

HOME MANAGEMENT OF PEDIATRIC FEVER:
THE WILSON EDUCATIONAL MODEL FOR
THE FAMILY NURSE PRACTITIONER

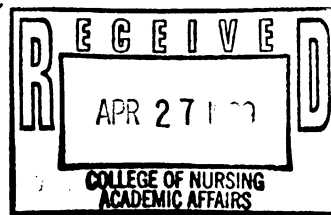
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KIM D. WILSON

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THESIS





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**HOME MANAGEMENT OF PEDIATRIC FEVER:
THE WILSON EDUCATIONAL MODEL FOR
THE FAMILY NURSE PRACTITIONER**

By

Kim D. Wilson

A SCHOLARLY PROJECT

**Submitted to
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ABSTRACT

HOME MANAGEMENT OF PEDIATRIC FEVER: THE WILSON EDUCATIONAL MODEL FOR THE FAMILY NURSE PRACTITIONER

By

Kim D. Wilson

Recent studies suggest that 20-30% of emergency room visits and approximately 30% of outpatient visits include fever as part of a chief complaint. Although all children experience fever, caregivers remain frightened and unsure of appropriate home management of the fever. This scholarly project describes the development of the Wilson Educational Model (WEM) for the family nurse practitioner (FNP) as an intervention for caregivers of young children. The Health Belief Model provides the theoretical framework for its development. The WEM includes: (a) a review guide for the FNP on fever, (b) written literature for caregivers in the form of an educational pamphlet on home management of pediatric fever, (c) a demonstration module on the technique for taking an axillary temperature, (d) suggestions for alternative educational and community resources, and (e) a pediatric follow-up call sheet. The WEM is based on scientific knowledge and research and should assist the FNP in assuming a leadership role as an educator in the primary care setting. Implications for practice, research, and education are examined.

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Introduction

In the pre-antibiotic era Sir William Osler once said “Humanity has but three great enemies: Fever, Famine, and War. Of these, by far the greatest, by far the most terrible, is Fever. (Atkins, 1984). In the twentieth century, fever is rarely considered as gravely as it was by Osler. Still, few symptoms prompt a caregiver more concern than a child’s fever. Recent studies suggest that 20-30% of emergency room visits and approximately 30% of out-patient visits include fever as part of a chief complaint for children (Murphy, 1972; D’Auria, 1997). Many caregivers often express fear and anxiety over the presence of fever, which sometimes may be difficult to control. In addition, caregivers lack knowledge on fever control and selected aspects of its management (Kelly, Morin, & Young, 1996).

Statement of the Problem

Despite the availability of over the counter antipyretics and the mass advertising concerning fever control, caregivers continue to demonstrate a lack of understanding and confusion about fever. Mismanagement of pediatric fever has lead to heightened anxiety on the part of caregivers, increased visits to the pediatrician or the emergency department, and the overdosing of antipyretics. Health care providers and in particular family nurse practitioners can play a significant role in enabling caregivers to make appropriate health care decisions regarding the home management of a child’s fever. However, there is nothing available in the current literature to guide the family nurse practitioner in the education of caregivers on the pathology of fever, the appropriate assessment of a child with fever, and the home management of fever.

Purpose and Significance

Health education is one of the family nurse practitioner's most significant roles in the era of managed care. Today's caregivers are lacking specific education on the management of pediatric fever. Due to time and staffing limitations facing nurses today, more creative types of educational approaches which capitalize on teaching opportunities at all points of entry into the health care system are needed. These include, but are not limited to, a broad variety of practice settings, such as primary care offices, emergency department waiting rooms, parenting classes, post-partum and pediatric hospital units. In addition, this would include utilizing a variety of educational mediums, i.e., written discharge instructions, HMO newsletters, follow-up calls, educational pamphlets, educational video tapes and the use of return demonstrations.

Thus, the purpose of this scholarly project is to develop an educational model for the family nurse practitioner on the home management of pediatric fever thus enabling caregivers to appropriately care for their child at home. The product, the Wilson Educational Model, is based on scientific knowledge and research and includes defining symptoms, treatment options, referral and follow-up recommendations.

Conceptual and Operational Definitions

The review of literature provided guidance in the identification and definitions of the conceptual and operational concepts discussed throughout this project. The concepts include: family nurse practitioner (FNP), educational model, home management, and pediatric fever.

Family Nurse Practitioner (FNP)

Historically, clinical nurse specialists (CNS) and nurse practitioners (NP) had

separate councils within the American Nurses Association (ANA) structure, i.e., the Council of Clinical Nurse Specialists, and the Council of Primary Health Care Nurse Practitioners. As the roles of the CNS and the NP developed, the differences between the roles appeared less clear. Nurse practitioners working essentially in primary care settings began moving into acute care settings, and clinical nurse specialists working mainly in the acute care setting began moving into primary care sites (Snyder & Yen, 1994). The overlap of roles between the NP and the CNS has added confusion for the public and for the nursing profession. Therefore, the roles of NP, CNS, and APN will be reviewed.

The role of the nurse practitioner (NP) was developed in 1965 at the University of Colorado when a program for the education of the pediatric nurse practitioner (PNP) was developed (Bryzynski & Fenton, 1993). The PNP role evolved and developed as well as other NP roles including the family nurse practitioner (FNP) and the adult nurse practitioner (ANP). The new NP roles increased client access to primary health care in the out-patient setting, addressed physician shortages, and focused on direct patient care. The NP possesses a broad knowledge base related to diagnosis, treatment and prevention, i.e., performing physical examinations, ordering laboratory studies, developing diagnostic treatment plans and making referrals (Page & Arena, 1994).

Currently, the American Academy of Nurse Practitioners offers certification for the ANP and the FNP while the American Nurses Credentialing Center (ANCC) provides specialty examination and certification in five areas: adult, family, school, pediatrics, and gerontology. The purpose of certification is to assure various publics that an individual has mastered a body of knowledge and has acquired skills in a particular specialty (Snyder & Yen, 1994).

The clinical nurse specialist (CNS) role was developed in 1954 at Rutgers University and was broadly defined as a nurse who holds a masters degree in a specific area (Bryzynski & Fenton, 1993). The CNS role was developed as a hospital based role which emphasized improving the quality of care delivered to patients by educating those who give direct patient care and keeping the expert specialized nurse at the hospital bedside (Page & Arena, 1994).

In 1992, the American Nurses Association (ANA) proposed the role of advanced practice nurse (APN) as a general term to describe several roles of nurses with advanced education, preparation, and degrees. Currently, the role of the APN includes the CNS, the NP, the certified registered nurse anesthetist (CRNA), and the certified nurse midwife (CNM). Thus, APN is a general term, which describes a variety of nurses with advanced preparations and degrees, and does not distinguish between the different roles.

For the purpose of this project the APN role of interest is the family nurse practitioner (FNP) and is defined as a nurse who is masters prepared and certified in the family specialty area. The FNP focuses on providing primary health care and health education to individuals and their families.

Home Management

Caregivers are responsible for the health and well being of their children. In today's managed care environment, medical care has become more complicated. The American Institute for Preventative Medicine (1994) describes health care conditions which caregivers can manage prior to seeking medical attention by using self-care guidelines as home management.

