IMMUNIZATION ASSESSMENT OF TWO YEAR OLDS IN A SELECT HARRIS COUNTY POPULATION

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BY

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November 17, 1993
Date

To the Associate Vice President for Research and Dean of the Graduate School:

I am submitting herewith a Thesis written by

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entitled "Immunization Assessment of Two Year Olds in a Select Harris County Population".

I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nursing.

Major Professor

We have read this thesis and recommend its acceptance:

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Accepted

Associate Vice President for Research and Dean of the Graduate School

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IMMUNIZATION ASSESSMENT OF TWO YEAR OLDS IN A SELECT HARRIS COUNTY POPULATION

ABSTRACT

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The purpose of this retrospective study was to explore the relationship between race, income, primary language and immunization rates of preschoolers in seven Northeast Harris County school districts. Kindergarten and first grade student records were abstracted using a multistage sampling design to systematically review 806 records. Descriptive and inferential statistics were employed to summarize data and to determine the association between race, income, primary language, and immunization rates. The sample consisted of 69% White and 31% non-White students. High income schools comprised 37% of the sample and 63% were low income schools. English was the primary language for 93% of the students, while 6% identified Spanish as the

Spanish as the primary language spoken at home. Disease prevention standard was met by 460 (57%) students by age two. The gold standard was met by 315 (39%) of the students and only 69 students (19%) were fully immunized age appropriately. Income was found to significantly influence immunization rates.

TABLE OF CONTENTS

LIST OF TABLES

Table

CHAPTER I

INTRODUCTION

Prevention of disease through the use of vaccines is one of the great success stories in preventive health medicine in the United States (Plotkin & Mortimer, 1988). Smallpox and poliomyelitis have essentially been eradicated from the general population. The incidence of other diseases that were once common, such as tetanus and meningitis, has been radically reduced.

Despite these successes, children remain at risk for acquiring childhood diseases such as diphtheria, pertussis, measles, mumps and rubella. One of the most important national health objectives identified for the year 2000 goals is to achieve at least a 90% success rate in immunization coverage against these conditions by two years of age (U.S. Dept. of Health and Human Services, 1990). According to Hinman (1990), morbidity and mortality can be further reduced by providing age appropriate immunizations to children. In the early 1970's state statutes were passed

to ensure minimum requirements of immunizations for school entry (Immunization Requirements for Children & Students, 1970). Immunization levels of 5-6 year old children have increased in all of the states due to the enforcement of these regulations. In the 1989-1990 school year, more than 95% of children enrolled had documented evidence of having the required vaccinations by school entry (Hinman, 1991).

Despite the increase in immunization rates in 5-6 year olds, a measles outbreak occurred in 1989 and intensified to epidemic proportion in 1990. This measles outbreak claimed over 60 lives in the United States. Between October 1988 and September 1989, there were 1802 confirmed cases of measles reported in Harris County (Canfield, 1989). Two hundred seventy-five persons required hospitalization and ten deaths were attributed to complications of measles. The majority of the measles epidemic victims (47%) were preschool children. Immunization rates in the preschool population are lower than those for the school-aged children making them more susceptible to disease (Eddin, Sirotkin & Holmgreen, 1985).

Very little is known about the immunization rates in the preschool population in the United States. During the spring of 1991, the Centers for Disease Control (CDC), in collaboration with state and local health departments, conducted a retrospective survey of immunization records of students entering school in nine U. S. cities. Data from this survey revealed that no city had better than 50% immunization success rate for recommended vaccines in children at two years of age.

Immunization rates in the study ranged from 42% in El Paso's children to 10% in the city of Houston. These rates fall far below the year 2000 goal. Data also revealed that socioeconomically disadvantaged minority populations were the children least likely to be immumized. In a similar study conducted in Chicago, 50% of students enrolled in predominantly Black and Hispanic schools were immunized against measles by their second birthday, compared to 80% of students in predominantly White schools (Morbidity, Mortality Report, CDC, 1990).

According to the 1990 census data, Harris County has 135,936 children under the age of two years (U.S. Dept. of Commerce, 1990). No data have been reported on the immunization status of this group of preschool children. Assessing immunization rates and targeting programs to reach the under-immunized preschool population is needed.

Problem Statement

The purpose of the study was to address the following questions: What are the immunization rates of children enrolled in Kindergarten and first grade in Northeast Harris County? Is there a relationship between immunization rates and race, primary language spoken at home, and socioeconomic level?

Rationale For Study

There is a lack of existing data and programs reported to be assessing the immunization status of the high risk population group i.e. preschool children in Harris County. Since lower socioeconomic, ethnic minority children have been shown to suffer increased morbidity and mortality from preventable childhood illnesses, the aim of the study was to

evaluate immunization records of kindergarten and 1st grade school children within a specific geographic area (seven school districts within the Humble and Baytown region of Harris County).

The national goal stated by Surgeon General Novello in a speech to Immunization Program Managers and CDC immunization personnel in Washington D.C., June 1991, is to attain a minimum of 90% immunization coverage of children by two years of age. Assessing immunization rates and identifying possible risk factors would offer the immunization program manager baseline data for targeting program activities. Community awareness and education programs can be targeted to reach unimmunized populations. Funds from state and federal grants can be solicited to help implement these programs in the needed areas. The data will serve as a baseline for evaluating program effectiveness in the targeted areas.

Conceptual Framework

The PRECEDE health education model was used as the conceptual framework for the research study. PRECEDE is an

acronym for "predisposing reinforcing and enabling causes in educational diagnoses and evaluation" (Green, Kreuter, Deeds & Partridge, 1980). The model uses a problem solving approach to help educators identify and change individuals' and/or groups' health-compromising behaviors. When the quality of life of an individual or group is affected by a health problem, the model can be used to organize data and evaluate the effectiveness of program activities in changing targeted behaviors. Each part of the acronym "PRECEDE" is explained as a phase that helps the educator identify information needed to change the individual/group behavior.

Phase one, predisposing, begins by evaluating the environment in which the individual or group lives. "What is the quality of life of the individual or group?" (Green, Kreuter, Deeds & Partridge, 1980). What are the social behaviors or characteristics of the group? What specific health problems appear to contribute to the problems identified?

The second part of the acronym, reinforcing, identifies social factors that influence health behaviors. Any reward

or punishment following or anticipated as a consequence is explored. Assessment of data generated from epidemiological and medical investigations are also included in this phase (Green, Kreuter, Deeds & Partridge, 1980).

Phase three, enabling causes, indicates specific health related behaviors that appear to be linked to the health problem. Any characteristic of the environment, any skill or resource required to attain the behavior is also identified. These characteristics will be the target of interventions to help effect change. In this phase, nonbehavioral factors are linked to health problems. Factors such as economy or environment may cause limitation in program implementation and must be taken into consideration (Green, Kreuter, Deeds & Partridge, 1980).

Phases four, five and six encompass categorizing all the information gathered from the previous phases. The health educator then decides what interventions will be developed and implemented in the program to effect change (Green, Kreuter, Deeds & Partridge, 1980).

