Factors Influencing Parents' Decisions Regarding Immunization for their Children

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A Thesis Presented

by

Norma E. Hallock

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Regarding Immunizations for their Children

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Approved as to style and content by:

Dr. Selcuk Sahin, Chairperson of Committee

Dr. Dorothy Gilbert, Member

Dr. Paula Stamps, member

Dr. Ann Sheridan,
Director

Division of Nursing

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Abstract

The purpose of this research was to determine the factors motivating parents' decisions regarding immunizations for their children according to the recommended schedule of childhood immunizations (DTP, Polio and MMR). The health belief model was used as a basis for the theory. Likert scales were used for the independent variables of susceptibility, seriousness, benefits, barriers and external factors motivating decision. A convenience sample of 79 parents was chosen from those who bring their babies to Amherst Medical Associates for care. Parents were given a questionnaire that addressed concepts in the health belief model using the Likert scales, a true/false format was used to test parents' knowledge of the diseases and immunizations and demographic information was requested. The nurse practitioner or physician also completed a brief questionnaire regarding the child's health and immunization status. The hypotheses of parents immunizing on the recommended schedule and their perceptions of their child's susceptibility to the disease, benefits of the vaccine, barriers to immunizations, and external motivating factors were supported. Seriousness was not a motivating factor in decision making. Demographic variables also did not influence decision.

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CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose of this study is to identify selected factors and attitudes influencing parents' decisions related to the immunization of their children. There appears to be a high rate of non compliance with medical care recommendations. The research will attempt to determine what factors prevent or interfere with parents' decisions to follow health care recommendations.

In nursing practice, a considerable amount of time is spent discussing the controversial questions pertaining to childhood immunizations. Two years ago ABC 20/20 had a program that portrayed frightening, yet possible risks of the vaccines. What was not discussed were potential outcomes of the disease if the child is not immunized. An extensive review of the literature has confirmed that the risks of contracting the diseases of diphtheria, tetanus, pertussis, polio, measles, mumps and rubella and of getting complications of these diseases are much greater than the risks of complications from the vaccines.

Childhood immunizations are not without side effects and parents must be aware of these. Much nursing and physician time is spent in our pediatric practice allaying parental fears. Parents are so anxious that they ask the same questions repeatedly before an immunization is given.

As parents have become more aware of complications of immunizations, they have opted to immunize their children according to their "own" protocols and not what is recommended by the American Academy of Pediatrics (AAP) and the Center for Disease Control (CDC). Many parents who choose alternate schedules omit the pertussis vaccine entirely. Some decide to give tetanus only, thus skipping the diphtheria and pertussis vaccines. Some choose the inactivated polio rather than the oral polio vaccine. Others will omit the measles, mumps and rubella vaccine although this is not as common as the above mentioned alternatives. Some parents opt to start the immunizations at a older age than the recommended age of two months. Other parents start the immunizations on time but do not continue on the recommended schedule even though their child has not had any reactions to the vaccines. All of the above reasons for omitting or deferring immunizations put the child at higher risk of developing the diseases and having sequelae to the diseases.

It is the intent of this research to determine what external and internal factors influence parents' decisions to immunize their children on schedule with the recommended vaccines. It is hypothesized by the researcher that parents who do not follow the recommended schedule also have a different set of attitudes in regard to their perceptions of their child's susceptibility to the disease, the seriousness of the disease should it occur, the effectiveness and benefits of the immunizations against the disease and the barriers of receiving the vaccines than do parents who follow the recommended schedule. Parental attitudes and other influencing factors will be assessed using the health belief model as a theoretical base.

Relevance to Nursing

Parents are often misinformed and confused about the information that they have received regarding childhood immunizations. Parents are influenced by the news media and others who have experience with side effects of the vaccine. They may feel that the disease is no longer prevalent or that the disease is not serious if it were contracted.

Nurses have more contact with patients than other health care professionals. They, therefore, have a chance to influence health related behaviors. Nurses can improve compliance by providing clients with information regarding the benefits of various health actions and helping them choose the action with the greatest chance of success if we can identify which parameters influence parental decisions (Mikhail, 1981).

Health beliefs should be recognized because the parents'concerns and fears are often based on their beliefs and their behavior can be influenced by their beliefs. Health beliefs can be influenced by nurses to:

1. Increase the parent's understanding of the problem.
2. Alleviate the parent's concern.

3. Explain the disease or its complications or the risks and benefits of the immunization to the parents in terms that they can understand.
4. To plan and negotiate the management of the problem with the parent (King, 1984).

Many nurses today are involved in preventative care rather than caring for an ill individual. With the advent of vaccines against dipththeria, tetanus, and pertussis, polio, measles, mumps and rubella, there has been a marked reduction in these diseases and their complications. Many young nurses, like the majority of new parents, have never had any experience in providing care to children with any of these diseases.

It is the responsibility of nurses to be knowledgeable, not only about the diseases, but to be informed about the risks of the vaccines so that parents can be assisted in making intelligent decisions in regard to childhood immunizations. It is the intent of this research to determine attitudes and factors that may identify certain parents as high risk and who can thus be identified as needing our expertise and intervention. If parents do not follow guidelines, the child is at risk to develop the disease. The information gained from this study can help us develop nursing strategies that will enable parents to make informed decisions regarding their child's health.

Scope and Limitations

The research is a descriptive survey study on attitudes and factors influencing parents' decisions whether to follow or not the immunization protocol for their children according to the American Academy of Pediatrics and the Center for Disease Control guidelines. The recommended schedule is:

2 months	DTP and OPV
4 months	DTP and OPV
6 months	DTP
15 months	MMR
18 months	DTP and OPV

It should be noted that the regular health maintenance schedule at Amherst Medical Associates omits the six month visit but the infants are then seen at seven months instead and the third DTP is given at that time.

A convenience sample is used in selecting parents who bring their child to the Amherst Medical Center at 170 University Drive in Amherst, MA for well baby check ups during weekday hours from 8 AM to 5 PM. It must also be a parent who accompanies the child (or legal guardian) because the parent or legal guardian is the one who must sign the consent form for the study as well as the immunization consent form. Therefore, infants who arrive

with a relative or child care provider other than the parent or legal guardian will be excluded from the study.

This study will be limited to exploring the diphtheria, tetanus, and pertussis, the polio and the measles, mumps and rubella vaccines which are offered at the 2 month, 4 month, 7 month, 15 month and 18 month well child visits. It will be limited to those immunizations which are recommended in the first eighteen months of life. This is the basic series plus the first booster. The second booster is not offered until ages four to six.

It will be limited to the age group specified unless for example the visit was deferred because of illness and the child is older than the recommended schedule by a few weeks. Thus, it will exclude the ten day, and one month visit.

The data will be collected over a six week period from February 15, 1987 to April 1, 1987. The time of year may reflect immunization deferral because of illness. It is peak flu season.

The research will be limited to parents who can speak and read the English language. While Amherst MA is mainly an academic community, it has a diverse population. Parents who choose the pediatric department are of different SES and ethnic backgrounds. Parents are either fee for service clients or have private insurance, are

members of the health maintenance organization, Valley Health Plan, or are covered under Medicaid.

While the parental questionnaire was adapted from Champion's (1984) research, the questions were changed significantly and therefore this research has not been tested for validity or reliability.

Statement of Problem

Do parents who choose to immunize their children according to the recommended schedule have beliefs different from parents who do not in their perception of the child's susceptibility toward the diseases, the seriousness of the diseases, the benefits of receiving the immunizations against the diseases and the barriers of receiving the vaccines? Do external and internal factors such as the influence of the mass media, experiences with other children and immunizations, experiences of friends or relatives children, discussions with the nurse, nurse practitioner or physician, written factual information given to the parent, the fact that one must now sign the informed consent form for immunizations, and the fact that immunizations are required for school entrance affect parental decisions to immunize on the recommended schedule? Do other variables such as age of the parents, income and educational level of both mother and father, religion, race and the sex, age and health status of the child affect decision?

It appears as if many hours are spent in nursing practice discussing the benefits and risks of childhood immunizations. Some parents feel that because selected diseases are no longer prevalent, there is little risk of contracting these diseases. Others have never had any experience knowing someone with the disease so do not feel that immunizations are important. Some parents think that the vaccines may not give lifelong immunity so do not want to subject their child to a vaccine, like rubella, which will not be effective when the child reaches childbearing age and needs it the most. Some parents will opt for a killed versus a live vaccine. Other parents do not want painful procedures so would choose the easiest route possible. Other parents prefer separate injections rather than the combined vaccines such as DTP or MMR. Parents are concerned that the risk of the complications of the vaccine outweigh the benefits of the immunization.

Hypotheses

Parents who choose to immunize their children according to the recommended schedule have a different set of attitudes than do parents who do not.

1. Parents who choose to immunize their children according to the recommended schedule believe that the child is more susceptible to the disease than do parents who do not fully immunize their children.

2. Parents who choose to immunize their children according to the recommended schedule believe that diseases are more serious should they occur than do parents who do not immunize their children according to this schedule.

3. Parents who choose to immunize their children according to the recommended schedule believe that the benefits of the immunization outweigh the risks of the vaccine more than do parents who do not immunize their children on this schedule.

4. Parents who decide to immunize their children according to the recommended schedule differ from parents who do not in their perceptions of the barriers to receiving the recommended vaccines.

5. Parents who choose to immunize their children according to the recommended schedule are more positively influenced by external and internal stimuli than are parents who do not follow the recommended schedule.

Stimuli or factors affecting such decisions are: The mass media, experiences with other children and immunizations, experiences of friends or relatives children, discussion with and influences of the nurse, nurse practitioner or physician, written factual information given to the parent, signing of the informed consent sheet and requirements for school entry.

Demographic factors to be assessed in determining decision and affecting outcome are: income and educational level of the mother and father, age of the parents, religion, race, sex, age and health status of the child.

Definitions of Terms

Attitude toward immunizations - a manner of acting, feeling or thinking that shows one's opinion.

Barrier toward immunizations - an obstacle that prevents receiving the immunizations according to the recommended schdeule.

Benefits to immunizations - anything contributing to an improvement in a condition or preventing disease.

Complications of disease - a disease or abnormal condition that occurs during another disease.

External stimuli - those outside influences that initiate an action such as newspapers, magazines, radio, television, experiences with other children and immunizations, sex of child, SES of parent, age of mother, health status of the child, experiences of friends or relative, discussions with the nurse, nurse practitioners, or physicians, fact sheet, signing to the informed consent sheet.

Factual knowledge - information based on fact (tested and approved information).

Health care provider - nurse practitioner or physician.

Immunizations - to make immune (protect against something that is harmful; used interchangeably with vaccine).

DTP - diphtheria, tetanus and pertussis (whooping cough) vaccine.

OPV or TOPV - live oral polio vaccine or Sabin vaccine. TOPV refers to the Trivalent vaccine which is the type used today.

IPV - inactivated polio or Salk vaccine.

MMR - measles, mumps and rubella vaccine.

Internal stimuli - those inside forces that initiate an action.

Guardian - a person legally placed in charge of the affairs of a minor.

Motivation - that which makes a person act. In this case it is what makes them make a decision.

News media - to include television, radio, newspapers and magazines.

Parent - a father or mother who have legal responsibility for this child.

Prevalence of disease - widespread existance of the disease under discussion.

Previous experience - having personally observed something in the past which will influence a person in the future.

Recommended schedule of vaccines - DTP at 2,4,7, 18 mo. and 5 years.
OPV at 2,4, 18mo and 5 years of age
MMR at 15 months of age.
According to the pediatric providers at Amherst Medical Associates and for purposes of this research, a child will be considered to have a late immunization if it is not given at the next regular health maintenance visit or if the child has had less than the following:
Three DTP's in the first year of life
Two OPV's in the first year
MMR by 18 months
DTP and OPV booster on time at 18 month check up

Seriousness of the disease - potential for being dangerous.

Susceptibility to disease - especially liable to the disease.

Vaccine - any preparation of dead bacteria or a live attenuated virus introduced into the body to produce immunity to a specific disease by causing the formation of antibodies (used interchangeably with vaccine).

CHAPTER II

LITERATURE REVIEW

The health belief model suggests an explanation for health behaviors. This model was designed by Hockbaum, Leventhal, Kegeles and Rosenstock in the 1950's. It has led to diverse research regarding behavior to maintain health or prevent disease in asymptomatic people at a level of personal decision making. (Champion, 1984) (Mikhail, 1981). According to Mikhail (1981) Kasl and Cobb describe health behavior as "an activity undertaken by a person believing himself to be healthy for the purpose of preventing disease or detecting it in an asymptomatic stage" (p. 66).

Rosenstock's health belief model was developed from Lewin's theory which is based on the premise that people are thought to live in a life space made up of regions. Some of these are positively valued; others are negatively valued and still others are neutral. A positively valued region contains a goal object and will reduce tension for

the person entering it. A negatively valued region contains a goal object and will increase tension for the person entering it (Becker, 1974).

The health belief model originated by a specific case of Lewin's theory namely: goal setting in the level of aspiration situation. The level of aspiration is defined as: "The level of future performance in a familiar task which an individual, knowing his level of past performance in that task, explicitly undertakes to reach" (Becker,1974 p. 10).

Lewin's theory then assumed that behavior depends on two factors:

1. The value of an outcome to an individual.
2. The individual's estimate of the chance that a certain action will result in that outcome (Mikhail, 1981).

Rosenstock's health belief model proposes that the chances that a person will take action relative to a health condition is decided by both the individual's psychological state of readiness to take action and by the perceived benefit of the action versus the perceived cost or barriers if the action is taken. A person's readiness to take action depends on his perceived susceptibility to a certain health condition and what the individual perceives as the seriousness or the consequences of contracting the condition. The person will not take action unless he

believes that there is both a personal susceptibility to the disease and that there would be serious consequences of the illness, should it occur (Mikhail, 1981).

There must be a stimulus to make a person act. The stimulus may be internal or external. Examples of an internal stimulus would be a perception of the state of the body. An external stimulus would be the influence of friends or the media. If the person making the decision, in this case the parent, is in a low readiness state, they will need a stronger stimuli (either internal of external) to motivate them towards making a decision than if they were in a high readiness state of mind. Factors that determine a persons perceptions of susceptibility, seriousness and cues to action are:

1. Demographic variables.
2. Structural variables such as the side effects of the regime.
3. Attitudinal variables such as satisfaction with the health care provided.
4. Interaction variables such as quality and type of client/provider relationships.
5. Other variables such as sources of advice and social pressure (Mikhail, 1981).

These will be explored in this research.

The health belief model is based on five constructs:

1. Perceived susceptibility - refers to the

subjective risks of contracting a specific condition in a specified time period.

2. Perceived seriousness - perceived degree of personal threat related to a specific condition.
3. Perceived benefits - focuses on the belief that the effectiveness of a specific new behavior or alternate behavior in preventing or detecting disease, maintaining health and caring or lessening undesirable consequences of a diseased state.
4. Perceived barriers - are the negative components of an anticipated behavior which would be undertaken to prevent or detect disease, maintain health and care or lessen undesirable consequences of a diseased state.
5. Health motivation - relates to a state of concern about general matters which results in positive health activities and willingness to seek and comply with orders that are believed to decrease disease (Champion, 1984 pp 77-78).

A persons perception of a personal susceptibility to disease has been found to be positively related to taking a large variety of preventive health measures such as: immunizations, prophylactic dental visits and screening for

vasrious diseases-such as cancer. There is a high correlation between the perceived susceptibility of contracting a health problem and receiving influenza immunizations, having preventive visits to the dentist and making appointments for health maintenance or well child visits. Studies have shown that people are more likely to comply with suggestions from health care providers when they believe that the recommended action will enable them to prevent, detect or treat diseases (Mikhail, 1981).

HYPOTHESIS I - SUSCEPTIBILITY

Each disease will be discussed in relation to the hypotheses so that the reader will get a more in-depth understanding of some of the controversies concerning immunization practices in the United States today. The diseases that will be considered are: diphtheria, tetanus, and pertussis (whooping cough), poliomyelitis, measles, mumps and rubella (German measles). The immunizations given are often combined into DTP for diphtheria, tetanus and pertussis, polio, and MMR for measles, mumps and rubella.

Parents who choose to immunize their children according to the recommended schedule believe that the child is more susceptible to the disease than do parents who do not immunize on this schedule. Some parents feel that the disease is no longer prevalent so that there is not a need to immunize their child but the following discussion demonstrates that these childhood diseases would be more common if children were not immunized in infancy.

Diphtheria, an upper respiratory disease, is the only bacterial disease of major significance that has become a rare disease by active immunization on a mass scale. The

incidence of diphtheria began to decline in the U.S. around 1900 due in part to the result of improvement in living conditions and an increased economic status of the population. This decline was accelerated in the 1920's with the introduction of large scale programs of active immunization. In Baltimore, for example, the diphtheria rate was 260 per 100,000 in 1900, 124 per 100,000 in 1925 and 0.0 per 100,000 in 1960 (Hodes,1979). Even though natural changes in bacterial-host relationships also added to this result, the major impact is due to the development of an effective vaccine.

The incidence of diphtheria is greater in girls but the case fatality rate is greater in boys because they are more likely to develop laryngeal diphtheria than are girls and this type of disease has a very high case fatality rate (Hodes, 1979). Most parents opt to get this vaccine either as a combined DTP or pediatric DT. Rarely does the diphtheria part of the vaccine cause side effects.

Tetanus is caused by clostridium tetani which is found in the soil, in animal and human feces, in house dust and in contaminated street drugs. The incidence of tetanus is inversely related to socioeconomic conditions and is found in many underdeveloped countries of the world. In March 1977, the World Health Organization and the Bangladesh Ministry of Health conducted a morbidity and mortality

survey and found that 78% of all cases of tetanus were in children less than one year of age (Stoll, 1979).