Kaiser Permanente Medical Centers published a patient educational guide in

1996; it describes patient education as a skill-building process which enables patients to take responsibility for their decisions of learning, when, how, and even why to make a change. Managing the family's health care as much as possible at home empowers clients and their families.

For this project, home management refers to the ability of the family/caregivers to provide self-health care at home prior to seeking health professional advice. Self-health care is based on health guidelines, which help caregivers decide when to treat or manage the fever at home and when to seek the advice of the health care provider.

Pediatric Fever

Normal body temperature of infants and children varies, but generally stays within a range of 36.2 degrees (°) to 38.0° centigrade (C), i.e., 97.0° to 100.4° farenheight (F) (Yaffe, 1980).

Fever is one of the body's natural defense mechanisms against disease and not merely an uncomfortable side effect of disease (Kilmon, 1987). The elevation of body temperature activates body defenses to increase T cell production and increase the effectiveness of interferon in combating viral infections (Fruthaler, 1985; Tierney, McPhee, & Papadakis, 1997; Uphold & Graham, 1998).

Fever, as defined by Brennan, Falk, Rothrock, & Kerr (1987), is greater than 100°F orally, greater than 100.4°F rectally or greater than 99.4°F axillary. Uphold & Graham (1998) define fever as oral temperatures greater than 37.8°C (100°F), rectal temperatures greater than 38°C (100.4°F), and axillary temperatures greater than 37.2°C (99°F.)

Uphold & Graham's (1998) definition of fever has been selected for this project.

An elevation of body temperature greater than 100°F orally, 100.4°F rectally, or greater than 99°F axillary.

Educational Model

The review of the literature identified several concepts that have many similarities and are used interchangeably. The main concepts of patient education, health instruction, health educational module, and educational model require definition.

Patient education as defined by Rankin & Stallings (1990) is a process of influencing behavior and generating changes in attitudes, knowledge, and skills required for maintaining or improving health. Fedor & Dalis (1989) define health instruction as a plan prepared for the sequential arrangement of learning designed to positively influence health, values, practice, attitudes, and cognitive capabilities conducive to the optimum development of the individual, the family, and the community. For health instruction to be effective, a systematic plan or lesson plan, is necessary. According to the authors, this plan would include several steps: (a) identification of the relationships among health areas, themes, questions and generalizations; (b) instructional objectives; and (c) teaching strategies (Fedor & Dalis).

According to Lorig (1996), a health educational module is defined as any set of organized activities designed to improve health behaviors and/or health status. Modules or plans, give clear detailed directions, and a systematic way of communicating the educational process.

The review of the literature did not provide a specific definition of educational model. However, according to Webster's Dictionary (1996), education is defined as the process of training and developing the knowledge skill, mind and character by formal

schooling, teaching or training. Educational, as an adjective, refers to the giving of instruction or information. Model is defined as a pattern, a plan, form or design.

Therefore, the definition for this project of ‘educational model’ is specific instruction formalized into a plan or design with the identification of instructional objectives and teaching strategies.

Theoretical Framework

The Health Belief Model (HBM) has been selected to guide this project. Understanding the determinants of health protecting behavior is critical for the development of effective interventions that health professionals can use to assist parents in altering their behaviors, attitudes, and beliefs about their child’s health. The HBM is an example of a theoretical explanation for health protection that has been proposed and modified by Becker & Janz (1984) and empirically tested (Rankin & Stallings, 1996; Pender, 1996). It was originally developed by social psychologists to predict the likelihood of a person taking recommended preventive health action and to understand a person’s motivation and decision-making about seeking health services.

The model attempts to identify compliers and non-compliers by looking at six factors. The factors considered important to health care decisions are: (a) perception of the *severity* of the illness, (b) perception of *susceptibility* to illness and its consequences, (c) perceived *threat* of the illness, (d) value of the *benefits* of treatment, (e) consideration of the *barriers* to treatment, such as degree of social support, expense, regimen, complexity, length of treatment, and side effects, the *cost* of treatment in physical and emotional terms, and (f) *cues* which stimulate *action* for treatment of illness, such as, illness in family or friends, television, or other media presentation-films, newspapers,

stories, or health pamphlets

Demographic variables such as age, gender, socioeconomic status and ethnicity are believed to modulate a person's perceptions about the seriousness of health conditions and the need to take action for those conditions. (Becker, 1974, 1979; Janz & Becker, 1984; Becker & Janz 1985; Pender, 1996).

The model, as modified by Becker & Janz (1984) and illustrated in Figure 1., includes: 1). An **Individual's Perceptions**, i.e., one's *perceived susceptibility* to disease and/or *perceived seriousness* or *severity* of disease; 2) **Modifying Factors**, i.e., *variables of demographics* such as socio-psychologic and structural variables, as well as *cues to action*, which indirectly affect action tendencies through their relationship with *perception of threat*; and 3) **Likelihood of Action**, i.e., the *perceived benefits* of preventive action minus *perceived barriers* to preventive action. Janz and Becker (1984) concluded through numerous studies that *perceived barriers* was the most powerful of the HBM dimensions in explaining or predicting various health behaviors and the likelihood of taking preventive action. In other words, the HBM relates components of a socio-psychologic theory of an individual's decision making to the HBM dimensions, i.e., *susceptibility, severity, threat, benefits, and barriers, and cues to action*.

The Health Belief Model has frequently guided nursing research in an attempt to increase knowledge of health related behaviors (Thomas, 1995). The literature shows a wide range of use of the HBM, e.g., predicting behavior of adherence to exercise programs with cardiac patients (Mirotznik, Feldman & Stein, 1995), examining the relationship of behaviors to cigarette smoking behavior (Galvin, 1992), utilizing mammography (Stein, Fox, Murata & Morisky, 1992), participating in breast cancer

