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NORFOLK RESOURCE MOTHERS PROGRAM EVALUATION

by

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A Dissertation Submitted to the Faculty of
Old Dominion University in Partial
Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

URBAN SERVICES

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April, 1991

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ABSTRACT

NORFOLK RESOURCE MOTHERS PROGRAM EVALUATION

Margaret Moore Konefal
Old Dominion University, 1991
Director: Dr. Wolfgang Pindur

This study uses the post-test only design to assess the preliminary effects of a community-based policy initiative, the Norfolk State University Resource Mothers Program (RMP), on the gestational ages, birth weights, and survival rates of infants born to participating adolescent mothers.

The RMP uses experienced mothers or paraprofessionals similar in race and socio-economic status to the participating teenagers. These persons are trained to assist pregnant adolescents and teen parents with non-medical dimensions of pregnancy and child care. They recruit teens into the RMP, encouraging them to get early prenatal care. Resource Mothers provide teen mothers and their families with practical help as needed, and help increase community awareness of the infant mortality and adolescent pregnancy issues.

This analysis compares selected pregnancy outcomes of participants in the RMP with pregnancy outcomes of participants in an alternate program, young mothers who receive traditional prenatal care without structured psycho-social support, and with teens who receive no prenatal care. The pregnancy outcomes of the total study population and subgroups also are compared with national, state, regional

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and local low birth weight rates, and high infant mortality rates. Study findings show that premature deliveries and low birth weight babies are lower among adolescent mothers, at increased risk for delivering low weight infants, by using a specialized support program involving lay home-visitors who share socio-economic characteristics of the adolescents' families or a multi-disciplinary program with home visiting.

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DEDICATION

This work is dedicated to the Norfolk State University resource mothers. They taught us much...they continue to show us the way. These women inspire many persons through their commitment to families, and their service to our community. There is no way to adequately acknowledge their individual and collective influence. Personally, I owe much to them for their generosity, support, and prayers.

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I wish to acknowledge and thank **Dr. Wolfgang Pindur**, Committee Chair, and Committee Members, **Dr. Leonard Ruchelman**, and **Dr. Edward Markowski** for their help and guidance in completing this research endeavor.

Though many people contributed to the development and success of the Norfolk State University Resource Mothers Program--the focus of this evaluation research, special appreciation is offered to:

Mrs. Lynda J. Robb, member of the National Commission to Prevent Infant Mortality and former First Lady of Virginia. The lay home visitor program is a direct result of her vision and commitment to improving the health of mothers and children.

Rebecca Rice, Ed.D. and the administration of **Norfolk State University; Christa Brinker, Alice Novitsky**, and **John McClung** of the March of Dimes Foundation. They encouraged me to implement the program and share the NSU Resource Mother experience with others.

Dorthea Orem, M.S.N., R.N., Helen Yura, Ph.D., R.N., and **Dorothy L. Powell, Ed.D., R.N.** These nurse scholars and teachers strongly influence my professional endeavors.

Dr. and Mrs. James G. Moore, my parents, who encourage me and exemplify commitment to community service; and finally, my sons **Douglas, David, Jesse**, and **Benjamin** whose help at home and love sustained me through this effort.

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LIST OF ABBREVIATIONS

The abbreviations remain the same across all tables in this document:

RMP - (Norfolk State University) Resource Mothers Program.

NPP - Norfolk (Department of Health) Prenatal Program.

TRAD - Traditional clinic or private prenatal care.

NoPNC - No prenatal care.

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CHAPTER I

INTRODUCTION

Purpose Of The Study

This study determines if the rate of premature deliveries and low weight births can be reduced among adolescent mothers through a support program using lay home visitors who share socio-economic characteristics of the adolescents. The study population consists of adolescent mothers living in selected urban neighborhoods which have poor pregnancy outcomes and high rates of adolescent pregnancies.

The lay home visitor program is a suggested strategy to complement traditional medical means for improving the outcomes of pregnancy and, thereby, reduce the tragic rate of infant mortality in the United States. This research project evaluates the impact of the Norfolk State University Resource Mothers Program (RMP) on the pregnancy outcomes of program participants.

The program's immediate goal is to provide practical assistance and social support opportunities for pregnant teens using lay home visitors who are accessible, supportive, and effective in helping families. This

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evaluation determines the degree to which the central and collateral objectives of the RMP have been achieved:

1. Decrease infant mortality, low weight births and premature deliveries among infants of adolescent mothers by increasing the number of their prenatal visits; encouraging their efforts to maintain healthy behavior, such as eating patterns and lifestyle practices; improving their compliance with medical treatment plans; and

2. Increase the interval for subsequent pregnancies to more than one year after the birth of the first infants.

The Resource Mothers Program

In 1985, the Virginia Task Force on Infant Mortality and the Virginia Department of Health sponsored and funded a policy initiative to address the special needs of pregnant and parenting adolescents in three cities having high rates of infant mortality and adolescent pregnancy--Richmond, Newport News, and Norfolk. The request for proposals stated the program goals and identified key program components; however, implementation could vary to meet the needs of individual communities. The proposal submitted by the Department of Nursing, Norfolk State University, was selected for implementation in Norfolk, VA.

Definition of Terms

As concise operational definitions of terms add clarity and understanding to statements of purpose, method and analysis, the following perinatal terms are defined in

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observable and quantifiable terms pertinent to the context of this study.[1]

Resource Mother/Lay Home Visitor. A resource mother, as defined in this project, is a lay person with evident helping skills who is trained to assist adolescent parents and their families with non-medical dimensions of pregnancy and child care. The training includes: basic prenatal education and child health topics, community outreach, health and social service resources, parenting skills, and advocacy techniques. The resource mother is responsible for recruiting teens for the program and prenatal care, providing teens and their families with practical help as needed, and increasing community awareness of the infant mortality and adolescent pregnancy issues. She visits each young mother at least once a month to assess the teen's needs, monitor progress, and provide support, advice and/or assistance as indicated. Each resource mother's activities are directed toward the following goals:

- Healthy outcome of pregnancy;
- Enhanced parent-infant bond;
- Well-being for the mother and child during the infant's first year of life;
- Movement toward academic or vocational goals,and
- Planning for the spacing of subsequent pregnancies.

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[1]Faye Abdellah, Nursing Research--Better Patient Care Through Nursing Research (New York: The MacMillan Company,1966), p. 705.

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Perinatal Terms:

Apgar Score represents a 10-point scale determined by a rapid assessment of heart rate, respiratory effort, muscle tone, reflex irritability, and color. Scoring is typically done at 1, 5, and 15 minutes.

Birth outcome refers to characteristics of a live birth, such as: low birth weight, gestation at delivery, intrauterine growth category, and survival during the first year of life (infant mortality).[2]

First trimester refers to the first three months of pregnancy.

Gestational age refers to the number of weeks from conception.

Appropriate for gestational age infants are between 10% and 90% of expected growth for the gestational week of the pregnancy.

Large for gestational age infants are greater than 90% of expected weight for age.

Small for gestational age infants are smaller than 10% in weight for age.

Infant deaths refer to deaths of children younger than 1 year of age.

Infant mortality rate is the annual number of deaths of infants younger than 1 year, per 1,000 live births.

Low weight birth refers to infants born weighing under 2,500 grams, or 5 pounds 8 ounces or less.

Very Low birth weight refers to a birth weight of under 1,500 grams, or 3 lbs. 4 oz.

Perinatal, "around birth", refers to the duration of pregnancy and the infants first month of life.

Prenatal care refers to the risk assessment, education and health promotion, medical and psycho-social interventions, and follow-up provided a woman during pregnancy.

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[2]Susheela Singh, Jacqueline Forrest, and Aida Torres, Prenatal Care in the United States, Volume 1 (New York: The Alan Guttmacher Institute, 1989), p.xv.

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Adequate prenatal care describes the care that begins in the first trimester of pregnancy and consists of the adolescent completing 80 percent or more of the recommended number of medical visits, given completed gestation.[3]

Inadequate prenatal care describes the care that begins after the first trimester of pregnancy, or care begun in the first trimester but consisting of less than 50 percent of the recommended number of medical visits, given completed gestation.

Pre-term delivery or premature birth refers to delivery before 36 weeks gestation.

Trimester is one of the three consecutive three-month periods of a pregnancy.

Neonatal period refers to the first 28 days of life.

Significance Of The Problem

Health Policy Perspective

Lay home visitor programs addressing the related problems of high infant mortality, low weight births and adolescent pregnancy are enjoying national recognition, and new programs are contemplated in many areas of the country. But only the South Carolina project has been formally evaluated.[4] The issues of high infant mortality, low birth weight babies and adolescent pregnancy represent crises in America; a lack of commitment to our children and our

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[3]Singh, Forrest, and Torres, p. xv.

[4]"A Review of Resource Mothers Projects," Perinatal Information Consortium-III Chronicles: Newsletter of DHHS Region III, Volume II, Number 1 (February, 1989).

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future.[5] A review of these issues demonstrates that in Virginia as elsewhere, the problems associated with high infant mortality and low-weight babies affect teenage mothers more than older mothers. Furthermore, data supports the belief that these critical and expensive problems are preventable if pregnant teenagers obtain comprehensive prenatal care from the first trimester of pregnancy through delivery.[6] The RMP addresses these issues and is a helpful complement to traditional prenatal care.

Perinatal Issues

Infant Mortality. Pediatrician Marsden Wagner of the World Health Organization (WHO) said, "Infant mortality is not a health problem. Infant mortality is a social problem with health consequences."[7] "Infant mortality" is defined by the Virginia Center for Health Statistics as the number of deaths of children younger than 1 year of age.[8] The infant mortality rate refers to the number of infant deaths divided by the number of live births in that locality, multiplied by

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[5]Death Before Life: The Tragedy of Infant Mortality, Report of the National Commission to Prevent Infant Mortality, by Lawton Chiles, Chairman, (Washington, D.C., 1988), p. 10.

[6]Virginia's Efforts for the Children of Tomorrow, Report of the Virginia Task Force on Infant Mortality, by Lynda J. Robb, Chairperson, (Richmond, 1984).

[7]Death Before Life: The Tragedy of Infant Mortality, p. 10.

[8]Vital Statistics Annual Report, Center for Health Statistics, (Richmond: Virginia Department of Health, 1988).

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1,000.[9] In 1986, the United States had the unfavorable infant mortality rate of 10.4 deaths per 1,000 live births, while spending a higher portion (11 percent) of our gross national product on health care than any other country in the world.[10] Though the United States led most countries in economic indicators and technological capabilities during the last four years, it ranks behind 16 to 19 other countries in infant mortality.[11]

Infant mortality data often assess the general health and health priorities of a country. The Surgeon General's goal was to reach an infant mortality rate of 9 deaths/1,000 live births by 1990.[12] The year 2000 goal is to reduce the infant mortality rate to no more than 7/1,000 live births with 11/1,000 among blacks.[13] Virginia, with an infant mortality rate of 11.5 in 1985, and 10.4 in 1988, is one of the states that did not achieve the 1990 goal and is not expected to achieve the Year 2000 goal unless innovative

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[9]Singh, Forrest, and Torres, p.xv.

[10]Caring For Our Future: The Content of Prenatal Care, Report of the Public Health Service Expert Panel on the Content of Prenatal Care, Mortimer G. Rosen, M.D., Chairman, (Washington, D.C., 1989), p. v.

[11]Perinatal Monograph. Office of Technology Assessment, 1983.

[12]S. Singh, J. Forrest, A. Torres, p. v.

[13]Objectives to Improve Maternal and Infant Health by the Year 2000, Summary Table (Draft). Washington, D.C.: Office of the Surgeon General, 1990.

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strategies are successful.[14] The City of Norfolk, having an infant mortality rate of 17.8/1,000 live births 1985 and 15.5/1,000 in 1988, is identified as an area needing of special attention.[15]

Low Birth Weight Babies. The primary cause of infant mortality and neonatal illness in Virginia is the birth of infants weighing less than 5½ pounds. Low birth weight infants are 40 times more likely to die in the first 28 days of life and those who do survive are twice as likely to suffer physical and mental handicaps as infants born at term after 40 weeks gestational. Advances in medical technology and availability of neonatal intensive care significantly lowered infant mortality rates across the country, but the percentage of low birth weight babies in Virginia has changed little.

In Virginia, women who receive no prenatal care are almost four times more likely to deliver low birth weight infants than women who receive prenatal care. However, about 20 percent of all pregnant women in Virginia receive little of no prenatal care.[16] In 1987, only 80.9 percent of

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[14]For the Children of Tomorrow: Report of the Southern Regional Task Force on Infant Mortality, by Richard W. Riley, Chairman, (Washington, D.C., 1983).

[15]Virginia: 1986-Vital Statistics Annual Report, Center for Health Statistics, (Richmond: Virginia Department of Health, 1986); Virginia: 1988-Vital Statistics Annual Report, Center for Health Statistics, (Richmond: Virginia Department of Health, 1988).

[16]Singh, Forrest, Torres, Vol.1, p. 34.

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all infants and 68.2 percent of black infants were born to mothers who received prenatal care early (beginning in the first three months of pregnancy).[17] Many mothers in this category are teenagers who begin prenatal care shortly before delivery after a long period of denying pregnancy.

Reducing the occurrences of low birth weight babies will markedly reduce infant mortality. Though not all infants can be saved, many could be spared death or disability if their mothers receive comprehensive prenatal care from the first trimester of pregnancy through delivery. Comprehensive prenatal care is the single most significant factor in reducing low birth weight babies and enhancing a newborn's health.[18] Teenage mothers have a higher risk than older pregnant women of delivering low birth weight infants and having infants die in their first year. The factors frequently identified as contributing to low weight babies are the mothers': lack of financial resources, inadequate nutrition, lack of prenatal care, and substance abuse.[19] Additional factors which compromise the reproductive health of teenagers include: physical immaturity, nutritional needs for adolescent growth, delayed confirmation of the pregnancy, late entry into prenatal care, and lack of

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[17]News Release: Children's Defense Fund, (Washington, D.C., March 1990.

[18]Caring For Our Future, p. v.

[19]Caring For Our Future, p. 2.

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information and/or motivation to promote personal health and prevent illness.

Adolescent Pregnancy. The problem of children bearing children captured the attention of policy makers and citizens from all sectors of society. Teen pregnancies are occurring at an alarming rate in the United States. More than 1,000,000 teenage girls are becoming pregnant each year; approximately 600,000 of these girls carry their pregnancy to term.[20] The Children's Defense Fund also reports that of the one-half million adolescent pregnancies in 1983, 10,000 births were to youths younger than 15 years of age. As many as 23 percent of the infants born to teenage mothers have low birth weights, (i.e., less than 5½ pounds).[21] The adolescent pregnancy rate in Virginia declined from 92.1/1,000 females, ages 15 - 19 years in 1980, to 86.4/1,000 in 1984, but increased slightly in 1986.[22] The current rate is above the national average and represents personal, economic, and health consequences.[23] Infants born to unmarried adolescents face serious

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[20]Children Having Children, The Children's Defense Fund (Washington, D.C., 1984).

[21]R. A. Lawrence and T. A. Merritt, "Infants of Adolescent Mothers: Perinatal, Neonatal, and Infancy Outcome," ed. E. R. McAraney, Premature Adolescent Pregnancy and Parenthood (New York: Grune and Stratton, 1983), pp. 149-168.

[22]Virginia: 1986-Vital Statistics Annual Report, 1986).

[23]Virginia: 1985-Vital Statistics Annual Report, 1985; Virginia: 1986-Vital Statistics Annual Report, 1986.

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consequences because their pregnancies are usually unplanned. Family relationships may become strained, future plans interrupted, and hasty marriages arranged. Economic pressures result from the cost of pregnancy care and infant needs. Additionally, schooling is frequently interrupted and welfare dependency is not uncommon. Health care costs are not insignificant, especially if the infant is of low birth weight. Caring for one infant suffering handicapping conditions can run in excess of one-quarter million dollars per year.[24]

Health consequences for the young mothers-to-be are related to problems of access to care, poverty, and limited education. Often the adolescent mothers do not have the basic information about their bodies and lifestyle behaviors harmful to their developing fetuses. Many times they do not know the importance of prenatal care, nor do they know how to access health and social services for which they are eligible. The educational level and limited life experiences may restrict the teen mothers ability to understand and benefit fully from the health education she receives. Mothers younger than age 17 have higher rates of infant mortality than mothers in their 20's and 30's, though teens who receive good prenatal care do not have higher rates of poor pregnancy outcomes.

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[24]Death Before Life, p. 9.

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While the rate of adolescent pregnancy in Virginia declined slightly, the actual number of adolescents is increasing and a greater percentage of all infants are being born to adolescent mothers.[25] In 1985, there were 10,496 births to mothers under 20 years of age in Virginia.[26] This figure represents 12.2% of the total Virginia births.

Norfolk, the site of this evaluation project, exceeds state and national statistics in teen pregnancies. Of the 1,426 pregnancies reported among teenagers younger than 19 years in Norfolk during 1988, 899 (63%) of the teenagers gave birth, 474 (33%) ended the pregnancy through abortion and 53 (4%) had spontaneous miscarriages or natural fetal deaths.[27] The percentage of adolescent pregnancy is consistently high. In 1985, 17.2% of all births in Norfolk were to teenage mothers, 15.9% in 1986, 17.3% in 1987, and 16.2 in 1988.[28]

The problem of teen pregnancy is significant in that young parents and their offspring are at risk for physical, emotional and developmental problems. These teens and their babies are at risk for serious and costly complications

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[25]Tayloe Report, Charlottesville: University of Virginia Press, 1983.

[26]Virginia: 1986-Vital Statistics Annual Report, 1986; Virginia: 1988-Vital Statistics Annual Report, 1988.

[27]Virginia: 1986-Vital Statistics Annual Report, 1986; Virginia: 1988-Vital Statistics Annual Report, 1988.

[28]Virginia: 1986-Vital Statistics Annual Report, 1986; Virginia: 1988-Vital Statistics Annual Report, 1988.

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during pregnancy and the infants' first years of life. Premature delivery, low weight babies and child abuse occur more frequently to teen mothers. The consequences of teen pregnancies continue over time, and are reflected in poor school performance, poor employment potential, welfare dependency and poverty--likely prospects for both the children and their parents. Any successful solution must address the multiple causality and case-specific nature of the adolescent pregnancy problem.

Economic Consequences of Selected Perinatal Issues

Measuring the staggering societal costs of high infant mortality, low birth weight infants and adolescent pregnancy is a complex task. The following facts and figures, gathered by the Virginia Task Force on Infant Mortality, illustrate the magnitude of expenses associated with these problems:

- In 1984, more than $1.5 billion a year was expended for neonatal intensive care in the United States.[29]
- Hospital costs for low birth weight babies range from $20,000 to $200,000 per infant, compared with an estimated $475 for hospital care of an infant born without complications.
- In Virginia, 23% of total hospital costs for neonatal intensive care (about $12 million) are not reimbursed by any source.
- Special education and long-term care costs more than $122,000 per child for many low birth weight

[29]Virginia's Efforts for the Children of Tomorrow.

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infants who survive with physical and/or neurological handicaps.

- Teenage mothers create an expense each year of $16 billion nationally.[30]

The National Commission to Prevent Infant Mortality estimates the following cost savings realized as a result of the lay home visitor program with annual per client costs from $1,000 to $3,400 (depending on the type of personnel used and the intensity of service):

- Every low-weight birth averted saves between $14,000 and $30,000 in health care costs; the cost of preventive prenatal care can be as little as $400;[31]

- $400,000 or more spent on lifelong costs associated with a low birth weight infant would be saved;

- $5 would be saved for every $1 spent on smoking cessation programs that can be implemented with the support of a lay home visitor;

- More than $487 million would be saved on hospitalizations, rehabilitation, special education and foster care involved in child abuse and neglect cases.[32]

This review of perinatal issues supports the premise that an evaluation of the RMP holds significance for policy makers, program personnel and professionals working in the urban environment to determine whether the lay home visitor

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[30]Federal Report on Adolescent Pregnancy, Washington, D.C.: Government Printing Office, 1986).

[31]Death Before Life: The Tragedy of Infant Mortality, p. 9.

[32]"The Healthy Birth Act of 1989: Summary of Home Health Visitors Program," Press Conference Information Packet of April 5, 1989, National Commission to Prevent Infant Mortality, Washington, D.C.

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strategy effectively complements traditional perinatal care. The program format, the research design, and the information generated through the Norfolk Resource Mothers Evaluation study is a model in other situations where the community-based, lay home visitor concept is applicable. On a program-level, the evaluation provides descriptive information and comparative data for improving the program, facilitating expansion, and supporting applications for future funding.

The Urban Nature Of The Problem

High infant mortality and low weight births are related problems disproportionately affecting infants born to women with multiple risk factors associated with living below the poverty level. Moreover, poverty and barriers to health and social services strongly explain the statistics which show Black infants face twice the risk of dying in their first years of life as compared to White infants.

Urban areas typically have large numbers of families living below the poverty level and a high proportion of minority residents. The interaction of adverse socio-economic conditions jeopardizes maternal and fetal health, and interferes with a woman's access to perinatal health care and pregnancy education. The nation's highest rates of infant mortality are in our largest cities and the South, where poverty is greatest. In 1983, ten of the 11 states in America with the highest levels of infant mortality were in

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the South.[33] In 1985, four-fifths of our largest cities had infant mortality rates greater than the national rate.[34] Southern cities served by major medical centers and medically under served rural areas of the South demonstrate equally high rates of infant mortality. The unfavorable statistics exist even in areas close to advanced health care technology and sophisticated health manpower resources. This suggests that solutions to reduce infant mortality are more likely to be found through public policy than medical research. Further, policies developed to reduce infant mortality must be responsive to the demographics and environmental characteristics of each locality where the problem exists.

Summary of Chapters

Chapter I introduces the purpose of the study, describes an overview of the RMP, presents definitions of terms, and explores the significance of the initiative from health policy and perinatal health perspectives. The economic consequences and the urban nature of the problem also are described. Chapter II reviews literature relevant to the theoretical framework of the RMP, and literature related to selected perinatal issues the program addresses. The research design is in Chapter III where the evaluation

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[33]For the Children of Tomorrow.

[34]Death Before Life: The Tragedy of Infant Mortality, p. 8.

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objectives are defined and specific research questions and hypotheses are put forward. The research design, study limitations, the population and sub-groups, data collection procedures, data analysis techniques are specified. The statistical analysis is presented in Chapter IV. Sub-groups and key variables are described, and findings related to the research questions are presented. Chapter V presents a summary of the findings relative to the research questions and evaluation objectives. Conclusions of the study and recommendations for service delivery, program development, and further research are described.

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CHAPTER II

LITERATURE REVIEW

Introduction

The Resource Mothers Program (RMP) is an innovative strategy to reduce the infant mortality rate among women considered at high risk for poor pregnancy outcomes and/or the death of their infants during the children's first year of life. A literature review supports the assumption that teenagers living below the poverty level in urban areas, the target population for this study, experience risk factors and face specific problems which can be eased with help from a lay home visitor. This chapter describes literature concerning infant mortality as related to socio-economic factors and maternal age, social support, social learning in health promotion, complementary aspects of traditional medical perinatal programs, the non-medical interventions of lay home visitors, and the evaluation studies of perinatal lay home visitor programs.

Socio-economic Factors

High infant mortality rates are specifically associated with poverty and other barriers to essential medical and social services. Miller and associates report a direct

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connection between economics and child health in a case study on the economic crisis and children in the United States.[35] They note that measures of health status and health risks for children show steady improvement throughout the 1970's, even during the 1974-1975 recession, when public responsibility for financing essential services and support were consistent. Further, the trend analysis reveals that since 1981 the health status and risks for children are adversely affected by a combination of circumstances including serious economic recession, increased number of households with children are at the poverty level, and diminished health benefits and social support services.

Infants born to black mothers face twice the risk of dying in their first year of life as infants of white mothers.[36] Boone explored the social and cultural factors in low birth weight among disadvantaged blacks.[37] Findings reported from that research project indicate that prenatal care, alcoholism, migrant status, hypertension history, and previous poor pregnancy outcomes denote women who deliver very low birth weight infants, as do family violence, weak

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[35]C. A. Miller, et al., "The World Economic Crisis and the Children: United States Case Study," International Journal of Health Services 15 (1):95-134.

[36]"Death Before Life," p.13.

[37]M. S. Boone, "Social and Cultural Factors in the Etiology of Low Birthweight Among Disadvantaged Blacks," Social Science Medicine 20(10) 1984: 1001-1011.

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social support systems, poor social and psychological adjustment, and ineffective contraception. Through interviews with eight women who suffered infant deaths within one year after delivery, Boone noted expressions of bitterness and resentment toward men in their lives, reliance on "girlfriends" for help, with mothers being inconsistent in their support. Powerlessness, hopelessness and lack of meaningful lives were dominant themes. The author recommends, among other things, programs to combat the social alienation and psychological distress of inner city women during pregnancy.

Surveys conducted by Ortiz and Bessoff also describe the lost optimism and lowered expectations of adolescent welfare mothers.[38] Adolescent parents have personal and external barriers as they face their situation and their responsibilities. Social barriers for adolescent parents as identified by Spivak and Weitzman in the Journal of the American Medical Association are associated with adolescent development, family matters, agency structure, and administrative policy.[39]

Economic disadvantage is interwoven with the psychological impoverishment often experienced by young

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[38]Elizabeth Ortiz and Betty Bessoff, "Adolescent Welfare Mothers: Lost Optimism and Lowered Expectations," Social Casework: The Journal of Contemporary Social Work (September 1987) p. 400.

[39]Howard Spivak and Michael Weitzman, "Social Barriers Faced by Adolescent Parents and Their Children," The Journal of the American Medical Association (September 18, 1987) p. 1500-1595.

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mothers, each compounding the effects of the other.[40] Sawhill notes that adolescent parenthood is often a precipitating force placing a family in, or preventing a family from moving out of, America's underclass.[41] These concerns are echoed throughout articles in professional journals and the lay press.[42] Adolescent pregnancy is truly everybody's problem, as described by Marian Wright Edelman.[43] This fact is underscored by the national costs of teenage parenthood, which exceed $16 billion per year.[44]

Teen mothers are often financially dependent on parents or are not skilled or experienced enough to support their young family. Therefore, many are forced to go on welfare. A repeat pregnancy compounds the socio-economic problems. Dropping out of school contributes to additional problems:

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[40]"Doomed to Fail in the Land of Opportunity: America's Underclass," The Economist (March 15, 1988) p. 29-32.

[41]Isabel V. Sawhill, "What About America's Underclass?" Challenge, May-June, p. 27, 1988.

[42]John S. Woderski and Lettie Lockhard, "Teenage Parents On Welfare," Society March-April, 1987, p. 46;
Jerry Adler, "A Teen Pregnancy Epidemic," Newsweek (March 25, 1985) p. 90;
Faith Mitchell and Claire Brindis, "Adolescent Pregnancy: The Responsibilities of Policymakers," Health Services Research (August, 1987) p. 399;
Vanessa J. Gellmen, "Mother to Mother," Essence Magazine (May, 1988) p. 134;
"Speaking Out," Essence Magazine (March, 1989), p. 136;
"Mothers Raising Mothers," U.S. News and World Report (March 17, 1988) p. 24.

[43]Marian Wright Edelman, "Adolescent Pregnancy: Everybody's Problem," Journal of State Government (Nov-Dec, 1986) p. 156.

[44]Death Before Life, p. 13.

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inadequate education and vocational skills, and alienation and isolation from her teenage peers during the stage of identity formation. The adolescent social system is essential to developing identity and belonging.[45]

Maternal Age

The lifestyle, social conditions and internal psycho-biological forces of adolescents strongly influence the health and well being of teenagers. During this stage of adolescence the maturational goals of becoming responsible persons in control of their lives and possessing a knowledge of who they are in relation to the world are accomplished through specific developmental tasks.[46] Developmentally, the adolescents strive for independence. They are egocentric, believe themselves to be invincible, and often have unrealistic views concerning their potentials.

The time period is accompanied by conflicting feelings, attitudes, and social activities related to the teens' developing sexuality. Experimentation, acting-out, the need to conform, impulsiveness, and the search for sexual identity are not uncommon at this time.[47] One consequence of such behavior is pregnancy, intended or unintended

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[45]D. D. Youngs and J.R. Niebyl, "Adolescent Pregnancy and Abortion," Medical Clinics of North America 59 (1979), p. 1419-1428.

[46]Lucille Whaley and Donna Wong, Nursing Care of Infants and Children, St. Louis: The C.V. Mosby Company (1979), p. 686.

[47]Whaley and Wong, p. 736.

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pregnancy, suggesting an adaptive response to resolve conflicts in a maladaptive situation.

When personal characteristics associated with the adolescent developmental stage are combined with the social conditions, life circumstances and medical risks, they create a grave potential for poor pregnancy outcomes for the young mothers and poorer cognitive and socio-emotional outcomes for their infants.[48] Girls between the ages of 10 to 13, who have not completed their adolescent growth, have specific increased health risks and may not achieve their full adult stature as the nutritional requirements of pregnancy and their growth are so great that complete nutritional requirements are not met. Nutritional status of the mother correlates strongly with pregnancy outcome. Labor may be prolonged for the young teens and they have a high rate of Cesarean section. There is a higher incidence of prematurity and low birth weight babies and complications such as pregnancy-induced hypertension are not uncommon.[49]

Adolescent mothers and their infants experience multiple risk factors which contribute to increased medical risks and diminished opportunities for the young mothers and their children. Studies of the interaction between

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[48]H. Sandler, P. Vietze, and S. O'Connor, "Obstetric and Neonatal Outcomes Following Intervention with Pregnant Teenagers," in (Eds.) K. Scott, T. Field, and E. Robertson, Teenage Parents and Their Offspring, New York: Grune and Stratton, 1981.

[49]Whaley and Wong, p. 737.

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adolescent mothers and their infants indicated very young mothers report less realistic developmental expectations and less desirable child-rearing attitudes than older mothers with similar socio-economic backgrounds. Adolescent mothers demonstrate less reciprocity and responsiveness, and they tend to talk less to their infants.[50] Furstenberg and Simkins reported that adolescent mothers tend to have lower educational attainment, greater marital instability, and greater dependence on welfare agencies.[51] Osofsky and Osofsky note the increased familial pressure, higher levels of stress, and lower social support in the social climate of adolescent parents.[52]

Social Support And Social Learning

Stresses associated with living in poverty and/or isolation are considered contributing factors in poor pregnancy outcomes and adversity experienced by infants.

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[50]T. M. Field, S. M. Widmayer, S. Stringer, and E. Ignatoff, "Teenage Lower-class, Black Mothers and Their Infants: An Intervention and Developmental Follow-up," Child Development, 51: 426-436, 1980;
M. W. Roosa, H. E. Fitzgerald, and N. A. Carlson, "Teenage and Older Mothers and Their Infants: A Descriptive Comparison," Adolescence, 65:1-16, 1982.

[51]F. F. Furstenberg, Jr., Unplanned Parenthood: The Social Consequences of Teenage Childbearing, New York: Free Press, 1976;
L. Simkins, "Consequences of Teenage Pregnancy and Motherhood," Adolescence, 19: 39-54, 1984.

[52]H. Osofsky and J. Osofsky, "Adolescent Adaptation to Pregnancy and New Parenthood," in Premature Adolescent Pregnancy and Parenthood, Eds. E. McAnarney, New York: Grune & Stratton, 1983.

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Social support--perceived availability of nurturance, practical assistance, and information--buffers stress, positively affecting health and social competence. Social support is protective because it moderates the effects of stress and facilitates coping.[53] A key part of the stress-buffering hypothesis is the link between effects of social support and the recipient's perception of support, and congruence of offered help with recipient needs.[54] Therefore, whether social support is helpful or detrimental is influenced by the recipient's perception, personal characteristics, and situational constraints. The clinical uses and policy implications of social support (considering the negative and positive) for pregnant adolescents is strongly documented in the literature.[55]

The expectation that social support benefits maternal behavior is derived from the social support and social

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[53]S. Cobb, "Social Support as a Moderator of Life Stress," Psychosomatic Medicine, 38 (1976): 300-314;
S. Cohen and T. A. Wills, "Stress, Social Support and the Buffering Hypothesis," Psychological Bulletin, 98 (1985): 310-357.

[54]E. Wethington and R. C. Kessler, "Perceived Support, Received Support and Adjustment to Stressful Life Events," Journal of Health and Social Behavior, 27 (1): 78-89, 1986;
G. A. Hilbert, "Spouse Support and Myocardial Infarction Patient Compliance," Nursing Research, 34(1985), 217-220.

[55]D. Brooten and C. H. Jordan, "Caffeine and Pregnancy: A Research Review and Recommendations for Clinical Practice," Journal of Obstetric, Gynecologic, and Neonatal Nursing, 12(1983), 190-195;
A. Brownell and S. A. Shumaker, "Where Do We Go From Here? The Policy Implications of Social Support," Journal of Social Issues, 41 (1): 111-121, 1985.

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network theories of sociologists and community psychologists.[56] Social support is perceived support that is multi-dimensional, having aspects of instrumental assistance, information, and nurturance. Michelene Malson defines social support as a set of personal contacts through which the individual maintains his/her social identity and receives emotional support, material aid and services, information, and new social contacts.[57] This author encourages the relationship between social support systems among black families, policy analysis, and program design incorporating multi-dimensional support featuring aspects of instrumental assistance, information and nurturance.[58] Social support in the theoretical framework refers to the ties and resources provided to persons through their interactions with others.[59] Social support theory assumes that interventions are based on an assessment of needs and weaknesses, and assistance is built on the individual's

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[56]C. F. Z. Boukydis, Research on Support for Parents and Infants in the Postnatal Period, (Norwood, N.J.: Ablex Publishing Corporation) 1988, p. 3.

[57]Michelene Malson, "The Social Support Systems of Black Families," Marriage and Family Review, Winter-Vol. 5(4) (1982), pp. 37-57.

[58]Malson, p.38.

[59]S. A. Shumaker and A. Brownell, "Toward a Theory of Social Support: Closing the Conceptual Gaps," Journal of Social Issues 40(4), 1984, pp. 11-36;
M. Shinn, S. Lehmann and N. Wong, "Social Interaction and Social Support," Journal of Social Issues, 40(4), 1984, pp. 55-76.

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strengths.[60] A second assumption states that interventions should be personally and socially focused, such that the person's competence is enhanced through education and information, as well as emotional and instrumental support.[61] Consequently, interventions by the indigenous helper must be flexible, providing different types of resources, in different amounts, at different times during the mother's pregnancy and parenting.[62] Interventions also vary with the mother's and the child's levels of development and degrees of personal resources.

The effects of perceived and received support on health behavior during pregnancy is a major premise underlying lay home visitor interventions and is supported by research. Norbeck identified pregnancy as a maturational crisis during which additional support is necessary for successful crisis resolution; a time when spontaneous support is elicited from strangers as well as family and friends.[63] Oakley, Brown

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[60]L.P. Wandersman, "An Analysis of the Effectiveness of Parent-Infant Support Groups," Journal of Primary Prevention 3(2), 1982, pp. 99-115.

[61]J. Garbarino, "Social Support Networks: Rx for the Helping Professionals," eds. J. K. Whittaker and J. Garbarino, Social Support Networks: Informal Helping in the Human Services (Hawthorn: Aldine, 1983), pp. 2-28.

[62]D. G. Unger and L. P. Wandersman, "Social Support and Adolescent Mothers: Action Research Contributions to Theory and Application," Journal of Social Issues 41(1), 1985, pp. 29-45.

[63]J. S. Norbeck, "Social Support: A Model for Clinical Research and Application," Advances in Nursing Science, 3(4):1981, 43-59; J. S. Norbeck and V. P. Tilden, "Life Stress, Social Support and Emotional Disequilibrium in Complications of Pregnancy: A

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strangers as well as family and friends.[63] Oakley, Brown and Cronenwett explored the stress-mitigating effects of social support on low birth weight of babies, parental health, and satisfaction with the parent role.[64] Noting that mechanisms other than mediating or buffering stress may operate through social support, Aaronson explored the relationship between general and specific perceived support and specific received support, and the impact of all three support type on pregnant women's behavior related to alcohol, caffeine, and cigarettes.[65] Her findings, based on a relatively homogeneous middle-class sample, suggest that both perceived support and received support contribute toward better overall health and warrant attention. Further evidence suggests that strengthening the social network of

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[63]J. S. Norbeck, "Social Support: A Model for Clinical Research and Application," Advances in Nursing Science, 3(4):1981, 43-59;
J. S. Norbeck and V. P. Tilden, "Life Stress, Social Support and Emotional Disequilibrium in Complications of Pregnancy: A Prospective, Multi-variate Study," Journal of Health and Social Behavior, 24: 1983, 30-14.