Phase seven is identified as the evaluation component. Although it is listed last in the model, it is a continuous part of the framework and occurs during the entire process as well as during the evaluation of program effectiveness.

Health education activities directed toward reinforcement of positive health behaviors or interruption of health risks will be guided by the use of the PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980). Use of the model offers insight into the evaluation process. The model directs attention to the planning process from the outcome end. Factors important to an outcome must be identified and diagnosed before the intervention is designed. Failure to do so will undoubtedly lead to interventions based on guesswork and a greater risk of being misdirected and ineffective (Green, Kreuter, Deeds & Partridge, 1980).

The research study evaluated the environment by selected demographic questions. Reinforcing was evaluated by an analysis of immunization rates in the Baytown and Humble communities. Possible economic and/ or cultural factors that may influence rates and put the community at

risk were assessed using Phases I, II, and III of the PRECEDE model. The information obtained from the survey was shared with community leaders to complete the final phases of the precede model. Strategies were developed to direct resources toward eliminating identified barriers in the current immunization program. Each step was evaluated while in progress, and the entire program was evaluated upon completion.

Assumptions

The study was based on the PRECEDE model (Green, Krueter, Deeds & Partridge, 1980). The PRECEDE model contains several underlying assumptions:

1. Certain patterns of health behaviors are beneficial.
2. Health education is related to health behaviors.
3. Behavior can be changed.
4. Clients are willing to change to healthy behaviors.
5. Change can result in better health outcomes.

6. Change in health behaviors is a mutual client-educator endeavor.
7. The health educator intervention is morally and politically correct.

Research Question

The research questions of the study are:

1. Is there a difference in the rate of immunizations for White students versus non-White students?
2. What is the immunization rate of students enrolled in schools of high socioeconomic status compared to those students enrolled in schools of low socioeconomic status?
3. Will the immunization rate of English-speaking students be the same as those of non-English-speaking students?

Definition of Terms

Operational definition for each term follows;

1. Childhood immunization - the series of vaccinations that are recommended by the American

Academy of Pediatrics (AAP) (Appendix E) as follows:

a) DPT, Diphtheria-Pertussis-Tetanus - a combination of diphtheria and tetanus toxoid combined with pertussis vaccine.

b) OPV, Oral Polio Vaccine - an orally administered poliovirus vaccine.

c) MMR, Measles, Mumps, Rubella - a combination of live attenuated vaccine for these three diseases.

2. Level of Immunization the completion status of the immunization series recommended by the AAP.

3. Immunization Rate - the number of children with complete immunization series divided by the total number of children.

a) Disease Prevention Standard - three (3) doses of DPT, three (3) doses of OPV and one (1) dose of MMR.

b) Gold Standard - four (4) doses of DPT, three (3)doses of OPV and one (1) dose of MMR.

c) Age Appropriate Standard - four (4) doses of DTP, three (3) doses of OPV, and one (1) of MMR given at the recommended time with the recommended time interval between doses (AAP 1991, see Appendix F).

4. Race - belonging to a particular cultural or ethnic group of humanity. The parent answers the race question on the school record. Only White, Black, Hispanic, or Other category grouping were used in the study.

5. Socioeconomic Level - the position of a particular group on the continuum of society's material wealth. The operational definition for this study is the percent of students enrolled in the federal free lunch program at a school.

a) High Socioeconomic - less than twenty percent (20%) of the students in a particular school enrolled in the free lunch program.

b) Low Socioeconomic - twenty percent or more of the students enrolled in the school's free lunch program.

6. Language - the expression and communication of emotions or ideas between human beings by means of speech and hearing. The primary language was obtained from the school's Primary Language Survey completed by parents. Language will be grouped by English and non-English.

Limitations

The following limitations may have an effect on the results of the study:

Retrospective studies by their nature are studies of occurrences that occurred in the past; because of that, other variables extraneous to the variables studied may have had an effect on the way children were or were not immunized. Social or other influences which impact immunization rates may have occurred between the time the study population was immunized and the present. Therefore, projecting rates found in this study to children who are presently two years old must be undertaken with caution.

Children who were born in other areas, such as rural areas or in other countries, may have other limitations to being immunized that do not exist in Harris County.

Extraneous variables such as the number of other children in the household and the birth order of the child being assessed may also be factors. First-born children are documented to be better immunized than children who are born after the first child. No information is available on the error rate of school personnel who record immunization information received from parents/ guardians.

Summary

Children who are under-immunized according to the recommended schedule are at risk for many diseases that have the potential to cause disability and death. Since there are safe and effective vaccines available at low or no cost, methods must be found to increase the immunization rate through education and awareness among parents of preschool children. The PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980) was used as the theoretical framework for the study. Immunization and demographic information were gathered in a retrospective study of the records of students who are enrolled in the Baytown and Humble area school districts to assess immunization rates, socioeconomic,

ethnic, and cultural factors. Results from this study will be used to design an educational program to raise immunization rates of children at greatest risk and as baseline data to evaluate change.

CHAPTER 2

REVIEW OF THE LITERATURE

The existing investigation and related literature on preschool immunization rates in the United States were reviewed using the PRECEDE Health Education Model as an organizing framework. PRECEDE is an acronym for "predisposing, reinforcing and enabling causes in the educational diagnoses and evaluation" (Green, Kreuter, Deeds & Partridge, 1980).

The PRECEDE model uses a problem solving approach to assist health educators to identify and change individual or groups' health-compromising behaviors. Each part of the acronym "PRECEDE" is explained as a phase that helps the researcher identify information required to change the individual/group behavior. Phase one, "predisposing," begins by evaluating the environment/ characteristics of the individual or group. The second part of the acronym, "reinforcing," identifies social factors that influence health behaviors. Phase three, "enabling causes,"

indicate specific health-related behaviors that appear to be linked to the health problem. Phases four, five and six encompass the categorization of all the information gathered from the previous phases. Phase seven of the acronym is identified as the evaluation component and is used throughout the preceding phases.

Predisposing Factors

Epidemiological studies were reviewed to examine the environmental factors identified during the outbreak surveillance. The environment identified in phase one of the PRECEDE model (Green, Kreuter, Deeds & partridge, 1980), provides insight into a specific situation that appears to contribute to or cause the health problem. Since the development and use of immunization protocols in school enrollees, there has been a reduction of morbidity and mortality of vaccine-preventable diseases. However, these successes are overshadowed by the apparent lack of immunizations in the preschool age group.

Assessment of preschool immunization rates in the United States (U.S.) is difficult due to the lack of a

mechanism in place to monitor immunization rates. Reviewing records of children entering school for the first time can provide retrospective estimates of immunization rates of children at two years of age and identify possible risks for disease outbreaks. During the spring of 1991, the Centers for Disease Control (CDC) staff surveyed immunization records of kindergarten students in nine U. S. cities to identify the immunization rates of these students at two years of age (MMWR, 1991). Data from these surveys determined that no city studied had a better than 50% immunization rate of its children for the recommended immunizations by two years of age. Immunization rates ranged from 10 to 40% for four doses of diphtheria, pertussis, tetanus (DPT); three doses oral polio vaccine (OPV); and one dose of measles, mumps, rubella (MMR). Immunization rates of three DPT, three OPV and one MMR ranged from 40 to 61 percent.

