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A Comparison Study of Immunization Adherence and Case Management

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A COMPARISON STUDY OF
IMMUNIZATION ADHERENCE AND CASE MANAGEMENT

By

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This thesis is dedicated to the memory of my mother Marjorie L. Spice who shared with me her great love of reading and learning.

We did it Mom!
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This study compared immunization adherence rates of 440 two-year-old children receiving two different types Medicaid managed care services in a nine county area in North Florida. Of particular interest was the primary care nurse case management one group of children received. This study examined whether the group which received primary care nurse case management had greater immunization adherence.

The study showed that the children receiving Medicaid MediPass with primary care nurse case management had significantly higher immunization adherence rates than the children receiving Medicaid Health Maintenance services.

King’s Theory of Goal Attainment and Knowles’ Adult Learner Assumptions were used as the Conceptual Framework to guide this study. In this study, parents are engaged and reinforced as they work with their nurse case manager to identify and meet mutual goals for immunization adherence.
CHAPTER 1

INTRODUCTION

The American Academy of Pediatrics (2003) recommends immunizing children against 11 vaccine-preventable diseases. Meeting this recommendation requires 19 - 20 vaccinations by the age of 2 years. The vaccinations recommended include four Diphtheria, Tetanus, acellular Pertussis (DTaP), three Inactivated Polio (IPV), three or four Haemophilus influenza type b (HIB) depending on the brand of vaccine used, one Measles, Mumps, Rubella (MMR), three Hepatitis B (Hep B), one Varicella (VAR) and four Pneumococcal Conjugate (PCV) injections. Most of the immunizations are given in series of three injections, at 2-month intervals, beginning at birth to 2 months of age, with subsequent boosters at 15 to 18 months. Further boosters are recommended at ages 4 to 6 years for school entry. Healthy People 2000 had a goal of achieving 90% adherence to basic immunizations in children 0 to 2 years (Center for Disease Control and Prevention, National Center for Health Statistics, 1999). While significant increases in immunization coverage have been made, this goal was not achieved nationwide and has been extended to the Healthy People 2010 agenda (Sondik, 1999).

Approximately 11,000 American babies are born daily (U.S. Department of Health and Human Services, 2000). The National Center for Health Statistics (1998) indicated a significant number of young children, approximately 1 million, were under-immunized against vaccine-preventable diseases. The data have not changed significantly in the last 4 years (Baker et al., 2002, National Center for Health Statistics, 2000). Multiple studies have been conducted to determine who comprises the under-immunized population and what factors contributed to their
lack of adherence to the recommended guidelines (Rodewald et al., 1995; Szilagyi et al., 1996; Watson et al., 1996; Wood et al., 1998).

Statement of the Problem

Vaccines are number one on the Public Health List of Great Achievements of the 20th Century. During the 20th century, new vaccines were developed and existing vaccines were aggressively used with great results. Smallpox has been eradicated world wide and in the United States there has been a decrease in mortality from diphtheria, pertussis, and measles. However, these diseases and other vaccine-preventable diseases are still prevalent world wide. In this day of increased air travel, it is easy for a disease to be spread. Less than 90% of the nation’s 2-year-old children are immunized adequately, leaving more than 400,000 2-year-old children at risk (Barker, Darling, McCauley, & Santoli, 2003; Barker, Luman, Smith, Linkins, Santoli, Rowald, & McCauley, 2002; National Center for Health Statistics, 2000; National Immunization Program, 2001; Sondik, 1999). These children are at risk for potentially deadly diseases which can result in debilitating physical and mental deficits, generate great medical expenses and can result in death (Lowery et al., 1998; National Immunization Program, 1999; Plott et al., 2002; Salsberry, Nickel, & Mitch, 1994). Antibiotics and antiviral medications are the least of the expenses. Medical and allied personnel and the equipment needed for rehabilitation and therapies are also counted as part of the cost. Additionally, there is the time off from work for the care giver and occasionally the cost of custodial care (Skaggs et al., 2003; Plott et al., 2002).

Multiple studies have been conducted to ascertain possible indicators for low immunization adherence (Flores, Abreu, Olivar & Kastner, 1998; Lowery et al., 1998; Pruitt, Kline, & Kovaz, 1995; Salsberry, Nickel, & Mitch, 1994; Wilson, 2000). Low socioeconomic status has been identified as one barrier to adherence to the immunization recommendations. Intertwined with low socioeconomic status are language barriers, lack of transportation, parental lack of knowledge about recommended immunizations, and inability to take time off
from work (Flores, Abreu, Olivar & Kastner, 1998; Lowery et al., 1998; Pruitt, Kline, & Kovaz, 1995; Salsberry, Nickel, & Mitch, 1994; Wilson, 2000). Rural patients face a long drive to a facility to receive immunizations (Pruitt, Kline, & Kovaz, 1995; Wilson, 2000). Urban patients do not all live in cities with good public transportation and walking is not always feasible when there is more than one young child (Salsberry, Nickel, & Mitch, 1994). Some of those with language barriers are newly arrived in the United States and may not be legal immigrants which leads them to avoid seeking care and possibly sparking the notice of immigration officials (Flores, Abreu, Olivar & Kastner, 1998). Immunizations appointments, whether given at a physician’s office or at a Public Health clinic, take time both in travel to and from the appointment and waiting to be seen. This can cause problems for working parents (Lowery et al., 1998; Pruitt, Kline, & Kovaz, 1995; Wilson, 2000).

Many of the children in this category receive public assistance in the form of Medicaid and are on some form of managed care (Cotter, 2000). In Florida, about half of the 2.1 million people served by Medicaid are children and adolescents under 21 years of age (Agency for Health Care Administration, 2003). It covers well baby care and immunization administration. Medicaid will cover transportation to and from physician appointments. However, there are inherent problems with Medicaid transportation since it only covers the child with the appointment and the parent. If there are other children in the household, a babysitter must be paid or the parent must pay for those children to ride along with the patient. Medicaid does not cover all service, fees are set for individual services and providers cannot bill for any excess amounts, therefore, not all facilities accept Medicaid patients (Agency for Health Care Administration, 2003).

Medicaid has adopted several managed care programs to improve the quality of care while reducing costs. The managed care options in North Florida include MediPass (Medicaid Provider Access System), HMOs (Medicaid Health Maintenance Organizations and CMS (Children’s Medical Services). They can be likened to the sections of an umbrella, each one different, yet all part of one larger entity (Figure 1). For children and adolescents the services available
through the managed care options are similar. The differences are in the method of provider payment and the providers available. All have some services that require referral or authorization. Most Medicaid recipients must choose a managed care plan unless they are in a nursing facility or have Medicare. If a plan is not chosen within 30 days from the start of Medicaid eligibility, then the recipients are mandatorily assigned to a program. They have 60 days to request a plan change or they are locked in that managed care plan for 9 months. They will have an opportunity to change plans during a 2-month open enrollment period at the end of the 9 months. During the time they are mandatorily assigned, they may only see physicians who accept their Medicaid managed care plan (Agency for Health Care Administration, 2003). Even with managed care programs, immunization adherence remains below the Healthy People 2000 goal (Center for Disease Prevention and Control, 1999; Cotter et al., 2000).

The Medicaid system with its managed care components is a more complex system than it was prior to managed care. If one had Medicaid, then
one only had to make sure that the provider accepted Medicaid and the recipient had access to all medical specialties. Changing providers entailed calling the new provider and making an appointment. With the advent of managed care, the recipient must determine which plans the desired provider accepts and if new patients are being accepted. In the case of pregnant women, they need to ensure that the plan they choose to cover the pregnancy is accepted by the pediatrician, since the baby will initially be on the same program as the mother for 1 to 3 months (Agency for Health Care Administration, 2003). Some women receive little prenatal care (State of Florida, Department of Health, 2002) and have given little thought to who will provide medical care for the infant. New babies present many decisions: whether to breast feed or bottle feed; use cloth or disposable diapers; will baby sleep in a bassinet, a crib, or with mom. Many of the decisions are predicated on the mother’s support system. Add to those, the decisions and questions involved in choosing a pediatrician or family practitioner and scheduling the first of six well-child checks recommended for the first year and the accompanying immunizations. Even if this is not the first child, it can be overwhelming also to need to choose a managed care plan and try to ensure that all the children are on the same plan and can see the chosen provider (Baby Resource, n. d.; State of Florida, Medicaid Options, 2001).

There are many types of case management providers across many disciplines. Primary care case management is the term used to describe case management provided by physicians. Nursing case management balances coordination of care with integration and direct delivery of services while placing controls on resources used for the care (Cesta & Cohen, 2000). Nursing case management can be provided in hospital settings, and in the community through home visits and telephone contact ensuring primary care. It can provide education about the vaccine-preventable diseases and the immunizations available. It can offer support and explore resources for overcoming barriers of language, transportation, and childcare (Schuster et al., 1998). Nursing case management is not mandated and, therefore, only a limited number of families receive its benefit. It is primarily used to manage specific diagnoses and
diseases. Case management in conjunction with home visitation has been used as an intervention to increase well child care and immunization rates. It was associated with a 13% increase in immunizations at 12 months (Schuster et al., 1998).

Significance of the Problem

Over time, a great feat has been accomplished, protecting children from disease by the development of immunizations. The bar has been set nationally at 90% vaccination coverage by Healthy People 2010, but Americans are not there yet (U.S. Department of Health and Human Services, 2000). Children who have not been immunized adequately are at risk for potentially deadly diseases as has been recently demonstrated in the pertussis outbreaks affecting children who had not received the complete series (Seattle Times, 2003).

Between 1997 and 2000, pertussis resulted in the deaths of 62 children (Center for Disease Control and Prevention, 2002; Fox, 2003). In 2003, there have been outbreaks of pertussis in Wyoming (Associated Press, 2003), Oregon (Associated Press, 2003), and South Carolina (Martinez & Langley, 2003). No deaths from pertussis have been reported for 2003, but containment of the outbreaks has required antibiotic treatment and exclusion from school and day care (Associated Press, 2003; Martinez & Langley, 2003). The costs are complex: allied and health care personnel for testing and treating, antibiotic cost for treatment and prophylaxis, lost time from school for quarantined children, and lost wages for parents who must take time off from work to watch children unable to attend school or day care until the quarantine has been satisfied (Associated Press, 2003; Martinez & Langley, 2003, Fox, 2003). The pertussis vaccine is not licensed for use in children over 7 years of age, however, it does not confer lifelong immunity. It loses efficacy after about 10 years, leaving adolescents and adults at risk for infection (National Immunization Program, 2003). This is a serious problem for the very young who are not fully immunized and for the
elderly who cannot be immunized again, but may be unable to withstand the rigors of the illness due to their health status (Collins, 2003; Langley, 2003).

In early 2001, shortages in routinely recommended vaccines occurred and lasted approximately 18 months. It remains to be seen what the impact of deferred vaccination will be. Introduction of a vaccine-preventable disease into an area with low coverage might yield a reservoir to transmit disease (Barker et al., 2002). This has already been seen in the Boulder, Colorado area where pertussis is prevalent due to low immunization rates (Allen, 2002).

There are children who do not receive immunizations. These include children who have medical conditions that contraindicate some of the immunizations (e.g. those who are immunosuppressed and those who are allergic to components of the vaccines). Religious exemptions also account for many of the children who are not immunized or are under-immunized (Feikin, 2000). In Florida, a form must be completed and filed with the local County Health Department. Florida no longer recognizes philosophical exemptions for those who do not wish to immunize but have no religious affiliation that would contraindicate immunization. Children who are home schooled are not required to be immunized. In 2001-02, at least 2 million children were home schooled in the 50 United States (Kafer, 2003). Non-immunization and under-immunization place several populations at risk: the newborns who are too young to immunize, the elderly who were never immunized, and the growing number of people who are immunosuppressed due to cancer, Human Immunodeficiency Virus (HIV), transplants, or steroid therapies (Collins, 2003, Langley, 2003).

Nurses are in an optimal position to promote immunization through education in the many settings where they interact with children and their parents, such as, the physician’s office, the public health clinic, and the emergency room (Schuster, et al., 1998). Primary care nurse case management provides a ready-made relationship which can be used to educate the parents on the importance of timely immunizations and to ensure through reminders, immunizations are received, and, if needed, assistance scheduling appointments and transportation (Mahn & Spross, 1996). Additionally, primary care nurse case
managers are able to help parents navigate the complex procedure of selecting a managed care program which allows them to continue to use their established primary care provider and receive continuity of care (Bower, 1992; Pittman & McCormick, 1991; L. St. Petery, personal communication, 1991)). The primary care nurse case manager has limited influence over what happens in the physician’s office or service site beyond notification of oversight in the case of missed opportunities of immunizations. It is there that the office nurse can be educated to review the chart and flag it for needed immunizations. The Advanced Practice Nurse (APN) can help by reviewing the immunization records to avoid missed opportunities for vaccination. The APN, can promote immunization adherence through education within the primary care program and by acting as a liaison with primary care providers, obstetricians, health departments, and schools (Mahn & Spross, 1996). The APN can clarify misinformation, reinforce immunizations, and promote wellness through lectures and health fairs. Pamphlets and other handouts, giving factual and concise information regarding immunization and its benefits, can be disseminated by the APN. The APN is in an excellent position to conduct a study such as this and to publish the results, thereby sharing valuable information with colleagues.

Statement of Purpose

This study will review the records of two groups of Medicaid recipients, children 2 years of age, to determine if there is greater immunization adherence in the group of children receiving primary care nurse case management than those not receiving primary care nurse case management. The study will examine actual immunization records, instead of accepting verbal confirmation from the parents. It will validate the use of case management as a way to increase immunization adherence, thereby decreasing the instances of vaccine-preventable diseases. Demographic data will also be evaluated to determine if there are other factors that may contribute to immunization adherence.
Research Questions

A retrospective review of charts will be conducted to answer the following questions:

1. What are the demographic characteristics of the sample of children age 2 years?

2. What is the rate of immunization adherence in children age 2 years who are receiving public assistance in the form of Medicaid without primary care nurse case management?

3. What is the rate of immunization adherence in children age 2 years who are receiving public assistance in the form of Medicaid who received primary care nurse case management?

4. Is there a higher rate of immunization adherence in the group of 2 year old children who received primary care nurse case management than in the group which did not?

Operational Definitions

The researcher has identified terms for this study and given a definition of how they will be measured.

Primary care nurse case management - Nurse case management provided in a primary care setting. For the purposes of this study, primary care case management will be that case management provided by a primary care case management program in northern Florida to children enrolled in Medicaid MediPass with the primary care case management program. Operationally, the children will be enrolled with the primary care case management program and their names will appear on a list in the physician’s office identifying them as on Medicaid MediPass with the primary care case management program.

Medicaid - A federally funded program, providing public assistance, administered by the individual 50 states, which provides medical services for eligible persons due to low income or disability. For the purposes of this study
receipt of Medicaid benefits will be used to identify a population of indigent children. Operationally, the children will appear on a list in the physician’s office indicating Medicaid as the paying source through a Medicaid Health Maintenance Organization or through the MediPass Program.

Medicaid Health Maintenance Organization (HMO) - A managed care program which has contracted to provide prepaid Medicaid services to eligible recipients (Health and Human Services, 2003). Operationally, Buena Vista (formerly Discovery Health Plan) will be the designated managed care provider for children on Medicaid HMO’s and the child’s name will appear on a list in the physician’s office of patients assigned to that practice.

Medicaid Provider Access System (MediPass) - A program developed and administered by Florida Medicaid to provide primary care case management. It was designed to decrease inappropriate medical services utilization and assure coordinated primary care access (Health and Human Services, 2003). Operationally, the Tallahassee Pediatric Foundation will be designated as the MediPass provider for the children who have chosen Medicaid Provider Access System for their managed care.

Two-year-old child - Any child who was born after June 30, 2001, and has had his or her second birthday. No data will be collected for any immunization given at 2 years and 1 day or beyond. Operationally, the date of birth of each child will be captured on the immunization record obtained from each physician’s office and from the primary care case management program.

Immunization adherence - Receipt of every immunization recommended by the American Academy of Pediatrics by the day the child turns 2 years of age. Operationally, each immunization record received from the physician’s office or the primary care case management program will be evaluated and assigned a value indicating all recommended immunizations were received by the second birthday. To be adherent, the record will reflect four doses of Diphtheria, Tetanus, Pertussis; three doses of Inactivated Polio; three or four doses of Haemophilus influenza type b (depending on the type of vaccine used); one dose of Measles,
Mumps, Rubella; three doses of Hepatitis B; one dose of Varicella and four doses of Pneumococcal Conjugate.

Immunization non-adherence - Lacking at least one immunization recommended by the American Academy of Pediatrics by the day the child turns 2 years of age. Operationally, an immunization record from a physician’s office or the primary care case management program which is lacking at least one recommended immunization by the second birthday.

Rate of immunization adherence- the number of children in each group who have received all recommended immunizations by the second birthday divided by the total number of children in the group.

Conceptual Framework

The theoretical framework for this study will be a combination of King’s Theory of Goal Attainment and Knowles’ Adult Learning Assumptions.

*King’s Theory of Goal Attainment*

King’s theory is drawn from the interpersonal system of King’s Dynamic Interacting Systems Framework. King (1981) described the interpersonal system to include small groups, dyads, triads, or large groups. The nursing process occurs primarily in the interpersonal system (King, 1981). King (1995) stated that in the health care delivery system, nurses are the constant persons. Nursing guidance and counseling help individuals and groups maintain health. In partnership with physicians, families, and allied health care professionals, nurses manage care and promote health and disease prevention (King, 1995).

