1992

The Effects of Prenatal Care on Infant Mortality in the United States

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An Abstract Presented to the Faculty of the Graduate School of Lindenwood College in Partial Fulfillment of the Requirements for the Degree of Master of Science

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ABSTRACT

This thesis will focus on the causes of infant mortality in the United States. The lack of adequate prenatal care will be specifically addressed.

Research has attributed the majority of preventable infant deaths to socio-economic factors as opposed to the lack of technology. Since the percentage of the United States GNP spent on medical care continues to rise without subsequent decreases in infant deaths, it becomes necessary to focus on causal relationship.

Since a nation's infant mortality rate has long been viewed as an indicator of the country's effectiveness in meeting health needs, many areas must be targeted. The importance of personal accountability coupled with governmental responsibility form portions of the medical, social, and moral dilemma of the problem.

The purpose of the present study is to investigate the primary causes of infant mortality including those ranging from substance abuse to the inability of ob-

taining adequate prenatal care. Specifically, it is hypothesized that the use of converted recreational vehicles to provide prenatal care and other related services in locales with high infant mortality rates will improve those rates.

Preliminary studies of other projects to improve prenatal care and initial surveys of St. Louis area hospitals indicate that this hypothesis be accepted. Both the projects and the initial random sampling of three major hospitals, all target prenatal care as a foundation for solving a formidable problem.

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DEDICATION

To my children, Pamela and Patrick Dieterich, for their continued support and encouragement.

To Toni and Paul Gerlach, for their unspoken love.

To Dorothy Webb, for loving me as I am!

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Chapter I

INTRODUCTION

Origin

Historically, the United States has fought and prevailed against many battles involving infant mortality. However, the current methodology has engaged this country in a war that cannot be won. In previous battles, the United States basically eradicated the existence of puerperal fever through the use of disinfectants, sterile technique, and antibiotics when indicated. Another battlefront was established with the introduction of vaccines and inoculations which protected children and adults against the often deadly communicable diseases of smallpox, diphtheria, pertussis, rubella, mumps, measles, and polio. During this time, the policy of the United States reaffirmed its commitment to provide basic protection to all infants and adults against these killers.

As the accessibility of insurance coverage increased in this century, the care available to the "poor" became

less of a societal priority, hence, there were fewer clinics, and the personal aspect diminished. Today, the definition of "poor" has changed, because more people fail to meet the qualifications for Medicaid and other assistance due to the changing criteria for federal and state funding. In addition, more and more people do not have the protection of insurance due to the gradual eradication of the middle class and the number of unemployed. Although free clinics are still available for immunization from childhood diseases, the number and accessibility of these clinics has drastically declined.

Of even greater consequence in the picture of infant mortality, however, is the fact that a larger percentage of people find prenatal care inaccessible by virtue of money, transportation, or existence. Because more and more people are "falling between the cracks" of our medical system, they fail to receive adequate prenatal care; some do not seek medical attention until the third trimester of pregnancy, or upon presenting for delivery. Coupled with these socioeconomic factors are the problems associated with substance abuse, ethnic and religious barriers, and ignorance. These

problems cannot be solved by vaccines, nor can they be solved by applying bandaids to the existing system. Either a new way of providing care must be established through some type of national health insurance, or a new means of bringing care to these people must be developed.

Competitive Exclusion

To more fully understand how the needy of our society can envelope such a wide spectrum, an important area to explore is competitive exclusion. In 1934, G. F. Gause, a professor at Moscow University, published the results of a set of experiments concerning competitive exclusion. Professor Gause, known as the father of mathematical biology, put two small animals of the same genus (protozoans) in a bottle with an adequate supply of food; one of the animals will always perish. Conversely, his second experiment put two small animals of different genus in a bottle with adequate food supply, and concluded that animals of two different species can coexist; this became known as Gause's Principle of Competitive Exclusion (Henderson 139). That same axiom can be applied to the current problem

in the United States' infant mortality rate. The current principles of dealing with prenatal care cannot be applied to both the 'haves' and the "have nots'.

Competition begins with life itself. Darwin's Theory of Evolution centers around ever-competing life sources. The abundance of life form develops from variety. "The richer the environment, the greater the number of potentially significant variables that can give each species a unique advantage; but also the greater the potential number of competitors - and the more severe the competition" (Henderson 139). In terms of mortality and morbidity, and the idealogy of prenatal care, the mothers who receive adequate care are at a distinct advantage over the mothers who do not receive care.

Business (including the health field), and biology would seemingly follow similar patterns of "gradual evolutionary change" except for the ability of business strategists to use their imaginations and ability, to reason logically to expedite the rate of change and the effects of competition. Aside from these two factors, strategy also necessitates the understanding of natural or cultural competition (Henderson 139).

With expenditures exceeding 11% of the G.N.P., our current "health care system" certainly needs to learn and apply Gause's Principle of Competitive Exclusion. Since hospitals constitute the largest percentage of health care costs, it seemed logical to originate cost reduction within these institutions. Cost containment methods including Disease Related Groups (DRG's), RVS, and Health Maintenance Organizations (HMO's) have been introduced in the last twenty years. However, incentives and system changes seem to battle one another each step of the way.

"New math" needs to be implemented within the strategy of the changing face of hospitals and related providers. Simply put, new facilities, procedures, or services, must reduce the "universal cost of care, regardless of its value or expense" (Maier 58). Realistically and intuitively assessing local needs will determine the cost effectiveness of particular ventures (Scotti 144). The possibilities appear endless and varied. Obviously, some will work, others will not.

Service companies with single-minded goals, regional networking, shared services, promotion of high-tech equipment, marketing services, early diagnosis,

and the emphasis of prevention, all constitute relatively new approaches in the health care industry. The effectiveness of these techniques, for most institutions, remains futuristic because the implementation requires insight, planning, changes, and risks.

In 1991, just as "by 1910, . . . the death rate, and especially the death rate among children, is high in inverse proportion to the social status of the population" (Gould, Davey, and LeRoy 181). Eighty years have passed with great advances in communication, technology, and seemingly the ability to change an alarming problem. Although the overall infant mortality rate has decreased, it has not decreased proportionately with the rate of other industrialized nations (Exhibit I). All of the industrialized nations utilize accessibility to technological improvements.

nfant Mortality, Worldwide

Nation	Rate
1. Finland	6.0
2. Japan	6.2
3. Sweden	7.0
4. Switzerland	7.7
5. Norway	7.8
6. Denmark	8.2
7. Netherlands	8.4
8. France	9.0
9. Canada	9.1
10. Belgium	9.2
11. Spain	9.6
12. West Germany	10.1
13. United Kingdom	10.1
14. Australia	10.3
15. United States	10.5

Source: World Pop Data Sheet, Pop Reference Bureau, 1985.

While the United States must contend with a large and mixed population, it bears accountability to its people by its diverse wealth of agriculture, technology, research, monies, and by a Bill of Rights that purports to be "for the people." The people, on the other hand, must learn self responsibility in order to empower a working relationship with the government that will bring about a reduction in the current deplorable statistics surrounding the infant mortality rate.

Definition of Infant Mortality

Neonatal and infant mortality, as defined by the World Health Organization, contain the following parameters: neonatal deaths are those allocated to the first twenty-eight days of life, and infant mortality as any infant less than one year of age (Miller 350). Since two-thirds of the United States' infant mortality occurs in the neonate period, attention must initially focus on the prenatal care of the mother, and then on the postnatal period.

Low birth weight babies, those under 2500 grams or 5.5 pounds, constitute the strongest predictor of infant mortality (Berg 86). Other problems associated

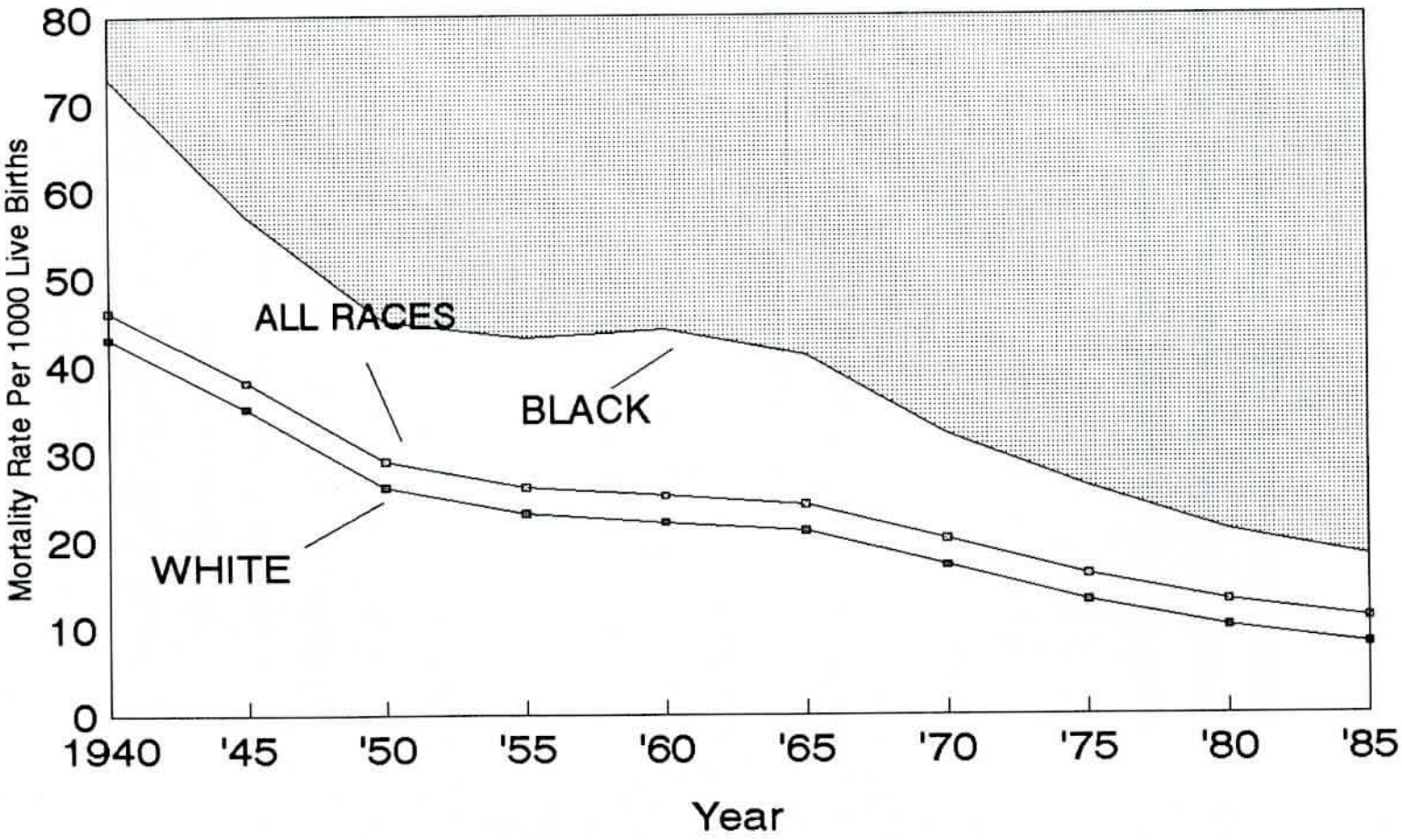
with these deaths center around "the increasing number of teenage mothers, and to the inequitable provision/use of maternal prenatal and postnatal care" (Rosenbaum 2). These figures, however, do little to demonstrate the social disparity reflected in tables that have virtually remained unchanged since the 1940's: black mortality remains approximately twice that of whites. In 1985, 18.2 black babies died for every 1000 born, as compared to 9.3 for their white counterparts. Other than the deep south, with its traditionally higher black populations, only four states demonstrate exceptionally high mortality rates (higher than the national average): South Dakota, Michigan, Illinois, and Missouri (Exhibit II). Washington D.C., however, led the national disgrace of infant mortality with almost twenty babies per thousand dying before the age of one (Rosenbaum 6).

In an effort to change this phenomenon, the National Infant Mortality Surveillance (NIMS) project was organized in 1980, "to monitor and study U.S. infant mortality" (Rosenbaum 8). To date, NIMS' suggestions have had little effect on the course of infant mortality in the United States.

Measures of the quality of infants' and mothers' health are an indication of the overall health of our societies, communities, and our cultural groups. In a nation where the infant and maternal mortality rates are high, it is very likely that the inhabitants experience a wide range of health problems. Ensuring all infants a healthy start in life, and enhancing the health of their mothers **must be** our top priority if we are to ensure the future health of our nation. This is not just a problem of the 'poor', it is **OUR** problem, and **OUR** responsibility!!

INFANT MORTALITY RATES BY RACE

UNITED STATES, 1940 to 1985



Statement of Purpose

The purpose of this paper will be to demonstrate that the inadequate prenatal care and the subsequent sequelae directly influence our infant mortality rate.

Chapter II

LITERATURE REVIEW

Since inadequate provision and utilization of maternal child care systems adversely affect infant mortality, changes must occur within the system to alleviate existing conditions. Identification of mothers at risk for compromised fetal outcome include numerous variables.

The most common characteristic associated with infant mortality, as previously stated, centers around low birth weight babies. Three factors influence this condition more than any others: smoking and the use of other chemical substances during pregnancy, lack of prenatal care usually associated with socioeconomic deprivation, and race.