[64]A. Oakley, "Social Support in Pregnancy: The 'Soft' Way to Increase Birthweight?" Social Science and Medicine, 21:1985, 1259-1268;
M. A. Brown, " Social Support During Pregnancy: A Unidimensional or Multidimensional Construct?" Nursing Research 35 (1986), 4-9;
L. R. Cronenwett, "Network Structure, Social Support and Psychological Outcomes of Pregnancy," Nursing Research 34: (1986) 93-99.

[65]Lauren S. Aaronson, "Perceived and Received Support: Effects on Health Behavior During Pregnancy," Nursing Research, 38: 1989, 4-9.

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pregnant women, as well as promoting healthful behaviors among them and their families enhances pregnancy outcomes.

Health Promotion

Health is a general, positive state of integrity and soundness, not just the absence of disease.[66] According to nurse theorist Dorothea Orem, self-care is the individual's consciously chosen behavior to maintain health and well-being, while self-care agency is the capacity for self-care.[67] Denyes tested the relationship of Orem's concepts of self-care and self-care agency and found them to be significant predictors of health in an aggregate sample of 369 adolescents. This work suggests that health is promoted as the individuals' ability to engage in self-care (self-care agency) is strengthened and as persons are encouraged to maintain life, health, and well-being (self-care).[68]

Weitzel tested the health promotion model of Pender, which consists of three major components:

a. Cognitive/perceptual or psychological elements that determine participation in health-promoting behaviors (importance of health; definition of health; perception of health, self-

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[66]Mary Denyes, "Orem's Model Used for Health Promotion: Directions From Research," Advances in Nursing Science, 11(1):13-21, 1988.

[67]Lucie Kelly, The Nursing Experience: Trends, Challenges, and Transitions, (New York: MacMillan Publishing Company), 1987, p. 149.

[68]Dorthea Orem, Nursing: Concepts of Practice, New York: McGraw-Hill, 1985.

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efficacy, and health status; and benefits of and barriers to health-promoting behaviors);

b. Modifying circumstances that influence the cognitive-perceptual factors and, thus, indirectly influence health-promoting behaviors; and

c. The likelihood of action directed toward enhancing or maintaining well-being.[69]

In Weitzel's study the most powerful predictors of the subjects' health-promoting behaviors were perceptions of health status and self-efficacy. Weitzel reports these results are corroborated by the work of Pender (187); Waller, et al. (1988); Dishman, et al. (1988); Bandura, et al. (1977); Condiotte and Lichtenstein (1981); DiClemente (1986); and Manning and Wright (1988). The powerlessness described by Boone, combined with the findings of Weitzel, confirm the assumption that adolescent mothers, specifically underclass suburban women, could be at risk for non-compliance with medical recommendations or persisting with non-health promoting behaviors.

The goal of prenatal care and parenting education is to promote healthy outcomes of pregnancy and enhance the physical and developmental well-being of children. An important task of the resource mother is to identify and reinforce the strengths of the teen mother and her family which support health promoting behaviors. Additionally, the

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[69]Marlene Weitzel, "A Test of the Health Promotion Model with Blue Collar Workers," Nursing Research (March/April, 1989) 38:2, p. 99.

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resource mother identifies barriers to health, and intervenes or refers the family for medical care or social services to prevent or reduce risks to health and development.

Adolescence has been described as the first barrier to health promotion.[70] Paraphrasing the paradox described by Kulbok, while adolescence is the peak period for health, as measured by traditional indicators of mortality and morbidity, the initiation of harmful behaviors by the pregnant adolescent may lead to premature disease or death for herself or her infant.[71] Also, non-compliance with medically recommended actions presents direct or indirect health risks.[72] Adolescents do not relate risk behaviors to potential negative outcomes. Behaviors such as smoking, substandard nutritional habits, absences from school, and premature sexual activity often occur without regard for the consequences.

Health education is one method of assisting the young mothers to maintain healthful practices and refrain from

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[70]T. J. Coates, A. C. Peterson, and C. Perry, "Crossing the Barriers," in T. J. Coats, et al (eds), Promoting Adolescent Health: A Dialogue on Research and Practice, New York: Academic Press, 1982.

[71]Pamela Porter Kulbok, Felton J. Earls, Andrew C. Montgomery, "Life Style and Patterns of Health and Social Behavior in High-risk Adolescents," Advances in Nursing Science 11 (1):22-35, 1988.

[72]F. Langlie, "Interrelationships Among Preventive Health Behaviors: A Test of Competing Hypotheses," Public Health Nursing 19: 216-225, 1979.

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harmful behaviors.[73] For new mothers, particular emphasis is needed with regard to self-care and infant care. According to Pahlka and Humenick, such education can effectively help women assume control of, participate in, and derive much satisfaction from the childbearing experience.[74]

Degenhart-Leskosky described the health education needs of adolescent and non-adolescent mothers, affirming the importance of planning individualized educational programs to meet the learning needs that the client perceives to be important.[75] In this study, adolescent mothers reported a greater perceived need for information on infant medical care than did non-adolescent mothers, and they tended to need more information on psycho-social matters and infant physical care.[76] Other investigators describe the self-oriented needs of pregnant adolescents and their need for information concerning the labor and delivery

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[73]Kulbok, p. 33.

[74]Barbara Pahlka and Phyllis Leppart, "The Premarital Examination," Medical Aspects of Human Sexuality (Vol. 19:2, 1985), pp. 182-195;
Sharon Humenick and Larry Bugen, "Instrumentality, Expressiveness, and Gender Effects Upon Parent-Infant Interaction," Basic and Applied Social Psychology (Vol 4:3, 1983), pp. 239-251.

[75]Suzanne Degenhart-Leskosky, "Health Education Needs of Adolescent and Non-adolescent Mothers," Journal of Obstetric, Gynecologic, and Neonatal Nurses (May/June, 1989), p. 238.

[76]Degenhart-Leskoskky, p. 244.

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process.[77]

Health promotion is more than health education. It is a developing field about which much is written, though there is no unifying theoretical base. Peterson and Stunkard suggest that personal control can be the cornerstone for a theory of health promotion. Personal control and the associated concept of self-efficacy are strongly related to persistence with health-promoting behaviors; lack of health-promoting behaviors is the greatest problem reflected in health care.[78] From this perspective, interventions to enhance personal control and self-efficacy help promote and sustain behaviors conducive to health.

Such change in behavior is enhanced through improved self-efficacy. Concepts in social learning theory suggest that locus of control, the degree to which a person perceives that rewards are a function of his or her own actions, is a major factor in human behavior.[79] Viewed from

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[77]L. Porterfield and B. Harris, "Information Needs of the Pregnant Adolescent," Home Health Care Nurse 3: 40-42, 1985;
D. Z. Copeland, "Unwed Adolescent Primigravidas Identify Subject Matter for Prenatal Classes," Journal of Obstetric, Gynecological, and Neonatal Nursing 8: 248-253, 1979;
T. T. Giblin, et al, "Pregnant Adolescents' Health-Information Needs," Journal of Adolescent Health Care 7: 168-72, 1986.

[78]H. B. Jacobs, "Self-Efficacy Theory and Control Theory: Toward a Comprehensive Understanding of Persistence," (Doctoral Dissertation, University of Alabama, 1984). Dissertation Abstracts International, 45, 2311B.

[79]Polit and Hungler. Nursing Research: Principles and Methods, (Philadelphia: J.B. Lippincott Company, 1978) p. 225.

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a social learning perspective, the process of interaction and reinforcement greatly influences the resource mothers' success in promoting behaviors which lead to healthy mothers and babies.[80]

Social learning theory is applied most frequently to substance abuse prevention among adolescents.[81] A social learning model was tested by Akers, et al. (1979), for its ability to explain why adolescents drive under the influence of alcohol and ride with drinking drivers. Using this model, DiBlasio demonstrated that if adolescent drinking and driving are to be prevented, careful attention should be paid to ways this behavior is learned and maintained.[82] The theory behind this study is directly applicable to the sexually active adolescent. Miller and Fox at Utah State University conclude a study of adolescent heterosexual behavior with the proposition that advances will be made in

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[80]Polit and Hungler, p. 225.

[81]Joan Rittenhouse and Judith Miller, "Social Learning and Teenage Drug Use: An Analysis of Family Dyads," Health Psychology 3 (4) 329-345, 1984;
Ronald Simons, et al., "A Multi-stage Social Learning Model of the Influences of Family and Peers Upon Adolescent Substance Abuse," Journal of Drug Issues 18 (3), pp. 293-315, 1988;
Ronald Akers, et al., "Adolescent Marijuana Use: A Test of Three Theories of Deviant Behavior," Deviant Behavior 6 (4), pp. 323-346, 1985.

[82]Frederick DiBlasio, "Drinking Adolescents on the Roads," Journal of Youth and Adolescents 15 (2), pp. 173-188, 1988.

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this area at the interface of two paradigms, biological and social learning/socialization.[83]

Motivation by the adolescent parent and resource mother provides energy and drive to affect behavior changes. The theoretical concepts from personal control/self-efficacy, health promotion/health education, and social learning/social support combine with motivation to expand upon a concept of empowerment--individually and collectively level.

The work of Abraham Maslow and those who follow him in studying motivation provide valuable insight. A basic or vital human need must be satisfied if the person or group is to survive.[84] The family, the neighborhood, community, state, nation, and family of nations were developed to ensure these human needs are met, and humanity and its diversity are perpetuated.[85]

An assumption of Maslow's work in human motivation is people are motivated to gratify basic or vital needs. Additionally, the actualization of a person's real potential is conditioned upon having basic-need satisfying parents and

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[83]Brent Miller and Greer Fox, "Theories of Adolescent Heterosexual Behavior," Journal of Adolescent Research 2 (3), pp. 269-282, 1987.

[84]A. Montague, On Being Human (New York: Hawthorn, 1966), p. 49.

[85]H. Yura and M. Walsh, The Nursing Process: Assessing, Planning, Implementing, evaluating, Fourth Edition (Norwalk: Appleton-Century-Crofts, 1983), p. 79.

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other persons during one's formative years.[86] These interpersonal relationships are among the "good pre-conditions" necessary to permit the individual to become strong enough to take over his own fate--to form an identity and become independent. Maslow further asserts that throughout one's life, human relationships are powerful sources of protection, love, and respect. These elements strengthen a person's psychological health and personality development.[87] Maslow also states that throughout history, people have sought advice and help from others whom they respect and love.[88]

The RMP formalized this human need for good human relationships in urban neighborhoods where socio-economic and interpersonal stresses often limit the availability of indigenous helpers. Primary tools used by the resource mothers are described by Maslow as "psychotherapeutic tools" so necessary in all good human relationships.[89] These tools are: reassurance, support, practical assistance, and basic need gratification.

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[86]Abraham Maslow, Motivation and Personality, Second Edition (New York: Harper & Row, 1970), p. xxv.

[87]Maslow, p. 254.

[88]Maslow, p. 254.

[89]Maslow, p. 254.

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Traditional Perinatal Health Care

Early, consistent and comprehensive prenatal care from the first trimester of pregnancy through delivery is instrumental for enhancing positive pregnancy outcomes because problems threatening the mother and/or fetus can be identified and prevented or the effects reduced. Nutritional status can be monitored and assistance provided, and health education and social services can be obtained according to individual need.[90]

Many services and programs are available to teen parents today, however, a gap exists in linking the young family with the programs. Further gaps are evident in the feeling of empowerment, individual or collective, among our most at-risk families. Empowered through their own increased knowledge and enhanced self-efficacy, trained resource mothers bridge these gaps. They share this empowerment with the young mothers, extending the circle of ability to several generations.

In addition to connecting at-risk adolescent parents with medical and social services, community-based programs are often used to strengthen relationships between teen parents and their developmentally delayed or environmentally at-risk infants. Barriers and challenges have been identified which interfere with staff effectiveness and

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[90]H. C. Heins, et al., "Social Support in Improving Perinatal Outcome: The Resource Mothers Program," Obstetrics and Gynecology, 70 (2), pp. 263-266, 1987.

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program efficiency. Musick and associates point to the necessity for parents to participate in the relationship, and not focus only on using skills taught in a parenting class.[91] This relationship is considered essential; improved parenting skill alone is not sufficient to improve functioning of disadvantaged children.

A home visitor project of the Menninger Foundation, Topeka, KA, was reported at the Third Congress of the World Association for Infant Psychiatry and Allied Disciplines in Stockholm, Sweden in 1986. In a follow-up article Lucile Ware and associates describe the beneficial effects of a home visitor intervention program for adolescents and their infants in reducing the inherent risks of adolescent parenthood.[92] Key issues described for creating and maintaining such a program are:

- Issues and problems arising with the integration of a home visitor intervention component into an ongoing health department program;
- Recruitment and training of lay home visitors;
- Supervision and quality control faced by the mental health consultants;
- Coping with potential stresses and dangers faced by the home visitors, and,

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[91]Judith Musick and associates, "A Chain of Enablement: Using Community-based Programs to Strengthen Relationships Between Teen Parents and Their Infants," Zero to Three 8 (2), pp. 1-6, 1987.

[92]Lucile M. Ware, Joy D. Osofsky, Alice Eberhart-Wright and Maria Luisa Leichtman, "Challenges of Home Visitor Interventions with Adolescent Mothers and Their Infants," Infant Mental Health Journal, 8 (4):418-428, 1987.

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- Difficulties of forming trusting relationships with the clients and meeting conflicting demands.[93]

Evaluation Studies: Lay Home Visitor Programs

While lay home visitor programs are being considered as a national strategy for decreasing infant mortality, few evaluation studies have been conducted to assess their effectiveness. Two studies have been reported. Buescher, et al., assessed the North Carolina project where there were 21,000 annual births.[94] Records were matched to birth certificates to compare characteristics of women in and out of the program. Logistic regression analysis showed women not in the project were 1.32 times as likely as project participants to give birth to children under 2500 grams (95% with a confidence interval of 1.14, 1.54). The relative risk for non-participants to give birth to children under 2500 grams was also higher.

Henry Heins reports about the Resource Mothers Program in South Carolina. Matched pairs of (case/control) rural teenage pregnant for the first time were studied. There were significantly more patients with adequate prenatal care in the program group (p = less than .000001) The frequency of low birth weight infants was significantly less (p =

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[93]Lucile Ware, et al., pp. 418-428.

[94]P. A. Buescher, et al., "A Comparison of Women In and Out of a Prematurity Prevention Project in a North Carolina Perinatal Care Region," American Journal of Public Health, March, 1988, 78(3), 264-267.

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.006), as was the small-for-gestational-age group (p = .002). Blackwood reports significant reductions of intrauterine growth retardation among participants in a comprehensive prenatal program.[95]

Outcomes of a home-based, early intervention program with infants of adolescent mothers were reported by Thompson, et al.[96] Monthly home visits by a nurse clinician to help young parents establish a positive parent-child relationship and interact with their infants in a developmentally helpful manner prevented a decline from normal levels of functioning that is common in economically disadvantaged children, but no lasting increases were noted on the developmental test scores.

The Government Accounting Office released its study of perinatal home-visiting programs supporting the concept as the Resource Mother Program evaluation study was in progress. After reviewing programs in the United States and abroad, they state home visiting can help families become healthier, more productive, and self-sufficient, given certain conditions and present the following conclusions:

- Home visiting can be an effective strategy for reaching at-risk families typically targeted by early intervention programs;

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[95]Blackwood, p.97.

[96]R. J. Thompson, M. W. Cappleman, and K. A. Zeitschel, "Neonatal Behavior of Infants of Adolescent Mothers," Dev. Med. Child Neurol. 21, 474, 1979.

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- Successful programs using home visiting share common characteristics that strengthen program design and implementation, namely,
  - Precise objectives to sustain program focus, determine appropriate services for the target population, and form program outcome measures,
  - A defined sequenced plan of home-delivered services,
  - Pre- and in-service training, for home visitors as well as close supervision from professionals,
  - Secure funding and links with other community services,
- The federal government's commitment to home visiting can be better coordinated and focused.[97]

Theoretical Framework

The theoretical framework for the program evaluation involves a matrix containing concepts from human need theory, motivation theory, social learning theory, social support theory, and a clinical construct.

Conceptual Model. Drawing upon the assumptions and principles of selected theories, the conceptual model was developed to describe the program logic of the RMP evaluation. This conceptual model is described below and depicted in Figure 1.

The pregnant/parenting adolescent will achieve program goals by responding to the assistance and reinforcement from a resource mother because:

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[97]Home Visiting: A Promising Early Intervention Strategy for at-Risk Families, Government Accounting Office Report/HRD-90-83 (Washington, D.C.: Government Printing Office, 1990), p. 59-61.

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1. Adding a resource mother to the social network of a young mother will facilitate identification of her unmet basic needs;
2. Assessment of the mother's individual needs will suggest types of practical assistance required, create opportunities to enhance her self-esteem and identify rewards to effectively reinforce positive health behaviors;
3. Such need fulfillment and reinforcement will increase the likelihood that the young mother will consistently attend a clinic, eat an appropriate diet, comply with the medical recommendations and modify harmful lifestyle practices;
4. Incidence of low birth weight babies and high infant mortality can be significantly reduced as these young mothers obtain comprehensive prenatal care from the first trimester through delivery and comply with medical and lifestyle recommendations, thus maintaining their health and promoting the health of their babies.

Chapter Summary

In summary, research reported in literature of the social sciences and clinical medicine confirms the association of improved pregnancy outcomes and parenting behaviors with early prenatal care and non-medical, supportive interventions of home-visiting programs. Thus,

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the theoretical framework developed in this chapter involves a matrix containing concepts from human need theory, motivation theory, social learning theory, social support theory, and a clinical construct. As a theory-based evaluation, the study demonstrates the presence of elements specified as necessary for goal attainment. Once this has been accomplished, an effective step has been taken toward determining goal achievement.[98] The program's design and evaluation methodology evolve from the theoretical framework.

Chapter III presents the evaluation objectives and specific research questions and hypotheses. The research design, study limitations, the population and sub-groups, data collection procedures, and data analysis techniques are specified.

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[98]C. T. Fitz-Gibbon and L. L. Morris, How to Design a Program Evaluation (Beverly Hills: Sage Publications, 1978), p. 22.

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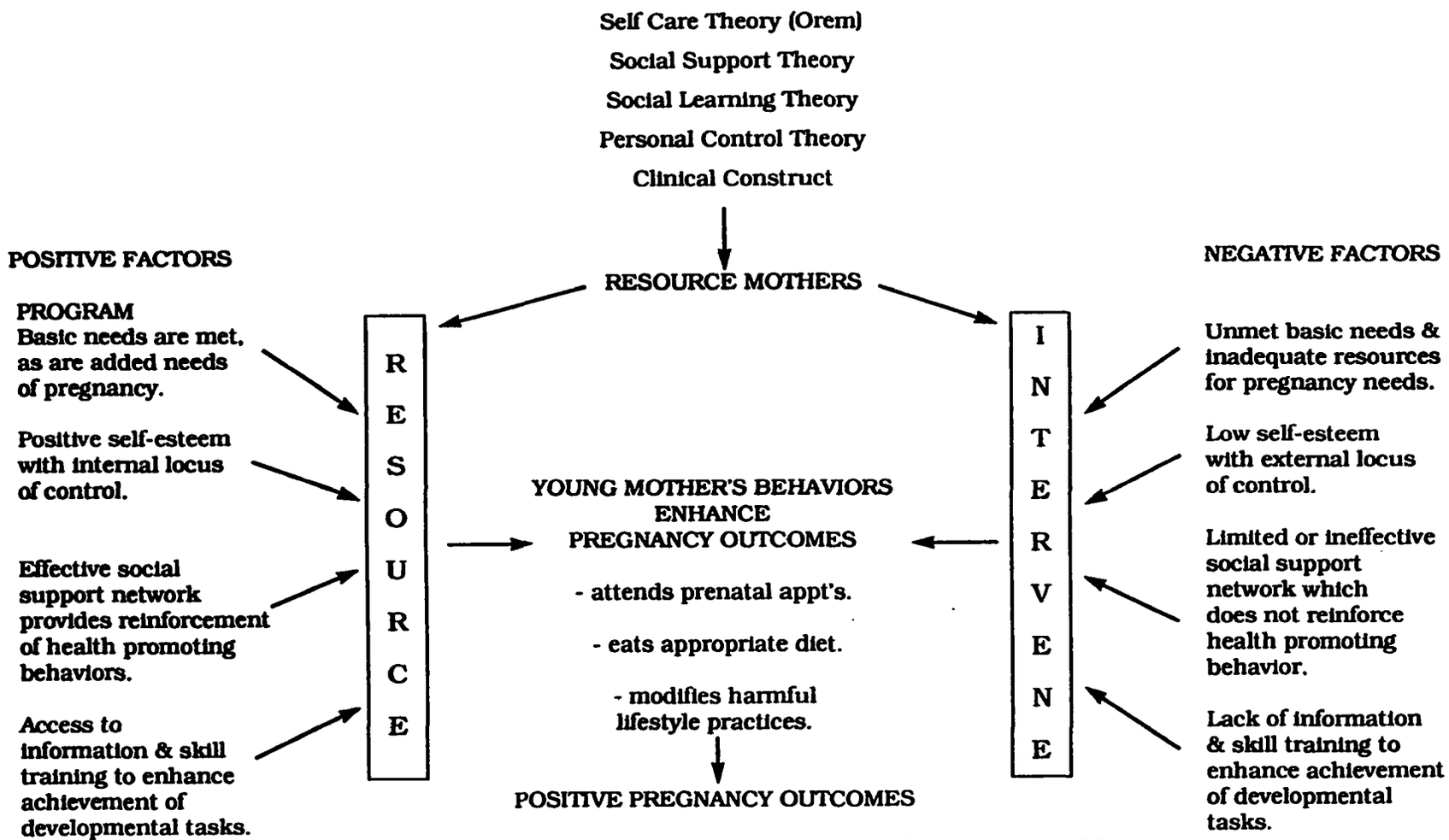
RESOURCE MOTHERS CONCEPTUAL MODEL



RM CONCEPTUAL MODEL, by Margaret M. Konefal, MSN, RN - 1987

CHAPTER III

METHODOLOGY

Introduction

This evaluation profiles selected characteristics for the total population and sub-groups of pregnant adolescents in the study, and examines the effect of Resource Mother Program participation on adequacy of prenatal care and selected pregnancy outcome measures among adolescent mothers delivering in a southeastern urban setting. The total population of adolescents delivering living infants during the study period (January 1988 through June 1989) is considered. Sub-groups are established for year of delivery, residence in targeted neighborhoods, and prenatal intervention program participation.

This chapter describes the research methodology. Evaluation objectives and research questions are defined. The study's research design and limitations, setting, population and sub-groups, data collection process, and data analysis procedures are presented.

Evaluation Objectives

Evaluation objectives associated with the population and sub-group profiles are:

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1. Determine whether the RMP is reaching the population for which it is designed in terms of maternal characteristics (age, race, marital status, income level, neighborhood of residence, and number of prior pregnancies).

2. Assess factors affecting future options and life circumstances of the teenage mother and her child (highest grade attained and educational progress).

3. Determine adequacy of prenatal care measures (the month prenatal care began, number of prenatal visits and, hospital of delivery).

Data concerning month prenatal care began and number of prenatal visits is self-reported by the mothers and may not be precise. Information on these factors is collected in the same way over time and, therefore, is useful for representing trends.

Maternal characteristics, adequacy of prenatal care, and pregnancy outcomes are analyzed to determine what is "typical" in the total group of teenage mothers, and how widely individuals in the prenatal intervention program groups vary from the total population profile. Further analysis calculates the relative risk of low weight birth associated with key variables and describes the differences between the prenatal intervention groups in terms of relative risk indications. Thus, profiles of the total

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population, sub-groups of prenatal intervention programs, targeted neighborhoods, and adolescents delivering low birth weight infants are developed.

Additional evaluation objectives of the study are associated with the effect of non-medical interventions by the perinatal lay home visitor on the birthweight, gestational age and infant survival through the first year of life:

4. Analyze pregnancy outcome measures across prenatal intervention program groups.
5. Compare pregnancy outcomes of the study populations with statistics for local, regional, state and national outcomes of pregnancy.

Research Questions And Hypotheses

Three research questions and the accompanying hypotheses are examined:

A. In what ways are the profiles of the total population, targeted neighborhoods, and prenatal intervention groups (RMP, NPP, traditional services, and no prenatal care) alike or different, relative to selected maternal characteristics? The hypotheses are:

1. Adolescent mothers participating in the RMP are characterized by young maternal age, residence in census tracts having low family income levels,

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completion of less than a high school education, and no prior pregnancies

-- factors placing them at an increased relative risk for inadequate prenatal care, preterm delivery, low birth weight infants, intrauterine growth retardation, and neonatal compromise.

2. RMP participants will demonstrate these risk factors to the same degree or more than the other groups.

B. Is there a significant difference in the pregnancy outcomes of adolescents mothers classified by prenatal intervention group (RMP, NPP, traditional services, no prenatal care) as measured by the occurrence of preterm delivery or low birth weight infants? The hypotheses are:

3. Adolescent mothers who receive supportive prenatal intervention through a perinatal lay home visitor program (RMP) or a multi-disciplinary approach (NPP) in addition to medical supervision during their pregnancies are more likely to experience lower rates of infant mortality, preterm delivery, and low birth weight infants than teen mothers who do not.

4. Positive pregnancy outcomes are attained even in populations characterized by factors placing them at an increased relative risk for infant mortality, preterm delivery, and low birth weight infants.

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C. Is there a significant difference in selected perinatal indicators -- adequacy of prenatal care for month care began and number of prenatal visits, delivery at tertiary perinatal center for high-risk conditions, intrauterine growth status, gestational age at delivery category, and assessed condition of newborn at 5 minutes after delivery -- for adolescent mothers classified by prenatal intervention group (RMP, NPP, traditional services, no prenatal care)? The hypotheses are:

5. Adolescent mothers who receive supportive prenatal intervention through a lay home visitor program (RMP) or a multi-disciplinary approach (NPP), in addition to medical supervision during pregnancy, are more likely than those who do not participate in a specialized support program to have:

- Higher adequacy of prenatal care index (they enter prenatal care earlier in pregnancy and receive more prenatal visits in proportion to gestational age);
- Treatment for high-risk conditions at tertiary perinatal center;
- Pregnancies continue to term (40 weeks gestation);
- Infants weigh more than 2,500 grams (5 ½ pounds) at birth;
- Infants are appropriately grown for their gestational age; and,
- Infants are vigorous at birth (the 5-minute Apgar score is greater than 6).

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6. These positive pregnancy outcomes are attained in populations characterized by factors placing them at an increased relative risk for inadequate prenatal care, preterm delivery, low birth weight infants, intrauterine growth retardation, and neonatal compromise.

Research Design

This quasi-experimental, post-test only study examines selected characteristics of the total population and sub-groups, and assesses the effect of participation in a perinatal lay home visitor program on the pregnancy outcome variables of gestational age, birth weight, initial extrauterine adjustment of the neonate, and first year survival of infants born to participating young mothers.

The study's first phase is a descriptive analysis of the study population and sub-groups with respect to maternal characteristics, prenatal intervention program, adequacy of prenatal care, and pregnancy outcomes. The second phase uses a post-test only design to assess the program's impact on selected pregnancy outcome measures. The influence of factors known to increase the risk of poor pregnancy outcome is also explored.

The post-test only design examines the relationship between prenatal intervention groups and selected pregnancy

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outcome measures.[99] The evaluation plan describes the connections between the research questions, program standards, performance criteria, data sources, and the research design/statistics (Appendix B). Project personnel defined each component of the evaluation plan and, where possible, substantiated them by literature sources and evidence of statewide use. The research design includes the analyzing multiple measures in assessing the effect of a prenatal intervention group on the infant's gestational age, birth weight, neonatal condition, and survival.

Limitations

The fact this evaluation was designed and implemented by the program staff in consultation with evaluators outside the organization may be a limitation because of questions concerning objectivity. This approach was selected because an in-depth understanding of the RMP and the context of prenatal care delivery in the city are necessary for testing the contrasting approaches to care and drawing conclusions and recommendations from the study.[100] Further, this approach was more cost-effective and appropriate under circumstances in which objective data is being used and procedures monitored.

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[99]D. Campbell and J. Stanley, Experimental and Quasi-Experimental Designs for Research (Boston: Houghton Mifflin Company, 1963), p. 25.

[100]Ernest House, Evaluating with Validity (Beverly Hills: Sage Publications, 1980), p. 81.

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Second, the study can be considered limited because it lacks randomization, meaning inferences of causal relationships cannot be determined and results can be generalized only to the study group. In this research project, it was not possible to randomly select service areas, nor deny service to a person within the targeted service areas. Random assignment to a treatment or control group is contrary to the program's outreach mission to selected groups of at-risk adolescents. Because entering prenatal care and participating in prenatal intervention programs is voluntary, the problems of self-selection are recognized. Factors associated with self-selection, entering one intervention group or another, could explain the reason for the results.[101]

Because after-only comparisons offer no comparison with a pretest or control sample, interpretation of results is difficult. In this study, all adolescents delivering in selected time periods were considered to capture as much information as possible. The population and sub-groups are compared on a variety of characteristics known to influence pregnancy outcomes. Additionally, pregnancy outcomes of the Norfolk adolescent pregnancy population and sub-groups are compared with data from other studies of similar

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[101]Susan Welch and John Comer, Quantitative Methods for Public Administration, Techniques and Applications (Homewood, Illinois: The Dorsey Press, 1983), p. 18.

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populations. Statistical techniques are used to control for extraneous influences.

Third, given the problem under study and program mission, pretest measures are not possible. Experiments without pretests have been widely conducted, most notably in the agricultural experiments of Fisher in the 1920's and 1930's and in elementary education where pretesting is impossible.[102] Campbell and Stanley consider Design 6, the post-test only control group, to be greatly under used in educational and psychological research.[103]

A problem in policy research of an on-going program, such as this one, is that it is normally modified continuously, while the experimental design assumes programs have a finite beginning and end and are relatively constant.[104] While the experimental design is a flexible tool to account for the effects of various threats to validity, real difficulties are encountered in research which evaluates the effects of a given policy or program.

The researcher recognizes these design weaknesses limit the ability to establish a causal connection between the independent and dependent variables posing threats to internal validity, and there are conditions limiting generalizations across categories and settings posing

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[102]Welch and Comer, p. 18.

[103]Welch and Comer, p. 26.

[104]Welch and Comer, p. 19.

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threats to external validity. Therefore, the quasi-experimental, post-test only design was developed to isolate, as well as possible, the effects of the independent or dependent variable from the possible effects of other factors.

Population And Sub-Groups

The RMP is a community service project initiated to serve teens in targeted neighborhoods having high rates of adolescent pregnancies and infant mortality. All teens delivering live infants in the community during 1988 and the first six months of 1989 form the study population. This population was divided into sub-groups by year of delivery, neighborhood of residence (those neighborhoods served and those not served by resource mothers), and prenatal intervention groups.

Year Of Delivery. Teens delivering during 1988 are one sub-group and those delivering during the first six months of 1989 form the second sub-group. In comparing the 1988 and 1989 subgroups it was found that the prenatal intervention groups were most distinct during 1988. In 1989 many teens were served by a resource mother (RMP) and participated in the Norfolk Department of Health's prenatal program (NPP). Therefore, 1988 and 1989 data is used for descriptive purposes and the 1988 data is used for the outcome analysis.

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Neighborhood Of Residence. All city census tracts are included in the total population. RMP service areas define the targeted neighborhoods. Residents of these neighborhoods demonstrate many characteristics associated with low birth weight infants and high infant mortality. These characteristics include: low income or working class status, minority race, female head of household-single parent families, less than a high school education. In fact, these areas demonstrate a high number of adolescent pregnancies and high rates of low birth weight infants and infant mortality. Target areas identified by the census tracts (C.T.) which include the public housing neighborhoods and four additional neighborhoods targeted to receive program services are: Park Place (C.T. 25); Fairmont, Lafayette, & Ballentine (C.T. 27, 28, 29); Huntersville and Brambleton (C.T. 30-35); Young, Calvert, Roberts, Bowling, Grandy, Tidewater (C.T. 41-48); Oakleaf and Diggs (C.T. 52); Norview and Foxhall (C.T. 57-59.9); and Poplar Hall (C.T. 69-70.9). These areas are depicted in Figure 2.

Prenatal Intervention Groups. Four prenatal care intervention groups are described in this study. First, the Resource Mothers Program (RMP) is a perinatal lay home visitor project administered through the Department of Nursing at Norfolk State University. Second, the Norfolk Prenatal Project (NPP) is a multi-disciplinary, clinic-based support program with a public health nurse home

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Figure 2. THE CITY OF NORFOLK, VIRGINIA (Census Tracts)

CENSUS TRACTS

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visiting component operated by the Norfolk Department of Health. Third, the traditional prenatal program group (TRAD) is made up of all other adolescent mothers receiving prenatal care and not participating in either of the identified prenatal support programs. Traditional prenatal care is provided by private physicians or hospital clinics. The fourth prenatal intervention group is composed of adolescents who received no prenatal care (NoPNC) during pregnancy.

The study population and sub-populations are examined to determine the influence of race, maternal age younger than 18 years, neighborhood of residence (a secondary measure of income), and adequacy of prenatal care. Literature sources indicate poverty, young maternal age, and race are demographic characteristics most strongly associated with high infant mortality and low birth weight babies. Adequate prenatal care is associated with positive pregnancy outcomes. It is suggested that inadequate prenatal care is influenced by poverty and young maternal age.

The Setting

The study takes place in Norfolk, a major port community on the waters of Hampton Roads in southeastern

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Virginia. Norfolk's population in 1988 was 290,900, a notable increase from 274,800 in 1985.[105]

Norfolk encompasses 65.98 square miles includes 50.15 square miles of high land and 15.85 square miles of water and low land. Founded as a town in 1682, Norfolk is surrounded by the waters of the Chesapeake Bay and Hampton Roads, and by the cities of Virginia Beach, Chesapeake, and Portsmouth. It's diverse economy includes: finance, education, medical services, ship building and repair, conventions/tourism, services, and the military.[106]

Norfolk is the hub of the Norfolk/Virginia Beach/Newport News Metropolitan Statistical Area (MSA), the 28th largest in the United States. This MSA contains 1,583 square miles and a population of 1.39 million people (1988).[107]

The description of census tracts, taken from Norfolk, Virginia: A Statistical Overview, explains the rationale for using census tract identification to determine the targeted neighborhood sub-groups of the study and for inferring income or socio-economic relationships:

> Census tracts, established by the U. S. Bureau of the Census, are small relatively permanent areas into which localities are divided for the purpose of providing statistics. Census

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[105]Norfolk, Virginia: A Statistical Overview, Department of City Planning and Codes Administration, (March 1990), p. 2.

[106]Norfolk, Virginia: A Statistical Overview, p.1.

[107]Norfolk, Virginia: A Statistical Overview, p. 1.

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tracts are usually homogeneous with respect to population characteristics, economic status, and living conditions. Planning districts, established by the City, are a second means of identifying neighborhoods. There are commercial and industrial, as well as residential planning districts. Planning districts are established according to the following criteria:

1. Housing having similar values, character, and/or state or repair;
2. Similar ethnic groups;
3. Similar land use;
4. Similar density of population;
5. Subjective local concepts of neighborhoods;
6. Location of elementary schools;
7. Location of 'convenience goods' shopping facilities;
8. Natural physical features limiting contact;
9. Major streets, railroads, etc. (existing and planned) limiting contact; and,
10. Local street patterns limiting contact.[108]

City demographics reported in the Statistical Overview for 1988 show:

- Racial composition is 60.8% White, 35.2% Black, and 4.0% other;
- Average household size is 2.65 people;
- Population density is 5,035.8 persons per square mile;
- Median age is 25.5 years, with the largest age cohort between 20 and 34 years (a large male population for that age group reflects the military presence in the city--31% of employment in Norfolk, 1987);
- Of those families living below the poverty level, two-thirds are non-white.[109]

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[108]Norfolk, Virginia: A Statistical Overview, pp. 1-2.