Case management at the primary care level is dependent upon mutual goal setting. The Theory of Goal Attainment provides a template through which the nurse can apply the nursing process to achieve a mutually set goal and measure the outcome. The Theory for Goal Attainment defines the context in which the encounter will occur and assumptions about the individuals involved in the encounters. The theory can be applied to the nursing process in practice. The nurse and the patient interact to identify patient behaviors. Communication
between the nurse and the patient conveys perceptions and judgments. Mutual goals are set. Reaction and interaction by and between the nurse and patient occur during the planning phase of the nursing process. Transaction results in goal attainment or growth and development. Goal attainment results in patient satisfaction and the effectiveness of the nursing care can be measured (King, 1981). The nurse case manager, working with the parent, sets mutual goals at the time of enrollment (Schuster et al., 1998,). Adherence to immunization schedules, and thereby decreasing the possibility of the enrolled child contracting a childhood disease, is discussed and agreed upon in writing. The nurse case manager works with the parent to ensure that the child receives the immunizations in a timely manner. When there is apparent non-adherence, the nurse case manager and the parent explore the differences and develop a new mutual goal (Pittman & McCormick, 1991, Sowell & Meadows, 1994).

King’s (1981, 1990) Theory of Goal Attainment includes 10 concepts (perception, communication, interaction, transaction, self, role, growth and development, time, personal space, and stress) from the dynamic interacting systems framework. This researcher will address communication, decision making, and growth and development as they relate to primary nurse case management and immunization adherence.

Communication can be either verbal or non-verbal where verbal includes both the spoken and the written exchanges. Nonverbal is equally important because a person’s posture, appearance, facial expression, and touch can give vital information in forming an accurate impression about that person’s feelings and attitudes (King, 1981; 1990). Several levels of communication occur in the enrollment when the nurse case manager and the parent meet face to face to complete the intake process and discuss the child’s health care needs. Will the parent look at the nurse case manager when she speaks? Will the parent interact with the child in the presence of the nurse case manager? Will the parent answer or ask questions? There will be non-verbal communication occurring that will be missed in subsequent telephone calls. The nurse case manager needs to be aware and establish a baseline for future communications.
Decision making is individual, and at the same time situational, because it is influenced by the individuals, available informational input, and the time at which the decision is being made. Decision making involves three components: the actual process of making the decision, the one making the decision, and the decision which results from the process (King, 1981; 1990). There are many decisions to make: to apply for Medicaid; which physician to choose; which managed care plan to choose; and whether to follow the recommendations made by the nurse case manager regarding well-child care and immunizations, to name a few.

Growth and development deals with more than physical aging. It encompasses experiences and environment and can move individuals towards maturity and actualization of their potentials (King, 1981; 1990). The nurse case manager is not just responsible for the growth and development of the child enrolled in the managed care program. The nurse case manager also has a responsibility to the parent to provide an environment where the parent can learn the skills needed to provide a safe and nurturing home for the child. The nurse can provide the environment for the parent or parents to mature and reach his/her potential goals and abilities.

**Adult Learning**

In order to achieve the mutual goal setting it is necessary for the nurse case manager to assess the parents’ knowledge and experience related to health care and immunization benefits. The nurse case manager then uses principles of adult learning to present information in a manner which enhances the parents’ experience as they learn how to care better for their children.

Prior to World War II, learning theory was advanced through the study of animals and young children, two populations which could be strictly controlled (Knowles, 1978). Since World War II, it has been recognized that adults learn differently from children. Knowles (1980) applied the term “andragogy” to describe the model of assumptions to be applied to adult learners. It uses the Greek word for man, “aner”, as its root to differentiate it from pedagogy the science of teaching children.
Knowles (1980) addressed four assumptions on the difference between pedagogy and andragogy. The first is that the adult learner is mature and self-directed although the rates may vary. Second, life experiences form a reservoir that becomes a rich resource for learning and sharing. Third, when adults recognize a need to learn, they become ready to learn. And fourth, adult learners seek immediate application of knowledge and they are performance centered.

Brookfield (1995) argued that the age of the learner may not be so important as the personality, ethnicity, cultural background, or political belief of the learner and that these variables may have a greater impact on how learning occurs. He added that adult learners have competing interests and preset patterns of learning.

The nurse case manager uses those assumptions and assesses the parents’ knowledge and life experiences related to health care, and specifically their child’s health care. The nurse case manager also assesses the parents’ level of maturity and self-directedness. It is necessary to identify the social role or developmental task that will result in the parents’ need to learn and yield a readiness to learn. The nurse case manager then outlines how the parents can, by taking the initiative, achieve immunization compliance.

When providing primary care nurse case management, it is of paramount importance to be able to instruct the parents at a level which is appropriate to their education and which takes into account their life experiences and cultural backgrounds. Knowles’ Adult Learning Theory provides a template for providing that instruction in the most effective way to achieve the positive outcomes which include appropriately immunized children.

Assumptions

For the purpose of this study, the following assumptions were made:
1. Parents and guardians participating in the primary care case management group will have received education on the importance of immunization against vaccine-preventable diseases.
2. Data were accurately collected, entered, and are valid for the purpose of inclusion and exclusion.
3. All children selected have access to immunization services.
4. The education received by the parent was at the appropriate level.

Limitations

The following limitations have been identified: (a) the children served by the primary care case managers may have a higher percentage of chronic illnesses due to the association of the primary care program with an agency which provides secondary and tertiary care and case management to children with chronic illnesses; and (b) the researcher has no control regarding reminders issued by the immunization site.

Summary

There are approximately 11,000 babies born daily (U.S. Department of Health and Human Services, 2000). It is recommended that they all receive 20 immunizations for vaccine-preventable diseases by the time they reach their second birthday (National Immunization Program, 1999). There are abundant barriers to adherence with the immunization recommendations (Lowery et al., 1998; Pruitt, Kline & Kovaz, 1995; Wilson, 2000). A relationship has already been established between the parent and the primary care nurse case manager during the enrollment process (Pittman & McCormick, 1991; Sowell & Meadows, 1994). It is anticipated that the study will demonstrate that where there exists a relationship between a primary care nurse case manager and a family or child, the immunization adherence is higher. This retrospective study will address whether immunization adherence is greater in children who receive primary care case management than those who do not receive primary care case management. The terms primary care nurse case management, Medicaid, 2-year-old child, immunization adherence, immunization non-adherence, and rate
of immunization adherence have been operationally defined. King’s Theory of Goal Attainment and Knowles’ (1980) adult learning assumptions provide the conceptual framework which will guide this study.

Chapter 2 will include a review of literature reflecting research related to immunization adherence and identified possible causes for lack of adherence. It will also address case management and its role. King’s Theory of Goal Attainment and Knowles’ adult learning theory will be examined as it applies to case management and immunization adherence.
CHAPTER 2

REVIEW OF LITERATURE

The review of literature examines King’s Theory of Goal Attainment as it relates to case management and immunization adherence. The chapter is divided to address theoretical and empirical review for each topic. King’s Dynamic Interacting Systems and Theory of Goal Attainment are examined along with Knowles’ Adult Learning Theory for their application to case management and immunization adherence. Literature related to case management, preventable communicable diseases, immunization adherence, and identified possible causes for lack of adherence are reviewed.

Theory

King’s Dynamic Interacting Systems

Case management at the primary care level is dependent upon mutual goal setting (May, Schraeder & Britt, 1996). Therefore, the theoretical framework for this study will be King’s Theory of Goal Attainment. The theory is drawn from the interpersonal system of King’s Dynamic Interacting Systems Framework. The framework, based on General System Theory, illustrates the “three dynamic interacting systems that form the environments that influence individuals growth, development, work and death” (King, 1990, p.74). The three systems are divided into the personal, the interpersonal and the social. Each system contains five essential elements: goals, structure, functions, resources, and decision making. The goal of the framework is health, which King describes as “dynamic life experiences of a human being, which implies continuous adjustment to stressors in the internal and external environment through optimum use of one’s resources
to achieve maximum potential for daily living” (King, 1981, p.5). King described the interpersonal system to include small groups, dyads, triads, or large groups. The focus moves from the individual alone (personal system) to individuals interacting with each other in small groups. Interaction is a major concept of the interpersonal system. Communication, role, stress, coping, and transaction are sub-concepts. King (1981) noted that in order for nurses to understand the fundamental information gathering process about human beings, it is essential to have knowledge of interaction. Interactions encompass a sequence of nonverbal and verbal behaviors between two or more individuals that are goal directed. The nursing process, a method of assessment, planning, implementation and evaluation, occurs primarily in the interpersonal system (King, 1981). Case management is a process which expands on the nursing process components with assessment, goal development, planning, intervention, monitoring, and evaluation (Bower, 1992).

**King’s Goal Attainment Theory**

King’s (1981) theory of goal attainment defines nursing as “a process of human interactions between nurse and client whereby each perceives the other and the situation; and through communication, they set goals, explore means, and agree on means to achieve goals” (p. 144). This provides a template through which the nurse can apply the nursing process to achieve a mutually-set goal and measure the outcome. The theory for goal attainment defines the context in which the encounter will occur and assumptions about the individuals involved. The nurse and the patient interact to identify patient behaviors. Communication between the nurse and the patient conveys perceptions and judgments. Mutual goals are set. Reaction and interaction by, and between, the nurse and patient occur during the planning phase of the nursing process. Transaction results in goal attainment or growth and development. Goal attainment results in patient satisfaction and the effectiveness of the nursing care can be measured (King, 1981, Sowell & Lowenstein, 1994).

The nurse case manager, working with the parent, sets mutual goals at the time of enrollment. These are identified during an interview with the parent.
where the parent’s knowledge about well care and immunizations is assessed, as well as the parent’s understanding of public assistance and managed care. The parent’s past experience with well care, immunizations, and public assistance is noted. The need for adherence to immunization schedules, which thereby decreases the possibility of the enrolled child contracting a childhood disease, is discussed and agreed upon in writing. The nurse case manager then works with the parent to ensure that the child receives the immunizations in a timely manner (King, 1981, Sowell & Lowenstein, 1994).

When there is apparent non-adherence, the nurse case manager and the parent explore the differences and develop a new mutual goal. It is necessary for the nurse case manager to communicate the agreed upon expectations to the parent and investigate why the goal was not met. The nurse case manager must find the information which will make achieving the mutual goal desirable to the parent (King, 1981, Sowell & Lowenstein, 1994).

**Adult Learning**

Andragogy is the term Knowles (1980) applied to describe the model of assumptions to be applied to adult learners. The assumptions deal with the self-concept of the learner, the role of learners’ experience, the learners’ readiness to learn, and orientation to learning. The learners’ concept of self-direction is the cusp of the transition to adulthood. Identity-forming issues have been mostly resolved. The individuals need others to perceive themselves as self-directed and when a situation occurs where self-direction is not allowed, there is tension, resistance, and resentment (Knowles, 1978).

An individual’s life experiences form a rich reservoir for learning and sharing and identify who the learner is. Using an individual’s life experiences as a resource for learning demonstrates respect for that person. Rejection of a person’s life experiences is perceived as rejection of the person. Unlike children, adults become ready to learn when they recognize a need to learn to fulfill a role. The teacher does not have to sit and wait to recognize a need, readiness can be stimulated by the teacher. Orientation to learning in the adult is performance centered, adults seek immediate application (Knowles, 1978). The nurse case manager...
manager can start this stimulation process during the intake and assessment appointment and continue to pursue the needs telephonically.

Adult learning theory is applicable to nursing case management. The patients need to feel that they have some modicum of control over their lives and health care. Their past experiences will color how they perceive their future care and how they perceive the case manager. Treating the patients and their life experiences with respect will create an environment where mutual goals can be set and outcomes can be identified. Often the goals of the case manager are not shared by the patients and it is incumbent on the case manager to stimulate a need in the patients to share or acknowledge the case manager’s goals so that a mutual goal can be achieved.

Teaching Methodology

The following study demonstrates how inquiry-based learning can be used as a teaching methodology to help parents develop skills for determining needs and seeking appropriate care for their children. Inquiry-based learning allows for a variety of learning methods to fit the parents’ learning styles. The approach promotes conceptual understanding, critical thinking skills development and strategies for self-directed learning. It focuses on specific problems while also looking at strengths. An issue is presented and discussed to determine what is “known” and tasks are assigned. The issue is revisited at a later date and reports given on the assigned tasks. Further discussion ensues and tasks are reassigned if needed, or all proceed to the next issue. Inquiry-Based Learning was developed by the nursing faculty in 1992 at the University of Hawaii at Manoa (Magnussen et al., 2000).

Vaccine Preventable Diseases

Diphtheria. Diphtheria is caused by an aerobic gram-positive bacillus, Corynebacterium diphtheriae. It produces an acute, toxin-mediated disease. The toxin is produced when a specific virus with genetic information for the toxin infects the bacillus. Of the three biotypes, mitis, intermedius, and gravis, the most severe disease results from the gravis biotype.
Diphtheria is usually acquired via the nasopharynx although skin lesions, conjunctiva and vulvo-vaginal areas may be involved. Cellular protein synthesis is inhibited by the toxin produced which leads to local tissue destruction and membrane formation. Major complications, myocarditis, neuritis, thrombocytopenia, and proteinuria, result from the absorption of the toxin into the bloodstream.

The onset may resemble the common cold with an incubation period of 2-5 days. An extremely adherent membrane forms which can be white to greyish-green to black and may be a small patch on the tonsil or cover the entire soft palate. Airway obstruction, coma, and death can occur, due to the location and size of the membrane. It is most dangerous for persons under 5 and over 40 years of age with a death rate of up to 20%. Treatment is with diphtheria antitoxin and antibiotics (National Immunization Program, 2003).

Pertussis. Pertussis is caused by a small aerobic gram-negative rod, *Bordetella pertussis*. It is an acute infectious disease which is annually responsible for more than 300,000 deaths worldwide. Multiple antigens and biologically active products such as pertactin, agglutinogens, tracheal cytotoxin, pertussis toxin, filamentous hemagglutinin, and adenylate cyclase are responsible for the clinical features. Transmission is by the respiratory route where the bacteria interfere with clearing of pulmonary secretions by paralyzing the respiratory cilia with toxin. Incubation ranges from 4 to 21 days.

The primary stage (catarrhal) is often mistaken for the common cold with coryza, low-grade fever, sneezing and occasional cough. The cough becomes more severe over a period of 1-2 weeks at which point the paroxysmal stage begins. This stage can last from 1 to 6 weeks with numerous rapid coughs followed by a long inspiratory effort. Difficulty expelling thick mucus appears to be the basis of the paroxysm and may cause cyanosis, vomiting and exhaustion. Seizures and encephalopathy from hypoxia may occur.

The convalescent stage lasts 2 - 3 weeks although paroxysmal coughing can recur with subsequent respiratory infections. Infants less than 6 months of age are at greatest risk for pertussis and its complications due to incomplete
immunizations. Infants less than 6 months old accounted for 90% of the pertussis-related deaths between 1997-2000. Treatment is with 14 days of Erythromycin to all household members and close contacts (National Immunization Program, 2003).

_Tetanus._ Tetanus is caused by an anaerobic, gram-positive rod which may develop a terminal spore, _Clostridium tetani_. The spores are found in soil and animal feces and are resistant to heat and common antiseptics. The tetanus bacteria enter through a wound, which may be major or unapparent. The spores germinate in the anaerobic conditions. Blood and lymphatics disseminate the toxins produced by the spores. The toxins interfere with the release of neurotransmitters which block inhibitor impulses, resulting in unopposed muscle contractions and spasms. Incubation ranges from 3 to 21 days depending on the distance of the wound from the central nervous system.

The most common type is generalized tetanus which demonstrates a descending pattern beginning with trismus (lockjaw). The lockjaw is followed by neck stiffness, swallowing difficulty, and abdominal muscle rigidity. Spasms are frequent and of several minutes duration and may continue for 3-4 weeks. Neonatal tetanus resulting from an umbilical stump infection is very rare in the United States.

Complications include laryngospasms, fractures of the spine and long bones, hypertension, nosocomial infections, pulmonary embolism, aspiration, and death. Death occurs in approximately 11% of cases. Treatment is with removal of necrotic tissue and foreign material from known wounds, administration of Tetanus immune globulin (TIG) and Tetanus toxoid (Td), supportive therapy, and maintenance of adequate airway (National Immunization Program, 2003).

_Poliomyelitis._ Poliomyelitis, commonly known as polio, is caused by a small, ether-insensitive virus with an RNA genome, _Picornaviridae_. It is an enterovirus. It is susceptible to heat, chlorine, ultraviolet light, and formaldehyde. Transmission is fecal-oral or oral-oral and primary implantation is in the pharynx and gastrointestinal tract. The blood stream is infected via local lymphoid tissue,
and, in turn, infects central nervous system cells. Cell destruction results from replication of poliovirus in brain stem and anterior horn motor neurons. Incubation ranges from 3 to 35 days.