In the United Stated, smoking factors into twenty to forty percent of the cases of low birth weight babies. Not all of these babies are born prematurely, many are full term babies that are small for dates or have associated intrauterine growth retardation. Babies born to mothers smoking greater than twenty

cigarettes per day weigh an average of 300 grams less then their nonsmoking counterparts. The more the mother smokes, the greater the risk of low birth weight and subsequent problems. "The odds of a woman delivering an infant weighing less than 2,500 grams increases by 26% for every five cigarettes she smokes per day" (Aaronson and Macnee 279). These differences in weight are not dependent on other factors known to influence birth weight such as race, parity, socioeconomic status, sex of the child, and gestational age. Cessation of smoking during pregnancy clearly demonstrates increased birth weights (Aaronson and Macnee 280). Without taking the economic factors into account, ceasing to smoke during pregnancy or at least decreasing the amount could save countless lives.

The fetus of a smoking mother faces many risks in just surviving within the uterus. Fetal death markedly increases in the smoking mother due to increased incidence of abruptio placenta, placenta previa, premature and prolonged rupture of membranes, prematurity, and stillborns (Alexander 167).

In addition to low birth weight, these infants face multiple other risks. Congenital anomalies are

2.3 times more prevalent among these babies. One study following more than 50,000 pregnancies, confirmed without question that smoking during pregnancy affects children's mental development. Hyperactivity, lower results on spelling and reading tests, and shorter attention spans were considerably more frequent among children whose mothers smoked during pregnancy than those who did not smoke (Alexander 168).

Just as smoking has been clearly related as a catalyst for adult cardiovascular disease, current studies implicate that maternal prenatal smoking may lead to vascular diseases of children born to smokers. Because the placentas of infants born to smoking mothers are smaller and more fibrous than that of a non-smoker, the hypothesis has been made that the resulting decreased circulation leads to lower birth weights. This phenomenon has led to studies indicating that this may result in the development of a fetal vascular system already predisposed to hypertension (Alexander 168).

In terms of human suffering and death, smoking during pregnancy must be regarded as a killer. The American Cancer Society, the American Heart Associa-

tion, and the American Lung Association all believe that health professionals must take a stand on smoking. That stand, in order to avoid confusion to their patients, necessarily includes positive enforcement, both actively and passively, from within their own behaviors. To encourage a patient to cease smoking based on the obvious health hazards to the maternal fetal unit, while the provider remains a smoker sends a perplexing message to clients that smoking is not a serious health issue. Smoking by health professionals thus conveys a message of passive approval and acceptance. Actively, health professionals need to inform patients of the specific risks involved in smoking during pregnancy. Many clients do not quit smoking during pregnancy because they feel they are the only person involved. Awareness of the fetal implications may alter the clients decision to smoke. The first step in health promotion of pregnant smokers necessitates that these mothers be specifically informed of the potential short and long term risks to the fetus. Although this can be construed as a campaign of fear, it constitutes one of information.

Smoking involves complex behavior with physiological, psychological, and social factors. Many individuals would prefer to quit smoking, but cannot do so without a great deal of support. All smokers need to be encouraged to quit, but time is critical with a pregnant smoker. Once the patient has been informed of the severity of the problem during pregnancy, and expresses a desire or interest in quitting, appropriate assistance and encouragement must be obtained.

Most communities offer some type of smoking cessation programs. Some diversity can be found among various support groups, church groups, the American Cancer Society, the American Heart Association, and the American Lung Association. In addition, many hospitals offer services through departments such as psychology, psychiatry, or outpatient areas. Health educators and practitioners also offer individual and/or group services for a fee.

To provide an adequate plan for the client who expresses a desire to quit smoking, the clinician must be aware of the possibilities that meet the specific individual needs based on an overall picture of the person including socioeconomic factors, time, and other

considerations. To adequately discuss the services available, the health professional must know the methodologies of the various smoking cessation programs. Some programs advocate a single strategy. These may include hypnosis, acupuncture, or some type of specific aversion method. Pregnant women need to avoid aversion techniques, including rapid smoking and the new patches, because of the increased risk to the developing fetus. Most of the time, a multifocal approach to smoking behavior carries a longer lasting impact. Such a program might include behavioral modification, self-analysis of smoking behavior, group or family support, and a long-term maintenance program (Alexander 169).

For many people formal smoking cessation programs are not the answer. Often transportation, financial, and time constraints adversely affect the mothers who need help the most. In this type of situation, self-help strategies are essential. Often the catalyst for positive steps towards smoking cessation is the interest and awareness stimulated by the clinician. Making the patient cognizant of when she smokes, altering the reinforcers, and developing simple rewards for nonsmoking success aid in establishing new behaviors. By

recording the times, places, and situations associated with smoking, the smokers can alter and monitor their smoking conduct (American Cancer Society).

A basic part of changing smoking attitudes must also address the risk to the fetus from passive smoke. Statistics are constantly being updated that demonstrate the danger to the fetal unit from other smokers within the home environment. Awareness and education play key roles in alleviating this life threatening hazard.

Gradual reduction of the number of cigarettes smoked, as well as a reduction in the level of tar and nicotine comprises at least a stop-gate measure. The inference of reducing the nicotine is based on the rationale that the addictive effects of the drug reduces the smokers reliance, and quitting becomes feasible (Alexander 172).

Strategies to assist pregnant smokers, as well as their families, are challenging, time-consuming, and frustrating for clients and clinicians. The benefits in terms of improved maternal-child well being make that challenge worth the effort. The American Cancer Society estimates that at least three billion dollars

would be saved annually if women quit smoking during the time of their pregnancy.

Although the effects of smoking during pregnancy are clear, the evidence on what constitutes overuse of alcohol during pregnancy are somewhat hazy. Literature on drinking strongly suggests associated low birth weights as well as teratogenic effects. The studies conflict as to what constitutes a problem as far as the amount and timing of alcohol ingestion that produce these effects. Because several of the studies infer that problems exist only in direct proportion to heavy drinking, a definition must be exacted as to what constitutes heavy, moderate, and light drinking. In addition, a universal definition must be established to measure alcohol intake. Measurement involves the amount of absolute alcohol versus the number of drinks (Aaronson and Macnee 281).

In a study of the effects of alcohol on more than 9,000 pregnant women, researchers found increased numbers of stillbirths, low birth weight infants, and lower placental weights for infants born to mothers who consumed greater than 1.6 oz of absolute alcohol per day. Even after controlling for other risk factors,

such as smoking, the effects remained. The highest risk was associated with beer as opposed to wine or liquor, despite the lower absolute alcohol content of beer.

Another study found that alcohol suppressed both maternal and fetal weight gain in rats fed protein enriched, protein adequate, or low protein diets. This study implies that the "deleterious effects of alcohol probably are exerted independently of the mother's nutritional status, despite the pattern of poor nutrition often associated with alcoholism" (Aaronson and Macnee 183).

Alcohol induced differences in infant birth weights were attributed to intrauterine growth retardation in other studies. Twice as many very low birth weight infants were born to mothers with alcohol related problems. Three ounces or six drinks per day poses a major health risk to both mother and fetus, but **NO** safe levels of alcohol consumption have been established. One factor that has been established is that heavy drinking in the third trimester of pregnancy is the most detrimental. Mothers, who drank heavily in the first and second trimesters and then reduced alco-

hol consumption before the third trimester, had fetal outcomes similar to women who drank rarely to moderately throughout the pregnancy (Aaronson and Macnee 282).

Fetal alcohol syndrome or (FAS) poses the most serious adverse effect to drinking alcohol during pregnancy. The extreme use of alcohol, calculated at 2.8-3.5 ounces per day, places an infant at risk for FAS. One out of three infants born to alcoholic mothers has FAS. The effects extend far beyond the infant stage and the problems associated with infant mortality. If they survive, by the age of seven these children will began exhibiting signs of intellectual impairment ranging from borderline to frank mental retardation (Aaronson and Macnee 283).

Clearly alcohol affects the outcome of pregnancy both in terms of weight and fetal development. The amount and mechanism by which this occurs remains unknown. Heavy third trimester drinking should be avoided at all costs because of the far reaching effects. Because many clients question the reasoning for avoidance of alcohol during pregnancy, this situation becomes an avenue for interaction. Since alcohol passes so easily through the placental barrier, fetal

alcohol concentration reaches a level comparable to that of the mother. Until further studies are concluded, abstinence seems to be the wisest choice (Aaronson and Macnee 283).

In the area of maternal fetal well being, clinicians must take the initiative to inform clients of the potential risks of alcohol during pregnancy. Teratogenic effects of maternal alcohol consumption are varied, but the patient must be advised of the risks in order to make responsible decisions.

Economically, it is easy to imagine the effects of just one infant born with fetal alcohol syndrome as astronomical. That effect reaches not only the immediate family, but everyone in the form of tax dollars.

The use of marijuana, cocaine, and other illicit psychoactive substances prior to and during pregnancy adversely affects fetal outcome. Health professionals must deal with the fact that addiction knows no socioeconomic barriers, and can be present in any culture.

Cocaine is more frequently seen as a drug associated with the middle or upper class, because of cost. Crack cocaine, which is cocaine mixed with baking soda and heated until it reaches its purest form, can be

sold at lower prices because of the baking soda additive. Because it is relatively inexpensive and available, crack is the form of cocaine more closely associated with poorer people. Crack is extremely addictive, and is ten to twenty times more potent than cocaine. It is estimated that heavy crack users can become addicted in approximately two weeks, while people who inhale cocaine take an average of four years to form an addition (Chisum 1).

The effects of using cocaine during pregnancy are difficult to differentiate from the other associated problems of smoking, sexually transmitted diseases from prostitution, poor nutrition, and the use of alcohol. It is known, however, that there are more first trimester spontaneous abortions due to cocaine induced placental vasoconstriction. It is also known that the use of cocaine in the third trimester can cause premature labor, sudden uterine contractions, and increased fetal activity within an hour of ingestion. Abruptio placenta, hypertension, maternal lung damage, and anorexia nervosa due to loss of appetite are other known complications of cocaine use during pregnancy (NAACOG-Newsletter).

At Grady Hospital in Atlanta, the estimated number of babies born with cocaine in their systems grew from one-fourth to one-third in just two years. Cocaine can affect almost every system in the neonate's body. The most common symptoms are neurobehavioral abnormalities such as irritability, tremors, and hypersensitivity to environmental stimuli similar to those associated with withdrawal. The neonate is not addicted, but exhibits many comparable symptoms. Most of the babies are born with lower birth weights, and many suffer an intrauterine stroke, or an infarct to the intestine. Intestinal infarcts, depending on severity, often require reparative surgery and almost always include digestion problems. Other abnormalities include smaller head and chest circumference, neonatal anemias, hypocalcemia, and low Apgar scores. The long term effects on the neonate are not known. If the mother does not abandon the infant in the nursery, and she returns to her drug habit, most of these infants will return to the hospital due to neglect and/or abuse. Many of these babies will die within the first year of life (Chisum).

Among female drug users, cocaine is more commonly abused than heroin. With 5,000 new users per day, this

problem can only escalate (Schwartz 1). The societal and medical implications of this problem can only be addressed by a multifocal impact coupled with individual responsibility.

In the issues of tobacco, alcohol and other substance abuse, it seems clear that individuals must begin to assume responsibility for their actions. But it is equally clear, that the federal government must take positive action by stopping all subsidies to tobacco farms. While this topic remains a volatile economic factor for the people involved in the tobacco industry, it must become a moral and economic issue for everyone.

Recently, some states, including Illinois, have begun posting large notices on the detrimental effects of alcohol during pregnancy. Wherever liquor is served, these posters must be prominently displayed by law. This can certainly be construed as a beginning awareness to the problems of FAS.

Illicit drug traffic, especially in the area of transportation and selling, must be prosecuted more stringently in order to make possession and use less desirable. Drug awareness and knowledge of its debili-

tating effects must be initiated at an earlier age in order to make an impact.

As a result of the use of illicit drugs, by either parent prior to conception, AIDS during pregnancy and afterwards in the infant looms as an increasing threat in this decade. Early reports of AIDS were confined to men, but now at least seven percent of AIDS cases are being reported in women. This new statistic will certainly adversely effect the infant mortality rate (Loveman and Dobin 90).

The Centers for Disease Control (CDC) define a case of AIDS as an "underlying cellular immunodeficiency in a person who has had no known underlying cause of reduced resistance reported to be associated with that disease" (Loveman and Dobin 91). AIDS is believed to be transmitted by intimate sexual contact, or by inoculation of blood or blood products. Epidemiological studies indicate that AIDS is caused by an infectious viral agent--the human T-cell lymphotrophic virus (HTLV III). The high risk group for AIDS includes homosexual or bisexual men, intravenous drug abusers, prostitutes, Haitians, and hemophiliacs (Loveman and Dobin 91).

In 1985, 509 cases of AIDS in infants had been reported with a sixty one percent mortality rate. It is unknown whether the AIDS agent is transferred in utero or shortly afterwards. The majority of these infants were known to be in the high risk group as previously defined (Loveman and Dobin 92).

In the area of perinatology, health professionals have always voiced concern over whether an infectious patient poses a threat to the nursing unit. Logic and common sense need to take precedence over fear of the unknown. Following the guideline of the Centers for Disease Control, any patient suspected of having AIDS should be placed on blood and secretion precautions to minimize possible transmission. Since the mode of transmission between mother and infant is unclear, these precautions do extend to the infant.