In another immunization retrospective study (MMWR, 1992b) conducted in Hartford and New Haven Connecticut in 1990-1991, first-grade students' records were reviewed for

completion of primary series (3 DPT, 3 OPV, 1 MMR) by two years of age. Information on race, per capita income of census tract and place of birth was also recorded. Results identified immunization rates at 67% in children by two years of age. The subjects were economically disadvantaged with 60% of students enrolled in the free lunch program. The school records of the Hartford students reflected that 37% were Black and 55% were Hispanic, while the proportion of those in the New Haven school district consisted of 59% Black and 19% Hispanic students.

Measles outbreak surveillance is a valuable tool in monitoring immunization program impact on disease and characterizes the environment in high risk areas. During the 1990 measles epidemic, inner city preschoolers were disproportionally affected by measles when compared to those in the non-inner city areas (Atkinson, Hadler, Reed & Orenstein, 1992). During the measles outbreak in seven large urban cities in 1991, Black, Hispanic and American-Indian children, between one and five years of age, were respectively 4, 6, and 19 times more likely to be

unimmunized than white children (Atkinson, Hadler, Reed & Orenstein, 1992).

During a measles outbreak in Duval County Florida (MMWR, 1993) in 1991-92, 76% of the 192 confirmed cases of measles were among children under five years of age. Black and Hispanic children were predominantly affected.

Reinforcing Factors

Social science literature provided information on reports of possible social factors in obtaining or not obtaining immunizations. The PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980) recognizes that social factors influence health behaviors.

In the study conducted by Orenstein, Atkinson, Mason & Bernier (1990), possible social factors are identified. One third of the students with low immunization rates came from migrant families. The data revealed migrant children were significantly more likely to have incomplete immunization series by their second birthday than non-migrant children. The place of residence at birth was also a predictor of incomplete immunization status.

A study (MMWR, 1991) conducted in 1990, which included metropolitan and rural schools, compared measles immunization rates of students enrolled in the first grade with those in the fifth grade. Measles levels were similar or higher at two years of age in first graders when compared to those students in the fifth grade. First grade students attending private schools had a higher percentage of immunization against measles by two years of age than students enrolled in the public school system. A comparison of immunization records of inner city schools versus non-inner city school districts revealed that non-inner city schools also had higher immunization levels than those enrolled as inner-city schools. Within inner-city schools, classified as White, Black, Hispanic or mixed schools, there were similar immunization levels. Race was not a predisposing factor for low immunization rates. Researchers found immunization rates between schools differed substantially between cities (MMWR, 1991).

Enabling Factors

A retrospective study (Higgins, 1990) carried out in

Tyler, Texas to identify immunization rates and effect of race and sibling order revealed that minority children with older siblings were at higher risk for being underimmunized by two years than first-born children. When the researcher controlled for income, Anglo children were more likely than Black or Hispanic children to have completed immunization.

Evaluating risk factors associated with delayed immunizations, Bobo, Gale, Thapa & Wassilak (1993) reviewed 1163 children records. Findings revealed that only 60% of the children received the recommended immunizations by two years of age. Child birth order, family income, maternal education and marital status significantly predicted failure to immunize. When a multivariate logistic model was used to analyze the information, birth order and maternal education consistently predicted immunization status. The first born child and children of more educated mothers were more likely to be adequately immunized.

In an early study conducted to identify risk factors associated with inadequate immunization levels (Marks, Halpin, Irvin, Johnson & Keller, 1979), findings revealed

that 73% of the children completed the recommended disease prevention standard (3 DTP, 3 OPV and 1 MMR). When the gold standard immunization status was reviewed (4 DTP, 3 OPV, 1 MMR), only 41% of children had completed doses by age two. Increased paternal or maternal education (greater than 12 years of formal education), small family size and higher socioeconomic status were all independently associated with completed primary series (3 DTP, 3OPV, 1 MMR). Race was not found to be a factor for poor immunization rates when socioeconomic status was controlled.

Evaluation of Identified Factors "Enabling Causes"

A study focused toward improving the immunization delivery system was conducted by Markland & Durand (1976) who collected data relevant to psycho-social factors implicated in the failure to receive immunizations. Children from young, poor, non-white, less-educated parents tended to be inadequately immunized.

According to Orenstein, Atkinson, Mason & Bernier (1990), all children in the U. S. have the potential to access immunization services. This fact is demonstrated in

the 95-97% immunization rates of children entering school. Phase three of the PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980) include the variable "causes" that appear to be linked to the health problem, such as, type of provider, availability of immunization and clinic utilization patterns.

In a study of the records in 13 private physicians' offices, researchers reported a 37% immunization rate by age two for 813 children whose records were classified as active status. Children who received immunizations from both public and private health care providers were reported to have a lower immunization rate (22%) than those who only used private providers (McDaniel, Patton & Mather, 1975).

According to the literature, the National Healthy People Goal (U.S. Dept. of Health and Human Services, 1990) of 90% immunization rates by age two originally set for 1990 and revised for the year 2000 has not been met. Factors that have been associated with low immunization rates differ substantively between and within study groups. The common predictive variables appear to be low income, parental

education level and birth order. Service delivery barriers, such as accessibility, availability and affordability are possible factors in obtaining preventative health services but were not reviewed for this study.

The literature suggests that programs must be tailored to meet the needs of the unimmunized populations. To attain the goal set forth, programs must be directed toward reaching high risk populations and identifying potential characteristics of unimmunized or inadequately immunized children.

Summary

In conclusion, the majority of the literature focuses on immunization data collected during measles outbreaks or retrospective audits of school records. Although these studies provide information on specific segments of the population, the results cannot be generalized to the preschool population. Researchers have identified certain variables as being significant in predicting immunization rates; however, among school children, additional studies are needed to identify what the immunization rates are and

factors that support these results in the preschool population. There is also a paucity of published research examining the status of age-appropriate immunizations among preschool children.

CHAPTER 3

METHODOLOGY

A retrospective, nonexperimental design was used to answer the study questions. Retrospective studies are ex post facto investigations which look at variables and the possible links to a phenomenon that occurred in the past (Polit & Hungler, 1987). The retrospective study assessed the immunization rates at the recommended ages among children enrolled in kindergarten and first grade in a specific area of Harris County during 1991-1992 school year. Information on race, language and socioeconomic status was gathered in an attempt to identify factors influencing the immunization rates among the population.

Setting

The setting was several school health clinics. Information was abstracted from systematically selected student records in the Baytown/Humble area. The geographic area for Baytown/Humble is within northeast Harris County, excluding the City of Houston. The boundaries are Highway

59 south, Interstate 10 east and the 610 loop. Abstractors who routinely check immunization records in schools for the State Department of Health recorded information from medical and registration data kept on each student at the selected school. Permission to obtain the data was requested from the principal of each school. The researcher also requested a room at the school for data abstraction.