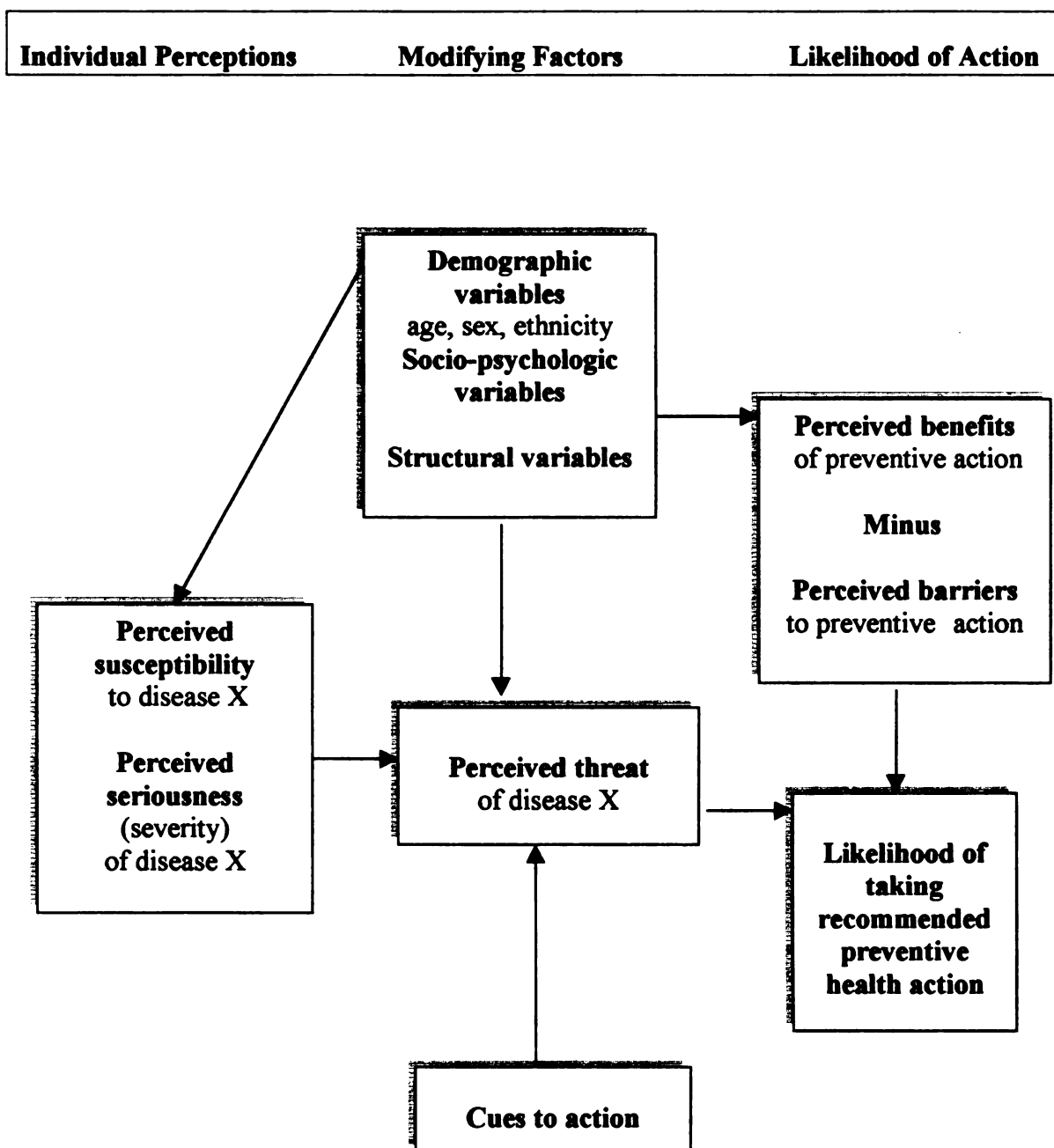


Figure 1. The Health Belief Model. Modified by Becker & Janz (1984)

screening (Fulton, et al., 1991), conducting self breast exams (Wyper, 1990), adhering to diabetes education (Hurley, 1990), and increasing compliance of emergency department patients (Jones, Jones & Katz, 1988).

Although the application of the HBM in research is often for compliance prediction, Rankin & Stallings (1996) found it to be useful in understanding caregivers' motivation to provide health care services for their children. However, present research using the HBM as the theoretical framework for predicting caregiver motivation is limited.

Application of the HBM to Caregiver Home Management of Childhood Fever

Applying the HBM in predicting behaviors of caregivers for their children with fever could enable the FNP to make the most appropriate educational interventions and ultimately promote or enhance the child's health and well being in the future.

A modified HBM, **Figure 2.**, The HBM as Applied to Caregiver Home Management of Pediatric Fever, reflects specific appropriate questions and issues noted in the literature which need to be considered. The literature review and model development sections expand on these areas, however a brief summary is included in this section.

The HBM component, **individual perceptions**, includes the concepts of perceived susceptibility, perceived seriousness, and perceived threat as related to fever in children as a universal concern to most caregivers. As stated previously, it is one of the

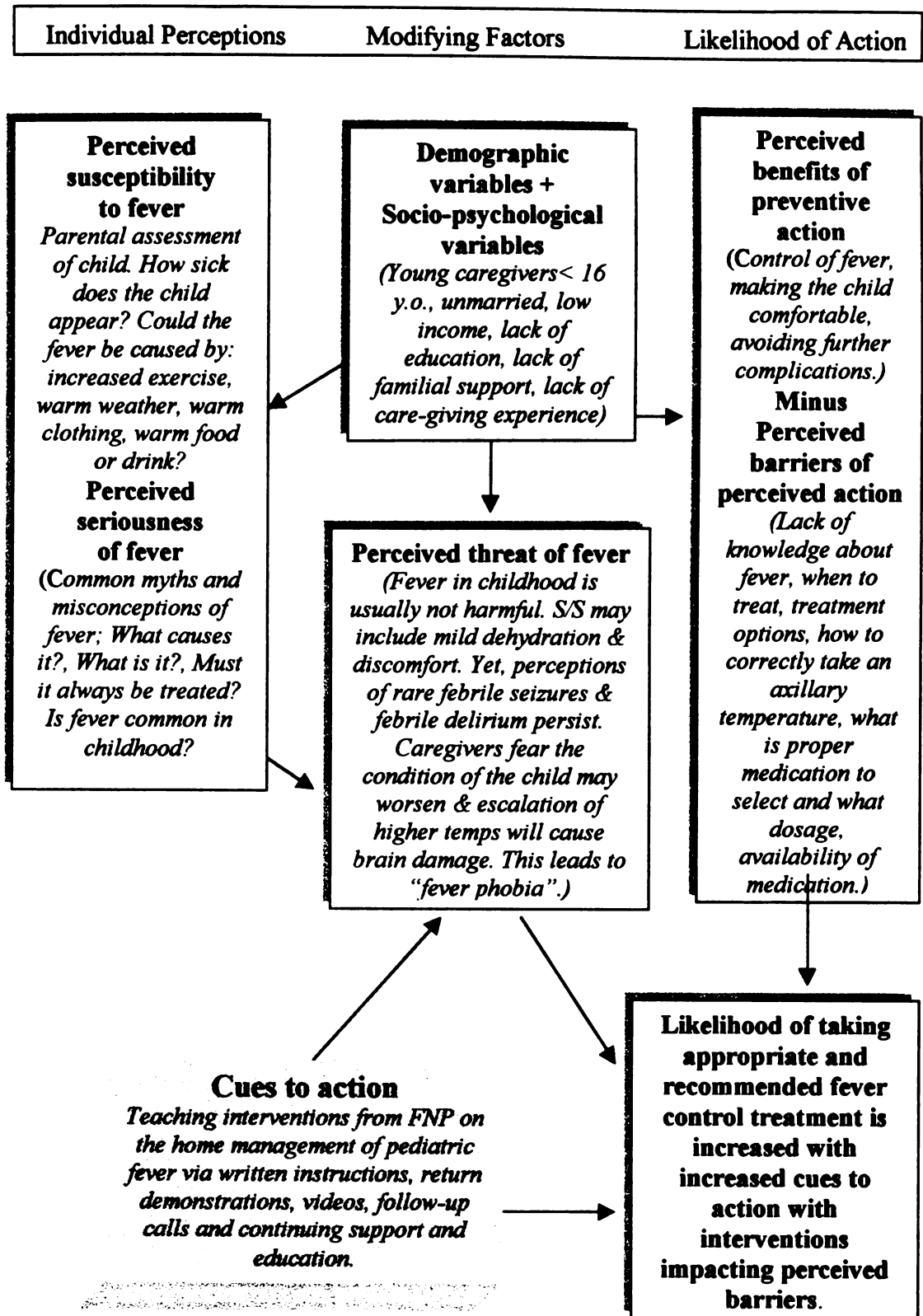


Figure 2. The HBM as Applied to Caregiver Home Management of Pediatric Fever (Wilson, 1999).