Because of the extremely poor survival rate in Aids Related Complex (ARC) and the current nonexistent survival rate for AIDS, the psychosocial impact to the patients (both mother and infant) are as paramount as their physical care (Loveman and Dobin 93). Common sense, compassion, and empathy seem to be the only comfort currently available.

The lack of prenatal care and socioeconomic deprivation are almost inseparable. In order to provide assessment of prenatal risk, adequate obstetrical care must become a national priority. The federal government currently supplies over 50% of the monies spent on health (Jonas 358). Reallocating some of that money to provide a basic standard of care for every pregnancy needs to become a reality not a dream for the next century. Utilizing neighborhood schools, churches, hospitals, and clinics in conjunction with non-physician care providers could substantially reduce cost.

By using qualified personnel more effectively, assessment could be accomplished in local areas more convenient to the client. The maternal-fetal unit could then be directed towards pre-existing Women, Infants, and Children (WIC) plans, food stamps, and other qualifying programs depending on circumstance. Initiating low or no cost adequate care early in pregnancy would most certainly change the prognosis towards a more favorable outcome. Even the cost of developing such programs would be compensated by the decreased need for tertiary care.

One of the most common problems associated with poor fetal outcome and associated low birth weight is pregnancy induced hypertension or PIH. This phenomenon occurs two to three times more frequently in women who do not receive prenatal care and/or of poor socioeconomic background. PIH accounts for approximately 25,000 perinatal deaths annually. The overall incidence of PIH is five to seven percent of all pregnancies (Remich and Youngkin 20).

The changes related to PIH include hypertension, edema, and proteinuria. These signs are caused by the underlying pathology of severe peripheral vasospasm. As a result, a reduction occurs in the visceral blood flow. This leads to tissue hypoxia which causes damage to all maternal organs. The organ most affected is the placenta. As the placental blood flow decreases, fetal hypoxia occurs, as well as inadequate fetal nutrition and deficient amounts of amniotic fluid. If undetected, because of lack of prenatal care or inadequate care, the results are devastating. They can range from maternal seizures and death to subsequent loss of the fetus. The results of PIH include low birth weight because of inadequate fetal nutrition, physical and/or

mental retardation due to hypoxia, and anoxia or death due to cord compression because of decreased amounts of amniotic fluid (Remich and Youngkin 20).

Pregnancy induced hypertension is usually diagnosed in the third trimester, but research has shown the underlying disease to be well established before overt symptoms occur. Because of the associated mortality and morbidity, the earlier PIH is detected the better the chances for a more favorable outcome for both mother and infant (Remich and Youngkin 22).

Early risk factors of PIH include extremely low or high pregravid weight, extremely low weight gain during pregnancy, extremes in pregravid weight combined with low weight gain, an increase of blood pressure with maternal position changes, second trimester decrease in blood pressure, low or high maternal age, and a MAP of 90 or more during the second trimester. (MAP or mean arterial pressure is equal to the systolic plus twice the diastolic pressure divided by three.) Significant research has been done on PIH, and all indications are that the quality of a woman's diet and low maternal age are the two most outstanding factors in predicting subsequent disease (Remich and Youngkin 22).

The factors most influential in pregnancy induced hypertension are prevalent in mothers with a poor socioeconomic background. This, coupled with lack of prenatal care, demonstrates why our infant mortality rate is usually higher in big cities with large concentrations of a black population. Race and age then become two separate but linked factors in predicting infant mortality due to low birth weight.

In the United States, race, other than Caucasian, definitely remains an issue. It is an issue not only of civil rights, but of economic rights and morality.

Blacks consistently head the infant mortality ratio, even though the risk for low birth weight babies expiring in the neonate period does not appear to be an initial factor. Just as females seem to have an advantage over males in the manufacturing of surfactant, so do blacks seem to respond both to clinical trials of dexamethasone and production of surfactant more so than their white counterparts (JAMA 2970). This advantage for low birth weight with associated respiratory distress syndrome is unfortunately offset by doubly increased mortality in the post neonate period. This occurs for conditions including prematurity, intrauter-

ine growth retardation, respiratory conditions including infection, and sudden infant death (Benkin 435-436).

The problems arising from racial disparity in prenatal care are real, and they must be addressed by us as individuals and by our government. It is very true that we as individuals must be responsible, but we are not responsible for the color of our skin nor our ethnic backgrounds. The question of ADC or Aid For Dependent Children arises many times. In talking with mothers who qualify for ADC, most are more than willing to work towards improvement of their situation and their skills. They need help. The answer is education, not charity. These mothers want to provide for their babies, but they are individuals fighting a system. In order to help them to help themselves, we as a nation must make provisions to teach them some job skill that will provide them with a means of survival.

Maternal age also plays an important role in assigning prenatal risk factors. Most mothers over the age of thirty-five recognize that they are at increased risks for birth defects and associated infant mortality. Teenage mothers, however, provide an unprecedented

problem. Seeking prenatal care in the last trimester, if at all, their children are most susceptible to low birth weight, prematurity, and respiratory distress (Johnson 227).

In addition to the problems facing all pregnant mothers, the adolescent mother must contend with her physiological development, safety, love, feelings of self esteem, and self actualization. All fifty states recognize that during the time of a pregnancy, a woman is considered emancipated and free to make her own choices concerning her pregnancy. That freedom applies whether the client is nineteen or eleven (Chisum 14).

In the United States, the most rapidly growing age for teenage pregnancy is between the ages of eleven and fifteen. Every year more than 1,500,000 adolescents become pregnant, resulting in 750,000 births. Thirteen percent of the pregnancies result in spontaneous abortions. Of those teens who deliver their babies, ten percent are under 2500 grams, and twenty percent are under 1500 grams. There is an eight percent anomaly rate compared to an overall national average of less than four percent. Sixty percent of the mothers who have children at the age of sixteen

will have another child by the age of nineteen. These mothers are seven times more likely to live in poverty all their lives and perpetuate another generation of teenage mothers. Because of lack of prenatal care, peer pressure, and submission to the use of tobacco, alcohol, other drugs and generalized poor nutrition, these mothers and their infants are at severe risk. Studies conducted in 1985 indicated that two-thirds of the infants that died within the first year of life were born to adolescent mothers. Once the infants were home, these mothers were poorly prepared to care for their infants. They were unskilled in parenting techniques including feeding, recognizing illness, and appropriate intervention (Nurses Association of the American College of Obstetrics and Gynecology NAACOG Conference).

The need for sex education is paramount in our homes as well as in our schools. Children need to learn the details of sex up to and including birth control in middle school if not before. As individuals we must take steps to be responsible for ourselves as well as our children. The loss of unnecessary life

bears accountability. As a nation, contraceptive and prenatal care must be available to all mothers.

Another risk factor that increases infant mortality is that of prior fetal loss. Two or more induced abortions, persistent fetal deaths in the first trimester, and any death from the second trimester, up to and including stillborns, enhances the prepartum chance for consequent problems (Public Health Reports 140).

Even with a history of fetal survival, a prior low birth weight delivery of an infant under 5.5 pounds places the mother at additional risks for future low weight deliveries. This factor, decidedly one of socioeconomic importance, underlines one of the endogenous conditions associated with infant mortality. Many mothers unaware of, or unable to meet proper dietary requirements of pregnancy contribute to this risk (Public Health Reports 141).

Complications not necessarily related to pregnancy, but markedly influencing a favorable outcome include hypertension, diabetes, drug addiction, cardiac or renal disease, pyelonephritis, syphilis, and rubella. Other conditions coexisting and detrimental to pregnancy are: toxemia from unchecked pregnancy induced

hypertension, bleeding, infection, anemia, urinary tract infections, and Rh sensitization (Berg 87).

The most devastating complication of pregnancy for all races, however, is multiple gestation. Twins who survive in utero, have a thirty percent higher risk of succumbing to postnatal mortality due to prematurity, low birth weight, or congenital malformations. This phenomenon is more prevalent in situations where more than one fetus are contained in one amniotic sac. These babies have a five times greater chance of cord injury or death, as well as disproportionate birth weights (Gast-Interview).

Many studies have been done concerning the area of bonding of the maternal fetal unit. Recently studies were conducted to ascertain whether there was a difference between attachment in normal versus high risk pregnancies. Prenatally, standards were formed to measure the extent to which a woman engaged in behaviors that represented affiliation and interaction with her unborn fetus. These behaviors included stages of talking to the fetus, calling the fetus by a special or pet name, and maneuvering the fetus so that the father could observe the movement. Subscales were devised to

measure: "differentiation of self from fetus, interaction with the fetus, attributing of characteristics and intentions to the fetus, giving of self, and maternal role taking" (Kemp and Page 179-183).

Prenatally, mothers of a high risk fetus scored well even when multiple factors were at stake. They performed attachments comparable with the control group of mothers with a normal pregnancy (Kemp and Page 183).

Other studies indicate, however, that problems arise in the neonate period. When these problems are unresolved, even if the infant survives, it is at increased risk for failure to thrive and subsequent infant mortality (Kemp and Page 183).

Using risk factor assessment as tools and ascribing numerical values to the risks, a score can be calculated to determine the most favorable delivery site for infants at risk. This would necessitate real implementation of the regionalization of the maternal-fetal unit by the health care provider and the client as based on assessment and "provision of appropriate level of care including referral and transport" (Berg 88). Uncomplicated deliveries for low risk maternal-fetal units would be done at Level 1 facili-

ties. Level 2 facilities would care for more moderate risk deliveries. High risk units would be delivered at Level 3 neonatal intensive care facilities equipped to care for highly specialized neonatal problems. Such an approach would necessitate reeducation of physicians and radical changes in public awareness that high risk mothers need special care (Berg 90).

One of the most common problems that has been positively addressed in the last ten to twenty years is that of maternal-fetal separation to the point of isolation. Previously, infants in critical care nurseries were touched as little as possible for fear of infection. Parents were never allowed in the nursery. Now, parents are encouraged to touch and talk to their infants no matter what the prognosis or the amount of monitoring equipment attached. In areas and circumstances where the tertiary care unit is close to the mother's home, infant mortality has decreased. Conversely, when the mother is unable, or chooses not to bond with an infant with multiple problems, infant mortality increases (NAACOG District Meeting 1986).

Even though increasing numbers of very low birth weight babies (less than 1500 grams or under 3 pounds)

are surviving, their general health, morbidity, and infant mortality rate is exceptionally high. The care of these infants during hospitalization, but especially post discharge is associated with anxiety, depression, and a feeling of helplessness by the parents. More than 250,000 low birth weight babies are born annually in the United States and approximately 20% of those fall in the range of very low birth weight. Research on pre- and post-discharge teaching has focused on many issues. These have included such topics as the timing of teaching in regard to discharge, use of discharge teaching tools, and specific learning needs of this population (NAACOG District Meeting 1986).

Some of the distinctive needs of mothers of low birth weight babies overlap those of mothers of normal low risk infants. These needs include information on general caretaking such as feeding, bathing, and crying infants. But mothers of infants with special needs must also contend with learning to work with apnea monitors, how to perform cardio-pulmonary resuscitation, and how to continue with other household tasks with assurance that they would still hear the monitors. In addition, most mothers expressed a need to learn

relaxation techniques to decrease tension (Brooten, et al 317).

With the advent of early discharge, due to rising hospital charges and the subsequent formation of Diagnostic Related Groups (DRG's), the mothers of low birth weight babies must contend with their own care and that of their infants. Coupling the effects of dealing with a complicated pregnancy and struggling to care for an infant that has superimposed needs far greater than the normal weight, full term infant, a low risk infant can be overwhelming. One of the practices that is currently being studied is the use of nursing interventions for the first three post partum months, and the use of homemaker-home health aides to assist in the perinatal care of high risk infants (Hampson 213).

Even the arrival of a low risk infant has long been acknowledged as a significant event in the life cycle of family. Parenthood does not just happen, and it seldom happens smoothly. As the new mother is recovering from the physical rigors of childbirth, she often needs more rest than ever before. In dealing with the unpredictable nature of a newborn, she often gets the least opportunity to rest (Hampson 214).

In Scandinavian countries, health care is much different than the United States. Women are paid a stipend if they seek prenatal care before the sixteenth week of pregnancy. That stipend varies according to their job and continues for 200 days after delivery (Carr 100-103).

The normal length of stay for a vaginal delivery in Scandinavia is five days, and eight days for a Cesarean birth. By being able to stay at home longer with the support of extended and natural family, and by early prenatal care, a causal relationship has been established in decreased infant mortality rates (Carr 100-103).

The use of nursing intervention and homemakers is an attempt, albeit an expensive one, to capture some of the methodology of industrialized nations who have significantly lowered their infant mortality rate. The nursing intervention, so far, has centered around two to three home visits, group support, and telephone follow-up (Hampson 116).

Home visits have centered around parents who presented the most obvious need for help with parenting problems. Mothers of low birth weight babies most

certainly present a risk. Visits are limited because of budgetary restrictions. In as few visits as possible, the nursing intervention is geared to assess the needs of the individual family unit, improve nutritional practices, encourage postnatal attachment behaviors, and improve favorable outcomes. In studies dealing with home visits, the effects appear positive towards increasing maternal attachment, lowering child abuse and neglect, and improving health care (Hampson 118). The problem remains one of economics. Only a few parents receive this service, and theoretically it could save billions of dollars by decreasing readmittance of these infants to the hospital.

The use of group support is probably most constructive when a parent faces the birth of a baby with a severe congenital defect or an infant who requires intensive hospital care. Parents who have been through similar circumstances can provide the new parent with a unique form of social support.