Severity ranges from unapparent or asymptomatic infections (<95%), minor non-specific illness (4% - 8%), non-paralytic aseptic meningitis (1% - 2%), and flaccid paralysis (<1%). Post-polio syndrome has been identified in 25% to 40% of people who suffered from polio in childhood as much as 30 to 40 years later. The syndrome manifests in new muscle pain or weakness, exacerbation of pre-existing weakness and paralysis. Risk factors for post-polio syndrome include female gender, presence of a permanent impairment as a result of the initial polio infection and the passage of time since the polio infection. During the recovery process oversized motor units are created and it is believed that the syndrome involves the failure of these units. It is not an infectious process. The last recorded cases of wild poliovirus were in 1979. The last case of vaccine-associated paralytic poliomyelitis, associated with the oral polio vaccine, was in 1999. The Advisory Committee on Immunization Practices (ACIP) recommended exclusive use of inactivated polio vaccine beginning in 2000 (National Immunization Program, 2003).

*Haemophilus Influenzae* type B. *Haemophilus influenzae* type B (Hib) is caused by a capsular gram-negative coccobacillus. Transmission is via respiratory droplets into the nasopharynx. It causes invasive diseases including meningitis, pneumonia, epiglottitis, cellulitis, and arthritis. Two percent to 5% of those with meningitis die, while 15% to 30% of the meningitis survivors suffer from neurologic sequelae. Children less than 5 years of age are most susceptible with most cases in children less than 18 months of age. Outbreaks peak between September and December and again between March and May. Treatment usually includes hospitalization and the use of chloramphenicol PO/IV, cefotaxime IM/IV, or ceftriaxone IM/IV for 10 to 14 days. Strains of ampicillin-resistant Hib are now common in the United States (National Immunization Program, 2003).
Hepatitis B. Hepatitis B (serum hepatitis; HBV) is caused by a small, double-shelled virus which contains numerous antigenic components. It is resilient and can remain infectious for a month at room temperature on environmental surfaces. Transmission is by parenteral or mucosal exposure to body fluids of carriers or persons with acute Hepatitis B infections. Incubation ranges from 6 weeks to 6 months and at least 50% of adults are asymptomatic along with most infants and children (National Immunization Program, 2003).

The next phase is the preicteric phase which can last up to 10 days and may include anorexia, nausea, malaise, vomiting, fever, myalgia, right upper quadrant abdominal pain, and dark urine. The icteric phase lasts 1 to 3 weeks and includes jaundice, hepatic tenderness, light or grey stools, and hepatomegaly. The convalescence phase may persist for weeks or months and include malaise and fatigue. Complications include fulminant hepatitis (63% to 93% fatal) and chronic HBV infection which is responsible for chronic hepatitis, cirrhosis, liver failure, and hepatocellular carcinoma. Up to 90% of infants exposed to HBV perinatally become carriers. Children infected between the ages of 1 to 5 years become carriers at a rate of 30% to 50%. Chronic infection in the form of hepatitis B-related liver cancer results in approximately 1,000 to 1,500 deaths yearly. Treatment for acute HBV deals with containment; there is no specific therapy. Chronic HBV infection is treated with interferon with a success rate of less than 50% due to the adverse side effects of the treatment (National Immunization Program, 2003).

Measles. Measles is caused by a paramyxovirus with a core of single-stranded RNA and 6 structural proteins, two of which cause the virus to fuse, penetrate, and hemolyze the host cell and adsorb the virus into the cell. The virus is susceptible to heat, light, trypsin, ether, and acidic pH. It causes an acute systemic infection. The respiratory epithelium of the nasopharynx is the primary site of infection. As the virus replicates, a primary viremia occurs infecting the reticuloendothelial system. This is followed several days later by a second viremia where infection of the respiratory tract and other organs occurs.
Incubation ranges from 7-18 days from exposure to rash onset. The last large outbreak lasted 5 years and involved more than 12,000 cases in the Los Angeles, California area. There have been no large outbreaks since 1993. Most outbreaks have been imported from outside the United States and have been limited to communities who refuse vaccination for personal or religious belief reasons (National Immunization Program, 2003).

Fever (up to 103° to 105°), cough, conjunctivitis, and coryza characterize the 1 to 7 days of the prodromal stage. Koplik’s spots (blue-white spots) appear on the buccal mucosa 1-2 days before the rash. The rash begins at the hairline and proceeds downward and outward. It is maculopapular, lasts 5-6 days, and fades in the order that it appeared. Complications include diarrhea, otitis media, pneumonia, encephalitis, seizures, and death. Measles during pregnancy can lead to premature labor, low-birth-weight infants, and spontaneous abortion. Treatment includes supportive care and containment (National Immunization Program, 2003).

**Mumps.** Mumps is caused by a paramyxovirus which has a single-stranded RNA genome. It is easily susceptible to ultraviolet light, heat, chloroform, ether, and formalin. Transmission is by respiratory droplets. The nasopharynx and regional lymph nodes host the virus while it replicates. The resulting viremia affects the meninges, pancreas, testes, ovaries, and salivary glands and leads to parotitis and aseptic meningitis. Incubation ranges from 14-25 days with prodromal symptoms including myalgia, malaise, anorexia, low-grade fever and headache. Parotitis occurs in up to 40% of cases and may last 10 days. Between 1980 and 1999 mumps was the cause of an average of 1 death per year. Cases of mumps have declined from 5,723 in 1989 to 231 cases in 2001, likely due to the second dose of the Measles vaccine which is combined with Mumps and Rubella in the MMR vaccine. Complications include central nervous system involvement, orchitis, oophoritis, pancreatitis, deafness, and death (National Immunization Program, 2003).

**Rubella.** Rubella is caused by a togavirus, which is an enveloped RNA virus with a single antigenic type. It is susceptible to amantadine, ultraviolet light,
chemical agents, and low pH. Transmission is airborne and by respiratory
droplets. Viremia occurs 5-7 days after replication begins in the nasopharynx and
regional lymph nodes, spreading the virus. Fetal infection occurs across the
placenta during viremia which results in destruction of cells and mitotic arrest.
Incubation ranges from 12 to 23 days (National Immunization Program, 2003).

Prodromal symptoms including low-grade fever occur in the first week and
upper respiratory symptoms and lymphadenopathy in the second week. The rash
starts on the face and progresses from head to foot and lasts three days. It can
be pruritic, is fainter than measles, and non-coalescent. Complications include
arthralgia or arthritis, encephalitis, thrombocytopenia, and Congenital Rubella
Syndrome. Congenital infection can result in deafness, cataracts, microcephaly,
heart defects, mental retardation, spleen and liver damage (National
Immunization Program, 2003).

Varicella. Varicella (Chicken Pox) is caused by a Herpes group DNA virus.
The primary infection causes chickenpox and the virus remains latent in sensory
nerve ganglia. Reactivation of the varicella zoster virus (VZV) results in Herpes
zoster (shingles). Transmission is via airborne droplets to the respiratory tract
and conjunctiva. Primary viremia occurs 4-6 days after replication begins in the
nasopharynx and regional lymph nodes. The virus is spread to the sensory
ganglia, the liver and the spleen. A secondary viremia occurs after further viral
replication in the viscera causing skin lesions. Incubation ranges from 10 to 21
days, with mild fever and malaise. Pruritic rash begins on the scalp and
progresses downward and outward. Successive crops of macules occur which
progress to papules and vesicular lesions which then crust over (National
Immunization Program, 2003).

Herpes Zoster is associated with aging, and immunosuppression,
intrauterine exposure, varicella at less than 18 months of age. Eruptions are
unilateral, follow a dermatome and are painful. Complications of varicella include
bacterial infections of the lesions, pneumonia, encephalopathy, meningitis and
other central nervous system manifestations (National Immunization Program,
2003).
**Immunizations**

Prior to 1900, vaccines had been developed against five diseases, but the vaccines were not widely used. Infectious diseases were widespread and mortality was high. Since the beginning of the 20th century there have been substantial advances leading to the development or licensure of vaccines for 26 diseases. Vaccines against 11 of the diseases have been recommended for use for all children in the United States (National Immunization Program, 1999).

The diphtheria, tetanus, and pertussis combination vaccines became widely used in the early 1950's across the United States. Polio vaccine was licensed for use in the United States in 1955, 10 years after President Roosevelt's death. The next vaccines to be licensed for use in children were the measles vaccine in 1963, the mumps vaccine in 1967, and the rubella vaccine in 1969 (National Immunization Program, 1999; Baker, 2000). In the last 20 years vaccines have been developed or licensed for Hepatitis B (1981), Haemophilus influenza type b (1985), Varicella (1995), and Rotavirus (1998) (National Immunization Program, 1999). The Rotavirus vaccine was subsequently removed from use in the United States in 1999 (Center for Disease Control, 2000). Pneumococcal conjugate vaccine was licensed in 2000 (Center for Disease Control, 2001).

The National Childhood Immunization Initiative was established in 1977 by the Department of Health, Education, and Welfare to increase immunization levels to 90% by October, 1979, and to ensure that high immunization levels were maintained by establishing mechanisms for timely vaccination. At the time the program was established, more than 20 million children under 15 years of age were missing at least one dose of one vaccine and, therefore, could not be considered to be fully protected. Immunization requirements for school entry were enacted in 1977 and immunization levels did rise. New goals were established, among them the eradication from the United States of indigenous measles by the fall of 1982. (Immunization Division, 1982).

In spite of the rise in immunization levels, there was again a measles epidemic between 1989 and 1991 in the United States. More than 55,000 cases
of the measles were documented. Over 11,000 people were hospitalized and 123 deaths (more than 50 in children under the age of five years died) were reported (Center for Disease Control and Prevention, 1991, 1993). It was determined that failure to vaccinate appropriately preschool-aged children was a primary cause of the epidemic (CDC, 1992).

In 1993 the Childhood Immunization Initiative established the goal of reduction or elimination of vaccine-preventable childhood diseases and immunization of 90% of all 2-year-olds with the most critical, initial vaccine doses. A second goal was to complete the recommended vaccine series by the year 2000 for 90% of all 2-year-olds (U.S. Department of Health and Human Services, 2000). To facilitate the accomplishment of these goals, funding was established to improve the quality and quantity of available vaccines, to reduce the costs to parents, and to monitor vaccination and diseases. The Vaccines for Children program was created as part of the Omnibus Budget Reconciliation Act (OBRA) in 1993. It provides funds for the purchase of vaccines to be used for children 0 - 18 years of age who receive Medicaid benefits, have no health insurance, or are American Indians or Alaskan Natives. Vaccine for Children vaccines may also be used for children whose health insurance does not cover vaccines (National Immunization Program, 2001).

The Childhood Immunization Initiative is evaluated yearly to document progress on the goals. There has been progress. By 1996 it was announced that there had been no tetanus among children less than 15 years of age and there had been no cases of polio caused by wild poliovirus (Center for Disease Control and Prevention, 1997). The goal to increase the rate of immunizations to 90% for 2-year-olds to receive all their recommended immunizations is ongoing. Data are collected by the National Immunization Survey and the National Center for Health Statistics. The results are published in the Center for Disease Control and Prevention’s Morbidity and Mortality Weekly Report.

Case Management

Case management has its roots in community service coordination in the public health community service programs which began at the turn of the century.
It has evolved through the years and expanded to many settings, including psychiatry, social work, and insurance (Bower, 1992). There are many definitions in use describing case management as a system and as a process. The American Nurses Association Task Force on Case Management defined a system:

Case management is a system of healthcare delivery designed to facilitate achievement of expected patient outcomes within an appropriate length of stay. The goals of case management are provision of quality health care along a continuum, decreased fragmentation of care across many settings, enhancement of the client’s quality of life, efficient utilization of patient care resources, and cost containment (Cesta, Tahan & Fink, 1998, pg. 2).

The National Case Management Task Force defined case management as a process and this definition has been adopted by the Case Management Society of America (CMSA, 1995):

Case management is a collaborative process which assesses, plans, implements, coordinates, monitors, and evaluates options and services to meet an individual’s health needs through communication and available resources to promote quality cost-effective outcomes (pg. 8).

The system and the process define the focus for achieving patient outcomes and expand on the components which are the nursing process, but it is as a role that case management provides an active practitioner of care coordination. Case management is client-focused, is outcome oriented, promotes coordination of client care, is cost-effective care, responds to the needs of the client, the insurer, and other third party payers, and can be a marketing point (Bower, 1992). Although physicians are the case managers of the medical plan of care, the nurse case manager coordinates multiple dimensions to ensure maximum effectiveness. Nurse case managers coordinate care across care settings to alleviate fragmentation with a broad vision of the clients’ needs and desired outcomes (Bower, 1992). Nurse case management is making an appointment for a child because the mother does not speak English. It is not just showing a
mother how to take a child’s temperature, but making sure she has a thermometer, knows how to read it, and what it means. It is calling to see if the prescription was purchased and is being given correctly. Nurse case management is a home visit when the mother calls and says she doesn’t know what she will do it she doesn’t get a moment’s quiet after days and nights of colic. Nurse case management is encouraging the parent to continue with school so that a better life can be provided for the family. Nurse case management is attending the funeral and giving comfort to the mother when her child has died. It is giving comfort to the mother when she has lost her mother. Nurse case management is seeing the person and the family holistically represented by the chart full of notes and office visits, and making sure they all are receiving quality, cost-effective care and have personal satisfaction with the care.

Research

King’s Goal Attainment Theory

King’s goal attainment theory can be used to guide research. Woods (1994) studied a group of elderly nursing home patients utilizing King’s goal attainment theory to promote health restoration. All the subjects were all elderly females \( n = 5 \) who agreed to talk about health promotion, education, and methods for restoration of health for 1 hour at 10 weekly meetings. The authors developed an assessment tool, using King’s conceptual framework and goal attainment theory, to collect data concerning perception self, growth and development (their personal system), interaction, role, stress (their interpersonal system), power, and status (their social system).

Nursing diagnoses were established, based on themes which emerged from analysis of the patient’s stated health goals and the assessment. The nursing diagnoses were: (a) “inadequate attention to hypertension treatment regimen related to a lack of knowledge”, (b) “potential difficulty with anticipated death, related to insufficient opportunities for reminiscence”, and (c) "knowledge deficit regarding causes of stress and stress management techniques"(Woods,
1994, p. 67). The author and the patients, mutually agreed on the patients’ goals and the interventions, utilizing King’s goal attainment theory to perceive each other and the situation, to communicate, plan interactions, and transactions. For 10 weeks the patients attended the sessions to learn more about their hypertension, dealing with their impending deaths and stress management and interventions were implemented (Woods, 1994).

The goal-based outcomes were (a) an increase in knowledge about hypertension and an awareness of the importance of diet and medication, (b) an improved perception of themselves and their life experiences, (c) an increased understanding of emotional situations and their role in responding and (d) an understanding of relaxation and stress reduction techniques. The author found King’s goal attainment theory was appropriate and useful as a guide for group settings. The identification of the goals and interventions in cooperation with the patients promoted their attainment of the goals (Woods, 1994).

Hampton (1994) examined nursing conceptual frameworks and the utilization of King’s theory of goal attainment to guide managed care. Managed care models were noted to be directed toward initiating cost effective, outcome oriented care. Decreased cost of care with increased quality of care were noted to be goals of administrators and practitioners who collaborated with managed care implementation. Nursing theory was very rarely used in managed care settings where organizational and management theories dominated.

Hampton (1994) suggested utilizing King’s theory of goal attainment in a managed care program in conjunction with CareMaps (critical pathways broadened to include the patient and family members). The CareMaps were multi-disciplinary and described measurable outcomes for all care. Similar to King’s goal attainment theory, interaction and transaction are integral. King describes nurse-patient interactions and how the lead to goal attainment, where as the CareMaps specify daily activities need to attain daily and long-term goals.

The author recommended the marriage to the theories to yield a Caremap which would be reviewed upon admission with the patient and family. Allowing the patients to express their desired outcomes presents social exchange which
can yield negotiation for accomplishing alternative outcomes. Mutual goals should be set and ongoing dialogue established (transactions) discussing desired outcomes and the accomplishment of the desired goals. This interaction will yield the optimal goal outcomes of the CareMap (Hampton, 1994).

**Adult Learning**

Owens, McCann, & Hutelmyer (1978) studied the effect of group educational programs, designed to increase patient knowledge about their disease, for hospitalized cardiac patients. Thirty six cardiac patients (postmyocardial and post cardiotomy) participated in the study while in the intermediate coronary care unit and upon discharge. A questionnaire was developed and tested and judged to have content validity. The sample was grouped into medical and surgical subgroups and included 11 females and 25 males. The mean age was 54.3 years. The medical group had an average length of stay of 20.4 days, with 18 days being the mean, the surgical group had a mean of 22 days.

Patients were pre-tested via interview by the investigator and invited to attend five 45 minute discussions held in a group setting covering anatomy and physiology, diet, appropriate activity, the adjustment process, risk factors, and recognizing complications of therapy. Medication concerns were discussed on an individual basis due to the difference in medications required by the patients (Owens, McCann, & Hutelmyer, 1978).

Discussions were held daily, conducted by a nurse or dietician and attendees numbered 3 to 12. Handouts were given at each group meeting. Upon completion of the five discussion groups the patients were again tested by the investigator via interview and then at 6 weeks and 3 months (Owens, McCann, & Hutelmyer, 1978).