In 1965 the Center for Disease Control made tetanus a reportable disease. Between 1965 and 1977 there were 2,019 cases reported. Most cases in the U.S. occurred in unimmunized or partially immunized individuals especially infants during the neonatal period. Other groups similiarly affected were the elderly and drug addicts. Immunizations are aimed at children and military personnel. While mortality from tetanus has decreased continually over the past seventy years, mortality among adults has not had a significant change since 1950 (Stoll, 1979).

Pertussis is an acute respiratory infection which can affect any age group but is most common and most serious in young children. It is caused by the bacteria bordetella pertussis and is one of the most contagious diseases. Pertussis disease has been known since the 16th century yet controversy still continues regarding optimal prevention and management. Attack rates of 97-100% have been noted in susceptible populations. Risk of the disease is highest in young children but the mortality is greatest in babies less than a year of age (Behrman & Vaughan, 1983). Pertussis is not seasonal and occurs more frequently in females than males. There is a substantial underreporting of cases in this country.

Leibel (1984) stated that in the 1930's there were over 250,000 cases of whooping cough in the United States resulting in 9,000 to 12,000 deaths annually. Great Britain omitted pertussis as part of the DTP because of reactions and there was a major epidemic of pertussis in the late 1970's. In 1958-1974 75% of the population elected to have their child receive DTP vaccine. By 1976 it dropped to 40% and by 1978 it was down to 30%. In 1974-75 there were 25,135 cases of pertussis. From 1977-79 there were 99,438 cases (Cody, 1979). About the same time two children died in Japan as a result of the DTP vaccine. After its withdrawal from the market, it was followed by 35,000 cases of the disease and 118 deaths over a five year period (Leibel, 1984; Cody, 1981). According to Katz (1976) in 1974 there were 2,402 cases of pertussis in the U.S. with 14 deaths. There were 272 cases of diphtheria with five deaths and 101 cases of tetanus with forty-four deaths. In 1982 there were 1,895 cases of pertussis with an increase in 1983 of 2,463. Over 50% of the cases occurred in babies less than a year and an additional 24.5% in children one to four years of age. While seizures occurred in 1.9%, 76% of these cases were in babies less than a year of age. Of the children between seven months and a year who contracted pertussis, 66% of them had received less than three doses of DTP (CDC, Oct 1984). In contrast a study reported in Pediatric Alert "Pertussis

Surveillance" states that 78% of children exposed to pertussis who have received at least three doses of the vaccine will be protected.

A letter to Massachusetts physicians dated April 1986 regarding a pertussis alert states there were 49 confirmed cases of pertussis in 1985 in this state. This is twice that of 1984. The clients ranged from 6 months to 53 years with the average age of 5 years. Approximately 60% of the children were less than 2 years of age. It is interesting to note that 55% had age appropriate immunizations! Although there were no deaths, 56% of children with pertussis required hospitalization. Pneumonia occurred in 15% of the children. One person had seizures, one had encepholopathy, and 2 had encephalitis following the disease. Ten out of fourteen counties in the Commonwealth of Massachusetts reported cases of pertussis in 1985. Most were from southeastern Massachusetts. Over 50% were from Plymouth, Norfolk, Bristol and Barnstable counties. Worcester and Middlesex county had 27% (Mafenson, 1986).

Polio is a virus as compared to the bacteria of diphtheria, tetanus and pertussis. This particular virus occurs only in man and is spread from person to person by the fecal-oral route and possibly by oral-oral route. In temperate climates, the peak incidence is in the summer and early fall (Krugman, 1977).

Two types of vaccines are available for control. The Salk or killed vaccine (inactivated polio vaccine) IPV or the Sabin or Trivalent oral polio vaccine (TOPV). Before the advent of the Salk vaccine in 1955 there were 18,000 cases of polio the previous year. This was reduced to twenty in a five year period from 1973-1978 (Advisory, 1979). Dunn (1985) cited 15,100 cases in 1956 and stated that the rate was down 48% from the previous year. Fulginiti (1980) saw fewer cases than Dunn.

Another controversial question is whether to give oral polio vaccine. This decision should be made at the same time as the DTP decision because the two vaccines are given simultaneously at two months of age. Polio is now an infrequent disease due to mass immunizations. In 1951-1955, the years preceding the introduction of the inactivated polio virus vaccine (IPV) 79,112 cases of paralytic polio were reported. In 1956-1960 when only IPV was available, 21,401 cases were reported with a consistent decrease to (7,911 cases in 1956 to 2,218 cases in 1960). There were further reductions after the introduction of live attenuated oral polio virus vaccines (OPV) from 1961 to the present. Only 111 cases have occurred between 1969-1974 (Fulginiti, 1976).

The CDC (Dec. 1984) reports a provisional total of 2,322 cases of measles in the U.S in the first 39 weeks of 1984. This is an incidence rate of 1 per 100,000

population and is an 84.3% increase from the 1,260 cases during the same period in 1983. A report by Mc Cormick (1977) describes an epidemic of 71 cases and 3 deaths on Indian reservationsin North and South Dakota. In 1984 twenty-nine students and their families at Dartmouth College contracted measles. Between January 15 and February 9, 1985 there were twelve confirmed cases among college students at Ohio State University (CDC, Feb. 1985). In March of 1985 there were outbreaks at Boston University and Principia College in Illinois but none were reported in Western Massachusetts (Markishima, 1985).

In the first four months of 1985, there were 2,704 cases of measles in the United States. Ten to fourteen year olds had a greater incidence in 1984. In 1985 the risk was greatest in the fifteen to nineteen year olds followed by preschoolers (MMWR, Jan 1986).

There is no treatment for measles itself and control lies in the protection by immunization with live measles vaccine after fifteen months of age. Maternal antibodies are still present prior to this and interfere with immunity.

Mumps is a generalized disease characterized by swelling of the salivary glands. The infection is more common in the late winter and early spring. It affects males 3 to 5 times more often than females.

Mumps vaccine seems to have been given lower priority than the other childhood disease vaccines. Mumps is responsible for less morbidity than the other diseases and no significant mortality. Mumps vaccine was developed in 1968 shortly after measles vaccine. More than 65 million doses of mumps vaccine have been given in the U.S. in the past seventeen years (CDC, Sept. 1984).

During the first 37 weeks of 1984, there was a provisional total of 2,112 cases of mumps down 13.5% from 2,443 in the same period in the previous year (CDC, Sept. 1984).

In 1985 there were a total of 2, 886 mumps cases in the United States. This is the lowest number since mumps became a reportable disease in 1968. There is a 98.1% decline since 1968. The greatest incidence presently is in the school age population, namely five to nine year olds (MMWR, April, 1986).

Rubella or three day measles became a reportable disease with the CDC in 1966. Rubella is a mild systemic viral illness. Since the rubella vaccine was licensed in 1969, over 123 million doses of the vaccine have been given in the United States. The rate of the disease is down by 90%. The 1983 incidence rate of 0.4 cases per 100,000 population is a 54% decrease from the previous low incidence rate in 1981 of 0.9 per 100,000 and a 98% decrease from 1969 (CDC, Sept, 1984).

Controversy over the most appropriate use of the rubella vaccine has been going on since the vaccine became available in 1969. Since the 1964 epidemic plus the availability of the vaccine and prior experience with measles vaccine, it was easily anticipated that the rubella vaccine would be equally successful. Another major outbreak of rubella was expected in 1970-72 so there was some urgency to get the immunization program under way. Prior to the release of the vaccines recommendations were made jointly by the American Academy of Pediatrics and the U.S. Public Health Service Advisory Committees concerning immunization policies. They recommended large scale community-wide immunization of children and individualized immunization of women of child bearing age. The target population was 50,000,000 children in the U.S. Reasons given were:

1. An epidemic was expected in 1970- 72.
2. Congenital rubella was to be prevented based on the epidemic of 1964.
3. The principal group to be immunized was the five to nine year old group with the olderand younger children given less priority.
4. About 15% of women of child bearing age remained susceptible, because they had not had the disease in childhood.
5. Immunity among children especially five to nine

year olds would protect the susceptible women of child bearing age. Immunity among an unspecified, but large majority (about 80-90%) of all children would provide herd immunity.

6. Live attenuated rubella virus had the potential of producing fetal infection in a vaccinated pregnant woman.
7. Live attenuated rubella vaccine produced a low incidence of arthralgia in children but a much higher incidence of arthralgia was observed among adult women.
8. Immunization of young girls would provide life long immunity.
9. The vaccine was unassociated with a significant risk of transmissibility from the person who received the vaccine to those who were not vaccinated (Fulginiti 1976, p. 13).

What actually happened is that no epidemic occurred in spite of the fact that only 55.6% of children one to four and 64.9% of children five to nine years of age were vaccinated. This review of the child's susceptibility to the common childhood diseases supports the fact that those illnesses will occur if a child is not fully immunized.

HYPOTHESIS II - SERIOUSNESS

Parents who choose to immunize their children according to the recommended schedule believe that the disease is more serious should it occur than do parents who do not immunize their children according to this schedule. They realize that serious and complicated sequelae that can result from contracting the disease.

The advent of penicillin has significantly reduced the frequency of secondary bacterial complications of diphtheria, especially streptococcal infections. However, respiratory obstruction and death may occur suddenly in young children with laryngeal or tracheal dipththeria because of the diphteritic membrane occluding the airway. Edema of the neck may also obstruct the airway. Myocarditis can occur in even mild cases of the disease. Neurologic complications can occur affecting motor rather than sensory areas (Behrman and Vaughan, 1983).

Tetanus has an insidious onset with progressively increasing stiffness of the voulntary muscles, usually of the jaw and neck. Within twenty-four to forty-eight hours the trunk and extremities may become involved. Anything that excites the person may make them go into a painful spasm. Tetanus involves the respiratory muscles leading to respiratory distress, to coma and death (Krugman, 1977).

Stoll, (1979) stated that 27% of all infant deaths nationwide are due to tetanus.

Pertussis disease is divided into three stages: catarrhal, paroxymal and convalescent. The catarrhal stage lasts one to two weeks and appears to have the symptoms of a common cold. After about one week the dry hacking cough becomes severe and it begins to appear in paroxysms. The second or paroxysmal stage lasts four to six weeks but can last up to ten weeks. The number of paroxysms may be in groups but be as many as four or five to forty per day and subside only when the child is able to raise the mucus plug by vomiting. The convalescent state lasts two to three weeks where the cough is persistant but not as severe.

Erythromycin is the drug of choice in the treatment of the disease but must be started in the catarrhal stage to be effective. The most important measure in controlling this disease is universal immunization with pertussis vaccine. This is usually combined with tetanus and diphtheria as DTP, but is one of the vaccines that is most controversial because of the side effects.

Pneumonia, a serious illness especially in young children, accounts for 90% of the complications of the pertussis disease usually during the peak of the paroxysmal stage. Atelectasis is another common complication. Convulsions, tetany, and hemorrhages can occur especially in young infants (Krugman, 1977).

Abortive polio (minor illness) is described as starting abruptly and lasting a few hours to a few days. It is characterized by a sore throat, headache, fever, anorexia, nausea, vomiting , abdominal pain and general malaise. Nonparalytic or major illness has the same characteristics as abortive polio but may also be followed by a stiff neck back and legs. There is more fever and headache and the person feels sicker than with the minor type of the disease. Paralytic polio begins with the previously described symptoms. The patient may feel well for one to seven days but then the same symptoms return with increased severity. Paralysis may be the first sign of major illness and may start in one to two days following the return or symptoms. Muscle pain may or may not be felt. If it is present, it is most common in the back and legs. Weakness often develops gradually before paralysis is fully noticeable. The legs are more often affected than the arms. Respiratory paralysis may appear quite late in the disease (Krugman, 1977).

Bulbar polio affects the cranial nerves rather than the spinal cord. This is a less common form of the disease and one usually recovers completely. (Krugman, 1977).

No antibiotics are effective against the disease and treatment of the less severe types are supportive. Bulbar or paralytic polio requires hospitalization to maintain an airway and prevent skeletal deformities (Behrman & Vaughn, 1983).

Measles is an acute infectious disease characterized by three stages. There is an incubation period of about ten to twelve days when there are few if any symptoms. The next stage has Koplik spots in the mouth and also is characterized by fever, coryza, conjunctivitis, and cough. The last stage has a maculopapular rash covering the whole body and is accompanied by a high fever (Behrman & Vaughn, 1983).

Complications of measles involves otitis media (ear infections), mastoiditis, pneumonia and acute encephalitis. Subacute sclerosing panencephalitis (SSPE) is a late but serious consequence of measles disease or vaccine and occurs in one out of 100,000 cases. It can occur from one to seven years after the viral infection of measles (Krugman, 1977). Modlin, (1979) reports that SSPE is two to three times more frequent in boys than girls, has a higher incidence in the southeastern states and is more common in rural areas.

Characteristic symptoms of mumps are fever, muscular pain especially in the neck, headache and malaise. The parotid glands swell with involvement of one or both glands (Krugman, 1977).

Complications of mumps is meningo-encephalitis. This can occur in 250/100,000 cases. The mortality rate is about 2%. Mumps is one of the most common causes of aseptic meningitis. Orchiditis occurs in 14-35% of adolescent or adult males. Thirteen percent may have impairment of fertility but sterility is rare. Mumps can also affect the kidney, the thyroid gland and the heart by causing inflammation of these organs. Mumps is considered a leading cause of unilateral nerve deafness. Hearing loss may be transient or permanent (Behrman & Vaughn, 1983). There is no specific treatment for mumps.

In 1964, a major outbreak of rubella changed the perception of the disease. It was formerly regarded as a mild benign disease of childhood but was found to produce significant congenital malformations especially if contracted in the first trimester of pregnancy. There were 20,000 deformed children born with this disease in 1964 (Fulginiti, 1976).

Rubella is associated with an erythematous maculopapular rash and lymphadenopathy. Arthritis and arthralgia are more common in adults. The disease has serious sequelae in pregnant women, especially in the first

trimester. Infants with congenital rubella are often small for gestational age and may be deaf, have cataracts, jaundice, purpura, enlarged liver and spleen and have cardiac problems (AAP, 1982).

HYPOTHESIS III - BENEFITS

Parents who choose to immunize their children according to the recommended schedule believe that the benefits of the immunizations outweigh the risks of the vaccines more than do parents who do not immunize on this schedule. Benefits to immunizations are alluded to under susceptibility and seriousness of the diseases.

Probably the most controversial disease under discussion is parents having to decide whether their baby should receive the pertussis vaccine. Parents are expected to make a choice when the infant is only 2 months old. This is at a time that many parents worry about SIDS (Sudden Infant Death Syndrome) and rightfully so because most cases of SIDS occurs in infants under 6 months of age which is the time that the initial series of DPT's are offered.

The American Academy of Pediatrics (Mayk 1985) stated that there is a temporal association between DTP and SIDS because many non vaccine associated neurological diseases first occur in the first year of life. This does not mean that DTP causes SIDS; in fact SIDS is less likely to occur in immunized children. The 20/20 program that aired on TV on February 5, 1985 implied major differences in Great

Britain and the United States in the starting age to receive the vaccine. The program stated that the DTP was started at six months of age in Britain compared to two months of age in the U.S. There is no evidence to support that the incidence of reactions is decreased when the vaccine is first administered at six months rather than two months of age. Infants less than six months who develop pertussis have a higher morbidity and mortality. Britain conducted what is known as the British National Childhood Encephalopathy Study (NCES) to determine side effects of the vaccine. A study done at UCLA determined the relationship of common side effects with DTP while the NCES study investigated only rare severe neurological reactions. Convulsions and collapse episodes occurred in one in 1,750 doses in the UCLA study but on follow up there was no persistent neurological deficit. This is an extremely important fact that most parents seem to overlook.

Polio vaccine comes in two types. The Salk, or killed injectable was introduced in 1955. It has worked well and is still used on a regular basis in some foreign countries today. The Sabin (oral vaccine) was introduced in the 1960's and is the type (Trivalent, Types I, II and III.) used in the United States today. It is not without controversy, however, because it can cause paralytic polio in a small number of cases, 1 in 8.1 million doses of OPV,

whereas the killed vaccine will not (CDC, 1984). This is the statistic that many parents remember and they cannot conceptualize that if their child got the disease the incidence of paralysis would increase markedly.

The full primary vaccination with OPV given at two months, four months and eighteen months will produce long lasting immunity to all three polio virus types in more than 95% of the recipients. Most people are protected after a single dose. In 1969-1978 there were 242 million doses of OPV given and 76 cases of paralysis associated with the vaccine.

The shift from killed to live virus occurred because the OPV is easier to give and administer on a large scale. The oral vaccine is believed to confer quicker and more lasting immunity than the inactivated vaccine. Another point to consider is the potential efficacy of IPV and OPV in eliminating wild virus form the U.S. population. This is known as the herd effect. This decreases the incidence of the disease in the non immune sector once a certain percentage of the population is immunized. The U.S. is a mobile population and has several health care systems. OPV is more widely accepted. It is thought that it provides a better barrier to the spread of disease to non immune people (Fulginiti, 1980).

The OPV vaccine is recommended by the Immunization Practice Advisory Committee of the CDC, the Committee on Infectious Diseases of the American Academy of Pediatrics and a Committee of the Institute of Medicine, National Academy of Sciences (CDC. Nov. 1984). People in this country should be fully informed and be able to make a choice. Arguments for use of the IPV include its proven efficacy in the U.S. when it was the only vaccine available and experience in Scandinavia where only IPV has been used with 90% of the population being immunized. In this population neither paralytic polio nor wild virus has occurred (Fulginiti, 1976).