Telephone support is another method of assisting postnatal adaptation. Because it does not require face to face contact, it is the least desirable even though 92-96% of American households have telephone service.

The value of telephone calls as an aid to postnatal adaptation, however, cannot be overlooked. Often the first few weeks at home with a new infant can make even the most simple tasks seem monumental. Expecting a new mother to transport herself and an infant anywhere, under the best of circumstances, is often unrealistic. A follow up call to lend support to a new mother, or to direct her to proper resources or interventions may save a crisis from developing. It may also provide cost effective measures to curtail little problems before they become large ones (Hampson 120-121).

The use of homemaker-home health aides in the care of perinatal care of high risk infants started under a grant from the March of Dimes. This study was initiated in response to the difficulties that surround the family life of these neonates. Since some parents never successfully adapt to the infant's problems, they must contend with a great deal of anger, denial, or guilt. As this spills over into the marriage, divorce rates skyrocket and/or the mother or infant becomes the target of abuse. The program developed in order to ease the transition from the neonatal intensive care unit to home care. The use of already skilled homemak-

ers, with special training in the care of high risk neonates, will hopefully alleviate some of the physical and psychological transitional problems. Although this was a pilot program, initial results were positive beyond expectations (Raff 142-145).

Any aspect of health care in the United States faces problems; our ability to pay overshadows the quality of our medical care. But even our ability to pay for our own care is overridden by escalating double digit medical costs. When someone cannot afford medical care, but is in the "system," we all pay. Nowhere does that seem more obvious than in the care of the critically ill infant. It is not just the infant who is ill, but the family unit. The system must change.

With the predominance of adolescent pregnancies, it seems logical that changes begin in our homes and schools. Somewhere children need to learn 'the facts' regarding sex education. Hopefully, this knowledge will be initiated at home with continued and added emphasis at school. If birth control, sexually transmitted disease, pregnancy, and substance abuse were part of a mandatory curriculum, we would have a beginning. The average age of pregnant teens in the Unites

States ranges from eleven to fifteen. This is evidence that we need to introduce sex education in our primary schools, and reinforce that curriculum along the way.

In order to teach, however, we must make an honest commitment to have equal education. That commitment must include an equal opportunity for all students to learn in a suitable environment, with adequate teachers. Dividing all the monies allocated to education within a state might put the right emphasis on equal opportunity for education.

Pregnancy, even when it is planned, is a time of high level stress. When complicated by factors placing the maternal-fetal unit at high risk, pregnancy can be agony. While some of that agony can be avoided by making responsible contraceptive choices, some of the agony cannot be avoided.

Prenatal care remains inexpensive when compared with keeping an infant in neonatal intensive care or a critical care unit. Unfortunately, the people who need care the most, often do not receive it. Many alternatives have been proposed to regional prenatal care, and they include the use of vans in city and rural areas, and the use of nurse practitioners and nurse midwives

to screen high risk patients. None of these practices are used on a wide-scale basis. Their implementation could save billions of dollars, improve the quality of life, and even save lives.

The widespread initiation of postnatal follow-up could alleviate many problems. Just imagine a home visit for every patient, from one to three hours, followed by a phone call. Crisis could often be averted, and, if nothing else, an unnecessary trip to the physician's office or to the emergency room could be avoided. Anguish cannot be measured, but money can. If 100,000 lives were saved and 1,000,000 cases of infant morbidity deflected by early intervention, changes would certainly be economically feasible. If you are the parent, then one case is sufficient.

In the book, Megatrends, Nasbitt defines strategic planning as a constant process. But planning and redirecting can only be successfully accomplished with a strategic vision in mind (Nasbitt 99). The United States collectively and individually possesses the ability to change the national shame of infant mortality. Whether the planning involved becomes a priority with a specific goal envisioned remains an unanswered question.

Chapter III

RESEARCH METHODOLOGY

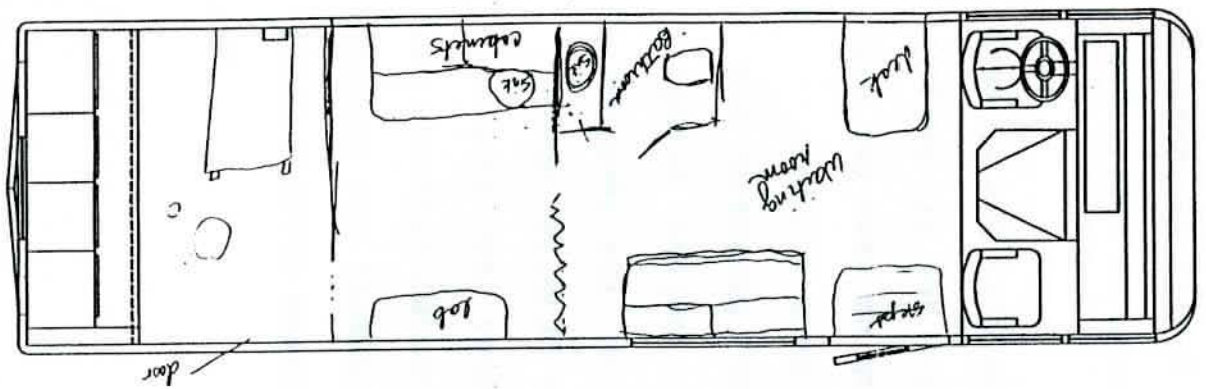
For a number of years, studies have indicated that adequate prenatal care will decrease the infant mortality rate as well as lower the morbidity rate for infants who weigh less than 2500 grams at birth. At this time adequate prenatal care has been defined as eight or more prenatal visits beginning before the end of the first trimester of pregnancy (Statistical Bulletin 1988.) If this goal can be accomplished while reinforcing positive individual responsibilities, such as smoking cessation, refraining from alcohol, and improving nutrition, more babies will have a chance at survival.

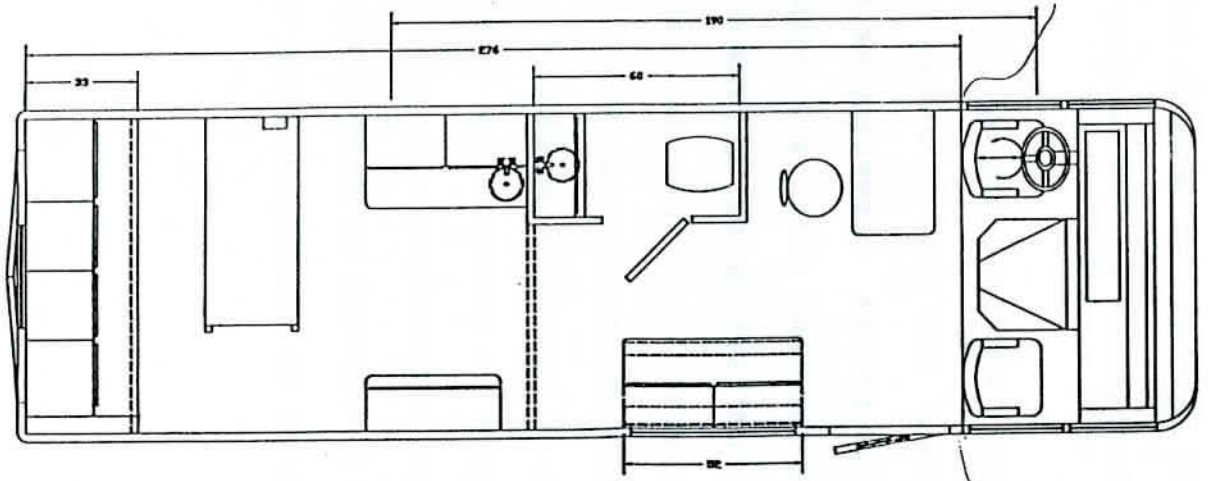
By changing our approach to giving care, substance abuse and socioeconomic problems could also be addressed. This type of modification will require a major revision of our current manner of providing health care. The diversity of the United States with our pluralistic interest groups, American style democracy, and current manner of dispensing health care,

however, makes it seem more likely that we will respond to changes in our health care approach as opposed to embracing national health insurance.

Methods

The use of recreational vehicles converted to traveling mobile units providing contraceptive and obstetrical care to rural and/or inner city areas is a concept that I would like to initiate. Currently, there are at least two states providing contraceptive care using an RV--Indiana and California. I would like to expand that concept to include obstetrical care and related services. The layout of the vehicles would essentially remain the same, but the theory could easily extend into a mobile unit providing both gynecological and obstetrical care (Exhibit III). Since the predominant problem in the United States affecting infant mortality is the lack of prenatal care combined with substance abuse, these mobile units could be used as a means of bringing care and knowledge to the people who need it the most.





DIVISION	MOBILE MEDICAL		
MODEL	DYNACOACH		
NAME	30' PLANNED PARENTHOOD		
COMPUTER	SALE1212		
DRAWN BY	A.K.	DATE	10-10-89
CHK'D. BY		DATE	
DRW'G. NO.	1212	SCALE	3/4"=1'

Although by definition most of these clients would fall into a moderate or high risk category, the concept of a mobile van coupled with many existing programs has the potential to decrease the individual risk factors into a low or moderate category. The programs sponsored by the American Heart Association, the American Lung Association, the American Cancer Society, Alcoholics Anonymous, the March of Dimes, WIC, Medicaid, and other organizations could all become part of this focus. This theory necessitates back up care not only by physicians, but also by Level I, II, and III hospitals and the increased use of non-physician health care providers.

The evaluators of the project would be multifocal. They should include the current care givers in institutional situations, as well as eventually being reflected in local, state, and national statistics.

HYPOTHESIS: The use of converted recreational vehicles to provide obstetrical and other related services in localities with high infant mortality rates will improve the mortality and morbidity ratios of these areas.

Subjects

The sample population of evaluators will be the existing health care givers: nurses and physicians dealing with emergency room and obstetrical care. This parameter will be established in order to narrow the amount of evaluators to subjects directly involved in antenatal and postnatal care. This boundary should help to obtain a more concise picture of current and future situations.

Ideally, at least two hundred nurses and physicians will participate in the initial study which will be done in St. Louis City. By definition, the evaluators will have advanced training and expertise in their specific areas. Their precise education and years of experience will be ascertained as part of the instruments used to evaluate the project.

Instrument

The use of a pretest-posttest control group design will be the initial methodology employed. By using a control group in which access to the "Van for Life" is not available, the effects of the extraneous variant of the van can be measured. Both the control group and

the group receiving clients from the van will be asked to fill out a questionnaire before the study begins, and annually during a three year pilot program.

In addition, the experiment will allow for the effects of increased interest on the target population by employing a factorial design. The major advantage of the factorial design is "its ability to measure the interaction effect, which may be greater than the total of the main effect" (Zigmund 240). In this scenario, postpartum interviews could be conducted to see if the targeted populace came to the 'van' for convenience, interest, care, or other factors.

Once these results are compiled, statistics can be assembled. These will include statistics from the observation of the evaluators, as well as the changes in percentage rates of mortality and morbidity in the areas serviced. Barring unforseen circumstances, such as a new disease or unprecedented new cases of HIV positive infants, the statistics should reflect an improved infant mortality and morbidity rate.

Initially hospital administration should be contacted to request permission for an informal survey. To gain the support of the hospital, stastics from

similar studies on the importance of prenatal care must be succinctly presented. Additional importance must be attached to the cost effectiveness of providing prenatal care in order to inhibit the number of low birth weight babies, and the subsequent length of hospital stay for these neonates. This fact may enhance the concept of the mobile unit to the hospitals.

With the cooperation of hospital administration, the emergency room and obstetrical units can be contacted regarding the use of surveys. Ideally the basic reasons for the survey would be presented at both the physicians and the nurses staff meetings. The explanation of the research will require careful consideration in order to avoid bias on the questionnaires. Following the original survey, the personnel will be told of the mobile unit's concept to provide prenatal care. Once the mobile unit is functional the questionnarie will be changed to allow exact hospital statistics to be coded into the program from a before and after standpoint.

Questionnaires will be sent to the evaluators as directed by the examples in the appendix.

Materials

After discussing the situation with private enterprise, some Missouri legislators, and the Health Department, I would like to write a grant proposing that the project of securing a van be initiated as soon as feasible. I would expect that the monies involved would initially be allocated by the government. Missouri's Family and Children's Services or the Health Department could hold the money in escrow for the purchase of the van. With the necessary equipment, the total purchase price of the van is approximately $110,000. Considering the potential of the van, this translates into a bargain. Overlooking the societal implications of improved health, the potential economic savings are astounding. (Currently, the cost of basic care for a low birth weight baby in St. Louis City ranges from $600 to $1199 /day, and this does not include the use of respirators, monitors, drugs, and laboratory fees. The mean stay for such infants is 12 days according to Sam Notzon from the National Center for Health Statistics (Phone Interview).

Procedure

The use of a pretest-posttest control group design will give the project credibility. The general nature of the study should be explained by a letter and by an optional discussion of the project to the evaluators. This should be done in general terms in order to avoid influencing either group to a biased conclusion.

Since St. Louis City has been chosen as the site of the pilot project, questionnaires will be distributed to hospitals within the area. The number of deliveries per year of uninsured clients at each hospital will determine whether the hospital is in the control group or the experimental group.

Before the mobile unit can be initiated, a careful evaluation of the market will need to be done in order to appropriate money and facilitate use of the van. This will require a study into the purchasing of the van and subsequent allocation of funds, projected needs of the prospective clients, coordination of existing programs, cooperation of existing prenatal and obstetrical services, and a thorough plan on correlating the van's schedule.