Significant increases in knowledge were shown with Chi square analysis. Percentage of correct responses ($n = 36$) regarding understanding of illness was 83% pre-test, 91% post-test, 97% 6-week, 88% 3 month ($p < .05$). Knowledge of risk factors was the lowest score on the pretest (30%, $n = 36$) and subsequently rose with each testing (61%, 63%, 69%). Increases were significant for all areas.
(lifestyle adjustment, medication therapy, pathophysiology, diet, and complication indicators) except causes of cardiac disease, where scores were 50% pre-test, 53% post-test, 44% 6-week, and 55% 3-month. The study showed patients can learn in group settings, while recovering, and continue to increase their knowledge. Group instruction allows for a sense of cohesion among members and reduces anxiety levels. This study supports continuing outreach programs which address groups for the purpose of advising patients of their choices for healthcare. It also supports the practice of speaking to parents while still in the hospital about their choices for health care, and reviewing well child care and immunization schedules and benefits of immunization (Owens, McCann, & Hutelmyer, 1978).

Conti (1985) examined teaching styles for adult learners and how they affect student achievement. Testing was done using a well known validated tool, the Principles of Adult Learning Scale (PALS) which consists of 44 items rated on a six-point Likert scale and yielded a score indicating teacher support for a collaborative mode of instruction. High scores relate to learner centered behaviors and progressive, initiating constructs. Low scores indicate teacher-centered, responsive, traditional behaviors. Twenty-nine teachers and 837 adult education students participated in the study. The teachers were all part-time instructors; seven taught basics, 14 were English as a Second Language (ESL) instructors, and 8 were General Educational Development (GED) instructors. All had bachelor’s degrees, and 14 had master’s degrees, but only 5 had formal adult education training. The students were enrolled in three types of courses: basic level (115); GED preparation (249) and ESL (473). Women outnumbered the men 2:1 and ages ranged from 15 to 76 with the average age being 30 years old (Conti, 1985).

The PALS mean score was 130.05 ($n = 29$, $SD = 0.8$). To make scores comparable, they were organized by $\frac{1}{2} SD$, which yielded a range of 10 since the PALS test has a $SD$ of 20. The independent variable (teaching style) was compared to the dependent variable (student achievement) using analysis of covariance. Teaching style was found to contribute significantly to student
achievement ($F = 5.67, df = 4/806, p < .001$). Students whose teachers scored 1.5 to 2.0 SD below the mean of the PALS showed the greatest gain. Students of teachers with the highest PALS scores came in second in gains. But when controlled for attendance and entrance level, the results changed ($F = 4.93, df = 4/805, p = .001$). The students who had the teachers with the highest PALS showed the greatest gain, and students with the lowest ranking teacher scores on PALS were second (Conti, 1985).

A significant difference due to teaching style was revealed with an analysis of covariance ($F = 5.69, df = 4/797, p < .001$), there was no difference due to gender or age. Teaching style and the type of course being taught yielded significant interaction. Student achievement in the GED setting revealed teaching style had a significant impact ($F = 16.94, df = 4/239, p < .001$). This pattern persisted even when controlled for attendance, age, and gender. With ESL and basic level students, the teaching style only emerged when entrance level ($F = 2.64, df = 3/95, p = .005$) and attendance ($F = 3.54, df = 4/458, p = .007$) were controlled (Conti, 1985).

The ESL students showed the most gain. The study supports that teaching style in adult education does affect student achievement. GED students respond better to a teacher-centered approach. ESL and basic level students responded better to a collaborative approach where improvement of skills, in addition to developing self-concept and interpersonal skills, are equally important. The author stated that the classroom can become a microcosm of society for the students once a positive relationship is developed with the teacher (Conti, 1985). This is also the case with the case manager and the client. The case manager must find the appropriate teaching style for each parent in order to be successful in providing the parent with the needed parenting knowledge. Only when the right style is found, is the case manager able to assemble the appropriate information and present it in a cultural context for the parent.

Teaching Methodology

Magnussen, Ishida and Itano (2000) studied the newly adopted Inquiry-Base Learning (IBL) teaching methodology to measure its effect on students’
critical thinking abilities. A tool called the Watson Glaser Critical Thinking Appraisal was used to collect data from a total of 228 new students at the University of Hawaii School of Nursing. Gains in critical thinking abilities resulting from instructional programs were measured with the tool. The same students were tested again in their last semester and a total of 150 paired scores were obtained. Three groups of approximately equal size were the result when the scores were divided into high, middle, and low. Although there was no statistical difference between the mean scores overall, the research did show an increase in mean of 2.23 ($t = 2.76, p < .001$) in the low scoring groups retest which indicated a significant improvement after exposure to an IBL curriculum (Magnussen et al., 2000).

**Vaccine Preventable Diseases**

Siedler, Hermann, Schmitt & Von Kries (2002) conducted a telephone survey to study the consequences of delayed measles vaccination in Germany in children <3 years of age. The surveyors assessed the vaccination status of 782 children age 0 to 35 months to determine the age when the first dose of measles vaccine was received. The first dose of measles vaccine is recommended between 11 to 14 months of age by the German Standing Committee on Vaccination. By 15 months of age only 21.7% (CI 18.0 to 25.3) had received the first dose. The proportion increased to 77.0% (CI 72.7 to 81.4) who received the first dose by 24 months. At 36 months, 87.6% had received their first dose of measles vaccine. Additionally three data sources for measles surveillance (official measles notifications of laboratory confirmed cases, sentinel data reported by diagnosing physicians, and official hospital discharge diagnoses available from mandatory reporting codes) were examined to determine occurrences in the targeted age of 1 to 4 years. Sentinel reports indicated 1113 ($n = 4500; 25\%$) cases of measles occurring in the target age range, and 36% ($400, n = 1113$) were in children 1 year of age. The 1 to 4 year old group also had the highest number of hospitalizations 30% ($172, n = 582$) and accounted for the largest number of complications (about 150). Data from the 3 sources for detecting measles was used to estimate the number of cases preventable by
adhering to the recommended time schedule for immunizing. If vaccine coverage were at the recommended level of 85% at 11 to 14 months, >50% of measles case could be prevented (Siedler, Hermann, Schmitt & Von Kries, 2002).

**Immunizations**

Many studies have centered on identifying barriers to immunization. Rural settings have been studied to determine barriers to immunization (Lowery et al., 1998; Pruitt, Kline & Kovaz, 1995; Wilson, 2000). Lowery, Belansky, Siegel, Goodspeed, Harman and Steiner (1998) found that there were not any significant immunization rate differences between urban and rural areas. They found no significant differences related to race. They did find that children had a higher probability of being under-immunized if they came from lower income homes (Lowery et al., 1998).

Lowery et al. (1998) conducted an analysis of two nationally representative surveys, the 1991 National Maternal and Infant Health Follow-Up Survey (NMIHS; 88%, \(N = 8252\)) a stratified, systematic survey, begun in 1988, of pregnant women in the lower 48 United States describing factors related to poor pregnancy outcomes, and the 1993 National Health Interview Survey (NHIS; 92.7%, \(N = 7323\)) a multistage and continuous survey of non-institutionalized civilian households in the United States obtained in 1993. Information was gathered from face-to-face and telephone interviews. Children between the ages of 19 months and 5 years old from rural areas with immunization status determined at or before 36 months were included NMIHS (\(n = 4425\)) and NHIS (\(n = 566\); Lowery et al., 1998).

Both surveys examined the relationship between the following demographic variables: sex of the child, race of the child, and annual family income. Reported with percent up-to-date (UTD), bivariate results OR(95% CI) and multivariate results OR(95% CI), the results were: male 65.1% UTD, female 60.7%, 0.8 (0.6, 1.1), 0.7% (0.5, 0.9), \(p < .05\); White, non-hispanic 66.4 %, Black 48.0% 0.5, \(p < .01\), (0.3, 0.7), 0.8 (0.5, 1.4), Other 52.1%, 0.6, \(p < .01\), (0.3, 0.9), 0.6 (0.3, 1.0); family income \(\geq\$40,000\) 70.6% UTD, \$20,000 to \$39,999 68.8%,
Neither data set demonstrated significant differences between rural (NMMIHS, 63.0%, $p = .88$, NHIS, 67.8%, $p = .31$) and urban (NMIHS, 63.3%, $p = .88$, NHIS, 65.5%, $p = .31$) area immunization rates. Although racial minority, lower income, and lower education were indicated as common demographic characteristics pointing to under-immunization, limited supply of physicians and lack of health insurance were noted as possible contributing factors. Immunization status was not significantly associated with the number of children in the family, mother’s age, or mother’s education level (Lowery et al., 1998).

Pruitt, Kline, and Kovaz (1995) conducted a descriptive study about perceived barriers among rural populations to childhood immunizations. The sample included mothers and fathers ($N = 109$) of 148 infants and toddlers from three rural South Carolina counties. Data were gathered by home visits and telephone interviews conducted by Registered Nurses. Analyses of the descriptive statistics used Pearson’s correlations, children in family ($r = .358$), age of mother ($r = .206$), employment of father ($r = .195$), yielded significant correlation with immunization delays ($p < .05$). Almost an equal number of mothers and fathers were employed (62% to 61.5%). Medicaid services were received in almost 40% of the families sampled. Twenty-nine per cent of the families had an income lower than $10,000 annually. Unmarried mothers made up 34% of the study and 25% of the population lacked a high school education (Pruitt, Kline, & Kovaz, 1995).

Perceptions, attitudes, and beliefs constituted predisposing factors. The importance of immunizations was acknowledged by a majority of subjects (89.6%, $n = 133$). Illness was the primary predisposing factor for delaying immunizations (49.5%, $n = 73$), followed by fear of side effects (24.8%, $n = 27$), fear of needles (27.4%, $n = 19$), and being against more than one shot per visit (16.5%, $n = 19$). Accessibility, affordability, and availability were enabling factors. Barriers noted were waiting time (40%, $n = 59$), inconvenient clinic hours (23.1%, $n = 25$), cost (22.2%, $n = 24$), need for appointment (18.5%, $n = 20$), clinic
distance (16.5%, n = 18), private doctor too expensive (16.5%, n = 18), and transportation problems (14%, n = 20). Influences on the parents by the media, past experience, family, community, and health care providers were considered reinforcing factors. Influences listed were childhood experiences (29.4%, n = 32), doctors (15.6%, n = 17), parents and grandparents (11.9%, n = 13), and positive messages (13.8%, n = 15); (Pruitt, Kline, & Kovaz, 1995).

The researchers found waiting times, cost, inconvenient clinic hours, and multiple providers to be barriers to immunization. Parental confusion related to which immunizations were due, sick infants, fear of adverse reactions, and fear of needles also contributed to under-immunization. The researchers recommended case management of high risk or delayed children with a tracking system for immunizations for private and public providers (Pruitt, Kline, & Kovaz, 1995).

Wilson (2000) conducted a descriptive study of rural Midwest populations evaluating parents' perceptions about their children's immunization, their decision to have their children immunized, and the rural offices' and clinics' provision of services. A grounded theory approach was used to analyze qualitative data from a convenience sample (N = 12), on decision making perceptions of parents related to vaccinations. Subjects' mean age was 27.5 (range 20 - 39), children's mean age was 22.23 months (range 8 - 36 months), Seventy-five percent were self pay, 80 % sought care at a private office, 80% had completed high school, 75 % had their own transportation, and 66% were married. Four categories emerged: past experiences, competing tasks, transportation, and knowledge which was divided into two parts, knowledge and misperceptions about communicable diseases and vaccines (Wilson, 2000).

Wilson (2000) found past adverse reactions to immunization made it difficult for 58% of the mothers to continue immunizing. Competing tasks, such as work, kept 67% of mothers from immunizing. Transportation difficulties were cited by 67% of parents; this included lack of transportation and also distance to the provider (mean 10.75 miles, range 2 - 30 miles). Knowledge of communicable diseases and vaccines led 92% to view vaccination positively yet
misperceptions led 50% to cancel appointments due to minor illnesses. The study also looked at immunization services provided by rural offices. Seventy-five percent of the parents complained about the clinic locations and hours. Information and support about immunizations were received from primary care health care providers 70% of the time. Confusion about when immunizations were needed was noted by 58% of the parents (Wilson, 2000).

Cotter et al. (2000) conducted a cross-sectional study on a random sample of Medicaid recipients (N = 5,788, 78.7% of the 7,356 total surveys sent) in three separate managed care programs: primary care case management (PCCM) (78.5%, n = 3,615), a voluntary health maintenance organization (VHMO) (96%, n = 818), and a mandatory health maintenance organization (MHMO) (71.3%, n = 1,355) ($\chi^2 = 215.88$, df = 2, p < 0.001). Adjustments were made for urban residence, gender and race. The samples were proportional to the total number in each program. Physicians were surveyed by mail, using customized data collection forms which were compiled from Department of Health databases, and primary care providers only needed to complete the form with information from the patient’s record. Results were compared pair-wise across all managed care programs using Chi-square tests. Logistic regression models were used to test the effect of baseline characteristic differences of the groups (Cotter et al., 2000).

Characteristics of the groups differed by managed care program: female 47.3%, (PCCM), 51.2% (VHMO), 50% (MHMO) (p < 0.05); white 46.0% (PCCM), 19.2% (VHMO), 27.3% (MHMO); black 38.9% (PCCM), 73.3% (VHMO), 69.5% (MHMO) (p < 0.05); urban 73.2% (PCCM), 99.0% (VHMO), 99% (MHMO) (p < 0.01). The percentage of 2-year-olds who had completed the 3:3:1 series (3 DTP, 3 Polio, 1 MMR) were 78% (n = 3,615, PCCM), 71% (n = 818, VHMO), 67% (n = 1,355, MHMO), 74% (Total, n = 5,788), (p < 0.01). The percentage of 2-year-olds completing the 4:3:1 series (4 DTP, 3 Polio, 1 MMR) were lower at 71% (n = 3,615, PCCM), 59% (n = 818, VHMO), 57% (n = 1,355, MHMO), 66% (Total, n = 5,788), (p < 0.01). The total persons receiving all 16 shots were listed by
program, 77%, (n = 3615) (PCCM), 73%, (n = 8180) (VHMO), 68%, (n = 1,355) (MHMO), 74% (Total, n = 5,788) (Cotter et al., 2000).

The children in the primary care case management (PCCM) group had a higher rate of immunization completion than the two HMO groups. They found that the key predictor of immunization status was the type of managed care program in which the children participate (Cotter et al., 2000).

Case Management

Polinsky, Fred & Ganz (1991) evaluated a social work case management program which they had designed and implemented for breast cancer patients. The case management program provided information, reassurance and referrals. The model designed is generic and adaptable for rehabilitation counselors and oncology nurses. The 69 study subjects were English speaking, newly diagnosed breast cancer patients who had no history of psychiatric illness or disabling non-cancer illnesses, and who had consented to participate with their physicians’ consent. Completion of four sets of interviews and questionnaires were required by the subjects during the year-long study. Three to 5 weeks after surgery, a comprehensive initial needs assessment was conducted at which time the social worker coded each need and indicated if it was present prior to the diagnosis. This interview was also used to build trust and rapport. Follow-up occurred at least every 6 weeks by telephone, or in person if needed, beginning with the initial call several days after the initial interview. Questions resulting from the initial assessment were addressed and reassurance and referrals were provided.

Detailed records were kept for each contact by the social worker, regarding the type of problem addressed, the time spent, the initiator of the contact, the intervention type, referrals and other items. Additionally, demographic data were collected including surgery type and treatment data. White, married, middle-to upper class subjects comprised a majority of the population. Follow-up treatments varied, but surgery type was equally divided between modified radical mastectomy and lumpectomy. Most contacts occurred in the first three months (569) with a total of 153 hours being spent at an average of 16 minutes per contact and 8.2 contacts per person. Contacts decreased
between 3 and 6 months to 327 with only 4.7 contacts per person, although
contacts continued to average 16 minutes in length for a total of 89 hours. At 6
to 12 months there were 548 contacts averaging 15 minutes in length for 7.9
contacts per person for a total of 132 hours. The average intervention time was
5.4 hours per year per person for a total of 374 hours of case management.
Topics ranged from physical, initially, to psychological at the end of the year, with
non-cancer related problems receiving increased attention. The need for
continued contact during the 1 year after surgery was demonstrated by the 25-
53% of contacts made during the second 6 months of the study. Examples
demonstrating the qualitative component of this study were provided highlighting
case management services. The authors have presented a case management
model and quantified the amount of time to apply the model given patients' needs
which the oncology case manager must deal with. It is an advantage of using
primarily telephonic case management that it uses existing resources, allows for
early problem identification due to periodic contact and is cost effective. Health
promotion education, increased control and referral to resources were identified
as patient benefits. Refusal to accept or follow though on referrals by patients,
early termination by patients, and exclusion of family members from
interventions, there by not meeting their needs were noted to be problems with
the model. Replication with other types of cancer and other phases of the illness
is recommended to establish efficacy and effectiveness (Polinsky et al., 1991).