[109]Norfolk, Virginia: A Statistical Overview, p. 11.

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Data Collection Process

Measuring the RMP's effectiveness involves assessing complex interrelated factors linking several data collection sources. Quantitative data came from vital statistics reports and program records. Analysis of qualitative data is beyond the scope of this study, however, appendices contain statements of lay home visitors (Appendix A) and success stories from recipients of program services (Appendix B).

A quantitative database was constructed from the monthly reports of Norfolk births, prepared by the Virginia Center for Health Statistics, based on birth certificate information. Information concerning prenatal intervention program participation was obtained from RMP and NPP client lists. Participation in the Coronado School program (an alternative school for pregnant adolescents) was confirmed by school attendance rolls. All records were controlled to ensure strict confidentiality of personal information during the data collection, and identifying information was removed once the data from various sources was linked. Census tract of residence was obtained from the Norfolk Address Coding Guide/Census Tracts. Intrauterine growth status was assigned by comparing infant birth weight and gestational age to a standard intrauterine growth chart.[110] Perinatal

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[110]Irene M. Bobak and Margaret Jensen, Essentials of Maternity Nursing (St. Louis: C.V.Mosby Company, 1984) ,p. 578.

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statistics for Perinatal Region VII, Virginia, and the United States were obtained from state and national sources and compared with outcomes from the evaluation study. The SPSS/PC+™ computer program prepared and audited the database and later analyzed the data.[111]

Data Analysis

The first phase of data analysis profiles selected characteristics for the total population and sub-groups, and determines whether the RMP is reaching the adolescents from targeted neighborhoods. Demographic data from the total study population and sub-groups is organized and described through frequency distributions and percentages. The degree and magnitude of relationships among variables are examined through cross tabulations and chi-square analysis. These methods identify characteristics* of the study populations and determine if significant differences exist with regard to:

- Age in years:	< 13, 14-15, 16-17, 18-19
- Race:	White, Black, other
- Marital Status:	Married, single
- Educational Level:	Current or highest grade attained
- Educational Progress:	Difference between expected and highest grade completed
- Census Tract:	Residence of young mother
- Hospital of Birth:	City/Hospital code
- Live born infants:	0, 1, 2, 3, > 3
- Pregnancy Terminations:	< 20 weeks, > 20 weeks
- Prenatal Intervention Group:	RMP, NPP, Traditional, No Prenatal Care.

[111]SPSS/PC+™. SPSS Inc. 444 North Michigan Avenue, Chicago, IL 60611.

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Data concerning income, prenatal care provider, and medical risks was not available for most cases. Consequently, census tract was used to represent income, and neither prenatal care provider nor medical risk was used.

Specifying a significance level and critical region, the probability for rejecting the null hypothesis when it is true, is a complex task in policy research. Significance levels range from .10 to .001, with .05, .01, and .001 the most common.[112] For this study, a significance level of p=.05 is the point at which the pattern is unlikely to have occurred by chance, and at which there is an acceptable risk of rejecting the null hypothesis when we should accept it. The one-tailed test is used when the direction of the outcome is predicted, while a two-tailed test is used when the relationship direction is not known. A probability given as 0.000 means the probability is less than 0.0005, a level at which the probability of a no difference finding is very small.

Analyzing the same data set for multiple analyses increases the likelihood of rejecting the null hypothesis when it is actually true (Type I or alpha error).[113] Bonferroni's inequality method adjusts the alpha level of significance, correcting for the problem of increased Type I

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[112]Welch and Comer, p. 163.

[113]L. D. Goodwin, "Increasing Efficiency and Precision of Data Analysis: Multi-variate vs Uni-variate Statistical Techniques," Nursing Research 33 (1984): pp. 247 - 249.

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error, giving a "region possessing probability greater than that demanded."[114] Where multiple analyses use the same data set, the adjusted values are provided.

The chi-square statistic (X^2) compares expected frequencies with real frequency values for each cell of a cross-tabulation. The chi-square value is converted to a probability figure or significance level. If the real value is larger than the theoretical value, after degrees of freedom and the level of significance are determined, the test statistic is significant, indicating probability the two variables are related.[115]

Measures of association based on chi-square are asymmetrical, non-linear, and non-directional, and are typically employed with nominal levels of measurement.[116] Two assumptions for using chi-square are the sample size is large enough and each cell has an expected frequency greater than 5.[117] As no more than 20% of the cells may have an expected frequency below 5, categories with excessively small expected frequencies are combined where meaningful

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[114]R. G. Miller, Jr., Simultaneous Statistical Inference (New York: Springer-Verlag, 1981), pp. 15-16.

[115]D. F. Polit and B. P. Hungler, Essentials of Nursing Research (Philadelphia: J. B. Lippincott Co., 1985), p. 114.

[116]Welch and Comer, p. 122.

[117]A. Naiman, R. Rosenfeld, and G. Zirkle, Understanding Statistics, (New York: McGraw-Hill Book Company, 1977), p. 190.

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results are obtained.[118] The Fisher's exact test is computed using the rounded values of the cell entries when there are fewer than 20 cases in a 2 x 2 table that do not result from missing rows or columns in a larger table; Yates' corrected chi-square is computed for all other 2 x 2 tables.[119]

As chi-square is not a specific measure of association, standardizing procedures such as Cramer's *V* are needed to provide information about the strength of the association between variables.[120] The range of Cramer's *V* is 0 to 1, with 1 representing a perfect association.[121]

Using the results of the chi-square analyses, the relative risk of delivering a low birth weight infant is calculated for selected characteristics by dividing the percentage of low weight infants having that characteristic by the percentage of the total population having that characteristic.[122] An adjusted relative risk is derived by

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[118]W. J. Popham and K. A. Sirotnik, Educational Statistics: Use and Interpretation (New York: Harper and Row, Publishers, 1973), pp. 287-288.

[119]SPSS-X User's Guide, 3rd Edition (Chicago, Illinois: SPSS Inc., 1988), p. 436.

[120]Welch and Comer, p. 121.

[121]Marija J. Norusis, The SPSS Guide to Data Analysis for SPSS-X (Chicago: SPSS Inc., 1988), p. 275.

[122]Statewide Perinatal Services Plan, Richmond: Virginia Perinatal Services Board (1983) p. 88.

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dividing the smaller relative risk by the larger relative risk in the group.[123]

Multiple regression, t-tests, and ANOVA are used to identify factors associated with positive pregnancy outcomes and determine whether the occurrence of preterm delivery, low weight births or high infant mortality is statistically independent of prenatal intervention program status.

The relationship and predictive power of significant variables associated with program participation and pregnancy outcome measures is analyzed using step-wise multiple regression analysis. Variables are entered into the equation according to their contribution in explaining the variance in the dependent variable, or they are excluded automatically if they do not meet the established statistical criteria.

The data was first examined for violation of the assumptions. The normal distribution and variance constancy were tested using a scatter plot of the standardized residuals against the predicted values.[124] Next, a correlation matrix for all variables was calculated to identify significant variables. Missing values were managed

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[123]Statewide Perinatal Services Plan.

[124]Marija Norusis, SPSS-X Advanced Statistics Guide, (Chicago: SPSS, Inc., 1985) p. 48.

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by list-wise deletion in which cases with missing values on any variable in the list were eliminated.[125]

The results of the step-wise multiple regression were interpreted using the multiple R statistic, R squared, and beta values. The multiple R statistic is the correlation between the dependent variable and all the independent variables in the regression equation and indicates the strength of the relationship in a range from 0 to 1.[126] Total R^2, the coefficient of determination, is considered the more useful statistic and indicates the proportion of variance explained in the dependent variable that is explained by the independent variables in the regression equation.[127] Beta values and partial standardized regression coefficients represent the change in the dependent variable by a unit change in the independent variable when both are measured in terms of standard deviation units.[128] Beta assists in evaluating each independent variable's influence on the dependent variable even if the original measurement units of the independent variables differ.[129]

Two difference-of-means tests are used: t-test, to test the null hypothesis that two population means are equal, and

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[125]Norusis, SPSS-X Advanced Statistics Guide, p.36.

[126]Welch and Comer, p. 209.

[127]Welch and Comer, p. 209.

[128]Welch and Comer, p. 210.

[129]Welch and Comer, p. 210.

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ANOVA, to test the null hypothesis that several population means are equal.[130] The t-test determines if there is a difference between the average of a selected pregnancy outcome measure for those who participate in the perinatal lay home visitor program and those who do not. Tests for adolescents with specific characteristics, such as maternal age younger than 16 years or first pregnancy, are conducted to minimize the effect of an intervening variable, making the results easier to interpret.

The null hypothesis is that participants have the same average birth weight babies, or other outcome measure, as non-participants. The alternative hypothesis is participants differ in average birth weight babies. Interpreting the t-test considers whether one assumes the two groups have the same variances or not; if so pooled variance estimates are used, if not, separate variance estimates are used.[131] The F-value represents the ratio of the variances in the two samples and tests for equality of variances. If the number is small, the t-test marked separate variance estimate is used.

The confidence interval provides a range of values that, with a designated likelihood, contains the population mean. The bottom end of the confidence interval is

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[130]Norusis, The SPSS Guide to Data Analysis for SPSS-S, pp. 210 and 267.

[131]Norusis, The SPSS Guide to Data Analysis for SPSS-X, p. 203.

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determined by subtracting twice the standard error from the mean, and the top end of the interval is found by adding that same figure to the mean.

An analysis of variance (ANOVA) with post-hoc test examines the difference, if any, in the average gestational age and the average birth weight of infants delivered to adolescent mothers, who are classified according to prenatal care program: RMP, NPP, traditional services or no prenatal care. ANOVA is a parametric analysis testing the significance of differences between group means.[132] The explained variation in ANOVA is the difference between each group mean and the overall or grand mean of the dependent variable.[133] The test statistic, an F-ratio, represents the variability between groups compared with the variability within groups. If, after determining the degrees of freedom and the level of significance, the resulting F-ratio is greater than the theoretical or table value of F, the null hypothesis is rejected.[134]

A one-way ANOVA determines the differences between group means for levels of one independent variable. A two-way ANOVA is used when the differences in means and the combined interaction effects of two independent variables

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[132]J. W. Kuzma, Basic Statistics for the Health Sciences (Philadelphia: J.B. Lippincott Co., 1984), p. 123.

[133]Welch and Comer, p. 230.

[134]Polit and Hungler, p. 106.

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are determined.[135] Multiple comparison procedures, in this case the Tukey B test, identify pairs of means appearing to differ from each other and protect against calling too many differences significant when a significant F-ratio is found.[136] Post-hoc comparisons determine what proportion of the variation is explained by prenatal care program status.[137] Eta is the correlation ratio derived from dividing the between sums of squares by the total sum of squares producing a proportion, or the amount of variation in the dependent variable that can be explained by the influence of the independent variable.

The assumptions for using ANOVA are that each group must be a random sample from a normal population, and in the population the variances in all groups must be equal.[138] Because the sample is not randomly selected, histograms of the outcome measures determine that normal distributions exist.

The results of these analyses demonstrate whether the RMP is more effective in reducing infant mortality, preterm delivery and low weight births than traditional services or

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[135]Polit and Hungler, p. 310.

[136]Norusis, The SPSS Guide to Data Analysis for SPSS-X, p. 267.

[137]Fitz-Gibbon and Morris, p. 135.

[138]Norusis, The SPSS Guide to Data Analysis for SPSS-X, p. 257.

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no prenatal care.[139] The outcomes of the RMP and the NPP are examined. Study findings are compared with local, state, and national statistics.

Data analyses by research questions are as follows:

1. In what ways are the profiles of the population and sub-groups, targeted neighborhoods and prenatal intervention groups (RMP, NPP, traditional services, no prenatal care) alike or different relative to selected maternal characteristics, adequacy of prenatal care, and pregnancy outcomes?

Frequency distributions and percentages determine a profile of dominant characteristics for the population and selected sub-groups. Categories are collapsed where needed for statistical purposes. Contingency tables with chi-square analysis determine if differences exist between the total population and selected sub-groups, and within perinatal intervention groups. Relative risk calculations are made for selected maternal characteristics, adequacy of prenatal care indicators, and prenatal intervention group participation.

2. Is there a significant difference in the occurrence rate of preterm delivery or low weight infants among groups of pregnant adolescents classified by prenatal intervention group (RMP, NPP, traditional services, no prenatal care)?

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[139]Kuzma, p. 126.

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ANOVA determines if a significant difference exists between the prenatal intervention groups or measures of pregnancy outcome. Post hoc tests determine which groups differ significantly.

3. Is there a significant difference in the intrauterine growth status, gestational age category, or assessed condition of the infant 5 minutes after delivery (Apgar score) for adolescent mothers classified by prenatal intervention group status?

A difference of means (t-test) procedure determines if the groups differ on intrauterine growth status, gestational age category, or condition of the infant.

Results of the data analysis are portrayed through tables and graphs. Tables present maternal characteristics, adequacy of prenatal care, and pregnancy outcomes in percentages for the total population and sub-groups of targeted neighborhoods and prenatal intervention groups. Data is organized in four ways: all adolescents delivering during 1988 and the sub-groups from targeted neighborhoods delivering during 1988; all adolescents delivering during the first half of 1989 and the sub-groups from the targeted neighborhoods who delivered during the first half of 1989. One set of tables describes differences between prenatal intervention groups. A second set describes characteristics within each intervention group. Other tables organize the results of specific statistical techniques and present

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comparisons of data for selected variables for national, state, and local population levels.

Chapter Summary

In summary, this chapter describes the methodology used for quasi-experimental, post-test only evaluation of the RMP. The study investigates selected demographic characteristics and pregnancy outcome measures to determine if these variables differ significantly between prenatal intervention groups. All births to adolescents delivering in the 18-month study and listed in the Vital Statistics Report are included in the study. Quantitative data is analyzed using descriptive and inferential statistics. Chapter IV describes the study's sub-groups and presents the statistical findings for each research question and hypothesis.

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CHAPTER IV

PRESENTATION OF STATISTICAL FINDINGS

Introduction

The purpose of this evaluation is two-fold: (1) establish a profile of selected characteristics for the total population and sub-groups,and (2) examine the impact of the Norfolk State University Resource Mother Program (RMP) on adequacy of prenatal care and selected pregnancy outcome measures among participating adolescent mothers delivering in a southeastern urban setting. The time period of the study, January 1988 through June 1989, covers the RMP's third year of operation.

The RMP design and evaluation methodology, using perinatal lay home-visitors to reduce infant mortality and low weight births, evolve from the conceptual model depicted in Figure 1, p. 44. The theoretical matrix includes concepts from Orem's theory of self-care, social learning and social support theory, health promotion and personal competence, and perinatology. This chapter describes the study's population and sub-groups. Key variables are described and statistical findings for each evaluation question are presented.

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Population Sub-Groups

This study examines maternal characteristics, adequacy of prenatal care, and pregnancy outcomes of the study population by year of delivery and compares these findings with two other sub-groups, who are defined by residence in at-risk neighborhoods targeted by the RMP and by prenatal intervention group.

Year Of Delivery. The population used to evaluate the perinatal lay home-visiting program include adolescent mothers delivering live infants in Norfolk, VA between January and December 1988, and between January and June 1989. The study data includes 862 live births to teenager mothers in 1988 and 357 births to teen mothers in 1989. The main difference between 1988 and 1989 are the increases in total number of NPP participants and number of participants in the targeted neighborhoods. The percentage of teens receiving services from both the perinatal lay home-visitors and the health department program also increased. Though differences in maternal characteristics are noted, the magnitude is not appreciable. Distribution of participants by year and prenatal intervention groups for the total and targeted population are in Tables A.1 and A.2. Detailed findings concerning year of delivery, target neighborhoods, and prenatal intervention groups are in the numbered tables describing key variables.

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Targeted Neighborhoods. The RMP targets certain neighborhoods because many pregnant adolescents living there are identified as at-risk due to their demographic and perinatal outcome indicators. Analysis of prenatal intervention group participation during 1988 indicates a concentrated RMP activity in the targeted neighborhoods as the percentage of RMP participation is higher for the targeted neighborhoods than the total population (Tables A.1 and A.2). The RMP clients likely are drawn from the teens who otherwise would receive traditional services because the percentage of traditional service participants decreased as the RMP percentage increased; the NNP and NoPNC percentages remained essentially unchanged. The consistent percentage of teens receiving no prenatal care suggests further study into why neither perinatal support intervention programs nor traditional services reach these very at-risk teen mothers.

Table A.1. PRENATAL INTERVENTION GROUP PARTICIPATION. 1988: Total/Targeted Population (Percentages)

	RMP	NPP	TRADITIONAL	NoPNC	TOTAL
TOTAL	5.7	5.3	85.6	3.4	100
TARGET	9.3	5.3	81.8	3.6	100

12 months; n = 862

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Table A.2. PRENATAL INTERVENTION GROUP PARTICIPATION.
1989: Total/Targeted Population (Percentages)

	RMP	NPP	TRADITIONAL	NoPNC	TOTAL
TOTAL	4.9	11.0	82.3	1.8	100
TARGET	9.5	13.7	74.9	1.9	100

6 months; n = 357

Prenatal Intervention Groups. Four prenatal care intervention groups are defined: the Resource Mothers Program (RMP), a perinatal lay home-visitor project administered through the Department of Nursing at Norfolk State University; the Norfolk Prenatal Project (NPP), a multi-disciplinary, clinic-based support program with a public health nurse home-visiting component, operated by the Norfolk Department of Health; traditional prenatal care services (Trad) provided by private physicians or hospital clinics without a specialized support program, and adolescents who received no prenatal care (NoPNC). Tables A.3 and A.4 show the actual number of teens in each prenatal intervention group.

Table A.3. PRENATAL INTERVENTION GROUP PARTICIPATION
Year/Total Population (in numbers)

YEAR	RMP	NPP	TRADITIONAL	NoPNC	BOTH	TOTAL
1988 (12 months)	49	46	731	36	0	862
1989 (6 months)	18	39	289	6	5	357

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Table A.4. PRENATAL INTERVENTION GROUP PARTICIPATION
Year/Targeted Population (in numbers)

YEAR	RMP	NPP	TRADITIONAL	NoPNC	BOTH	TOTAL
1988 (12 months)	46	26	401	22	1	496
1989 (6 months)	16	27	116	4	5	168

In each time period, most adolescents were served by traditional providers. Funding limited the number of clients enrolled in the specialized support programs, and outreach, access, and availability of services influenced the number of mothers who received no prenatal care. In 1989, more adolescent mothers were served by the NPP than in 1988. This change was accompanied by an overall service decline in all other groups. The decrease in teen mothers receiving no prenatal care before delivery is especially noteworthy because of the association between prenatal care and improved pregnancy outcomes. The RMP enrolled fewer very young pregnant teens during the first half of the 1989 than in 1988 due, in part, to the number of parenting teens continuing with the program. It also may be due to reduced specialized RMP outreach activities, resulting from program personnel's community and national promotion of the lay home visiting concept. (Maternal Age Tables 1.2 & 1.3).

Teens served by the RMP and NPP were not included in the comparative analysis However, the positive outcomes underscore the value of perinatal psycho-social support. The maternal characteristics of participants served by both

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programs reflect the high-risk profile of the targeted neighborhood population and the high number of infants delivered at term and healthy supports the previously described observation that the NPP efforts increased in the targeted neighborhoods in 1989. In 1988, no teens participated in both the RMP and the NPP; in 1989, five teens participated in both programs. Teen mothers served by both perinatal support programs (RMP & NPP) had positive pregnancy outcomes.

Key Variables

Analyzing of key variables focuses on factors influencing infant survival: maternal characteristics, adequacy of prenatal care, and pregnancy outcome. These factors are frequently cited in discussions of low weight births and infant mortality in the perinatal and public policy literature.

The findings of this study section are presented in two ways. First, the analysis of each key variable is presented in terms of the total study population, showing percentages by year of delivery, prenatal intervention group, and pregnancy outcome. Second, the analysis of key variables shows the percentage of maternal characteristics, adequacy of prenatal care indicators, and pregnancy outcome measures in relation to participation in prenatal intervention groups.

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Tables 1 through 8 describe maternal characteristics. Those designated _.1 summarize data concerning a specific maternal characteristic for the total population. Tables designated _.2 describe the maternal characteristic by program participation for the total population, targeted neighborhoods, and year of delivery. Those designated _.3 present the distribution of selected maternal characteristics within each prenatal intervention group. Data concerning adequacy of prenatal care are organized on Tables 9.1 through 11.3 in like manner and data concerning pregnancy outcome measures are in Tables 12.1 through 16.3.

Maternal Characteristics. Maternal characteristics for the study include mother's age at delivery, race, marital status, census tract of residence (income data was not available), highest grade attained and expected grade level for age, number of prior live born infants, and number of other pregnancy terminations.

Adequacy Of Prenatal Care. Indicators of adequate prenatal care include: the month of pregnancy when prenatal care began, number of medical prenatal visits made, and the hospital of delivery. The delivery hospital is included under adequacy of prenatal care because it measures perinatal regionalization, a concept giving high-risk mothers and infants specialized diagnostic, treatment, and support services through regional centers. When prenatal

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care is adequate and includes concurrent risk assessment, it is expected that infants with very low birth weights are delivered at the regional perinatal center; a large proportion of other, less severely affected infants are also delivered at regional centers. Two regional perinatal centers are available to Norfolk residents: Norfolk General Hospital, a civilian hospital, and Portsmouth Naval Hospital, serving military personnel and their dependents. Other hospital in the area serve mothers having moderate and low risk pregnancies. All hospitals deliver quality and are equipped to treat emerging complications.

Pregnancy Outcomes. Pregnancy outcome measures include birth weight, gestational age, intrauterine growth status (birth weight for gestational age), and Apgar scores recorded at 5 minutes after birth. For this study, normal birth weight is greater than 2,500 grams or 5 ½ pounds.[139] Infants born weighing between 1,500 and 2,499 grams or approximately 3 ½ to 5 ½ pounds are designated as having moderately low birth weights.[140] Infants weighing less than 1,500 grams at birth are designated as having very low birth weight.[141]

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[139]H.C. Heins, p. 264.

[140]H.C. Heins, p. 264.

[141]H.C. Heins, p. 264.

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Gestational age is calculated as the number of completed weeks of fetal development as determined by neonatal examination or counting from the first day of the last normal menstrual cycle.[142] Forty weeks is the normal length of pregnancy (term).[143] Infants are considered preterm if born before the 38th week of pregnancy, and very preterm if born before the 34th week of pregnancy.[144] [145] Infants are post-term if born after the 42nd week.[146]

Intrauterine growth status is classified as appropriate for gestational age (AGA) if it is between the 10th% and the 90th% expected for the gestational week of the pregnancy, large for gestational age (LGA) if greater than 90th% for age, and small for gestational age (SGA) if smaller than the 10th% for age.[147]

A standard intrauterine growth chart was used to classify intrauterine growth status.[148] Alteration in fetal growth places an infant at increased health risk before, during,

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[142]S. Singh, J.D. Forrest, and A. Torres, p. *xv*.

[143]Gordon B. Avery, Neonatology: Pathophysiology and Management of the Newborn, 2nd Edition, (Philadelphia: J.B. Lippincott Company) 1981, p. 206.

[144]Avery, p. 206.

[145]S. Singh, J.D. Forrest, A. Torres, p. *xvi*.

[146]Avery, p. 206.

[147]Irene Bobak and Margaret Jensen, Essentials of Maternity Nursing, (St Louis: C.V. Mosby company), 1984, pp. 1066, 1059.

[148]Bobak & Jensen, p. 578.

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and after delivery. Inadequate fetal growth, intrauterine growth retardation (IUGR), has many causes such as deficient nutrient supply, placental insufficiency, intrauterine infection, or associated congenital anomaly. Excessive fetal size/accelerated intrauterine growth are most often the result of maternal diabetes or genetics. Problems related to fetal growth patterns are preventable or correctable through medical intervention before or during delivery.

The Apgar score, developed by Dr. Virginia Apgar, is a numeric expression of the infant's condition at birth.[149] Apgar scores represent a 10-point scale determining by a rapid assessment of heart rate, respiratory effort, muscle tone, reflex irritability, and color of the newborn. Scoring is typically done a 1, 5, and 15 minutes after birth. If the infant has a score of 2 or less at 1 minute, or less than 5 at 5 minutes, resuscitation is required. A most ominous sign is a 5-minute Apgar score that is much lower than the 1-minute score.[150] The 5-minute score is an initial screening device for predicting future neuromuscular functioning; it should be used along with more sensitive outcome tests.[151]

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[149]Avery, p. 189.

[150]Avery, p. 189.

[151]Avery, p. 330.

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Maternal Characteristics

This section provides data on maternal age, residential neighborhood (an income indicator), marital status, race, and educational level. These factors are associated with increased health risks to both pregnant women and their infants. Information about the adolescents delivering during the 18 months of this study shows young mothers having these maternal characteristics experience an increased relative risk of delivering a low birth weight infant. Clients served by the prenatal support programs (RMP &/or NPP) are concentrated in the age range younger than 17 years, lower income neighborhoods, and the non-white minority group. The relative risk calculated for RMP participants was higher, based on these maternal characteristics. Characteristics of the NoPNC group concerning age, marital status, census tract of residence, education, and parity (number of live born infants) have special relevance in planning program expansions and outreach services, as well as for improving prenatal care access and provider availability.

The demographic and socio-economic background of women giving birth are important predictors use levels for prenatal services and birth outcomes. The variation in maternal characteristics of participants in the perinatal lay home-visitor program from the total population and other

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prenatal intervention sub-groups are presented in the following narrative and tables.

Maternal Age

Maternal age is important to infant survival because adolescent motherhood is commonly associated with the delivery of low birth weight infants. Infants born to teenagers are two to three times more likely to have low birth weights than infants born to mothers ages 25-29, and low weight infants are twice as likely to die before age one. Among adolescent mothers, 33 percent receive inadequate care, a level nearly twice the rate for all mothers.[152]

Maternal age is considered from two perspectives: (1) the RMP's success in reaching teenage mothers, and (2) the risks of delivering low birth weight infants by young mothers in the populations/sub-populations in the study.

Total Population

Table 1.1 presents the distribution of maternal age groups within the total population. During 1988 the maternal age of adolescents delivering live infants in Norfolk ranged from 13 to 19 years (mean age = 17.9). Table 1.1 shows slight shifts toward younger maternal age between 1988 and the first half of 1989. These appreciable shifts are similar to state and national increases in the number of

[152]S. Singh, J.D. Forrest, A. Torres p. *vi*.

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young adolescents and increases noted in sexual activity among younger adolescents.

Table 1.1. MATERNAL AGE for the Total Population (Percentages)

Year	*n*	Younger Than 16	16-17	Older Than 17
1988	862	8.6	28.1	63.3
1989	357	11.2	27.0	61.8

Sub-Groups

Targeted neighborhoods. Table 1.2 shows program participation by maternal age for the total population, adolescents living in targeted neighborhoods, and year of delivery. The fewer number of younger adolescents between 1988 to 1989 is related to the increased number of adolescents served by the NPP, as described in the subsection describing prenatal intervention group participation.

Prenatal Intervention Groups. Table 1.3 presents the distribution of maternal age within prenatal intervention groups. Analysis of 1988 maternal age distribution shows that approximately one-third of the teen mothers delivering live infants were younger than 18 years.

The RMP served 17% of Norfolk teens mothers younger than 18; 75% of RMP clients are younger than 18 years.

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The NPP served 10% of Norfolk teen mothers younger than 18 years, who delivered in 1988; 45% of NPP clients were younger than 18.

Ninety percent of teen mothers older than 17 received traditional prenatal care services with no specialized support program. Two-thirds of the total population receiving traditional services was older than 17; only 7.3% of pregnant adolescents receiving traditional services were younger than 16.

The percentage of teen mothers younger than 16 in the NoPNC group is twice that of teen mothers older than age 17. This finding is consistent with the Guttmacher Institute report stating that mothers ages 18-19 have a higher level of prenatal care than younger mothers, but much lower than the average for the total population.[153]

The importance of this finding is teens younger than age 18 account for 30%-40% of all births to teenagers nationally, and are the age group with the highest level of inadequate care (37 percent) when compared to the national population. They represent a sub-population at special risk who need improved and specialized support services. The prenatal support programs do not reach the majority of these adolescent mothers, though the RMP achieved its goal of serving adolescent mothers within its caseload capacity (a function of funding levels). The NPP enrolled more of the

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[153]S. Singh, J.D. Forrest, A. Torres p. 12.

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Table 1.2. MATERNAL AGE by Program Participation (in percentages)

	1988		1989	
	YOUNGER THAN 16 YEARS		YOUNGER THAN 16 YEARS	
	TOTAL n= 74	TARGET n= 50	TOTAL n= 40	TARGET n= 26
ALL	8.6	10.1	11.2	15.2
RMP	17.6	24.0	7.5	12.5
NPP	4.0	4.0	12.5	12.5
TRAD	73.0	68.0	75.0	71.1
NoPNC	5.4	4.0	2.5	3.9
	100.0	100.0	100.0	100.0
	16-17 YEARS		16-17 YEARS	
	TOTAL n= 240	TARGET n= 151	TOTAL n= 96	TARGET n= 63
ALL	28.1	30.6	27.0	37.5
RMP	10.0	16.4	9.4	14.3
NPP	7.6	6.6	13.5	15.9
TRAD	78.6	72.4	74.0	66.6
NoPNC	3.8	4.6	2.1	1.6
	100.0	100.0	100.0	100.0
	OLDER THAN 17 YEARS		OLDER THAN 17 YEARS	
	TOTAL n= 546	TARGET n= 294	TOTAL n= 220	TARGET n= 79
ALL	63.3	59.3	61.8	47.0
RMP	2.2	3.4	2.3	531
NPP	4.6	4.8	9.5	17.7
TRAD	90.3	88.8	85.5	72.2
NoPNC	2.9	3.0	104	2.5
	100.0	100.0	100.0	100.0
	n = 860	n = 495	n = 356	n= 168
	p = .0000	p = .0000	p =.2901	p=.0006
	X^2 = 51.3	X^2 = 37.9	X^2 = 11.9	X^2=26.2
	V = .17	V = .20	V = .13	V = .18

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Table 1.3. MATERNAL AGE Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
< 16 YEARS	26.5	6.5	7.3	13.4	8.6
16 - 17 YRS	49.0	39.1	25.7	31.0	28.1
> 17 YEARS	24.5	54.4	67.0	55.2	63.3
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0000$; $X^2 = 51.3$; $V = .17$

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
< 16 YEARS	17.7	12.8	10.4	16.7	11.2
16 - 17 YRS	52.9	33.3	24.6	33.3	27.0
> 17 YEARS	29.4	53.9	65.1	50.0	61.8
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .29$
$X^2 = 11.9$ $V = .13$

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
< 16 YEARS	26.1	7.7	8.4	11.1	10.1
16 - 17 YRS	52.2	38.5	27.2	38.9	30.6
> 17 YEARS	21.7	53.8	64.4	50.0	59.3
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0000$; $X^2 = 37.9$; $V = .2$

1989

	RMP (n=17)	NPP (n=29)	TRADITIONAL (n=156)	NO PNC (n=4)	TOTAL POPUL (n=208)
< 16 YEARS	17.6	10.3	12.8	25.0	13.0
16 - 17 YRS	52.9	34.5	31.4	25.0	33.1
> 17 YEARS	29.5	55.2	55.8	50.0	52.9
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0000$; $X^2 = 26.23$; $V = .18$

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adolescent sub-population in the 1989 period. In summary, during 1988 the association of maternal age with prenatal intervention group was significant (p=.0000). RMP participants were largely younger than 17, (76%), while 45.6% of NPP participants and 44.8% of teens not receiving prenatal care were younger than 17; 33% of the traditional group was younger than 17. This compares with a total population in which 36.7% of the young mothers were younger than age 17. In 1989, the percentage of teen mothers younger than 16 delivering live born infants increased, while the RMP enrollment of teen mothers younger than 16 years declined. The percentage of mothers younger than 17 participating in the NPP increased from 1988 to 1989.

The percentage of adolescents younger than 16 years was about the same in the traditional group, while the percentage of teens younger than 16 decreased in the no prenatal care group. Maternal age distribution within the groups for 1989 reflected increases made by the NPP in terms of the group less than 16, but was essentially unchanged in the other age categories.

The age distribution in the targeted neighborhoods is slightly younger than the total population. Teens younger than 18 years in the target neighborhoods are only 4% more likely to become pregnant than their peers in the total adolescent delivery population of 1988.

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Tables 1.2 and 1.3 also show significant relationships between maternal age and program participation for both the total population and the targeted neighborhoods. A larger percentage of the younger adolescent mothers are found in these neighborhoods targeted by the RMP.

Race

According to the National Commission to Prevent Infant Mortality in its 1990 publication Troubling Trends, black women are twice as likely than white mothers to have infants born under 5 ½ pounds, and three times as likely to have an infant born with very low birth weight, under 3 ½ pounds.[154] The reasons for the large and growing disparity between the health of black and white infants are not entirely understood.[155] Increased risk is associated with poverty and barriers to early and regular prenatal care, in addition to the greater concentration of other socio-demographic risk factors: limited education, young maternal age, being unmarried and having an unplanned pregnancy.[156]

Total Population

Table 2.1 presents the racial distribution of the study population. In 1988, two-thirds of adolescents delivering live infants were black. The figures for racial

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[154]Troubling Trends, p. 4.

[155]Troubling Trends, p. 4.

[156]Troubling Trends, p. 3.

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distribution did not appreciably change between 1988 and 1989.

Table 2.1. RACIAL DISTRIBUTION for the Total Population (Percentages)

Year	*n*	White	Non-White	Other
1988	862	36.7	62.4	.9
1989	357	36.5	62.9	.6

Table 2.2 shows program participation by racial group for the total population, by those living in targeted neighborhoods, and by year of delivery. While the specialized prenatal intervention programs (RMP and NPP) did not reach a majority of adolescents, the programs served predominantly minority clients. These findings are significant (p=.0006 in 1988 and p=.0015 in 1989). Considering the black-white infant mortality gap, in 1988, 1.2% of white teens and 4.3% of black teen mothers received no prenatal care. A striking majority--greater than 90%, of white teens receive prenatal care through traditional sources (92.4% in 1988 and 95.4% in 1989). The RMP, serving inner-city black teens, served only 1.3% of white mothers in the total; and the NPP served 4.4% of white teen mothers. Though the percentage of white teen mothers served by the RMP and NPP decreased slightly in 1989, the percentage of black teens served by the NPP more than doubled from 6% to 15.6% for the same time period. The no prenatal care

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Table 2.2. RACIAL DISTRIBUTION BY Program Participation (in percentages)

	1988		1989	
	WHITE		WHITE	
	TOTAL n= 316	TARGET n= 87	TOTAL n= 130	TARGET n= 43
ALL	36.7	17.5	36.5	2.4
RMP	1.3	1.1	.8	2.3
NPP	4.4	3.4	3.1	4.7
TRAD	92.4	93.2	95.4	93.0
NoPNC	1.2	2.30	.8	0.0
	100.0	100.0	100.0	100.0
	BLACK		BLACK	
	TOTAL n= 538	TARGET n= 405	TOTAL n= 224	TARGET n= 163
ALL	62.3	100.0	62.9	79.6
RMP	8.4	11.1	7.1	10.0
NPP	6.0	5.7	15.6	16.6
TRAD	81.6	79.0	72.8	69.0
NoPNC	4.3	5.0	2.3	2.4
	100.0	100.0	100.0	100.0
	OTHER		OTHER	
	TOTAL n= 8	TARGET n= 0	TOTAL n= 2	TARGET n= 0
ALL	0.8	0.0	0.6	0.0
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	0.0	0.0
RM/NPP	0.0	0.0	0.0	0.0
TRAD	100.0	0.0	100.0	0.0
NoPNC	0.0	0.0	.0	0.0
	100.0	0.0	100.0	0.0
	n =862	n =495	n =356	n =168
	p =.0006	p =.1629	p =.0015	p =.06
	X^2=27.4	X^2=11.7	X^2=28.4	X^2=10.4
	V =.13	*V* = .11	*V* = .20	*V* =.22

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statistics improved by 50% in 1989, for both racial groups.