The current measles vaccine produces an antibody response in at least 95% of the recipients. The vaccine has been available since 1964 but was perfected in the early 70's. A fifteen year follow-up of vaccinees has revealed the persistence of an antibody (AAP, 1982). This vaccine is usually given as a combined MMR, measles, mumps, rubella). The controversy here lies in giving a combined vaccine when some people feel that a child should get the natural disease of mumps or rubella.

Inactivated measles vaccine became available in 1964 and was given at twelve months of age. On exposure to natural measles some children previously innoculated with inactivated measles virus vaccine have had atypical measles (Krugman, 1977). A live attenuated vaccine became

available in 1969 and the measles vaccine was combined with mumps and rubella vaccine in 1971. In the mid seventies it was discovered that there were still some maternal antibodies present and the vaccine was probably not as effective. There was a mass immunization program in the spring of 1977 to reimmunize everyone who had received the vaccine before fifteen months of age. The current practice is to immunize at fifteen months but not to reimmunize if the measles vaccine was given over one year of age unless the child had not received either mumps or rubella vaccine, then the MMR should be given.

Many cases of measles are preventable. The greatest emphasis should be to vaccinate at fifteen months and be certain to have received the vaccine by school entry. College students are at high risk for the following reasons:

1. Many college-aged students may have missed measles vaccine in the first years after licensure of vaccines.
2. College students tend to congregate in large groups such as dormitories, fraternities, sororities, social and sports events.
3. Many colleges and universities lack immunization requirements.

In May of 1983 the American College Health Association adopted a preadmission immunization policy recommending by September of 1985 colleges and universities require that all students born before 1956 present proof of immunity. Similar recommendations were made in 1980 by the Advisory Committee on Immunization Practices of the CDC (CDC, Feb. 1985).

Control of mumps lies in prevention of the disease by administration of live attenuated mumps vaccine. More than 90% of persons susceptible develop an antibody after a single dose. The antibody is present for at least twelve years after administration of the vaccine and the immunity may be lifelong. Live mumps virus vaccine can be given alone or in the combined MMR. It may also be given at the same time as the DTP and OPV if necessary. The vaccine is usually given at fifteen months of age but if not done at the scheduled time should be done before puberty.

Antibodies to mumps appeared in 95% and protection was given on exposure to wild virus for a short period. Since then the following findings have been discovered: antibody levels are much lower following the vaccine than those observed after natural disease, and antibody titers tend to decrease with time to low levels but one must note that immunity seems to persist in spite of the low levels.

There are few side effects to rubella vaccine given in infancy except for slight fever and mild rash. The CDC and AAP and Fulginiti (1982) still recommend immunization at fifteen months, support school immunization laws, and recommend searching for non immunized adolescents.

HYPOTHESIS IV - BARRIERS

Parents who decide to immunize their children according to the recommended schedule differ from parents who do not in their perceptions of the barriers to receiving the recommended vaccines.

Clinical immunity to tetanus depends on the presence of a circulating antibody. Therefore, prophylaxis should be achieved by active stimulation of the antibody or passive antibody transfer as a combination or both. However, the active immunizing agent has a formaldehyde base (Harrison, 1980). Active immunization is the best means of control and should be given with the diphtheria and pertussis vaccine at two months of age. Adults should receive boosters of tetanus and diphtheria vaccine every ten years unless there is a bad injury; then it should be within five years (Report Comm, 1982).

DTP, namely the pertussis component, has side effects. These include redness at the injection site with or without tenderness, malaise and slight to moderate fever and increased fussiness. Some reactions are severe and if these occurred would by a definate contraindication to receiving the pertussis vaccine again. These are as follows: convulsions, with or without fever, encephalitis, excessive somnolence or persistent crying for more than

three hours duration and a temperature greater than 105 degrees F (40.5 C). (Report Comm, 1982, 1986) (Advisory, 1984). The immunization should be deferred in a child who has had a seizure before the DTP series was begun or develops a seizure before the four dose primary series is given. The risks versus the benefits of the vaccine must be weighed in administering the pertussis vaccine to children with neurological disorders. Usually non progressive neurological diseases are not contraindications such as cerebral palsy or developmental retardation (Report Comm., 1982, 1986).

Pertussis is a severe disease expecially in early infancy with marked morbidity and mortality in this age group. However, despite more than thirty years of experience with pertussis immunization, the reasons one recovers from an acute infection and subsequent immunity are still uncertain. According to Fulginiti (1976), 45-95% of those who receive pertussis vaccine are susceptible to pertussis twelve years later. Barkin (1979) agrees with these figures. Studies show that pertussis virulence was declining before the advent of the vaccine and that the incidence continued to fall both before and after the vaccine was introduced.

Cody (1981, p.651) did a prospective study of 15,752 doses of DTP and 784 doses of DT given to children 0-6 years. He compared the minor reactions associated with each. They are as follows:

symptoms	DPT	DT
local redness	37.4%	7.6%
swelling	40.7%	7.6 %
pain	50.9%	9.9%
fever	31.5%	14.9%
drowsiness	31.5%	14.9%
fretfulness	53.4%	22.6%
vomiting	6.2%	2.6%
anorexia	20.9%	7.0%
persistent crying	3.1%	0.7%

There were 9 convulsions, 9 developed hypotonic hyporesponsive episodes (collapse). There was, however, no sequelae.

Barkin (1979) did a similar study where 7% had no reaction, 53.6% had a fever and 81.8% showed behavioral changes while 72.2% had local reactions. It is not surprising that people question the safety of the DTP vaccine when there are reactions even if there is no permanent damage.

The NCES study found the incidence of permanent neurological damage one year after administration of the vaccine to be 1 in 310,000 doses of DTP. For some people this is too much of a risk for parents to want the vaccine for their child..

As mentioned previously, over a nine year period out of 242 million doses of OPV given there were 76 cases of paralysis associated with the vaccine. Eighteen were in vaccine recipients, 47 in health care contacts and 11 in people with immune deficiency disorders (Advisory 1979). In June 1984, 21 cases of paralytic polio were reported to the CDC during 1982-1983. All cases were vaccine related (CDC, Nov., 1984). There have been no vaccine related injuries with the inactivated vaccine.

Problems with the inactivated vaccine are the need for five injections versus four oral doses of the live vaccine. The killed vaccine is not as quick acting and it is questionable as to whether it gives lasting immunity.

There are no barriers to the measles vaccine except for a rare instance of SSPE but this can occur much more readily with the disease itself. The measles vaccine, however, is commonly combined with the rubella and mumps vaccine.

The concept of herd immunity occurring if 75-80% are immunized is not true with rubella vaccine. In several studies even if 80-90% are vaccinated, it has not prevented

the nonvaccinated people from being susceptible. Available evidence now is questioning whether immunizing a child at fifteen months will protect a woman through her child bearing years (Fulginiti, 1976).

Several countries have adopted the policy of immunizing women of child bearing age. Precautions must be observed. Lack of pregnancy at the time of immunization and for two months afterwards is imperative. Adults must also be given adequate warning of the expected athralgia and arthritis which can occur (Pajares, 1984). It is not surprising that parents question not only the safety but the efficacy of some of these vaccines.

HYPOTHESIS V - EXTERNAL FACTORS

Parents who choose to immunize their children according to the recommended schedule are more positively influenced by external and internal stimuli than are parents who do not follow the recommended schedule. These factors appear to play a major role in parental decision making. Worrying about health matters was found to be positively correlated with preventive health behaviors. According to (Lenz, 1984), it is common for people to search for health related information. But in spite of the clients desire to obtain information related to health beliefs, they often perceive that they are not successful in getting the information that they need especially from health care professionals who may have erroneous ideas of what and how much people want to know! Most clients go through the following decision making process by:

1. Identifying the problem to be solved to achieve a goal.
2. Gathering information.
3. Evaluating and weighing options.
4. Choosing an optimal alternative.
5. Taking action to achieve a goal (Lenz, 1984).

Worrying about health matters as a measure of health motivation was found to be positively correlated with preventive health behavior. Use of the mass media and information from health workers has influenced people to take action (Mikhail, 1981).

Immunizations are one of our most basic parts to preventive medicine. Yet we do not know all we should about their efficacy. There are two types of groups who have control of vaccines. Governmental agencies are responsible for permitting experiments, assessing their results and licensing the vaccine. The second type of influence are advisory committees such as the Committee on Infectious Diseases of the American Academy of Pediatrics and the Advisory Committee on Immunizations Practices of the U.S. Public Health Service, The Council on Environmental Health of the American Medical Association as well as the Center for Disease Control (Fulginiti, 1976). Fulginiti (1976) wrote an article on major controversies in immunization practice. The major topics that are relevant to this paper that he discusses are:

1. Is pertussis vaccine effective and safe?
2. Should inactivated poliovirus vaccine be reintroduced in the U.S?
3. Should combined viral vaccines be developed, used and encouraged?
4. Should mumps vaccine be as widely administered

as it now is?

5. Should rubella vaccine be given routinely?
6. How safe are childhood immunizations?
7. Should prior, informed consent be required for each immunization procedure?

Ten years later unfortunately only the last question has been resolved but the vaccines are recommended by these agencies for reasons given under susceptibility and seriousness of the diseases should it occur.

There had been a program on the Today Show in 1982 discussing immunizations but the controversy seemed to come to a peak in this country with the ABC program 20/20. The program alluded to the fact that in addition to local reactions and fever there were significant hazards associated with the vaccine from neurological impairment to Sudden Infant Death Syndrome (SIDS). Material was presented by lawyers or parents of affected children. The group calls themselves DPT "Dissatisfied Parents Together". Also the program said risks were understated by the CDC (Center for Disease Control) (Network, 1985).

According to an article in Pediatric Alert on February 14, 1985, the 20/20 program was a disservice to the parents who watched it. The program presented little in the way of new or useful information. The report repeatedly mixed concerns over minor reactions with concerns over serious ones. The most disturbing allegation was linking SIDS as a

result of the vaccine. The National Institute of Health Study examined the rates of DTP reactions in controls as well as infants who died from SIDS and found no support for the hypotheses. In fact, SIDS is less likely to occur in babies who had DTP vaccine (Haggerty, Feb., 1985).

Since immunizations are mandated for school entrance in all fifty states, there has been an injury compensation program started to recognize the public's responsibility for serious injury that occasionally follows administration of vaccines. This would be awarded even if the parents gave full informed consent (Smith, 1981).

According to an article in the American Nurse, September, 1986, there has been a political movement toward a compensation plan which would be supported by the U.S. Treasury to pay damages for all vaccine related injuries sustained anywhere in the country in a publically supported immunization program. The ANA, American Nurses Association, the AAP, American Academy of Pediatrics and the APHA, American Public Health Association have supported a vaccine injury compensation program. A bill HR 5184 was introduced by Rep. Henry Waxman D. California to create a no fault compensation system for victims of injuries from the vaccines (Vaccine, 1986).

On November 14, 1986, President Reagan reluctantly signed the bill to support legislation to compensate the 50-75 children injured each year by the vaccines against

childhood diseases. There cannot be compensation for these children until Congress passes and President Reagan signs into law a bill to finance the program. This debate as to who will pay will allow critics a chance to seek changes in the law to help stop a threatened vaccine shortage and decrease the sharp rise in prices due to increased liability costs (Daily Hampshire Gazette, Nov. 29, 1986).

Two out of three major commercial companies stopped making the DTP vaccine in 1984. They are Wyeth and Connaught, Inc. Lederle is the only private manufacturer of DTP vaccine. Although they increased their product to meet needs, some recent lots failed to meet the manufacturers requirements for release. It was announced that no new lots would be available until February 1985. Beginning in January 1985, supplies would be limited and some areas may be without DTP vaccine. It was thought that the situation might continue through most of 1985. To minimize risks, the U.S. Public Health Service offered two options. One would be to reduce the amount of vaccine given per dose; the other is to postpone one or more doses. Since immunity cannot be predicted from partial doses, it was decided to postpone part of the schedule. Their figures stated that the first three doses provide protection in 70-90% of recipients. Therefore, it was decided to postpone the eighteen month and/or preschool booster (U.S. Dec. 1984). This was not a problem in

Massachusetts because the DTP vaccine used in this state is manufactured by the Department of Public Health.

Some manufacturers, as has already been mentioned, have stopped making the DTP vaccine because of the litigation. DTP vaccine is made for Massachusetts at the state biological lab which is part of the Department of Public Health. There have been several suits in Massachusetts because of problems with DTP. Some private physicians from Western Massachusetts have requested that it be given only by public health clinics. People are sueing because they feel that they have not been fully informed regarding the risks and that the vaccine has been given in spite of parents stating there have been previous reactions. Health care providers in Massachusetts have been advised that the charts reflect that the parents have been instructed in the risks and have signed a statement that they have been so advised.

Most magazines that young parents read today have advocated the continuing of childhood immunizations on the present schedule. Jean Caldwell (1985), in American Baby, articulately discusses the risks of pertussis disease. She feels that since most young mothers have no experience with the disease, they may be reluctant to have their baby get the injection. Articles in Parent's Magazine and Changing Times were in favor of immunizations and told parents what the schedule should be and what to do if their child were

behind schedule. Complications were discussed frankly but benefits versus risks were stressed (Pomeranz and Schulty, 1980; Pomeranz, 1982; Pomeranz 1983).

A similar article appeared in Ladies Home Journal (Mohler, 1984) as well as Science News (Herbert, 1982). The magazine which seemed to question the safety and efficacy and necessity of child immunizations the most was Mothering magazine. Robert Mendelsohn is a physician who writes a nationally syndicated column, "The People's Doctor". In an interview, he stated that "immunizations have lost their glamour".

Because of the literature available, people question whether immunizations destroy one's natural immunity. They wonder why the manufacturers won't guarantee that the vaccines are safe. A person should not submit their child to unnecessary and "poisonous" vaccines when no one is willing to offer a money back guarantee (Girdwain, 1979). Several parents have written articles on the need to immunize therir child "just in case". They feel that we must consider the incidence of the disease along with people's nutrition, sanitation and housing. The questions asked were: Does it make sense to inject a disease into a healthy body "Just in Case?" and do we have to make ourselves sick in order to avoid sickness (McMahon, 1979; Rutledge, 1979; Savage, 1979; Lander, 1981)?

Even some physicians (Maskowitzk, 1984) question whether the decrease in disease is due to the vaccines. Time was given in this magazine for pro immunizations. One article described the outbreak of polio among the Amish people who live "pure" lives (Brown, 1980; LaCerva, 1979; and Buttram, 1983). Several physicians wrote articles in Mothering magazines on the dangers of the diseases and considered immunizations as another useful tool in any plan to maintain health.

Halper (1981) describes a naturopaths views on immunizations. Their emphasis is on strengthening the individual's resistance to disease. There is much less emphasis on the presence of absence of pathogens. Injecting antigens is an abnormal form of exposure and an invasion of a person's defenses.

The reader can see that outside factors certainly influence a persons decision. What was not found in the literature is the impact of health care providers, relatives, and friends have on decision making. People seem more skeptical of the immunizations since they must now read the fact sheet and sign an informed consent form.

DEMOGRAPHICS

Demographic variables have a major impact on decision. The parents age, level of income and level of education all influence decision. What was not found in the literature and yet seems to play an important role is the age and sex of the child.

(Becker, Radius, Rosenstock, Drachman, Schuberth, Teets 1978)) in their research on compliance with a medical regime for asthma found that mother's perceptions of the threat of an illness especially the child's susceptibility to the illness and the seriousness of getting the illness whether related to asthma or not and of difficulties with administration of the medicine were good predictors of adherence to a regime. They also found that adherent mothers were more skeptical of yet more dependent on a physician for medical care in lieu of caring for the problem themselves with their experience with the condition. Mother's compliance with medical regimes were determined only by her marital status and level of formal education. Yet another article by (Becker, 1972) showed age and marital status as useful predictors of compliance. The mother's level of education was significantly related to only "learnable" aspects of compliance.

Steele and, McBroom, (1972) found that health behavior has a low positive association with SES but this relationship changes with the distance from the persons usual source of medical care and the recency of an illness. Evidence suggests that health beliefs are in part a function of income. There is little relationship between income and seeking care for illness. The chance of a family having contact with a physician during a twelve month period increases with income. Those people with a higher SES are more likely to get preventive health care, including health insurance, having physicals and eye exams and partaking in other health related behaviors. In this research SES was measured by family income, occupational prestige of the head of the household and the level of education of the dominant woman in the household. Occupational prestige of the household head was discovered to be the weakest indicator of the likelihood of engaging in preventive health action but education of the dominant woman is an important indicator (Steele et al, 1972).

The poor, especially children, received less health services relative to need than the affluent. Results of a study by Dutton, (1978) showed that neither financial access nor health education without better improvements in the delivery systems will eliminate income differentials that are in use. The poor usually chooose out patient departments and hospital emergency rooms in contrast to

prepaid health plans which are used by more mid to upper class people. Many health care systems are still illness versus health orientated, More well known barriers to the utilization of preventive services were reinforced by alienation, including feelings of powerlessness, hopelessness and social isolation (Bullough, 1972).

Selwyn, (1978) demonstrated that non users of health services often lacked knowledge about the reasons for immunizations. They also were unfamiliar with how to stop a contagious disease. Non users of health services rarely read newspapers.

The overall rate of completion for the minimum basic series (three DTP and three OPV plus the MMR by age two) was 72.5%. Overall there is a greater completion rate with a higher SES. More white are more likely to complete than non white but there is no association with race (white versus non white) in the same SES (Failure, 1979). Children from metropolitan areas have a higher rate of completion than those from rural areas.