Lynn and Kelley (1997) studied nursing practice and examined the effect
of case management on work satisfaction, control over nursing practice and
perceived quality of care delivered. The site of the study implemented a program
with case management by registered nurses for cardiac bypass patients. In
addition to case management and direct care, the nurses were responsible for
the development of a critical pathway for their patients. Surveys were
administered to all nurses working in the study units one month prior and one
year post implementation of the case management program. The surveys
established validity and reliability and assessed work satisfaction, control and
autonomy, and quality of care. Only 39 nurses completed both the surveys.
Positive changes were seen in the significantly higher scores post implementation in the areas of developing relationships with patients (paired $t = -2.65$, $p = .012$), patient care (paired $t = -2.56$, $p = .016$), resource adequacy, both physical and intra-organizational (paired $t = -2.97$, $p = .006$) and physician and colleague respect and treatment (paired $t = 3.39$, $p = .000$). Satisfaction with pay and reward structure was less (paired $t = 3.16$, $p = .004$) after implementation and perception of practice control was unchanged (paired $t = 1.29$, $p = .21$). There were insufficient case managers who completed both surveys for a meaningful separate analysis. Of benefit were other findings including significant reductions in length of stay and cost, earlier implementation of education and discharge planning and increase patient awareness of potential complications.

A multipurpose study was conducted by Newcomer, Arnsberger, & Zhang (1997) to create a case manager activity typology, examine how case manager actions and client characteristics relate, and explore the relationship of the actions to use-outcomes. A multisite demonstration project with two types of community care case management programs in use for dementia client was the source of the randomized sample for this study. The case manager to client ratio was 1:100 in one project and 1:30 in the other project. For a period of 3 years annual assessment data was collected from chart reviews. Selection criteria were identified and 1,000 sample cases were evaluated. Eight-hundred-ninety three cased met the criteria and that was adequate for power and alpha. A case manager activities code list was constructed and chart information was summarized and means and standard deviations were calculated. A number of instruments with established validity and reliability were used in the collection of data such as caregiver health status, client health status and functional status and utilization of services.

A categorized list containing 200 items, of which 54 were case management activities, was used by a RN/MPH and a MSW/MSG to code case manager activities used to resolve client or caregiver problems. The typology was generated by factor-analysis of the case management activities. The factors
were scaled and the Chronbach’s alpha statistics ranged from .67 to .78 for each factor with inclusion as a factor requiring a criterion value of 30 or greater. Client functional status and caregiver attributes showed some relationship with case manager activities. A greater relationship between service outcomes and case manager activities is suggested through statistical analysis. Identified case manager activities in this analysis were caregiver training, empowerment and support, crisis intervention, clinical nursing, routine monitoring, placement activities and client health (Newcomer, Arnsberger, & Zhang, 1997).

There were several qualifications cited by the authors. The programs evaluated had very specific client contact protocols that may have impacted association of some client attributes to case manager activities, showing that case manager behavior may be significantly affected by program protocol. Replication, suggested by the authors, may identify more associations with a more varied population and a program with more flexible protocols. Second, the size of the program caseload did not affect caregiver training or empowerment. Further study is needed to determine if this is an influence of the protocols or the limited study period. Limitations of the study were specific to the fee-for-service community case management environment. The staffing was too homogeneous to determine if case manager behaviors were influenced by experience and professional training. Replication may be enhanced and data clarified with the use of other statistical analysis methods (Newcomer, Arnsberger, & Zhang, 1997).

Schuster et al. (1998) evaluated well-child care to determine if case management and home visits improved access and utilization. The study design used a population-based random sample of African-American mothers of newborns, 185 in the intervention group and 180 in the control group. Both groups completed a baseline and a follow-up survey. The number of well-child care visits was the primary outcome. Other variables included age at first well child care visit, usual source of care, travel time, regular provider, denial of care, insurance coverage, duration during first year of life, age enrolled in Medi-Cal. The intervention group received an initial assessment and four home visits during
the first year of life. The case management was provided by African-American women with bachelor’s or master’s degrees in social sciences who had been trained on well-child care, local health care for children and immunizations. The protocol included assessment, collaboration, coordination of services, advocacy, monitoring, and follow-up. Identification and resolution of barriers to well care and instruction regarding the importance of well child care and immunizations were provided by the case managers (Schuster et al., 1998).

The demographic characteristics showed no significant differences for the intervention and control groups. Analyses of dichotomous and nominal variables used Pearson’s Chi-square. A two-sample $t$ test was used for continuous variables. The characteristics for the intervention ($n = 185$) and the control ($n = 180$) groups were mothers’ age in years: Mean 24.7 vs. Mean 25.3 (SD 6.2; $p = .353$); Finished high school 62% vs. 68%, $p = .253$; living children: Mean 2.7 vs. 2.9 (SD 1.9; $p = .233$). Well child care visit means were 4.6 (SD, 1.3) for the intervention group and 4.4 (SD, 1.5; $p = .880$) for the control group. The $\chi^2$ was not significant ($p = .088$) for the discrete distribution of well-child care. Comparisons were made of cumulative visits for significant differences (one to three visits versus four or more visits) intervention (19% vs. 81%) and control (30% vs. 70%) ($p = .012$). A Smirnov test was conducted to account for multiple comparisons in the number of visits and yielded a reduced level of significance ($p = .056$). Logistic regressions were conducted on the variable zero to three visits versus four or more visits and the intervention had a positive effect when it was the sole variable (OR 13.87; CI 1.14 to 3.07; $p = .014$). Demographic variables also showed a fairly robust intervention effect (OR, 1.81; CI, 1.08 to 3.03; $p = .024$; Schuster et al., 1998).

The case management group obtained help, more than the control group, with making doctors’ appointments (35% vs. 23%. $p = .009$), doctor selection (52% vs. 31%, $p = < .001$), obtaining sick care (46% vs. 25%, $p = .001$), transportation (44% vs. 35%, $p = .086$), and information about when immunizations and well check-ups were due (60% vs. 38%, $p = .001$). Case managers assisted with obtaining formula for 23% of the mothers, transportation
(10%), social services (6%), payment of well child checks (5%) and issues with the well care provider (5%). The cost of the intervention averaged $1587 per child and was not cost effective as a method of increasing well child care access and utilization. The intervention was associated with an increased immunization rate at 12 months (13%). Educating the parents on the need for immunizations was more effective than on the need for well child care. The case managers had limited resources, which may have prevented the intervention from having a greater effect. There were no taxi vouchers, and no mobile van services. The home visits may have had more impact if focused on the home environment, such as child proofing, rather than well-child care. Improving well-child care utilization in low-income communities may be accomplished more effectively with interventions other than case management with home visits (Schuster et al., 1998).

Although no mention is made of case management in either of the next two articles, case management is what the researchers were observing being performed by the nurses in the studies. Beckie (1989) studied coronary artery bypass graft recipients to evaluate the impact of a support/education telephone program on knowledge and anxiety levels. The study was a post-test only design with seven patients randomly assigned to either a control group or an experimental group. A knowledge test and an anxiety test were administered 6 weeks after a cardiac rehabilitation nurse specialist implemented a support/education telephone program with the experimental group. The control group received no cardiac rehabilitation care until their visit with the cardiologist and surgeon 6 weeks after discharge when an exercise tolerance test was administered. The study was three-fold: first, evaluate the impact of a telephone education/support program on knowledge levels in seven categories; second, evaluate the impact on patients’ anxiety level; and third determine the relationship between the knowledge and anxiety levels of the patient.

The intervention was an interactive program consisting of 4 to 6 telephone calls initiated by the cardiac rehabilitation nurse specialist to exchange information with the patient during the first six weeks of convalescing at home,
and to help the patient improve decision-making and coping skills, and gain knowledge with the result of decreasing anxiety. The cardiac rehabilitation nurse specialist’s role was to provide information, assist with recommendation implementation and support acceptance and integration of new knowledge, thereby empowering the patient. Assessment of the effect of the intervention was by a 70-item knowledge test validated by Horn and Swain and the State Anxiety Inventory comprised of 20 statements to be rated on a Likert scale (Beckie, 1989).

Demographic characteristics of the sample \( (n = 74) \) revealed 81.1 % were married, 86.5% were male, and 70% were between 50 and 70 years of age. Fifty-eight percent were employed and 52.9% were in white collar jobs. Analysis for homogeneity using Chi-square and independent \( t \) test analysis revealed the groups to be equivalent. The control group made significantly more calls to health care professionals: calls to the family physician \( (n = 37, \text{ mean } 76, \text{ SD } 0.80) \); and calls to the cardiovascular surgeon \( (n = 37, \text{ mean } 0.52, \text{ SD } 0.87) \). Seventy-nine percent of all calls from all participants were made in the first 2 weeks after discharge (Beckie, 1989).

The scores on the 70 point knowledge test, reported as percentages, were: the sample score 85.81% \( (n = 74, \text{ mean } 60.07, \text{ SD } 8.94) \); the experimental group score 96.76% \( (n = 37, \text{ mean } 67.72, \text{ SD } 1.43) \) and the control group score 74.86% \( (n = 37, \text{ mean } 52.4, \text{ SD } 6.28) \) thus supporting the first hypothesis that the experimental group would demonstrate higher levels of knowledge about coronary artery disease and related self-care measures. The state anxiety score for the experimental group was 29.78 ± 7.72 (range 20 to 40) and for the control group 43.22 ± 11.52 (range 21 to 68), which supported the second hypothesis that the experimental group would experience lower levels of anxiety. The third hypothesis was supported by the results of the Pearson Product Moment correlation coefficient computed using the mean percent correct total knowledge score and the mean state anxiety score. The negative correlation \( r = -0.71, p < 0.05 \) was substantial between the knowledge and anxiety levels for the entire sample. When the groups were analyzed separately, the control group’s level of
knowledge and anxiety showed a statistically significant negative correlation ($r = -0.61, p < 0.05$). The experimental group’s negative correlation was less pronounced ($r = -0.31, p < 0.05$). The experimental group scored higher on the knowledge test than the control group in all categories. The results were listed for the experimental (E) and control (C) groups: exercise (mean % 98.80 (E), 88.29 (C), $SD$ 3.24 (E), 11.09 (C), $t = 5.53, df = 72, p = 0.000$); coronary artery disease and relate self-care measure (mean % 98.65 (E), 87.59 (C), $SD$ 2.81 (E), 10.31 (C), $t = 6.29, df = 72, p = 0.000$); diet (mean % 98.65 (E), 83.88 (C), $SD$ 3.89 (E), 15.49 (C), $t = 5.62, df = 72, p = 0.000$); medications (mean % 95.36 (E), 58.82 (C), $SD$ 5.53 (E), 15.49 (C), $t = 13.52, df = 72, p = 0.000$); rest (mean % 94.60 (E), 70.46 (C), $SD$ 7.97 (E), 14.40 (C), $t = 8.92, df = 72, p = 0.000$); and activity restrictions (mean % 94.09 (E), 72.80 (C), $SD$ 5.69 (E), 13.03 (C), $t = 9.11, df = 72, p = 0.000$). Exercise, CAD, and diet were one, two, and three for both groups. Rest was fifth for both groups. Medication and activity restrictions were fourth and sixth for the experimental group and sixth and fourth for the control group (Beckie, 1989).

In conclusion, it was found that the experimental group, which received weekly support and education telephone calls from a cardiac rehabilitation nurse specialist, was more knowledgeable and had lower anxiety levels compared to the control group which received no support. Additionally, it was determined that information given at home in a timely manner as it was needed was more effective, as shown by the high knowledge scores. It was suggested that hospitalized patients be provided with limited information, specific to questions and concerns, and their self-care information being given when the patient is at home. The educative/supportive telephone program was deemed to be effective in decreasing anxiety and increasing knowledge in CABG patients (Beckie, 1989).

Linde and Janz, (1979) studied a comprehensive teaching program and the effect it had on patient knowledge and compliance. Forty-eight cardiac surgery patients [18 coronary artery bypass (16 male, 2 female) and 30 (18 male, 12 female) valve replacement] were divided into two groups with 25 taught by
masters-prepared clinical nurse specialists and 23 taught by cardiac nurses with less than masters preparation. Mean ages were similar for the patients, 56.1 years (bypass) and 54.6 years (valve). All were tested pre-operatively about their knowledge of their illness and their medications. The same knowledge test was administered at discharge, at one month post operation and at 3 to 4 months post-operation. Additionally at the latter two testing events, cardiac medication and compliance measures were evaluated. The post-operative tests were reviewed immediately and discussed in sufficient detail to clarify misconceptions and provide reinforcement. Increases in activity and management changes were also discussed. Initial teaching for all patients was done in the same location and the same teaching materials were available. The only difference between the two groups was the educational preparation of the nurses. The CNSs performed all outpatient teaching, testing, and reinforcement. The knowledge test had five questions specific to the patient’s diagnosis (valve replacement or bypass) and seven true-false and 10 multiple choice questions answered by everyone. Each time the test was re-administered, the questions were re-numbered. The medication test consisted of asking the patient to list current cardiac medications by name, dose, and purpose. Four areas were evaluated for compliance: clinic appointment attendance, adherence to diet, obtaining of follow up labs, and reduction of risk factors, as reported by the patient (Linde & Janz, 1979).

There were five hypotheses: a) no significant difference in the preoperative knowledge of the two groups; b) patients will show an increase of knowledge following postoperative education, c) there will be no significant difference in subsequent tests in either group; d) compliance levels will be higher in patients who receive post operative education; e) discharge scores will be significantly different for both groups and will be related to the level of education of the nurse. Hypothesis 1 was not supported, the preoperative bypass test score was 82.71 (Variation 49.09, df 46, t 3.8117, p < .001, U 116.0, p < .001) and the valve replacement was 67.67 (Variation 288.6). The Mann-Whitney U test and the t test did not explain the significant difference. It is attributed to the inoculation effect. The inoculation effect suggests that patients build up a
resistance to further information after they receive the initial knowledge about their medical condition and care. The effect was overcome by comprehensive education of the valve patients. Hotelling’s T-square test was used to evaluate hypothesis 2 & 3 for changes in knowledge scores over time. Improvement between preoperative and discharge scores accounted for the differences.

Knowledge content scores for the valve replacement patients \((n = 30)\) were Hotelling’s \(T^2 = 70.896, F = 22.002, p < .00005\) and for the coronary artery bypass patients \((n = 18)\) Hotelling’s \(T^2 = 23.484, F = 6.9071, p = .0038\).

Compliance levels were measured using a sample mean and the mean from this study’s population, and applying a t test. Compliance measures equaled 100 percent in six out of thirteen measures with \(p < .01\) for all measures. A t test was used to compare the discharge scores for the two groups (Hypothesis 5) and yielded a \(t\)-score of 3.274 (\(df = 46, p = .002\)). The CNS’s had a mean score of 92.560 \((n = 25, \text{ variation } 40.673)\) and the non-masters prepared staff nurses had a score of 86.826 \((n = 25, \text{ variation } 32.423, \text{ Linde & Janz, 1979})\).

The researchers believe advanced preparation and experienced teachers contributed significantly to the results of this research. The master’s prepared nurses’ impact on patient learning was much greater. Teaching and reinforcement are integral to providing appropriate care since patients need to understand before they can comply (Linde & Janz, 1979).

Summary

In summary, King’s Goal Attainment Theory (1981) provides a framework that can be utilized to guide nursing professionals to set goals with their clients and identify outcomes which are mutually desired. It has been used to guide numerous studies (Hampton, 1994; Sowell & Lowenstein, 1994; Woods, 1994). Immunization adherence has been identified as a problem with low income families (Cotter et al., 2000; Lowery et al., 1998; Pruitt, Kline, & Kovaz, 1995; Wilson, 2000). Case management has been used as an intervention to obtain desired outcomes (Beckie, 1989, Linde & Janz, 1979, Polinsky, Fred & Ganz,
1991; Schuster et al., 1998; Sowell & Lowenstein, 1994). Understanding regarding adult learning is useful in developing and executing interventions (Conti, 1985; Magnussen, Ishida and Itano, 2000; Owens, McCann, & Hutelmyer, 1978).

The methodology used for this research will be presented in Chapter 3. It will cover the design, setting, sample, protection of human rights, instruments, procedure and data analysis.
CHAPTER 3

METHODOLOGY

This chapter will cover the methodology for the study. It will cover the design, setting, sample, protection of human rights, instruments, procedure, and data analysis.

Design

This was a retrospective, ex-post-facto study. It was designed to determine the effect of primary care nurse case management on immunization rates in 2-year-old children receiving Medicaid benefits in North Florida. The independent variable of case management or no case management was expected to affect the dependent variable of immunization adherence. The research questions are: (1) What are the demographic characteristics of the 2-year-old children? (2) What was the rate of immunization adherence in children age 2 years who are receiving public assistance in the form of Medicaid without primary care nurse case management? (3) What was the rate of immunization adherence in children age 2 years who are receiving public assistance in the form of Medicaid who received primary care nurse case management? (4) Is there a higher rate of immunization adherence in the group of 2-year old children who received primary care nurse case management than in the group who did not?
Setting

Florida's population in the 2000 U.S. Census was 15,982,378. Poverty status was determined for 15,605,367 and 1,952,629 or 12.5% were found to be below the poverty level. In the nine county area of north Florida where the study was conducted, 66,232 or 18.2% were below the poverty level. The setting for data collection was the offices of physician members of the primary care nurse case management program. Patients served by the primary care nurse case management program and its participating pediatricians lived in a nine-county area including Calhoun, Franklin, Gadsden, Jefferson, Leon, Liberty, Madison, Taylor and Wakulla counties. All of the pediatricians' offices that participated in this study were in Tallahassee. All of the pediatricians accepted clients from one Medicaid Health Maintenance Organization, Medicaid MediPass Program clients, as well as insured and cash clients.