Sub-Groups

Targeted Neighborhoods. Reflecting neighborhood demographics, greater than 75% of the teens delivering live born infants in the targeted neighborhoods were black. The 1989 improvement in NoPNC was less dramatic in the targeted neighborhoods. This finding is important because adequate prenatal care is associated with positive pregnancy outcomes, and the mothers living in the targeted neighborhoods are at high risk for infant mortality and low birth weight babies.

While the percentage of black teen mothers served by the RMP decreased slightly in 1989, the percentage served by the NPP doubled, indicating an enrollment change to the NPP among the targeted at-risk neighborhoods. The apparent decrease in the RMP participation is misleading because of the increased number of clients served by both programs. The percentage of teens in all racial and age groups served by both the RMP and the NNP increased, indicating the RMP objective to increase cooperation with the NPP that year was met.

Prenatal Intervention Groups. Table 2.3 presents the racial distribution within prenatal intervention groups. Greater than 90% of the RMP participants were black

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adolescents during both service years, and more than 70% of NPP participants were black. The traditional service group was approximately 60% black in both time periods. The NoPNC was nearly 80% black in 1988, and 62% black in 1989. However, the racial differences among prenatal intervention groups are not sufficiently large to be important. The racial composition of the prenatal intervention groups changed little between 1988 and 1989 except for the increase in NPP enrollment as described previously.

Marital Status

Single marital status suggests limited social support and fewer personal resources. Unmarried adolescent teens have a higher incidence of low birth weight infants. The National Center for Health Statistics reports that unmarried mothers are more than three times as likely as married mothers to receive inadequate prenatal care.[157] One can infer that the majority of pregnancies among single adolescents are unplanned and these infants have a greater risk of low birth weights. The National Center for Health Statistics projected that if all pregnancies were planned the rate of low birth weights could be reduced by 16% among black infants, 5% among white infants, and 12% overall.[158]

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[157]Troubling Trends, p. 22.

[158]"Unintended Pregnancy and Infant Mortality/Morbidity," in R.W. Amler and H.B. Dull, eds., Closing the Gap (New York: Oxford University Press), pp.130-142.

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Table 2.3. RACIAL DISTRIBUTION Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
WHITE	8.2	30.4	39.7	20.7	36.7
BLACK	91.8	69.6	59.2	79.3	62.4
OTHER	0.0	0.0	1.1	0.0	.9
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0006$; $X^2 = 27.4$; $V = .13$

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
WHITE	5.9	10.3	42.8	16.7	37.0
BLACK	94.1	89.7	56.4	83.3	62.4
OTHER	0.0	0.0	.8	50.0	0.6
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0015$; $X^2 = 28.4$; $V = .2$

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (N=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
WHITE	2.2	11.5	20.0	11.1	17.5
BLACK	97.8	88.5	79.0	88.9	81.7
OTHER	0.0	0.0	1.0	0.0	0.8
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .16$; $X^2 = 11.8$; $V = .11$

1989

	RMP (n=17)	NPP (n=29)	TRADITIONAL (n=156)	NO PNC (n=4)	TOTAL POPUL (n=206)
WHITE	5.9	6.9	25.6	0.0	20.4
BLACK	94.1	93.1	74.4	100.0	79.6
OTHER	0.0	0.0	0.0	0.0	0.0
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .06$; $X^2 = 10.4$; $V = .22$

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Total Population

Table 3.1 presents the distribution of married and never married mothers within the total population.

Table 3.1. MARITAL STATUS FOR the Total Population (Percentages)

Year	*n*	Married	Not Married
1988	862	32.8	67.2
1989	357	30.1	69.9

The majority (67.2%) of teen mothers in the Norfolk study were unmarried, a significant finding. Most of the married mothers were older than 17.

Sub-Groups

Table 3.2 shows program participation by marital status for the total population, by those living in targeted neighborhoods, and by year of delivery. The 1988 data show a difference in the percentage of single mothers verses married mothers is significant among programs (p=.0000). This significant result indicates that the proportion of single mothers is significant among the four programs. The decrease in the percentage of single teens receiving no prenatal care between 1988 and 1989 may indicate NPP's increased service delivery. However, there is a rise in the number (6) of married teenage mothers who received no prenatal care between 1988 and 1989. This difference may reflect changes in community availability of prenatal care

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because this occurred when eligibility requirements and processing procedures were improved.

The RMP and the NPP each served 8% of the single adolescent mothers delivering in 1988. The largest percentage of single teen mothers (79.1) were served through traditional sources. The majority of married adolescents received prenatal care from traditional prenatal providers. In 1988, the RMP served a very small number (.7%) of the married mothers. Very few married adolescent mothers (.4%) received no prenatal care, and the NPP carried no married teens in its caseload. The major change between 1988 and 1989 is the 4% increase in teens served by the NPP, and the corresponding 4% decrease in those receiving traditional care.

Targeted Neighborhoods. More than 80 percent of teen mothers living in the targeted neighborhoods and delivering in 1988 were not married (81.7% single, 18.3% married). The RMP served 11% of the single teens in these neighborhoods and the NPP served 6.2%, compared with 8% each in the total population. Nearly all of the single mothers receiving no prenatal care lived in the targeted neighborhoods. Changes between 1988 and 1989 parallel those seen in the total population with increases in NPP services.

Prenatal Intervention Groups. Table 3.3 presents the marital status within prenatal intervention groups. Both

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Table 3.2. MARITAL STATUS by Program Participation (in percentages)

	1988		1989	
	SINGLE		SINGLE	
	TOTAL n= 578	TARGET n= 464	TOTAL n= 244	TARGET n= 151
ALL	67.2	81.7	69.5	92.6
RMP	8.1	11.2	7.0	10.6
NPP	8.0	6.6	14.3	17.2
TRAD	79.1	77.8	77.1	70.2
NoPNC	4.8	4.4	1.6	2.0
	100.0	100.0	100.0	100.0
	MARRIED		MARRIED	
	TOTAL n= 282	TARGET n= 91	TOTAL n= 107	TARGET n= 12
ALL	32.8	18.3	30.1	7.4
RMP	.7	1.1	0.0	0.0
NPP	0.0	0.0	3.7	8.3
TRAD	98.9	98.9	94.4	83.4
NoPNC	0.4	0.0	1.9	8.3
	100.0	100.0	100.0	100.0
	n=860	n=495	n=351	n=163
	$p = .0000$	$p = .0002$	$p=.0005$	$p=.2730$
	$X^2 = 61.9$	$X^2 = 22.2$	$X^2 = 17.7$	$X^2 = 3.9$
	$V = .28$	$V = .20$	$V = .23$	$V = .16$

specialized prenatal intervention programs provide most of their services to single mothers (more than 90%). Two-thirds of adolescent mothers receiving traditional services are single. The percentages of single and married adolescents receiving traditional prenatal services reflects the two-to-one ratio seen in the total population.

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Table 3.3. MARITAL STATUS Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (N=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
SINGLE	95.9	100.0	62.1	96.6	67.3
MARRIED	4.1	0.0	37.9	3.4	32.7
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0000$; $X^2 = 61.9$; $V = .27$

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
SINGLE	100.0	89.7	65.1	66.7	69.5
MARRIED	0.0	10.3	34.9	33.3	30.5
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0005$; $X^2 = 17.72$; $V = .23$

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
SINGLE	97.8	100.0	77.8	100.0	81.7
MARRIED	2.2	0.0	22.2	0.0	18.3
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0002$; $X^2 = 22.2$; $V = .21$

1989

	RMP (n=16)	NPP (n=27)	TRADITIONAL (n=116)	NO PNC (n=4)	TOTAL POPUL (n=163)
SINGLE	100.0	96.3	91.4	75.0	92.6
MARRIED	0.0	3.7	8.6	25.0	7.4
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .2730$; $X^2 = 3.90$; $V = .16$

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Census Tract Of Residence.

The census tract of each mother's residence is used to estimate the family income level, as specific income data is not available. The city was divided into 20 neighborhood areas combining census tracts with similar income and racial characteristics. (Figure 2.)

Maternal ages and pregnancy outcomes were analyzed by census tract to determine if patterns of maternal age and poor pregnancy outcomes were evident. Census tract of residence is a variable selected to represent family income, since income data is not part of the vital statistics record. As a shadow variable for family income census tract of residence is helpful in designing specific outreach and service programs. Adolescent pregnancy occurs in neighborhoods throughout the city, though areas of concentration are identifiable.

Total Population

Two working class neighborhoods had more than 90 infants born to mothers younger than 19; four neighborhoods had 50 to 89 teen deliveries; seven 25 to 49; five 10 to 24; and five less than 10 teen deliveries. Figure 3 shows the distribution of maternal age in selected neighborhoods, as well as RMP/NPP participation and selected pregnancy outcomes.

In the neighborhood with the most teen pregnancies, 5% of the mothers were 15 or younger, 21% were 16 - 17 years

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old, and 74% were 18 years or older. In the neighborhood with 94 pregnancies, 12% of the mothers were younger than 16, 39% were 16 - 17, and 49% were 18 or older. Figure 3 shows the census tract (#03) with a large number of low birth weight infants did not have any participants in the RMP or NPP and the characteristics of maternal age younger than 16 and black race were not evident. The census tract (#02) with a high number of infants born small for gestational age demonstrated young maternal age, predominantly mothers of black race, and mothers participating in both the RMP and the NPP.

Sub-Groups

Table 4.1 shows program participation for selected census tracts for the total population, of those living in targeted neighborhoods, and by year of delivery.

Table 4.1. NEIGHBORHOOD OF RESIDENCE For The Total Population (Percentages)

Year	*n*	Total	Targeted
1988	862	100.0	57.4
1989	357	100.0	57.7

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Figure 3. SELECTED CENSUS TRACT, MATERNAL CHARACTERISTICS AND PREGNANCY OUTCOME

CT	#	<16	16	>17	R	RM	NP	O	LBW	SGA
03	88			*					*	
01	104			*						
04	76						•	•		
14	24				*			*	•	
06	52				*	*	•		•	
08	44				*	•			•	•
09	42					*			•	•
02	94	*	*		*		•	•		*
10	38									•
07	45		•	•	•		*	•	•	•
12	27				*		•	•	•	
05	76	•		*		•	•			•
13	27					•				•
17	13				•		•			

Abbreviations:
CT=Census Tract; #=Number of pregnant teens; <16=less than 16 years of age, 16=16-17 years old; >17=older than 17 years of age; R=Black race; RM=% Resource Mother participants; NP=%NPP participants; O=% NoPNC group; LBW=Low Birth Weight Infants; SGA=Small For Gestational Age Infants.
Prevalence Code: check = large; asterisk = moderate; dot = small.

Targeted Neighborhoods. The targeted neighborhoods, corresponding with the RMP service area, parallels the areas having many teen pregnancies. The two areas with high NoPNC percentages are in the expanded perinatal lay home-visiting service areas recently funded by a the March of Dimes through a Hampton Roads Chapter grant.

Prenatal Intervention Groups. Table 4.2 describes the variation seen within prenatal intervention groups in selected neighborhoods. Traditional prenatal care providers are used by most teens in all areas of Norfolk. The RMP has

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a strong presence in Roberts Village and Park Place, a weak presence in the Oakleaf area. Areas such as Calvert and Young Terrace do not have a concentration of pregnant teens at this time, however, prevention services continue to be supported. These findings are relevant to program management and staff training. Tables 4.3A - 4.3D present neighborhood of residence data within each prenatal intervention group. Clusters evident in the target neighborhoods indicate again that the RMP concentrates efforts according to program goals.

Education

Education is described by the adolescent's highest grade completed and expected grade level for her age. The educational progress of students attending a special school for pregnant adolescents, Coronado School, is reviewed.

The National Center for Health Statistics states that the more years of education and higher the grade completed, the more likely the mother is to have a higher birth weight infant.[159] Completing high school is important for the mothers' future economic opportunities. Education data reflects adolescents' success or difficulty experienced in school setting, reading levels, potential for vocational education, and need for assistance with developmental tasks.

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[159] Troubling Trends, p. 32.

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Table 4.2. NEIGHBORHOOD OF RESIDENCE by Program Participation (in percentages)

	1988		1989	
	WILLOUGHBY		WILLOUGHBY	
	TOTAL n= 76	TARGET n= 0	TOTAL n= 25	TARGET n= 0
ALL	8.8	0.0	7.0	0.0
RMP	1.3	0.0	0.0	0.0
NPP	1.3	0.0	4.0	0.0
TRAD	97.4	0.0	96.0	0.0
NoPNC	.0	0.0	0.0	0.0
	100.0	0.0	100.0	0.0
	OCEANVIEW		OCEANVIEW	
	TOTAL n= 16	TARGET n= 0	TOTAL n= 12	TARGET n= 9
ALL	1.9	0.0	3.4	2.5
RMP	0.0	0.0	8.3	0.0
NPP	0.0	0.0	0.0	11.1
TRAD	100.0	0.0	83.3	88.9
NoPNC	0.0	0.0	8.3	0.0
	100.0	0.0	100.0	100.0
	EAST OCEANVIEW		EAST OCEANVIEW	
	TOTAL n= 88	TARGET n= 0	TOTAL n= 31	TARGET n= 0
ALL	10.2	0.0	8.7	0.0
RMP	2.4	0.0	0.0	0.0
NPP	3.4	0.0	3.2	0.0
TRAD	87.5	0.0	93.5	0.0
NoPNC	5.7	0.0	3.3	0.0
	100.0	0.0	100.0	0.0
	NAVAL BASE		NAVAL BASE	
	TOTAL n= 23	TARGET n= 0	TOTAL n= 15	TARGET n= 0
ALL	2.7	0.0	4.2	0.0
RMP	0.0	0.0	0.0	0.0
NPP	4.3	0.0	0.0	0.0
TRAD	95.7	0.0	100.0	0.0
NoPNC	0.0	0.0	0.0	0.0
	100.0	0.0	100.0	0.0

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Table 4.2. NEIGHBORHOOD OF RESIDENCE by Program Participation, cont.

	1988		1989	
	MEADOWBK/TALBERT		MEADOWBK/TALBERT	
	TOTAL n= 38	TARGET n= 0	TOTAL n= 20	TARGET n= 0
ALL	4.4	0.0	5.6	0.0
RMP	0.0	0.0	0.0	0.0
NPP	7.9	0.0	10.0	0.0
TRAD	92.1	0.0	85.0	0.0
NoPNC	0.0	0.0	5.0	0.0
	100.0	0.0	100.0	0.0
	RIVERPT/LARCH.		RIVERPT/LARCH.	
	TOTAL n= 16	TARGET n= 0	TOTAL n= 1	TARGET n= 0
ALL	1.9	0.0	.3	0.0
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	0.0	0.0
TRAD	100.0	0.0	100.0	0.0
NoPNC	0.0	0.0	0.0	0.0
	100.0	0.0	100.0	100.0
	PARK PLACE/COLONIAL		PARK PLACE/COLONIAL	
	TOTAL n= 94	TARGET n= 93	TOTAL n= 39	TARGET n= 39
ALL	10.9	19.0	11.0	23.2
RMP	9.6	9.0	5.1	5.1
NPP	5.3	5.9	23.1	33.3
TRAD	79.8	79.8	71.8	71.8
NoPNC	5.3	5.3	0.0	0.0
	100.0	0.0	100.0	100.0
	FAIRMONT/LAF/BAL		FAIRMONT/LAF/BAL	
	TOTAL n= 42	TARGET n= 42	TOTAL n= 15	TARGET n= 10
ALL	4.9	8.5	4.2	6.0
RMP	11.9	11.9	0.0	0.0
NPP	7.1	7.1	13.3	20.0
TRAD	78.6	78.6	86.7	80.0
NoPNC	2.4	2.4	0.0	0.0
	100.0	100.0	100.0	0.0

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Table 4.2. NEIGHBORHOOD OF RESIDENCE by Program Participation, cont.

	1988		1989	
	HUNTERSV/BRAMBLETON		HUNTERSV/BRAMBLETON	
	TOTAL n= 7	TARGET n= 7	TOTAL n= 1	TARGET n= 1
ALL	.8	1.4	.3	0.6
RMP	14.3	14.3	0.0	0.0
NPP	14.3	14.3	100.0	100.0
TRAD	71.4	71.4	0.0	0.0
NoPNC	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	GHENT/MED. CTR.		GHENT/MED. CTR.	
	TOTAL n= 6	TARGET n= 0	TOTAL n= 2	TARGET n= 0
ALL	.7	0.0	.6	0.0
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	0.0	0.0
TRAD	100.0	0.0	100.0	0.0
NoPNC	0.0	0.0	0.0	0.0
	100.0	0.0	100.0	100.0
	YOUNG/CALVERT		YOUNG/CALVERT	
	TOTAL n= 27	TARGET n= 27	TOTAL n= 19	TARGET n= 18
ALL	3.1	5.4	5.3	10.7
RMP	11.1	10.0	0.0	0.0
NPP	7.4	7.2	15.8	11.1
TRAD	77.8	77.4	85.0	83.3
NoPNC	3.7	5.4	0.0	0.0
	100.0	100.0	100.0	100.0
	ROBERTS/BOWLING		ROBERTS/BOWLING	
	TOTAL n= 52	TARGET n= 52	TOTAL n= 25	TARGET n= 24
ALL	6.1	10.5	7.0	14.3
RMP	25.0	25.0	32.0	33.3
NPP	5.8	5.8	5.1	8.3
TRAD	67.3	67.3	52.0	50.0
NoPNC	1.9	5.6	0.0	0.0
	100.0	100.0	100.0	100.0
n=861; p=.0004		n=495; p=.0769	n=354	n=168
X^2=139.3; V=.20		X^2=53.4; V=.16	Not Significant	

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Table 4.3.A. NEIGHBORHOOD OF RESIDENCE Within Prenatal Intervention Groups: 1988.
(in percentages)

Total Population
1988

	RMP (n=49)	NPP (n=44)	TRADI TIONAL (n=735)	NO PNC (n=29)	TOTAL POPUL (n=857)
WILLOUGHBY	2.0	2.3	10.1	0.0	8.8
W. OCEANVIEW	0.0	0.0	2.2	0.0	1.9
NAVAL BASE	0.0	2.3	3.0	0.0	2.7
MEDBK/TAL	0.0	6.8	4.8	0.0	4.4
RIVERPT/LARCH	0.0	0.0	.7	0.0	.6
PARK PLACE	16.3	11.4	10.2	17.3	10.9
FAIRMONT,ETC.	10.2	6.8	4.5	3.4	4.9
HUNTERSVILLE/BRAMB.	2.0	2.3	.7	0.0	.8
GHENT/MED CENTER	0.0	0.0	.8	0.0	.7
YOUNG/CALVERT	6.1	4.5	2.9	3.4	3.1
ROBERTS/BOWLING	26.5	6.8	4.8	3.4	6.1
GRANDY/LIBERTY	6.1	4.5	2.9	3.4	3.1
TIDEWATER	4.1	0.0	.8	6.9	1.2
BERKLEY	0.0	2.3	2.6	13.9	2.8
OAKLEAF/DIGGS	2.2	6.8	5.2	6.9	5.3
OAKDALE/BAYVIEW	0.0	0.0	1.1	0.0	.9
NORVIEW/FOXHALL	6.1	9.1	13.1	3.4	12.1
COLEMAN PLACE	0.0	15.9	4.9	6.9	5.2
E. OCEANVIEW	4.1	6.8	10.5	17.2	10.2
LARRYMORE	0.0	4.5	4.4	0.0	4.0
POPLAR HALL	4.1	2.4	1.1	6.9	1.5
OTHER	10.2	4.5	9.1	6.9	8.8
TOTAL	100.0	100.0	100.0	100.0	100.0

$p=.0004$; $X^2=139.3$; $V=.2$

Such information is useful in planning pregnancy prevention programs, initiating prenatal recruitment efforts, and developing complementary programs which encourage young mothers to complete high school. Correlating educational level with pregnancy information required linking health and educational records.

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Table 4.3.B. NEIGHBORHOOD OF RESIDENCE Within Prenatal Intervention Groups: 1989.
(in percentages)

Total Population
1989

	RMP (n=17)	NPP (n=39)	TRADI TIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
WILLOUGHBY	0.0	2.6	8.3	0.0	7.0
W. OCEANVIEW	0.0	2.6	2.8	0.0	2.6
NAVAL BASE	0.0	0.0	5.2	0.0	4.3
MEDBK/TAL	0.0	5.1	5.9	16.7	5.7
RIVERPT/LARCH	0.0	0.0	.3	0.0	.3
PARK PLACE	11.8	23.1	9.7	17.2	11.0
FAIRMONT/LAF/BAL	0.0	5.1	4.5	0.0	4.2
HUNTERSVILLE/BRAMB.	0.0	2.6	0.0	0.0	.3
GHENT/MED CENTER	0.0	0.0	.7	0.0	.6
YOUNG/CALVERT	0.0	7.7	5.2	0.0	5.3
ROBERTS/BOWLING	47.0	5.1	4.5	0.0	7.0
GRANDY/LIBERTY	5.8	0.0	3.8	0.0	3.4
TIDEWATER	11.8	0.0	2.4	0.0	2.5
BERKLEY	0.0	7.7	3.5	0.0	3.7
OAKLEAF/DIGGS	11.8	5.1	4.2	0.0	4.5
OAKDALE/BAYVIEW	0.0	0.0	1.4	0.0	1.1
NORVIEW/FOXHALL	11.8	20.5	8.7	49.1	11.0
COLEMAN PLACE	0.0	5.1	2.4	0.0	2.5
E. OCEANVIEW	0.0	2.6	10.0	16.7	8.7
LARRYMORE	0.0	0.0	5.5	0.0	4.5
POPLAR HALL	0.0	0.0	3.1	0.0	2.5
OTHER	0.0	5.1	8.0	16.7	7.6
TOTAL	100.0	100.0	100.0	100.0	100.0

p = .0300
X^2 = 133.1 V = .27

Highest Grade Completed: Total Population

Table 5.1 reflects the expected relationship between maternal age and highest grade completed. Young mothers delivering in 1988 averaged 10.5 years of school at an average age of 17.7 years. Additionally, between 1988

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Table 4.3.C. NEIGHBORHOOD OF RESIDENCE Within Prenatal Intervention Groups: 1988.
(in percentages)

Targeted Neighborhoods
1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
*WILLOUGHBY					
*W. OCEANVIEW					
*NAVAL BASE					
*MEDBK/TAL					
*RIVERPT/LARCH					
PARK PLACE	17.4	19.2	18.5	27.6	19.0
FAIRMONT/LAF/BAL	10.9	11.5	8.1	5.6	8.5
HUNTERSVILLE/BRAMB.	2.2	3.9	1.4	0.0	1.4
*GHENT/MED CENTER					
YOUNG/CALVERT	6.5	7.7	5.2	5.6	5.4
ROBERTS/BOWLING	28.3	11.5	8.6	5.6	10.5
GRANDY/LIBERTY	6.5	7.7	5.2	5.6	5.4
TIDEWATER	4.3	0.0	1.4	11.1	2.0
*BERKLEY					
OAKLEAF/DIGGS	2.2	11.5	9.4	11.1	8.9
*OAKDALE/BAYVIEW					
NORVIEW/FOXHALL	6.5	15.4	23.7	5.6	21.0
*COLEMAN PLACE					
*E. OCEANVIEW					
*LARRYMORE					
POPLAR HALL	4.3	3.9	2.0	11.1	2.6
OTHER	10.9	7.7	16.5	11.1	15.3
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .08$
$X^2 = 53.4 \quad V = .16$

*Areas outside targeted neighborhoods

and 1989 there is a notable decrease in the highest grade completed, with the greatest percentage occurring at 10th grade or less.

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Table 4.3.D. NEIGHBORHOOD OF RESIDENCE Within Prenatal Intervention Groups: 1989.
(in percentages)

Targeted Neighborhoods
1989

	RMP (n=17)	NPP (n=29)	TRADI TIONAL (n=156)	NO PNC (n=4)	TOTAL POPUL (n=206)
*WILLOUGHBY					
*W. OCEANVIEW					
*NAVAL BASE					
*MEDBK/TAL					
*RIVERPT/LARCH					
PARK PLACE	11.8	31.0	17.9	0.0	18.9
FAIRMONT/LAF/BAL	0.0	6.9	8.3	0.0	7.1
HUNTERSVILLE/BRAMB.	0.0	3.5	0.0	0.0	.5
*GHENT/MED CENTER					
YOUNG/CALVERT	0.0	10.3	9.6	0.0	8.0
ROBERTS/BOWLING	47.0	6.9	8.4	0.0	11.8
GRANDY/LIBERTY	5.8	0.0	7.1	0.0	5.8
TIDEWATER	11.8	0.0	4.5	0.0	4.4
*BERKLEY					
OAKLEAF/DIGGS	11.8	6.9	7.7	0.0	7.8
*OAKDALE/BAYVIEW					
NORVIEW/FOXHALL	11.8	27.6	25.0	75.0	18.4
*COLEMAN PLACE					
*E. OCEANVIEW					
*LARRYMORE					
POPLAR HALL	0.0	0.0	5.8	0.0	4.4
OTHER	0.0	6.9	14.7	25.0	12.6
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .0413$
$X^2 = 68.6 \quad V = .26$

*Areas outside targeted neighborhoods

Highest Grade Completed: Sub-Groups

Table 5.2 shows program participation by highest grade completed for the total population, those living in targeted neighborhoods, and year of delivery.

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Table 5.1. EDUCATION: HIGHEST GRADE COMPLETED for the Total Population (Percentages)

Year	*n*	< 9	9th	10th	11th	> 11
1988	858	9.3	13.7	16.6	22.4	38.0
1989	351	13.2	12.4	20.3	23.1	31.0

Targeted Neighborhoods. The 1988 distribution of highest grade completed was not strikingly different among teens living in the targeted neighborhoods and the total population, except fewer teens in the targeted neighborhoods completed the 12th grade. The downward shift in educational level was evident in the targeted neighborhoods during 1989.

Prenatal Intervention Groups. Table 5.3 presents the distribution of the mothers' educational status within prenatal intervention groups. The differences in highest grade completed were significantly different between the prenatal intervention groups in 1988. Half of the RMP participants were in the 9th grade or below; half of all participants in the other groups were in the 11th grade or above. The younger age of RMP participants is reflected in these data. The traditional group had the largest percentages in all grade levels; the RMP and NPP had the most mothers indicating 9th grade was the highest grade they completed.

The no prenatal care group had the largest percentage of persons completing the 11th grade (4.7%). Age and

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Table 5.2. EDUCATION: Highest Grade Completed by Program Participation (in percentages)

	1988		1989	
	< 9TH GRADE		< 9TH GRADE	
	TOTAL n= 80	TARGET n= 49	TOTAL n= 47	TARGET n= 25
ALL	9.3	9.9	13.2	15.0
RMP	8.8	12.3	6.4	12.0
NPP	2.5	0.0	10.6	16.0
TRAD	85.0	83.7	78.7	64.0
NoPNC	3.8	4.0	0.0	0.0
	100.0	100.0	100.0	100.0
	9TH GRADE		9TH GRADE	
	TOTAL n= 118	TARGET n= 60	TOTAL n= 44	TARGET n= 21
ALL	13.7	15.2	12.4	12.6
RMP	11.0	17.3	4.5	9.5
NPP	10.2	8.0	13.6	14.3
TRAD	75.4	70.7	81.8	76.2
NoPNC	3.4	4.0	0.0	0.0
	100.0	100.0	100.0	100.0
	10TH GRADE		10TH GRADE	
	TOTAL n= 141	TARGET n= 81	TOTAL n= 72	TARGET n= 43
ALL	16.6	16.6	20.3	25.7
RMP	6.3	12.0	8.3	11.6
NPP	9.1	13.5	9.7	14.0
TRAD	79.7	70.7	76.4	67.4
NoPNC	3.5	3.8	4.2	4.7
	100.0	100.0	100.0	100.0

education of the participants influence program focus and content development. However, 3.5% of the teens having no prenatal care were in the elementary or lower high school

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Table 5.2. EDUCATION: Highest Grade Completed by Program Participation (in percentages), con't.

	1988		1989	
	11TH GRADE		11TH GRADE	
	TOTAL n= 192	TARGET n= 124	TOTAL n= 82	TARGET n= 45
ALL	22.3	25.1	23.1	26.9
RMP	8.9	12.8	6.1	11.1
NPP	4.2	3.4	17.1	17.8
TRAD	82.3	93.4	74.4	66.7
NoPNC	4.7	2.4	1.2	2.2
	100.0	100.0	100.0	100.0
	> 11TH GRADE		> 11TH GRADE	
	TOTAL n= 327	TARGET n= 115	TOTAL n= 110	TARGET n= 33
ALL	38.0	33.3	31.0	19.8
RMP	.9	1.2	.8	3.0
NPP	3.4	3.0	6.4	18.2
TRAD	93.3	92.4	90.0	72.7
NoPNC	4.7	2.4	1.8	3.0
	100.0	100.0	100.0	100.0
	n = 860	n = 494	n = 356	n = 168
	p_2 = .0000	p_2 = .0001	p_2 = .1898	p=.7000
	X^2 = 53.1	X^2 = 47.2	X^2 = 25.3	X^2 =16.2
	V = .12	V = .15	V = .13	V =.14

grades. The group who received no prenatal care had the fewest adolescent mothers who completed the 12th grade (2.4%).

A general shift toward younger age and, consequently, lower grade levels occurred in 1989 with a total population increase of 8% for mothers having an elementary grade as the highest completed. Other distributions changed little.

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Table 5.3. EDUCATION: HIGHEST GRADE COMPLETED Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=734)	NO PNC (n=29)	TOTAL POPUL (n=858)
< 9th GRADE	14.3	4.3	9.3	10.4	9.3
9TH GRADE	26.5	26.1	12.1	13.8	13.7
10TH GRADE	18.4	28.3	15.5	17.2	16.6
11TH GRADE	34.7	17.4	21.5	31.0	22.4
> 11TH GRADE	6.1	23.9	41.6	27.6	38.0
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .0000$; $X^2 = 53.1$; $V = .12$

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=288)	NO PNC (n=6)	TOTAL POPUL (n=351)
< 9th GRADE	17.6	12.8	12.8	0.0	13.2
9TH GRADE	11.8	15.4	12.5	0.0	12.4
10TH GRADE	35.3	17.9	19.1	50.0	20.3
11TH GRADE	29.4	35.9	21.2	16.7	23.1
> 12TH GRADE	15.9	17.9	34.4	33.3	31.0
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .1898$; $X^2 = 25.3$; $V = .13$

Expected Grade Level: Total Population

Table 6.1 compares the percentage of students grade level in the total population with the percentage of students attending Coronado School who are on grade level. Approximately half of the total student group are on grade level, while fewer than 25% of the Coronado Students are on grade level.

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Table 5.3 EDUCATION: HIGHEST GRADE COMPLETED Within Prenatal Intervention Groups, con't. (in percentages)

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=404)	NO PNC (n=18)	TOTAL POPUL (n=494)
< 9th GRADE	13.0	0.0	10.1	11.1	9.9
9TH GRADE	28.3	23.1	13.1	16.7	15.2
10TH GRADE	19.6	42.3	14.4	16.7	16.6
11TH GRADE	34.8	15.4	24.3	33.3	25.1
> 11TH GRADE	4.3	19.2	38.1	22.2	33.2
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .0001$; $X^2 = 47.3$ $V = .15$

1989

	RMP (n=17)	NPP (n=29)	TRADITIONAL (n=155)	NO PNC (n=4)	TOTAL POPUL (n=205)
< 9th GRADE	17.6	13.8	13.5	0.0	14.3
9TH GRADE	11.8	13.8	13.5	0.0	12.9
10TH GRADE	35.3	20.7	23.3	50.0	24.3
11TH GRADE	29.4	31.0	21.3	25.0	23.3
> 11TH GRADE	5.9	20.7	28.4	25.0	25.2
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .7$
$X^2 = 16.26$ $V = .14$

Expected Grade Level: Sub-Groups

Table 6.2 presents expected grade level data by program participation. Table 6.2-A shows the data for Coronado School students.

Targeted Neighborhoods. A higher percentage of students in the targeted at-risk neighborhoods are not on grade level and attended Coronado School than those in the total population.

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Table 6.1 EXPECTED GRADE LEVEL For The Total Population (In Percentages)

Year	Total *n*	Total	Target	Coronado *n*	Total	Target
1988	853	59.4	57.4	100	6.4	9.1
1989	237	46.6	42.4	148	24.7	40.5

Prenatal Intervention Groups. An appreciable difference between prenatal intervention groups was noted for the percentage of teens on grade level. Table 6.2 shows that 50% of the total population was on grade level in 1988. However, only 3% of teens receiving no prenatal care were progressing on grade level. RMP and NPP participants were also more likely to be behind grade level, especially if they lived in the targeted neighborhoods. (RMP=90% and NPP=96%). When actual grade level is compared with expected grade for age, approximately 40% are at least one year behind. One explanation is some teens may have given their current grade or the year they dropped out instead of the highest grade completed.

Table 6.2-A. shows the percentage of teens enrolled at Coronado School is higher among teens living in the targeted neighborhoods and the percentage increased approximately 20% in early 1989. Coronado School is an alternative program for pregnant students. The RMP works closely with the school staff and regularly recruit participants from this

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Table 6.2. EXPECTED GRADE LEVEL By Program Participation (in percentages)

	ON GRADE LEVEL TOTAL n= 509	ON GRADE LEVEL TARGET n= 217	ON GRADE LEVEL TOTAL n= 181	ON GRADE LEVEL TARGET n= 69
ALL	59.4	53.7	51.6	42.3
RMP	6.5	12.4	6.6	7.2
NPP	4.3	5.5	13.8	14.5
TRAD	86.3	79.3	77.9	75.4
NoPNC	2.9	2.8	1.7	2.9
	100.0	100.0	100.0	100.0
	n = 858	n = 403	n = 351	n = 163
	p =.2141	p =.0156	p = .1209	p=.6806
	X^2 = 10.8	X^2 = 30.5	X^2 = 5.8	X^2 =1.5
	V = .08	*V* = .14	*V* =.13	*V* =.10

site. This arrangement is beneficial in helping these adolescents with their health and academic concerns. In addition to the risks of young age and poverty, about 10% of the students are in special education. Twenty percent of teens living in the targeted neighborhoods and attending Coronado School are enrolled in the RMP. Nearly 70% of the Coronado School students receive traditional prenatal care. Very few are not enrolled in any prenatal program.

Parity Status: Prior Live Born Infants

Regardless of age, women having their first infant are more likely to experience problems with this pregnancy than later pregnancies. The increased risk is associated with health and socio-economic factors. While the median age for

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Table 6.2-A. EXPECTED GRADE LEVEL By Program Participation: For Those Attending Coronado School (in percentages)

	1988		1989	
	ATTENDED CORONADO TOTAL n= 55	TARGET n= 45	ATTENDED CORONADO TOTAL n= 88	TARGET n= 60
ALL	6.4	9.1	24.7	40.5
RMP	16.4	20.0	14.8	20.8
NPP	7.3	8.9	20.5	21.7
TRAD	74.5	68.9	61.4	53.3
NoPNC	1.8	2.2	0.0	0.0
	100.0	100.0	100.0	100.0
**Special Education Students	6%		9%	
	n = 859	n = 494	n = 356	n = 168

mothers having their first child is increasing, the median age for non-white mothers continues to be lower than for white mothers. In 1988, the median age for non-white first time mothers in Virginia was 22 years, while the median age for white women was older.[160]

Total Population

Table 7.1 presents the distribution of parity (prior live born infants) within the total population. More than 70% of teens delivering in 1988 had no previous live born children. This finding was consistent in 1989.