Market Analysis

The current market supports two main types of prenatal care: private physicians and clinic care for the "needy." The first type of care is the type of care that most people would prefer. The client chooses a physician or has a physician designated by their preferred provider plan. They make an appointment, drive to the doctor's office in their car, and are seen by their health care provider at a specified time. In the second scenario, the client may have to wait months for an appointment on a certain day with no fixed appointment. All this occurs after they have secured some type of transportation.

The main difference between the two types of care is the availability of insurance. For those clients who have insurance provided by an employer or provide their own, access to prenatal care is easier to attain. But for many Americans, the lack of insurance negates the accessibility of private providers. This forces them to chose clinics or to opt for no prenatal care.

Transportation may also be an issue. The clients able to afford private providers often have a car

available. For those who do not have a car, a neighbor with a car or a taxi is a viable option. The clients without insurance often do not have an automobile at their disposal, nor do their friends or family. Finding transportation to their provider is just one additional obstacle they must overcome. The public transportation system, if available at all, is often inconvenient or too expensive for them to consider as an option. In early pregnancy, when the client may feel nauseous, or in late pregnancy, when they just feel exhausted, the clinic may seem just too far away, and not worth the effort. Also, some women may be unable to afford the cost of the bus or subway.

What I want to pursue, in the use of the mobile units, is the possibility of fulfilling the existing needs of the fertile women outside the current healthcare system. The present trend in the United States, especially in the poor and lower middle class, is the absence of healthcare within the clients' neighborhood. The presence of a mobile unit would provide the connecting link between these neighborhoods and the chasm between the unattainable system. The units would supply a suitable alternative, as long as the quality

of care was maintained. Education regarding the importance of prenatal care and contraceptive techniques would be crucial to the program's success.

Consumer Analysis

In a society that continues to focus on health and convenience, the mobile units could target a variety of consumers. Ideally, the clients with limited options for healthcare providers would be the initial market. As previously mentioned, the lack of insurance and transportation sets the parameter for this group. In addition, those clients who have access to private providers could also be targeted with the focus of convenience. Many of the patients with private health care providers, however, may be reluctant to utilize a facility that must be shared with people of different socio-economic backgrounds.

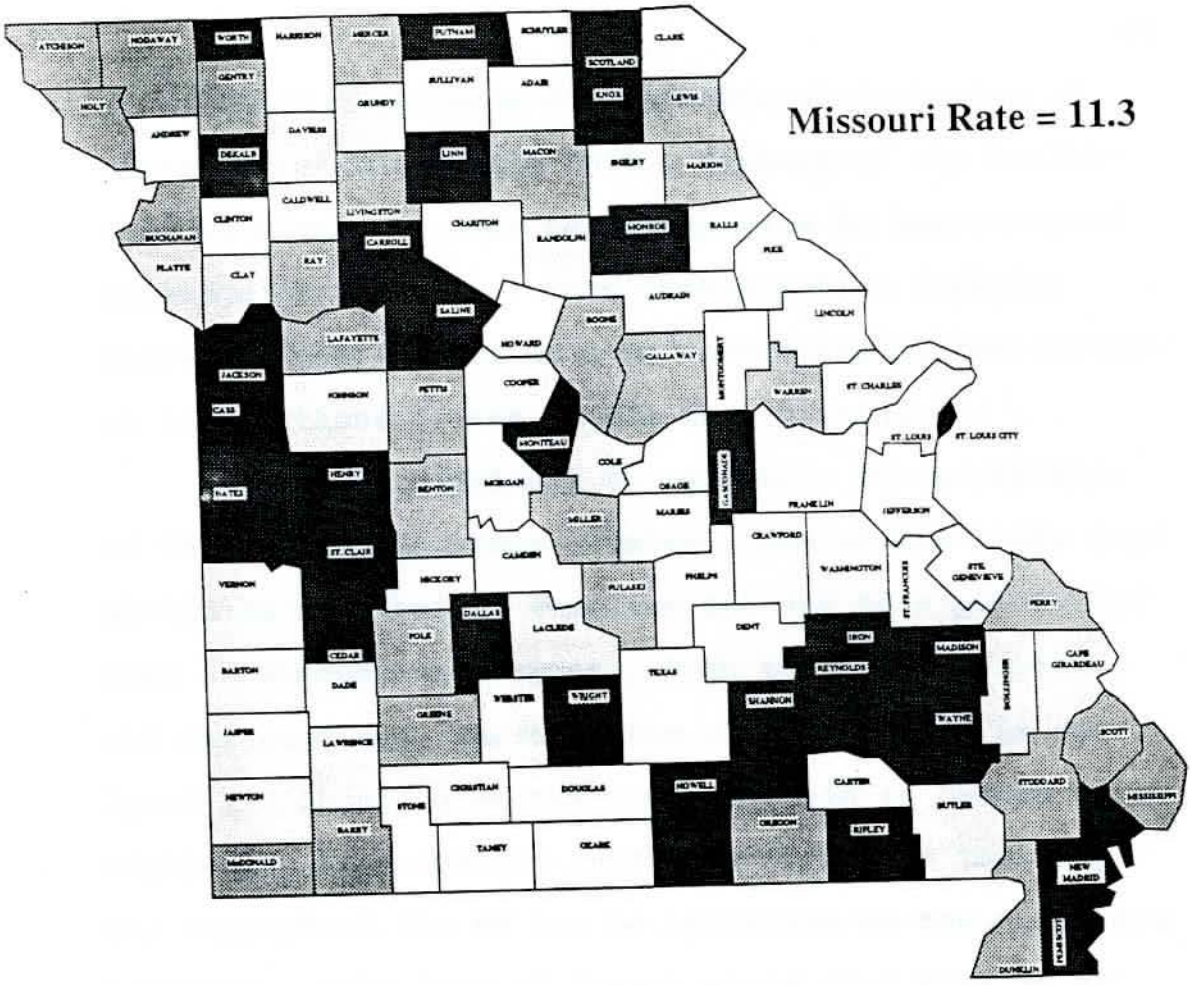
Because the mobile unit brings healthcare to the consumer, rural residents would be one priority. Unfortunately rural areas with limited populations are not conducive to the establishment of medical care facilities and/or sufficient providers to staff them. A full-time clinic may not be feasible for the communi-

ty to financially support. The mobile unit can meet these part-time needs, therefore allowing the fees to remain affordable for the clientele. The convenience of the mobile unit in outlying areas could be a marketing strategy targeting both the indigent population and those clients who prefer the expedience of a local provider.

Inner city residents are a primary target for this type of operation. In contrast to the rural scenario, the dense population and the ethnic backgrounds present a different challenge both in direction and personnel needs.

Often inner cities have limited facilities available and a waiting list for clients. The congested healthcare facilities reflect the overcrowded living conditions of the clients. A mobile unit in this setting could operate on a full-time basis providing intervention in hopes of preventing the increased need for tertiary care facilities. In the state of Missouri, the areas of increased infant mortality are concentrated in St. Louis City and the rural areas (Exhibit IV).

Infant Deaths Per 1000 Live Births: Missouri 1979 - 1988



Source: Missouri's Infant Health Status Indicators

Ethnic difference will mandate some changes in personnel of the mobile unit. Members of the health-care team must be able to communicate in the accepted language of the area. That communication includes different dialects as well as understanding the cultural implications of the people they attend.

It will be difficult to ascertain the acceptance of the van in different locales. One of the tasks that should be done before starting the van in a particular area is a needs assessment. Both the physical needs and the emotional needs of the clients should be analyzed. Informal discussion groups held in church halls might give some insight into this area. In that way, the concept of the RV can be explained as the needs are assessed. This type of format would also provide an avenue to solicit volunteers to help their own community. The use of male volunteers would also help to ensure the physical security of the endeavor.

Trade Analysis

In the present market, most pregnancies that dramatize the need for improved prenatal care i.e., the young, the poor, or the uninsured receive little or no

prenatal care until the last trimester of pregnancy. As stated earlier, many of these problems are due to lack of transportation, time, money, and ignorance of the importance of prenatal care.

Bringing the RV to local areas will alleviate the majority of the transportation problem. Ideally the unit could be parked at a local church, the YMCA, or some other common meeting ground. This would also help with the time problem.

Funding for this type of unit should basically be done by the government because the government stands to make the most return on their investment. The initial purchases, salaries, etc. would be money saved from taxpayers' dollars. The concept behind the unit is to save lives, not money. If the approach is handled correctly, money will be saved by the decreased time any of these maternal fetal units spend in the hospital. On the other hand, individual responsibility must be a part of the program. For a smoker the cost could be the price of two to three packages of cigarettes per visit. No one, however, should be denied care based on the inability to pay.

Ignorance about the importance of prenatal care needs to be addressed in the schools. In addition, advertising about the significance of prenatal care can be done by billboards, handouts, churches, radio, television, and newspapers. The last three are examples of how public and private enterprise can be involved in community improvements.

To make a difference in infant mortality the concept of prenatal care must be seen as important, reasonably priced, and attainable. A mobile unit can provide all these factors. Although this concept can be viewed as a form of socialized medicine, **NOT** providing prenatal care ultimately results in an extremely expensive form of medicine--caring for an increasing amount of very sick neonates.

The same channels of distribution that exist with our current system of prenatal care will be followed with the recreational vehicle. The difference will be using the unit as a connecting link between the hospitals and physicians and the local areas. A great deal of coordination will have to be done with other organizations to provide the necessary outreach to these communities. Nutrition, parenting classes, childbirth

classes, stress management, schools, substance abuse programs, etc. can all be a part of this campaign. Once again the importance of volunteers cannot be overlooked. Working out the logistics of such an enterprise will be a formidable task.

Competitive Analysis

The main competition in the current market is complacency. But if we do nothing, the problem can only get worse. Realistic goals need to be set for the number of clients seen, the responsiveness of the community, and the prognosis of the clients seen. Ideally this concept would be used as a controlled test study with an equal number of participants treated on site and an equal number receiving whatever care they normally receive. The clients visiting the unit would be taking an active and hopefully productive stance.

If the concept of the unit is to give quality prenatal and contraceptive care under the established protocols of cooperating physicians and hospitals, then the unit is working on the free enterprise system. Even though the unit should be functioning on a "no frills" budget, it would still be providing care to a

group of clients that are currently receiving inadequate care.

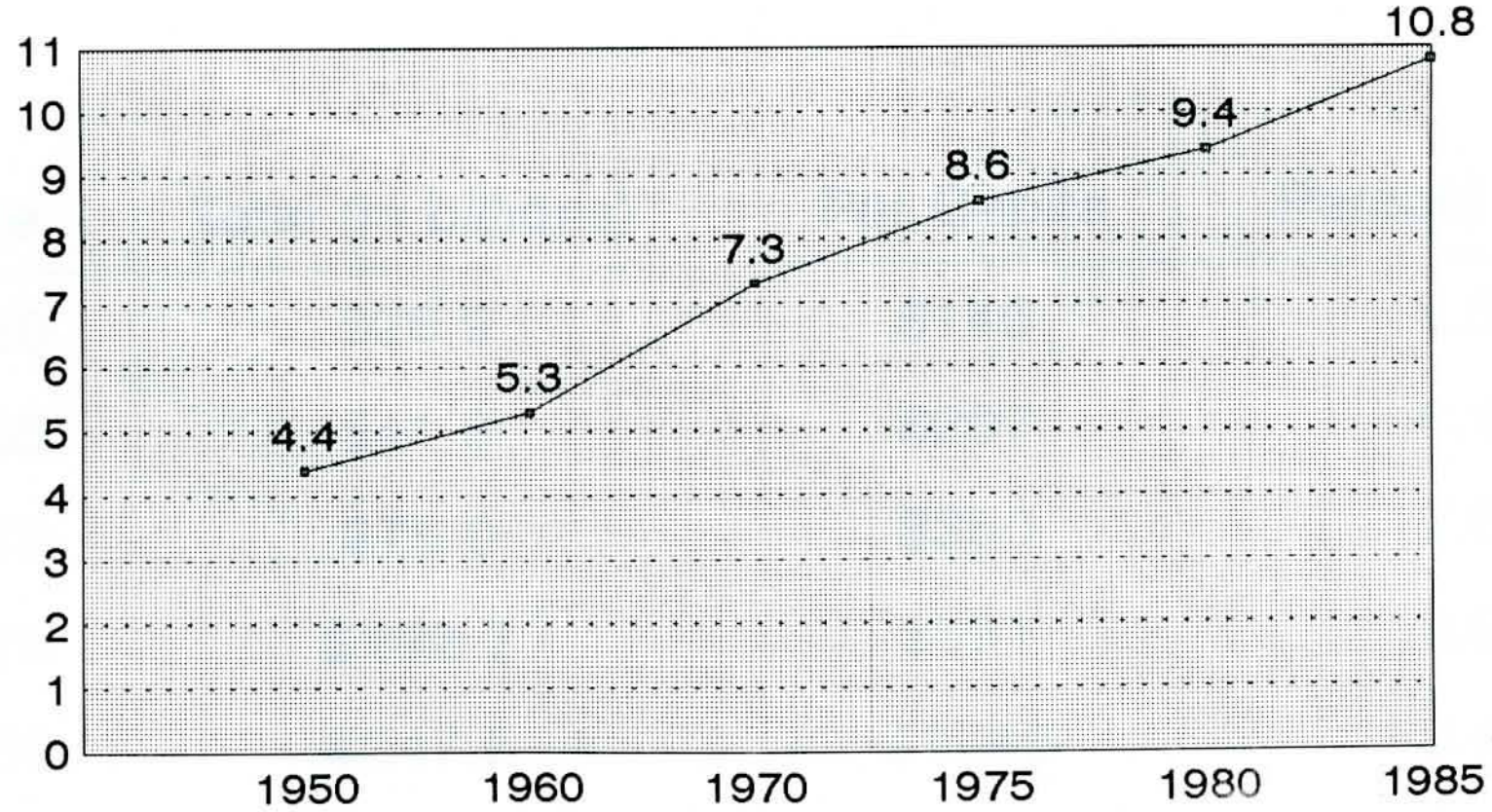
Economic Analysis

We know that the current value of the total market is somewhere within 11% of the GNP (Exhibits V through VII). In this instance, any decrease in expenditures with improved neonatal and infant mortality is a bonus.