Population

The records of kindergarten and first grade students who were enrolled in the thirty-seven (37) elementary schools in Northeast Harris County, Baytown/Humble area, during the 1991-1992 school year comprised the study population. Every public elementary school in the Baytown and Humble was sent a letter informing them of the study and containing a list of information needed for selecting schools in the study. Information on the number of students enrolled in kindergarten and first grade, their racial breakdown, and the number of students enrolled in the federal free lunch program was gathered from each school to construct a sampling frame.

Sample Size

Sample size was determined using the following formula: $n = Z^2(pq)/d^2$ (U.S. Dept. of Health and Human Services, 1990b). In the study n is equal to the sample size needed for the study. Z is the value from the normal probability distribution such that + or - Z demarks an area equal to $\alpha/2$ on each tail of the distribution. In the study α was set at .05 and Z = 1.96 confidence level. "p" is an estimate of the expected proportion of immunized students. The "q" represents 1 - p. As there are no figures available for this population, .50 will be used in this study as it yields the largest sample size. "d" represents degrees of departure from the truth that is allowed or the accuracy desired in this study. "d" will be set at .05. In the study "n" = $1.96^2[(.50)(.50)]/(.05)^2$ yielding an n = 384, the minimum sample size.

Information on race was used to estimate the sample size needed to obtain a representative sample of each of the racial groups for each district. The number of children in each district was divided by the total number of children in

the designated area; this calculation determined the percentage of children from each district. School districts were listed with the percent distribution for each of the four races (White, Black, Hispanic and Other). Statistical inferences were made only on the first three groups, White, Black and Hispanic. "Other" was a very small, heterogeneous group, and the sample sizes would need to be much larger to make inferences about this group. The estimated racial proportion of children in each district was divided by "n" (384 the minimum sample size) to determine the number of children in each cell. To avoid empty cells or cells with less than 5 subjects when the data are stratified by school district and race, sample size was increased proportionally.

Sampling Design

A multistage sampling design was used to select students' records for the sample. A cumulative list of all eligible schools was developed as a sampling frame. Schools within each district were stratified by socioeconomic status and alphabetized. The Center for Disease Control (CDC) recommends using thirty-five schools (or clusters) when

conducting a survey of this type. The total number of children in the designated area "N" was divided by 35 to determine the sampling interval. Systematic sampling was used to select school clusters. Systematic sampling is a convenient and effective way to sample a population and can be applied to lists that have been stratified (Polit & Hungler,1987).

A random start number was selected from a table of random numbers. When the random start number fell within the number of children in the first school on the cumulative school list, that school was selected. The sampling interval was then added to the random start number. When the sum of that number fell within the first school, the first school was doubled sampled. When the number was greater than the number of children in school one, but less than the total in school two, school two was selected. The investigator continued adding the sampling interval and selecting schools until 35 schools were selected.

The number of children selected from each school cluster was determined by dividing the sample size (n) by

35. The sampling interval within the cluster was calculated by dividing the number of kindergarten and first grade children in the school by the number of children to be selected from that cluster in order to systematically sample that school. A random start number was selected for each school. Children were stratified by grade and listed alphabetically by teacher. Starting with the random start number record, every "nth" (the sampling interval) child's record was selected.

Inclusion Criteria

Students enrolled in kindergarten and first grade during the 1991-1992 school year in selected public schools on the Northeast side of Harris county were included.

Exclusion Criteria

Children not enrolled in selected public schools and selected grades or those with incomplete records were excluded from the study. Schools within Houston city limits were also be excluded.

Protection Of Human Subjects

Permission to conduct the study was obtained from the Institutional Review Board of Texas Woman's University and the agency where the research took place (Appendix A and B). Confidentiality was maintained to protect students' records. Code numbers were assigned to students selected to be in the study (Appendix C). Lists of student names and their code number were kept in the researcher's locked file cabinet and will be destroyed at the completion of the study. The abstracting tool had no other identifying marks to link numbers to students. Only group data were presented.

Instrument

An instrument developed for this survey was used to abstract the record data (Appendix D). The instrument consisted of two parts. Part one was the demographic data which gathered information about race and primary language spoken a home. Part two of the instrument gathered the immunization information. The tool was presented to four nurses who do program surveillance and quality assurance activities in the County Health Department, to an

epidemiologist, and to the immunization surveillance coordinator for the State Health Department for content validity. Upon their recommendation that the abstracting tool would collect the data needed to answer the research questions, the tool was adopted for the study.

To insure content validity, ten percent of the records abstracted were reabstracted to identify the percent of reliability of data recorded by each abstractor and for the overall project. Records were also entered twice into the computer to identify errors and check the reliability of data entered.

Data Collection

Schedules were developed that were convenient for both school personnel and data abstractors. Abstractors picked names from current school rosters. Lists of students were arranged alphabetically by the teacher's last name: kindergarten, then first grade. Abstractors picked students' names according to the sampling procedures listed above for that school and recorded them on Form 1. Once the list was complete, abstractors recorded the immunization and

demographic information from the record to the abstracting tool. Tracking forms were used to make sure that every student record that should be abstracted was abstracted, returned to the office, and entered into the computer.

Pilot Study

A pilot study was conducted before the initial data collection. The objectives of the pilot study were twofold: 1) to test the data collection process; 2) to train the abstractors. Results from the pilot study were reviewed and consensus was obtained to proceed with the study. Minor revisions in the tool were recommended and completed. The demographic information, race and primary language were listed last on the original tool. The information was more conveniently gathered before immunization data and was moved from the last sheet of the form to the first sheet.

Treatment Of Data

Frequency of immunizations according to disease prevention rates, gold standard rates and immunization received age appropriately were assessed. Percent of immunization rates were determined by race, socioeconomic

status and primary language. Mantel-Haenszel Chi-square significance testing was used to identify whether the rates identified are significantly different. Chi-square will test whether there is an association between immunization rates and demographic variables such as race and socioeconomic status. Some districts may be excluded from some phases of the analysis if the cell size is determined to be too small.

CHAPTER 4

ANALYSIS OF DATA

The purpose of this chapter is twofold: (a) to describe the sample population, and (b) to summarize data analyses. Descriptive and inferential statistics were employed for sample description and findings related to the following research questions: 1) Is there a difference in the rate of immunizations for White students versus non-White students? 2) What is the immunization rate of students enrolled in schools of high socioeconomic status compared to those students enrolled in schools of low socioeconomic status? 3) Will the immunization rate of English speaking students be the same as those of non-English speaking students?

Description of Sample

The sample population consisted of five and six year old children entering kindergarten and first grade in North East Harris County excluding the City of Houston. The geographic area included seven school districts composed of

37 eligible schools in which 8,409 students are enrolled (Table 1). Thirty-one schools were systematically sampled from the target schools and students were systematically selected from each school using a random start number from a table of random numbers.