Sampling Plan

A cohort group was identified from pediatric physicians' offices in a nine-county area in North Florida. The cohort group consisted of randomly selected male and female children of varying races and ethnic backgrounds who were receiving Medicaid benefits from birth through 2 years of age. The cohort was subdivided into two groups, based on the type of Medicaid managed care being received. One group was comprised of children receiving Medicaid through MediPass with the primary care nurse case management program. The second group was comprised of children from the same pediatricians' offices who received Medicaid services through a Medicaid Health Maintenance Organization which provided no primary care nurse case management.

Assumptions were specified in the Data Analysis, and, given that they are credible for the populations of interest, the researcher set alpha, the probability of making a Type I error or rejecting the null in error, at 0.05, and power (1-β), the probability of a statistical test leading to the correct rejection of the null at 0.90,
and a moderate effect to determine the size of the sample to be obtained. The minimum sample size needed was 263 records (Cohen, 1988). This included 132 children who had received nurse case management through the primary care nurse case management program as Medicaid MediPass recipients and 132 children who had used the same pediatricians’ offices via a Medicaid Health Maintenance Organization. In order to prevent reductions in power, efforts were made to keep the sample sizes equal.

Protection of Human Subjects

This research project was a retrospective ex-post-facto study. The data reported were group data. None of the data reported included subject names or any other identifying information. The proposal for the study was approved by the Florida State University Human Subjects Committee (Appendix A). Numeric identifying codes were assigned by the pediatricians’ office personnel as records were abstracted. No record was identified by name. A master list of records furnished to the researcher was kept in the pediatricians’ offices to avoid duplication. Immunization records were examined by a designated staff member in each office and transferred to the Data Collection Sheet (Appendix B), along with demographic information including date of birth, sex, race, Medicaid status, and county of residence to determine if urban or rural. When office immunization records were furnished, staff photocopied the immunization record, marked through the identifying information, photocopied the copy that had been de-identified and applied the adhesive label to the second copy. These de-identified records were placed in a sealed manila envelope and held in the physicians’ offices by the office managers until they were collected by the researcher once a week. All raw data will be kept, by the researcher, in a secured cabinet at the researcher’s office for a period of 10 years until October 31, 2013. The researcher will have sole access. At the end of the 10 years the records will be destroyed. Any publications, presentations or reports will contain only group data. No patient names or physicians offices will be identified. Appendix C contains a
letter from the Executive Director of the Tallahassee Pediatric Foundation agreeing, on behalf of the member physicians, to allow their staff to provide anonymous immunization records with their accompanying demographic data.

Instrument

The Data Collection Sheet was developed by the researcher for extracting demographic information and immunization records (Appendix B). It contained the date of birth, race, gender, county of residence, type of Medicaid program (MediPass or Medicaid Health Maintenance Organization), effective date of Medicaid, Medicaid status on second birthday, and dates of all recommended immunizations. For staff convenience, immunization records could be photocopied by the pediatricians’ staff and names redacted. An example of an immunization record can be found in Appendix D. Staff were provided with adhesive labels which could be affixed to the immunization record indicating the numeric identifying code, gender, race, date of birth and county of residence of the child, effective date of Medicaid, and Medicaid status on second birthday. The last two data items were obtained by staff checking Medicaid with a point-of-sale device (Envoy or Medifax) to determine the child’s Medicaid eligibility and managed care program assignment. Only children continuously on Medicaid from the month of birth through the month of their second birthday were considered.

Procedure

Upon receiving approval from the Florida State University Human Subjects Committee, the researcher contacted six pediatric physicians’ offices for permission to obtain data. The office managers were contacted in each physician’s office and they, or a member of their nursing staff were asked to extract the data. The individual was given detailed instructions on how to obtain a random sample of 2-year old children who were Medicaid Health Maintenance Organization participants and 2-year old children who were Medicaid MediPass
participants. The extractor was offered compensation of $1.00 per eligible shot record.

Each physician’s office was asked to compile a computer-generated list of 2-year-old children. A coin was tossed by the selected staff member and the result determined where the random sample began. Heads indicated starting with the first record and selecting every third name on the list until a minimum of 25 Medicaid Health Maintenance Organization names and 25 Medicaid MediPass names had been identified. Tails indicated starting the process with the second record and selecting every third name until the required records were collected. Staff then completed the collection tool or adhesive labels to be affixed to a photocopied de-identified immunization record. For the purposes of this study, only children who had been on Medicaid since birth were considered.

The physicians have limited the number of Medicaid Health Maintenance Organization assignments and their census had decreased due to attrition. Therefore not all offices had sufficiently high enough censuses to provide 25 randomly selected records. When this occurred, the staff member was asked to provide as many randomly selected Medicaid HMO records as possible and to select an equal number of Medicaid MediPass records. When the staff in each office had collected an equal number of Medicaid Health Maintenance Organization records and Medicaid MediPass records, the records were placed in a manila envelope and placed in the office manager’s locked desk. The staff member called the researcher who picked up the sealed envelope. The records will be kept in a locked file cabinet in the researcher’s office with access limited to the researcher, for a period of 10 years and then destroyed by shredding October 31, 2013.

Data Analysis

Research Question 1

Research Question 1: (What are the demographic characteristics of the 2-year-olds?) was answered using descriptive, non-inferential statistics.
Continuous and interval scale variables were described using central location locators and dispersion measures where meaningful. Frequencies, percentages and cumulative percentages were used to describe discrete variables such as gender, race, and type of Medicaid managed care program.

**Research Question 2**

Research Question 2 (What is the rate of immunization adherence in children age 2 years who are receiving public assistance in the form of Medicaid without primary care nurse case management?) was answered using descriptive, non-inferential statistics. Frequencies, percentages and cumulative percentages were used to describe discrete variables such as gender, race, and type of Medicaid managed care program.

**Research Question 3**

Research Question 3 (What is the rate of immunization adherence in children age 2 years who are receiving public assistance in the form of Medicaid who receive primary care nurse case management?) was answered using descriptive, non-inferential statistics. Frequencies, percentages and cumulative percentages were used to describe discrete variables such as gender, race, and type of Medicaid managed care program.

**Research Question 4**

Research Question 4 (Is there a higher rate of immunization adherence in the group of 2 year old children who received primary care nurse case management than in the group who did not?) These data are categorical in nature and nominal in scale. The data is dichotomous. The children in the study participate in only one of two Medicaid managed care programs. They have been evaluated with regard to immunization status and are either up to date or not. They are either male or female and the live in an urban area or a rural area. The data was analyzed using the Chi-square test for a 2x2 contingency table of compliance/group data (Thorndike & Dinnel, 2001). The Chi-square test is a nonparametric procedure that will yield an approximate $p$ value to be used for the statistical decision. Fisher’s Exact test will also be used to obtain an exact $p$ value for comparison purposes. The Fisher Exact $p$ value will be the value
reported in Chapter 4. Assumptions for the Chi-square test and the Fisher Exact test are that the scale for the two variables is nominal and continuous, that the observations between and within the samples are independent and randomly selected and that the cells are exhaustive and mutually exclusive. (Polit & Hungler, 1999). The records for the Medicaid HMO were drawn from a separate list from the Medicaid MediPass records and, therefore, are independent. The records were selected by staff trained to obtain random samples. The cells are mutually exclusive and exhaustive. The records are either adherent or not adherent, records cannot be both. They are either Medicaid HMO or Medicaid MediPass, they cannot be both at the same time.

Summary

This chapter presented the methodology for the study. It discussed the design, setting, sample, protection of human rights, instruments, procedures, and data analysis. The data gathered for this research study examined the relationship between immunization adherence in the 2 year-old Medicaid HMO population and Medicaid primary care nurse case management. Chapter 4 will present the analysis of the data.
CHAPTER 4

RESULTS

The purpose of this study was to examine, retrospectively, immunization adherence between two Medicaid populations. This chapter will address the statistical findings of the study.

Sample

Research Question 1

Research Question 1: What are the demographic characteristics of the 2-year-olds? The sample for this study consisted of 440 randomly selected 2-year-old Medicaid recipients from Leon county and surrounding counties. The recipients were patients from six pediatric call groups that accepted both a Medicaid Health Maintenance Organization and Medicaid’s MediPass Program. Sixteen pediatricians from within the six call groups had patients which met the criteria for inclusion in the study. The samples were almost evenly divided between those who received managed care and primary care nurse case management through Medicaid ‘s MediPass program (51%, \( n =225 \)) and those who received managed care without primary care nurse case management through a Medicaid Health Maintenance Organization (49%, \( n =215 \)). There were almost equal numbers of males (51.6%, \( n =227 \)) and females (48.4%, \( n =213 \)). This was reflected in the proportion which were Black (Male 47.9%, Female 52.1%) and also with the proportion that were White (Male 54.%, Female 45.3%). The Other category comprised only 10% of the children and was 63% male and 36% female. Of the children included in the study 58.4% were Black (\( n =257 \)), 31.6% were White (\( n =139 \)) and 10% were Other (\( n =44 \)). The Medicaid Health
Maintenance Organization (49%, \( n = 215 \)) had 108 (50%) males and 107 (50%) females with a racial mix of 102 (47.7%) Black, 77 (35.5%) White and 35 (16.8%) Other with 166 (77%) living in urban residences and 49 (23%) living in rural residences. The Medicaid MediPass sample (51%, \( n = 225 \)) had 119 (52.9%) males and 106 (47.1%) females with a racial mix of 155 (68.9%) Black, 62 (27.6%) White, and 8 (3.6%) Other with 161 (71.6%) living in urban residences and 64 (28.4%) living in rural residences. Table 1 shows a break down of gender by race for all the children included in the study.

Table 1
*Crosstabulation of gender and race*

<table>
<thead>
<tr>
<th>Race</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Black</td>
<td>123 (47.9%)</td>
<td>134 (52.1%)</td>
</tr>
<tr>
<td>White</td>
<td>76 (54.7%)</td>
<td>63 (45.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>28 (63.6%)</td>
<td>16 (36.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>227 (51.6%)</td>
<td>213 (48.4%)</td>
</tr>
</tbody>
</table>

According to the U.S. Census for 2000, the racial mix for Florida is 78% White, 14.6% Black and 7.4% Other. The U.S Census reflects the entire State of Florida and all income groups. When the data set is viewed for the nine north Florida counties where the children included in this study live, the population mix is made up of almost 50% racial minorities living in poverty. Approximately half of the current Medicaid population is a racial minority according to Medicaid data.

The immunization records of the children included in the study were examined for demographic variables in relation to immunization adherence. Table 2 shows a break down of gender and race for those who were fully immunized. Adherence was almost equal between males and females for all six
vaccines (see table). Varivax had a spread of .02 with females having the higher adherence rate. DTaP and Varivax are two of the vaccines which have been in short supply.

Table 2

<table>
<thead>
<tr>
<th>Immunization Type</th>
<th>Male % (n = 227)</th>
<th>Female % (n = 213)</th>
<th>Black % (n = 257)</th>
<th>White % (n = 139)</th>
<th>Other % (n = 44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP</td>
<td>204 (89)</td>
<td>198 (92)</td>
<td>236 (92)</td>
<td>127 (91)</td>
<td>39 (89)</td>
</tr>
<tr>
<td>Polio</td>
<td>213 (93)</td>
<td>197 (92)</td>
<td>244 (95)</td>
<td>128 (92)</td>
<td>38 (86)</td>
</tr>
<tr>
<td>HIB</td>
<td>223 (.98)</td>
<td>209 (98)</td>
<td>252 (98)</td>
<td>137 (99)</td>
<td>43 (98)</td>
</tr>
<tr>
<td>Hep B</td>
<td>221 (97)</td>
<td>210 (98)</td>
<td>255 (99)</td>
<td>134 (96)</td>
<td>42 (95)</td>
</tr>
<tr>
<td>MMR</td>
<td>221 (97)</td>
<td>205 (96)</td>
<td>251 (98)</td>
<td>132 (95)</td>
<td>43 (98)</td>
</tr>
<tr>
<td>Varivax</td>
<td>211 (92)</td>
<td>201 (94)</td>
<td>242 (94)</td>
<td>132 (95)</td>
<td>38 (86)</td>
</tr>
</tbody>
</table>

The two most populated communities were deemed to be urban. Children whose addresses were outside those two communities were considered rural residents. Seventy-four percent (n=327) were urban dwellers and 26% (n = 113) lived in rural areas. Table 3 shows the number of fully immunized 2 year old children who are urban dwellers and those who are rural dwellers.

Table 3

<table>
<thead>
<tr>
<th>Location</th>
<th>DTaP % (n = 327)</th>
<th>Polio % (n = 327)</th>
<th>HIB % (n = 327)</th>
<th>HepB % (n = 327)</th>
<th>MMR % (n = 327)</th>
<th>Varivax % (n = 327)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>299 (.91)</td>
<td>307 (.94)</td>
<td>320 (.98)</td>
<td>319 (.98)</td>
<td>315 (.96)</td>
<td>306 (.93)</td>
</tr>
<tr>
<td>Rural</td>
<td>103 (.91)</td>
<td>103 (.91)</td>
<td>112 (.99)</td>
<td>112 (.99)</td>
<td>111 (.98)</td>
<td>106 (.94)</td>
</tr>
</tbody>
</table>
Immunization rates were similar for urban and rural dwellers. This result has been supported by other studies (Feldman, Andrew, Gilbert, Bracken & Thompson, 1994; Lowery et al., 1998). Transportation has been noted as a barrier to immunization for both rural and urban dwellers. The rural residents in this study sometimes traveled more than 60 miles to visit their doctor. Medicaid transportation was available in each of the counties for both urban and rural patients (Agency for Health Care Administration, 2003).

**Research Question 2**

Research Question 2: What is the rate of immunization adherence in children age 2 who are receiving public assistance in the form of Medicaid without primary care nurse case management? The children (48.9%, n = 215) receiving public assistance in the form of Medicaid without primary care nurse case management were members of a Medicaid Health Maintenance Organization (HMO). Their vaccination records were examined for 10 specific diseases to see if they were fully immunized. The diseases are diphtheria, tetanus, pertussis, polio, Haemophilus influenzae type B, hepatitis B, measles, mumps, rubella, and varicella. Advances in vaccine production have led to combination vaccines which decrease the actual number of injections. Table 4 gives frequencies and percentages for the immunized children by vaccine type.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Yes (n)</th>
<th>Percentage</th>
<th>No (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP</td>
<td>183</td>
<td>85.1</td>
<td>32</td>
<td>14.9</td>
</tr>
<tr>
<td>Polio</td>
<td>189</td>
<td>87.9</td>
<td>24</td>
<td>12.1</td>
</tr>
<tr>
<td>Hib</td>
<td>207</td>
<td>96.2</td>
<td>8</td>
<td>3.8</td>
</tr>
<tr>
<td>Hep B</td>
<td>208</td>
<td>96.7</td>
<td>7</td>
<td>3.3</td>
</tr>
<tr>
<td>MMR</td>
<td>201</td>
<td>93.5</td>
<td>14</td>
<td>6.5</td>
</tr>
<tr>
<td>Varivax</td>
<td>193</td>
<td>89.8</td>
<td>22</td>
<td>10.2</td>
</tr>
</tbody>
</table>
Combination vaccines decreases the number of vaccines tabulated to 6: DTaP (diphtheria, tetanus and acellular pertussis), Polio, Hib (Haemophilus influenzae type B), Hep B (hepatitis B), MMR (measles, mumps, and rubella) and Varivax (varicella).

Documentation of 4 doses of DTaP, 3 doses of polio, Hib and Hep B, and one dose of MMR and Varivax was required for a child to be considered fully immunized. Hib vaccine is produced in a four dose and a three dose form. The type of vaccine was not always noted, therefore children with at least 3 doses of Hib were counted as fully immunized and adherent.

The highest rate of immunization was with the Hep B series which is started at birth or by 2 months and completed by 6 to 9 months of age. It can be given as a combination vaccine with Hib which may account for the high Hib rates. MMR and likewise Varivax can be given any time after the 1st birthday and are often given then or at the 15 month well-child visit. Since both are one-dose vaccines at that age, full compliance is more readily attainable and may account for the high percentage. Varivax has been recommended by the American Academy of Pediatrics for all susceptible children over 12 months since 1995. Varicella is still thought by some parents to be to be a benign illness and that the vaccine will not prevent the disease. Lack of parental information has been found to be associated with the choice not to immunize for varicella (Niederhauser, Baruffi & Heck, 2001).

The fourth DTaP dose may be given 6 months after the third DTaP, at approximately 12 months, but has commonly been given at the 18-month well child check. It accounted for the largest number of missed doses. Tetanus and diphtheria toxoids were part of a National shortage which began in 2000 with two manufacturers ceasing production of DTaP. The shortage resulted in prioritizing how available vaccines should be administered. Wound management was the highest priority using adult tetanus and diphtheria toxoids (Td) and the initial 3 dose series of DTaP were also considered a high priority. The two boosters (15-18 months and 4-6 years) were deferred with the intent of recalling the patients to be vaccinated as soon as the shortage eased (Center for Disease Control and
Prevention, 2002). The decrease may also be attributed to the known lack of well care between the second year and the pre-school boosters at age 4 to 5 (Yu et al., 2002). The third polio dose, which is commonly given in conjunction with the fourth DTaP, was the second most frequently missed dose. It is possible that the deferment of the fourth DTaP may have resulted in missed polio doses.