The biggest area of development will be twofold: selling the idea of prenatal care to the consumers who need it the most, and developing a marketing mix with expanded emphasis on integrating different organizations to work in indigent areas.

HEALTH EXPENDITURES

UNITED STATES



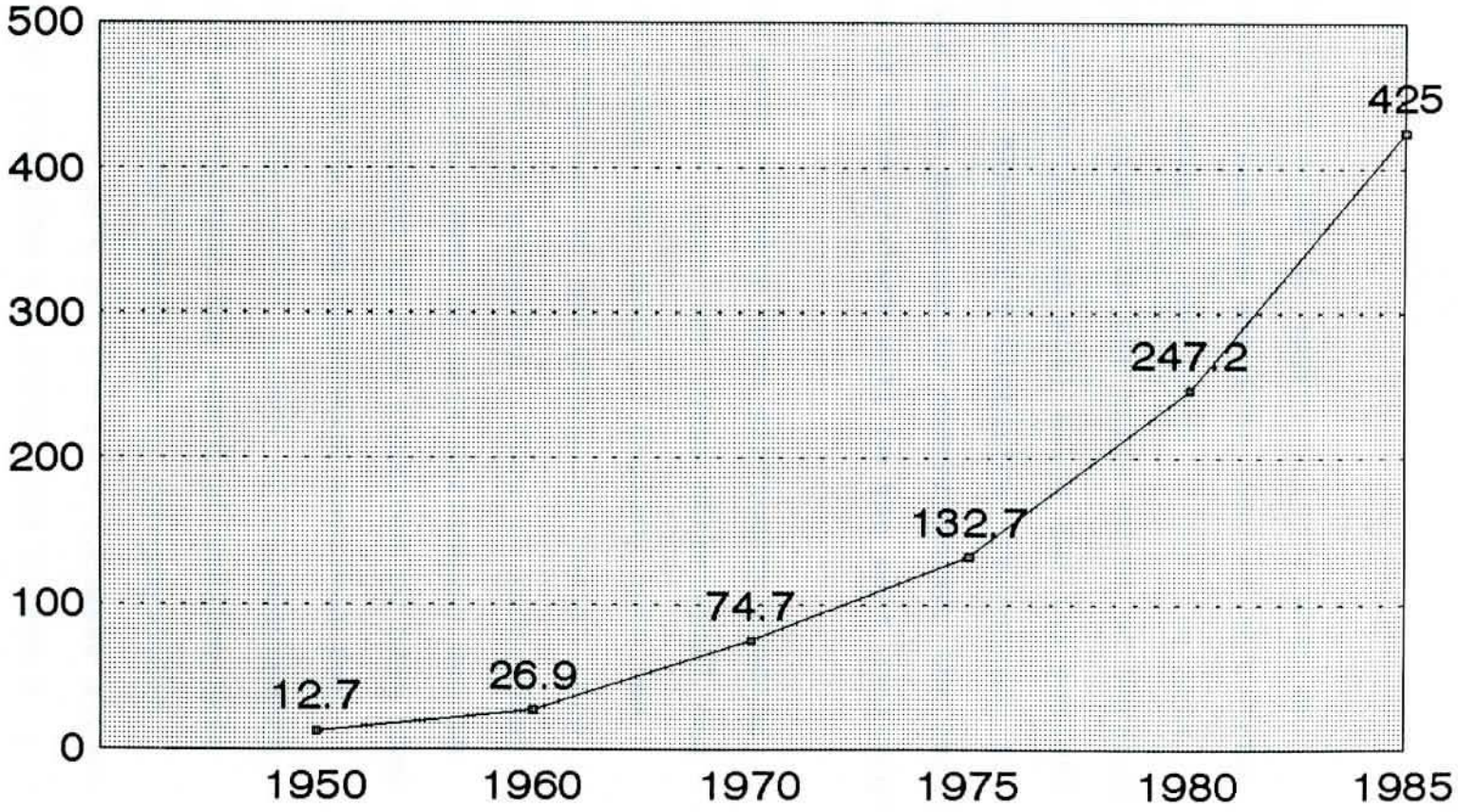
percent of G.N.P

National Health Expenditures

Date	Total (in billions)	Per Capita	Percent GNP
1960	$26.9	$146	5.3
1965	$41.9	$207	6.1
1970	$75.0	$350	7.6
1975	$132.7	$591	8.6
1980	$247.5	$1049	9.4
1984	$387.4	$1580	10.6

NATIONAL HEALTH EXPENDITURES

UNITED STATES



in billions of dollars

Legal Analysis

If this pilot study is approved, care must be taken to remain within the specific laws of the state. In Missouri, for example, the Board of Healing Arts must work hand in hand with the State Board of Nursing to establish protocols that will allow quality patient care. Because of Missouri's historical resistance to change and its rich devotion to conservatism, the legal implications of this project will be the most challenging.

Although poor patients have difficulty finding private physicians to care for their obstetrical and contraceptive needs, the Board of Healing Arts has tried to block the use of non-physician health care providers on numerous occasions. From an individual physician standpoint, much of this difficulty can be attributed to the amount of care required by high risk patients, malpractice, the paperwork involved for remuneration, and the actual amount of reimbursement. From a general standpoint, the Board of Healing Arts does not want patients' needs met by non-physician providers. But they have not provided suitable alternatives such as requiring all physicians to see a

certain percentage of indigent patients, or working with the government to trade school expenses for work.

If the Board of Healing Arts can be persuaded to consider the concept of the RV, a multidisciplinary board could be established to devise protocols agreeable to all concerned. The coalition that must be formed between physician and non-physician healthcare providers is essential.

Chapter IV

RESULTS

Although the results of this project cannot be ascertained until the pilot project has been operational long enough to collect relevant data, there is every reason to be optimistic. I have talked with nurses at Regional Hospital, Children's, Jewish, and Barnes. The general consensus seems to be that the infant mortality rate in the inner city is steadily increasing. Over and over, I heard the frustration of the nurses at these hospitals about the prenatal care currently available, and the lack of initiative by the government and the people.

In a preliminary evaluation of two hundred questionnaires, eighty nurses and twenty-seven physicians responded. The majority of the patients they see were perceived as young (60%), poor (70%), and non-white (68%). Most of these women had received no prenatal care (75%), or no care until late in the second trimester. The average hospital stay of the mother was five days, due to complications of undiagnosed diabetes and

pregnancy induced hypertension. The estimated average stay of infants whose mothers received no prenatal care was nine days. (The average stay for a noncomplicated vaginal delivery of a mother and infant receiving adequate prenatal care is twenty-three to forty-eight hours according to insurance guidelines.)

While St. Louis has limited existing programs for prenatal care in the community itself, there are people who are trying to make a difference. Karen Foss, from KSDK, in a special presentation about infant deaths discussed the importance of prenatal care and the value of community involvement. There are currently several clinics offering prenatal care: if their waiting time is lengthy, volunteers are willing to transport patients to clinics with shorter waiting lists. According to Foss, the cost of caring for an infant weighing less than 2500 grams is between $400,000 to $1,000,000 per infant over the life of the child.

In other areas of the country, attempts are also being made to increase the prenatal care of 'needy' patients. Between January 1984 and December 1986, approximately 29% of the deliveries of a three county program in West Virginia were from a clinic for the

uninsured. The one Level 2 hospital involved experienced a decline in hospital-wide fetal deaths from 11.8 to 7.2 per 1000 live births during the years of clinic operation. The uninsured clients experienced a dramatic and statistically significant decline in the fetal death ratio: 35.4 to 7.0 per 1000 live births (Foster, Guzick, and Pulliam 41). Eventually the clinic was closed due to rising malpractice insurance premiums and lack of continued governmental funding. The fetal death rate returned to an overall 10.3 per 1000 births the year after the clinic closed (Foster et, al. 42).

Early diagnosis of pregnancy induced hypertension, gestational diabetes, and lower rates of prematurely ruptured membranes were all factors that contributed to the clinic's success. There was no appreciable change in advanced age of the mothers, postdatism, twins, and marital status that would have significantly altered the program (Foster et al. 42).

Previous studies have indicated that a number of variables are associated with the fetal death rate. In this particular study, however, the one variable that changed was the existence of the prenatal clinic. Variables such as smoking, number of visits, and time

of first visit were not factored into this study. This was a decided weakness of the study. The strength of the study was that the numbers and causes of both the pre-clinic and post-clinic deaths were studied (Foster et al. 43).

In another study in Florida, Dade County reported dramatic differences in infant mortality when prenatal care was coupled with pediatric care supplied by the National Health Service Corps Physicians. According to the study, the United States ranked thirteenth in perinatal and infant deaths in 1986. When the nonwhite American populace was examined, however, the perinatal death rate of 22.6 per 1000 live births was comparable to the rates found in third world countries. During that time, some portions of Dade County had infant mortality rates greater than **30 per 1000 births** (Nguyen, O'Sullivan, and Fournier 385)!

Working on the premise that quality prenatal and obstetrical care would change the infant mortality rate, obstetricians and pediatricians from the Corps were assigned to Dade County to provide appropriate care. The study began with the assumption that the barriers of access to prenatal care for poor pregnant

women was a major contributor to infant mortality. These barriers included "financial problems, physician supply, substance abuse, transportation difficulties, and unawareness of pregnancy" (Nguyen et, al. 386).

A consortium was formed to promote networking, sharing, and expanding of perinatal services to the patients surrounding the existing nonprofit, federally supported clinics. The estimated percentage of the populace living below the poverty level was approximately 96%. The study in Dade County continued from 1987 through 1989. The perinatal death rate during this time dropped from 29 to 16 per 1000 live births. During the same time frame, the overall United States nonwhite perinatal death rate dropped from 21.5 to 21.1 per live births.

The sample populations of the Dade County study and the West Virginia study differ from the proposed project in St. Louis in ethnic and cultural backgrounds. The Dade County study involved a high percentage of Hispanic immigrants and the West Virginia study absorbed a large populace of poor white coal miners. The St. Louis project will focus on a large number of Afro-Americans by virtue of its boundaries.

The target of each population, however, was and is the same: the poor and uninsured pregnant and/or fertile woman.

Chapter V

DISCUSSION

From past studies in Florida to West Virginia, to proposed studies in St. Louis, the consensus is that prenatal care in the community makes a difference in the mortality and morbidity of our infants. The lack of prenatal care, associated with poverty, is the single most significant risk for low birth weight babies. The direct correlation between the mother's ability to pay for health care and infant mortality is a proven theory. "This is a significant problem because 29 to 35 million people, or 12% to 15% of the United States population, have no health insurance" (Kliegman, Rottman, and Behrman 1073).

If a low birth weight baby is born in the United States, that baby has a better chance of survival than in almost any other country. But more than 60% of all of the infant deaths in the U.S. are from low birth weight babies; this country has more low birth weight babies than any other country in the industrialized

world. With the $500 billion national health bill in 1987, the public is asking for answers (Davidson 2).

Clearly, the advanced standing of the United States in technology is not the only answer. With the technological advances of the United States, infant mortality should be markedly lower than it is. The variable factor of prenatal care has a decided effect on infant mortality, but all the causal relationships are not known. What is known is that "if a woman starts prenatal care in the first trimester, her chances of having a normal child are four times better than for a woman who receives no prenatal care" (Davidson 2). This knowledge alone should be the catalyst for accessible prenatal care for every woman in this country.

Summary

One of the primary objectives of a study by Dollfus, Patetta, Siegel, and Cross in 1988 was to identify the major groups of causes of infant mortality, and to see if there was a correlation between low birth weight babies and preventable deaths. The goal of the study was to identify the causal effects of

infant mortality, define the population of infants and mothers at risk, and propose preventative strategies. "The infant mortality rate is a standard indicator of a population's health frequently used by health care professionals, program planners, and decision makers" (Dollfus et, al. 176).