TABLE 1

School Districts and Distribution of Student Population

School Districts	Students	Percentage
	n	%
District 1	3087	36.7
District 2	854	10.2
District 3	2820	33.5
District 4	545	6.5
District 5	704	8.4
District 6	287	3.4
District 7	112	1.3
TOTAL	8,409	100.0

Demographic data collected on the participants included information concerning income, race and primary language. Income level was defined by percentage of students enrolled in the federal free lunch program. Schools with 20% or greater of their students enrolled in the federal free lunch program were classified as low income. Schools with less than 20% of their students enrolled in the program was classified as high income. All schools in the target population were classified using these criteria. Race taken from the school immunization record filled out by each child's parent or guardian. Choices for parents/guardians on school records were listed: White, Black, Hispanic and Other. To answer the first research question, race information was grouped into White and non-White categories.

Information on the primary language spoken in the home was obtained from the language survey completed by parents/ guardians at the time of enrollment of the child. Language was grouped into English spoken in the home and all other languages usually spoken in the home identified as non-English.

Disease prevention standard as defined by the American Academy of Pediatrics was categorized as three doses of Diphtheria-Pertussis-Tetanus (DPT), three doses of Oral Polio vaccine (OPV) and one dose of Measles, Mumps and Rubella (MMR). The gold standard consists of four DPT's, three OPV's and one MMR. Age-appropriate standard is the same as the gold standard but given within a designated time frame.

Findings

Eight hundred six records were abstracted. Table 2 identifies demographic distribution of race among the school districts sampled. The majority of the sample was White (69%); the remaining subjects were non-White (30%) and not recorded (1%). Data in subsequent tables are divided into subsamples that meet the immunization standards described earlier: disease prevention standard = subsample 1; gold standard = subsample 2; and age appropriate standard = subsample 3.

Race, Income and Primary Language

The racial composition of the sample population very

Table 2

Race Distribution According to School Districts

(n = 806)

School Districts	Students n	Percentage %
District 1	276	34.2
White	231	83.7
Non-White	43	15.6
Not Recorded	0	0.0
District 2	93	11.5
White	72	77.4
Non-White	21	22.6
Not recorded	0	0.0
District 3	276	34.2
White	148	53.6
Non-White	127	46.0
Not Recorded	1	0.4
District 4	46	5.7
White	34	73.9
Non-White	12	26.1
Not Recorded	0	0.0
District 5	69	8.6
White	46	66.7
Non-White	20	29.0
Not Recorded	3	4.3
District 6	23	2.9
White	21	91.3
Non-White	2	8.7
Not Recorded	0	0.0
District 7	23	2.9
White	2	8.7
Non-White	20	87.0
Not Recorded	3	4.3
TOTAL	806	100.0

closely paralleled the actual distribution in the target population. Less than a 1 percent variation existed between the racial composition of the target and sample populations.

The income distribution for the sample population (Table 3) reveals that 37% (299) of the sample population was classified as high income, and 63% (507) of the sample population was classified as low income. The income distribution variance between the sample population and the actual population was about 2%.

English was identified in the school records as the primary language spoken in the homes on 93% of the records (Table 3). Only 4% percent of the children came from homes where English was not the primary language. Spanish was listed as a second language spoken in the home on 51 records (6%). Ninety-two percent of the school records did not indicate a second language spoken at home. Twenty-eight records did not have language listed and will be omitted from analysis. Information not recorded by the

parent/guardian will be omitted in each of the subsequent tables.

Immunization Criteria

The disease prevention standard (subsample 1) for childhood immunizations, as defined by the American Academy of Pediatrics, includes three DTP's, three OPV's, and one MMR. A total of 460 students out of the 806 sampled (57%) met the disease prevention standard criteria by age 2. Variation between racial groups by immunization rates was noted (Table 4).

Four records did not have race listed and were excluded from the analysis. Sixty percent of the White students (334) were immunized according to the disease prevention standard, whereas only 50% of the minority students (122) met the disease prevention standard criteria.

The data indicated that there was a difference between White and non-White children who were fully immunized. The association between the independent variable (race) and outcome variable (disease prevention immunization) was

TABLE 3

Distribution of the Sample According to Race Socioeconomic Status and Language Spoken at Home (n = 806)

Variable	Frequency n	Percentage %
Race		
White	554	68.7
Non-White	245	30.4
Not Recorded	7	.9
Socioeconomic Status		
High Income*	299	37.1
White	253	84.6
Non-White	44	14.7
Not Recorded	2	0.7
Low Income**	507	62.9
White	301	59.4
Non-White	201	39.6
Not Recorded	5	1.0
Language Spoken at Home		
Primary Language		
English	747	92.7
Non-English	31	3.8
Not Recorded	28	3.5
Secondary Language		
Non-English	51	6.3
None listed	746	92.6

*High Income - less than 20% of students at the schools enrolled in the federal free lunch program.

**Low Income - 20% or greater of students at the school enrolled in the federal free lunch program.

Table 4

Frequency and Percentage of Subjects Meeting Disease Prevention Immunization Standard, (3 DTP's, 3 OPV's, 1 MMR) According to Race, Socioeconomic Status and Primary Language (n = 460)
Subsample 1

Variable	Frequency n	Percentage %
Race	456*	
White	334	73.2
Non-White	122	26.8
Socioeconomic Status	460	
High Income	210	45.7
White	180	86.5
Non-White	28	13.5
Low Income	250	54.3
White	154	62.1
Non-White	94	37.9
Language Spoken at Home		
Primary Language	452*	
English	434	96.0
Non-English	18	4.0

*subjects with no information reported excluded

tested (Table 5). Chi-square analysis showed a difference based on race ($X^2 = 7.62$, df = 1, p = .005).

Table 5

Statistical Association Between Race and Subjects Meeting Disease Prevention Immunization Standard By Age 2 (n = 806)

	Subsample 1					
	Fully Immunized		Not Fully Immunized		Total	
Race	%	n	%	n	%	n
White	60.3	334	39.7	220	69.3	554
Non-White	49.8	122	50.2	123	30.7	245
Total	57.1	456	42.9	343	100.0	799*

*seven subjects with no information reported

A comparison of income to immunization status revealed that 70% (210) of students from high income schools were appropriately immunized using the disease prevention standard. Complete immunizations were achieved in 49% (250) of low income students. From the data there appears to be a difference in the complete immunization rates between low and high income children, with more of the high income children being immunized, $X^2 = 33.57$, df = 1, p = .001 (Table 6).

Table 6

Statistical Association Between Income Level and Subjects Meeting Disease Prevention Immunization Standard By Age 2)

(n = 806)

	Subsample 1 Fully Immunized		Not Fully Immunized		Total	
Income	%	n	%	n	%	n
High	70.2	210	29.8	89	37.1	299
Low	49.3	250	50.7	257	62.9	507
Total	57.1	460	42.9	346	100.0	806

The question arises as to the validity of the race and income results. Since studies have shown these variables to be highly correlated, is the significant difference between the groups influenced by race or due to income level? To explore this question, the variable race was retested controlling for income. Race was identified as being statistically non-significant. Of the high income students immunized according to the disease prevention standard 71% (180) of the White students and 64% (28) of the non-White were fully immunized. On the low income students immunized

according to the disease prevention standard 51% (154) of the White and 47% (94) of the non-White students were fully immunized.