most common complaints that children are treated for in pediatric ambulatory care settings and pediatric offices (Robinson, Schwartz, Magwene, Krengel, Tambutello, 1989; Kelly, Morin & Young, 1996; Schmitt, 1980, 1984, 1993). Caregivers worry that, if uncontrolled, the fever may spiral upwards to a fatal outcome (Parks, 1986). Caregivers and professionals alike are alarmed by the threat of febrile convulsions or seizures causing irreversible brain damage. Schmitt (1980, 1984, 1993) described this 'phenomena' of unfounded fears concerning fever as *fever phobia*. While many caregivers would likely intervene and give an antipyretic or another intervention in an attempt to decrease their child's fever, other caregivers, do nothing or panic and rush their child to the nearest doctor's office or emergency room. Prevailing myths and misconceptions of fever, the cause of fever, treatment or non-treatment, and the commonness in childhood may influence the caregiver's perception of the seriousness of fever. In order to understand why certain caregivers take initial action and others do not, the **modifying factors** need to be identified.

Becker & Janz (1984) identified **modifying factors** as demographic variables, i.e., age, sex, race, ethnicity, etc., and socio-psychologic variables, i.e., personality, social class, peers and reference group pressure. The literature review for this project identified these variables as young caregivers (<16 years old), unmarried, low income, lack of education, lack of familial support, lack of care-giving experience.

According to the authors, **cues to action** may include teaching interventions from the FNP via written instructions, return demonstrations, videos, follow-up calls and continuing support. All are relevant interventions, which may impact cues to action. Each of these variables has an impact on a caregiver's perceived susceptibility and

seriousness and thus, perceived threat of fever. The focus of this project will be directed towards the **cues to action** with the Wilson Educational Model incorporating the educational interventions previously identified.

The **likelihood of action** component includes the concepts of perceived benefits of preventive action minus the perceived barriers of taking preventive action. **Perceived benefits** appear obvious: (a) control of the fever, (b) making the child comfortable, (c) avoidance of further complications. **Perceived barriers** are often very subjective and include: (a) lack of knowledge about fever, (b) when to treat or not to treat, (c) treatment options, (d) how to take a temperature correctly and what does it mean or what really constitutes a fever, (e) availability, cost, and proper dosage of medications, (e) which medication to choose, i.e., Tylenol vs. ibuprofen vs. aspirin.

As Figure 2. illustrates, the various perceptions and influencing factors can have either a direct or indirect impact on the predicted likelihood a caregiver will use appropriate fever control interventions when treating their child's fever.

Janz & Becker (1984) suggested that perceived barriers were the most prominent factor associated with preventive health practices or maintenance of health regimes. This project identifies these **barriers** and provides an educational model for the FNP to implement with caregivers for the home management of pediatric fever. It is anticipated that implementation of such a model would increase the likelihood of the caregiver taking the appropriate action at home in the management of their child's fever.

Literature Review

The following review of the literature discusses the issue of pediatric fever, current protocols and management of pediatric fever, and the family nurse practitioner

(FNP) in the role of the educator. The review of the literature revealed that the majority of research on pediatric fever and caregiver assessment and management took place during the 1970s and 1980s and that little specific research has been done in these areas during the 1990s.

Pediatric Fever

Fever is one of the most common problems that children experience (Kilmon, 1987). In fact, almost all families have to cope with this problem at some time (Schmitt, 1980, 1984, 1993). As stated previously, 20-30% of all pediatric emergency visits and 30% of out-patient visits have fever as part of the chief complaint (Murphy, 1992; D'Auria, 1997). However, many parents frequently assess and manage febrile illnesses at home, often without consulting a health professional (Ames, Hayden, Campbell & Lohr, 1982).

Caregiver knowledge of what constitutes fever and appropriate management of fever has been studied since the early 1980's. Generally, caregiver knowledge has been assessed either when caregivers sought medical interventions because a child was ill (Banco & Veltri, 1984; Kramer, Naimark, & Leduc, 1985) or when the child was seen for routine health maintenance (Anderson, 1988; Casey, McMahon, McCormick, Pasquariello, Zavrod & King, 1984; Kilmon, 1987; Schmitt, 1980). Analysis of these studies' findings revealed that caregivers are unaware of what level of temperature indicates fever. In addition, caregivers often select inappropriate fever management strategies. Studies conducted by Casey, et al., and Kelly, Morrin & Young (1996) found that many caregivers exhibit a great deal of concern and many misconceptions about fever and its management. Approximately 75% of parents could not define fever

accurately or the temperature at which harm could occur to the child. In addition, the majority did not know when to start antipyretic therapy, the correct dosage, or the appropriate frequency for checking temperatures and administering subsequent doses. A substantial minority (26.5%) voiced opinions that reflected considerable concern about fever and its significance, as well as a sense of helplessness in the management of fever (15.1%).

The focus and preoccupation on an objective measurement of body temperature to determine fever can interfere with a caregiver's ability to accurately observe that their child may look and act normally despite the fever. This over concern with body temperature and fever has been termed by Schmitt (1980, 1984, 1993) as "fever phobia" and may actually prevent caregivers from observing more serious manifestations of the child's illness. This can lead to an indiscriminate usage of anti-pyretic medication to treat fever. The indiscriminate usage of anti-pyretics is contrary to the belief that fevers without other manifestations is the body's natural protection against disease and may actually benefit from allowing the fever to 'run its course' (Rosenthal & Silverstein, 1988).

Caregiver experience plays a significant role in predicting whether a caregiver will choose appropriate medical interventions for a child. Caregivers who reported successfully treating their older children at home for fever, expressed more self-efficacy in their ability to care for the child and less fear about initiating the appropriate interventions (Kilmon, 1987). A study done in 1980 by Kapasi, Lorin, Nirken & Yudovich discovered that fifty-three percent of caregivers who felt they were knowledgeable about antipyretics were unaware that an overdose of acetaminophen

(Tylenol) could be lethal or cause irreversible liver damage. Recent reports of therapeutic excess of anti-pyretic medications and or acetaminophen overdosing, have lead to liver failure and even death (Greene, Craft, & Grishan, 1983; McDonough, 1998; Nogen & Brenner, 1978; Schiodt, Rochling, Casey & Lee, 1997). In addition, ibuprofen toxicity can lead to severe agitation, hypothermia, metabolic acidosis, acute renal insufficiency and death (Kapasi, Lorin, Nirken & Yudovich, 1980; Kim, Gazarian, Verjee, & Johnson, 1995; Linden & Townsend (1987); Ritter & Eskin, 1998). The literature review did not reveal a more recent caregiver knowledge study on the dangers of anti-pyretic over dosage. However, an observation may be made; given the increased recent literature on the consequences of specific cases of over-dosage of anti-pyretics, caregivers may remain unaware of the dangers involved.