SUMMARY

A study by Aho, (1979) researched, using the health belief model, participation of senior citizens in the swine flu innoculation program. In 1977, 122 subjects were randomly selected and interviewed regarding their attitudes toward this program. This was a retrospective study but the participants were questioned regarding the efficacy and safety of the vaccine, knowledge of side effects, experience with previous flu shots, and their experience with relatives and friends who got the innoculation. Their future plans for flu innoculations and other innoculations were explored. Many people who refused to have the innoculation cited the following reasons for declining: they had fears and doubts about the effectiveness and safety of the shot and whether it had side effects. Others have shown that external barriers to compliance are: time, money, physical distance from the treatment center and the organization of the medical services. It is beyond the scope of this paper to also explore these variables.

While there are still many controversies facing the immunization issue today, the overwhelming reports in the scientific review of the literature still support immunization programs. People need to have explicit information and be fully informed before a vaccine is

administered. To achieve this we need support from both the public and private sector. Vaccines still remain one of the greatest bargains of health care. The total cost to fully immunize a child is $10.00 (Hinsman, 1983).

As a result of immunization programs there has been a decrease in disease associated complications, sequelae and death. Without such programs, disease costs would have been 1.4 billion. The incidence of disease and costs in 1983 were 14.5 million. The expenditure for immunizations including the vaccine totaled 9.6 million. The benefit cost ratio was 14:1. (White, Koplan, Orenstein 1985).

Progress is being made to increase the public awareness of the importance of childhood immunizations. Maternal education programs are stressing that all new mothers receive information on immunizations before leaving the hospital (Slack 1982). By 1990, it is hoped that 95% of our school children will have proof of their full immunization status.

CHAPTER III

METHODOLOGY

INSTRUMENTS

1. A five page questionnaire given to parents which will obtain information on:

   a. Demographic parameters.

   b. Knowledge of facts regarding: diseases and risks and benefits of immunizations.

   c. Factors influencing parental decisions regarding the seriousness and susceptibility to the diseases of diphtheria, tetanus, pertussis, polio, and measles mumps and rubella versus the benefits of the vaccine in relation to the barriers of receiving the vaccine or contracting the illness. The format and some of the questions for the parental questionnaire were taken from Dr. Victoria Champion's research (Champion, 1984).(see Appendix A).

2. A brief health care provider questionnaire to be completed by the nurse practitioner or physician seeing the baby. (see Appendix B).

PROCEDURE

This is a descriptive study to determine what factors and attitudes affect parental decisions regarding immunization of their children. A pilot study with five subjects will be done before the study begins in order to check the instruments and procedures. The purpose is to see how smoothly the research will be conducted and whether the information that is given is understandable by all participants.

A convenience sample will be used in choosing subjects for the study. One hundred subjects will be selected from among those parents who bring their children to Amherst Medical Associates at 170 University Drive in Amherst, MA for pediatric care from 8 AM to 5 PM on weekdays. Data will be collected over a six week period from February 15, 1987 to April 1, 1987. Every parent who brings their child to Amherst Medical pediatrics for a 2 month, 4 month, 7 month, 11 month, 15 month or an 18 month well baby visit will be told by the receptionist about the study when they check in and asked if they would like to participate.

If the parent agrees, the packet that the receptionist will give the parent will contain a cover letter, a five page questionnaire and two consent forms as well as an envelope marked with the researchers name on it. An index card will also be included and is to be completed by the

parent with their name and address if they would like a summary of the research. In addition it will contain the fact sheets on DTP, Polio, and MMR as well as the sheet on fever. Each packet will be numbered to correspond to the provider questionnaire which the receptionist will tear off and place on the child's chart. Since the parent and provider questionnaire will have the same number, the researcher will be able to distinguish between the number of people who were asked to participate and the total population who actually took part in the study.

Parents will only be asked to participate once at either the 2 month, 4 month, 7 month, 11 month, 15 month or 18 month visit. All of the questionnaires are the same so as to facilitate simplicity in administration. If the parent prefers not to participate, the receptionist will mark the questionnaire returned to them with the baby's age in the upper left hand corner and will write refused across the top page. Parents will not see this since the uncompleted questionnaires will be filed at the receptionists desk.

Parents will start filling out the questionnaire in the waiting room and will probably finish them in the examination room preferably before the immunization is given. The parents will be distracted by the baby crying after the injection and may not complete the questionnaire. If the parents are unable to complete the questionnaire in

the office, they may take it home and return it in the self addressed stamped envelope that is provided.

When parent and child are brought into the examining room, it is the nurses or aides responsibility to make sure that the parent has the fact sheets. (see Appendix DTP, Polio, MMR and fever). Nurses, nurse practitioners and physicians are responsible before giving the immunization to ask if there are questions. Nurses, nurse practitioners and physicians will have all passed the test on the immunization fact sheets. It is the providers responsibility to ask if there are questions and whether the child had any side effects from previous immunizations. The parents are expected to read the fact sheets before signing the Amherst Medical Associates consent form. The nurse makes certain that the parent has signed the office informed consent form before administering the vaccine.

Before parents leave the office, they will put the questionnaire in the provided envelope, seal it and give it to the receptionist who puts it in a manila envelope in her desk. If parents want results of the study they will drop the index card with their name and address at the receptionist's desk in the box marked for this purpose. The provider completes the brief questionnaire that is on the chart and puts it in the provided manila envelope to

keep in their desk. The researcher will collect all questionnaires (parent and provider) weekly.

**See appendices for:

1. Letter to parent (see Appendix C).
2. Consent form for research (see Appendix D).
3. Fact sheets for DTP, polio, and MMR, fever sheet and consent forms (see Appendixes E, F, G, H).
4. Amherst Medical Associates consent form (see Appendix I).
5. Victoria Champion's questionnaire (1984) (see Appendix J).
6. See quiz that all RN, NP and MD's take regarding vaccines (see Appendix K).
7. See handout on responsibilities of: receptionist, nurses, aides, nurse practitioners and physicians (see Appendix L).

Methods of Analysis

The parental questionnaire is divided into three parts. Part I has 36 questions which pertain to the health belief model and the five hypotheses to be tested. These will be assessed on a Likert scale of 1 to 5 with 1 denoting strongly disagree and 5 strongly agree.

Part II consists of 11 questions and is looking for factual information regarding the diseases and the vaccines. A true/false format is used to determine parental knowledge of diseases and vaccines and their complications.

Part III contains demographic information in the 11 questions to be circled or filled in. This will be explained in greater detail later on in this section.

The following questions will seek information regarding the first hypotheses which is concerned with parents'perception of the susceptibility to the diseases. They are questions: 1, 6, 11, 16, 19, and 21 in part I.

The following questions will be answered under the second hypotheses which questions parents' perceptions of the seriousness of the diseases. These are questions: 2, 7, 12, 17, 23, 24 and 33 in part I.

The third hypotheses or benefits to vaccines will be surveyed under questions 3, 8, 13, 18, 26 of part I.

Questions 4, 14, 27, 28 29, 30, 31 of part I will answer questions dealing with the fourth hypothesis which is parents' perceptions of the barriers of the immunizations.

The following questions are under the fifth hypotheses which is internal and external stimuli or factors affecting decision making. They are as follows under part I: 5, 9, 10, 15, 20, 22, 25, 32, 34, 35, 36.

The questions are worded in such a way as to make people not fall into a routine of being swayed in one direction. Therefore, some questions are in the positive and some are in the negative. For the purposes of analysis, they will be reversed so that they're all directed one way to test the hypotheses.

The dependent variable is whether parents immunize their child on the recommended schedule. The answer to this question is found in number 2 of the provider questionnaire.

The independent variables are how do parents perception of the susceptibility of the disease, seriousness of the the disease, benefits to the immunization, barriers to the immunization and internal and external motivating factors affect the decision.

There are 6 questions out of 36 (part I) related to parents' perceptions of their child's susceptibility to the disease. Of the 6 susceptibility questions, an average

will be taken. An example would be: 3.9 out of 1 to 5. This score would indicate a higher susceptibility versus a 1.2 which is a lower perception of susceptibility. Next all 100 subjects with susceptibility scores will be divided into two groups: those that immunize on schedule and those who do not. A t-test will be used to compare if those who immunize have a higher susceptibility score than low immunizers thus testing hypotheses 1. A t-test is often used to compare the means of 2 groups. (In this case the 2 groups are those that immuniize on the recommended schedule and those who do not). If the 2 sample means are far enough apart, the t-test will yield a significant difference, therefore, allowing the researcher to conclude that the 2 populations do not have the same mean and are therefore different from one another. (Huck, Cormier & Bounds, 1974).

A one tailed t-test is sensitive to differences in only one direction such as greater or less. A .05 level of confidence will be accepted. A two tailed t-test is sensitive to significant differences in either direction such as greater and less. In this case a .025 level of confidence would be accepted at either end of the bell shaped curve. In this research the hypotheses were stated as a one tail test but the computer was inadvertently coded to do a two tailed t-test. Therefore, to get the level of significance the probability must be divided by 2 (Polit,

Hungler, 1983). The only hypothesis that this makes a difference on is the Hypothesis IV related to barriers.

The same procedure and statistic will be used to test the next 4 hypotheses such as hypotheses II tests the seriousness of the diseases with the 7 above mentioned questions. Hypotheses III regarding benefits to the vaccine has 5 questions. Barriers to the vaccine will be tested with the 7 questions mentioned. External factors greatly influence decision with the 11 questions already mentioned. This hypotheses will be further divided and analyzed into categories which are: television influence, signing the consent form, newspaper articles, magazine articles, fact sheets given to parents, school requirements, discussion with a nurse, nurse practitioner of physician, other children and no side effects, experience with others, medical orders, experiences with the diseases and parental perceptions of improving their child's health.

These variables along with the quiz and the demographics will be tested using a X2 statistic which will be explained further on in this manuscript.

The true/false questions in part II are testing parents knowledge of the benefits and risks of the immunizations. These will be described in the final analysis.

In addition to the health belief model, other variables affect outcome such as the demographic information. This includes: age of the parents, marital status, religion, race, educational level of both parents, level of combined family income, age of this child, sex of this child and the number and ages of other children as well as the health status of this child.

To test these demographic variables a X2 statistic will be used such as: age of mother versus receiving the immunization yes or no. The chi-square statistic is computed by summarizing differences between observed and expected frequencies for each cell. This statistic is computed by comparing 2 sets of frequencies: those observed in the collected data and those that would be expected if there were no relationship between the 2 variables. A large X2 should indicate that the expected differed more from the observed than is expected by chance (Polit & Hungler, 1983).

The provider questionnaire consists of 7 brief questions to determine if the baby is healthy today and received the immunizations on schedule. The baby's age is recorded. If the provider states that the immunizations were not given on schedule, then a brief explaination is given as to the reason for deferral. Differentiation is made between past and present deferral. The provider's position (MD of NP) is recorded as well as the amount of

time spent discussing immunizations with the parents. (see Appendix B).

The data will be then summarized into a descriptive account of the results. This is a description of how the t-test and X2 statistics will be used to test the hypotheses and analyze this data.

Summary

A descriptive study has been conducted to determine factors and attitudes influencing parents decisions whether to immunize their child on the recommended schedule as set up by the American Academy of Pediatrics and the Center for Disease Control guidelines. Constructs of parent's perceptions of the seriousness of the disease versus their child's susceptibility without immunizations are explored as well as benefits and barriers to immunizations. Motivations to make a decision will be determined based on the above factors plus past experiences with the disease or vaccines, the experience with relatives or friends, relationships with health care providers, knowledge about the disease, side effects of the disease versus side effects of vaccines and influences of the mass media as well as other diverse stimuli. The research was done by the use of a questionnaire based on the health belief model. Parents' knowledge about the above factors plus their knowledge about the diseases were assessed. Demographic variables were studied.

CHAPTER IV

DESCRIPTIVE ANALYSIS

A meeting was held in late January of this year to review with all of the pediatric staff, receptionists, aides, nurses, nurse practitioners and physicians, a description of the research and expectations of the provider and support staff. Each person was given a list of their responsibilities. (see Appendix L).

Criteria for delayed immunizations were also discussed and determined at a separate provider meeting. Approval was granted by the research committee at Amherst Medical Associates and the Human Subjects Review Committee at the University of Massachusetts prior to the commencing of this study.

Also before the study began, every nurse, nurse practitioner and physician took and passed a quiz on facts related to DTP, OPV and MMR vaccines and to the disease entity as well. (see Appendix K).

The pilot study began on February 14, 1987. Although it was hoped that a total of five participants would be involved, in fact only four children were scheduled for checkups that day who were in the appropriate age group. Therefore, four parents were asked by the receptionist to

participate. While all agreed only two of the four completed the questionnaire in the office. They asked if they could take it home. While that had not been the original intent of the researcher, it seemed that it was better to do that than to lose the parents entirely because some felt that the questionnaire was too time consuming to do in the office at the time. Of the two questionnaires taken home only one was returned but this was a 75% return rate on the parental questionnaire for the pilot study.

Prior to beginning the actual research, the researcher reviewed each provider's schedule and appointment book to see how many babies would be coming for the 2 month through 18 month checkup in the next six weeks. The researcher, eventhough, she is working part time, had 24 babies booked, the other nurse practitioner had 23 scheduled. The physicians had 37, 24, 24, 14, and 8. (The latter is a part time physician). This is a total of 154 babies in the next 6 weeks with appointments for health maintenance visits.

The study began on Monday, February 16, 1987 but it was not initially realized that this was a holiday. Normally this is reserved for illness only since there is only one physician and a nurse practitioner to cover the office. However, the afternoons are generally quiet so the researcher permitted one physical exam to be scheduled.

Within the next four days, 14 questionnaires were given out, an additional 45 were given out the next week. The third week 28 were distributed and the last two days 13 were given out. Number 100 was distributed on March 10, 1987. This is two and one-half weeks ahead of what was anticipated originally but expected when 154 appointments were scheduled in a 6 week period for check-ups.

Some parents refused at the onset when they were told by the receptionist about the study. As was expected, it was not an ideal time of year to do this survey. February is the busiest month of the year with sick children. In spite of these conditions, a 79% return rate was obtained on the parental questionnaire and a 92% return rate on the provider questionnaire. Parents were encouraged to complete the questionnaire in the office but if they were reluctant to do so were asked to notify the receptionist so that they could leave their name and telephone number so that the researcher could contact them to see if they had returned the questionnaire. They were given a self addressed stamped envelope.

Of the first 15 questionnaires given out from February 16, 1987 to February 20, 1987, 11 were completed by the parent. 13 were completed by the provider. Of the 4 not done by the parents 2 were missing and presumed not done, 1 parent refused at the onset and 1 questionnaire was misplaced and lost in the waiting room but the mother

requested and completed an entirely new form before leaving the office!

In week February 23, 1987 to February 27, 1987, a total of 45 questionnaires were given out. Thirty-four were returned with 2 of these by mail. Nine were missing. There were 40 completed by the providers. In 2 cases the baby was too young (1 month) and the parent should not have been given the questionnaire and the other cases the provider form was missing. Sometimes the receptionist would forget to take it off the packet and put it on the infant's chart.

Questionnaires 60-88 were distributed the third week from March 2, 1987 to March 6, 1987. Twenty-three were returned on time and counted in the analysis. An additional questionnaire arrived by mail on April 1, 1987 and was not considered in the analysis because data had already been entered into the computer. Of the 23 returned, 3 were done by mail, 4 were missing and 1 was not completed because the mother is mentally retarded and although legally responsible to sign for her baby's immunizations was not capable of completing the questionnaire. The mothers foster mother wanted to do it but it was stipulated that it is the legal guardian of the child who must sign so this questionnaire was omitted by both the parent and the provider. In this group, of 27 questionnaires only 2 were not completed by the providers.

In one case the baby was too young and in the other case, as just mentioned, the mother is retarded.

The remaining 13 questionnaires, 89-100, were given out in the first two days of the fourth week. There were nine returned, 3 by mail, and 4 are missing. All 13 of the provider questionnaires were completed.

The researcher who has worked at this medical center for 10 years only personnally knew 25% of the respondents as was noted by the signature on the consent forms at the completion on the research. It was gratifying to receive such a high return rate. It can be generalized that it was due to the fact that the people in the Amherst community are committed to research and this topic and participated out of their own interest and not because they knew the researcher.

Results of data collection

Seventy-nine percent of the parental questionnaires were completed. Ninety-two percent of the provider questionnaires were completed. The research proved high immunization rates. The chi square statistic was used to analyze the demographic information. Much of the data was not statistically significant but is interesting and informative to see where the distribution lies.

There were 29 girls and 44 boys in the study ranging in age from 2 months to 24 months. Forty-nine percent were 7 months or younger and 76% were 15 months of younger. (see Table 1 for age distribution of the babies).

TABLE 1: Frequency count of baby's age in months

Code in Months	Absolute Frequency	Adjusted Freq Percent
2	16	17.2%
4	16	17.2%
5	2	2.2%
6	1	1.1%
7	11	11.8%
8	1	1.1%
10	1	1.1%
11	11	11.8%
13	2	2.2%
15	10	10.8%
16	4	4.3%
17	1	1.1%
18	11	11.8%
19	1	1.1%
21	2	2.2%
24	3	3.2%
-1	1	missing
Total	94	100.0%

Fifty-four percent of the mothers were over 30 years of age. None were over 40 years of age. Sixty-nine percent of the fathers were 31 or older and 11% were over 40. Fifty-nine percent of the mothers versus 60% of the fathers had a college education. More fathers 20% compared to 9% of mothers had greater than 20 years of education.

Seventy-eight percent made more than $20,000 per year. Nineteen percent made more than $50,000 per year.