Research Question 3

Research Question 3: What is the rate of immunization adherence in children age 2 years who receive primary care nurse case management? The children (51%, \(n=225\)) receiving public assistance in the form of Medicaid with primary care nurse case management were members of Medicaid's MediPass program. Their immunization records were likewise examined for full compliance with the recommended vaccine doses for the 10 specified diseases. Table 5 gives frequencies and percentages for these immunized children by vaccine type. As with the HMO group, DTaP accounted for the largest number of missed doses, but it is tied with Varivax. The third largest number of missed doses is polio. Hep B was missing in only 2 immunization records, one received the birth dose only and the other did not receive the third dose by his second birthday.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Yes ((n))</th>
<th>Percentage</th>
<th>No ((n))</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP</td>
<td>219</td>
<td>97.3</td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td>Polio</td>
<td>221</td>
<td>98.2</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>Hib</td>
<td>225</td>
<td>100</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Hep B</td>
<td>223</td>
<td>99.1</td>
<td>2</td>
<td>.9</td>
</tr>
<tr>
<td>MMR</td>
<td>225</td>
<td>100</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Varivax</td>
<td>219</td>
<td>97.3</td>
<td>6</td>
<td>2.7</td>
</tr>
</tbody>
</table>
MMR was received by all the sample before the second birthday. All children in the sample received at least 3 doses of Hib.

*Research Question 4*

Research Question 4: Is there a higher rate of immunization adherence in the group of 2-year old children who received primary care nurse case management than in the group who did not? This question compares the rate of immunization adherence between the children who received public assistance in the form of a Medicaid HMO with no case management and those who received public assistance in the form of Medicaid with MediPass with primary care nurse case management.

The children who were fully immunized \( n = 402 \) and received public assistance in the form of Medicaid with MediPass \( n = 219 \) made up 54.5% of the total number of adherent records. Adherent children who received public assistance in the form of a Medicaid HMO comprised 45.5% \( n = 183 \) of the total. The statistical test used to determine statistical significance between immunization adherence in those who had Medicaid MediPass with primary care case management and those who had a Medicaid HMO was the Fisher Exact Test. With Alpha set at .05, the exact \( p \) value for Medicaid MediPass with primary care case management and adherence of \( p = .001 \) was significant and supports the conclusion that there were sufficient sample data for the assertion that immunization adherence and Medicaid MediPass with primary care case management are not independent of each other.

Table 6 compares adherent Medicaid HMO children and Medicaid MediPass with primary care case management children and gives the exact \( p \) value for each vaccine type. The tabulation reflects statistically significant values for the comparison using the Fisher Exact Test, of the two groups, for DTaP, polio, HIB, MMR and Varivax. The difference between the two groups for Hep B was too low to determine significance.
Table 6

<table>
<thead>
<tr>
<th>Group</th>
<th>DTaP</th>
<th>Polio</th>
<th>HIB</th>
<th>Hep B</th>
<th>MMR</th>
<th>Varivax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid HMO</td>
<td>183</td>
<td>189</td>
<td>207</td>
<td>208</td>
<td>201</td>
<td>193</td>
</tr>
<tr>
<td>Medicaid MediPass</td>
<td>219</td>
<td>221</td>
<td>225</td>
<td>223</td>
<td>225</td>
<td>219</td>
</tr>
<tr>
<td>( p \text{ value} )</td>
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<td>&lt;.001</td>
<td>.003</td>
<td>.077</td>
<td>&lt;.001</td>
<td>.001</td>
</tr>
</tbody>
</table>

Conclusions

Conclusions that can be drawn from analysis of the data are:

1. The greatest number of missed doses were for DTaP; polio ranked second.
2. Males were more adherent than females by a small margin.
3. Black and White 2 year olds were equally adherent, with Other slightly behind.
4. Children who received primary care case management with their Medicaid MediPass services were more fully immunized than the children with the Medicaid HMO.

Summary

This chapter presented the statistical findings of the retrospective study of immunization adherence in two groups of 2-year-old Medicaid recipients from Leon and surrounding counties in northern Florida. Demographic information about the sample was presented. Children who received Medicaid through MediPass with primary care case management were significantly more adherent than the Medicaid HMO children. Factors that could have had an effect on the outcome will be discussed in Chapter 5.
CHAPTER 5

DISCUSSION

This study was designed to compare immunization adherence in two groups of 2-year-old children in North Florida receiving different types of Medicaid managed care services. Immunization rates were provided for the recommended series of immunizations for 2-year-old children. The study encompassed 2-year-old children from 9 counties in a predominantly rural part of North Florida. This chapter discusses the findings; limitations; strengths; assumptions; and the conceptual framework that was used as a guide for the research. Implications for the nursing profession, practice, administration and education, as well as recommendations for future research will also be discussed.

Findings

The overall findings of this study were that 2-year-old Medicaid recipients who received primary care nurse case management had a greater immunization adherence than 2-year-old children who did not receive primary care nurse case management. Medicaid managed-care programs are available to Medicaid recipients to provide a medical home for acute illnesses and preventive care. The children in this study were seen in private physicians’ offices and not in public clinics or health departments. Access by these Medicaid children to the physicians’ offices is in a large part as a result of the Tallahassee Pediatric Foundation’s presence in the area for the last 20 years and its efforts to make Medicaid invisible to the physicians. A vital component of the Tallahassee
Pediatric Foundation has been nurse case management. The adherence rate of the Medicaid MediPass group was expected because they receive nurse case management through the Tallahassee Pediatric Foundation. The rates for the Medicaid HMO, though lower than the MediPass primary care nurse case management group, were higher than the state-wide norms and the reported rates for north Florida. This may be a beneficial side effect for the HMO patient who reaps the benefit of the physicians’ offices’ constant reminders from nurse case managers and the MediPass patients’ frequent presence for recommended well care.

Relationship to Literature

Many studies have used King’s Goal attainment theory as a framework to guide goal setting behavior and to identify mutually desired outcomes (Hampton, 1994; Sowell & Lowenstein, 1994; Woods, 1994). With every enrollment interview that is scheduled, the nurse case manager is beginning the process of mutual goal setting. During the enrollment interview, behaviors are agreed upon and the process is followed through the achievement of the goal.

Lack of immunization adherence has been identified as a problem and studies performed which focus on barriers, missed opportunities and low income as possible contributors (Cotter et al., 2000; Lowery et al., 1998; Pruitt, Kline, & Kovaz, 1995; Wilson, 2000). The samples in this study were examined for immunization adherence. They were all from low income backgrounds as evidenced by their qualification for Medicaid. This study found that neither race nor gender nor residence had an effect on immunization adherence.

Case management has been examined as a possible solution to obtain desired outcomes (Beckie, 1989, Cotter et al., 2000; Linde & Janz, 1979, Polinsky, Fred & Ganz, 1991; Schuster et al., 1998; Sowell & Lowenstein, 1994). The results of this study support that case management can be used effectively to obtain desired outcomes. The sample that received case management was
demographically similar to the other sample, but was significantly more adherent with immunization completion.

Adult learning concepts and teaching methodologies were investigated to determine useful interventions and organization for presenting materials to adult learners in order to achieve optimal outcomes (Beckie, 1989; Conti, 1985, Magnussen, Ishida & Itano, 2000; Owens, McCann, & Hutelmyer, 1978). The demographics on the caregivers were not available, but observation of the parents and guardians who enroll children in the Tallahassee Pediatric Foundation shows a wide range of ages. The case managers assess each parent or guardian as they are conducting the enrollment interview and tailor the educational information to the appropriate level. This is working at a satisfactory level given the high rate of immunization adherence.

Conceptual Framework

This study was guided by King’s Theory of Goal Attainment (1981) and Knowles’ Adult Learning assumptions (1978). King furnished a template through which the nursing process was applied to allow the nurse case manager to assess the patients’ needs and develop a plan to achieve a mutual goal for meeting the needs. Knowles provided a set of assumptions which described the adult learner and guided the nurse case manager in gathering information and delivering it in a manner that was acceptable and useful to the parent.

King’s Theory of Goal Attainment

The nursing process occurs primarily in the interpersonal system of King’s Dynamic Interacting Systems Framework, and the primary care nurse case management involves dyads, triads and small groups. Because the framework is dynamic and interacting, primary care nurse case management will touch the personal and social systems also. Effective case management requires an assessment of the needs, identification of a plan for meeting the needs, and evaluation to determine if the needs were met.
Through the enrollment interview and subsequent conversations, the case manager established mutual goals with the client. The case manager had a responsibility to assess the clients and their social context and culture and to present mutually acceptable goals. This required the nurse to acknowledge perceptions and to make judgments regarding how the desired outcome could be presented as a mutual goal and agreed upon. Both the nurse case manager and the parent or guardian had to acknowledge the parent’s priorities and competing interests. The follow-up that was done on a regular basis, depending on the child’s age, was part of the feedback loop and allowed for the nurse case manager to reinforce positive behaviors while setting new goals.

The goal attainment theory served as an excellent guide because of its close relationship to the nursing process. Case management follows the nursing process and King’s definition of concepts clarifies how case management fits the nursing process and, therefore, the identification of needs, establishment of mutual goals and the ability to measure outcomes.

Adult Learning

Knowles popularized the concept of adult learning. His assumptions, about adult learners gives those preparing to share information a basis from which to start. The assumptions are applicable to all adult learners. They have been used in teaching a parent how to care for a new infant or to deal with an independent teenager. They have also been used in training nurse case managers since they each come from varied prior work experience. Once again assessment is an important part. The adult needs to be assessed to determine if he/she is ready to learn and how he/she learns best. The learner has life experiences and a cultural context upon which learning will take place. The nurse case manager has a role in helping the adult learner recognize the need to learn, thereby becoming ready to learn. Since adult learners are performance centered, the nurse case manager must show immediate application for any learning.

Because there are many life experiences and adult learners have varying levels of achievement, difficult concepts have been simplified for explanation by the nurse case manager. One concept which was found to be very difficult to
explain was the requirement for managed care assignment to reduce costs. It was difficult to explain abstract choices of managed care to persons of limited education or interest. One tool designed to explain a primary care nurse case management program’s relationship to Medicaid and the services it provided can be found in Figure 2. The umbrella was seen earlier in Chapter 1 as Medicaid

Figure 2 Tallahassee Pediatric Foundation Managed Care Choice Tool
was discussed. The tool has been colored to highlight services and to simplify relationships. The yellow section of the umbrella represents the MediPass managed care program, the other segments represent Medicaid HMOs. The MediPass managed care program (yellow) provides all of the services listed under the yellow roof of the doctor’s office and can be accessed with the yellow membership card given by the MediPass managed care program. Parents are instructed to show the yellow card at the doctor’s office, but to use the gold Medicaid card for any transactions outside the doctor’s office. The grouping on the left side of the figure is used to explain how the physician is paid and Medicaid rendered invisible so that the patient receives level and quality of care that private pay patients receive.

Assumptions

The assumptions for this study, presented in Chapter 1 were supported. All of the children in this study were born unvaccinated, and therefore started out on an even field. The children participating in the Medicaid MediPass program with primary care nurse case management were consistently higher for immunization adherence. As members of the state-contracted nurse case-managed private practice based primary care program, the parents or guardians received information on the importance of immunization beginning with the enrollment interview and with every subsequent telephone contact made for well care reminder or illness follow-up.

All of the selected children in the study had continuous Medicaid services that entitled them to immunizations with their private physician or at a public health department clinic. Non-immunization cannot be attributed to lack of access because all had access to Medicaid transportation. Other barriers may have resulted in the decreased immunization adherence by the Medicaid HMO group.

The assumption that the education received by the parent was at the appropriate level would seem to be supported, once again, because of the higher immunization adherence rate. The parents or guardians of all children receiving
immunizations at the physicians’ offices or health departments received “Vaccine Information Statements” (VIS, Appendix F). The distribution of the VIS is required by federal law and the parent or guardian is given the sheet to take home. One is to be given at each visit for each vaccine administered. The physician can download the VIS from the Immunization Action Coalition (http://www.Immunize.org). The VIS are available in 25 languages. The parents and guardians of children on the Medicaid MediPass primary care nurse case management had a designated nurse case manager that they could call with any questions or concerns about the immunizations received, or scheduled to be given. Further information in addition to the VIS was located and sent to the parents. Legitimate refereed websites were recommended for those parents who had computer access (Appendix G). The Medicaid HMO patients received the VIS at every visit, but did not have the option of speaking with a nurse case manager about any questions or concerns about what was written on the VIS. They did have the option of calling their physicians’ office and asking to speak to one of the staff. Unfortunately many of the physicians’ offices do not have an RN and questions must be fielded by LPNs or medical assistants who have less education.

Limitations

Two limitations were noted in Chapter 1. The Medicaid MediPass program studied has many children with chronic or debilitating illnesses who are not eligible for Medicaid Health Maintenance Organizations. It was listed as a limitation because some treatments require delay in immunization. Due to concerns about confidentiality, it was not possible to obtain information to indicate whether those chosen for the sample had any chronic or debilitating illnesses, and it was indicated that they were to be excluded from the selection process. Given the high rate of immunization adherence in the Medicaid MediPass group, this did not appear to be a limitation.

The other limitation cited was the lack of control over reminders issued by the physicians’ offices. These would have been sent to both groups by any
offices participating in the practice. Only one office is known to follow this practice. All children from that practice selected for this study were fully immunized by their second birthday.

Two other limitations of note which were not present at the beginning of this study were the enforcement of the Health Insurance Portability and Accountability Act (HIPAA) which placed restrictions on the type of health information that could be reported, even for research purposes. This resulted in data being gathered by a third party. Most offices were prompt in preparing the requested immunization and demographic information. One of the most difficult items to obtain was race. It is not routinely noted in the patient's record. Those children on MediPass had a demographic sheet in their chart that gave the racial background of the child, but for the HMO population, the office staff had to know the family in order to be able to complete the field. The practice managers in each of the offices took responsibility for pulling the required records and were able to identify the child’s race.

The other unanticipated limitation was the continued problems with vaccine supplies. This study was delayed until after the major shortage in vaccines was over. This cohort should not have been affected by the delay of the fourth DTaP dose. It is possible that not enough emphasis was placed on recalling and immunizing those children whose fourth DTaP was delayed. Immunization rates fell for the year 2002 in Florida and in the United States. In particular the DTaP coverage rates dropped from 95% for DTaP # 3 to 81% for DTaP #4 in Florida and 95% to 82% respectively in the United States (Atkinson, 2004).

**Implications for Nursing**

This retrospective review on immunization adherence and case management has provided a basis for formulating a plan of action for improving immunization adherence, beginning with those at greatest risk, children under 2 years old. The study showed that children who received nurse case management
had greater immunization adherence rates. The challenge for the nursing profession is to provide the education, leadership, and practice example to instill in health care professionals and parents the importance of protecting children to the greatest extent possible with immunization.

*Nursing Practice*

Nurses need to take every opportunity to talk to anyone who will listen about the great achievement of immunization. This does not mean talking only to mothers of young children or expectant mothers. Grandmothers, grandfathers, aunts, and uncles need to be reminded when they have appointments, that their loved ones could be at risk if not immunized. Lewis Mumford (1956) predicted the demise of the three-generation household as families spread out in different directions into their own homes with nuclear families. Now more grown children are moving back home, young teens are starting families, and elderly parents moving in with their children so that once again there are many three-generational families. Nurses need to recognize the changes in family structure and take advantage of all opportunities for stressing immunization importance and timely vaccination. Nurses working in offices need to review the immunization status of every patient seen and make appropriate notes for recommendations by the practitioner since immunizations are required over the life span.

*Expert/Advanced Practitioner*

Clinical expert advanced practice nurses quite often do a majority of the well child care in a practice and, therefore, are in an excellent position to take the lead in increasing immunization adherence. They need to address contraindications and precautions, and make a commitment to reduce missed opportunities. They need to work with the nurses in the office to emphasize the importance of review and recall to ensure that anyone who had immunizations deferred due to a qualifying illness is brought back into the office at the earliest possible time to administer vaccinations. They need to work to establish a reminder/recall system and work with staff to ensure they are done. They need to train staff to review immunization records and flag charts to indicate missing
immunizations. Clinical experts have a responsibility to fellow advanced practice nurses to share research and pertinent information and to teach registered nurses through conferences of their responsibilities.

*Leader/Administrator*

Advanced practice nurses have experience lobbying for recognition in their individual specialties and need to make an effort to use their influence and lobbying organizations to work toward regulation of exemptions from immunization and enforcing rules already in place regarding immunizations required for day care.

Administrators need to implement and enforce standards of practice in the many public and private locations where immunizations are provided. They need to disseminate patient and professional information that encourages best practices and excellence.