[160]Virginia : 1988 Vital Statistics Annual Report, Center for Health Statistics (1988), p. 13.

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Table 6.3. EXPECTED GRADE LEVEL Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=734)	NO PNC (n=29)	TOTAL POPUL (n=858)
ON GRADE LEVEL	65.3	47.8	60.1	51.7	59.4
NOT ON LEVEL	34.7	52.2	39.9	48.3	40.6
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .2494$; $X^2 = 4.1$; $V = .07$

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
ON GRADE LEVEL	29.4	35.9	51.2	50.0	48.4
NOT ON LEVEL	70.6	64.1	48.8	50.0	51.6
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .1209$; $X^2 = 5.8$; $V = .13$

Targeted Neighborhoods

1988

	RMP (n=45)	NPP (n=23)	TRADITIONAL (n=319)	NO PNC (n=16)	TOTAL POPUL (n=403)
ON GRADE LEVEL	62.2	52.2	58.3	37.5	57.6
NOT ON LEVEL	37.8	47.8	41.7	62.5	42.4
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .3364$; $X^2 = 3.4$; $V = .02$

1989

	RMP (n=16)	NPP (n=27)	TRADITIONAL (n=116)	NO PNC (n=4)	TOTAL POPUL (n=163)
ON GRADE LEVEL	31.2	37.0	44.8	50.0	42.3
NOT ON LEVEL	68.8	63.0	55.2	50.0	57.7
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .6806$; $X^2 = 1.5$; $V = .10$

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Table 7.1 PARITY STATUS: Prior Live Born Infants Within The Total Population (in percentages)

Year	*n*	No Prior	One Prior	> One Prior
1988	859	71.0	23.6	5.4
1989	350	71.0	22.7	6.2

Sub-groups

Table 7.2 shows program participation by parity for the total population, those living in targeted neighborhoods, and by year of delivery. The percentage of first and second time mothers in the total population served by the RMP and the NPP was about the same (6% of the total), with RMP participants represented more in the targeted neighborhoods during 1988. The percentage of NoPNC increases with parity, suggesting the importance of maintaining contact with the young mothers to assist them in spacing their family and entering prenatal care early with any pregnancy.

The overall percentage distributions changed little in 1989. However, increased NPP participation was reflected within each group. Among teens who delivered no prior children, the percentage served by the NPP doubled from 1988 to 1989 (5.9% to 10.3%); among those who delivered more than one child, the NPP participation percentage increased seven-fold (4.3% to 27.3%). The percentage of teens in each

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parity category receiving no prenatal care decreased overall in 1989.

Targeted Neighborhoods. The RMP served twice as many first-time mothers delivering in 1988 from the targeted neighborhoods as did the NPP. From 1988 to 1989 there here was a slight increase in the percentage of teens served by the RMP who have one or more prior pregnancies 1989. The total population figures do not reflect such an increase. As serving first time mothers is a RMP program goal, this indicator should be a monitored on a concurrent basis.

Prenatal Intervention Groups. Table 7.3 presents the parity distribution (prior live born infants) within prenatal intervention groups. More than 80% of RMP participants were first-time mothers, reflecting the program's emphasis on this group. First-time mothers made up the majority of all other groups, except the NoPNC, which was evenly split between first and second-time mothers. NoPNC had the largest percentage of mothers with more than one prior live birth.

The 1989 figures depict an increase in more than one prior birth in two specialized support groups, and no teens having a second child in the NoPNC group, even though the population totals remained the same each year. The numbers here are very small, possibly reflecting successful outreach for prenatal care to teens known to be at high risk for a subsequent pregnancy.

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Table 7.2. PARITY by Program Participation (in percentages)

	1988		1989	
	NO PRIOR PREGNANCIES		NO PRIOR PREGNANCIES	
	TOTAL n= 611	TARGET n= 343	TOTAL n= 253	TARGET n= 108
ALL	71.0	69.2	71.3	64.3
RMP	6.5	11.1	4.0	8.3
NPP	5.9	5.8	10.3	17.6
TRAD	85.6	81.3	82.6	67.6
NoPNC	2.0	1.8	1.6	2.8
	100.0	100.0	100.0	100.0
	ONE PRIOR PREGNANCY		ONE PRIOR PREGNANCY	
	TOTAL n= 203	TARGET n= 116	TOTAL n= 80	TARGET n= 44
ALL	23.6	23.6	22.5	26.2
RMP	3.9	6.5	6.3	11.4
NPP	3.9	5.5	15.8	11.4
TRAD	86.2	81.2	83.5	75.0
NoPNC	6.0	6.8	2.5	2.2
	100.0	100.0	100.0	100.0
	> ONE PRIOR PREGNANCY		> ONE PRIOR PREGNANCY	
	TOTAL n= 47	TARGET n= 36	TOTAL n= 22	TARGET n= 16
ALL	5.4	7.2	6.2	9.5
RMP	2.1	2.8	9.1	12.5
NPP	4.3	0.0	27.3	18.8
TRAD	83.0	86.1	59.1	62.5
NoPNC	10.6	11.1	0.0	0.0
	100.0	100.0	100.0	100.0
	n = 859	n = 495	n = 356	n = 168
	p_2 = .0013	p = .0052	p_2 = .18	p =.77
	X^2 = 25.5	X^2 = 21.9	X^2 = 13.8	X^2=6.55
	V = .12	V = .15	V = .14	V =.12

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Other Pregnancy Terminations

The association of other pregnancy terminations and future pregnancy outcome is not clear. Information on this variable is included to show the prevalence of abortion in the study population.

Total Population.

Table 8.1 presents the distribution of other pregnancy terminations within the total population.

Table 8.1. NUMBER OF OTHER PREGNANCY TERMINATIONS: Before 20 Weeks Gestation* For The Total Population
(in percentages)

Year	*n*	No Prior	One Prior	> One Prior
1988	860	88.4	10.0	2.1
1989	351	71.0	22.7	6.2

*One percent of teens delivering in 1988 and 1989 had an abortion after 20 weeks gestation.

Sub-groups

Table 8.2 shows program participation by the other pregnancy terminations for the total population, of those living in targeted neighborhoods, and by year of delivery. More than 80% of the total had no other pregnancy terminations. The figure is consistent for the targeted neighborhoods and each period of time.

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Table 7.3. PARITY Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=735)	NO PNC (n=29)	TOTAL POPUL (n=859)
NO PRIOR	81.6	78.3	71.2	41.4	71.0
ONE PRIOR	16.4	17.4	23.5	41.4	23.6
> ONE PRIOR	2.0	4.3	5.3	17.2	5.4
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .0013; X^2 = 25.5; V = .12

1989

	RMP (n=17)	NPP (n=38)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=350)
NO PRIOR	58.8	68.4	72.3	66.7	71.1
ONE PRIOR	29.4	15.8	23.2	33.3	22.7
> ONE PRIOR	11.8	15.8	4.5	0.0	6.2
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .18; X^2 = 13.8; V = .14

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
NO PRIOR	82.6	76.9	68.9	33.3	69.2
ONE PRIOR	15.2	23.1	23.5	44.4	23.6
> ONE PRIOR	2.2	0.0	7.7	22.2	7.3
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .0052; X^2 = 21.9; V = .15

1989

	RMP (n=17)	NPP (n=29)	TRADITIONAL (n=156)	NO PNC (n=4)	TOTAL POPUL (n=206)
NO PRIOR	58.8	69.0	66.7	75.0	66.5
ONE PRIOR	29.4	17.2	26.9	25.0	25.7
> ONE PRIOR	11.8	13.8	6.4	0.0	7.8
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .77; X^2 = 6.55; V = .12

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Targeted neighborhoods. The distribution in the targeted neighborhood indicates a stronger RMP presence than in the total population, particularly among the group of young mothers who had no prior pregnancy terminations before 20 weeks gestation.

Prenatal Intervention Groups. Table 8.3 presents the distribution of the other pregnancy terminations before 20 weeks gestation within prenatal intervention groups. Three groups reflect the percentages of the total population. More than 85% of the RMP, NPP, and TRAD group have no other pregnancy terminations before 20 weeks gestation. A larger percentage (over 95%) of the NoPNC group had no prior pregnancy terminations before 20 weeks gestation.

Adequacy Of Prenatal Care

Adequacy of prenatal care indicators in this study are the month of pregnancy when prenatal care began, the number of medical prenatal visits completed, and the delivery hospital. Prenatal care is defined as pregnancy and infant related medical and support services to promote the health and well-being of the pregnant woman, fetus, infant, and family. Basic components include: early and continuing risk assessment, health promotion, medical supervision, psycho-

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Table 8.2. OTHER PREGNANCY TERMINATIONS: Before 20 Weeks Gestation by Program Participation (in percentages)

	1988		1989	
	NO OTHER TERMINATIONS		NO OTHER TERMINATIONS	
	TOTAL n= 755	TARGET n= 436	TOTAL n= 358	TARGET n= 317
ALL	87.8	88.1	88.4	89.0
RMP	5.8	9.4	11.1	4.7
NPP	5.4	5.3	5.6	10.7
TRAD	85.1	81.0	78.5	81.1
NoPNC	3.7	4.3	4.5	1.9
	100.0	100.0	100.0	100.0
	ONE OTHER TERMINATION		ONE OTHER TERMINATION	
	TOTAL n= 86	TARGET n= 48	TOTAL n= 32	TARGET n= 19
ALL	10.0	9.6	9.0	11.3
RMP	7.0	10.4	6.3	10.5
NPP	4.7	2.1	9.4	10.5
TRAD	87.1	87.5	84.4	79.0
NoPNC	1.2	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	> ONE OTHER TERMINATION		> ONE OTHER TERMINATION	
	TOTAL n= 19	TARGET n= 11	TOTAL n= 7	TARGET n= 2
ALL	2.2	2.2	2.0	1.2
RMP	0.0	0.0	0.0	0.0
NPP	10.5	18.2	28.6	50.0
TRAD	89.5	81.8	71.4	50.0
NoPNC	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	$n = 860$	$n = 495$	$n = 356$	$n = 168$
	$p = .77$	$p = .4038$	$p = .9500$	$p = .9600$
	$X^2 = 4.9$	$X^2 = 8.3$	$X^2 = 4.02$	$X^2 = 3.8$
	$V = .05$	$V = .09$	$V = .08$	$V = .09$

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social interventions and follow-up.[161] The National Commission to Prevent Infant Mortality reports that the percentage of women, particularly black women, receiving early and regular prenatal care has declined significantly in the 1980's.[162] Nationally, 33% of all teenage mothers obtain inadequate care, as compared with 16% of all mothers and 27 percent of black mothers.[163] In Virginia, the care blacks receive is better than the average--22% of blacks in Virginia receive inadequate care.[164]

Early and comprehensive prenatal care is associated with lower rates of maternal mortality, infant mortality and low birth weights.[165] The American College of Obstetricians and Gynecologists recommends that care begin in the first month of pregnancy, or within the first six weeks of gestation, dated from the first day of the last menstrual period.[166] Adequacy of medical prenatal care combines the timing of entry into prenatal care with the number of

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[161]Caring for Our Future: The Content of Prenatal Care, p. 2.

[162]Troubling Trends, p. 28.

[163]Singh, Forrest, and Torres, p. 10.

[164]Singh, Forrest, Torres, p. 12.

[165]Troubling Trends, p.29.

[166]Standards for Obstetric-Gynecologic Services, American College of Obstetricians and Gynecologists, Washington, D.C., 1985.

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Table 8.3. OTHER PREGNANCY TERMINATIONS: Before 20 Weeks Gestation Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
NONE	87.8	87.0	87.5	96.6	87.8
ONE	12.2	8.7	10.2	3.4	10.0
> ONE	0.0	4.3	2.3	0.0	2.2
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .77$; $X^2 = 4.86$ $V = .05$

1989

	RMP (n=17)	NPP (n=39)	TRADI TIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
NONE	88.2	87.2	88.9	100.0	89.1
ONE	11.8	7.7	9.4	0.0	9.0
> ONE	0.0	5.1	1.7	0.0	1.9
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .95$; $X^2 = 4.02$; $V = .08$

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADI TIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
NONE	89.1	88.5	87.4	100.0	88.1
ONE	10.9	3.8	10.4	0.0	9.7
> ONE	0.0	7.7	2.2	0.0	2.2
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .4$; $X^2 = 8.3$; $V = .09$

1989

	RMP (n=17)	NPP (n=29)	TRADI TIONAL (n=156)	NO PNC (n=4)	TOTAL POPUL (n=206)
NONE	88.2	89.7	88.5	100.0	88.8
ONE	11.8	6.9	10.9	0.0	10.2
> ONE	0.0	3.4	.6	0.0	1.0
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .96$; $X^2 = 3.8$; $V = .09$

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medical visits completed during the pregnancy, taking length of gestation into account.[167]

Month Of Pregnancy When Care Began

When prenatal care begins early (i.e., in the first trimester), risk assessment can identify early potential and actual problems, nutritional and lifestyle adjustments can be made before the infant is fully formed, and personal needs can be addressed. Late entry into prenatal care is often associated with preterm deliveries and births of low weight infants and/or infants with congenital abnormalities or infections.

Vital statistics on the month care began and the number of prenatal visits is reported to Virginia Department of Health, via a registration clerk, by the mother at the time of delivery. Comparing RMP and NPP participant self-reports with information from the medical records revealed inconsistencies, usually reflecting earlier initiation of prenatal care and more visits than were officially recorded. Though distortion occurs through self-reporting, the information is still useful because the statistical trends are consistent over time.

Total Population

Table 9.1 presents the distribution of the month prenatal care begins within the total population. According

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[167]Singh, Forrest, and Torres, p. v.

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to the self-reported information, just over half of the teens entered care in the first trimester each year. Birth certificate information of a small convenience sample was compared with the actual medical records and entry into care was found to be later than reported in many instances, confirming the assumption that self-reported data is inflated. Low birth weights could be prevented in many

Table 9.1. MONTH PRENATAL CARE BEGAN for Total Population: (in percentages)

Year	n	< 4 Months	> 3 Months
1988	854	51.9	48.1
1989	351	48.1	51.9

cases and lessened in others by 3 - 5 percent if all the adolescents began prenatal care in the first trimester.[168]

Sub-Groups

Targeted Neighborhoods. Table 9.2 shows program participation by the characteristic of month care began for the total population, those living in targeted neighborhoods, and by year of delivery. In 1988, the RMP entry into care figures were slightly better than the total group of adolescents, and this was particularly true for the targeted neighborhoods. The 1989 data again demonstrates

[168]Preventing Low Birthweight, Institute of Medicine, Washington, D.C., 1988, p. 109.

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Table 9.2. MONTH CARE BEGAN: Before the Fourth Month of Pregnancy by Program Participation (in percentages)

	1988		1989	
	ADEQUATE MCB (< FOUR MONTHS)		ADEQUATE MCB (< FOUR MONTHS)	
	TOTAL n= 444	TARGET n= 184	TOTAL n= 169	TARGET n= 67
ALL	52.0	45.9	48.1	41.1
RMP	5.9	12.5	6.5	14.9
NPP	3.4	4.3	11.2	17.9
TRAD	90.8	83.2	82.2	67.2
NoPNC	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	INADEQUATE MCB (> THREE MONTHS)		INADEQUATE MCB (> THREE MONTHS)	
	TOTAL n= 410	TARGET n= 217	TOTAL n= 174	TARGET n= 96
ALL	48.0	54.1	51.9	58.9
RMP	5.6	10.1	3.3	6.3
NPP	7.6	6.9	11.0	15.6
TRAD	80.0	75.6	82.4	74.0
NoPNC	6.8	6.9	3.3	100.0
	100.0	100.0	100.0	100.0
	n = 854	n = 490	n = 351	n = 163
	p =.0000	p = .0000	p = .0590	p=.1024
	X^2 = 40.2	X^2 = 21.6	X^2 = 7.4	X^2 =6.2
	V = .22	*V* = .21	*V* =.15	*V* =.19

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important gains, reflecting the NPP's increased efforts of to reach the at-risk adolescents. The change is likely related to two factors: (1) working with teens who would likely have received no prenatal care, and (2) the percentage decrease of teens entering care early through traditional providers--especially in the targeted neighborhoods.

Prenatal Intervention Groups. Table 9.3 presents the distribution of entry into care within prenatal intervention groups. RMP participants entered care earlier than the population as a whole and earlier than other subgroups. Evidence in this table supports recommendations in other reports that specialized prenatal support programs are well suited, guiding into prenatal care women who are at increased risk due to young age, income, limited education, and race. Inconsistencies in the reported data make interpretation difficult, however, the figures demonstrate a need to improve outreach, education, and access to services.

Prenatal Visits

Number of prenatal visits is the variable most strongly associated with improved pregnancy outcomes in the total population and across all sub-groups. While higher numbers of prenatal visits are associated with early entry into prenatal care, prenatal visits during the second and third trimesters of pregnancy are opportunities to identify and treat problems such as fetal distress and preterm labor.

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Table 9.3. MONTH CARE BEGAN: Before Fourth Month of Pregnancy within Prenatal Intervention Groups
(in percentages)

Total Population
1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=729)	NO PNC (n=35)	TOTAL POPUL (n=859)
< 4TH MONTH	53.1	32.6	55.1	0.0	51.9
> 3RD MONTH	46.9	67.4	44.9	100.0	48.1
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0000$; $X^2 = 42.3$ $V = .22$

Targeted Neighborhoods
1988

	RMP (n=49)	NPP (n=26)	TRADITIONAL (n=401)	NO PNC (n=22)	TOTAL POPUL (n=495)
< 4TH MONTH	51.1	34.8	48.3	0.0	45.9
> 3RD MONTH	48.9	65.2	51.7	100.0	54.1
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0031$; $X^2 = 15.9$ $V = .20$

Total Population
1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n= 6)	TOTAL POPUL (n=351)
< 4TH MONTH	64.7	48.7	48.1	0.0	48.1
> 3RD MONTH	35.3	51.3	51.9	100.0	51.9
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0590$; $X^2 = 7.4$ $V = .15$

Targeted Neighborhoods
1989

	RMP (n=16)	NPP (n=27)	TRADITIONAL (n=116)	NO PNC (n=4)	TOTAL POPUL (n=163)
< 4TH MONTH	51.1	34.8	48.3	0.0	45.9
> 3RD MONTH	48.9	65.2	51.7	100.0	54.1
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0031$; $X^2 = 15.9$ $V = .20$

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Total Population

Table 10.1 presents the distribution of the prenatal visits within the total population. Though the influence of self-reported data makes interpretation difficult, there is consistency between the number of prenatal visits and expected pregnancy outcomes.

Table 10.1. PRENATAL VISITS for The Total Population: (in percentages)

Year	*n*	> 6 Visits	< 7 Visits
1988	841	83.7	16.3
1989	344	86.3	13.7

Sub-Groups

Targeted Neighborhoods. Table 10.2 shows the program participation by the percentage of all adolescent mothers who attended more than 6 prenatal visits those living in targeted neighborhoods, and for year of delivery. Little change occurred between 1988 and 1989 in the percentage of mothers attending more than 6 prenatal visits. The influence of a specialized support program is demonstrated by the total and target columns.

Prenatal Intervention Groups. Table 10.3 presents the distribution of prenatal visit data within prenatal intervention groups. RMP participants attend appointments early in pregnancy and consistently through delivery.

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Table 10.2. NUMBER OF PRENATAL VISITS: More Than Six By Program Participation (in percentages)

	1988		1989	
	ADEQUATE PNV		ADEQUATE PNV	
	TOTAL n=704	TARGET n=335	TOTAL n=297	TARGET n=133
ALL	83.7	85.5	86.3	83.6
RMP	6.1	12.5	5.1	10.6
NPP	4.8	6.0	10.5	16.5
TRAD	89.1	81.5	82.9	72.9
NoPNC	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	INADEQUATE PNV		INADEQUATE PNV	
	TOTAL n= 137	TARGET n= 57	TOTAL n=47	TARGET n=26
ALL	16.3	14.5	13.7	16.4
RMP	4.4	5.3	2.1	3.8
NPP	8.8	5.3	14.9	19.2
TRAD	65.7	60.3	70.2	61.5
NoPNC	21.2	29.1	12.8	100.0
	100.0	100.0	100.0	100.0
	n = 841	n = 392	n = 344	n = 159
	p =.0000	p =.0000	p =.0000	p=.0001
	X^2 160.2	X^2= 98.8	X^2= 40.2	X^2=21.2
	V = .44	V = .50	V = .34	V = .31

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Table 10.3. PRENATAL VISITS Within Prenatal Intervention Groups: More Than Six (in percentages)

Total Population
1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=717)	NO PNC (n=35)	TOTAL POPUL (n=841)
> 6 VISITS	87.8	73.9	87.4	0.0	83.7
< 7 VISITS	12.2	26.1	12.6	100.0	16.3
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .0000; X^2 = 160.2; V = .44

Target Population

	RMP (n=45)	NPP (n=23)	TRADITIONAL (n=308)	NO PNC (n=16)	TOTAL POPUL (n=392)
> 6 VISITS	93.3	87.0	88.6	0.0	85.5
< 7 VISITS	6.7	13.0	11.4	100.0	14.5
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .0000; X^2 = 98.8 V = .50

Total Population
1989

	RMP (n=16)	NPP (n=39)	TRADITIONAL (n=283)	NO PNC (n= 6)	TOTAL POPUL (n=344)
> 6 VISITS	93.8	82.1	88.3	0.0	86.3
< 7 VISITS	6.3	17.9	11.7	100.0	16.3
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .0000; X^2 = 40.2; V = .34

Target Population
1989

	RMP (n=15)	NPP (n=27)	TRADITIONAL (n=113)	NO PNC (n= 4)	TOTAL POPUL (n=159)
> 6 VISITS	93.6	81.5	85.8	0.0	83.6
< 7 VISITS	6.7	18.5	14.2	100.0	16.4
TOTALS	100.0	100.0	100.0	100.0	100.0

p = .0001; X^2 = 30.0; V = .37

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Hospital of Delivery

Under the concept of regionalized perinatal care, high-risk patients are monitored, treated, and delivered at the tertiary perinatal center where health care specialists, diagnostic equipment, and treatment technologies are available. In some localities, as many as 40 percent of pregnant adolescents are classified as high-risk perinatal patients. Therefore, it is expected that a large number of adolescents deliver at the local tertiary center. Additionally many teens wish to deliver at the perinatal center because of the hospital's reputation and because their friends go there to deliver.

Total Population

Table 11.1 presents the distribution of the hospital of delivery within the total population. As expected, more teens deliver at the tertiary center than at other hospitals.

Table 11.1. HOSPITAL OF DELIVERY for The Total Population (in percentages)

Year	*n*	DePAUL	NCH	NGH	PNH	NO HOSP
1988	860	27.4	16.0	35.8	16.9	0.6
1989	351	27.6	12.6	43.0	13.7	0.6

*1.5% delivered in a hospital outside the Norfolk area.

**DePaul = Depaul Medical Center; NCH = Norfolk Community Hospital; NGH = Sentara Norfolk General; PNH = Portsmouth Naval Hospital; No Hospital = not delivered in a hospital.

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Targeted Neighborhoods. Table 11.2 shows program participation by the hospital of delivery or the total population, for those living in targeted neighborhoods, and for year of delivery.

Prenatal Intervention Groups. Table 11.3 presents the distribution of hospital of delivery data within prenatal intervention groups. Though most adolescents without prenatal care delivered at the major tertiary center (NGH), an appreciable number also delivered at the hospital closest to the neighborhood not specifically served by either specialized prenatal intervention program. The no prenatal care group also demonstrated the largest percentage of out of hospital deliveries in 1988.

Pregnancy Outcomes

Infant Birth Weight

Infant birth weight is a sensitive indicator of pregnancy outcome reflecting the length of pregnancy and the well-being of the infant. Standardized charts relate length of pregnancy to birth weight and indicate whether the infant is appropriately grown, small for gestational age, or large for gestational age. Infant deliveries occurring before the expected 38 - 40 weeks of gestation are considered pre-term. These infants frequently weigh less than 2500 grams and are considered of low birth weight.

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Table 11.2. HOSPITAL OF DELIVERY by Program Participation (in percentages)

	1988		1989	
	DePAUL		DePAUL	
	TOTAL n= 236	TARGET n= 73	TOTAL n= 97	TARGET n= 22
ALL	27.4	18.0	27.6	13.5
RMP	2.5	4.1	3.1	9.1
NPP	7.2	21.7	9.3	22.7
TRAD	88.6	19.7	86.6	63.6
NoPNC	1.7	12.5	1.0	4.6
	100.0	100.0	100.0	100.0
	NORFOLK COMMUNITY HOSP		NORFOLK COMMUNITY HOSP	
	TOTAL n= 138	TARGET n= 107	TOTAL n= 43	TARGET n= 36
ALL	16.0	26.4	12.3	22.8
RMP	7.3	9.3	2.3	2.0
NPP	11.6	10.3	25.6	25.0
TRAD	80.4	80.4	72.1	72.2
NoPNC	0.7	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	NORFOLK GENERAL		NORFOLK GENERAL	
	TOTAL n= 308	TARGET n= 201	TOTAL n=151	TARGET n= 96
ALL	35.8	19.6	43.0	58.9
RMP	9.7	14.9	8.6	13.5
NPP	3.9	3.0	12.6	13.5
TRAD	79.5	75.6	76.2	70.8
NoPNC	6.8	6.5	2.6	2.2
	100.0	100.0	100.0	100.0
	PORTSMOUTH NAVAL HOSP		PORTSMOUTH NAVAL HOSP	
	TOTAL n= 145	TARGET n= 14	TOTAL n= 48	TARGET n= 7
ALL	16.9	3.5	13.7	4.3
RMP	1.4	7.1	0.0	0.0
NPP	0.0	0.0	0.0	0.0
TRAD	97.2	92.9	97.9	85.7
NoPNC	1.4	0.0	2.1	14.3
	100.0	100.0	100.0	100.0

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Table 11.2. HOSPITAL OF DELIVERY by Program Participation cont., (in percentages)

	1988		1989	
	TOTAL n= 5	NO HOSPITAL TARGET n= 4	TOTAL n= 2	NO HOSPITAL TARGET n= 2
ALL	0.6	1.2	0.6	1.2
RMP	0.0	0.0	0.0	0.0
NPP	20.0	25.0	0.0	0.0
TRAD	60.0	50.0	100.0	100.0
NoPNC	20.0	25.0	0.0	0.0
	100.0	100.0	100.0	100.0
	n = 860	n = 404	n = 356	n = 168

Total Population

Table 12.1 presents the distribution of infant birth weight outcomes within the total population grouped as more than 2499 grams (not low birth weight), 1500 grams to 2499 grams (low birth weight), and less than 1500 grams (very low birth weight). The slight variation in birth weight by year shows little change in the percentage of very low birth weight infants and a slight increase in the percentage of infants weighing 2499 to 1500 grams. Given minimal changes in adequacy of care indicators--month care began and prenatal visits--pregnancy outcome improvement is not unexpected.

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Table 11.3. HOSPITAL OF DELIVERY Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
DePAUL	12.2	37.0	28.4	13.8	27.4
NORF COMM	20.5	34.8	15.1	3.4	16.0
NORF GEN	61.2	26.0	33.2	72.4	35.8
CHES GEN	2.0	0.0	1.0	0.0	0.9
PORTS NAV	4.1	0.0	19.2	6.9	16.9
PORTS GEN	0.0	0.0	.7	0.0	.6
VA BEACH	0.0	0.0	2.0	0.0	1.7
NO HOSP	0.0	2.2	.4	3.5	.7
TOTALS	100.0	100.0	100.0	100.0	100.0

1989

	RMP (n=17)	NPP (n=39)	TRADI TIONAL (n=289)	NO PNC (n= 6)	TOTAL POPUL (n=351)
DePAUL	17.6	23.1	29.6	16.7	27.6
NORF COMM	5.9	28.2	10.7	0.0	12.3
NORF GEN	76.5	48.7	40.1	66.6	43.0
CHES GEN	0.0	0.0	.7	0.0	0.6
PORTS NAV	0.0	0.0	16.3	16.7	13.7
PORTS GEN	0.0	0.0	.7	0.0	.6
VA BEACH	0.0	0.0	1.6	0.0	1.4
NO HOSP	0.0	0.0	.7	0.0	.6
TOTALS	100.0	100.0	100.0	100.0	100.0

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Table 11.3. HOSPITAL OF DELIVERY Within Prenatal Intervention Groups (in percentages), con't.

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADI TIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
DePAUL	8.7	30.8	25.1	11.0	23.4
NORF COMM	21.7	42.3	21.5	0.0	21.8
NORF GEN	65.2	23.1	42.5	77.8	44.8
CHES GEN	2.2	0.0	1.0	0.0	1.0
PORTS NAV	2.2	0.0	8.4	5.6	7.2
PORTS GEN	0.0	0.0	.5	0.0	.4
VA BEACH	0.0	0.0	0.5	0.0	.4
NO HOSP	0.0	3.8	.5	5.6	1.0
TOTALS	100.0	100.0	100.0	100.0	100.0

1989

	RMP (n=16)	NPP (n=27)	TRADI TIONAL (n=116)	NO PNC (n=4)	TOTAL POPUL (n=163)
DePAUL	12.5	18.5	12.1	25.0	13.5
NORF COMM	6.3	33.3	22.4	0.0	22.1
NORF GEN	81.3	48.1	58.6	50.0	58.9
CHES GEN	0.0	0.0	0.0	0.0	0.0
PORTS NAV	0.0	0.0	5.2	14.3	4.3
PORTS GEN	0.0	0.0	.0	0.0	0.0
VA BEACH	0.0	0.0	0.0	0.0	0.0
NO HOSP	0.0	0.0	1.7	0.0	1.2
TOTALS	100.0	100.0	100.0	100.0	100.0

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Table 12.1. BIRTH WEIGHT OUTCOMES for the Total Population (in percentages)

Year	*n*	> 2499 GRAMS	1500-2499	< 1500 GRAMS
1988	860	90.7	7.2	2.1
1989	351	88.2	9.0	2.8

Sub-Groups

Targeted Neighborhoods. Table 12.2 shows program participation by birth weight categories of not low birth weight (more than 2500 grams), low birth weight (2500 to 1500 grams, and very low birth weight (less than 1500 grams). The percentage of low birth weight infants born to adolescents varied little between the total population and the target neighborhoods.

Prenatal Intervention Groups. Table 12.3 presents the distribution of birth weight category data within prenatal intervention groups. No very low birth weight infants were born to RMP participants. Overall fewer low birth weight infants (2499 - 1500 grams) occurred among the NPP participants. The largest percentage of very low birth weight (less than 1499 grams) infants were born to adolescent mothers receiving no prenatal care.

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Table 12.2. BIRTH WEIGHT OUTCOMES by Program Participation (in percentages)

	1988		1989	
	NOT LBW		NOT LBW	
	TOTAL n= 780	TARGET n= 447	TOTAL n= 309	TARGET n= 135
ALL	90.7	90.3	88.0	82.8
RMP	5.7	9.3	5.5	11.9
NPP	5.3	5.4	10.3	15.6
TRAD	91.0	81.5	83.2	71.1
NoPNC	3.4	3.8	1.0	1.5
	100.0	100.0	100.0	100.0
	VERY LOW BIRTH WEIGHT		VERY LOW BIRTH WEIGHT	
	TOTAL n= 18	TARGET n= 8	TOTAL n= 10	TARGET n= 7
ALL	2.1	1.6	2.8	4.3
RMP	0.0	0.0	0.0	0.0
NPP	5.6	12.5	10.0	0.0
TRAD	72.2	75.0	80.0	85.7
NoPNC	22.2	12.5	10.0	14.3
	100.0	100.0	100.0	100.0
	MODERATELY LBW		MODERATELY LBW	
	TOTAL n= 62	TARGET n= 40	TOTAL n= 32	TARGET n= 21
ALL	7.2	8.1	9.0	12.9
RMP	8.1	12.5	0.0	0.0
NPP	3.2	2.5	18.8	28.6
TRAD	83.8	82.5	75.0	66.6
NoPNC	4.9	2.5	6.2	4.8
	100.0	100.0	100.0	100.0
	n = 860	n = 495	n = 351	n = 163
	p = .0042	p = .9214	p = .0390	p= .0709
	X^2 = 22.0	X^2 = 3.2	X^2 = 13.27	X^2 =11.6
	V = .11	*V* = .06	*V* = .14	*V* =.89

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Table 12.3. BIRTH WEIGHT OUTCOMES within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=729)	NO PNC (n=36)	TOTAL POPUL (n=860)
GRAMS					
LO-1499	0.0	2.2	1.6	13.9	2.1
1500-2499	10.2	4.3	7.1	8.4	7.2
2500-HI	89.8	93.5	91.3	77.7	90.7
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0045$
$X^2 = 22.2$; $V = .11$

1989

	RMP (n=17)	NPP (n=39)	TRADI TIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
GRAMS					
LO-1499	0.0	2.5	2.8	16.7	2.8
1500-2499	0.0	15.4	8.3	33.3	9.0
2500-HI	100.0	82.1	88.9	50.0	88.2
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0390$
$X^2 = 13.27$ $V = .14$

Low Birth Weight: 2499 - 1500 Grams

The birth weight data in this category is grouped showing the larger aggregate frequently reported in the literature and this grouping creates a contingency table with fewer cells having an expected frequency less than 5.

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Table 12.3. BIRTH WEIGHT OUTCOMES By Prenatal Program Groups cont., (in percentages)

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADI TIONAL (n=401)	NO PNC (n=22)	TOTAL POPUL (n=495)
GRAMS					
LO-1499	0.0	3.8	1.5	4.5	1.6
1500-2499	10.9	3.8	8.2	5.5	8.1
2500-HI	89.1	92.2	90.3	90.0	90.3
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .92$
$X^2 = 3.2 \quad V = .06$

1989

	RMP (n=16)	NPP (n=27)	TRADI TIONAL (n=116)	NO PNC (n=4)	TOTAL POPUL (n=163)
GRAMS					
LO-1499	0.0	0.0	5.2	25.0	4.3
1500-2499	0.0	22.7	12.1	25.0	12.9
2500-HI	100.0	77.3	82.7	50.0	82.8
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0709$
$X^2 = 11.63; \; V = .19$

Total Population

Table 13.1 presents a second distribution of infant low birth weight outcomes within the total population grouped as not low birth weight (more than 2499 grams) and low birthweight (less than 2500 grams). Though an appreciable difference is noted between 1988 and 1989, the meaning and significance is not known.

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Table 13.1. LOW BIRTH WEIGHT OUTCOMES for Total Population Greater Than 2,499 GRAMS AND Less Than 2,500 Grams (in percentages)

Year	*n*	< 2500 GRAMS	> 2499 GRAMS
1988	860	9.7	90.3
1989	351	12.0	88.0

Targeted Neighborhoods. Table 13.2 shows program participation by the percentage of low birth weight infants delivered for the total population, for those living in targeted neighborhoods, and for year of delivery. Again, the vast majority of adolescents delivering in 1988 receive traditional services and, therefore, largest percentage of low weight and not low weight outcomes are in this group. Among those not of low birth weight, an equal percentage of teen mothers were served by each specialized prenatal intervention program; however, in the targeted neighborhoods the RMP reached nearly twice as many adolescent mothers. Of the adolescents delivering low weight infants, nearly twice as many participated in the RMP than the NPP. None of the RMP participants delivering low weight infants lived in the target neighborhoods. Young mothers outside the target area were admitted to the RMP when circumstances suggested the adolescent was at particular risk for a poor pregnancy outcome or social/school difficulties. It is not possible to determine whether any RMP participants would have received no prenatal care without the RMP outreach activities in the

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targeted neighborhoods. However, all adolescents not receiving prenatal living in the targeted neighborhood delivered infants weighing greater than 2499 grams. In the total population nearly 10% of adolescents delivering low weight infants received no prenatal care.

Prenatal Intervention Groups. Table 13.3 presents the distribution of low weight infant data within prenatal intervention groups. The percentage of low weight deliveries among mothers not receiving prenatal care is 20.7. This large percentage of low birth weight among the NoPNC group is consistent with state and national data about pregnancy outcomes of women receiving no prenatal care. The NPP has the lowest percentage of low birth weight deliveries, the TRAD percentage was equal to that of the total population, and the RMP group was slightly higher.