A t-test was used to test the 5 hypotheses involving factors influencing parental decisions regarding immunizations and to compare the difference between the two groups, namely those who immunize on schedule and those who do not. Group 1 consisted of 70 children who immunized on schedule and group 2 consisted of 7 children who were not immunized on schedule. To be in the second group, the child either did not get the immunization because of missed appointments or parental refusal. It does not include those children who had reactions to previous immunizations and, therefore, did not receive subsequent ones or those who had deferred immunizations because of illness. The factors to be considered involved the first 36 questions or part I of the parental questionnaire. (see Table 2).

TABLE 2: Summary of values for the five hypotheses of the health belief model.

Variable	#	mean	SD	T	df	prob.
SUSCEPT						
group 1	70	3.4557	.624			
				2.19	75	.032
group 2	7	2.9048	.751			
SERIOUS						
group 1	70	3.6664	.607			
				.06	75	.955
group 2	7	3.6531	.377			
BENEFIT						
group 1	70	4.3614	.575			
				2.25	75	.027
group 2	7	3.8095	.996			
BARRIER						
group 1	70	1.5216	.487			
				-1.84	75	.069
group 2	7	1.8840	.591			
EXTERNAL						
group 1	70	3.9354	.473			
				2.12	75	.037
group 2	7	3.5377	.477			

NOTE:

These are for a 2 tailed t-test probability. To get a 1 tailed probability, divide by 2.

It must be noted as mentioned previously that these statistics were done for a 2 tailed t-test. The probability number must therefore be divided by 2 to get the level of significance for a 1 tailed t-test. The only hypothesis that this affects is hypothesis IV regarding barriers. Dividing the other four hypotheses by 2 does not change the level of significance.

Hypothesis I: Parents who choose to immunize their children according to the recommended schedule believe that the child is more susceptible to the disease than do parents who do not fully immunize their children.

This is a susceptibility question and questions 1, 6, 11, 16, 19, and 21 are related to this. Group 1 had a mean of 3.4557. Group 2 had a mean of 2.904. The T value of 2.19 with 75 degrees of freedom yields a probability of .032. If this were divided by 2, the p value would be .016. From this it can be concluded that those who were off schedule perceived their child to be less susceptible since the p value is less than .05 level of significance.

Hypothesis II: Parents who choose to immunize their children according to the recommended schedule believe that diseases are more serious should they occur than do parents who do not immunize their children according to this schedule.

This is a seriousness question and questions 2, 7, 12, 17, 23, 24 and 33 relate to this hypothesis. The t-test demonstrates a mean for group 1 of 3.6664 and a mean for group 2 as 3.6531. The T value of .06 with 75 degrees of freedom yields a probability of .955. If this were divided by 2 the p value would be .477. Since the p value at the .05 level of significance is greater, it can be concluded that there is no difference between the two groups in their perception of the seriousness of the diseases should they occur.

Hypothesis III: Parents who choose to immunize their children according to the recommended schedule believe that the benefits of the immunization outweigh the risks of the vaccine more than do parents who do not immunize their children on this schedule.

This is a benefits question and questions 3, 8, 13, 18, and 26 pertain to this hypothesis. Group 1 has a mean of 4.3614 and group 2 has a mean of 3.8095. A T value of 2.25 with 75 degrees of freedom yields a probability of .027. The probability value of .027 is less than .05, and

if this were divided by 2 the p value would be .013, it can thus be concluded that those in group 2 perceive benefits of the immunizations to be slightly less important than those who immunize on the recommended schedule. However, if one looks at the standard deviation in this group, it is large. It is .575 in group 1 compared to .996 in group 2. Hence the researcher has looked at the separate variance estimate which is an approximation as compared to the pooled variances of the other 4 hypotheses. The p value in this group is .199. Divided by 2 this would yield .099. Since .199 and .099 is >.05, it can be concluded that this is an interesting result and should be looked at in further detail at a later time. Parents in group 2, therefore, don't perceive the benefits to outweigh the risks.

Hypothesis IV: Parents who decide to immunize their children according to the recommended schedule differ from parents who do not in their perceptions of the barriers to receiving the recommended vaccines.

This is a barriers question and questions 4, 14, 27, 28, 29, 30, and 31 pertain to this hypothesis.
Group 1 had a mean value of 1.5216 and group 2 a mean of 1.8840. There does not appear to be much of a difference between these two means. The T value of - 1.84 with 75 degrees of freedom yields a probability of .069. If this number were divided by 2, the results would be .034. Since

this is less than our p value of .05, the researcher can conclude that there is a significant difference between the two populations in regard to the barriers to receiving the vaccines.

Hypothesis V: Parents who choose to immunize their children according to the recommended schedule are more positively influenced by external and internal stimuli than are parents who do not follow the recommended schedule.

Questions relating to these factors are: 5, 9, 10, 15, 20, 22, 25, 32, 34, 35, and 36. Group 1 has a mean of 3.9354 and group 2 a mean of 3.5377. The T value of 2.12 at 75 degrees of freedom yields a probability of .037. Since .037 and if divided by 2 would yield .018 is less than .05, the researcher can conclude that those who are in group 2 regard external factors as slightly less significant than do those who immunize on the recommended schedule.

A chi square statistic was used to compare using cross tabulation of each question 1 through 36 with immunization on the recommended schedule (group 1) with those who were not on schedule (group 2). Overall 91% of the children were immunized on the recommended schedule and 9% were not. The following factors will be reported using a frequency count only and if there is a difference shown by chi square for a particular issue this will be discussed.

Overall 80% of those who were surveyed felt that a child being fully immunized prevented the diseases. The data showed that 82% of those who immunized on schedule agreed whereas 71% of those not on schedule agreed.

Religion was not a factor to be considered. One hundred percent of those surveyed in both groups indicated that this did not influence their decision. The demographic data showed 72 parents answered this question. Sixteen indicated that they had no religious affiliation. Twenty-seven were Catholic, 5 were Jewish, 17 were Protestant and 7 were other denominations.

It was thought that the news media would have negative influencing factors regarding decisions. Eighty-three percent of those who immunized on schedule vs 72% of those who did not were not strongly negatively influenced by the news media. Likewise of the total number surveyed 35% disagreed that newspaper articles positively affected decision, 43% were neutral and 22% thought that the newspaper did influence their decision. The same is true for magazine articles. Forty-two percent felt that magazine articles were not a motivating factor, 30% were neutral and only 28% felt that it influenced their decision to immunize.

It was thought that the fact that a parent must now sign the informed consent form might influence decision to decide against immunizations. Out of the 79 parents who

answered this question, 74% felt that the fact that they were required to sign the form did not affect their decision regarding immunizations. Eleven percent were neutral and 16% did feel that it did affect their decision.

A greater number of people (70% with 22% neutral) felt that their child could get measles if not immunized in contrast to 45% who felt their child was susceptible to pertussis. Only 19% felt their child could get polio if not immunized. However, 48% worried that their child might get rubella or mumps. Thirty-six percent were neutral and 17% not worried. Thirty-six percent felt their child was susceptible to tetanus.

Written information given at the doctor's office helped 72% make an intelligent decision regarding immunizing their child. Twenty-two percent were neutral and 7% felt that it was not a helpful tool.

Due to the fact that immunizations were required for school entrance, 64 out of 79 or 84% said that they would immunize because of this. Eight percent were neutral and 9% disagreed.

Approximately 2/3 or 66% felt that it was helpful to talk to a nurse, nurse practitioner or a physician before making a decision. Twenty-two percent didn't feel that it made any difference and 12% felt that it was not helpful.

This compares to 66% who immunized on schedule vs 57% who did not immunize on schedule.

Oral polio was preferred by 74% of those who immunize versus 83% who do not immunize. There was only one child in the study who did not get polio because of parent's absolute refusal. These parents did not elect to get the inactivated vaccine. This is significant. Chi square = to 12.54634 with 4 df. This gives a significance of .0137. Since this is <.05, it can be concluded that a higher proportion of those who don't immunize feel that oral polio is preferred by health care providers; is easy to administer and may be more effective in giving life long immunity.

Most parents were not afraid of the vaccines whose other children received them without side effects because they feel that they know more now than when their other children were immunized. Sixty-six percent were not afraid, 24% were neutral but 10% were afraid now that they know more about the vaccines.

When surveyed 29% of those parents in group 2 (non immunize) versus 0% in group 1 answered the question of knowing children who had side effects so would not immunize on schedule. The data showed that this was significant with a chi square = 21.48766 with 3 df yielding a significance of .0001. This is statistically significant because the p value is less than 0.05.

People were not superstitious! Only 5% agreed that they'd be pushing their luck if they gave this child the vaccine, eventhough, their other children didn't have side effects.

Parents also want to be informed. Eighty-six percent of both groups want to know the side effects of the vaccines and would not rely on the doctor completely.

It is interesting to note that 59% felt that they would follow medical orders because they would benefit their child's health compared to 14% who did not immunize on schedule. Of those in group 2, 72% felt that they would not follow medical orders.

Those who did not immunize on schedule thought that the cost of the vaccines was not an inexpensive investment in protecting their child's health. Fifty percent in group 2 versus 10% in group 1 felt this way. This is statistically significant. Chi square is = 7.93760 with 3 df. This has a probability value of .0473. Since this is <.05, it can be concluded that a higher proportion of those who don't immunize on schedule think that this is not an inexpensive investment.

Lastly it is important to note that the question regarding regular scheduled physical exams in addition to visits related to illness was statistically significant. Ninety-eight percent of people in group 1 agreed versus 86% in group 2. There was one parent in group 2 who disagreed

and this must have made the difference. Chi square is equal to 10.90149 with 3 df yields a probability of .0123 which is significant.

It is also noted that 50% of those who did not immunize on time had no other children. Thirty-three percent had one other child and 17% had four other children. This is compared to the immunized group who had the following results: Thirty-eight percent had no other children, 40% had one other child, and 0% had four other children. Chi square is equal to 12.34002 with 4 df which is significance of .0150. (see Table 3).

TABLE 3: Number of other children in relation to immunization on and off the recommended schedule.

Code: 1 = 1 child
2 = 2 children
3 = 3 children
4 = 4 children
7 = NO other children

code	1	2	3	4	7
on schedule	31	7	3	0	25
	47.0%	10.6%	4.5	0	37.9%
off schedule	2	0	0	1	3
	33.3%	0%	0%	16.7%	50.0%
Total	33	7	3	1	28
	45.8%	9.7%	4.2%	1.4%	38.9%

chi square = 12.34002 with 4 df significance .0150

In conclusion of this aspect of the study 87% felt that it was important to get the immunizations on the recommended schedule. No one disagreed that they frequently did things to improve their child's health. Many searched for new information related to their child's

health and the majority got regularly scheduled checkups in addition to illness visits.

The provider questionnaire provided very useful information not only if the child was not immunized on the recommended schedule in the past but how many immunizations were deferred in these four weeks and for what reasons. Babies were coded into the missed or refused category if regular scheduled appointments where immunizations were given were missed or if the parent absolutely refused part or an entire vaccine. Actually only 4 parents refused the vaccines. Two of these parents did not want to start the immunizations at the two month check up because they felt that the baby could tolerate them better when older. One of these infants was only 2 months old at the time of the study so it cannot be determined whether they will immunize at the next visit. The other couple came for the 15 month visit and don't fit into the category of refusal now because they started the immunizations at 4 months of age and the child was up to date by the 11 month visit. Two others are clearly off schedule. In one instance the infant is 4 months old and has not had any polio vaccine. The other instance, the child is 2 years old and has never had pertussis vaccine eventhough the parents agreed to the pediatric Dt vaccine on the same schedule as DTP.

Children were not considered to be in the refused or missed category if vaccines were deferred because of illness or due to previous side effects of the immunization. Three children have not gotten all immunizations in the past because of a significant reaction to a previous vaccine namely the DTP. Of the 20 immunizations not given in this months period, 16 or 80% were due to an acute illness with the most common one being otitis media (56%). One was deferred because the child had a newly diagnosed seizure disorder, 2 were deferred because of parental refusal as stated in the previous paragraph, 4 for other acute illnesses and 1 because the mother was in a hurry and couldn't wait for the nurse! The latter is a 7 month old who had gotten the first sets of immunizations on schedule.

The provider questionnaire showed that 57 out of 94 or 62% of the children were seen by one of the five physicians. 35 out of 94 or 38% were seen by one of the two nurse practitioners.

The majority of the providers spent no more than 4 minutes talking with parents regarding immunizations. Not every provider recorded the time spent but of the 44 physicians out of 57 who did, 19 spent less than 1 minute talking about immunizations with the parent. This is 43%. Twenty-four out of 44 spent 1 to 4 minutes discussing immunizations. This is 56%. Only one physician (2%) spent

4 to 7 minutes. In contrast, 7 out of 32 or 22% of the nurse practitioner encounters spent 1 minute. Twenty-one out of 32 nurse practitioners encounters or 66% were spent discussing immunizations with the parent for 1 to 4 minutes. In addition 4 out of 32 nurse practitioner encounters took 4-7 minutes of time discussing immunizations with the parent. This is 13 %. (see Table 4).

TABLE 4: Time in minutes spent be all providers with parents discussing immunizations.

time	< 1 min.	1-4 min.	4-7 min
on schedule	26	41	4
	36.6%	57.7%	5.6%
off schedule	1	5	1
	14.3%	71.4%	14.3%
Total of 78	27	46	5
	34.6%	59%	6.4%

raw chi square = 1.86450 with 2 df significance .3937

The most surprising and yet pertinent part of this study appears to be in parents understanding of the facts of the DTP, OPV and MMR vaccines versus the facts regarding the diseases. Eventhough there was an overall acceptance rate of 91% who immunized on schedule, only 9% got a perfect score on the true/false quiz. Fourteen percent of those who did not immunize on schedule got all the facts correct. Only 2 questions, numbers 3 and 5 were false. (see Table 5 frequency count).

TABLE 5: Number of correct responses out of a total of 11 questions on quiz parents' took regarding immunizations and childhood diseases.

# correct	Absolute frequency	Adjusted freq
2	1	1.3%
5	5	6.5%
6	5	6.5%
7	7	14.3%
8	13	16.9%
9	20	26.0%
10	19	24.7%
11	7	9.1%
missing	17	missing
Total	77 out of 94	100%

The most errors seemed to be with the information regarding DTP. Ten percent who were in group 1 got all 6 of the DTP questions correct versus 29% correct of those people in group 2 (not immunized on schedule).

Sixty-three percent answered question 3 correctly namely that Diphtheria is a bacterial disease that is no longer prevalent. False is correct.

Seventy-seven percent answered number 5 correctly as false that pertussis is a disease that is more common and more serious in children over 5 years of age. Pertussis is much more serious in a young child than someone who is over 5.

Ninety-seven percent knew that DTP vaccine can cause slight fever and irritability within 2 days after the immunization.

Forty-six percent, however, thought that continuous crying for more than 3 hours or a high pitched cry can occur after DTP and that this is a contraindication to further immunizations.

Ninety-one percent knew that convulsions or episodes of limpness and paleness can occur in 1 in 1,750 shots of DTP.

Fifty-nine percent knew that permanent brain damage has resulted in 1 in 310,000 children who received DTP. (see Table 6).

TABLE 6: Number and percent of correct versus incorrect responses out of 6 questions on DTP section of quiz given to parents.

DTP score

Schedule	Some wrong	All right
# on	61	7
% on	89.7%	10.3%
# off	5	2
% off	71.4%	28.6%
Total = 75	66	9
Total percent	88.0%	12.0%

The OPV score was better with 79% of those answering the two questions regarding polio giving the correct responses. Fifty-seven percent of those who did not immunize on schedule got both of these questions correct. Questions 1 and 9 pertain to polio vaccine .

Ninety-six percent knew that their child might be paralyzed if he contracted polio.

Eighty-four percent answered correctly that oral polio vaccine can cause paralytic polio (1 in 8.1 million doses) in the person who receives it. (see Table 7).

TABLE 7: Number amd percent of correct versus incorrect responses by parents out of 2 questions on polio section of quiz.

OPV score

Schedule	Some wrong	All right
# on	14	54
% on	20.6%	79.4%
# off	3	4
% off	42.9%	57.1%
Total = 75	17	58
Total percent	22.7%	77.3%

Sixty-eight percent answered the 3 questions on the MMR correctly who were in group 1. Fifty-seven percent in group 2 answered all of the MMR questions correctly. Questions 2, 4, and 11 pertain to the MMR vaccine.

Eighty-four percent answered correctly that mumps disease can cause deafness.

Eighty-six percent knew that measles disease can cause inflammation of the brain which can lead to convulsions and mental retardation.

Ninety-two percent knew the common side effects of the MMR vaccine. (see Table 8).

TABLE 8: Number and percent of correct versus incorrect responses given by parents out of 3 questions on the MMR section of the quiz.

	MMR score	
Schedule	Some wrong	All right
# on	22	46
% on	32.4%	67.6%
# off	3	4
% off	42.9%	57.1%
Total = 75	25	50
Total percent	33.5%	66.7%

In summary ,eventhough, the numbers are small and often not statistically significant, the data shows some interesting results.

CHAPTER V

CONCLUSIONS

There are very different conclusions that can be made from the results of this research. Many of them were not anticipated by the researcher. Some are confirmed by the literature, others are not documented and will stimulate further review and research.

Hypothesis I:

Parents who choose to immunize their children according to the recommended schedule believe that the child is more susceptible to the disease than do parents who do not fully immunize their children.

This is true and supports the hypothesis. Those who immunize on schedule do believe that their child is more susceptible to the disease than do those who do not. This was expected.

Of those who immunize versus those who didn't, it was felt that their child was more susceptible to measles, mumps and rubella than pertussis. Most of both groups didn't feel they were susceptible to polio. This may be due to the fact that they remember themselves having measles or have heard about unborn babies being deformed by congenital rubella but don't remember anyone with pertussis because

they were immunized with this as an infant. Measles vaccine wasn't available until 1964 and rubella vaccine until 1969.