*Education*

Programs need to be developed for presentation at several levels. The first is a program for physicians sponsored by a physician-recognized group to address missed opportunities, review contraindications versus precautions for vaccine administration, advocate simultaneous administration of vaccines, and to give guidelines on how to institute reminder/recall systems. A similar program needs to be developed for Nurse Practitioners to be taken to their place of work or common meeting venue. They need an opportunity to hear the same information in a setting that allows them to ask questions and share solutions and practice methods. These first two recommendations are important, but possibly even more important is a program for the office nurses and office staff. The program needs to emphasize the importance of vaccination and the nurses’ job in reviewing the patient’s immunization record at every visit and indicating to the provider the immunization status of the child, and what is lacking, so that the provider can order the needed immunizations if they are not contraindicated. This kind of program is best done in the physicians’ office, or possibly staff from several offices, if they are close together. Lunch needs to be provided in order to maximize the number of attendees. This program can be arranged by an APN...
and will entail simple grant writing to obtain funds for the meals or solicitation of
the lunches from local restaurants. Pharmaceutical companies can provide
favors like pens and note pads. Information also needs to be disseminated to the
community. A program needs to be developed for elementary, middle, and high
school students on vaccine preventable diseases and immunizations. A recent
study, not yet published, found that non-indigent children were under-immunized
(McCormick, 2004); therefore, the programs should be presented at all schools.
The thrust of this education would be that providers need to keep immunizing or
the diseases will have a resurgence.

Nursing curriculum needs to be reviewed and emphasis placed on vaccine
preventable diseases. This review needs to be at all levels of nursing instruction
and should include associate nurses, licensed practical nurses, certified nurse
assistants, and medical assistants. Where curriculum is beyond the influence of
nursing to regulate, the nurse educator must provide the information in the
workplace. This is necessary due to their prevalence in physicians’ offices in lieu
of Bachelor prepared nurses.

Recommendations for Future

This study compared immunization adherence in two groups of Medicaid
recipients and found that the children in the program receiving primary care
nurse case management had a higher adherence rate despite national vaccine
shortages and the potential of chronic and debilitating illnesses within the
MediPass sample. Studies of other MediPass providers and the other Medicaid
HMO in the area, which do not provide primary care nurse case management,
would be beneficial in solidifying the validity of the positive results wrought by
primary care nurse case management in this study. Also of interest would be a
comparison study of other primary care programs and their local Medicaid
managed care counterparts. This could be done through the graduate programs
in nursing throughout the state in conjunction with the Department of Health and
Children's Medical Services.
Summary

This Chapter provided a discussion of the results of a comparison of immunization records of 2-year-old children receiving two types of Medicaid managed care in North Florida. It revealed that the children who received primary care nurse case management while covered by Medicaid MediPass were consistently more fully immunized and therefore adherent with the recommendations of the American Academy of Pediatrics and the Center for Disease Control and Prevention than the children who were covered by the Medicaid Health Maintenance Organization and received no case management. Nurse case management and the education provided by the nurse case managers from the moment a child is enrolled makes a difference.
APPENDIX A

HUMAN SUBJECTS COMMITTEE APPROVAL
APPROVAL MEMORANDUM
Human Subjects Committee

Date: 1/21/2004

Elizabeth Spice
103 Hoffman Dr.
Tallahassee, FL 32312

Dept.: Nursing
From: David Quadagno, Chair
Re: Use of Human Subjects in Research
   A comparison Study of Immunization Adherence and Case

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be exempt per 45 CFR § 46.101(b) 4 and has been approved by an accelerated review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If the project has not been completed by 1/20/2005 you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB000000446.

Cc: Jeanne Flannery
HSC No. 2003.750
Data Collection Sheet

Date of Birth __/__/________ Code Number________

Race (circle): Black White Other Sex (circle): Female Male

Office (circle): Pediatric Family Practice

County of residence (circle):

Calhoun Franklin Gadsden Jefferson Leon Liberty Madison Taylor Wakulla

Medicaid Program (circle):

MediPass Provider Health Maintenance Organization

Tallahassee Pediatric Foundation Buena Vista

Healthease

Immunizations recommended by the American Academy of Pediatrics

<table>
<thead>
<tr>
<th>Vaccine type</th>
<th>mm/dd/yyyy</th>
<th>mm/dd/yyyy</th>
<th>mm/dd/yyyy</th>
<th>mm/dd/yyyy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria, Tetanus, Pertussis (DTP)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Polio (IPV)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Haemophilus influenza type B (HIB)</td>
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<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
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<tr>
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<td>XXXXXX</td>
</tr>
<tr>
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<td>/</td>
<td>XXXXXX</td>
<td>XXXXXX</td>
</tr>
<tr>
<td>Pneumococcal Conjugate (PCV)</td>
<td>/</td>
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</table>
APPENDIX C

TALLAHASSEE PEDIATRIC FOUNDATION PRESIDENT’S LETTER
November 17, 2003

To Whom It May Concern:

The Tallahassee Pediatric Foundation, Inc., physician members are fully supportive of the research project proposed by Elizabeth Spice, RN, BC, in partial fulfillment of the requirements of the Master’s in Nursing degree at Florida State University. They have agreed to allow staff in their offices to provide immunization and demographic data for the study. The information provided will contain no names or other identifying information, in order to maintain patient confidentiality.

Sincerely,

Larry C. Deeb, M.D.
President
APPENDIX D

SAMPLE IMMUNIZATION RECORD
Vaccine Administration Record for Children and Teens

Before administering any vaccines, give the parent/guardian all appropriate copies of Vaccine Information Statements (VISs) and make sure they understand the risks and benefits of the vaccine(s). Update the patient’s personal record card or provide a new one whenever you administer vaccine.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Type of Vaccine* (generic abbreviation)</th>
<th>Date given (mo/day/yr)</th>
<th>Route</th>
<th>Vaccine</th>
<th>Vaccine Information Statement</th>
<th>Signature/ Initials of vaccinator</th>
</tr>
</thead>
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<td></td>
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<td>IM</td>
<td></td>
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<td></td>
</tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Polio</td>
<td>(e.g., IPV, DTaP-HepB-IPV)</td>
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<td>IM-SC</td>
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<tr>
<td>Pneumococcal conjugate (PCV)</td>
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<td>IM</td>
<td></td>
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<tr>
<td>Measles, Mumps, Rubella (MMR)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Other**</td>
<td></td>
<td></td>
<td>IM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Record the generic abbreviation for the type of vaccine given (e.g., DTaP-Hb, PCV), not the trade name.

1For combination vaccines, fill in the row for each individual antigen composing the combination.

2Record the publication date of each VIS as well as the date it is given to the patient. According to federal law, VISs must be given to patients and their parents or guardians of a minor child before administering each dose of DTaP, Td, Hep, polio, MMR, varicella, PCV, or HepB vaccine, or combinations thereof.

**Influenza, pneumococcal polysaccharide (PPV23), hepatitis A, and/or meningococcal vaccines are recommended for certain high-risk children.

Patient name: ____________________________

Birthdate: ____________________________

Chart number: ____________________________

IM: Intramuscular; SC: Subcutaneous; IM-SC: Intramuscular or Subcutaneous

lot #: ____________________________
mfr.: ____________________________

Data on VIS #: ____________________________

Data given #: ____________________________

www.immunize.org/catg.d/t2622b.pdf • 425-7821 (4/02)

Immunization Action Coalition • 1573 Selby Avenue • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org
APPENDIX E

VACCINE INFORMATION STATEMENT
DIPHTHERIA TETANUS & PERTUSSIS VACCINES

WHAT YOU NEED TO KNOW

1 Why get vaccinated?

Diphtheria, tetanus, and pertussis are serious diseases caused by bacteria. Diphtheria and pertussis are spread from person to person. Tetanus enters the body through cuts or wounds.

DIPHTHERIA causes a thick covering in the back of the throat.

- It can lead to breathing problems, paralysis, heart failure, and even death.

TETANUS (Lockjaw) causes painful tightening of the muscles, usually all over the body.

- It can lead to “locking” of the jaw so the victim cannot open his mouth or swallow. Tetanus leads to death in about 1 out of 10 cases.

PERTUSSIS (Whooping Cough) causes coughing spells so bad that it is hard for infants to eat, drink, or breathe. These spells can last for weeks.

- It can lead to pneumonia, seizures (jerking and staring spells), brain damage, and death.

Diphtheria, tetanus, and pertussis vaccine (DTaP) can help prevent these diseases. Most children who are vaccinated with DTaP will be protected throughout childhood. Many more children would get these diseases if we stopped vaccinating.

DTaP is a safer version of an older vaccine called DTP. DTP is no longer used in the United States.

2 Who should get DTaP vaccine and when?

Children should get 5 doses of DTaP vaccine, one dose at each of the following ages:

- 2 months
- 4 months
- 6 months
- 15-18 months
- 4-6 years

DTaP may be given at the same time as other vaccines.

3 Some children should not get DTaP vaccine or should wait

- Children with minor illnesses, such as a cold, may be vaccinated. But children who are moderately or severely ill should usually wait until they recover before getting DTaP vaccine.

- Any child who had a life-threatening allergic reaction after a dose of DTaP should not get another dose.

- Any child who suffered a brain or nervous system disease within 7 days after a dose of DTaP should not get another dose.

- Talk with your doctor if your child:
  - had a seizure or collapsed after a dose of DTaP,
  - cried non-stop for 3 hours or more after a dose of DTaP,
  - had a fever over 105°F after a dose of DTaP.

Ask your health care provider for more information. Some of these children should not get another dose of pertussis vaccine, but may get a vaccine without pertussis, called DT.

4 Older children and adults

DTaP should not be given to anyone 7 years of age or older because pertussis vaccine is only licensed for children under 7.

But older children, adolescents, and adults still need protection from tetanus and diphtheria. A booster shot called Td is recommended at 11-12 years of age, and then every 10 years. There is a separate Vaccine Information Statement for Td vaccine.

Diphtheria/Tetanus/Pertussis 7/30/2001
5 What are the risks from DTaP vaccine?

Getting diphtheria, tetanus, or pertussis disease is much riskier than getting DTaP vaccine.

However, a vaccine, like any medicine, is capable of causing serious problems, such as severe allergic reactions. The risk of DTaP vaccine causing serious harm, or death, is extremely small.

Mild Problems (Common)
- Fever (up to about 1 child in 4)
- Redness or swelling where the shot was given (up to about 1 child in 4)
- Soreness or tenderness where the shot was given (up to about 1 child in 4)

These problems occur more often after the 4th and 5th doses of the DTaP series than after earlier doses. Sometimes the 4th or 5th dose of DTaP vaccine is followed by swelling of the entire arm or leg in which the shot was given, lasting 1-7 days (up to about 1 child in 30).

Other mild problems include:
- Fussiness (up to about 1 child in 3)
- Tiredness or poor appetite (up to about 1 child in 10)
- Vomiting (up to about 1 child in 50)

These problems generally occur 1-3 days after the shot.

Moderate Problems (Uncommon)
- Seizure (jerking or staring) (about 1 child out of 14,000)
- Non-stop crying, for 3 hours or more (up to about 1 child out of 1,000)
- High fever, over 105°F (about 1 child out of 16,000)

Severe Problems (Very Rare)
- Serious allergic reaction (less than 1 out of a million doses)
- Several other severe problems have been reported after DTaP vaccine. These include:
  - Long-term seizures, coma, or lowered consciousness
  - Permanent brain damage.

These are so rare it is hard to tell if they are caused by the vaccine.

Controlling fever is especially important for children who have had seizures, for any reason. It is also important if another family member has had seizures. You can reduce fever and pain by giving your child an aspirin-free pain reliever when the shot is given, and for the next 24 hours, following the package instructions.

6 What if there is a moderate or severe reaction?

What should I look for?
Any unusual conditions, such as a serious allergic reaction, high fever or unusual behavior. Serious allergic reactions are extremely rare with any vaccine. If one were to occur, it would most likely be within a few minutes to a few hours after the shot. Signs can include difficulty breathing, hoarseness or wheezing, hives, paleness, weakness, a fast heart beat or dizziness. If a high fever or seizure were to occur, it would usually be within a week after the shot.

What should I do?
- Call a doctor, or get the person to a doctor right away.
- Tell your doctor what happened, the date and time it happened, and when the vaccination was given.
- Ask your doctor, nurse, or health department to file a Vaccine Adverse Event Reporting System (VAERS) form, or call VAERS yourself at 1-800-822-7967.

7 The National Vaccine Injury Compensation Program

In the rare event that you or your child has a serious reaction to a vaccine, a federal program has been created to help pay for the care of those who have been harmed.

For details about the National Vaccine Injury Compensation Program, call 1-800-338-2382 or visit the program’s website at http://www.hrsa.gov/osp/vicp

8 How can I learn more?

- Ask your health care provider. They can give you the vaccine package insert or suggest other sources of information.
- Call your local or state health department’s immunization program.
- Contact the Centers for Disease Control and Prevention (CDC):
  - Call 1-800-232-2522 (English)
  - Call 1-800-232-0233 (Español)
- Visit the National Immunization Program’s website at http://www.cdc.gov/nip

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention
National Immunization Program

Vaccine Information Statement
DTaP (7/20/01) 42 U.S.C. § 300a-26

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APPENDIX F

IMMUNIZATION ACTION COALITION
RELIABLE SOURCES OF IMMUNIZATION INFORMATION:
WHERE TO GO TO FIND ANSWERS!
Reliable Sources of Immunization Information: Where to go to find answers!

**Websites**

**Allied Vaccine Group**
www.vaccine.org
The Allied Vaccine Group is composed of select organizations dedicated to presenting valid scientific information about vaccines.

**CDC's Division of Viral Hepatitis**
www.cdc.gov/hepatitis
The Division of Viral Hepatitis is part of the Centers for Disease Control and Prevention. This website provides a substantial amount of information on the prevention of viral hepatitis.

**CDC's National Immunization Program**
www.cdc.gov/nip
The National Immunization Program provides leadership for the planning, coordination, and implementation of immunization activities nationwide.

**Childhood Immunization Support Program (CISP)**
www.cispimmunize.org
Created by the American Academy of Pediatrics, this is an immunization website for parents and health professionals.

**Immunization Action Coalition (IAC)**
www.immunize.org & www.vaccineinformation.org
IAC is a nonprofit organization that promotes immunization for all people against vaccine-preventable diseases. These websites offer educational pieces, photos, and video clips for parents, health professionals, the media, and the public.

**Nat'l Network for Immunization Information (NNII)**
www.immunizationinfo.org
NNII provides current, science-based, extensively reviewed information to health professionals, the media, policy makers, and the public.

**Nat'l Vaccine Program Office (NVPO)**
www.hhs.gov/nvpo
NVPO is a federal program that provides pertinent information about childhood, adolescent, and adult immunization policy.

**Vaccine Education Center at Children's Hospital of Philadelphia (CHOP)**
www.vaccine.chop.edu
The goal of the Vaccine Education Center is to accurately communicate the facts about each childhood vaccine, including how vaccines are made, how and why vaccines work, who recommends them, and more.

**Phone Numbers**

**CDC's Immunization Information Hotline**
A toll-free number for consumers and health professionals who have questions about vaccine-preventable diseases.
- English: (800) 232-2522
- Spanish: (800) 232-0233
- TTY: (800) 243-7889 (teletypewriter)

**CDC's Hepatitis Hotline**
Get information by recording, fax, or voice.
(888) 413-7232 (888-4HEPCDC)

**Books for Parents**

**Vaccines: What you should know, 3rd edition**
By Paul Offit, MD, and Louis Bell, MD, IDG Books, 2003. To purchase, visit your local bookstore, call John Wiley & Sons, Inc. at (877) 762-2974, or visit www.wiley.com

**Vaccinating Your Child: Questions and Answers for the Concerned Parent, 2nd edition**
By Sharon Humiston, MD, MPH, and Cynthia Good, Peachtree Publishers, 2003. To purchase, visit your local bookstore, call Peachtree Publishers at (800) 241-0113, or visit www.peachtree-online.com

**Parents' Guide to Childhood Immunization**
A 96-page booklet from CDC's National Immunization Program at www.cdc.gov/nip/publications/Parents-Guide/default.htm. Call (800) 232-2522 or complete the online order form at www.cdc.gov/nip/publications

**Videos**

"Vaccines and Your Baby" and "Vaccines: Separating Fact from Fear"
Each of these two videos is designed for parents of young children and is available free of charge from the Vaccine Education Center at The Children's Hospital of Philadelphia. To order, call (215) 590-1000 or order online at www.vaccine.chop.edu/orders/parents.html

Immunization Action Coalition • 1573 Selby Ave. • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org
REFERENCES


Center for Disease Control and Prevention (1997, July 25). Status report on the Childhood Immunization Initiative: Reported cases of selected vaccine-


BIOGRAPHICAL SKETCH

Elizabeth Spice was born in Asuncion, Paraguay, on June 30, 1955, to missionary parents. She lived in Paraguay and Mexico until age 6 when the family moved to Indianapolis, Indiana. She completed her secondary education at Thomas Carr Howe High School in 1973. Missing the warmer climes of her early childhood, she attended the University of South Florida in Tampa where she received a Bachelors of Arts in Speech Communication and Theatre Arts in 1976.

In 1989, she entered Florida State University to pursue a Bachelor of Science in Nursing. Upon graduation she worked in the Newborn Intensive Care Unit at Tallahassee Memorial Hospital. Night shifts did not agree with her husband so in December of 1991, she accepted a position as a Nurse Case Manager at the Tallahassee Pediatric Foundation. For the last 8 years she has been a Nursing Supervisor at the Tallahassee Pediatric Foundation. She provides primary care nurse case management to indigent children. Among her patients are all of the children whose parents speak only Spanish.

In 1999, Elizabeth returned to school once again to begin a Graduate Program in Clinical Nurse Specialist Case/Care Management at the Florida State University School of Nursing. She looks forward to graduating and spending her time practicing her Spanish and preparing educational programs on immunizations to be shared with health care providers and lay people in the community.