The literature review established the issue of the constant need for educating caregivers on pediatric fever, but in general the studies focused on subject populations who were relatively well educated and had small intact families. The majority of caregivers participating in the studies were in their late twenties or early thirties with more than a high school education and were seeing a physician with their only or eldest child. Racial demographics ranged from 50-60 % White, 20-40 % Black, and other, i.e., Indian, Hispanic, Asian; the latter did not significantly affect the statistical outcomes (Robinson, et.al., 1989; Casey, et al., 1984). Interestingly, despite the obvious advantages of education, having an intact family unit, and being older caregivers, this group of caregivers still lacked the knowledge and many of the necessary assessment skills to make appropriate decisions concerning their child's fever (Kilmon, 1987; Kelly, et al., 1996).

Social scientists have evaluated the breakdown of today's families, the increase of single parent homes, teenage mothers raising children, and the impact of lower income and education on the health care decisions caregivers make regarding their children's health care. Scientists found that these have contributed to an increased lack of knowledge regarding the children's health and caregivers ability to care for them (Ames, et al., 1982; Lindgren, 1990; Porter, 1990; Ell, 1996).

Current social and environmental trends and the current 'abandonment' of traditional family support systems have increased the family's need for support from the health care system (Black, 1989; Porter, 1990). Fuller (1997) describes single parent families as an unique challenge for health care providers since they may be the only support system available to the single parent. This may account for many caregivers having feels of inadequacy and powerlessness in dealing with their children's illness at home. In addition, low self esteem has been shown to be directly related to poverty, lack of education, and lack of resources and motivation; these also have been identified as predictors of health promotion/prevention behavior (Ford-Gilboe, 1997; Meurer, Meurer, & Holloway, 1997).

Young adolescent mothers (less than sixteen years of age) were found to have many of the negative burdens or barriers, i.e., poverty, lack of education, lack of family support systems, and lack of parenting experience (Ames, et al., 1982; Ford-Gilboe, 1997). With no one to turn to for counseling or advice, many young mothers use the emergency room and/or their primary care provider at alarming rates (Murphy, 1992).

Research on educational interventions has been somewhat limited to a few studies (Casey, et al., 1984; McCarthy, Sznajderman, Lustman-Findling, Baron, Fink,

Czarkowski, Bauchner, Forsyth & Cicchetti, 1990; Robinson, et al., 1989). These studies have shown an impact on caregiver's knowledge and treatment of fever, but suggest that more than a one time intervention is needed for knowledge retention and compliance (Kelly, et al., 1996). McCarthy, et al., (1990) found in their research that teaching caregivers to assess specific clinical information had its greatest effect on the reliability and specificity of their judgements. Educational interventions which were shown to have had the greatest impact on caregivers were a combination of reading instruction or written material, modeling or demonstrations by the FNP, observing videos and follow-up calls to reinforce the information (Kelly, et al. 1996).

To summarize, the issue of pediatric fever is a continuing problem for all caregivers. Disadvantaged caregivers, i.e., those with low income, a lack of education, and a lack of familial support and experience with children, face increased barriers which add to the mixed dilemma of caring for the child at home with fever. Comprehensive educational interventions can play a significant role in the home management of pediatric fever by enabling caregivers to: adequately assess their child's state of health, make appropriate decisions at home, and impact the perceptions of severity and susceptibility of disease. Educational interventions can also identify the barriers and costs/benefits of treatment, increase provider acknowledgment and sensitivity to the various demographic variables which influence all caregivers, and increase the cues to action which may ultimately increase their likelihood of taking appropriate and recommended action.

Home Management of Pediatric Fever

The review of the literature on the management of pediatric fever at home clearly indicates the need for caregivers to be educated about fever (Schmidt, 1983; McCarthy, et

al., 1990; Kelly, et al., 1996). Effective home management of fever requires a basic understanding of: (a) the pathology of fever, including a definition, the causes, and the benefits and harmful effects, (b) caregiver assessment of fever, including, how to take a temperature and the identification of other signs and symptoms the child is experiencing, (c) the health care provider's assessment and management including, past medical history, when to call a health care provider, and application of current protocols and specific recommendations for home management of fever. Each of these areas are further explored.

Pathophysiology of fever

Fever is defined as a temperature above the normal range. A rectal temperature above 38.0 degrees (°) Centigrade (C), i.e., 100.4°Fahrenheit (F), an oral temperature above 37.8 ° C, i.e., 100° F, and an axillary temperature above 37.2°C, i.e., 99° F, are considered to be fevers (Dubois, 1948; Schmidt, 1983). The body's temperature can average 37°C (98.6°F) and can fluctuate during the day from a low of 36.1°C (97.0°F) in the morning to a high of 38°C (100.4°F) in late afternoon. Mild elevation ranging from 38 to 38.5°C (100.4° to 101.2°F) can occur and be caused by exercise, warm clothing, hot weather, or warm food or drink. If one of these causes is suspected, it should be eliminated and the temperature should be retaken in one-half hour (Schmitt, 1984).

Infection is the most common cause of fever in children. Most infections are viral in etiology and the onset of the fever indicates the start of the infection. Typically, the disappearance of the fever signals the end of the illness or infection. Most fever associated with viral illnesses range from 38.3°C to 40°C (101° to 104°F), and last for two or three days (Schmitt, 1984). Uphold & Graham (1998) list other possible causes of

fever such as, hypersensitivity to drugs, recent immunizations with certain vaccines, vascular occlusive and/or inflammatory events, acute hemolytic episodes associated with acute autoimmune hemolytic anemia or sickle cell anemia, neoplasms, collagen-vascular diseases, and central nervous system abnormalities. In general, the height of the fever does not relate to the seriousness of the illness (Kilmon, 1987). According to Schmidt (1983), how sick a child acts is what counts.

The pathogenesis of fever occurs when bacteria, viruses, toxins, or other agents are phagocytosed by leukocytes. Then, interleukin-1 and other chemical mediators (previously referred to as endogenous pyrogens) are produced and activate the production of prostaglandins. Prostaglandins act on the thermoregulatory mechanism in the hypothalamus and upwardly readjust the body's thermostat. Raising the hypothalamic set-point initiates the process of heat production and conservation by increasing metabolism, triggering peripheral vasoconstriction, and less frequently trigger shivering which increase heat production from the muscles.

The possible benefits of fever have been only recently appreciated. Research has documented that many human host defense mechanisms, e.g., the inflammatory response, are enhanced by fever (Kluger, 1980; Rosenthal & Silverstein, 1988; D'Auria, 1997). Evidence suggests that the lymphocyte transformation component of the human immune system is enhanced within a range of slight temperature elevation. Enright & Hill (1996) note that the role of fever may be one of enhancement of the body's defenses, reduction of viability of the infecting organism, or both.