Hypothesis II:

Parents who choose to immunize their children according to the recommended schedule believe that diseases are more serious should they occur than do parents who do not immunize their children according to this schedule.

There is no difference between the groups in regard to seriousness of the disease. Both regard the diseases as equally serious. Both groups felt they could get diphtheria. An even higher percentage of those in group 2 felt one could get problems from measles that could last a lifetime. Both felt ill if a pregnant woman got rubella. About 50% of group 1 felt polio was more serious than other diseases whereas 42% of group 2 felt this way. Eighty-five percent of both groups were concerned regarding pertussis. Approximately 50% of both thought mumps was serious. It is interesting to note that a higher percentage of those who refused immunizations on schedule than those who got them knew someone with the disease. One could conclude that, eventhough, people regard the disease as serious, as long as they don't perceive themselves as susceptible, they will not choose the vaccine.

Hypothesis III:

Parents who choose to immunize their children according to the recommended schedule believe that the benefits of the immunization outweigh the risks of the vaccine more than do parents who do not immunize their children on this schedule.

This hypothesis is supported by the research. Those who immunize on the recommended schedule believe the benefits of the vaccine are important. Those who choose not to immunize on the recommended schedule do not see the benefits of the vaccine as being as important as those who do immunize. This is what would be expected. Ninety-two percent versus 71% of those who immunize on schedule felt having the child fully immunized for DTP prevents him from getting the diseases. Ninety percent in group 1 felt it was important to get the vaccines on schedule versus 57% in group 2 in order to have maximum protection. Almost twice those who immunized versus those who did not felt that the cost of immunizations was a good investment in the child's health. A much greater number of those who immunize felt eventhough diseases aren't prevalent, we'll see a recurrence if not immunized. What is surprising and is statistically significant is the fact a greater number who refused immunizations felt that oral polio was better. Only one person did not. It would be interesting to know if that was the one who refused polio vaccine for her 4

month old baby. It must be remembered that because of the small number in group 2, a refusal of one person is equal to almost 15%.

Hypothesis IV:

Parents who decide to immunize their children according to the recommended schedule differ from parents who do not in their perceptions of the barriers to receiving the recommended vaccines.

There is a significant difference in parents' perceptions of the barriers to the vaccines. The research is congruent with the hypothesis and confirms what the literature states as those who do not immunize think that the barriers to the vaccines are greater. Those who immunize felt that eventhough they knew more now, they are not afraid of the immunization. Those who did not immunize were neutral on this aspect. As will be discussed in more detail in this conclusion, both groups felt that they needed to know the side effects. Most felt of those who were in group 1 that eventhough they knew someone with side effects, they would still immunize.

Hypothesis V:

Parents who choose to immunize their children according to the recommended schedule are more positively influenced by external and internal stimuli than are parents who do not follow the recommended schedule.

Those who choose to immunize on schedule are more positively influenced by external factors and conversly those who immunize on alternate schedules view external factors as less significant. These external factors will be more fully discussed throughout this conclusion.

Most people, 91%, got the immunizations on the recommended schedule. This is surprising. When the proposal was generated, it seemed as if a lot more people were immunizing on their own schedule.

It is also interesting to find that the news media had little influence on decision. Mikail (1981) found that the mass media motivated people to take action. Even fewer parents were motivated by newspaper articles (12%). Only 28% were influenced by magazine articles. It seems as if these results would have been significantly different if done two years ago when there was a great deal of attention attributed to DTP vaccine on national television. The biggest controversy seemed to center around DTP. There have been several articles in the newspaper recently about the government establishing compensation programs for

children injured from receiving a vaccination. There has also been attention paid in the news to the fact that measles was epidemic at some universities in the past year because college aged students either had the vaccine too early (before one year of age) or got the vaccine that was developed in the mid sixties which wasn't as effective. Not much focus has been on the polio vaccine. It may be concluded that the majority of parents who are making these decisions are a little too young to remember someone with one of these diseases although 50% of the mothers are over 30 years of age. Polio vaccine came out in the mid fifties. They would have most likely had measles disease and, therefore, want to protect their child against it. It may also be possible that people in the Amherst community are too busy with their professional lives to read baby magazines that address some of these issues. It would have been interesting to ask in the demographic information if the mother or primary care taker also worked outside the home.

It is also interesting to note that 89% knew that rubella caused harm to the fetus, eventhough, only about 1/3 of the babies had or were eligible for the MMR at the time of the study. It didn't seem to make a difference that rubella was given as a combined vaccine. Of those eligible for the MMR, no one refused it. It was only deferred because of illness. One of the parents who

deferred immunizations at the 2 month visit choose the MMR on schedule. Because of the age of most of the mothers, they would have been old enough to remember the rubella epidemic of 1964.

Ninety-two percent were not detered from getting the vaccine because of the painful injection. It is assumed that they must realize that if their child got the disease, the medications, treatment, if any, and the disease entity itself would be much more painful.

Eighty-six percent felt that the cost of the vaccines was inexpensive. People were not asked if they had health insurance or were part of the health maintenance organization. It seems as if due to the high combined income of most parents, this is not even a consideration, yet the results were significant. This had to be due to the fact that 17% (1 parent out of 6) thought the vaccines were expensive and 33% in group 2 were neutral.

The researcher would have expected a higher number of respondents than 72% (22% neutral) to feel that printed material given at the office motivates decision. By the results of the quiz that parents took as part of this survey, which will be addressed later in this paper, we need to do more as nurses and health care providers than give parents a fact sheet and ask if they have any questions.

Only 66% with another 27% neutral felt that it was helpful to talk with a nurse, nurse practitioner or a physician. It would have been interesting to see who they felt gave them the most information and was most helpful. Other research has shown the health practitioner to be a very motivating factor. As health care professionals, we need to be more explicit in making certain parents understand the facts, eventhough, some parents may not feel that we are helpful.

Parents indicated that they want to be informed of side effects. Legally it is their right to be fully informed. The provider must state in the progress notes that the parents have no questions regarding the vaccines and the child has had no previous side effects. The "doctor" no longer carries the burden of protecting the patient from information that might upset him.

Most indicated that they sought information and frequently did things to improve their child's health. Most got regularly scheduled checkups in addition to illness visits. One can also conclude that even if the parents don't immunize on schedule, they are actually protecting their child's health from the side effects of the vaccines.

No one in this study started the immunizations on schedule and then decided to immunize on their ouwn schedule. This has been the researcher's experience in the past.

People generally felt that they would receive the immunizations because they were required for school entrance. It had been expected that some would not agree with this.

Becker (1972) showed age and marital status to be a useful predictor of compliance. While the majority of people were married, 93% of those married elected to immunize whereas 100% of those that were in the non compliant group were married.

Steele (1972) found that people with a higher SES are more likely to get preventative care, by having physicals and participating in other health related behavior. In his research, SES was measured by family income, occupation of the head of the household and level of education of the dominant woman in the house. This current research did not survey occupation nor whether the mother worked outside the home but it is clear from using parents' education and combined income that this is a high SES bracket.

Selwyn (1978) showed that non users of health services often lacked knowledge about the reasons for immunizations. As was stated in the scope and limitations, this research is limited to only those people who come to

Amherst Medical Associates for health care. It is beyond the scope of this paper to determine if those people who do not use health services were unfamiliar with how to prevent contagious diseases.

Research has showed that more white than non white are more likely to complete the immunizations but there is no association with race (white verses non white in the same SES). The study did not prove any statistical significance with race and immunization status. The researcher omitted unintentionally race and religion for both mother and father.

Time spent by the health care providers was surprising. Clearly the nurse practitioner spent more time than did the physicians eventhough the nurse practitioners are not the ones giving the actual immunizations in most instances. In talking with a colleague, it was decided that the nurse practitioner prepares the parent for untoward reactions of the vaccines and offers information of what to do for possible side effects. When documenting that there are no reactions, the nurse practitioner usually asks some of the common side effects particularly of the DTP. Perhaps the physicians rely on the nurses to do this. What is not documented is how much time is spent by the nurse in preparing the injection, giving it and discussing issues with the parent.

The most unsuspecting part of this research was how little parents know about the facts of the diseases and the vaccines, yet immunize their child at a 91% rate. It is expected that they have read and understood the information given to them, have been given a chance to ask questions and have signed the informed consent form. Only 10% of all of the respondents got 100% on the quiz. One could argue that no one is expected to get 100% in order to pass an exam. There were six questions related to DTP and this seems to be where parents had the most problems. The question dealing with side effects and contraindications to the vaccine seemed to be one of the most incorrectly answered yet this seems to be one of the most critical issues. DTP seems to be the most controversial vaccine, however. It may be thought that parents were not paying careful attention to the test because of the testing conditions, the fact that they may have had to wait for their visit because of the busy schedule or the fact that their child was not going to get an immunization today. The best response rate was on the MMR which is not given until the 15 month visit. It would be interesting to note if those who took the questionnaires home had more correct responses because they could really concentrate on the questions. It is not possible to test this because the researcher no longer knows which questionnaires were taken home. The biggest question that remains is: If parents

knew all of the facts, would they still give the immunizations?

According to (Failure, 1979), the overall rate of completion for the basic series of immunizations (3 DTP, 3 OPV and the MMR) by age 2 was 72.5% This research cannot be truly compared to that because many of the children in this study were only a few months old but it would be useful if these infants could be follow prospectively.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

In summary, Hypothesis I: Parents who immunize on schedule believe that their child is more susceptible to the disease than do people who do not immunize on schedule. Hypothesis III: Parents who immunize on schedule believe that the benefits of the vaccine outweigh the risks more than do people who do not immunize on schedule. Hypothesis IV: Parents who do not immunize on schedule do perceive the barriers of the vaccine as a deciding factor. Hypothesis V: People who immunize on schedule believe that external factors are more motivating factors in making a decision to immunize than do parents who do not immunize on schedule.

Hypothesis II: Parents who do not immunize on schedule do not perceive the diseases to be as serious as do those who immunize on schedule.

In conclusion, it is reassuring to know that 87% felt that it was important to get the vaccines on schedule to have maximum protection. It is also relevant that 90% felt that we could still get the disease, eventhough, the disease is not prevalent now. These instruments have not been checked for validity and reliability. The population

was also fairly homogeneous. Therefore, it cannot be generalized to a larger population but the findings regarding knowledge of the facts are highly relevant and generate a need for further and immediate intervention.

There was also a problem with the design in Hypothesis III. The hypothesis states that those who immunize on the recommended schedule believe that the benefits of the immunization outweigh the risks of the vaccine. These are two different issues and the questionnaire does not reflect the testing of these two issues.

Nursing Implications

It is very distressing to find that a population that is so highly motivated to give childhood immunizations and so well educated know so little about the benefits of the vaccines and the risks of the diseases and the immunizations. This demands an immediate and through review of our teaching techniques. For fear of overwhelming our new parents, discussion of immunizations doesn't usually occur until the infant is 1 month old. It would seem appropriate to introduce some of this information in the hospital and reinforce it at each health maintenance visit before a decision needs to be made. This would include the 4 day, 2 week and 1 month visit. It also appears that the health care providers need to reexamine the amount of time they spend discussing immunizations with the parent. Documenting the time spent, reviewing in more detail the benefits and risks, devising and expecting parents to take a quiz on the immunizations before signing the informed consent form would be a relevant project for future research.

APPENDICES

Appendix A

QUESTIONNAIRE

Please rate these questions from 1 to 5.
Strongly disagree is 1 Strongly agree is 5

Part I	Disagree				Agree
	1	2	3	4	5
1. The chances of my child getting pertussis is great if not vaccinated.	1	2	3	4	5
2. When I think that my child might get diphtheria, I feel sick.	1	2	3	4	5
3. Having my child fully immunized against DTP prevents him from getting these diseases.	1	2	3	4	5
4. Receiving immunizations is against my religion.	1	2	3	4	5
5. The news media has negatively affected my decision to immunize my child.	1	2	3	4	5
6. My child's physical health makes it more likely that he will get polio if not immunized.	1	2	3	4	5
7. Problems that my child could experience from measles disease could last a lifetime.	1	2	3	4	5
8. It is important to get the vaccines as scheduled in order to have maximum protection.	1	2	3	4	5
9. The fact that I have to sign the informed consent form makes me not want to give the vaccine.	1	2	3	4	5
10. Newspaper articles positively affect my decision to immunize my child.	1	2	3	4	5
11. I feel that the chances of my child getting measles in the future are good if not immunized.	1	2	3	4	5
12. When I think about rubella during a mother's pregnancy causing harm to the fetus, I feel sad.	1	2	3	4	5
13. The cost of each of the childhood vaccines are no more than $6.00 apiece. This is an inexpensive investment in protecting my child's health.	1	2	3	4	5

Appendix A

	disagree				agree
14. I dislike painful procedures so will not allow my child to receive the injection.	1	2	3	4	5
15. Magazine articles have motivated me to immunize my child.	1	2	3	4	5
16. I worry a lot that my child will get rubella or mumps if he doesn't get the vaccine.	1	2	3	4	5
17. If my child got polio, it would be more serious than other diseases.	1	2	3	4	5
18. Even if these diseases are not prevalent in the 1980's, we will see a greater recurrence if I don't have my child immunized.	1	2	3	4	5
19. If my child gets a deep cut, he will get tetanus if not immunized.	1	2	3	4	5
20. Written information given to me at the doctor's office helps me make a decision to immunize my child.	1	2	3	4	5
21. My child will not get any of the childhood diseases because they are no longer prevalent.	1	2	3	4	5
22. These vaccines are required for school entrance so I will have my child immunized on the recommended schedule.	1	2	3	4	5
23. The thought of my child getting pertussis scares me.	1	2	3	4	5
24. Mumps is the least serious of all of the childhood diseases.	1	2	3	4	5
25. Discussion with a nurse, a nurse practitioner or a physician helps me make a decision to immunize my child.	1	2	3	4	5
26. Oral polio vaccine is preferred by health care providers in this country because it is easy to administer and is more effective in giving lifelong immunity than the killed injectable vaccine.	1	2	3	4	5
27. Eventhough my other children received the vaccines without side effects, I know so much more now that I am afraid of the immunizations.	1	2	3	4	5

Appendix A

	disagree				agree
28. I would rather not know the side effects of shots or medications. I trust the doctor completely.	1	2	3	4	5
29. I know children who had side effects from the vaccine so I will not immunize my child on the recommended schedule.	1	2	3	4	5
30. Eventhough my children have not had side effects from the vaccines, I do not want to push my luck so I will not immunize this child.	1	2	3	4	5
31. My other children received the vaccines without side effects, so I will immunize this child.	1	2	3	4	5
32. I always follow medical orders because I believe they will benefit my child's health	1	2	3	4	5
33. When I was a child, I remember someone with one of these childhood diseases, therefore,I will immunize my child.	1	2	3	4	5
34. I frequently do things to improve my child's health.	1	2	3	4	5
35. I search for new information related to my child's health.	1	2	3	4	5
36. My child gets regularly scheduled physical exams in addition to visits related to illness.	1	2	3	4	5

Appendix A

Part II	True	False
1. If my child got polio, he might be paralyzed.	T	F
2. Mumps disease can cause deafness.	T	F
3. Diphtheria is a bacterial disease that is no longer prevalent.	T	F
4. Measles disease can cause an inflammation to the brain which can lead to convulsions and mental retardation.	T	F
5. Pertussis is a disease that is more common and more serious in children over 5 years of age.	T	F
6. DTP vaccine can cause slight fever and irritability within 2 days after the shot.	T	F
7. Continuous crying for more than 3 hours or a high pitched cry can occur after DTP. This would mean that the child should not get the pertussis vaccine again.	T	F
8. Convulsions or episodes of limpness and paleness can occur in 1 in 1,750 shots of DTP.	T	F
9. Oral polio vaccine can cause paralytic polio (1 in 8.1 million doses of vaccine) in the person who receives it.	T	F
10. Permanent brain damage has resulted in 1 in 310,000 children who received DTP.	T	F
11. The MMR may cause a fever, rash or swollen glands 7-10 days after it is given.	T	F

Appendix A
Part III

Please circle or fill in the next questions.

1. Age of mother
   16-20 21-25 26-30 31-35 36-40 41 or older

2. Age of father
   16-20 21-25 26-30 31-35 36-40 41 or older

3. Marital Status
   Married Divorced Widowed Single Other

4. Religion
   None Catholic Jewish Protestant Other

5. Race
   Black Caucasian Hispanic Asian Other

6. Education Highest level in years:
   <12 12 13-15 16 17-20 >20 mother

7. <12 12 13-15 16 17-20 >20 father

8. Level of combined family income
   up to $10,000 $10,000-20,000 $20,000-40,000 >$50,000

10. Age of this child in months

11. Sex of child Female Male

12. If you have other children, please list their ages.

Thank you for your patience, time and cooperation.

Appendix B

Provider Questionnaire

Please answer the following brief questions after the baby's visit and leave the questionnaire in the manila envelope.

1. What is the baby's age in months?

2. The baby has received the age appropriate immunizations to date and on the recommended schedule. Yes No

3. If #2 is No, please note how different.

4. A vaccine was deferred today because:

5. A vaccine was deferred in the past because:

6. Please circle if you are an MD NP.

7. How much time did you spend today talking with the parents regarding the immunizations? Circle one.
   1 min. 1-4 min. 4-7 min. 7-10 min. >10 min.

Thank you for your time in completing this questionnaire.
Please see me in the office days or call me at home (549-5526) evenings if you have any questions.

Norma E. Hallock, CPNP

*****NOTE

For purposes of this research a child will be considered to have a late immunization if it is not given at the next regular health maintenance visit or if the child has had less than the following:
Three DTP's in the first year of life
Two OPV's in the first year
MMR by 18 months
DTP and OPV booster at 18 month visit.