Gestational Age

Gestational age refers to the number of completed weeks/days which have elapsed between the first day of the last normal period to delivery of the fetus.[169] Infants delivered prior to term are at increased risk of death and illness due to their immaturity and the complications associated with special problems of the premature infant.

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[169]Avery, p. 23.

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Table 13.2. LOW BIRTH WEIGHT OUTCOMES: Greater than 2499 Grams And Less Than 2,500 GRAMS by Program Participation (in percentages)

	1988		1989	
	NOT LBW		NOT LBW	
	TOTAL n= 780	TARGET n= 447	TOTAL n= 351	TARGET n= 140
ALL	90.7	90.3	88.0	83.3
RMP	5.6	9.3	5.5	11.4
NPP	5.5	5.4	10.4	15.0
TRAD	85.9	81.5	83.1	68.6
NoPNC	2.9	3.8	1.0	1.4
	100.0	100.0	100.0	100.0
	LOW BIRTH WEIGHT		LOW BIRTH WEIGHT	
	TOTAL n= 80	TARGET n= 8	TOTAL n= 42	TARGET n= 7
ALL	9.3	1.6	12.0	4.2
RMP	6.2	0.0	0.0	0.0
NPP	3.8	12.5	16.7	0.0
TRAD	82.5	87.5	76.2	85.7
NoPNC	7.5	0.0	7.1	14.3
	100.0	100.0	100.0	100.0

Cells with and expected frequency less than 5 = 37.5%.

n = 860	n = 495	n = 351	n = 168
p =.0045	p = .9214	p = .0071	
X^2 = 22.2	X^2 = 3.2	X^2 = 12.1	X^2 =
V = .11	V = .06	V = .19	V =

Total Population

Table 14.1 presents the distribution of gestational age outcomes within the total population grouped as not preterm

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Table 13.3. LOW BIRTH WEIGHT OUTCOMES: Less Than 2,500 GRAMS And Greater than 2,499 GRAMS Within Prenatal Intervention Groups (in percentages)

Total Population
1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=729)	NO PNC (n=36)	TOTAL POPUL (n=860)
GRAMS					
< 2,500	10.2	6.5	9.0	20.7	9.3
> 2,499	89.8	93.5	91.0	79.3	90.7
TOTALS	100.0	100.0	100.0	100.0	100.0

Cells with an expected frequency less than 5 = 37.5%.
p= .17. Significance not attained.
$X^2 = 5.24$ $V = .08$

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
GRAMS					
< 2,500	0.0	17.9	11.1	50.0	11.0
> 2,499	100.0	82.1	88.9	50.0	88.0
TOTALS	100.0	100.0	100.0	100.0	100.0

Cells with an expected frequency less than 5 = 37.5%.
$p = .0071$; $X^2 = 12.1$; $V = .19$

(born after the 37th week of pregnancy), preterm (born between 28 and 37 weeks) and very preterm (born before the 28th week of pregnancy). The percentage of very pre-term infants delivered in the first six months of 1989 was nearly double the percentage of very pre-term infants delivered in 1988.

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Table 13.3. LOW BIRTH WEIGHT OUTCOMES: Greater Than 2,500 Grams and Less Than 2,499 Grams Within Prenatal Intervention Groups (in percentages), cont.

Targeted Neighborhoods

1988

GRAMS	RMP (n=46)	NPP (n=26)	TRADI TIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=494)
< 2,500	10.9	7.7	9.9	5.6	9.7
> 2,500	89.1	92.3	90.1	94.4	90.3
TOTALS	100.0	100.0	100.0	100.0	100.0

p_2 = .9553. Significance not attained.
X^2 = .67 V = .04

1989

GRAMS	RMP (n=17)	NPP (n=29)	TRADI TIONAL (n=156)	NO PNC (n=4)	TOTAL POPUL (n=206)
< 2,500	0.0	20.7	13.5	25.0	14.1
> 2,500	100.0	79.3	86.5	50.0	85.9
TOTALS	100.0	100.0	100.0	100.0	100.0

p_2 = .1. Significance not attained.
X^2 = 9.13; V = .21

Targeted Neighborhoods. Table 14.2 shows program participation by the percentage of gestational age categories delivered for the total population, for those living in targeted neighborhoods, and for year of delivery. The NoPNC group demonstrates a high percentage of very pre-term infants (born before the 32nd week of gestation). The TRAD category,

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Table 14.1. GESTATIONAL AGE OF INFANT AT DELIVERY For Total Population (in percentages)

Year	*n*	< 28 Weeks	28-37 Weeks	> 37 Weeks
1988	860	1.4	12.5	86.1
1989	351	2.2	12.7	85.1

being the largest overall group, shows the highest percentage of infants born before the 38th week of gestation and after the 42nd gestational week.

Prenatal Intervention Groups. Table 14.3 presents the distribution of gestational age of deliveries within prenatal intervention groups. Lack of prenatal care (NoPNC) again is a characteristic of the group showing the highest percentage of pre-term deliveries. The NPP shows the lowest percentage of pre-term deliveries. Post term delivery was only noted among the TRAD group (.4%).

Intrauterine Growth Status

Intrauterine growth standards are difficult to establish because of inherent differences in specific populations and because infant weights used to establish standards for pre-term infants may be affected by the conditions precipitating the early delivery.[170] In spite of these difficulties, standards are accepted within the limits described above in order to identify high-risk infants and

[170]Avery, p. 206.

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Table 14.2. GESTATIONAL AGE OF INFANT AT DELIVERY by Program Participation (in percentages)

	1988		1989	
	38 - 42 WEEKS		38 - 42 WEEKS	
	TOTAL n= 737	TARGET n= 352	TOTAL n= 297	TARGET n= 138
ALL	85.7	87.1	84.4	84.7
RMP	5.8	11.4	5.7	11.6
NPP	6.0	6.0	9.8	14.5
TRAD	85.2	79.0	83.8	73.2
NoPNC	3.0	3.6	.7	.7
	100.0	100.0	100.0	100.0
	32 - 37 WEEKS		32 - 37 WEEKS	
	TOTAL n= 100	TARGET n= 46	TOTAL n= 41	TARGET n= 16
ALL	11.6	11.4	11.7	9.8
RMP	6.0	10.9	0.0	0.0
NPP	2.0	4.3	19.5	37.5
TRAD	89.0	78.3	73.2	50.0
NoPNC	3.0	6.5	7.3	12.5
	100.0	100.0	100.0	100.0
	28 - 31 WEEKS		28 - 31 WEEKS	
	TOTAL n= 8	TARGET n= 4	TOTAL n= 4	TARGET n= 4
ALL	.9	.7	1.1	2.5
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	25.0	25.0
TRAD	87.5	100.0	75.0	75.0
NoPNC	12.5	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	24 - 27 WEEKS		24 - 27 WEEKS	
	TOTAL n= 6	TARGET n= 1	TOTAL n= 5	TARGET n= 4
ALL	.7	.2	1.4	2.5
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	20.0	0.0
TRAD	66.7	100.0	60.0	75.0
NoPNC	33.3	0.0	20.0	25.0
	100.0	100.0	100.0	100.0

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Table 14.2. GESTATIONAL AGE OF INFANT AT DELIVERY by Program Participation (in percentages), con't.

	1988		1989	
	LESS THAN 24 WEEKS		LESS THAN 24 WEEKS	
	TOTAL	TARGET	TOTAL	TARGET
	n= 6	n= 2	n= 3	n= 1
ALL	.7	.5	.9	.6
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	0.0	0.0
TRAD	83.3	100.0	100.0	100.0
NoPNC	13.7	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	MORE THAN 42 WEEKS		MORE THAN 42 WEEKS	
	TOTAL	TARGET	TOTAL	TARGET
	n= 3	n= 0	n= 1	n= 0
ALL	.3	0.0	.3	0.0
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	0.0	0.0
TRAD	100.0	0.0	100.0	0.0
NoPNC	0.0	0.0	0.0	0.0
	100.0	0.0	100.0	0.0
	n = 860	n = 404	n = 351	n = 163
	p = .0267	p = .9977	p=.0217	p=.0095
	X^2 = 27.3	X^2 = 2.6	X^2 =28.0	X^2 =26.4
	V = .10	*V* = .05	*V* =.06	*V* =.23

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Table 14.3. GESTATIONAL AGE OF INFANT AT DELIVERY within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
< 24 WEEKS	0.0	0.0	.7	3.4	.7
24 - 27 WEEKS	0.0	0.0	.5	6.9	.7
28 - 31 WEEKS	0.0	0.0	1.0	3.4	.9
32 - 37 WEEKS	12.2	4.3	12.1	10.3	11.6
38 - 42 WEEKS	87.8	95.7	85.3	75.9	85.8
> 42 WEEKS	0.0	0.0	.4	0.0	.3
TOTAL	100.0	100.0	100.0	100.0	100.0

p=.0267 X^2 = 27.3 V = .10

1989

	RMP (n=17)	NPP (n=39)	TRADITIONAL (n=289)	NO PNC (n=6)	TOTAL POPUL (n=351)
< 24 WEEKS	0.0	0.0	1.0	0.0	.9
24 - 27 WEEKS	0.0	2.6	1.0	16.7	1.4
28 - 31 WEEKS	0.0	2.6	1.0	0.0	1.1
32 - 37 WEEKS	0.0	20.4	10.5	50.0	11.7
38 - 42 WEEKS	100.0	74.4	86.2	33.3	84.6
> 42 WEEKS	0.0	0.0	.3	0.0	.3
TOTAL	100.0	100.0	100.0	100.0	100.0

p= .0217 X^2 = 28.0 V = .16

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Table 14.3. GESTATIONAL AGE OF INFANT AT DELIVERY by Program Participation, cont. (in percentages)

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
< 24 WEEKS	0.0	0.0	.5	0.0	.4
24 - 27 WEEKS	0.0	0.0	.5	0.0	.4
28 - 31 WEEKS	0.0	0.0	1.2	0.0	1.0
32 - 37 WEEKS	10.9	7.7	10.9	16.7	10.9
38 - 42 WEEKS	89.1	92.3	86.4	83.3	86.9
> 42 WEEKS	0.0	0.0	.5	0.0	0.4
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = 1.0 \quad X^2 = 3.5 \quad V = .04$

1989

	RMP (n=16)	NPP (n=27)	TRADITIONAL (n=116)	NO PNC (n=4)	TOTAL POPUL (n=163)
< 24 WEEKS	0.0	0.0	.9	0.0	.6
24 - 27 WEEKS	0.0	0.0	2.6	25.0	2.5
28 - 31 WEEKS	0.0	3.7	2.6	0.0	2.5
32 - 37 WEEKS	0.0	22.2	6.8	50.0	9.8
38 - 42 WEEKS	100.0	72.1	87.1	25.0	84.6
> 42 WEEKS	0.0	0.0	0.0	0.0	0.0
TOTAL	100.0	100.0	100.0	100.0	100.0

$p = .0095 \quad X^2 = 26.4 \quad V = .23$

prepare for the specific conditions associated with alterations in intrauterine growth and length of gestation.

Total Population

Table 15.1 presents the distribution of the

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intrauterine growth status in the total population. Large for gestation (LGA) classification occurred more frequently than growth retardation (SGA). Approximately 3% of infants were classified as small for gestational age.

Table 15.1. INTRAUTERINE GROWTH STATUS for the Total Population (in percentages)

Year	*n*	AGA	LGA	SGA
1988	859	87.7	7.9	3.4
1989	350	84.3	12.8	2.9

Sub Groups

Targeted Neighborhoods. Table 15.2 shows program participation by the intrauterine growth status for the total population, for those living in targeted neighborhoods, and for year of delivery. The occurrence of intrauterine growth alterations is approximately 11% among the total population of young mothers and among those living in targeted neighborhoods (LGA = 7.5%; SGA = 3.5%).

Prenatal Intervention Groups. Table 15.3 presents the distribution of intrauterine growth within prenatal intervention groups. Infants of RMP participants have the largest percentage of infants classified as appropriate for gestational age (AGA). The NoPNC group has the largest percentage of infants classified as small for gestational age (SGA).

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Table 15.2. INTRAUTERINE GROWTH STATUS by Program Participation (in percentages)

	1988		1989	
	AGA		AGA	
	TOTAL n= 765	TARGET n= 441	TOTAL n= 301	TARGET n= 147
ALL	88.7	88.9	84.6	87.5
RMP	6.2	10.0	4.7	9.5
NPP	5.4	5.0	11.3	15.0
TRAD	85.1	81.4	80.4	69.4
NoPNC	3.3	3.6	2.0	2.7
	100.0	100.0	100.0	100.0
	LGA		LGA	
	TOTAL n= 67	TARGET n= 36	TOTAL n= 45	TARGET n= 15
ALL	7.9	7.5	12.6	8.9
RMP	1.5	3.7	6.7	13.3
NPP	2.9	7.4	6.7	20.0
TRAD	92.6	86.2	86.6	66.7
NoPNC	1.5	2.7	0.0	0.0
	100.0	100.0	100.0	100.0
	SGA		SGA	
	TOTAL n= 29	TARGET n= 18	TOTAL n= 9	TARGET n= 5
ALL	3.4	3.6	2.5	3.0
RMP	3.4	5.6	0.0	0.0
NPP	10.3	11.0	22.2	40.0
TRAD	76.0	77.8	77.8	60.0
NoPNC	10.3	5.6	0.0	0.0
	100.0	100.0	100.0	100.0
	n = 860	n = 495	n = 356	n = 168
	p = .0528	p = .0385	p = .9920	p = .99
	X^2 = 15.3	X^2 = 16.3	X^2 = 5.02	X^2 = 4.7
	V = .09	V = .13	V = .06	V = .09

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Table 15.3. INTRAUTERINE GROWTH STATUS Within Prenatal Intervention Groups (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=735)	NO PNC (n=29)	TOTAL POPUL (n=859)
APPROPRIATE	96.0	89.2	88.5	86.2	88.7
LARGE (LGA)	2.0	4.3	8.5	3.4	7.9
SMALL (SGA)	2.0	6.5	3.0	10.4	3.4
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0528$; $X^2 = 15.3$; $V = .09$

1989

	RMP (n=17)	NPP (n=39)	TRADI TIONAL (n=287)	NO PNC (n=6)	TOTAL POPUL (n=350)
APPROPRIATE	82.4	87.2	84.0	100.0	84.3
LARGE (LGA)	17.6	7.7	13.5	0.0	12.8
SMALL (SGA)	0.0	5.1	2.4	0.0	2.9
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .9920$.
$X^2 = 5.02$; $V = .06$

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Table 15.3. INTRAUTERINE GROWTH STATUS within Prenatal Intervention Group, cont. (in percentages)

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=26)	TRADITIONAL (n=405)	NO PNC (n=18)	TOTAL POPUL (n=495)
APPROPRIATE	95.6	84.6	88.6	88.8	88.9
LARGE (LGA)	2.2	7.7	7.9	5.6	7.5
SMALL (SGA)	2.2	7.7	3.5	5.6	3.6
TOTALS	100.0	100.0	100.0	100.0	100.0

$p_2 = .0385$
$X^2 = 16.3 \quad V = .13$

1989

	RMP (n=17)	NPP (n=29)	TRADITIONAL (n=155)	NO PNC (n=4)	TOTAL POPUL (n=206)
APPROPRIATE	82.4	82.8	85.2	100.0	86.9
LARGE (LGA)	17.6	10.3	12.2	0.0	12.1
SMALL (SGA)	0.0	6.9	2.6	0.0	2.0
TOTALS	100.0	100.0	100.0	100.0	100.0

$p_2 = .99.$
$X^2 = 4.7; \quad V = .09$

Apgar Score

The Apgar score reflects the newborn infant's capacity to respond to the stresses of labor and delivery.[171] While use of the Apgar score to predict long-term outcome is limited, the score obtained 5 to 15 minutes after delivery, measuring the immediate response capacity of the neonate, is useful as an initial screening devise to predict a spectrum

[171]Avery, p. 329.

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of future functioning.[172] As adverse prenatal and intrapartal factors influence the score, it is used as one indicator of pregnancy outcome in this study.

Total Population

Table 16.1 presents the distribution of categories for Apgar score five minutes after birth as they occur in the total population. Ninety-five percent of infants are born with Apgar scores greater than 7.

Table 16.1. APGAR SCORE AT FIVE MINUTES for Total Population (in percentages)

Year	*n*	0-4	5-7	8-10
1988	851	.8	3.8	95.4
1989	351	2.0	3.4	94.6

Sub-Groups

Targeted Neighborhoods. Table 16.2 shows program participation by the percentage of Apgar score categories delivered for the total population, for those living in targeted neighborhoods, and for year of delivery. Mothers who participated in specialized prenatal programs during 1988 did not deliver infants with 5 minute Apgar scores less than 5. Mothers of infants with very low Apgar scores are characterized as having limited (TRAD) or no prenatal care.

[172]Avery, p. 330.

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Table 16.2. APGAR SCORE AT FIVE MINUTES by Program Participation (in percentages)

	1988		1989	
	0 - 4		0 - 4	
	TOTAL n= 7	TARGET n= 3	TOTAL n= 7	TARGET n= 47
ALL	.8	100.0	2.0	2.4
RMP	0.0	0.0	0.0	0.0
NPP	0.0	0.0	0.0	0.0
TRAD	85.7	100.0	100.0	100.0
NoPNC	14.3	0.0	0.0	0.0
	100.0	100.0	100.0	100.0
	5 - 7		5 - 7	
	TOTAL n= 33	TARGET n= 20	TOTAL n= 12	TARGET n= 61
ALL	3.8	4.0	3.4	3.6
RMP	9.0	15.0	8.3	6.6
NPP	3.0	0.0	0.0	0.0
TRAD	84.8	85.0	83.3	66.7
NoPNC	3.0	0.0	8.3	16.7
	100.0	100.0	100.0	100.0
	8 - 10		8 - 10	
	TOTAL n= 818	TARGET n= 471	TOTAL n= 386	TARGET n= 156
ALL	95.2	95.3	95.8	94.0
RMP	5.7	9.2	11.1	11.8
NPP	5.4	5.5	5.7	18.4
TRAD	85.5	81.5	78.8	67.9
NoPNC	3.3	3.8	4.1	1.9
	100.0	100.0	100.0	100.0
	n = 860	n = 493	n = 354	n = 166
	p = .0364	p = .9148	p = .75	p = .52
	X^2 = 22.1	X^2 = 3.3	X^2 =6.78	X^2 =9.14
	V = .09	*V* = .06	*V* = .70	*V* = .05

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Infants of adolescent mothers in the target neighborhoods show an increased percentage of five minute Apgar scores less than 8.

Prenatal Intervention Groups. Table 16.3 presents the distribution of Apgar score category data within prenatal intervention groups. Fewer infants of NPP participants scored lower than 8 on the Apgar assessment 5 minutes after birth than infants of mothers in any other group.

Table 16.3. APGAR SCORE AT FIVE MINUTES Within Prenatal Intervention Group (in percentages)

Total Population

1988

	RMP (n=49)	NPP (n=45)	TRADI TIONAL (n=735)	NO PNC (n=29)	TOTAL POPUL (n=858)
0 - 4	0.0	0.0	.8	3.4	.8
5 - 7	6.1	2.2	3.8	3.4	3.8
8 - 10	93.9	95.8	95.4	93.2	95.4
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .0364$
$X^2 = 22.1$; $V = .09$

1989

	RMP (n=17)	NPP (n=39)	TRADI TIONAL (n=287)	NO PNC (n=6)	TOTAL POPUL (n=349)
1 - 4	0.0	0.0	2.4	0.0	2.0
5 - 7	5.9	0.0	3.5	16.7	3.4
8 - 10	94.1	100.0	94.1	83.3	94.6
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .75$
$X^2 = 6.78$; $V = .20$

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Table 16.3. APGAR SCORE AT FIVE MINUTES Within Prenatal Intervention Groups (in percentages), con't.

Targeted Neighborhoods

1988

	RMP (n=46)	NPP (n=25)	TRADI TIONAL (n=404)	NO PNC (n=18)	TOTAL POPUL (n=493)
0 - 4	0.0	0.0	.7	0.0	.6
5 - 7	6.5	0.0	4.2	0.0	4.0
8 - 10	93.5	100.0	95.0	100.0	95.4
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .91$
$X^2 = 3.29 \quad V = .06$

1989

	RMP (n=17)	NPP (n=29)	TRADI TIONAL (n=154)	NO PNC (n=4)	TOTAL POPUL (n=204)
1 - 4	0.0	0.0	3.2	0.0	2.4
5 - 7	5.9	0.0	3.2	25.0	3.3
8 - 10	94.1	100.0	93.6	75.0	94.3
TOTALS	100.0	100.0	100.0	100.0	100.0

$p = .52$
$X^2 = 9.14; \quad V = .05$

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Analysis Of Findings Related To Research Questions

Research Question A

Research Question A. In what ways are the profiles of the population, targeted neighborhoods, and prenatal intervention groups (RMP, NPP, traditional service, and no prenatal care) alike or different relative to selected maternal characteristics?

Hypothesis 1

Hypothesis 1: Adolescent mothers participating in the RMP are characterized by young maternal age, black American race, residence in census tracts having low family income levels, completion of less than a high school education, and no prior pregnancies--factors placing them at an increased relative risk for inadequate prenatal care, pre-term delivery, low weight infants, intrauterine growth retardation, and neonatal compromise.

In analyzing the 1988 data, the null hypotheses are rejected that selected maternal characteristics are independent of participation in the prenatal intervention groups (RMP, NPP, traditional services, and no prenatal care). The strength of the association measured by Cramer's *V* calculations is not particularly large. The association with prenatal intervention group is stronger for maternal age (.17), marital status (.27), and neighborhood of residence (.20) Non-white race is prevalent in all groups (.01), grade

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level and parity (.12 each) are weakly associated. The occurrence of other pregnancy terminations is independent of prenatal group participation, as the chi-square value is not significant. In 1989, race, maternal age, and neighborhood are the variables associated with prenatal intervention group participation. Table 17 summarizes the chi-square analysis of maternal characteristics and prenatal intervention groups. Young maternal age, single marital status, and residence in target neighborhoods characterize RMP participants.

Table 17. Chi-Square Analysis: Maternal Characteristics Associated with Prenatal Intervention Groups. (p = .05)

Total Population: 1988

Variable	N	X^2	p	Cramer's V
Maternal Age	860	51.3	.0000	.17
Race	860	27.4	.0006	.01
Marital Status	860	61.9	.0000	.27
Neighborhood	857	139.3	.0004	.20
Highest Gr. Comp.	858	53.1	.0000	.12
Parity	859	25.5	.0013	.12
Other Preg. Term.	860	4.9	.7700 (ns)	.05

Total Population: 1989

Variable	N	X^2	p	Cramer's V
Maternal Age	351	11.9	.2900 (ns)	.13
Race	351	28.4	.0015	.20
Marital Status	351	17.7	.0005	.23
Neighborhood	351	133.1	.0300	.27
Highest Gr. Comp.	351	25.3	.1890 (ns)	.13
Parity	350	13.8	.1880 (ns)	.14
Other Preg. Term.	350	4.0	.9515 (ns)	.08

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Hypothesis 2

Hypothesis 2:. RMP participants demonstrate these perinatal risk factors to the same degree or more than the total population and other prenatal intervention groups.

Chi-square analysis demonstrates the prenatal intervention groups differ with respect to their maternal characteristics and the percentages indicate the RMP participants are more likely to be younger than 17, of black race, residents of the targeted neighborhood, having education less than high school graduation, and be first time mothers. A relative risk analysis was calculated to more precisely determine the adjusted relative risk among groups.

Tables 18.1 - 18.4 show calculations of the relative risk of low birth weight for the total population, the targeted neighborhoods, and each prenatal intervention group. The tables were constructed by identifying risk categories within selected maternal characteristics and adequacy of prenatal care indicators. The number of low birth weight infants in each category is then divided by the total number of mothers with the characteristic. Next, the relative risk of delivering a low birth weight infant is calculated by dividing the percent of low weight infants having that characteristic by the percent of the total population having that characteristic. The adjusted relative risk is derived by dividing each relative risk factor by the smallest.

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Table 18.1. MATERNAL CHARACTERISTICS AND RELATIVE RISK* OF DELIVERING A LOW BIRTH WEIGHT INFANT (< 2500 Grams) FOR ALL ADOLESCENTS DELIVERING IN NORFOLK, VA: 1988
*Relative risk scoring is described on page 177.

CHARACTERISTIC	LOW BIRTH WEIGHT	TOTAL	% LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
AGE					
LESS THAN 18 YRS	30	312	9.62	.27	1.93
MORE THAN 17 YRS	50	548	9.12	.14	1.00
LESS THAN 16 YRS	10	74	13.51	1.57	11.21
16 - 17 YRS	20	238	8.40	.30	2.14
MORE THAN 17 YRS	50	548	9.12	.14	1.00
RACE					
WHITE	23	316	7.28	.20	1.78
NON-WHITE	57	536	10.63	.17	1.00
MARITAL					
MARRIED	21	261	8.05	.26	1.73
UNMARRIED	59	578	10.21	.15	1.00
EDUCATION					
LESS THAN 12 YRS	53	531	9.98	.25	1.79
MORE THAN 12 YRS	27	327	8.26	.14	1.00
PARA					
NONE	50	611	8.18	.12	1.00
1 - 2	25	201	12.44	.53	1.52
MORE THAN 3	5	47	10.64	1.93	16.08
PRENATAL CARE					
RECEIVED CARE	74	831	8.90	.92	1.00
NO CARE	6	29	20.69	6.09	6.62
MONTH CARE BEGAN					
LESS THAN 6TH	71	819	8.67	.90	1.00
MORE THAN 5TH	9	35	25.71	6.43	7.75
PRENATAL VISITS					
0 - 4	20	104	19.23	1.55	14.09
5 - 9	27	216	12.50	.49	4.45
10 OR MORE	33	521	6.33	.71	1.00
TOTAL POPULATION	80	859	9.31	.09	1.00
RMP PARTICIPANTS	5	48	10.42	1.86	20.72

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Table 18.2. MATERNAL CHARACTERISTICS AND RELATIVE RISK OF DELIVERING A LOW BIRTH WEIGHT INFANT (< 2500 GRAMS) FOR ADOLESCENTS DELIVERING IN TARGETED NEIGHBORHOODS OF NORFOLK, VA: 1988

CHARACTERISTIC	LOW BIRTH WEIGHT	TOTAL	% LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
AGE					
LESS THAN 18 YRS	23	219	10.50	.29	2.23
MORE THAN 17 YRS	15	186	8.06	.13	1.00
LESS THAN 16 YRS	6	50	12.00	1.34	8.38
16 - 17 YRS	9	136	6.62	.24	1.50
MORE THAN 17 YRS	23	219	10.50	.16	1.00
RACE*					
WHITE	0	0	.00	.00	0.00
NON-WHITE	38	405	9.38	.15	1.00
MARITAL					
MARRIED	4	33	12.12	.39	3.00
UNMARRIED	34	372	9.14	.13	1.00
EDUCATION					
LESS THAN 12 YRS	25	280	8.93	.14	1.00
MORE THAN 12 YRS	13	119	10.92	.29	2.07
PARA					
NONE	21	278	7.55	.11	1.00
1 - 2	13	95	13.68	.58	5.27
MORE THAN 3	4	28	14.29	2.60	23.64
PRENATAL CARE					
RECEIVED CARE	37	381	9.71	.10	1.46
NO CARE	1	15	6.67	1.96	19.60
MONTH CARE BEGAN					
LESS THAN 6TH	35	359	9.75	.10	1.00
MORE THAN 5TH	3	46	6.52	1.64	16.40
PRENATAL VISITS					
0 - 4	7	57	12.28	.10	1.00
5 - 9	16	111	14.41	.55	5.56
10 OR MORE	15	225	6.67	.11	1.10
TARGET POPULATION	38	405	9.38	.20	2.22
TOTAL POPULATION	80	859	9.31	.09	1.00

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Table 18.3. MATERNAL CHARACTERISTICS AND RELATIVE RISK OF DELIVERING A LOW BIRTH WEIGHT INFANT (< 2500 GRAMS) FOR RESOURCE MOTHER PARTICIPANTS DELIVERING IN NORFOLK, VA: 1988

CHARACTERISTIC	LOW BIRTH WEIGHT	TOTAL	% LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
AGE					
LESS THAN 18 YRS	4	37	10.81	.30	2.14
MORE THAN 17 YRS	1	11	9.09	.14	1.00
LESS THAN 16 YRS	4	13	30.77	3.58	22.38
16 - 17 YRS	0	24	.00	.00	0.00
MORE THAN 17 YRS	1	11	9.09	.16	1.00
RACE					
WHITE	0	3	.00	.00	0.00
NON-WHITE	5	45	11.11	.18	1.00
MARITAL					
MARRIED	0	2	.00	.00	0.00
UNMARRIED	5	46	10.87	1.11	1.00
EDUCATION					
LESS THAN 12 YRS	5	48	10.42	.17	1.00
MORE THAN 12 YRS	0	0	.00	.00	0.00
PARA					
NONE	4	40	10.00	.14	1.00
1 - 2	1	8	12.50	.53	3.79
MORE THAN 3	0	0	.00	.00	0.00
PRENATAL CARE					
RECEIVED CARE	5	48	10.42	.11	1.00
NO CARE	0	0	0.00	.00	0.00
MONTH CARE BEGAN					
LESS THAN 6TH	5	48	10.42	.11	1.00
MORE THAN 5TH	0	0	0.00	.00	0.00
PRENATAL VISITS					
0 - 4	0	3	.00	.00	.00
5 - 9	2	13	15.38	.59	3.93
10 OR MORE	3	32	9.38	.15	1.00
RMP PARTICIPANTS	5	48	10.42	1.74	19.33
TARGET POPULATION	38	405	9.38	.20	2.22
TOTAL POPULATION	80	859	9.31	.09	1.00

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Table 19.1. MATERNAL CHARACTERISTICS, PRENATAL INTERVENTION GROUP, AND RELATIVE RISK OF DELIVERING A VERY LOW BIRTH WEIGHT INFANT FOR ALL ADOLESCENTS DELIVERING IN NORFOLK, VA: 1988

VERY LOW BIRTH WEIGHT = < 1500 GRAMS

n = 860 CHARACTERISTIC	VERY LOW BIRTH WEIGHT	TOTAL	% VERY LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
MATERNAL AGE: LESS THAN 16 YEARS (8.6%)					
RMP	0	13	0.0	0.0	0.0
NPP	0	3	0.0	0.0	0.0
TRAD	1	53	1.9	0.2	1.0
NoPNC	1	5	20.0	2.3	11.5
TOTAL	2	74	2.7	.3	1.5
RACE: BLACK AMERICAN (62.9%)					
RMP	0	45	0.0	0.0	0.0
NPP	1	32	3.1	0.1	2.5
TRAD	6	431	1.4	0.1	1.0
NoPNC	3	28	10.7	0.2	10.0
TOTAL	10	536	1.8	.0	1.5
MARITAL STATUS: UNMARRIED (68.9%)					
RMP	0	47	0.0	0.0	0.0
NPP	1	46	2.1	1.1	1.5
TRAD	6	451	1.3	0.7	1.0
NoPNC	4	34	11.8	6.2	8.5
TOTAL	11	579	1.9	1.0	1.5
EDUCATION: LESS THAN 12TH GRADE (62%)					
RMP	0	46	0.0	0.0	0.0
NPP	0	35	0.0	0.0	0.0
TRAD	6	424	1.4	0.0	1.0
NoPNC	4	34	11.8	0.2	9.5
TOTAL	9	531	1.7	0.0	1.5
PARA: NO PRIOR CHILDREN (71.1%)					
RMP	0	40	0.0	0.0	0.0
NPP	0	36	2.8	0.0	2.0
TRAD	9	520	1.7	0.0	1.0
NoPNC	3	15	20.0	0.3	14.0
TOTAL	13	611	2.1	0.0	1.5

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Table 19.1. MATERNAL CHARACTERISTICS, PRENATAL INTERVENTION GROUP, AND RELATIVE RISK OF DELIVERING A VERY LOW BIRTH WEIGHT INFANT FOR ALL ADOLESCENTS DELIVERING IN NORFOLK, VA: 1988, con't.

VERY LOW BIRTH WEIGHT = < 1500 GRAMS

CHARACTERISTIC	VERY LOW BIRTH WEIGHT	TOTAL	% VERY LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
PARITY: ONE PRIOR CHILD (23%)					
RMP	0	8	0.0	0.0	0.0
NPP	0	8	0.0	0.0	0.0
TRAD	2	170	1.2	0.0	1.0
NoPNC	2	15	13.3	0.6	11.6
TOTAL	4	201	1.9	0.9	1.6
PARITY: MORE THAN ONE CHILD (5%)					
RMP	0	1	0.0	0.0	0.0
NPP	0	1	0.0	0.0	0.0
TRAD	1	38	.5	1.2	1.2
NoPNC	0	6	0.0	0.0	0.0
TOTAL	1	47	2.1	1.0	1.0
MONTH CARE BEGAN: AFTER FIFTH MONTH OF GESTATION (4%)					
RMP	0	23	0.0	0.0	0.0
NPP	0	31	0.0	0.0	0.0
TRAD	4	321	1.2	0.7	1.0
NoPNC	5	35	14.3	6.5	11.9
TOTAL	9	410	2.2	0.6	1.8
PRENATAL VISITS: LESS THAN 7 (22%)					
RMP	0	9	0.0	0.0	0.0
NPP	0	15	0.0	0.0	0.0
TRAD	8	127	6.3	0.3	1.0
NoPNC	5	36	13.9	0.6	2.2
TOTAL	13	187	7.0	1.0	1.1
RESIDENCE: TARGET NEIGHBORHOOD (47%)					
RMP	0	46	0.0	0.0	0.0
NPP	1	26	3.8	0.1	1.3
TRAD	12	401	3.0	0.1	1.0
NoPNC	5	22	22.7	0.5	8.0
TOTAL	18	495	3.6	0.1	1.3

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Table 19.2. MATERNAL CHARACTERISTICS, PRENATAL INTERVENTION GROUP, AND RELATIVE RISK OF DELIVERING A MODERATELY LOW WEIGHT INFANT FOR ALL ADOLESCENTS DELIVERING IN NORFOLK, VA: 1988

MODERATELY LOW BIRTH WEIGHT = 1500 - 2499 GRAMS

CHARACTERISTIC	MODERATELY LOW BIRTH WEIGHT	TOTAL	% MODERATELY LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
MATERNAL AGE: LESS THAN 16 YEARS (8.6%)					
RMP	4	13	30.8	3.6	5.1
NPP	0	3	0.0	0.0	0.0
TRAD	3	53	5.7	0.7	1.0
NoPNC	1	5	20.0	2.3	3.3
TOTAL	8	74	10.8	1.3	1.9
RACE: BLACK AMERICAN (62.9%)					
RMP	5	45	11.1	0.2	1.8
NPP	2	32	6.3	0.0	1.0
TRAD	37	388	9.5	0.2	1.5
NoPNC	3	28	10.7	0.1	1.7
TOTAL	47	536	8.8	0.1	1.4
MARITAL STATUS: UNMARRIED (68.9%)					
RMP	5	47	10.6	0.2	2.5
NPP	2	46	4.4	0.5	1.0
TRAD	38	451	8.4	1.0	2.0
NoPNC	3	34	8.8	1.1	2.2
TOTAL	48	578	8.3	1.0	2.0
EDUCATION: LESS THAN 12TH GRADE (62%)					
RMP	5	46	10.8	0.2	1.8
NPP	2	35	5.7	0.5	1.0
TRAD	35	424	8.3	1.0	1.4
NoPNC	2	26	7.6	0.9	1.3
TOTAL	44	531	8.3	1.0	1.4
PARA: NO PRIOR CHILDREN (71.1%)					
RMP	4	40	10.0	1.7	3.5
NPP	1	36	2.8	0.5	1.0
TRAD	31	520	5.7	1.0	2.0
NoPNC	1	15	6.7	1.1	2.3
TOTAL	37	611	6.1	1.0	2.3

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Table 19.2. MATERNAL CHARACTERISTICS, PRENATAL INTERVENTION GROUP, AND RELATIVE RISK OF DELIVERING A MODERATELY LOW BIRTH WEIGHT INFANT FOR ALL ADOLESCENTS, con't.