In general, fever that a child usually experiences is not harmful (Schmidt, 1980, 1984, 1993). However, a high fever, defined as greater than 40.5 °C (105°F) has direct

correlation with an increased likelihood of bacteremia (McCarthy & Dolan, 1976). It is important to realize that fever by itself causes no brain damage or harm unless it reaches at least 41°C (107° F). Fortunately, the brain's thermostat keeps an untreated fever from infection below this level. A fever does not climb relentlessly upward. According to Schmidt (1980, 1984, 1993) all children experience fever, but only four percent will have a febrile convulsion or seizure. According to Nelson & Ellenberg (1978) most common side effects of fever in children are generally harmless. They include; mild dehydration, discomfort, febrile delirium and simple febrile seizures. These symptoms are also transient or treatable.

To summarize, all children experience fever and this can be viewed as the body's natural response to fighting off infection either viral or bacterial. Fever is usually harmless and the overall condition of the child needs to be evaluated prior to treatment of the fever.

Caregiver assessment of fever

The main purpose of taking a temperature is to determine whether a fever is present or absent, not to chart its every move. In general, the temperature should be taken once a day, in the morning, e.g., before noon, until the fever is gone (Schmitt, 1980, 1984, 1993).

In children too young to cooperate when their temperature is taken orally, axillary temperatures are recommended at home (Schmitt, 1984). Rectal temperature taking is frightening and uncomfortable for many small children and their parents. It is also less safe and occasionally leads to rectal perforation or broken thermometers (Wolfson, 1966; Frank & Brown, 1978; Schmidt, 1984). In addition, Morales, Rovira, Mongard, Sancho

& Bach (1983) described a rare case of intra-spinal foreign body, a clinical thermometer bulb, which after perforating the rectum migrated through the second left sacral foramina and sacral canal up to the epidural space at S1-L5 level.

As stated earlier, the main purpose of taking a temperature is to find out if fever is present and not the exact level of the temperature. Schmidt (1984) recommends that axillary temperatures are adequate for home screening. The accuracy of axillary temperatures has some support in the pediatric literature. In a study by David (1983), involving 77 infants and children, the axillary reading detected 93% of rectal fevers between 38 and 38.9°C and 100% of fevers greater than 39 °C. Eoff and Joyce (1981) found a mean difference of 0.49° C between rectal and axillary temperatures in 50 infants and preschool-aged children.

Alternative approaches used by parents include touching their child's forehead, plastic forehead strips, and the ear thermometer. A study by Banco & Veltri in 1982, found that parents touching the forehead detected only 74% of all febrile children; however 90% of the children with fever greater than 38.9°C (102°F) were detected. The plastic forehead strips were found to be unacceptable substitutes for thermometers in three studies; the Clini-temp failed to detect 57% to 72% of children with fever and the Fever Scan failed to detect 21% to 33% of children with fever (David, 1983, Reisinger, Kao & Grant, 1979; Scholefield, Gerber, Dwyer, 1982).

The ear thermos-scan thermometer or the infrared tympanic thermometer (ITT) is appealing to many caregivers as it offers a clean, rapid, convenient, painless and noninvasive replacement for the rectal thermometer. However, it is subject to user error and expensive to buy. Research done by Yaron, Lowensein, Koziol-McLane (1995)

showed the ITT missed a significant proportion of patients with fever. The authors also stated that the errors in measurement may occur because of inadequate technique, wax in the auditory canal, or device inaccuracy. Kelly, et al., (1996) concluded that many parents weren't aware that in order to obtain an accurate reading the scope must be directed on the tympanic membrane and not be placed haphazardly in the ear canal.

As stated previously, the temperature should not be the sole determinant of the need to treat a fever. Specific caregiver assessments and close observations concerning the child's state of health need to be explored. McCarthy, et al., (1990) found that careful observation of the state of well-being of a child to be the most important assessment component in identifying a seriously ill febrile child. Questions they identified to aid in the caregiver's assessment include: Is the child less than six months of age? Is the child's fever accompanied by seizures, chills, listlessness, abnormal breathing, stiff neck, excessive irritability, confusion, ear pain, sore throat, vomiting or diarrhea, urinary pain or rash on the skin? Is the child's fever greater than 104°F?, Has there been no improvement in the last seventy- two hours? Does the child suffer from other chronic diseases, a history of seizures or has the child recently received immunizations? (American Institute of Preventative Medicine, 1994; Schmitt, 1984).

Health care provider's assessment and management of pediatric fever

Management of fever in a child begins with careful observation of the child's state. For example, is the child active or lethargic? Does the child have a decrease in appetite? Is the child fussy or has his/her mood changed? (Rosenthal & Silverstein, 1988). If the overall condition of the child does not appear to be affected by the fever, research suggests allowing the fever to run its course (D'Auria, 1997; Upholt & Grahm,

1998). Comfort measures as simple as offering a child fluids every 15-60 minutes, having the child wear light clothing, avoiding bundling a febrile child, reducing activity of the child, providing additional rest, and encouraging light meals may be enough to give the child relief from the discomfort of a fever (Schmidt, 1993; D'Auria, 1997; Uphold & Graham, 1998).

The use of antipyretic medication can afford considerable relief of the associated fever discomfort (Rosenthal & Silverstein, 1988). D'Auria (1997) describes general fever management interventions for children without specific localized infection and in children less than three months of age. Intervention included the use of antipyretics for temperature of 39 to 39.4°C (greater than 102°F to 103°F) or if the child is uncomfortable. Children with a history of febrile seizures, underlying chronic disease or immune disorder may need earlier or more aggressive antipyretic schedules (D'Auria, 1997). Acetaminophen 15mg/kg per dose up to five doses in 24 hours was recommended. McNeil Pharmaceuticals (1998), the maker of Children's Tylenol, recommends the following dosing: (a) Children 0-3 months or 6-11 pounds- Infant Suspension or Original Tylenol drops containing 80mg/.08ml., or a ½ dropper of Suspension or Elixir (160mg/5cc) ¼ teaspoon (tsp.); (b) Children 4-11 months or 11-17 pounds- 1 dropper of Suspension or ½ tsp. of Elixir; (c) Children 12-23 months or 18-23 pounds- 1 ½ droppers of Suspension or ¾ tsp. Elixir or 1 ½ tablets of Children's Tylenol Chewable Tablets containing 80 mg. each tablet (tab.); (d) Children 2-3 years old or 24-35 pounds- 2 droppers of Suspension or Elixir 1 tsp. or 2 chewable tabs; (e) Children ages 4-5 years old or 36-47 pounds- 1 ½ tsp. Elixir or 3 chewable tabs; (f) Children 6-8 years old or 48-59 pounds- 2 tsp. Elixir or 3 chewable tabs; (g) Children 9-10 years old or

60-71 pounds- 2 ½ tsp. Elixir or 5 chewable tabs; (h) Children 11 years old or 72-95 pounds- 3 tsp. Elixir or 6 tabs; (i) Children over 12 years old or over 96 pounds may take 2 Adult Tylenol tabs. (325mg/tab).