Records were analyzed according to language. There was no difference in the immunization rates of children whose primary language was English compared to those whose primary language was other than English. The percentage of students whose primary language was English and who met the disease prevention standard was 58% (434). Students whose primary language was non-English and met this standard were 58% (18).

The gold standard for childhood immunizations, which includes four DTP's, three OPV's and one MMR as defined by the American Academy of Pediatrics, was used as a measure for comparison. A total of 315 students out of the 806 sampled (39%) met the criteria by age 2 years. Frequency and percentage of the demographic variables for the subjects meeting the gold standard for immunization (subsample 2) were noted in Table 7.

Table 7

Frequency and Percentage of Gold Standard (4 DTP's, 3 OPV's, 1 MMR) According to Race, Socioeconomic Status and Primary Language (n = 315)
Subsample 2

Variable	Frequency n	Percentage %
Race	313*	
White	237	75.7
Non-White	76	24.3
Socioeconomic Status	315	
High Income	158	50.8
White	139	88.0
Non-White	19	12.0
Low Income	155	49.2
White	98	63.2
Non-White	57	36.8
Language Spoken at Home		
Primary Language	309*	
English	297	96.1
Non-English	12	3.9

*some subjects with no information reported

Data indicated that there is a difference between the number of White children and non-White children who are fully immunized by the gold standard. Forty-three percent

(237) of the White students were immunized according to the gold standard whereas only 31% (76) of the minority students met this criterion. Significance testing of the gold standard by race; socioeconomic status; and primary language is detailed in consecutive tables.

The association between the independent variable of race and the outcome variable of gold standard was tested (Table 8). Chi-square analysis revealed a significant difference between groups based on race ($X^2 = 9.85$, df = 1, p = .001).

A comparison of income to gold standard immunization status revealed that 54% (160) of students from high income schools were appropriately immunized using the gold standard. Complete immunization was achieved in 31% (155) of low income students. From the data there appears to be a difference in the complete immunization rates between low and high income children ($X^2 = 41.52$, df = 1, p = .001), with more of the high income children being immunized than those within low income (Table 9).

Table 8

Statistical Association Between Race and Subjects Meeting Gold Immunization Standard By Age 2

(n = 806)

	Subsample 2					
	Fully Immunized		Not Fully Immunized		Total	
Race	%	n	%	n	%	n
White	42.8	237	57.2	317	69.3	554
Non-White	31.0	76	69.0	169	30.7	245
Total	39.2	313	60.8	486	100.0	799*

*no race information reported on 7 children

The question again arises as to the relationship of race to income on immunization rates. Since literature shows these variables to be highly correlated, is the significant difference between the groups influenced by race or due to income level or both? To explore this question, the variables were retested with income controlled. The data revealed no statistically significant relationship for race when controlled for income. There were 55% of the high income, White students immunized according to the gold standard (139); and 43% of the non-White students (19).

Table 9

Statistical Association of Income Level and Subjects Meeting Gold Immunization Standard By Age 2
(n = 806)

Subsample 2						
	Fully Immunized		Not Fully Immunized		Total	
Income	%	n	%	n	%	n
High	53.5	160	46.5	139	37.1	299
Low	30.6	155	69.4	352	62.9	507
Total	39.1	315	60.9	491	100.0	806

There were 33% (98) of the low income, White students immunized according to the gold standard; and 28% (57) of the non-White students.

When analyzed for the association of primary language and rate of immunization, data revealed no difference in English and non-English speaking students and immunization rates. Students who met the gold standard and whose primary language was English were 40% (297). Students whose primary language was non-English and who met the gold standard were 39% (12).

Age appropriate valid childhood immunizations (Subsample 3) include the same criteria as the gold standard

(4 DTP's, 3 OPV's and 1 MMR) but immunizations must be given within the time frame recommended by the American Academy of Pediatrics (1991) (Appendix F). A total of 69 (9%) students out of the 806 sampled, met these criteria by age 2 years. (Table 10). Statistical testing of the race, socioeconomic status, and primary language spoken at home was conducted and is detailed in the following tables.

Data indicate that there is a difference between the number of White children and non-White children who are fully immunized age appropriately. Eleven percent (58) of the White students were immunized according to the Age Appropriate standard whereas only 5% (11) of the minority students met these criteria (Table 11). Analyses show a significant difference between White and non-White students ($X^2 = 7.69$, df = 1, p = .006).

A comparison of income to immunization status revealed that 14% (41) of students from high income schools were appropriately immunized using the age-appropriate standard. Age appropriate immunization was achieved in 6% (28) of low income students. From the data there appears to be a

Table 10

Frequency and Percent of Age Appropriate Immunization According to Race, Socioeconomic Status and Primary Language (n = 69)
Subsample 3

Variable	Frequency n	Percentage %
Race	69	
White	58	84.1
Non-White	11	15.9
Socioeconomic Status	69	
High Income	41	59.4
White	35	85.4
Non-White	6	13.6
Low Income	28	40.6
White	23	82.1
Non-White	5	17.9
Language Spoken at Home		
Primary Language	69	
English	66	95.7
Non-English	3	4.3

difference in the complete immunization rates between low and high income children, with more of the high income being immunized (X^2 = 16.10, df = 1, p = .001 (Table 12).

The question arises as to whether the difference between the groups is influenced by race or due to income?

Table 11

Association Between Race and Subjects Meeting Age-Appropriate Immunization Standard By Age 2 (n = 806)

	Subsample 3 Fully Immunized		Not Fully Immunized		Total	
Race	%	n	%	n	%	n
White	10.5	58	89.5	496	69.3	554
Non-White	4.5	11	95.5	234	30.7	245
Total	8.9	69	91.4	730	100.0	799*

*seven students with no information reported

Table 12

Statistical Association of Income Level and Subjects Meeting Age-Appropriate Immunization Standard By Age 2 (n = 806)

	Subsample 3 Fully Immunized		Not Fully Immunized		Total	
Income	%	n	%	n	%	n
High	13.7	41	86.3	258	37.1	299
Low	5.5	28	94.5	479	62.9	507
Total	8.6	69	91.4	737	100.0	806

To explore this question the variable was tested with income controlled (Table 13) and was found to be significant in low

income students (X^2 = 6.07, df = 1, p = .038) and non-significant in high income students.

Data reveals there is no difference in the immunization rates of children whose primary language is English compared to those whose primary language is other than English. Students who meet the age-approppriate immunization standard and whose primary language was English was 9% (66). Students who identified their primary language as non-English and meet the age-appropriate was 10% (3).