MODERATELY LOW BIRTH WEIGHT = 1500 - 2499 GRAMS

CHARACTERISTIC	MODERATELY LOW BIRTH WEIGHT	TOTAL	% MODERATELY LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
PARITY: ONE PRIOR CHILD (23%)					
RMP	1	8	12.5	0.5	1.3
NPP	1	8	12.5	0.5	1.3
TRAD	17	170	10.0	0.4	1.0
NoPNC	2	15	13.3	0.6	1.3
TOTAL	21	201	10.4	0.4	1.0
PARITY: MORE THAN ONE CHILD (5%)					
RMP	0	1	0.0	0.0	0.0
NPP	0	2	0.0	0.0	0.0
TRAD	4	38	10.5	2.1	5.3
NoPNC	0	6	0.0	0.0	0.0
TOTAL	4	47	2.1	0.4	1.0
MONTH CARE BEGAN: AFTER FIFTH MONTH OF GESTATION (4%)					
RMP	3	23	13.0	3.3	9.8
NPP	0	31	0.0	0.0	0.0
TRAD	4	321	1.3	0.7	1.0
NoPNC	5	35	14.3	3.5	10.9
TOTAL	79	410	1.7	0.4	1.3
PRENATAL VISITS: LESS THAN 7 (22%)					
RMP	2	9	22.2	1.0	2.5
NPP	0	15	0.0	0.0	0.0
TRAD	14	127	11.0	0.5	1.3
NoPNC	3	36	8.4	0.4	1.0
TOTAL	19	187	10.2	0.5	1.3
RESIDENCE: TARGET NEIGHBORHOOD (47%)					
RMP	5	46	10.9	0.2	2.5
NPP	1	26	3.9	0.1	1.0
TRAD	33	401	8.2	0.2	2.1
NoPNC	1	22	4.6	0.1	1.3
TOTAL	40	495	8.6	0.2	2.3

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Table 19.3. MATERNAL CHARACTERISTICS, PRENATAL INTERVENTION GROUP, AND RELATIVE RISK OF DELIVERING A LOW WEIGHT INFANT FOR ALL ADOLESCENTS DELIVERING IN NORFOLK, VA: 1988

LOW BIRTH WEIGHT = < 2500 GRAMS

CHARACTERISTIC	LOW BIRTH WEIGHT	TOTAL	% LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
MATERNAL AGE: LESS THAN 16 YEARS ((8.6%)					
RMP	4	13	30.8	3.6	4.0
NPP	0	3	0.0	0.0	0.0
TRAD	4	53	7.6	0.9	1.0
NoPNC	2	5	40.0	4.7	5.2
TOTAL	10	74	13.5	1.6	1.8
RACE: BLACK AMERICAN (62.9%)					
RMP	5	45	11.1	0.2	1.2
NPP	3	32	9.4	0.1	1.0
TRAD	43	431	10.0	0.1	1.1
NoPNC	6	28	21.4	0.3	2.3
TOTAL	57	536	10.6	0.2	1.1
MARITAL STATUS: UNMARRIED (68.9%)					
RMP	5	47	10.6	0.2	1.6
NPP	3	46	6.5	0.1	1.0
TRAD	44	451	9.8	0.1	1.5
NoPNC	7	34	20.6	0.3	3.3
TOTAL	59	579	10.2	0.2	1.6
EDUCATION: LESS THAN 12TH GRADE (62%)					
RMP	5	46	10.9	0.2	9.0
NPP	2	35	5.7	0.6	4.5
TRAD	41	424	9.7	1.0	8.0
NoPNC	5	26	19.2	1.9	15.0
TOTAL	53	531	1.0	1.0	1.0
PARA: NO PRIOR CHILDREN (71.1%)					
RMP	4	40	10.0	0.1	4.7
NPP	2	36	5.6	0.1	1.3
TRAD	40	520	7.7	0.5	3.6
NoPNC	4	15	26.7	0.2	6.0
TOTAL	13	611	2.1	0.0	1.0

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Table 19.3. MATERNAL CHARACTERISTICS, PRENATAL INTERVENTION GROUP, AND RELATIVE RISK OF DELIVERING A LOW WEIGHT INFANT FOR ALL ADOLESCENTS DELIVERING IN NORFOLK, VA: 1988, con't.

LOW BIRTH WEIGHT = < 2500 GRAMS

CHARACTERISTIC	LOW BIRTH WEIGHT	TOTAL	% LOW BIRTH WEIGHT	RELATIVE RISK	ADJUSTED RELATIVE RISK
PARITY: ONE PRIOR CHILD (23%)					
RMP	1	8	12.5	0.5	1.1
NPP	1	8	12.5	0.5	1.1
TRAD	19	170	11.2	0.9	1.0
NoPNC	4	15	26.7	2.1	2.4
TOTAL	25	201	12.4	1.0	1.1
PARITY: MORE THAN ONE CHILD (5%)					
RMP	0	1	0.0	0.0	0.0
NPP	0	2	0.0	0.0	0.0
TRAD	5	38	13.5	0.3	2.7
NoPNC	0	6	0.0	0.0	0.0
TOTAL	5	47	9.1	1.8	1.0
MONTH CARE BEGAN: AFTER FIFTH MONTH OF GESTATION (4%)					
RMP	3	23	13.0	0.5	1.8
NPP	0	31	0.0	0.0	0.0
TRAD	22	321	6.9	0.3	1.0
NoPNC	8	35	22.9	5.7	22.8
TOTAL	29	410	7.1	1.8	7.2
PRENATAL VISITS: LESS THAN 7 (22%)					
RMP	2	9	22.2	1.0	1.3
NPP	0	15	0.0	0.0	0.0
TRAD	22	127	17.3	0.8	1.0
NoPNC	8	36	22.2	1.0	1.3
TOTAL	32	187	17.1	1.0	1.3
RESIDENCE: TARGET NEIGHBORHOOD (47%)					
RMP	5	46	10.9	0.2	1.4
NPP	2	26	7.6	0.2	1.0
TRAD	39	401	9.7	1.0	1.3
NoPNC	2	22	9.1	0.2	1.2
TOTAL	48	495	9.7	0.2	1.3

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A relative risk of "1" indicates the chance of delivering a low weight infant is not different with or without the characteristic, less than "1" indicates a smaller chance with the characteristic, and more than "1" indicates a greater chance with the characteristic. For example, young mothers in the RMP younger than 16 years have the greatest risk for delivering a low weight infant, with a relative risk (RR) score of 3.58 for that characteristic (Table 18.3).

Findings Related To Maternal Characteristics

The maternal characteristics placing adolescent mothers at increased relative risk (RR) for poor pregnancy outcomes are summarized in Table 20. The adjusted relative risk (aRR) is calculated by dividing the value of the highest risk group in each characteristic by the lowest; thereby, enabling comparisons to be made among characteristics.

Adequacy of prenatal care is the most important relative risk factor associated with the birth of low weight infants. A profile of the total population does not demonstrate an increased relative risk of delivering low weight infants (RR=.95) because the RR value is less than "1" (Table 18.1). The relative risk among RMP participants is 1.07, with an adjusted relative risk of 1.12 (Table 18.3). The major difference between the RMP participants and the total population is maternal age; RMP participants are younger with an adjusted relative risk for maternal age less than 16 years nearly 3 times higher than the total population (Table 19.2).

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TABLE 20. RELATIVE RISK OF LOW BIRTH WEIGHT: COMPARING RMP AND TOTAL POPULATION

Characteristic	RMP (Table 18.3) aRR	Total Population (Table 18.1) aRR
Prenatal Visits		
0 to 4	0.00	14.09
Maternal Age		
Less Than 16 YRS	22.38	11.21
Parity*		
1 - 2	3.79	1.52
Race**		
Non-white	1.00	1.78
Marital Status**		
Unmarried	1.00	1.00
Education**		
Less than 12	1.00	1.00

*This category also is associated with a high percentage of mothers who do not enter prenatal care early in pregnancy.

**aRR is artificially low because the few mothers characterized as white, married, or high school graduates in the RMP delivered no infants < 2500 grams.

Table 21 shows the relative risk of delivering a low birth weight infant comparing pregnancy outcomes of the prenatal intervention groups. In this population a young mother receiving no prenatal care is 2.5 times more likely to deliver a low weight infant compared with the total group. NPP participants demonstrate the lowest relative risk of delivering a low weight infant.

Adjusting the relative risk standard to compare each prenatal intervention groups with the lowest risk NPP participants, the risk in the NoPNC group rises to 3.5. The

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TABLE 21. RELATIVE RISK OF LOW BIRTH WEIGHT INFANTS BY PRENATAL INTERVENTION GROUP

LOW BIRTH WEIGHT = < 2500 GRAMS

PRENATAL INTERVENTION GROUP	LOW BIRTH WEIGHT	TOTAL	% LOW BIRTH WEIGHT	RR	aRR
Total Population					
RMP	5	48	10.2	1.07	1.56
NPP	3	46	6.5	.70	1.00
Trad	64	729	8.9	.96	1.37
No PNC	8	36	22.9	2.46	3.51
TOTAL	80	859	9.3	1.00	1.32
Targeted Neighborhood					
RMP	5	46	10.9	1.12	1.42
NPP	2	26	7.7	.79	1.00
Trad	39	401	9.9	.99	1.25
No PNC	2	20	9.6	.99	1.25
TOTAL	48	495	9.7	1.00	1.27

degree of risk rises slightly in the targeted neighborhoods for all except the NoPNC group. Relative risk analysis described in Table 20 show RMP participants demonstrate perinatal risk factors to the same degree or more than the total population and other prenatal intervention groups. Hypothesis 2 is supported.

Considering the increased relative risk for adolescent mothers enrolled in the specialized prenatal intervention programs, they are less likely to have adequate prenatal care evidenced by entry into care before the sixth month of

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pregnancy and more prenatal visits per week of gestation without special intervention. Additionally, low weight infants at-risk born to teens are less likely to be born in tertiary hospitals specializing in delivery of high-risk infants.

An important exception is noted--a striking number of older, white, "young adult" adolescent mothers are among those receiving no prenatal care or inadequate care as defined by month care began and number of prenatal visits. These mothers also have higher parity, suggesting increased risk for limited life opportunities dependent upon education, financial resources, and stable child-care arrangements.

Research Question 2

Research Question 2. Is there a significant difference in the occurrence rate of low birth weight infants or preterm delivery among groups of pregnant adolescents classified by prenatal intervention group (RMP, NPP, traditional services, no prenatal care)?

Hypothesis 3

Hypothesis 3: Adolescent mothers who receive specialized prenatal intervention through a perinatal lay home-visitor program (RMP) or a multi-disciplinary approach (NPP) in addition to medical supervision during pregnancy are more likely to experience a lower rate of low birth weight

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infants and preterm delivery than teen mothers who do not participate in such programs.

Hypothesis 3 is also affirmed by the relative risk analysis. Table 21 demonstrates the positive pregnancy outcomes attained in specialized perinatal intervention programs, even when participants are characterized by factors placing them at an increased relative risk for inadequate prenatal care, preterm delivery, low birth weight infants, intrauterine growth retardation, and neonatal compromise. It must be also remembered that birthweight is strongly influenced by number of prenatal visits (Table 20).

A second method of analysis tested Hypothesis 3. Variables identified by chi-square analysis are entered into multiple regression analysis in a step-wise manner, first with birth weight as the dependent variable and second with gestational age as the dependent variable. The distribution of residuals and variance were calculated to affirm the assumptions of regression analysis.[173]

Table 22 gives the values associated with birth weight and significant maternal characteristics. The variables entered into the birth weight equation are number of prenatal visits, month prenatal care began, race, Apgar score 5 minutes after birth, and neighborhood of residence. Variables not entered into the equation due to lack of significance are the mother's highest grade completed in

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[173]Norusis, p. 338, pp. 355-358.

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school, maternal age, number of living children delivered by the adolescent, and prenatal intervention groups (RMP, NPP, traditional services, no prenatal care). Though specialized prenatal intervention supports positive pregnancy outcomes, prenatal intervention group alone is not a predictor of positive pregnancy outcome.

Table 22. VARIABLES IN THE EQUATION FOR STEPWISE MULTIPLE REGRESSION ANALYSIS OF BIRTH WEIGHT ($p \leq .05$)

VARIABLE	Step	Multiple R	R^2	Adj. R^2	F	Beta	≤ p
Prenatal Visits	1	.1890	.0357	.0346	30.9	.1890	.0000
Month Care Began	2	.2298	.0528	.0505	23.2	.1330	.0000
Race	3	.2653	.0704	.0671	21.0	.1340	.0000
Apgar at 5 Min.	4	.2794	.0781	.0737	17.6	.0879	.0000
Neighborhood	5	.2870	.0824	.0769	14.9	.0667	.0000

The variables entered into the gestational age equation shown in Table 23 are number of prenatal visits, Apgar score at 5 minutes after birth, and month prenatal care began. Variables not entered into the equation due to lack of significance are the mother's highest grade completed in school, maternal age, number of living children delivered by the adolescent, and prenatal intervention groups (RMP, NPP, traditional services, no prenatal care), neighborhood, and race. Again, prenatal intervention group does not predict length of gestation.

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Table 23. VARIABLES IN THE EQUATION FOR STEPWISE MULTIPLE REGRESSION ANALYSIS OF GESTATIONAL AGE ($p \leq .05$)

VARIABLE	Step	Multiple R	R^2	Adj. R^2	F	Beta	$\leq$ p
Prenatal Visits	1	.1635	.0267	.0256	22.9	.1635	.0000
Apgar at 5 Min.	2	.2001	.0400	.0377	17.4	.1155	.0000
Month Care Began	3	.2199	.0484	.0449	14.1	.0428	.0000

The multiple R statistic, a correlation coefficient indicating the strength of the relationship increases as the variables are entered.[174] The strength of the relationship in the birth weight equation is weak to moderate at .29. The adjusted R^2 of .08, the coefficient of determination, indicates that only 8% of variance in birth weight can be explained by the values of prenatal visits, month care began, Apgar score, and neighborhood of residence. Most of the variance is explained by gestational age.

Hypothesis 4

Hypothesis 4: Positive pregnancy outcomes are attained even in populations characterized by factors placing them at an increased relative risk for delivering low weight infants or premature deliveries.

Table 25 describes the one-way analysis of variance results for birthweight. The mean birth weight in each group is above 2500 grams (the group means ranged from 2785 to 3211

[174]Welch and Comer, p. 194.

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grams). The Tukey-HSD Procedure determined a significant difference in infants' birth weight exists between the no prenatal care group and the traditional service group; no other pairs of groups were significantly different at the .05 level. The explanation, given the increased relative risk of

Table 24. ONE-WAY ANALYSIS OF VARIANCE: DEPENDENT VARIABLE BIRTH WEIGHT BY INDEPENDENT VARIABLE, PRENATAL INTERVENTION GROUP (RMP, NPP, TRAD, AND NoPNC).

Source of Variation	SS	df	MS	F	Signif-icance of F
Birth weight					
Between Groups	3079820	3	1026606	2.7	.0479
Within Groups	331929866	856	387768		
Total	335009686	859			

Mean (n): RMP = 3158 gms (50); NPP = 2878 gms (29)*;
Trad = 3201 gms (783)*; NoPNC = .

*Denotes pairs of groups significantly different at the .05 level.

the RMP participants, seems to be adequacy of prenatal care variables offset the risk for maternal age and/or race.

Table 25 describes similar findings in the one-way analysis for gestational age. The mean gestational age is 39 for all groups except the no prenatal care group (37). Prenatal intervention group is not a predictor of gestational age at delivery.

One-way analysis of variance does not conclusively affirm Hypothesis 4, though there is no significant difference in birth weights or gestational ages of infants at

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delivery between the RMP, NPP, and traditional service group of adolescent mothers receiving prenatal care in 1988. Relative risk analysis demonstrates positive pregnancy outcomes in birth weight and gestational age for populations characterized by factors which place them at an increased

Table 25. ONE-WAY ANALYSIS OF VARIANCE: DEPENDENT VARIABLE BIRTH WEIGHT BY INDEPENDENT VARIABLE, PRENATAL INTERVENTION GROUP (RMP, NPP, AND TRAD).

Source of Variation	SS	df	MS	F	Significance of F
Gestational Age					
Between Groups	110	2	37	3.4	.0164
Within Groups	9194	856	11		
Total	9305	859			

Mean (n): RMP = 39 weeks (n=49)**; NPP = 39 weeks (n=46)**; Trad = 39 weeks (736)**; NoPNC = 37 weeks (n=29).

**Denotes groups significantly different when paired with NoPNC group.

relative risk for delivering prematurely or having low birth weight infants.

Research Question 3

Research Question 3. Is there a significant difference in the number of prenatal visits and month prenatal care begins, intrauterine growth status, gestational age at delivery category, and assessed condition of newborn at 5 minutes after delivery for infants born to adolescent mothers classified by prenatal intervention group status?

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Hypothesis 5. Adolescent mothers who receive supportive prenatal intervention through a perinatal lay home-visitor program (RMP) or a multi-disciplinary approach (NPP) in addition to medical supervision during pregnancy have:

a. A higher number of prenatal visits and earlier entry into prenatal care than those who do not participate in a specialized support program;

b. Pregnancies continue to term (40 weeks gestation);

c. Infants weighing more than 2,500 grams (5 ½ pounds) at birth;

d. Infants appropriately grown for their gestational age;

e. Infants are vigorous at birth (the 5-minute Apgar score is greater than 6).

Table 26 demonstrates the moderate effectiveness the RMP has in enrolling at-risk teens into prenatal care during the

TABLE 26. COMPARISON: ADEQUACY OF CARE, PREGNANCY OUTCOME AND PRENATAL INTERVENTION PROGRAM PARTICIPATION
(in percentages)

1988	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
ADEQUACY OF CARE:					
Entry into PNC	53	33	55	0	52
Prenatal Visits	88	74	87	0	83
Hospital of Delivery	61	26	34	72	36
PREGNANCY OUTCOME:					
Intrauterine Growth*	96	89	89	86	89
Apgar Score at 5 min	94	96	95	93	95
> 38 Weeks	88	93	87	76	86
> 2500 Grams	90	94	91	79	91

* Appropriate Intrauterine Growth For Gestational Age

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first trimester and encouraging attendance of prenatal appointments. Another factor influencing pregnancy outcome is the large number of teens delivering at tertiary centers, though most patients receiving no prenatal care also deliver in these centers. Intrauterine growth and vigor at birth are indicators of positive pregnancy outcomes.

Hypothesis 6

Hypothesis 6: These positive pregnancy outcomes are attained in populations characterized by factors placing them at increased risk for inadequate prenatal care, preterm delivery, low birth weight infants, intrauterine growth retardation, and neonatal compromise.

Relative risk analysis affirms Hypothesis 6. T-tests do not show significant differences in adequacy of care measures (Table 27) nor pregnancy outcome measures between RMP participants and non-participants (Table 28). Chi-square analysis of appropriate intrauterine growth demonstrated a weak association with RMP participation (Table 28).

Table 27. ADEQUACY OF PRENATAL CARE MEASURES: T-TEST RMP AND NOT RMP

Variable	t-value	d.f.	2-tail prob
Month Care Began	**.26**	**56.24**	**.796**
RMP (n = 49; mean = 3.46)			
Others (n =806; mean = 3.41)			
Prenatal Visits	**.93**	**58.68**	**.358**
RMP (n = 49; mean = 10.2)			
Others (n =792; mean = 9.3)			

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Table 28. PREGNANCY OUTCOME MEASURES: T-TEST RMP AND NOT RMP

Variable	t-value	d.f.	2-tail prob
Birth Weight	**-.86**	**59.12**	**.394**
RMP (n = 49; mean = 3132.5)			
Others (n =810; mean = 3192.3)			
Gestational Age	**.75**	**63.82**	**.459**
RMP (n = 49; mean = 39.3)			
Others (n =810; mean = 39.1)			
Apgar Score, 5 min.	**-.34**	**347.21**	**.738**
RMP (n = 49; mean = 8.9)			
Others (n =810; mean = 8.9)			
Appropriate Intrauterine Growth			
	X^2	p	Cramer's *V*
Chi-square analysis	26.9	.0001	.12511
RMP (n = 49; AGA = 95.9%)			
Others (n =810; AGA = 83.3%)			

Table 29. ADEQUACY OF PRENATAL CARE MEASURES: T-TEST RMP AND NPP

Variable	t-value	d.f.	2-tail prob
Month Care Began	**.26**	**56.24**	**.796**
RMP (n = 49; mean = 3.46)			
Others (n =806; mean = 3.41)			
Prenatal Visits	**.93**	**58.68**	**.358**
RMP (n = 49; mean = 10.2)			
Others (n =792; mean = 9.3)			

Chapter Summary

The purpose of this evaluation is two-fold: first, establish a profile of selected characteristics for the total population and sub-groups, and second, examine the impact of the Norfolk State University Resource Mother Program (RMP) on adequacy of prenatal care and selected pregnancy outcome

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Table 30. PREGNANCY OUTCOME MEASURES: T-TEST RMP AND NPP

Variable	t-value	d.f.	2-tail prob
Birth Weight	**-.71**	**91.78**	**.477**
RMP (n = 49; mean = 3132.5)			
NPP (n = 46; mean = 3202.2)			
Gestational Age	**-1.33**	**81.41**	**.189**
RMP (n = 49; mean = 39.3)			
NPP (n = 46; mean = 39.7)			
Apgar Score, 5 min.	**-1.01**	**45.16**	**.316**
RMP (n = 49; mean = 8.9)			
Others (n =810; mean = 9.9)			
Appropriate Intrauterine Growth			
	X^2	p	Cramer's *V*
Chi-square analysis	26.9	.0001	.12511
RMP (n = 49; AGA = 95.9%)			
NPP (n = 46; AGA = 89.1%)			

measures among participating adolescent mothers delivering in a southeastern urban setting.

Research findings are presented in this chapter. A profile of pregnant adolescents for the eighteen month period of the study is presented and analyzed for relative risk of delivering a low weight infant; the impact of the Resource Mothers' Program on adequacy of care and pregnancy outcomes is examined. RMP participants have a higher risk profile from the other groups. Young maternal age, no prior children, non-white race, and residence in low income neighborhoods are more prevalent in the RMP group than in other groups. There are appreciable positive differences in adequacy of care and pregnancy outcome measures. A discussion of the findings is presented in Chapter 5.

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CHAPTER V

DISCUSSION OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter describes the study findings for the evaluation objectives, research questions and hypotheses. Recommendations for perinatal lay home-visiting programs, conclusions of the study, and recommendations for future research on this strategy to reduce infant mortality are presented.

The two-fold purpose of this study is: (1) determine if the rate of premature delivery and low-weight births can be reduced among adolescent mothers in a southeastern urban setting by using lay home-visitors who share socio-economic characteristics of the families of the adolescents, and (2) discover whether positive pregnancy outcomes are attained among program participants who are characterized by factors placing them at increased risk for inadequate prenatal care, preterm delivery, low birth weight infants, intrauterine growth retardation, and neonatal compromise. Evaluation criteria and hypotheses were developed from objectives set by project administrators and derived from the RMP

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conceptual model. Particular attention is given to the analysis of characteristics of the population in relation to pregnancy outcomes.

Discussion Of Findings Related To Research Questions

Research Question A

Research Question A: In what ways are the profiles of the total population, targeted neighborhoods, and prenatal intervention groups (RMP, NPP, traditional services, and no prenatal care) alike or different, relative to selected maternal characteristics?

Hypothesis 1

Hypothesis 1: Adolescent mothers participating in the RMP are characterized by young maternal age, non-white race, residence in targeted neighborhoods with low family income levels, completion of less than a high school education, and no prior pregnancies--factors placing them at an increased risk for inadequate prenatal care, preterm delivery, low birth weight infants, intrauterine growth retardation, and neonatal compromise.

The majority (75%) of adolescent mothers participating in the RMP are young adolescents, 92% are non-white, 91% reside in targeted neighborhoods with low family income levels, 94% have not completed high school, and 82% are first time mothers. These findings indicate the positive

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degree to which RMP referral criteria are followed. Hypothesis 1 is affirmed; RMP participants are characterized by factors that contribute barriers to accessing prenatal care and place them at increased personal risk for compromised pregnancy outcomes.

Hypothesis 2

Hypothesis 2: RMP participants will demonstrate these risk factors to the same degree or more than the other groups.

Table 31 summarizes the percentage of participants in each prenatal intervention group characterized by the risk factors of young maternal age, non-white race, residence in targeted neighborhoods with low family income levels, completion of less than a high school education, and no prior pregnancies. Hypothesis 2 is affirmed as the RMP participants demonstrate these risk factors to the same or greater degree as the total population or sub-groups (NPP, TRAD, or NoPNC).

Table 31. COMPARISON: MATERNAL CHARACTERISTICS AND PRENATAL PROGRAM PARTICIPATION (in percentages)

1988	RMP (n=49)	NPP (n=46)	TRADITIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
Younger Than 17	75	45	33	44	37
Black	92	70	59	79	62
Target Neighborhood	91	59	55	61	58
H.S. Not Completed	94	76	58	72	62
First Time Mothers	82	78	71	41	71

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Risk analysis combines the occurrence of low weight births with selected maternal characteristics and adequacy of care indicators: maternal age less than 17, black American race, unmarried status, education less than 12 years, parity (number of living children delivered), residence in target neighborhoods, entry into prenatal care after five months, and less than seven prenatal visits. Table 32 summarizes the relative risk analysis for low weight births (less than 2500 grams) and for very low weight births (less than 1500 grams). The NoPNC group is at greatest risk for delivering a very low weight and moderately low weight infant. In this population a teen delivering without benefit of prenatal care is 1.5 times more likely to deliver a low weight infant than a RMP participant, and is 30 times more likely than a RMP participant to deliver a very low weight infant. Though other differences are appreciable, the small sample size requires caution when interpreting the results.

Research Question B

Research Question B: Is there a significant difference in the occurrence rate of preterm deliveries or low birth weight infants among groups of pregnant adolescents classified by prenatal intervention group (RMP, NPP, traditional services, no prenatal care)?

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Table 32. RELATIVE RISK ANALYSIS SUMMARY: PRENATAL INTERVENTION GROUP AND BIRTH WEIGHT

	LBW: < 2500 GRAMS		VLBW: < 1500 GRAMS	
	RR	aRR	RR	aRR
RMP	1.39	2.67	0.16	1.00 **
NPP	0.52	1.00 **	0.49	3.04
TRAD	1.02	1.95	1.76	10.94
NoPNC	2.13	4.43 xx	4.92	30.51 xx
TOTAL	1.00	1.91	1.00	6.20

** Lowest adjusted relative risk; xx Highest adjusted relative risk.

Hypothesis 3

Hypothesis 3: Adolescent mothers who receive supportive prenatal intervention through a perinatal lay home visitor program (RMP) or a multi-disciplinary approach (NPP) in addition to medical supervision during pregnancy are more likely to experience a lower rate of preterm deliveries and low birth weight infants than teen mothers who do not receive prenatal intervention.

Table 33 compares pregnancy outcomes by prenatal intervention program participation in percentages. There are appreciable differences in gestational age and birth weight among participants in the prenatal intervention group. Because the contingency tables had 37.5% of cells with an expected frequency of less than 5, significance for these associations was not established.

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Teen mothers who received specific prenatal supportive intervention (RMP and NPP) demonstrated a lower rate of pre-term delivery than the population as a whole, or the other subgroups (TRAD and NoPNC). This finding adds support for the proposition that specific outreach to at-risk populations improves entry into care and the number of prenatal visits, factors strongly related to improved pregnancy outcomes. Percentages described in Tables 32 and 33 affirm the pre-term delivery component of Hypothesis 3 and partially support the birth weight component.

Table 33. COMPARISON: PREGNANCY OUTCOMES AND PRENATAL INTERVENTION PROGRAM PARTICIPATION (in percentages)

1988

	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
< 38 Weeks	12.2	4.3	14.3	24.0	13.9
< 2500 Grams	10.2	6.5	9.0	20.7	9.3
< 1500 Grams	0.0	2.2	1.8	13.8	2.1

The absence of very low birth weight infants in the RMP group is particularly important because it represents a reduction in human and financial costs, both present and future. The higher percentage of non-white (black American) than white mothers younger than 17 may explain the higher frequency of preterm delivery and, consequently, the higher percentage of low weight infants because infants born to

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very young black mothers are more than twice as likely as white mothers to be born of small size.

The positive outcomes among RMP and NPP participants suggest the need for increased outreach to particular populations. The findings suggest that implementing specific strategies to improve early entry into prenatal care and attending appointments related to medical care, social services, and school activities of high risk populations contributes to improve pregnancy outcomes. A random study of a larger population is needed to fully establish these relationships.

Hypothesis 4

Hypothesis 4: Positive pregnancy outcomes are attained even in populations characterized by factors placing them at an increased relative risk for preterm delivery and low birth weight infants.

As expected, analysis of variance and post hoc tests show only significant differences in birth weight and gestational age between the NoPNC group and other adolescent mothers. There is no significant difference in the birth weights or gestational ages of infants between the RMP, NPP, and traditional service group of adolescent mothers receiving prenatal care in the city during 1988.

The most positive pregnancy outcomes are attained by RMP participants whose characteristics place them at somewhat lower relative risk for delivering prematurely or

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having low birth weight infants than participants who demonstrate multiple risk factors. A review of the specific low weight infants in the RMP revealed that several of the adolescents lived outside the target service area and were referred by school officials or were brought to the attention of the resource mother by neighbors because the teens needed special help.

Research Question C

Research Question C: Is there a significant difference in selected perinatal indicators--adequacy of prenatal care measures (month prenatal care began and number of prenatal visits), intrauterine growth status, gestational age at delivery category, assessed condition of newborn at 5 minutes after delivery of infants born to adolescent mothers, classified by prenatal intervention group status?

Hypothesis 5

Hypothesis 5: Adolescent mothers who receive supportive prenatal intervention through a perinatal lay home visitor program (RMP) or a multi-disciplinary approach (NPP), in addition to a medical supervision during pregnancy, have:

a. Higher adequacy of prenatal care indicators (enter prenatal care earlier in pregnancy and make more prenatal visits in proportion to infant's gestational age) than those who do not participate in a specialized support program;

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b. Treatment and deliveries associated with high-risk conditions at tertiary perinatal center;

c. Pregnancies continuing to term (40 weeks gestation);

d. Infants weighing more than 2,500 grams (5 ½ pounds) at birth;

e. Infants appropriately grown for their gestational age; and,

f. Infants vigorous at birth (the 5-minute Apgar score is greater than 6).

Table 34 summarizes adequacy of prenatal care measures, pregnancy outcomes, and prenatal intervention program participation.

Table 34. COMPARISON: ADEQUACY OF PRENATAL CARE, PREGNANCY OUTCOME, AND PRENATAL INTERVENTION PROGRAM PARTICIPATION (in percentages)

1988

	RMP (n=49)	NPP (n=46)	TRADI TIONAL (n=736)	NO PNC (n=29)	TOTAL POPUL (n=860)
Month Care Began	53	33	55	0	52
Prenatal Visits	88	74	87	0	84
Apgar at 5 Minutes	94	96	95	93	95
Intrauterine Growth	96	89	89	81	89
Gestational Age*	88	96	86	76	86
Birth Weight**	90	93	91	79	91

Table indicates positive/adequate outcome for each variable (i.e. * > 37 Weeks Gestation ** > 2500 Grams)

The RMP has been moderately effective in enrolling at-risk teens into prenatal care during the first trimester of pregnancy and encouraging their attendance to prenatal

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appointments. The vast majority of infants born to RMP participants are appropriately grown and vigorous. Though the relatively high rates of moderately low birth weight babies and preterm deliveries are disappointing, a high percentage of at-risk RMP participants received adequate prenatal care and attained positive pregnancy outcomes.

Hypothesis 6

Hypothesis 6: Positive pregnancy outcomes are attained in populations characterized by factors placing them at an increased relative risk for inadequate prenatal care, intrauterine growth retardation, and neonatal compromise.

Table 32 demonstrates the increased relative risk of the population served by the RMP and Table 34 shows the positive infant outcome measures of intrauterine growth and Apgar scores. Hypothesis 6 is partially supported.

DISCUSSION OF EVALUATION OBJECTIVES

Evaluation Objectives

Evaluation Objective 1.

Evaluation Objective 1. Determine whether the RMP is reaching the population for which it is designed. The population is determined by maternal characteristics (mother's age, race, marital status, neighborhood of residence, and number of prior pregnancies).

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While the RMP serves only 5 percent of all adolescents in Norfolk who become pregnant, those enrolled in the RMP program are characterized by specified factors placing them at particular risk for delivering low birth weight infant's. The neighborhood of residence and no prior pregnancy factors are waived more frequently than other referral criteria.

Maternal Age

Relative risk profiles indicate teens ages 16-17 years are less likely to deliver low birth weight infants than other adolescent mothers; teens older than 17 are at some increased risk; teens younger than 16 years have the greatest risk. The most at risk girls, younger than 16, have competing nutritional needs, their own and those of the fetus; their body systems are not mature; they are at an egocentric developmental stage and often have difficulty with impulse control. Older teens face these problems as well, but to a lesser degree. While the younger teens are often within a family support environment, older teens--especially married adolescents--are frequently fiercely independent or emancipated without emotional or material support from caring adults.

More than half of the RMP participants are in the 16-17 year age group, one-fourth are older than 17 years and one-fourth are younger than 16 years. Increased emphasis on identifying, enrolling younger teens, as well as assessing and planning for specific client circumstances is warranted.

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Race

Because of national and state indicators, the RMP targets inner city, low income neighborhoods with largely non-white residents. Consequently, though two-thirds of teen mothers in the city are non-white, 92 percent of the RMP participants are black American teenagers. The emphasis toward serving the targeted low income, minority neighborhoods is supported by the relative risk calculations in this study showing the percentage of low weight deliveries for all black teens is 10.63 and 7.28 for all white teens. The association of low birth weight infants and poverty is well described in the Guttmacher Institute study and confirms the decision to concentrate program efforts in the target neighborhoods.[175]

Marital Status

Marriage, theoretically, suggests increased social support and family resources which contribute to the well being of the pregnant women and enhances pregnancy outcomes. There is no appreciable risk noted in relative risk calculations because all teen mothers in the RMP and the NPP were unmarried. Risk analysis in the total population indicates an increased risk among married teens. Married teens often move away from family support. Given the life

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circumstances of young mothers, especially older teens, married status should not be a barrier to RMP enrollment.

Parity

The program focuses on adolescents who are pregnant for the first time. This criterion was established because first time mothers are at increased risk for delivering low birth weight infants and for having subsequent pregnancies at a young age. First-time mothers make up 81% of the RMP participants and teens with previous pregnancies are enrolled on a space available basis. The relative risk calculation for the total population demonstrated a slight increase in risk of low birth weight infants for first time mothers, but the effect of this variable is more pronounced when combined with the characteristics of race and income. This study supports a recommendation to expand the criteria to encompass all pregnancies when funding levels allow program expansion.

Evaluation Objective 2

Evaluation Objective 2: Assess factors affecting future options and life circumstances for each teenage mother and her child (highest grade attained and educational progress).

National and local data indicate an association between a mother's reduced educational level and increased risk of adverse outcomes during and after pregnancy. Nearly half of the young mothers in Norfolk were behind their expected

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grade levels or demonstrated marginal academic mastery. Low self-esteem, unsuccessful school history, lack of supportive home environments, limited availability of role models, and inadequate goal setting and problem-solving skills limit future options for a teen mother and her child. Correcting these deficiencies is beyond the RMP's scope. Therefore, it is essential that the RMP initiate or cooperate in forming community links among the various programs and individuals working with Norfolk youth. Family mobility and diversity of services needed, are realities that call for regional resources and networks. Some teens are lost to prenatal and/or postnatal follow-up when they change place of residence, moving in with other relatives or friends. It is not uncommon for adolescents to live with grandparents. However, should the older adults move into housing for the elderly, the adolescents are excluded. For this and other reasons, more and more youngsters are among the homeless.