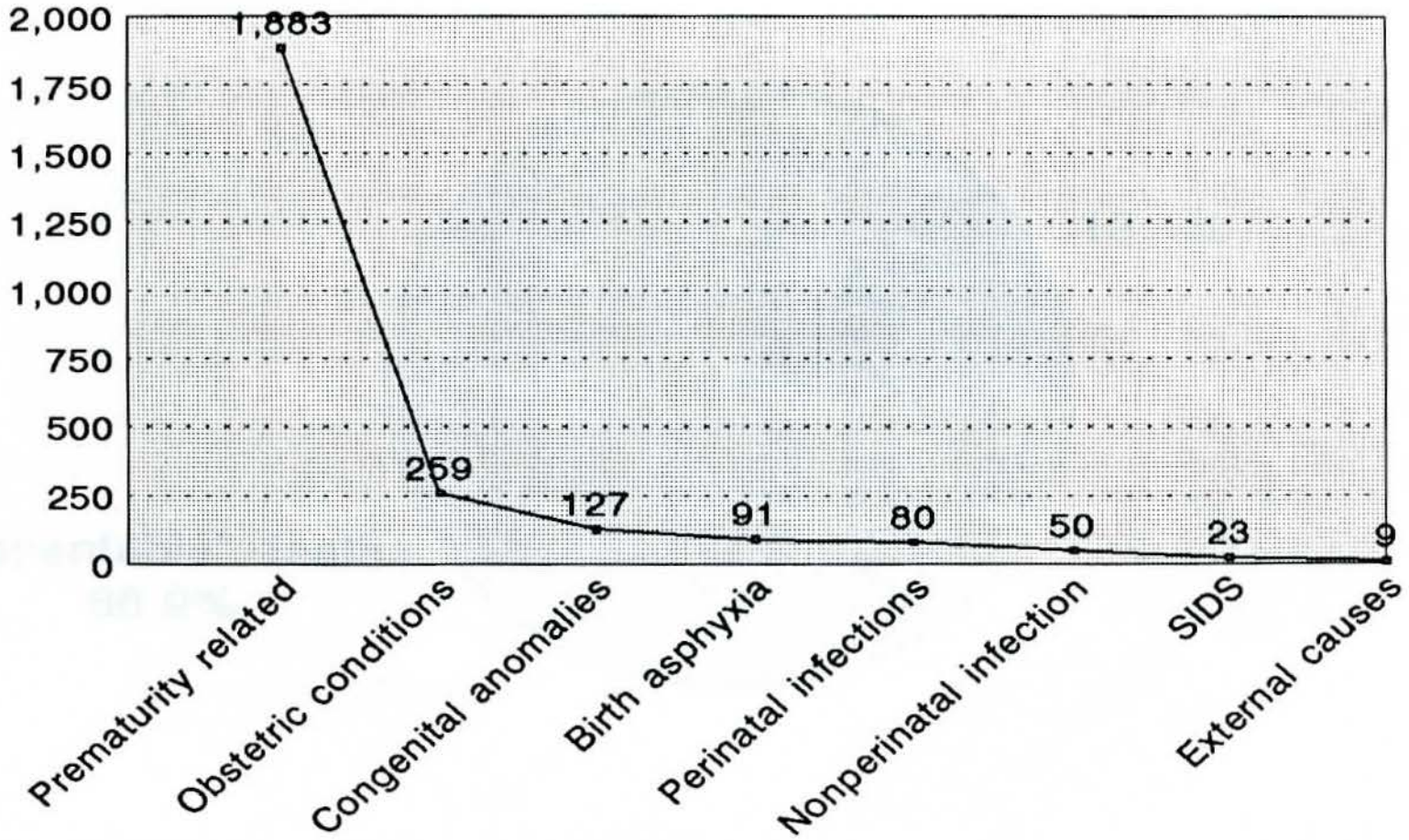
The importance of the Dollfus et, al. study was that it analyzed many variables. The research compared the birth and infant death certificates for linkage of influencing factors in North Carolina. Several socio-economic components were considered. These included maternal characteristics of race, marital status, age, and education. High risk factors for infant mortality in North Carolina based on previous research included: nonwhite, unmarried, education less than twelve years, and age younger than seventeen. The adequacy of pre-natal care, based on when care was begun and the total number of prenatal visits, was assessed by the Kessner Index (Dollfus et, al. 178).

Normal birth weight (NBL), low birth weight (LBW), moderately low birth weight (MLBW), and very low birth weight (VLBW) infant deaths were ranked to identify the cause of death. The top fifty causes were "collapsed"

to eight causes based on a common etiologic mechanism (Exhibits VIII through XIII). The infant mortality rate increased exponentially with decreasing birth weight. "A MLBW was 6 times more likely to die in the first year of life than a NBW baby and a VLBW baby 85 times more likely" (Dollfus et, al. 179). The best method of preventing the deaths construed as avoidable, remains adequate prenatal care with appropriate intervention.