Table 13

Income Level and Subject Meeting Age-Appropriate Immunization Standard By Age 2 Controlling for Income (n = 806)

High Income

Subsample 3						
	Fully Immunized		Not Fully Immunized		Total	
Race	%	n	%	n	%	n
White	13.8	35	86.2	218	85.2	253
Non-White	13.6	6	86.4	38	14.8	44
Total	13.7	41	86.3	256	100.0	297*

Low Income

	Fully Immunized		Not Fully Immunized		Total	
Race	%	n	%	n	%	n
White	7.6	23	92.4	278	60.0	301
Non-White	2.5	5	97.5	196	40.0	201
Total	5.6	28	94.4	474	100.0	502*

*omitted students with no information reported

Summary of Findings

Descriptive and inferential techniques were employed to evaluate the immunization status of children at 2 years of age. Data were obtained from 806 school records of 7 school districts. The variables of race, income, and primary language were evaluated and their relationship to immunization rates was analyzed. The findings of this study support earlier research by Marks, Halpin, Irvin, Johnson & Keller (1979) in which income was found to be related to immunization rates.

The PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980) was used to organize the variables. Race and primary language spoken at home were identified as environmental factors that are considered "predisposing" factors according PRECEDE Model. Additionally, socioeconomic status was identified as a social factor and considered to be an "enabling cause" as described in the model. Phases four, five and six of the model assist with evaluation of the variables. Income was identified as a significant factor associated with immunization rates of preschoolers.

CHAPTER 5

SUMMARY OF THE STUDY

The purpose of this study was to explore the relationship between race, income, and primary language spoken at home and immunization rates of preschoolers in seven Harris County school districts. The specific research questions focused on the elements of the PRECEDE Model (Green, Kreuter, Deeds & Partridge, 1980) to organize data and evaluate the findings. The model guided the researcher in interpreting the data and identifying variables which influence immunization rates. As a result of this study, prospective goals will be directed toward increasing outreach activities for immunization services in areas of low income.

Summary

In this nonexperimental study, kindergarten and first grade student records were abstracted using a multistage sampling design to systematically sample 806 records. Information relative to race, income, and primary

language had been reviewed to identify variables which could influence immunization rates among the specific population.

Descriptive statistics were used to summarize demographic and immunization data. Inferential statistical procedures were employed to determine the relationships between the independent variables of race, income and primary language and the immunization status of the students.

Discussion of Findings

The sample of 806 kindergarten and first grade students from Northeast Harris County consisted of 69% White and 31% non-White students. Thirty-seven percent of students sampled were classified as high income and 63% were classified as low income. Data revealed that English was the primary language for 93% of the students, while 6% identified Spanish as the primary language spoken at home.

Of the 806 student records sampled, 460 (57%) records met the disease prevention standard (3 DTP, 3 OPV and 1 MMR) by two years of age. Three hundred fifteen students (39%) were immunized by the gold immunization

standard (4 DTP, 3 OPV and 1 MMR) and only sixty-nine students (19.2%) of the 806 student records sampled were fully immunized age appropriately. Environmental and other miscellaneous factors predispose children to numerous health problems that are preventable by immunizations. The review of literature revealed that outbreaks occurred in populations with immunization rates below 60%. Phase one of the PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980) served to identify the environmental characteristics of a designated study population.

The significance of race was reviewed in relation to immunization rates among preschoolers. In the initial review of the data there appeared to be a significant difference in immunization rate between Whites and non-Whites in disease prevention, gold standard and age appropriate immunization rates. White students appeared to have higher immunization rates than non-White students. This relationship did not hold up under further scrutiny.

The social information relative to race, income and primary language had been reviewed to identify variables

that could influence immunization rates among the specific population. The study revealed that low income students are at higher risk of being unimmunized. In view of the finding that income and race were highly related, the attempts were made to determine whether the variable of race or the variable of income influenced the immunization rates. When income was controlled, the difference of race largely disappeared in the disease prevention and gold standard subsamples. Low income students, both White and non-White, were identified to be at highest risk for under immunization. When age-appropriate immunization rates were analyzed, non-White, low income students were at significantly more risk than low income White students.

Language spoken at home was identified as a possible social factor that could influence obtaining immunizations. When primary language was reviewed for its significance on immunization rates, primary language spoken at home was not significant in its impact on immunization rates. No significance was identified in immunization rates of English or non-English students.

The PRECEDE model (Green, Kreuter, Deeds & Partridge, 1980) guided the analysis of data that focused on possible risk factors within the preschool population. The model delineates the environment in which a group lives and considers the social factors that influence health behaviors.

Conclusions and Implications

The results of the study indicate that the overall immunization rate in the preschool population was low. Children from low income families, regardless of race, were at highest risk for being unimmunized. In view of the results of this study, it is questionable whether the national goal of a 90% immunization rate of the preschool population, as suggested by Healthy People 2000 (1990), will be achieved. Program activities, according to the results of this research, should be geared toward reaching the low income parent regardless of race or language to increase the immunization rates.

Recommendations for Further Research

Suggestion for future research:

1. Conduct a similar study investigating the impact of family income.
2. Explore the factor of maternal age and education on preschool immunization rates.
3. Consider birth order of the child and immunization status.
4. Survey the type and frequency of missed opportunities in clinical settings for preschool immunization services.
5. Evaluate the impact of educational and informational techniques on immunization status.

The health of the public is the concern of every individual who provides health services. Public health nurses, in particular, work in settings where the greatest potential for reaching the highest risk population exists. Therefore, every effort must be taken to assess the immunization status of clients and provide the appropriate immunizations.

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APPENDIX A

AGENCY PERMISSION TO CONDUCT STUDY

THOMAS HYSLOP, M.D., M.P.H.
DIRECTOR

HARRIS COUNTY HEALTH DEPARTMENT
P.O. BOX 25249
HOUSTON, TEXAS 77265

(713) 526-1841

March 23, 1993

Ms. Kathleen Ingrando, R.N.
4106 Park Douglas Drive
Houston, Texas 77084

Dear Ms. Ingrando:

It is my pleasure to inform you that the Harris County Health Department Projects Review Committee recommended approval of your proposed research, "Immunization Assessment of Two-Year Olds In A Select Harris County Population." The final approval was signed by the Director, Doctor Thomas Hyslop, on March 19, 1993. Attached are signed letters of agreement for the initiation of your work.

We wish you success on the completion of your research, and we look forward to reading the results of the finished study. Please coordinate activities through Caroline Stamps and Marita Lazzaro.

Sincerely,

Dan D. Williamson, DDS

Dan D. Williamson, DDS, MPH, MBA
Chairman, Projects Review

DDW:nld

APPENDIX B

HUMAN SUBJECT'S REVIEW COMMITTEE APPROVAL

TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

HUMAN SUBJECTS REVIEW COMMITTEE - HOUSTON CENTER

PROSPECTUS FOR THE THESIS
APPLICATION TO HUMAN SUBJECTS REVIEW COMMITTEE

(This form, completed and signed, must accompany student's thesis research application to the HSRC)

This prospectus proposed by: Kathleen Ingrando

Social Security Number: 117-42-8198

Entitled: Immunization Assessment of Two Year Olds in a Select Harris County Population

Has been read and approved by the members of his/her research committee.