Evaluation Objective 3

Evaluation Objective 3: Determine adequacy of prenatal care measures by the month of entry into prenatal care, number of prenatal visits, and the hospital of delivery.

Prenatal Visits

The number of prenatal visits is the strongest predictor of pregnancy outcomes. Nearly 95% of the RMP teens indicated they had more than six prenatal visits

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during their pregnancy. This self-reported figure may be inflated. However, anecdotal reports from service providers and school personnel affirm the effect lay home-visitors have on attendance of scheduled events including: medical visits, social service appointments, WIC consultations, and school classes.

Month Prenatal Care Begins

The number of prenatal visits is influenced by the month care begins and the length of gestation at delivery. The Adequacy of Prenatal Care Index developed by the Guttmacher Institute includes these factors and is an accurate means of defining adequacy of prenatal care.[176]

Early entry into prenatal care, within the first trimester, is associated with positive pregnancy outcomes. Consistent with the total teen population, more than half of the RMP participants report they enter care in the first trimester. RMP data suggests this percentage is actually lower, representing a major deficiency in service delivery. Adolescent denial and reluctance to confront their parents may last three to four months, or longer. Resolving late entry into prenatal care is particularly difficult because limited provider services result in waiting lists for prenatal appointments which can contribute delays of two to six weeks. Increased commitment and renewed efforts are

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needed to improve early entry into prenatal care. Success is noted among the lay home-visitors with rich community networks who often learn of the pregnancy first-hand from the teen, her family or friends.

A major gap in service is evident from the number of teens receiving no prenatal care. Many adolescents use emergency rooms for intercurrent problems during their pregnancy, such as "stomach pain", colds, and urinary tract infections. More than half of the NoPNC group live in the targeted neighborhoods, suggesting the need for greater public awareness concerning prenatal care and the RMP. More intense and more effective recruitment efforts in the areas served by the RMP are also needed. Six percent of teens receiving no prenatal care also delivered outside the hospital setting in homes or in cars enroute to the hospital, thus increasing the risks to maternal and neonatal health.

Expanding neighborhood networks, developing an effective referral system for personnel providing pregnancy testing services, and establishing reciprocal communication with the Medical College of Hampton Roads and the staffs in Sentara Norfolk General Hospital emergency room and clinics are recommended.

Hospital of Delivery

Two-thirds of the RMP participants deliver at Sentara Norfolk General Hospital, a tertiary medical center; 72% of

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teens receiving no prenatal care also deliver there. This situation contributes to positive pregnancy outcomes for teens who are at high risk for delivering infants with low birth weight and low Apgar scores.

DePaul Medical Center has the second highest number of NoPNC deliveries. It is near the transient area of Oceanview where many of the NoPNC adolescents in this study reside. The area was not served by the RMP during the study period, but is identified as the next area for expansion. Reducing the number of teens who deliver without prenatal care would likely decrease the number of those delivering outside a hospital. No RMP participants delivered outside the hospital.

Evaluation Objective 4

Evaluation Objective 4: Analyze pregnancy outcome measures across prenatal intervention program groups.

As described, pregnancy outcomes such as birth weight, gestational age, intrauterine growth, and neonatal condition at delivery are promising, but inconclusive. Supported by the theoretical framework and the strong relationship between the month pregnancy care begins and the adequacy of prenatal care, it is likely a supportive intervention reaching residents of at risk neighborhoods would improve pregnancy outcomes. This is suggested by the positive outcomes among a population with a high relative risk for low birth weight deliveries.

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The positive impact of the reducing the occurrence of very low birth weight infants among the RMP group is noted in the hospital cost savings. Though a rate of low weight births is the same as the total city low birth weight statistic, this group of infants has a short length of hospital stay (less than 2 weeks) and did not require admission to the tertiary neonatal intensive care unit.

Evaluation Objective 5

Evaluation Objective 5: Compare pregnancy outcomes of the study populations with statistics for local, regional, state, and national pregnancy outcomes.

Though the RMP's effectiveness is not conclusively established, there is evidence that specialized outreach activities and support given to adolescent mothers contributes to early entry into prenatal care and a higher number of prenatal visits among teens with risk factors (age, race, income, education, first-time mothers) putting them at increased risk for having low birth weight infants.

Conclusions

The following conclusions about study results are submitted:

1. The RMP reached pregnant adolescents characterized by young maternal age, black race, residence in targeted neighborhoods with low family income levels, less than a high school education, and no prior pregnancies.

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Table 35. PERINATAL INDICATORS: COMPARISON OF NATION, STATE, REGIONAL AND LOCAL STATISTICS

1988

	LOW BIRTH WEIGHT		
	NON-WHITE	WHITE	TOTAL
1990 GOAL			9.0
UNITED STATES			10.0
VIRGINIA	11.7	5.5	7.1
VA PLANNING DIST. 20	11.9	5.8	7.9
NORFOLK, VIRGINIA	12.2	6.5	9.2
ALL ADOLESCENT MOTHERS	10.6	7.3	9.3
PRENATAL INTERVENTION GROUPS			
RESOURCE MOTHERS PROGRAM	10.4	0.0	10.4
NORFOLK PRENATAL PROJECT	9.4	3.0	6.5
TRADITIONAL SERVICES	11.1	7.2	9.0
NO PRENATAL CARE	17.4	23.9	20.7

2. RMP participants demonstrated these risk factors to a greater degree than teens outside the target neighborhoods.
3. The difference in the rate of preterm deliveries or low birth weight infants among the prenatal intervention groups is not significant.
4. Given the increased relative risk of the RMP participants, the lack of difference in pregnancy outcomes among the prenatal intervention groups is a positive finding. The expected low birth weight rate among black adolescent from low income neighborhoods is much higher than seen in either specialized prenatal intervention group (RMP & NPP).
5. RMP participation contributes to improved adequacy of prenatal care and pregnancy outcomes among adolescent

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mothers characterized by factors placing them at increased relative risk for inadequate prenatal care, intrauterine growth retardation, and neonatal compromise.

6. Reducing the number of women delivering without prenatal care is essential if perinatal statistics for a geographical area are to be improved; specialized programs such as community based lay home visiting are strongly recommended.
7. Programs providing outreach to special populations and complementing traditional prenatal care with supportive interventions can improve pregnancy outcomes among at-risk adolescent mothers.
8. Lay home-visitors encourage early entry into prenatal care and increase the number of prenatal visits among pregnant adolescents.

Recommendations

The results of this evaluation research are the foundation for the recommendations summarized in Tables 36 through 39. Resource Mother Program modifications and public policy development are suggested. Special emphasis is given to targeting programs to address identified population groups at known risk of poor pregnancy outcomes. Recommendations are grouped into the following categories: service delivery, program development, advisory committee organization, and research/policy analysis.

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Table 36. RECOMMENDATIONS: SERVICE DELIVERY

1. Increase the number of participants served by the program to 175 per year (20% of the total teen deliveries in a given year).
2. Remove the age and first time pregnancy referral criteria.
3. Increase recruitment and enrollment activities targeting girls 12-15 years old.
4. Provide in-service to lay home-visitors on the developmental tasks of girls 12-15 years old.
5. Link RMP participants with tutoring and job training programs, as appropriate.
6. Document a medical risk score and adequate prenatal care index in each client record.

Table 37. RECOMMENDATIONS: PROGRAM DEVELOPMENT

1. Develop primary pregnancy prevention services for girls 12-15 years of age.
2. Provide community workshops and support groups for parents of pregnant teens to improve family communications and enhance cooperation between the home, health providers, and the school, or refer the individuals to similar programs.
3. Develop follow-up and referral procedures for pregnant teens who come to the hospital emergency room for pregnancy emergencies.
4. Participate in public awareness and outreach efforts which encourage identification and enrollment during the first trimester of pregnancy.
5. Reactivate the advisory committee and sub-committees.

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Table 38. RECOMMENDATIONS: ADVISORY COMMITTEE ORGANIZATION

1. Community Liaison Committee
   - Facilitate community involvement and ownership in the RMP.
   - Provide input on the identification, screening, and selection of lay home visitors.
   - Advise staff on case finding strategies for enrolling participants during the first trimester of pregnancy and program policies.
   - Advocate for the program within the targeted neighborhoods.
   - Assist with planning and implementation of the program evaluation.
2. Inter-agency Management and Coordination
   - Facilitate communication, cooperation, and coordination of services between the RMP and cooperating agencies.
   - Advise staff in the area of inter-agency matters, emphasizing timely and appropriate referrals.
   - Establish a positive inter-agency climate and assist in reducing extramural conflict and competition.
3. Future Funding
   - Serve as ambassadors for the program through contacts with various business, civic, and church groups.
   - Cultivate interest and commitment from community sources of local funding.
   - Help in identifying a variety of funding sources and developing proposals for continued RMP support/expansion of the RMP.
   - Facilitate communication between the community and the RMP.

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Table 39. RECOMMENDATIONS: RESEARCH AND POLICY ANALYSIS

1. Examine the causes of the consistently high percentage of no prenatal care among teenagers and explore strategies to reverse the situation.
2. Investigate programs that successfully reach at-risk adolescents and disseminate that information to agencies serving youth.
3. Replicate this evaluation using medical risk score and adequate prenatal care index.
4. Replicate this evaluation with the RMP and other perinatal lay home-visiting programs to more firmly establish the effects of lay home-visitor interventions on improving adequacy of care and compliance with recommendations to reduce perinatal risk.
5. Develop a quantitative and qualitative lay home-visitor role analysis and client/family survey to more clearly define the intervention of lay home visitors.
6. Conduct a cost-benefit analysis of perinatal lay home visiting as a strategy to reduce infant mortality and low birth weight infants.
7. Examine the intergovernmental implications of health care funding as they affect services for mothers and infants.
8. Explore the ethical problems associated with allocation of health resources in relation to perinatal services and outcomes of pregnancy.

IMPLICATIONS FOR THE RMP AND OTHER PERINATAL LAY HOME-VISITOR PROGRAMS

Infant mortality and low weight births cannot be eliminated, but the rate of infant survival must be improved. Helpful strategies are: (1) identify women at particular risk for delivering a pre-term, low weight

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infant, (2) determine community resources and reduce barriers to perinatal services can be identified, and (3) establish linkages between those in need of prenatal assistance and providers of prenatal care and services.

Factors placing a woman's infant at increased risk for low weight birth or infant death are associated with barriers to health care, social support services, and early intervention programs; increased risk is also associated with harmful lifestyle choices, lack of personal competence and responsibility, and limited family resources (emotional and material). Community-based efforts are needed to link resources, remove barriers, and resolve gaps in needed services. Perinatal lay home visiting is one effective strategy for bringing together the efforts of health care and social service providers, governmental officials on various levels, and community leaders together with at-risk families; families in need of service; families who do not understand the value of preventive services; families isolated by reason of economics, culture, ignorance, or fear.

KEY COMPONENTS OF SUCCESSFUL PROGRAMS

I have directed a perinatal lay home-visiting program for five years. Based on this experience and my previous perinatal nursing experience, I believe perinatal lay home-

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visiting is an important complement to traditional and non-traditional health and social service programs.

The following things associated with the RMP are commended and recommended to other lay home-visiting projects:

Each neighborhood modifies program components to meet the unique conditions and problems experienced by pregnant women and families. In this way, the RMP is tailored to meet the specific needs of a community and use the available resources there.

Each Resource Mother and pregnant teen forms bonds of friendship and caring, enhancing the competence of the individuals involved. This is a major factor in the program's success, especially in hard to reach and high-risk populations such as adolescents, low income/underclass families, minority groups, non-English speaking persons, or mothers challenged with educational or mental deficits.

The resource mother, often a woman who has experienced a similar pregnancy, understands the pressures and obstacles faced by a young mother. When a resource mother is matched with a pregnant young woman in her own neighborhood, they are likely to share a common outlook on life, a common history, a familiar speech pattern, and a mutually respected approach to families.

The lay home visitor focuses on the many ordinary concerns and tensions of daily life. Case study examples

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describing typical success stories are included in Appendix C. The lay home visitor is in a unique position to connect families with a wide variety of services and resources: baby sitting, WIC, child health care, transportation, job/school opportunities, friends, to list a few. Through their network, home-visitors often link neighbors with each other in creative ways.

The resource mother looks for the strengths and possibilities of the teen and the situation. The lay home visitor and client enhance and reaffirm each other, thus strengthening the quality of life for the teen and her child. As the younger mother begins to value and take responsibility for herself and her child, daily decisions are made with an eye toward the future.

Selection of a university school of nursing as the lead agency had many advantages. First, this historically black university has a long tradition of community service and support. This enhances entry into the neighborhoods and shortens the trust building phase of the project. Second, university resources are available for providing service, training, and evaluation. Finally, the perspective of nursing practice provides an excellent framework for implementing such a project. Table 40 lists a number of nursing diagnoses applicable to the pregnant adolescent and the family to illustrate the basis for nursing intervention supported through professional and lay home visiting.

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Table 40. THE PREGNANT ADOLESCENT AND FAMILY: NURSING DIAGNOSIS [177]

1. *Knowledge deficit* related to normal body function.
2. *Powerlessness* related to dependence on the family.
3. Potential *disturbance in self-concept* related to personal identity.
4. Potential for *social isolation* related to beliefs about pregnancy.
5. Potential *self-care deficit: dressing/grooming* related to poor self-concept.
6. *Noncompliance* related to level of education.
7. Potential *alterations in parenting* related to impaired parent-infant attachment.
8. Potential for *ineffective family coping* related to beliefs about pregnancy.

Shortcomings of the NSU program and potential problem areas for other projects are:

1. The absence of stable funding. This requires the program staff to develop new financial resources and conduct program operations at the same time.
2. Fragmentation of services and relative isolation from the primary care or prenatal health provider.
3. The need for intensive supervision and inservice education of lay home visitors.

[177]Jane Servonsky and Susan R. Opas, Nursing Management of Children, (Boston: Jones and Bartlett Publishers,Inc.) 1987, p. 1417.

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4. Lack of institutional resources to administer program within the larger organization, support interagency collaboration, and conduct community/public relations activities.
5. Limited documentation and communication with other service providers limit the evaluation for the program and participants.

In the future, I would like to see prenatal and child health services delivered from a common site located in neighborhood facilities, integration of lay outreach and home visiting activities with traditional perinatal services, and a comprehensive process for reducing low weight births which has a broad base of community support. Public health nurses have been leaders in reducing infant mortality and improving the life chances of children. They have a rich tradition of neighborhood service. The current focus is on clinic based services in public health. We need to redirect our attention to the community and re-establish professional and lay home visiting services. Public health nurses are stabilizing influences and change agents; they are effective advocates for the poor and the vulnerable.

Additionally, I recommend holistic approaches that strengthen families toward self-sufficiency. Such approaches would involve parents--fathers and mothers of the adolescent parents and the teens as parents. There is also a need to consider the children--the young parents as

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children with developmental tasks to complete and the infant child.

A shift in thinking is needed concerning education. Life skills for independent living are necessary tools for each family member. This shift enables the adolescent mother to seek gainful employment, encourages thoughtful inquiry, and values critical thinking with active problem solving. Other family members could participate in the learning, thus strengthening neighborhoods one family at a time.

Such a change puts education back into proper perspective; it begins with the adolescent mother and her child, or extends to include family and friends, and it takes situational realities into account. Many young mothers do not finish high school. Some are learning disabled, others discouraged, and still others are overwhelmed by the dual roles of being a child and being a mother.

This study shows that a shift in thinking, a return to empowering neighborhoods, and building personal relationships can reduce premature delivery and low-weight births among adolescent mothers. The results are most encouraging among those who are at increased relative risk for delivering low weight infants. Specialized support programs involving lay home-visitors who share socio-economic characteristics of the families of the adolescents

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or a multi-disciplinary program with a home visiting component complements traditional perinatal services.

As the results of this study are being presented, the Government Accounting Office released its study of perinatal lay home-visitor programs supporting the concept. The House intergovernmental subcommittee is studying the effect of Medicaid expansions and finding states are reducing medical services for the poor because state treasuries are exhausted, and the Children's Defense Fund is concerned about the great failure in providing access to preventive care.[178] Shortly after the health funding shortfall was brought to public attention, Louis Sullivan announced a new administrative Federal initiative to improve the health of American babies.[179] However, there are concerns...in the words of Florida Gov. Lawton Chiles, Chairman of the National Commission to Prevent Infant Mortality, "this is simply robbing Peter to pay Paul."[180]

Though the relationship between preventive prenatal care and improved pregnancy outcomes is well established,

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[178]Home Visiting: A Promising Early Intervention Strategy for At-Risk Families. Government Accounting Office Report/HRD-90-83. Washington, D.C.: Government Printing Office, 1990, p. 61; Federal Register. House Subcommittee on Intergovernmental Relations Hearings, Friday, December 7, 1990.

[179]Louis W. Sullivan, "Healthy Start: The Bush Administration's Pilot Project for Reducing Infant Mortality," Dallas, TX: March of Dimes National Leadership Conference, February 14, 1991.

[180]Spencer Rich, "U.S. Launches Program to Reduce Infant Mortality," The Washington Post, February 15, 1991.

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the gap in health care services for the poor is widening. Strategies to mobilize the political will, structure funding priorities, and implement effective comprehensive perinatal programs is needed to protect our most vulnerable children. Research in the areas of community assessment, grassroots mobilization, intergovernmental relations, program evaluation, and resource allocation is needed to guide policy makers.

The problem has been defined in human, economic, and political terms; yet, the inter-related problems of infant mortality, low birth weight infants, and adolescent pregnancy do not have an adequate constituency. While some people question whether we have the resources to solve these issues, the solution to the problem of infants being born with low birth weight is actually less expensive than the problem itself. A national commitment and local empowerment will bring providers of care and services together with recipients. Empowerment releases creativity and energy. Empowerment fosters trust and confidence necessary for risking change.

A community based strategy is important because the individuals most at risk for having their babies born small are the least likely to seek early and consistent health care during pregnancy. The reasons they do not go for pregnancy care are many: lack of awareness, financial problems, no transportation, low self esteem, denial, fear,

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and more. Having a trusted neighbor come to your door or speak to you at the corner store can change all that. Lay home-visiting programs identify the trusted individuals, they find the women people turn to for help in their own neighborhood; then they train them and empower them to make a difference in the lives of people they know or will come to know.

A community based strategy reaches the hard to reach, it sends the right message by the right messenger. The results we have seen indicate pregnant women listen, are nurtured, attend prenatal and infant care appointments, and follow through with recommendations concerning their health and the health of other family members. Lay home-visitors are change makers. Young mothers assisted by the home-visitor substitute positive actions for harmful lifestyle behaviors such as smoking, substance abuse, and poor nutrition; as the teen's confidence in herself improves, she takes better care of herself; as she and the home-visitor explore the future, create a future together, short term goals become reality. By establishing friendships with others and building personal competence families become stronger and less vulnerable to the pressures of daily life; stronger families contribute to their neighborhood and their community.

Working in neighborhoods targeted because of their high rates of infant mortality and low weight births is teaching

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me a great deal about communities. The humbling part is realizing that if you listen, people have the vision and the energy needed to solve problems they identify as worth the effort.

To be effective in assisting others, our goals and our approaches must have meaning and value for the individuals involved. The statistics of infant mortality, low birth weight, and adolescent pregnancy describe national issues; these statistics take on personal significance within the family, thus are meaningful to local groups--Neighborhood Tenants' Associations, civic leagues, church groups, YMCA's & YWCA's, sororities/ fraternities, service clubs, youth serving agencies, etc. Lay home-visiting programs provide a structure for individuals and groups to become involved, to take action on behalf of children and families.

Lay home visitors, empowered by information and resources, make a difference in their neighborhoods. They link mothers with services and encourage families toward a brighter future.

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APPENDIX A

PRESS CONFERENCE: APRIL 5, 1989
THE NATIONAL COMMISSION TO PREVENT INFANT MORTALITY

CAROLYN THOMAS: RESOURCE MOTHER, NORFOLK STATE UNIVERSITY

WHY IS THE WORK OF RESOURCE MOTHERS SO IMPORTANT TO PREGNANT WOMEN?

The kind of work Resource Mothers do when visiting pregnant women in their homes and working with them in the neighborhoods where they live is very important. Resource Mothers become a trusted friend. It is through this alliance we seek to strengthen personal competence, communication skills and nurturing relationships within the families we serve. Not only do we help mothers understand the value of preventive health care, we offer them supportive friendship and extend practical assistance. Perhaps most important of all, we provide a vital human link between the young mother and established health services and social programs. These programs can mean the difference between a healthy baby and a premature infant, between a life of welfare dependance and self-sufficiency.

WHAT HAVE THE OUTCOMES BEEN?

While working with young mothers and their families during pregnancy and the baby's infancy period, we see pregnant women gaining weight appropriately, healthy babies being born, teens staying in school, infants receiving proper well-child care, subsequent pregnancies being delayed, and more confidence developing among the new parents and grandparents. The cross-generational effect of our work is illustrated by the following example:

Two years ago I became acquainted with a high school senior who was pregnant with her first child. She was motivated to graduate, but uncertain about her ability to combine motherhood and school. Her high school did not consider her a college bound student. As we worked together she graduated from high school, was accepted at Norfolk State University and received a financial aid award. She is now successfully completing her freshman year of college, the first member of her family to do so.

Not only is the teen's mother very proud of her daughter's accomplishments, she has gone back to school herself to get a GED. This is what the college student's mother told me just last week, "Now I can read and for the first time in my life I am able to help my child with his homework." Her son is in the third grade.

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ALICE BUTLER: RESOURCE MOTHER, NORFOLK STATE UNIVERSITY

WHAT MIGHT THE SCENARIO BE IF RESOURCE MOTHERS WERE NOT IN THESE YOUNG GIRLS LIVES?

The Resource Mothers Program has been a great help to the young women in my neighborhood because now there is someone close by that the girls can talk to, someone who can help them get into prenatal care and then explain what the doctor has said to them. Without the Resource Mothers we would see fewer women seeking early prenatal care, more small or sick babies being born, more teens dropping out of school.

Lack of information, embarrassment and intimidation would cause fewer mothers to take advantage of health services and the WIC food program. Young women have been dropped from programs because they did not complete the eligibility maze, or did not know how to appeal when they were denied services. Not knowing the dangers--young mothers would be more likely to drink alcohol and get involved with drugs; more likely to go from partner to partner seeking love and a father figure. Without a Resource Mother some young women would be alone during times of stress resulting from crises such as eviction, family alcoholism, or a boyfriend's abandonment. That was the situation before the Resource Mothers Program got started.

WHAT HAVE THE RESOURCE MOTHERS BEEN ABLE TO ACCOMPLISH WITH THESE YOUNG WOMEN?

I think the most important thing we accomplish through our work with pregnant women is helping them to accept the value of preventive health care. Most of the time early prenatal care is not a priority; often the mothers of the young women I work with have not gone for prenatal care themselves until late in pregnancy. Gentle encouragement is often all that is needed to get someone to make her first prenatal appointment. Once in care, frequent reminders are necessary to help young women remember to take their vitamins, attend the clinic regularly and eat foods from all the basic food groups.

When faced with a question about pregnancy or child care, young mothers and even grandmothers have said, "Let's see what Miss Alice says about that first!" Working with the Resource Mothers program is a privileged responsibility and a precious opportunity that means a great deal to me. Young mothers and their families have come to rely on the Resource Mother as someone who can help them; someone who can show them how to help themselves.

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APPENDIX B

RESOURCE MOTHERS' OATH

I, (state your name), solemnly pledge my support and my allegiance to the Resource Mothers Program.

I will strive diligently to assist young women to experience a positive and successful pregnancy such that there might be healthy and strong families.

Where there is fear, I shall bring some light,

Where there is despair, I shall bring some hope.

Where there is ignorance, I shall bring some understanding,

Where there is difficulty, I shall be an advocate.

Where there is loneliness, I shall be a friend,

Where there is reluctance, I shall be a companion.

I recognize the confidential nature of my tasks and promise to uphold high ethical standards in the performance of my duties.

I shall remain loyal to The Resource Mothers Program and do all in my power to ensure its success.

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APPENDIX C

CASE STUDY #1: NSU RESOURCE MOTHERS PROGRAM

Outcome: Healthy pregnancy outcome, housing assistance, school progress, help in coping with her mother's alcoholism.

The Program Director met P.K. at the clinic during her first prenatal appointment. She was eighteen, frightened, and deeply committed to providing for herself and her baby. However, there were problems. She was living with her mother who was "ill" and they were facing their second eviction in three months. She was trying to take care of her mother as best she could, but it was becoming so hard. A junior in high school, her grades had fallen because she did not have the book rental fee and because she was absent a lot to take care of her mother.

When the Resource Mother visited P.K. and her mother she found out they had twenty-four hours to locate new housing. Contacting a local church, temporary housing was arranged. Their belongings were moved. In time a more permanent arrangement was made. Her mother's illness was alcoholism. Because P.K. required a more nurturing environment than her mother could provide, she decided to live in a shelter for pregnant women and continue attending the alternative school for pregnant adolescents. She planned to return to live with her mother after the baby was born--when she could no longer stay at the shelter. Upon discharge from the hospital with her two day old infant, she came home to find all of her belongings on the curb! Her mother had been evicted again that morning. Her mother had not told anyone that she was being evicted.

Her grandmother, risking problems with her landlord for breaking her own lease agreement, took in the young mother and her infant until other plans could be made. P.K. is realizing that she can no longer rely on nor take care of her mother. She and the Resource Mother are making plans to establish her independent living arrangements. A tutor has been contacted to help her catch up on her studies and an elderly couple, seeking to do community service, have been involved to provide babysitting and social support for the mother and her grandmother. P.K. is also attending a support group for adult children of alcoholic parents.

P.K. plans to remain in school and graduate in June, 1990. She faces the future with a new sense of trust in her own ability of take charge of her life, a confidence in her support network, and a dedication to her infant daughter.

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CASE STUDY #2: NSU RESOURCE MOTHER PROGRAM

Outcome: Early identification of a potentially serious threat to the pregnancy, access to nutrition programs and medicaid, delivery of a healthy infant, prevention of premature subsequent pregnancy.

W.P. had been invited to participate in the Resource Mothers Program during her first pregnancy. A fiercely independent seventeen year old, she declined because the program was something new and she believed she could handle things by herself. Her baby was delivered two weeks early and was a bit smaller than she should have been--even for the early deliver. Then, within two months of the delivery, W.P. found herself pregnant again. This time she approached the Resource Mother and asked for her help. Enrolled in prenatal care at twelve weeks, W.P. kept all of her appointments. This time she was able to obtain food stamps and participate in the WIC program to ensure this baby would grow well and she would remain strong and healthy. Her medicaid eligibility was renewed, giving her encouragement to take her daughter to the pediatrician.

At one point during the second pregnancy, the Resource Mother and teen were talking about how one could help oneself during labor. The young mother happened to say that she was going to stop taking her blood pressure pills because they made her "feel bad." The teen was first instructed to make an appointment with the clinic and the Resource Mother consulted the nurse director of the Resource Mothers Program. As a precaution the Resource Mother was told to have the teen drink orange juice and eat a banana to replace the potassium which might be low, a situation which could be causing her to feel bad. Later at the clinic the doctor adjusted the medication, W.P. felt better, she continued to take her medication, and her blood pressure remained under control--a necessary condition for the mother and her unborn child to stay in good health.

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CASE STUDY #3: NSU RESOURCE MOTHER PROGRAM

Outcome: Support during the crisis of decision-making, early prenatal care, improved family communication, healthy mother and infant, delayed subsequent pregnancy.

S.K. knocked on the Resource Mother's door. "My mother thinks I'm pregnant and she wants me to have an abortion. I don't want to kill my baby. I don't know what to do. Maybe I'm not even pregnant." The young girl was fourteen years old and dealing with a very adult decision! The teen agreed to have the Resource Mother and Program Director come to her home and the four would talk together. Throughout their discussions, the Resource Mother and Program Director helped the mother and daughter recognize the love and concern each had for the other; helped to improve family communication. The first task was to determine whether S.K. was indeed pregnant and if so, how far the pregnancy had progressed.

S.K. was pregnant--though at fourteen did not fully understand how or why. The next priority involved helping the family explore their options and their feelings so that they could take control of their situation and begin to actively solve the multiple problems facing them. Together, mother and daughter decided to allow the pregnancy to continue. Religious beliefs and life experiences made abortion unacceptable. There was also concern that, since S.K. was so against that option, she might become pregnant again within a short period of time. Medical supervision of the pregnancy began in the first trimester, within one week of the first contact, because access to the clinic was facilitated by the Resource Mother. At that time a six to eight week wait was not uncommon for women calling to enroll in prenatal care.

At the suggestion of the Resource Mother, S.K.'s mother explored job training opportunities and now works as a certified geriatric nursing assistant. This woman and the Resource Mother worked closely together and with others, providing S.K. with consistent support and guidance. She was enrolled in an alternative school for pregnant girls where her attendance needed to be closely monitored. The school staff became a key members of the team participating with the family, the Resource Mother, social worker and health care providers in working toward a positive pregnancy outcome and improved life circumstances.

S.K. was in the sixth grade when she became pregnant. Many adolescent tasks are yet to be accomplished. Because of the complexity of her situation and the limited supportive resources available within the family, we anticipate working with S.K., her infant and her mother

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through her adolescence. That would be six years; adolescent pregnancy is not a problem that resolves in nine months. However, long term follow-up is an investment of time and resource which offers a significant return in human and financial terms.

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CASE STUDY #4: NSU RESOURCE MOTHER PROGRAM

Outcome: Healthy pregnancy outcome, high school graduation, college entry and part-time employment, maternal grandmother returned to school for her GED, younger sibling enjoys a home where literacy and academics are valued and supported.

Two years ago when L.F. entered the Resource Mothers Program, she was a high school senior and pregnant with her first child. The seventeen year old was motivated to obtain her high school diploma, but uncertain about her ability to combine motherhood and school. At this point her high school counselor did not consider her a college bound student.

Working with her Resource Mother over the next few months, L.F. followed the recommendations of the health care team concerning her pregnancy, attended school regularly and graduated from high school with the rest of her class. With the encouragement and assistance of her Resource Mother, L.F. completed college entrance applications and financial aid forms. She was accepted into Norfolk State University with a financial aid award, the first member of her family to attend college. This young mother is now successfully completing her freshman year at the University. L.F. credits the Resource Mother with giving her a vision of possibilities beyond her dreams and warmly praises her by saying that these accomplishments would not have been possible without her Resource Mother.

The cross-generational effect of the Resource Mothers Program is illustrated by the example of L.F.'s mother. L.F.'s mother is very proud of her daughter's accomplishments and considers the Resource Mother a valued friend. Seeing the progress her daughter was making, the woman explored her own options with the Resource Mother. She ultimately returned to school herself and is working toward a General Education Diploma(GED). Her pride and confidence were evident when she said, "Now I can read and for the first time in my life I am able to help my child with his homework." Her son is in the third grade.

Case studies complied for:
The National Commission to Prevent Infant Mortality
by Margaret Konefal, MSN, RN, Director
Resource Mothers Program, Norfolk State University
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APPENDIX D

GLOSSARY

This glossary reflects the meanings of these words as used in this study.

Apgar Score represents a 10-point scale determined by a rapid assessment of heart rate, respiratory effort, muscle tone, reflex irritability, and color of a newborn infant. Scoring is typically done at 1, 5, and 15 minutes.

Birth outcome refers to characteristics of a live birth such as: low birth weight, gestation at delivery, intrauterine growth category, and survival during the first year of life (infant mortality).[1]

First trimester refers to the first three months of pregnancy.

Gestational age refers to the number of weeks from conception.

> Appropriate for gestational age infants achieve intrauterine growth between the 10th percentile and the 90th percentile expected for the gestational week of the pregnancy
>
> Large for gestational age infants have intrauterine growth larger than 90th percentile expected for the gestational week of pregnancy.
>
> Small for gestational age infants are less than the 10th percentile in weight for age.

Infant deaths refer to deaths of children younger than 1 year of age.

Infant mortality rate is the annual number of deaths of infants younger than 1 year of age, per 1,000 live births.

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[1]Susheela Singh, Jacqueline Forrest, and Aida Torres, Prenatal Care in the United States, Volume 1 (New York: The Alan Guttmacher Institute, 1989), p. xvi.

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GLOSSARY (Continued)

Low weight birth refers to infants born weighing under 2,500 grams, or 5 lbs. 8 oz. or less.

> Very low birth weight refers to a birth weight of under 1,500 grams, or 3 lbs. 4 oz.

Neonatal period refers to the first 28 days of life.

Perinatal, "around birth", refers to the duration of pregnancy and the first month.

Prenatal care refers to the risk assessment, education and health promotion, medical and psycho-social interventions, and follow-up provided to a woman during pregnancy.

> Adequate prenatal care describes the care that begins in the first trimester of pregnancy and consists of the adolescent completing 80 percent or more of the recommended number of medical visits, given completed gestation.[2]
>
> Inadequate prenatal care describes the care that begins in the first trimester of pregnancy and consists of less than 50 percent of the recommended number of medical visits, given completed gestation.

Pre-term delivery or premature birth refers to delivery before 36 weeks gestation.

Resource Mother/Lay Home Visitor. A Resource Mother, as defined in this project, is a lay person with evident helping skills who is trained to assist adolescent parents and their families with non-medical dimensions of pregnancy and child care.

Trimester is one of the three consecutive three-month periods of a pregnancy.

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[2]Singh, Forrest, and Torres, p. xv.

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AUTOBIOGRAPHICAL STATEMENT

Margaret Moore Konefal was born in New York City, NY, on April 20, 1939. Ms. Konefal received a bachelor of science in nursing from Incarnate Word College, San Antonio, TX, in 1961; a master of science in maternal-infant nursing from Catholic University of America, Washington, D.C., in 1969; certificates in bioethics from the Kennedy Institute of Bioethics, Georgetown University, Washington, D.C. in 1984 and 1988 and a certificate of advanced study in public administration from the School of Business and Finance, Old Dominion University, Norfolk, VA, 1990.

Ms. Konefal has held positions as staff nurse at Memorial Hospital, Colorado Springs, CO; Children's Hospital, San Diego, CA; and Sibley Hospital, Washington, D.C.; instructor at Beth El School of Nursing in Colorado Springs, CO and at Federal City College, Washington, D.C.; childbirth and parent educator with Parent-and-Child, Inc., Washington, D.C.; clinical nurse specialist and Clinical Unit Coordinator of the Newborn Nursery, Children's Hospital National Medical Center, Washington, D.C; Clinical Nursing Coordinator of the Neonatal Intensive Care Unit and Associate Director of Nursing responsible for critical care, transport, continuing education, and quality assurance, Children's Hospital of the King's Daughters, Norfolk, VA; Director of the Resource Mothers Program and assistant professor at Norfolk State University, Norfolk, Virginia;

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and Director of Critical Care and Emergency Nursing, Children's Hospital, Columbus, OH. She provides consultation in perinatal nursing, program evaluation, and bioethics.

Ms. Konefal is a member of Sigma Theta Tau, the American Nurses' Association, the National Perinatal Association, and several specialty nursing and research organizations. She served on the Board of Directors of the Virginia Perinatal Association and the Child and Family Services of Southwestern Hampton Roads. She was awarded a federal traineeship for master's study and received grants for conducting the Resource Mothers program from the Virginia Department of Health, Division of Maternal and Child Health; the City of Norfolk; the March of Dimes Greater Hampton Roads Chapter; the March of Dimes Birth Defects Foundation, National Office; and the Junior League. She received the Outstanding Doctoral Student Award from the College of Business and Public Administration at Old Dominion University, and was awarded tenure at Norfolk State University.

Ms. Konefal's publications include:

Resource Mothers: A Strategy to Reduce Infant Mortality Using Lay Home-Visitors: The Norfolk State University Program's Experience. Monograph (June, 1990).

The Caring Connection, A Newsletter for Lay Home Visitors, Editor, M. M. Konefal, Published Quarterly by the March of Dimes, White Plains, N.Y. (1990).

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