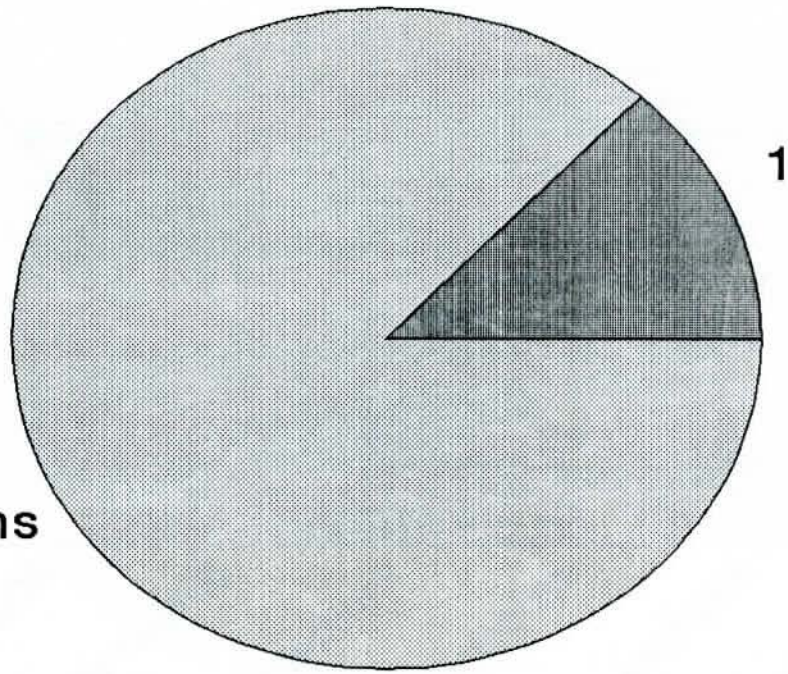
LEADING CAUSE OF DEATH - VERY LOW BIRTH WEIGHT

1980 through 1984



TOTAL DEATHS - VERY LOW BIRTH WEIGHT

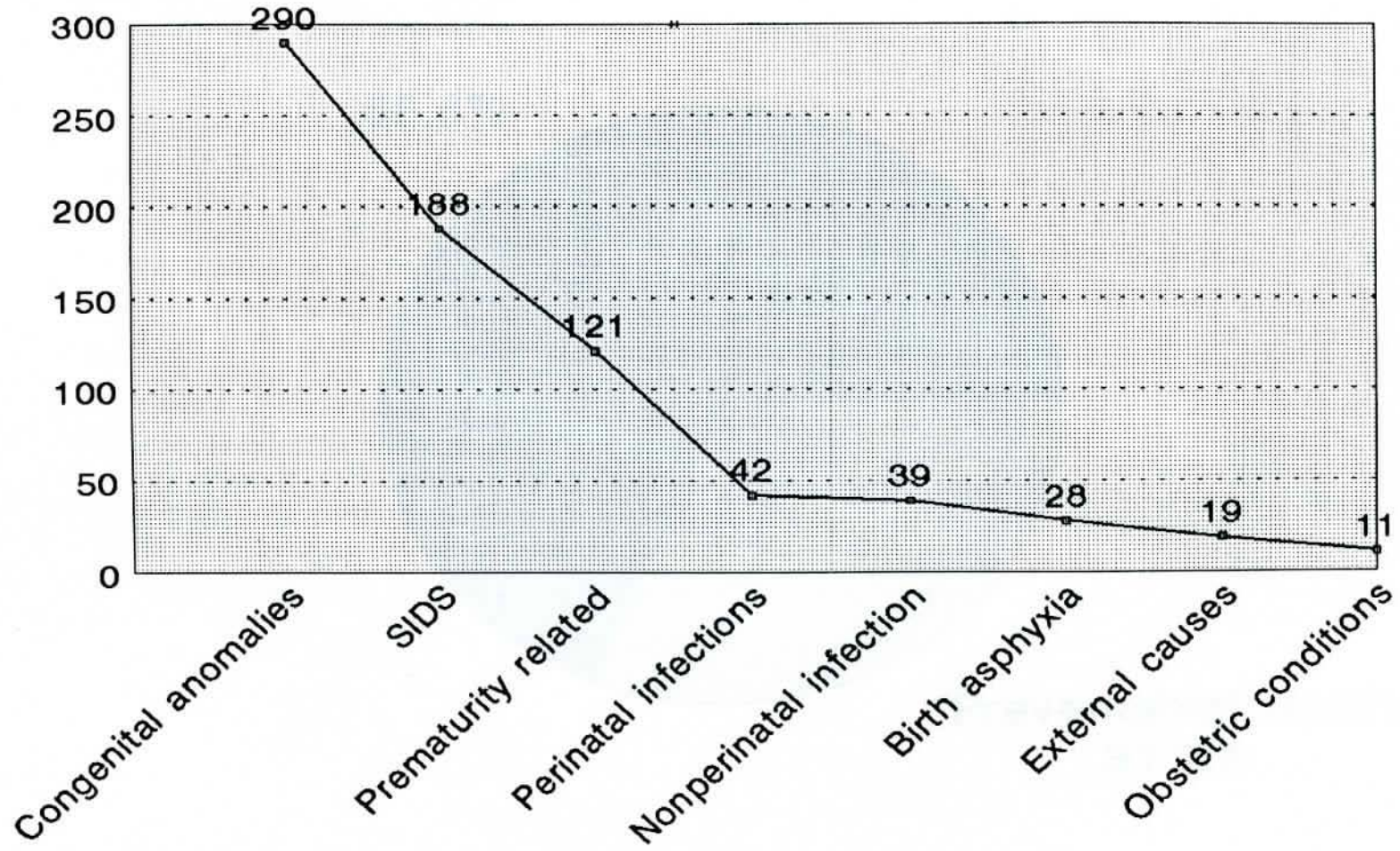
1980 through 1984



TOTAL DEATHS = 2708

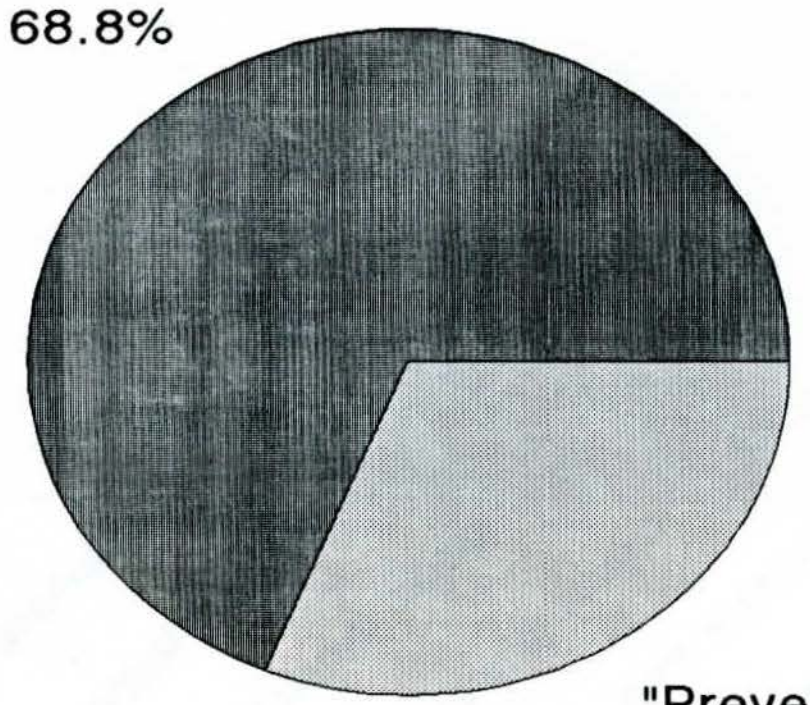
LEADING CAUSE OF DEATH - MODERATELY LOW BIRTH WEIGHT

1980 through 1984



TOTAL DEATHS - MODERATELY LOW BIRTH WEIGHT

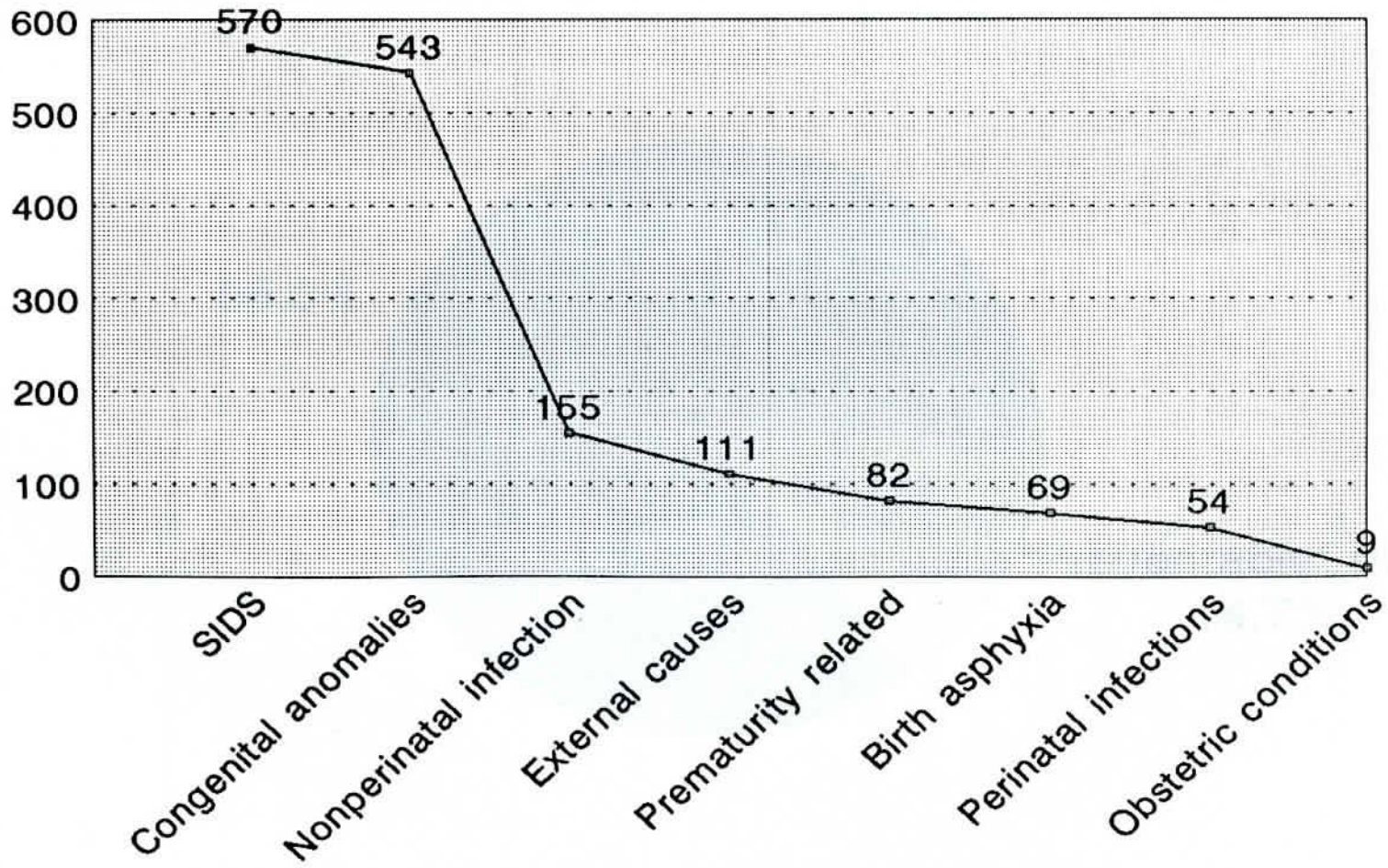
1980 through 1984



TOTAL DEATHS = 840

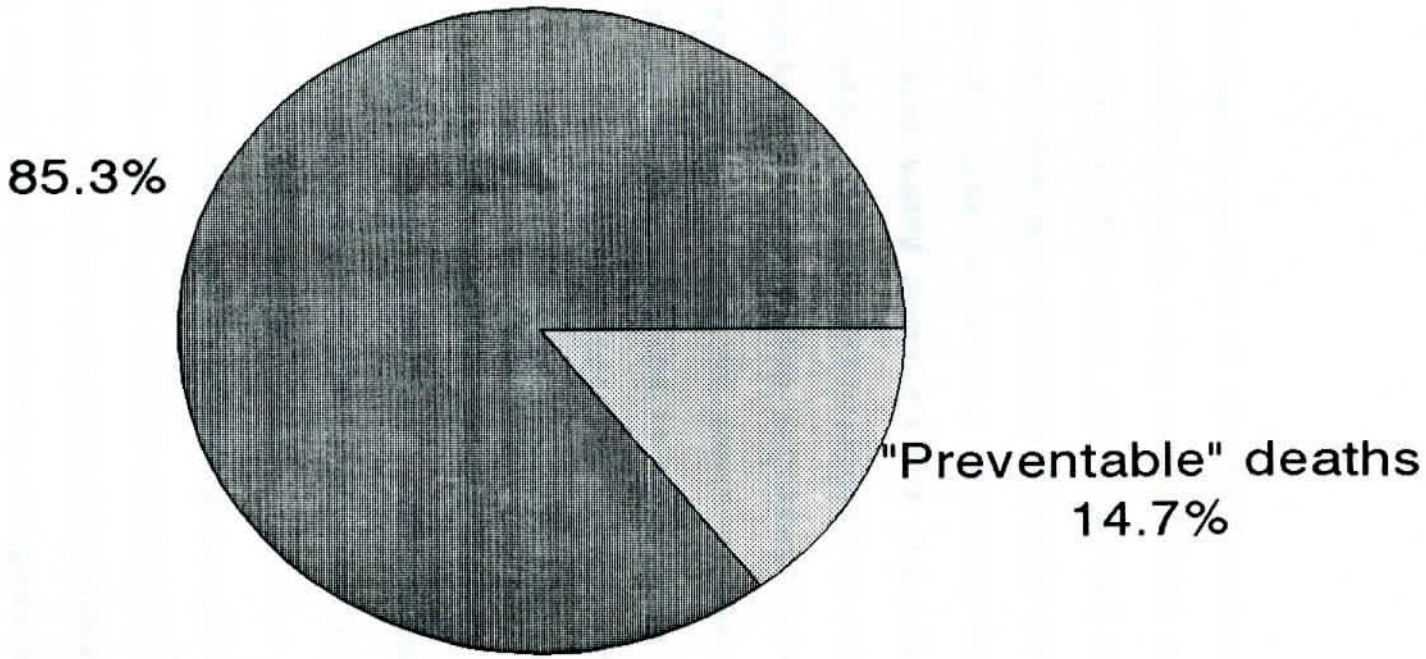
LEADING CAUSE OF DEATH - NORMAL BIRTH WEIGHT

1980 through 1984



TOTAL DEATHS - NORMAL BIRTH WEIGHT

1980 through 1984



TOTAL DEATHS = 2003

In the preliminary results of the discussions and questionnaires among St. Louis City obstetrical and emergency room personnel, the plan for improved access to adequate prenatal care was enthusiastically received. Over 50% of those responding believed that improved prenatal care would decrease the current infant mortality rate. Additional suggestions were made regarding better contraceptive information to teens, and increasing the amount of women on WIC.

Many nurses expressed a desire to work with the prenatal indigent, but were justifiably afraid of working in some neighborhoods. They felt police protection would be counterproductive to enrollment of patients, but did feel reassured about using local facilities such as churches, the YMCA, or parking fairly close to police precincts.

I firmly believe that the hypothesis is workable and will decrease the amount of infant mortality. Funding, coordination of other programs, neighborhood acceptance, and a safe environment are all part of the in-depth study that must ensue to make the program a success.

Repeated studies have indicated that access to prenatal care has improved the outcome of infant mortality and morbidity. The mobile unit represents the framework to develop other outreach programs, which include sex education in the primary schools that evolves into a more detailed program in the secondary schools. This approach does encompass the accessibility of contraceptives at an affordable cost. Because of the differences in public opinion concerning contraceptive use, consideration of this program will need careful structuring. Substance abuse, including alcohol and smoking, also demand our attention at home and at school.

Although I attempted to reach several legislators by letter and by phone, only two responded: Joe Ortwerth (State Representative) and Joan Kelly Horn (Congresswoman). From a standpoint within the state, Representative Ortwerth felt that "although the idea is excellent, and many programs are attempting to provide services, there are two main problems: the first is the conflict between the Board of Healing Arts and the Nursing Board as to what constitutes medical care, and the second is that on a state level, there is no money

available to initiate or support such a venture" (Ortwerth). Joan Kelly Horn was more optimistic from a federal standpoint about the "appropriation of funds to increase prenatal access. The problem is that although many private physicians do not want to care for Medicaid patients and other indigent patients, they do not want any non-physician to care for them either" (Horn).

Limitations

In addition to coordinating the efforts of different organizations to provide prenatal and ancillary care, it is obvious that funding will be of paramount importance. As stated previously, the initial funding will require $110,000 for the mobile unit and supplies. Ongoing expenses will include salaries, supplies, insurance (vehicular and malpractice), and maintenance. Plans need to be developed to generate these operational expenses. Several topics will need to be addressed in order to obtain start-up and maintenance funds. One avenue, in addition to the federal government, is private enterprise, as well as donations. An entire discussion needs to be devoted to this possibility.

With the downscaling in business and governmental cutbacks, this will be a monumental challenge.

Assuming that the mobile unit can be purchased and staffed by non-physician health care providers, the study has a major flaw in procedure. In talking with, and reading the suggestions of several of the inner city hospital employees, I realized the impossibility of a control group within the same geographical region. Because many patients would be visiting the unit in an area where they work, or delivering at a hospital outside the region covered by the van, a great deal of crossover will occur. This will negate the idea of a control group by location.

Since this is a hypothetical situation, other design problems may be encountered during the time of the project. The feasibility of the study is real, even though the obstacles are formidable.

Suggestions For Future Research

I would like to proceed with this study and acquire the necessary funding to make this project work. The money is there. If not in government, then in private donations or grants. It will take perseverance

to acquire suitable and ongoing funding to support the mobile unit. The most formidable problem will be dealing with the Board of Healing Arts in Missouri. The conservatism of this state will be a difficult enigma to encounter.

Assuming that these problems can be overcome, the one portion of the project I would change would be in the procedure. Instead of using a pretest-posttest control group, I would use a format similar to the one used in the North Carolina study by Dollfus et, al. By using the statistics from previous years to ascertain the casual relationship of births and infant mortality as my control group, I would use an equal number of years with access to prenatal care as my study.

Throughout the 1960's and early 1970's, the United States fought a nonconventional war in Southeast Asia using tactics that were not suitable to the terrain. We failed to make a national commitment, and we lost the war.

Today we are fighting another unconventional war and it is not half-way across the world. The war is here, and we are losing ground. If we want to win the battle against infant mortality, the mirror of our

national health, **WE MUST MAKE A COMMITMENT AND MAKE CHANGES NOW!**

APPENDIX A

LETTER INTRODUCING QUESTIONNAIRE

April 1, 1992

Please complete the attached voluntary questionnaire. The information you provide will be used to evaluate prenatal care or the lack of adequate care for those patients you serve.

I have provided a self-addressed, stamped envelope. Please return this information to me by April 22, 1992.

If you would like a copy of my reportings, please make a notation on the questionnaire, and I will provide these to you.

I sincerely appreciate your efforts in this matter. Your professionalism and experiences will make all the difference! Thank you for your cooperation!!!!!

This study is part of a research project in the St. Louis area on prenatal care. If you have any questions, please feel free to call me at 314-928-2265. Barbara A. Dieterich, RNC, BA.

APPENDIX B

QUESTIONNAIRE

Emergency Room Nurses/Physicians

Name (Optional): _____

Title: _____

Area of Specialization: _____

# of Years in present position: _____

Hospital Name: _____

1. Approximately how many emergency deliveries do you see each month? _____

2. Is each emergency delivery patient questioned regarding prenatal care? Yes _____ No_____

   How? _____

   _____

   _____

   Is there a set protocol? Yes_____No_____

   _____

   _____

3. Of the number of deliveries in question 1, give an estimate of how many of these patients have had no prenatal care? _____

4. Estimate the percentage of each category below:

_____% have delivered at home

_____% deliver enroute to the hospital

_____% deliver in the emergency room

_____% are transported and deliver in 'Labor and Delivery'

5. In general, state the physical status of women with prenatal care, compared to those with no prenatal care. _____

_____

_____

_____

_____

5. Have you seen an _____ increase

or _____ decrease

in patients with no prenatal care in the last year?

6. Rate the initial health status of the infants born to those women with no prenatal care:

_____

1 2 3 4 5 6 7

Poor Healthy

APPENDIX C

QUESTIONNAIRE

Obstetric/Pediatric Nurses and Physicians

Name (Optional): _____

Title: _____

Area of Specialization: _____

# of Years in present position: _____

Hospital Name: _____

1. Approximately how many deliveries do you provide each month? _____

2. Is each delivery patient questioned regarding prenatal care? Yes _____ No_____

   How? _____

   _____

   _____

   Is there a set protocol? Yes_____No_____

   _____

   _____

3. Of the number of deliveries in question 1, give an estimate of how many of these patients have had no prenatal care? _____

4. Estimate the percentage of each category below:

_____% have delivered at home

_____% deliver enroute to the hospital

_____% deliver in the emergency room

5. In general, state the physical status of women with prenatal care, compared to those with no prenatal care. _____

_____

_____

_____

_____

5. Have you seen an _____ increase

or _____ decrease

in patients with no prenatal care in the last year?

6. Rate the initial health status of the infants born to those women with no prenatal care:

_____

1 2 3 4 5 6 7

Poor Healthy

7. Average length of hospital stay for the infants born to women without prenatal care: _____

8. From the information you gather in dealing with the women and infants, state some of the contributing factors for the health status noted in #6, and the estimated percentages for each cause:

Reason	%
_____	____
_____	____
_____	____
_____	____
_____	____
_____	____
_____	____
_____	____

9. Of the infants born to women with no prenatal care, what percentage survive? _____%

10. Complete the following:

a) Fill in the percentages regarding age of mother at delivery:

_____% age 14 and under

_____% 15-19 years

_____% 20-24 years

_____% 25-34 years

_____% 35-40 years

_____% age 40 and over

b) Race:

_____% Caucasian

_____% African-American

_____% Hispanic

_____% Asian

		Nationality
Other:	_____%	_____
	_____%	_____

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