Alternative therapy proposed was ibuprofen in children between 6 months and 12 years of age for temperatures less than 39.2°C (less than 102.5°F) or ibuprofen 5mg/kg per dose every eight hours. However, if the temperature is 39.2°C or higher (greater than 102.5°F), ibuprofen 10mg/kg per dose every eight hours (available in 100mg/5ml) was suggested. For children, 12 years of age and older, one tablet (200mg) every four to six hours was suggested. If the fever does not respond to one tablet, the dosage may be increased to two tablets. D'Auria (1997) stated that the number of tablets should not exceed six tablets in a twenty-four hour period. Whitehall-Robins Healthcare (1998) a division of American Home Products Corporation, makers of Advil (ibuprofen) and McNeil Pharmaceutical Corporation (1998) makers of Motrin (ibuprofen) recommend the following medication dosing for the suspension of 100mg/5ml or 1 teaspoon: (a) Children 6-11 months of age or 12-17 pounds for fever at or under 102.5° F- ¼ tsp., or fever over 102.5° F- ½ tsp.; (b) Children 12-23 months or 18-23 pounds with fever at or under 102.5° F- ½ tsp. or over 102.5° F- 1 tsp.; (c) Children 2-3 years old or 24-35 pounds-1 tsp.; (d) Children 4-5 years old or 36-47 pounds- 1 ½ tsp.; (e) Children 6-8 years old or 48-59 pounds- 2 tsp.; (f) Children 9-10 years old or 60-71 pounds- 2 ½ tsp.; (g) Children 11 years old or 72-95 pounds- 3 tsp.

Aspirin is contraindicated in children and adolescents with high fever due to the association between aspirin and Reyes syndrome (Uphold & Grahm, 1998; D'Auria, 1997). Caregivers need to be aware of other over the counter medications which contain

aspirin such as Pepto-Bismol and to avoid giving these types of medications when their children have fevers (Uphold & Graham, 1998).

Historically, other methods used by health care providers and caregivers have included sponging the child with water and/or alcohol, or placing the child in a tepid bath water. Sponging is unnecessary in the majority of febrile episodes and sponging with alcohol is contraindicated (D'Auria, 1997; Uphold & Grahm, 1998). Sponging is recommended only when the need for aggressive treatment of fevers is indicated, i.e., if fever is extremely high or child has history of febrile seizures; for children with liver disease who cannot take acetaminophen; for children with neurologic problems in which temperature regulation mechanisms are abnormal may experience heat stroke; or in environments with excessive temperatures. Using a tepid bath is not currently recommended due to the increased discomfort children feel due to shivering which may actually lead to an increase in body temperature (D'Auria, 1997; Uphold & Graham, 1998).

While most childhood fever is self-limiting and can be managed at home, the caregiver needs a guideline for home management as well as for calling a health professional. As stated previously in the caregiver assessment section, caregivers must call their health care provider if any of the accompanying signs and symptoms are associated with fever.

In summary, the literature review identified information to be included in a guide for home management of pediatric fever based on scientific research; this information guides the assessment of fever, the need for treatment, and the type of treatment options available to caregivers and health providers.

The FNP in the Role of the Educator

As far back as Nightingale (1859), teaching has been recognized as a nursing function. Today, the nurse practice acts in many states and the national guidelines from the American Nurses Association (1979) and the American Hospital Association (1972) mandate nursing's obligation to help patients learn to take care of their health and self-manage their illnesses. Leventhal and Johnson (1983) describe the nurse as the professional who acknowledges the patient's perception of illness, the personal impact of their illness, and the strategies they use to respond to their illness experience.

Rankin and Stallings (1990) describe the relationship between patient education and nursing practice as:

The most effective means of returning control to the patient by reducing feelings of helplessness and enhancing the ability to be the chief decision maker in the management of one's health and illness problems. We view patient education as the *essence* of nursing practice (p.2).

It is the *essence of nursing* as described by Rankin and Stallings (1990) that provides a foundation for preparing nurses for a generalist role as a registered nurse (R.N.) which includes associate degree, diploma, and bachelor of science academic preparation. However, the master's prepared FNP expands this basic role of educator, from the generalist (R.N.) to primary care provider (FNP). The latter incorporates patient teaching and counseling acquired through graduate education which builds upon previous practice and experience.

Rankin and Stallings (1990) identify the significance of the FNP as an educator in clinical practice and emphasize this role in patient education. Routinely, the FNP

addresses four components in the plan of care: (a) Dx: Diagnostic test and consultation, (b) Rx: Pharmacologic and other therapeutic interventions; (c) Pt. Ed.: Patient Education; and, (d) F/U: Follow-up. Thus, the FNP is constantly reminded that patient education is one of the four important parts of the management plan that should always be considered and documented in the primary care setting. The follow-up portion of the management plan presents an opportunity for the FNP to evaluate and document the patient's response.

An added impact regarding the attention and detail towards patient education may be that it sets FNP practice apart from other primary care providers. Research demonstrates that in general, the quality of primary care provided by nurse practitioners is equivalent to that provided by physicians and that patients are particularly pleased with the health education provided by nurse practitioners (Mundinger, 1994).

Historically, the role of the CNS has had a strong component of team-building and team support. The CNS's effectiveness was frequently measured by how effective the team was in reaching mutual goals. It is not surprising, then, that many CNSs have placed a high value on education and spent a large segment of their time performing the educator role (Hart, Lekander, Bartels, & Tebbitt, 1987). Robichaud and Hamric (1986) found that CNSs spent 27% of their time on staff, student and community education.

In general, advanced practice nurses are committed to further their own education, but they also assume responsibility for providing continuing education for other nurses (Sparks, 1995; Benner, 1984). Collaboration in the health care arena is essential and the FNP needs to work with other health care providers to assure the timely delivery of education to meet the needs of the clients. The FNP role requires education, re-

education, collaboration and cooperation with their nursing colleagues in order to provide the best opportunity for patient education (Sparks, 1995). Nurse practitioners have identified the teaching-coaching function as one of the major areas of their practice (Brykczynski, 1989).

In conclusion, the literature suggests that one of the most important and significant roles of the APN, and in turn the FNP, is that of patient and colleague educator.

Development of the Model

The literature review provides the essential elements in order to develop an educational model for the FNP in the home management of pediatric fever. This section reflects the author's organization of the information for the educational model. As mentioned earlier, the literature review did not reveal a previously developed model for use by the FNP when educating caregivers on home management of pediatric fever. Thus, this educational model, referred to as the Wilson Educational Model (WEM) is based upon scientific evidence and research; it provides flexibility and guidance to the FNP when developing a management plan for the child and educating the caregiver.

The WEM utilizes Knowles' educational principles of adult learning. Knowles (1980) recognized that adult patterns of learning are quite distinct from those used by children. He suggested that adults, because of their more extensive backgrounds and greater independence, bring more to a learning experience, and that the instructor should serve as a facilitator with the opportunity to benefit from the exchange as much as the learner. Knowles' views on teaching adults are summarized in his four principles of *andragogy*. In Knowles' view, the approach taken in teaching adults is so different from

the approach used with children that a new term, *andragogy*, is needed to describe “the art and science of helping adults learn.” (p. 43). A brief discussion describing these four principles of adult learning follows.