Appendix C
Dear Parent:

As a pediatric nurse practitioner at Amherst Medical Associates and a graduate student in the Division of Nursing at the University of Massachusetts, I am very interested in parents' ideas about immunizing their children. Would you be willing to take 20 minutes to answer some questions? You will be given only one questionnaire to complete.

The physician or nurse practitioner who will see your child today will also complete a brief questionnaire about your child's health and immunization status.

All information and replies will be confidential. Questionnaires will be coded by number only. No one other than the researcher, Norma Hallock, will have access to the questionnaires which will be placed in a sealed envelope for her by you or by the provider for the questionnaire the provider will complete. No names or identifying characteristics will be used and only information about the study participants as a group will be reported.

Participation is voluntary. You may refuse to participate or withdraw from the study at any time without penalty or loss of services for you or your child.

If you have questions, you may contact me at any time at the addresses or phone numbers listed below.

Division of Nursing
School of Public Health
University of Massachusetts
Amherst, MA 01002
(413) 545-0089

Amherst Medical
Associates
170 University Drive
Amherst, MA 01004
(413) 253-7227

6 Meadowbrook Drive
Hadley, MA 01035
(413) 549-5526 evenings

Thank you for your participation. If you would like a summary of this research, please complete the index card with your name and address and put it in the box at the receptionist's desk.

Sincerely,

Norma E. Hallock, RN, CPNP

Appendix D

Consent Form

I understand the purpose of this study is to learn more about factors influencing parents' decisions related to immunization of their children. The research may help parents more fully understand the risks of contracting the diseases of diphtheria, tetanus, pertussis, polio, measles, mumps and rubella and potential complications of the disease versus possible side effects of the vaccine.

I understand that my direct participation will involve filling out a questionnaire that will take no more than 20 minutes to complete.

I understand that the provider (NP or MD) whom my child is seeing today will also answer a brief questionnaire about my child's health and immunization status even if I do not choose to participate. No names or identifying characteristics will be used and only information about the study participants as a group will be reported.

I understand that the researcher and the provider will keep their information confidential. The questionnaire that the provider and I complete will be coded by number only. I will seal my questions in one envelope and the provider will seal his/her questions in another. No names or identifying characteristics will be used and only information about the study participants as a group will be reported. The questionnaires will be destroyed on completion of the study.

I understand that my participation is voluntary and refusal to participate will involve no penalty or loss of services for me or my child.

You may contact me at any time at the addresses or phone numbers listed below.

Norma E. Hallock, RN,CPNP

School of Nursing
University of Massachusetts
Amherst, MA 01003
(413) 545-0089

Amherst Medical Associates
170 University Drive
Amherst, Ma. 01004
(413) 253-7227

6 Meadowbrook Drive
Hadley, MA 01035
(413) 549-5526 evenings

I have read the above, I have received a copy of this consent form and I agree to participate.

Signature of parent

Appendix E

IMPORTANT INFORMATION ABOUT DIPHTHERIA, TETANUS, AND PERTUSSIS AND DTP, DT, AND Td VACCINES

Please read this carefully

DTP 2/1/86

WHAT IS DIPHTHERIA? Diphtheria is a very serious disease which can affect people in different ways. It can cause an infection in the nose and throat which can interfere with breathing. It can also cause an infection of the skin. Sometimes it causes heart failure or paralysis. About 1 person out of every 10 who get diphtheria dies of it.

WHAT IS TETANUS? Tetanus, or lockjaw, results when wounds are infected with tetanus bacteria, which are often found in dirt. The bacteria in the wound make a poison which causes the muscles of the body to go into spasm. Four out of every 10 persons who get tetanus die of it.

WHAT IS PERTUSSIS? Pertussis, or whooping cough, causes severe spells of coughing which can interfere with eating, drinking, and breathing. In the United States, more than 75 percent of reported pertussis cases occur in children younger than 5 years. Pertussis is a more serious disease in young children and more than half of the children less than 1 year of age reported to have pertussis are hospitalized. In recent years, an average of 1,700 cases of pertussis have been reported each year in the United States. Complications occur in a substantial proportion of reported cases. Pneumonia occurs in one of every four children with pertussis. For every 1,000 reported pertussis cases, 22 develop convulsions and/or have more severe problems of the brain. In recent years, an average of eight deaths due to pertussis occurred annually.

Before vaccines were developed, these three diseases were all very common and caused a large number of deaths each year in the United States. If children are not vaccinated, the risk of getting these diseases will go back up again.

DTP, DT, AND Td VACCINES: Immunization with DTP vaccine is one of the best ways to prevent these diseases. DTP vaccine is actually three vaccines combined into one shot to make it easier to get protection. The United States Public Health Service and the American Academy of Pediatrics recommend DTP vaccine be used in children up to their seventh birthday. The vaccine is given by injection starting early in infancy. At least three shots are needed to provide initial protection. Young children should get three doses in the first year of life and a fourth dose at about 18 months of age. A booster shot is important for children who are about to enter school and should be given between their fourth and seventh birthdays. The vaccine is very effective at preventing tetanus—over 95 percent of those who get the vaccine are protected if the recommended number of shots is given. Although the diphtheria and pertussis parts of the vaccine are not quite as effective, they still prevent most children from getting disease and they make the disease milder for those who do get it.

Because pertussis is not very common or severe in older children, those 7 years of age and older should take a vaccine that does not contain the pertussis part. Also, because reactions to the diphtheria part of the vaccine may be more common in older children, those 7 years of age and older should take a form of the vaccine that has a lower concentration of the diphtheria part. This vaccine which contains no pertussis part and a lower concentration of the diphtheria part is called Td vaccine. Boosters with the Td vaccine should be received every 10 years throughout life.

(PLEASE READ OTHER SIDE)

Appendix F.

DEFERRAL OF DTP IMMUNIZATION: Children who have had a serious reaction to previous DTP shots should not receive additional pertussis vaccine (see WARNING). A preparation called DT vaccine is available for them which does not contain the pertussis part. Also, children who have previously had a convulsion or are suspected to have a problem of the nervous system should not receive DTP vaccine until a full medical evaluation has been made.

POSSIBLE SIDE EFFECTS FROM THE VACCINE: With DTP vaccine, most children will have a slight fever and be irritable within 2 days after getting the shot. One half of children develop some soreness and swelling in the area where the shot was given. More serious side effects can occur. A temperature of 105°F or greater may follow 1 out of 330 DTP shots. Continuous crying lasting 3 or more hours may occur after 1 in every 100 shots and unusual, high-pitched crying may occur after 1 in every 900 shots. Convulsions or episodes of limpness and paleness may each occur after 1 in every 1,750 shots. Children who have previously had a convulsion may be more likely to have another one after pertussis shots. Rarely, about once in every 110,000 shots, other more severe problems of the brain may occur, and permanent brain damage may occur about once in every 310,000 shots. Side effects from DT or Td vaccine are not common and usually consist only of soreness and slight fever. As with any drug or vaccine, there is a rare possibility that allergic or more serious reactions or even death could occur.

Although some people have questioned whether DTP shots might cause Sudden Infant Death Syndrome (SIDS), in careful studies DTP shots have not been shown to cause SIDS.

PREGNANCY: Babies born under unsanitary conditions to unimmunized women have a risk of developing tetanus during the newborn period (neonatal tetanus). Neonatal tetanus can be prevented by immunization of adult women. Women who have not received Td earlier and who are thought to be at risk of delivering their babies under unsanitary conditions should be immunized during pregnancy. Td is not known to cause special problems for pregnant women or their unborn babies. Doctors usually do not recommend giving any drugs or vaccines to pregnant women unless there is a specific need. Pregnant women who need Td should receive it, preferably during the second and/or third trimesters.

WARNING—SOME PERSONS SHOULD *NOT* TAKE THESE VACCINES WITHOUT CHECKING WITH A DOCTOR:

- Anyone who is sick right now with something more serious than a cold.
- Anyone who has had a convulsion or is suspected to have a problem of the nervous system.
- Anyone who has had a serious reaction to DTP, DT, or Td shots before, such as: an allergic reaction to any vaccine component; a temperature of 105°F or greater; an episode of limpness and paleness; prolonged continous crying; an unusual, high-pitched cry; or a convulsion or other more severe problem of the brain.
- Anyone taking a drug or undergoing a treatment that lowers the body's resistance to infection, such as: cortisone, prednisone, certain anticancer drugs, or irradiation.

QUESTIONS: If you have any questions about diphtheria, tetanus, or pertussis or DTP, DT, or Td vaccination, please ask us now or call your doctor or health department before you sign this form.

REACTIONS: If the person who received the vaccine develops a temperature of 105°F or greater, continuous crying lasting 3 or more hours, an unusual high-pitched cry, a convulsion, an episode of limpness and paleness, or a severe problem of the brain, the person should be evaluated promptly by a doctor.

If the person who received the vaccine gets sick and visits a doctor, hospital, or clinic in the 4 weeks after vaccination, please report it to: The physician or nurse where vaccine was administered or call collect 617-522-3767 Massachusetts Department of Public Health.

PLEASE KEEP THIS PART OF THE INFORMATION SHEET FOR YOUR RECORDS

I have read the information on this form about diphtheria, tetanus, and pertussis and DTP, DT, and Td vaccines. I have had a chance to ask questions which were answered to my satisfaction. I believe I understand the benefits and risks of DTP, DT, and Td vaccines and request that the vaccine checked below be given to me or to the person named below for whom I am authorized to make this request.

VACCINE TO BE GIVEN: ☐ DTP ☐ DT ☐ Td

DTP 2/1/86

INFORMATION ABOUT PERSON TO RECEIVE VACCINE (Please Print)				
Last Name	First Name	MI	Birthdate	Age
Address				
City	County		State	Zip
X				
Signature of person to receive vaccine or person authorized to make the request.				Date

FOR CLINIC USE
Clinic Ident.
Date Vaccinated
Manuf. and Lot No.
Site of injection

FOR DATA PROCESSING USE ONLY (OPTIONAL)

VACCINE HISTORY PLACE CHECK ☐ IN BOX IF HISTORY PREVIOUSLY SUBMITTED

DTP:	m/d/yr	m/d/yr	m/d/yr	m/d/yr	m/d/yr	MEASLES:	m/d/yr	MUMPS:	m/d/yr
POLIO:	m/d/yr	m/d/yr	m/d/yr	m/d/yr	m/d/yr	RUBELLA:	m/d/yr	HAEMOPHILUS b:	m/d/yr

Appendix F

IMPORTANT INFORMATION ABOUT POLIO AND ORAL POLIO VACCINE

Please read this carefully

OP 3/1/83

WHAT IS POLIO? Polio is a virus disease that may cause permanent crippling (paralysis) and occasionally death. There used to be thousands of cases and hundreds of deaths from polio every year in the United States. Because of the widespread use of polio vaccines, which became available beginning in the mid-1950's, polio disease has *nearly* been eliminated from the *United States*. Although thousands of cases continue to occur each year in the rest of the world, in the United States during the past 5 years there have been only 67 cases of polio reported, an average of 13 cases per year. Our success in preventing the spread of wild polio virus has been so great that most of the recent cases (approximately nine per year) have resulted from the rare side effects of oral polio vaccine (see below). Because of this fact, some people have asked why we should continue to use polio vaccine. The reason is that, even though we may not have much wild polio virus spreading here now, there is so much of it in the rest of the world that there is a great risk of its being reestablished if our children are not vaccinated.

ORAL LIVE POLIO VACCINE: Immunization with oral live polio vaccine (OPV) is one of the best ways to prevent polio. It is given by mouth starting in early infancy. Several doses are needed to provide good protection. Young children should get two or more doses in the first year of life and another dose at about 18 months of age. An additional dose is important for children when they enter school or when there is a high risk of polio, for example, during an epidemic or when traveling to a place where polio is common. The vaccine is easy to take and is effective in preventing the spread of polio. In over 90 percent of people, OPV gives protection for a long *time*, probably for life. Because OPV viruses live for a time in the intestinal tract of the person who is vaccinated, some of the viruses pass in the stool and can spread from the vaccinated person to those in close contact (usually household members). This may help to immunize these persons and is one of the advantages of OPV. The Immunization Practices Advisory Committee of the Public Health Service and the American Academy of Pediatrics recommend oral *live* polio vaccine as the preferred polio vaccine for people up to the 18th birthday.

POSSIBLE SIDE EFFECTS FROM THE VACCINE: OPV very rarely (once in about every 8.1 million doses of OPV distributed) causes paralytic polio in the person who is vaccinated. The risk may be slightly higher in adults being vaccinated and substantially higher in persons *with* abnormally low resistance to *infection*. Also very rarely (once in about every 5 million doses of OPV distributed) paralytic polio may develop in a close contact of a recently vaccinated person. Even though these risks are very low, they should be recognized. The risk of side effects from the vaccine must be balanced against the risk of the disease, both now and in the future.

PREGNANCY: Polio vaccine experts do not *think* oral polio vaccine can cause *special* problems for pregnant women or their unborn babies. However, doctors usually avoid giving any drugs or vaccines to pregnant women unless there is a specific need. Pregnant women should check with a doctor before taking oral polio vaccine.

WARNING—SOME PERSONS SHOULD NOT TAKE ORAL POLIO VACCINE WITHOUT CHECKING WITH A DOCTOR:

- Anyone with cancer, leukemia, or lymphoma.
- Anyone with a disease that lowers the body's resistance to infection.
- Anyone taking a drug that lowers the body's resistance to infection, such as cortisone or prednisone.
- Anyone who lives in the same household with anyone who has one of the conditions listed above.
- Anyone who is sick right *now* with something more *serious* than a cold.
- Pregnant women.
- Most persons age 18 and older because adults have a slightly bigger risk of developing paralysis from oral polio vaccine than children (However, if the risk of polio is increased-as may occur, for example, when there is an outbreak in your community-most polio experts recommend that unprotected persons receive oral *polio* vaccine regardless of age.)

NOTE OF INJECTABLE (KILLED) POLIO VACCINE: Besides the oral polio vaccine (OPV), there is also a killed polio vaccine (IPV) given by injection which protects against polio after several shots. This killed polio vaccine has no known risk of causing paralytic polio. Because OPV may provide lifetime protection, seems to provide stronger immunity in the intestinal tract (where infection first occurs), is simpler to administer, and is more effective in preventing the spread of polio virus than IPV, most polio experts feel that oral vaccine is more effective for controlling *polio* in the United States. Injectable polio vaccine is recommended for persons needing polio vaccination who have low resistance to serious infections or who live with persons with low resistance to serious infections. It may also be recommended for previously unvaccinated adults who plan to travel to a place where polio is common or for previously unvaccinated adults whose children are to be vaccinated with OPV. It is not widely used in this country at the present *time*, but it is available. If you *would* like to know more about this type of polio vaccine, or wish to receive this vaccine, please ask us.

QUESTIONS: If you have any questions about polio or polio vaccination, please ask us now or call your doctor or health department before you sign this form.

REACTIONS: If the person who received the vaccine gets sick and visits a doctor, hospital, or clinic in the 4 weeks after vaccination, please report it to: The physician or nurse where the vaccine was administered or call 617-727-2686 Massachusetts Department of Public Health.

AMERICAN ACADEMY OF PEDIATRICS 1-800-433-7237

Appendix G

IMPORTANT INFORMATION ABOUT MEASLES, MUMPS, AND RUBELLA AND MEASLES, MUMPS, AND RUBELLA VACCINES

Please read this carefully MMR 3/1/83

WHAT IS MEASLES? Measles is the most serious of the common childhood diseases. Usually it causes a rash, high fever, cough, runny nose, and watery eyes lasting 1 to 2 weeks. Sometimes it is more serious. It causes an ear infection or pneumonia in nearly 1 out of 10 children who get it. Approximately 1 child out of every 1,000 who get measles has an inflammation of the brain (encephalitis). This can lead to convulsions, deafness, or mental retardation. About 2 children in every 10,000 who get measles die from it. Measles can also cause a pregnant woman to have a miscarriage or give birth to a premature baby.

Before measles vaccine shots were available, there were hundreds of thousands of cases and hundreds of deaths each year. Nearly all children got measles by the time they were 15. Now, wide use of measles vaccine has nearly eliminated measles from the United States. However, if children are not vaccinated they have a high risk of getting measles, either now or later in life.

WHAT IS MUMPS? Mumps is a common disease of children. Usually it causes fever, headache, and inflammation of the salivary glands, which causes the cheeks to swell. Sometimes it is more serious. It causes a mild inflammation of the coverings of the brain and spinal cord (meningitis) in about 1 child in every 10 who get it. More rarely, it can cause inflammation of the brain (encephalitis) which usually goes away without leaving permanent damage. Mumps can also cause deafness. About 1 out of every 4 adolescent or adult men who get mumps develops painful inflammation and swelling of the testicles. While this condition usually goes away, on rare occasions it may cause sterility.

Before mumps vaccine shots were available, there were more than 150,000 cases each year. Now, because of the wide use of mumps vaccine, the number of cases of mumps is much lower. However, if children are not vaccinated, they have a high risk of getting mumps.

WHAT IS RUBELLA? Rubella is also called German measles. It is a common disease of children and may also affect adults. Usually it is very mild and causes a slight fever, rash, and swelling of glands in the neck. The sickness lasts about 3 days. Sometimes, especially in adult women, there may be swelling and aching of the joints for a week or two. Very rarely, rubella can cause inflammation of the brain (encephalitis) or cause a temporary bleeding disorder (purpura).

The most serious problem with rubella is that if a pregnant woman gets this disease, there is a good chance that she may have a miscarriage or that the baby will be born crippled, blind, or with other defects. The last big rubella epidemic in the United States was in 1964. Because of that epidemic, about 25,000 children were born with serious problems such as heart defects, deafness, blindness, or mental retardation because their mothers had rubella during the pregnancy.