This research (check one):

__X__ **Is Exempt from Human Subjects Review Committee review because:**

Data will be abstracted from school records. A Survey Research Study involving the collection of existing data.

(If exempt is selected for this research, complete form "Exempt From HSRC Review")

_____ **Requires Full Human Subjects Review Committee review because:**

_____ **Requires Expedited Human Subjects Review Committee review because:**

Research Committee:

Type name	Signature
Jeanette Kernicki (Chair)	Jeanette Kernicki
Shirley Hutchinson	Shirley Hutchinson
Lynn Wieck	Lynn Wieck

(Submit one copy to the Dean of the Graduate School)

HSRC Houston Center
Fall. 1991

APPENDIX C

SELECTION OF STUDENT RECORD

FORM 1

FORM 1 IMMUNIZATION RETROSPECTIVE STUDY PAGE 1

REGISTER OF STUDY PARTICIPANTS

NAME _____ SCHOOL _____

#	NAME	STUDY NUMBER	INFORMATION ABST.	DATE
01				
02				
03				
04				
05				
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08				
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16				
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18				

APPENDIX D

ABSTRACTING TOOL

SCHEDULE A

CODED [ ] ENTERED [ ] CORRECT [ ]

HARRIS COUNTY HEALTH DEPARTMENT EVALUATION OF IMMUNIZATIONS IN HARRIS COUNTY SCHOOL CHILDREN

Schedule A
1992 Version

1.	Document ID	9 2 1
2.	Study Number	-- -- -- --
3.	School Number	-- --
4.	Abstractor's Name: _____	-- --
5.	Date of Abstraction	___/___/___ M D Y
6.	School District	-- --

SOCIO-DEMOGRAPHIC INFORMATION ON CHILD

7.	Date of Birth	___/___/___ M D Y
8.	Place of Birth:	
	City: _____	-- -- --
	State: 043. Texas	-- -- --
	Other: _____	
	Country: 23. USA	
	Other: _____	-- --
9a.	Address _____	-------.----
9b.	Zipcode (Place of Residence)	----------
10.	Race	---
	1. American Indian	
	2. Asian	
	3. Black	
	4. Hispanic	
	5. White	
	6. Other: _____	
	8. Not Recorded/ Not Available	
11.	Primary Language Spoken at Home:	
	08. English	-- --
	23. Spanish	
	Other: _____	-- --

HARRIS COUNTY HEALTH DEPARTMENT EVALUATION OF IMMUNIZATIONS
nursing section

IMMUNIZATION RECORD		
12. DPT #1	1. Yes 2. No 8. Not Available	___
	Date DPT #1 Received: 12/12/12. Not Recorded	___/___/___ M D Y
13. DPT #2	1. Yes 2. No 8. Not Available	___
	Date DPT #2 Received: 12/12/12. Not Recorded	___/___/___ M D Y
14. DPT #3	1. Yes 2. No 8. Not Available	___
	Date DPT #3 Received: 12/12/12. Not Recorded	___/___/___ M D Y
15. DPT #4	1. Yes 2. No 8. Not Available	___
	Date DPT #4 Received: 12/12/12. Not Recorded	___/___/___ M D Y
16. DPT #5	1. Yes 2. No 8. Not Available	___
	Date DPT #5 Received: 12/12/12. Not Recorded	___/___/___ M D Y
17. POLIO #1	1. Yes 2. No 8. Not Available	___
	Date POLIO #1 Received: 12/12/12. Not Recorded	___/___/___ M D Y

HARRIS COUNTY HEALTH DEPARTMENT EVALUATION OF IMMUNIZATIONS
IN HARRIS COUNTY SCHOOL CHILDREN
Schedule A Study Number __ __ __ __

	IMMUNIZATION RECORD		
8.	POLIO #2	1. Yes 2. No 8. Not Available	___
		Date POLIO #2 Received: 12/12/12. Not Recorded	___/___/___ M D Y
9.	POLIO #3	1. Yes 2. No 8. Not Available	___
		Date POLIO #3 Received: 12/12/12. Not Recorded	___/___/___ M D Y
10.	POLIO #4	1. Yes 2. No 8. Not Available	___
		Date POLIO #4 Received: 12/12/12. Not Recorded	___/___/___ M D Y
11.	POLIO #5	1. Yes 2. No 8. Not Available	___
		Date POLIO #5 Received: 12/12/12. Not Recorded	___/___/___ M D Y
12.	MMR #1	1. Yes 2. No 8. Not Available	___
		Date MMR #1 Received: 12/12/12. Not Recorded	___/___/___ M D Y
13.	MMR #2	1. Yes 2. No 8. Not Available	___
		Date MMR #2 Received: 12/12/12. Not Recorded	___/___/___ M D Y

HARRIS COUNTY HEALTH DEPARTMENT EVALUATION OF IMMUNIZATIONS
IN HARRIS COUNTY SCHOOL CHILDREN
Schedule A Study Number __ __ __ __

IMMUNIZATION RECORD		
4. MEASLES	1. Yes 2. No 8. Not Available	___
	Date MEASLES Received: 12/12/12. Not Recorded	___/___/___ M D Y
5. MUMPS	1. Yes 2. No 8. Not Available	___
	Date MUMPS Received: 12/12/12. Not Recorded	___/___/___ M D Y
6. RUBELLA	1. Yes 2. No 8. Not Available	___
	Date RUBELLA Received: 12/12/12. Not Recorded	___/___/___ M D Y

APPENDIX E

IMMUNIZATION RECOMMENDATIONS

FROM THE AMERICAN ACADEMY OF PEDIATRICS

Recommended Schedule for Active Immunization of Normal Infants and Children

Recommended Age	Immunization	Comments
2 mo	DPT, OPV Hib	Can be initiated as early as 2 wk of age in areas of high epidemics.
4 mo	DPT, OPV Hib	2-mo interval desired for OPV to avoid interference from previous dose.
6 mo	DPT, (OPV) Hib	OPV is optional (may be given in areas with in crease risk of polio exposure).
12 mo	MMR	Recommended at 12 mo. for areas who have experienced outbreaks.
15-18 mo	DPT, OPV Hib	
4-6 years	DPT, OPV MMR	Second MMR is recommended but may be given up to age 12 years

Note. From Report of the Committee of Infectious Diseases, Red Book, (21st ed.) American Academy Of Pediatrics. (1991). Elk Grove, Ill.

APPENDIX F

RECOMMENDED AGE-APPROPRIATE IMMUNIZATION SCHEDULE

Age Appropriate and Valid Dosing Schedule

	Earliest date (days)		Latest date (days)	Minimal Interval (days) between doses
DTP 1	42	(60)	92	
DTP 2	90	(120)	153	28
DTP 3	150	(180)	214	28
DTP 4	420	(450-540)	579	180
OPV 1	42		92	
OPV 2	90		153	42
OPV 3	420	(450-540)	579	42
MMR 1	366		579	

Note: American Academy of Pediatrics, (1991). Report of the Committee on Infectious Diseases, Red Book. (21st ed.), Elk Grove, Ill.