Before rubella vaccine shots were available, rubella was so common that most children got the disease by the time they were 15. Now, because of the wide use of rubella vaccine, the number of cases of rubella is much lower. However, if children are not vaccinated, they have a high risk of getting rubella and possibly exposing a pregnant woman to the disease. If an unvaccinated woman later becomes pregnant and catches rubella, she may have a defective baby.

Since rubella is a mild illness, many women of childbearing age do not recall if they had rubella as a child. A simple blood test can show whether a person is immune to rubella or is not protected against the disease. Overall, about one in five women of childbearing age is not protected against rubella.

MEASLES, MUMPS, AND RUBELLA VACCINES: The vaccines are given by injection and are very effective. Ninety percent or more of people who get the shot will have protection, probably for life. Since protection is not as likely to occur if the vaccines are given very early in life, these vaccines should be given to children after their first birthday; measles vaccine should be given at 15 months of age or older. Measles, mumps, and rubella vaccines can be given one at a time or in a combined vaccine (measles-rubella [MR], measles-mumps-rubella [MMR]) by a single shot. If they are given in combined vaccine, they should be given at 15 months of age or older.

Experts recommend that adolescents and adults—especially women of childbearing age—who are not known to be immune to rubella should receive rubella vaccine (or MMR if they might also be susceptible to measles or mumps). Women should not receive the shot if they are pregnant or might become pregnant within 3 months. There is no known risk in being vaccinated against any or all three of these diseases if you are already immune to any of them.

POSSIBLE SIDE EFFECTS FROM THE VACCINES: About 1 out of every 5 children will get a rash or slight fever lasting for a few days, 1 or 2 weeks after getting measles vaccine. Occasionally there is mild swelling of the salivary glands after mumps vaccination.

About 1 out of every 7 children who get rubella vaccine will get a rash or some swelling of the glands of the neck 1 or 2 weeks after the shot. About 1 out of every 20 children who get rubella vaccine will have some aching or swelling of the joints. This may happen anywhere from 1-3 weeks after the shot. It usually lasts only 2 or 3 days. Adults are more likely to have these problems with their joints—as many as 1 in 4 may have them. Other temporary side effects, such as pain, numbness, or tingling in the hands and feet have also occurred but are very uncommon.

Although experts are not sure, it seems that *very rarely* children who get these vaccines may have a more serious reaction, such as inflammation of the brain (encephalitis), convulsions with fever, or nerve deafness.

With any vaccine or drug, there is a possibility that allergic or other more serious reactions or even death could occur.

WARNING—SOME PERSONS SHOULD *NOT* TAKE THESE VACCINES WITHOUT CHECKING WITH A DOCTOR:

- Anyone who is sick right now with something more serious than a cold.
- Anyone who had an allergic reaction to eating eggs so serious that it required medical treatment (does not apply to rubella vaccine).
- Anyone with cancer, leukemia, or lymphoma.
- Anyone with a disease that lowers the body's resistance to infection.
- Anyone taking a drug that lowers the body's resistance to infection (such as cortisone, prednisone or certain anticancer drugs)
- Anyone who has received a gamma globulin (immune globulin) within the preceding 3 months.
- Anyone who had an allergic reaction to an antibiotic called neomycin so serious that it required medical treatment.

PREGNANCY: Measles, mumps, and rubella vaccines are not known to cause special problems for pregnant women or their unborn babies. However, doctors usually avoid giving any drugs or vaccines to pregnant women unless there is a specific need. To be safe, pregnant women should not get these vaccines. A woman who gets any of these vaccines should wait 3 months before getting pregnant.

Vaccinating a child whose mother is pregnant is not dangerous to the pregnancy.

QUESTIONS: If you have any questions about measles, mumps, or rubella vaccination, please ask us now or call your doctor or health department before you sign this form.

REACTIONS: If the person who received the vaccine gets sick and visits a doctor, hospital, or clinic in the 4 weeks after vaccination, please report it to:

Amherst Medical Pediatric - 253-7227

Appendix H

FEVER

The most common symptom that parents are concerned about is fever. The purpose of this sheet is to discuss fever, what it means, when to become concerned, and what to do about it.

First, Don't Panic! Fever is not a disease in itself. It, along with changes in eating, sleeping and attentiveness, is a sign of illness. Fever is an elevation of the body temperature over normal. the body's temperature varies during the day with PM temperatures being up to 2° higher than AM readings. Body temperature may be elevated by exercise, a hot environment, dehydration, as well as by infection. The degree of fever in itself is not a reliable indicator of the seriousness of the illness. An illness may be quite serious without fever or a child may run a fever of 104° or higher with a cold.

A temperature may be taken in 3 basic locations and varies with the location. The most accurate location is rectal and a fever there would be greater than 101°F or 38.3°C. In general, an oral temperature is 1° less than rectal. An underarm or under chin temperature is 2° less than rectal. An underarm or under chin temperature is easiest to take but any noted elevation should be verified by a rectal temperature. Fever strips are inaccurate and should not be used.

When evaluating a child with a fever try to look beyond the fever and "see the child". If the child is happy, playing, and eating, it is unlikely that the illness is serious. Fever itself may make a child quite lethargic and unhappy. In these cases how the child acts after reducing the fever might be helpful. The following are some guidelines when we want you to call us about fever.

1. Any fever at all in a child less than 4 months of age.
2. Any fever of 104° rectally in a child less than 2 years of age.
3. Any fever over 105° regardless of age.
4. Any fever which lasts more than 4 days.
5. A fever that increases an hour or so after aspirin or tylenol is given.

During infection fever may indeed be helpful and in itself is not damaging to the body except in rare cases where the temperature exceeds 107° rectal. In young children seizures may sometimes occur with fever (often even before the fever is obvious). A first febrile seizure is not generally preventable nor does it cause brain damage.

The main reason we treat fever is to reduce the discomfort it causes. The first things that can be done are safe and simple and include dressing your child in light clothing, keeping the house cool, and supplying the child with adequate fluids to drink. Another effective measure is sponging the child with lukewarm water. This may be repeated as often as desired. Never use cool water or alcohol as these cause shivering which increases body temperature and are also painful to the child.

Appendix H

Medical methods of reducing fever are Aspirin and Acetominophen. There are many brands of each, and although cost varies, they are all effective. Each of these medicines should be given in the doses shown in the table below. The medicines take about 1/2 to 1 hour to work and are effective for 3 to 4 hours so they may be given as often as every 4 hours. Remember, these medicines do not cure anything but merely relieve fever and its symptoms for a limited time. Because of the concern of Reye's syndrome, we do not recommend the use of aspirin if the illness is the possibly influenza of chicken pox.

Brand	Concentration	Weight			Age				
		2.7–5 kg (6–11 lb)	5.4–7.7 kg (12–17 lb)	8.2–10.5 kg (18–23 lb)	2–3 yr	4–5 yr	6–8 yr	9–11 yr	>12 yr
Total amount (mg)		40	80	120	160	240	325	485	650
Acetaminophen drops (Tylenol, Tempra, Panadol or Liquiprin drops)	80 mg/dropper*	½ dropper 0.4ml	1 0.8ml	1½ 1.2ml	2 1.6ml	3	...	...	...
Acetaminophen syrup (Tylenol, Tempra or Panadol syrup or elixir)	160/5 mL(1 tsp)	...	½ tsp	¾	1	1½	2	2½	4
Chewable aspirin or acetaminophen	80-mg tablets	...	...	1½	2	3	4	5–6	8
Adult aspirin or acetaminophen	325-mg tablets	...	...	...	...	...	1	1–1½	2

* The dropper that comes with one product should not be used with other brands.

INFORMED CONSENT SHEET

Appendix I

Permission for DPT, Dt, and Td Vaccines

I have read the *information (DPT 2-1-86) given me about diphtheria, tetanus, pertussis, and DPT Dt, and Td vaccines. I have had a chance to ask questions which were answered to my satisfactio I believe I understand the benefits and risks of DPT, Dt, and Td vaccines and request that these vaccines be given to me or the person below for whom I am authorized to make the request.

_____ _____

Signature of person to receive vaccines or person authorized to make the request. DATE

I understand the risks of not receiving the vaccines and request that the vaccine not be given.

_____ _____

Signature DATE

Permission for Polio Vaccine

I have read the *information (OP 3/1/83 and/or IP 3/1/83) given me about polio and the vaccines. I have had the chance to ask questions which were answered to my satisfaction. I believe I unde stand the benefits and risks of the polio vaccines. I request that

ORAL POLIO INACTIVATED POLIO

CIRCLE VACCINE TO BE GIVEN

be given me or the person named below for whom I am authorized to make this request.

_____ _____

Signature of person to receive vaccines or person authorized to make the request. DATE

I understand the risks of not receiving the vaccines and request that the vaccines not be given.

_____ _____

Signature DATE

Permission for Measles, Mumps, and Rubella Vaccines

I have read the *information (MMR 3/1/83) given me about measles, mumps, and rubella and the measles, mumps, and rubella vaccines. I have had a chance to ask questions which were answered to my satisfaction. I believe I understand the benefits and risks of measles, mumps, and rubella vaccines and request that these vaccines be given to me or to the person named below for whom I am authorized to make this request.

_____ _____

Signature of person to receive vaccines or person authorized to make the request. DATE

I understand the risks of not receiving the vaccines and request that the vaccines not be given.

_____ _____

Signature DATE

Permission for Hemophilus Vaccine

I have read the "Hemophilus Vaccine Sheet for 2 year olds: FACT SHEET". I have had a chance to ask questions which were answered to my satisfaction. I understand the benefits and risks of th hemophilus vaccine and request that this vaccine be given to the person named below for whom I am authorized to make this request.

_____ _____

Signature of Parent or Guardian DATE

*Information from: Department of Health and Human Services, Public Health Services, Centers for Disease Control, Atlanta, Georgia 30333

PATIENT NAME:_____ CHART #_____ DOB_____

Appendix J

ble 3. Items evidencing enternal consistency for each scale

Item	Correlation with scale
Susceptibility	
1. My chances of getting breast cancer are great.	.60
2. My physical health makes it more likely that I will get breast cancer.	.42
3. I feel that my chances of getting breast cancer in the future are good.	.63
4. There is a good possibility that I will get breast cancer.	.61
5. I worry a lot about getting breast cancer.	.44
6. Within the next year I will get breast cancer.	.39
Cronbach Alpha	.78
Seriousness	
1. The thought of breast cancer scares me.	.40
2. When I think about breast cancer I feel nauseous.	.35
3. If I had breast cancer my career would be endangered.	.35
4. When I think about breast cancer my heart beats faster.	.46
5. Breast cancer would endanger my marriage (or a significant relationship).	.39
6. Breast cancer is a hopeless disease.	.32
7. My feelings about myself would change if I got breast cancer.	.54
8. I am afraid to even think about breast cancer.	.54
9. My financial security would be endangered if I got breast cancer.	.29
10. Problems I would experience from breast cancer would last a long time.	.45
11. If I got breast cancer, it would be more serious than other diseases.	.38
12. If I had breast cancer, my whole life would change.	.55
Cronbach Alpha	.78
Benefits	
1. Doing self breast exams prevents future problems for me.	.27
2. I have a lot to gain by doing self breast exams.	.48
3. Self breast exams can help me find lumps in my breast.	.50
4. If I do monthly breast exams I may find a lump before it is discovered by regular health exams.	.47
5. I would not be so anxious about breast cancer if I did monthly exams.	.21
Cronbach Alpha	.61
Barriers	
1. It is embarrassing for me to do monthly breast exams.	.46
2. In order to do monthly breast exams I have to give up quite a bit.	.62
3. Self breast exams can be painful.	.32
4. Self breast exams are time consuming.	.48
5. My family would make fun of me if I did self breast exams.	.50
6. The practice of self breast exams interferes with my activities.	.62
7. Doing self breast exams would require starting a new habit, which is difficult.	.39
8. I am afraid I would not be able to do self breast exams.	.47
Cronbach Alpha	.76
Motivation	
1. I eat a well-balanced diet.	.33
2. I always follow medical orders because I believe they will benefit my state of health.	.29
3. I frequently do things to improve my health.	.45
4. I take vitamins when I don't eat good meals.	.26
5. I search for new information related to my health.	.39
6. I have the recommended yearly physical exams in addition to visits related to illness.	.31
7. I have the recommended periodic dental exams in addition to visits for a specific problem.	.19
8. I exercise regularly—at least three times a week.	.37
Cronbach Alpha	.62

Champion, Victoria (Apr. 1984) Instrument development for the health belief model constructs, Advances in Nursing Science, 73-85.

Appendix K

MULTIPLE CHOICE. CIRCLE THE CORRECT ANSWER(S).

1. DPT malpractice claims are usually based on:

   a. giving DPT in the face of contraindications
   b. failure to warn of risks
   c. failure to report adverse events
   d. SIDS temporally related to the vaccine

2. DPT immunization should be deferred in children who:

   a. are premature
   b. have afebrile U.R.I. symptoms or severe allergic rhinitis
   c. have completed a course of steroids in the past month
   d. have suspected (but incompletely defined) neurologic conditions

3. SEVERE reactions to DPT include:

   a. hives
   b. rectal temp 104° beginning 36 hours post immunization
   c. rectal temp 105° beginning 36 hours post immunization
   d. shock-like state (hypotonic-hyporesponsive episode) with 48 hours
   e. persistent, inconsolable crying last $\geq$ 1 hour
   f. convulsion with fever within 3 days
   g. convulsion without fever within 7 days
   h. encephalopathy within 28 days

4. Patients with a well-controlled seizure disorder:

   a. have an increased risk of a seizure after DPT immunization
   b. should not receive DPT
   c. have the same risk of seizure after DPT as a patient without seizures, but with a family hisory of seizures

5. Common adverse events following intramuscular DPT immunization include:

   a. erythema, induration and pain at injection site for 12 to 72 hours
   b. fretfulness, drowsiness
   c. temp to 104.9°
   d. anorexia, vomiting
   e. sterile nodule

Appendix K

TRUE/FALSE Circle the correct answer.

6. T F The frequency of fever and local reactions increases with increasing numbers of DPT doses.

7. T F The frequency of fretfulness and vomiting decreases with increasing numbers of DPT doses.

8. T F Arthus-type hypersensitivity reactions (characterized by severe local reactions, generally 2 to 8 hours after an injection) occasionally follow DPT or DT.

9. T F The frequently quoted risk of developing encephalopathy (brain disease) attributable to pertussis vaccine is 1/310,000.

10. T F The physician is obliged to report adverse DPT reactions occurring within 4 weeks of vaccination.

11. T F A reduced individual dose of DPT is recommended to small babies to reduce the frequency of severe reactions.

12. T F 75% of pertussis cases occurs in children less than 1 year, more than half of whom are hospitalized.

13. T F For every 1,000 reported pertussis cases, 22 develop convulsions and/or have more severe brain problems.

14. T F The most common "reaction" after DPT vaccination is no reaction at all.

15. T F The reported frequency of:

3 or more hours of continuous crying is:	1/100
temp 105° or greater is:	1/330
unusual, high pitched cry is:	1/900
convulsions or limp, pale episodes is:	1/1750

EXTRA CREDIT QUESTION

What must be asked and documented at the 4 month, 7 month, 18 month and preschool Health Maintenance visit?
David Marsh M.D. (Dec. 1986)

Appendix K

Quiz on Polio and MMR Vaccines

	True	False
1. OPV must not be given to anyone over 12 years of age.	T	F
2. Approximately one child out of every 1000 who gets the measles disease gets encephalitis.	T	F
3. OPV can cause paralytic polio in the person vaccinated in 1 in 8.1 million doses.	T	F
4. Measles disease can cause rash, runny nose and eyes and cough and can last up to a month.	T	F
5. The IPV has no known risk of causing paralytic polio.	T	F
6. Mumps disease frequently causes sterility and deafness.	T	F
7. Rubella is a mild disease in young children but can have serious repercussions if contracted in the first trimester of pregnancy.	T	F
8. Because OPV vaccine is absorbed in the bowel, it should not be given to children with diarrhea.	T	F
9. The MMR vaccine can cause a rash or slight fever 1-2 weeks after administration of the vaccine in 1-5 children who receive the vaccine.	T	F
10. MMR vaccine is contraindicated in anyone who is sick with more than a cold, or who is immunocompromised.	T	F

Appendix L

Responsibilities of Receptionist

1. When parents check in for 2 month, 4 month, 7 month, 11, 15 or 18 month visit, tell then that a study is being conducted by Norma Hallock,PNP for requirements for a Master's degree in Nursing. It is on attitudes of parents regarding childhood immunizations.
Ask if they would like to participate?

2. Give them the packet after tearing off provider questionnaire which is the last page.

3. Place provider questionnaire on the child's chart.

4. If parent refuses: Mark baby's age in left hand corner and write refused across the front page. File with completed forms.

5. Collect questionnaires in sealed envelope before parent leaves the office and place in box provided in bottom drawer of front desk.

Responsibilities of Nurse or Aide

1. Be sure that parent has fact sheet before you leave the room after baby has been weighed and measured.

2. Nurse asks parents if they have any questions when parent signs the informed consent form.

3. Nurse gives immunization if consent form is signed and all questions are answered.

4. Nurse asks provider to speak with parents if they are ambivalent or have questions nurse can't answer.

Responsibilities of NP or MD

1.. Ask if any side effects from previous immunizations.

2. Ask if any questions regarding vaccine that child is supposed to get today.

3. Document answer to #1 and #2 in chart or dictated note.

4. Complete brief questionnaire and put in manila envelope and place in your desk.

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