1) Adults are independent learners. The process of moving from childhood to adulthood is a process of moving from dependence to increasing independence. There is a deep psychological need for adults to see themselves, as well as to have others see them, as generally independent or self-reliant. The educator working with adult learners must respect the independence and ability of the adult learner to control his/her own learning. Adults are responsible for what is to be learned and take an active role in their learning. The learning takes place between the learner and the material; the teacher facilitates the exchange.

2) Adults' past experiences are resources for learning. Unlike children, adults have a reservoir of past experience, which can be a resource for learning. Whenever possible, adult past experiences should be drawn upon to enhance the learning process. Further, adult self-images are often defined, at least in part, by their past experiences and they have a deep investment in their value. Ignoring these past experiences in current learning can be interpreted as essentially rejecting a large part of the adult learner.

3) Adults' readiness to learn emerges from life's developmental stages. The adult learner's readiness to learn develops from life's tasks and problems. As the adult years progress, there is a shift in career, social roles, personal responsibilities, etc. The transitions which evolve during life create opportunities for learning as the individual strives to better understand and cope. Such phases have been labeled as “teachable moments.” The individual is both more highly motivated to learn and the information is

more readily understood when presented within this context.

4) Adults' learning is task or problem oriented. Adults will seek out various resources for specific learning (information skills) to help them in answering a question or dealing with a problem. They are motivated in their learning to find answers or solve problems. Learning experiences will be most effective when they respond to adult learners' perceived needs.

Hence, the WEM for the FNP in the home management of pediatric fever is guided by these four basic principles of adult learning as applied to the FNP and to their clients, the caregivers of pediatric patients.

The Wilson Educational Model

The Wilson Educational Model (WEM) contains a guide for the FNP to facilitate the discussion on home management of pediatric fever with the caregiver. This includes educational objectives and teaching strategies as well as a brief review for the FNP on identifying those caregivers that may benefit most by an educational intervention. It also includes the definition of fever, pathogenesis of fever, and the benefits and harmful effects of fever. A caregiver assessment guide and an educational pamphlet outlining appropriate home management of fever that the FNP can review with the caregiver is also included. In addition, a demonstration model on the proper technique of taking an axillary temperature is provided. Furthermore, a list of web site addresses, educational videos, and alternative community resources to assist the FNP in a variety of educational techniques is included. The WEM also offers a suggested follow-up call sheet that could aid the FNP in providing reinforcement of the educational interventions and to evaluate the educational model's effectiveness.

The complete packet of the Wilson Educational Model: Home Management of Pediatric Fever (WEM), is included as Appendix A. This is the product for use and reference for the FNP in practice.

Educational Objectives

For health instruction to be effective, a systematic plan with specific instructional or educational objectives and teaching strategies need to be identified (Fedor & Dalis, 1989). The educational objectives for the FNP address the problem of pediatric fever. Studies suggest that 20-30% of emergency room visits and approximately 30% of out-patient visits include fever as part of the chief complaint for children (Murphy, 1972; D'Auria, 1997). Despite the availability of over the counter antipyretics and the mass advertising on fever control, caregivers remain confused and lack an understanding of fever and appropriate home management (Casey, et.al, 1984). This has resulted in what some experts perceive is "fever phobia" (Schmidt, 1980) on the part of caregivers. It results in an increase in unnecessary visits to health care providers or emergency departments and the overdosing of antipyretics.

Therefore, the educational objectives for the WEM are directed towards the caregiver and the FNP. The goal or major outcome sought is the proper home management of pediatric fever by caregivers. Thus, the result being a decrease in unnecessary visits to the health care provider's office and/or emergency room with fever as the sole complaint. The following are the WEM objectives: (a) Caregivers will demonstrate an improved knowledge of fever as evidenced by defining "fever", describing its cause and identifying the harmful and the beneficial effects associated with fever; (b) Caregivers will verbalize appropriate home management of their child's fever;

(c) Caregivers will demonstrate the technique for taking and reading an axillary temperature; (d) Caregivers will state when they can manage the child's fever at home and appropriately identify when they must see a health professional; (e) Caregivers will verbalize where to find appropriate dosing instructions about antipyretic medications and recognize the dangers of over dosing of these over the counter medications; (f) Caregivers will identify other comfort measures that they can initiate in caring for the child's fever at home; (g) The FNP will increase his/her knowledge of pediatric fever and enhance the caregiver's knowledge and management of fever through the use of the WEM; (h) The FNP will identify alternative teaching strategies and resources available in his/her community; and (i) The FNP will utilize the follow-up call sheet to evaluate the effectiveness of the WEM.

Fever Review Guide for the FNP

In order for the FNP to make effective educational interventions, it is important to include a review of the basics of fever, i.e., the definition, the pathogenesis, and benefits and harmful effects. Furthermore, identification of caregivers that may benefit most from an educational intervention is required. The 'Fever Review Guide' for the FNP incorporates this information in an organized and logical sequence. It is formatted for quick reference using bullets and bold print to identify major content areas and to aid readability of the guide (Figure 3.).

The literature review established a definition of fever as an elevation of body temperature greater than 100 °F orally, 100.4 °F rectally, or greater than 99° F axillary (Uphold & Graham, 1998). Fever occurs when bacteria, viruses, toxins, or other agents are phagocytosed by leukocytes. Interleukin-1 and other chemical mediators are

Fever Review Guide for the Family Nurse Practitioner

What is a fever?

- *An elevation of body temperature greater than 100°F orally, 100.4°F rectally, or greater than 99°F axillary (Uphold & Graham, 1998).*

What causes a fever?

- *Infection is most common cause of fever in children with most infections viral in etiology and lasting from two to three days (Schmitt, 1984).*
- *Other medical conditions and causes for fever include: Hypersensitivity to drugs, recent immunizations with certain vaccines, vascular occlusive and/or inflammatory events, acute hemolytic episodes associated with acute auto-immune hemolytic anemia, neoplasms, collagen-vascular diseases, and central nervous system abnormalities (Uphold & Graham).*
- *Environmental causes of fever include; exercise, warm clothing or bundling, hot weather, or warm food or drinks (Schmitt, 1984).*

What is the pathology of fever?

Fever occurs when bacteria, viruses, toxins, or other agents are phagocytosed by leukocytes. Interleukin-1 and other chemical mediators (previously known as endogenous pyrogenes) are produced and activate the production of prostaglandins. Prostaglandins act on the thermoregulatory mechanism in the hypothalamus and upwardly readjust the body's thermostat. Raising the hypothalamic set-point initiates the process of heat production and conservation by increasing metabolism, triggering peripheral vasoconstriction, and less frequently by triggering shivering which increase heat production from the muscles (Uphold & Graham, 1998).

What are the benefits and harmful effects of fever?

- *Fever enhances the inflammatory response which results in a reduction of viability of the infecting organism, within a range of slight temperature elevation (D'Auria, 1997).*
- *Children usually suffer no harmful effects and a fever by itself causes no brain damage or harm unless it reaches 107°F (McCarthy & Dolan, 1976).*
- *Bacterial infections seem to be most usually linked with higher fevers 105°F and greater (McCarthy & Dolan, 1976).*
- *The most common side effects of fever are harmless and include mild dehydration, discomfort, febrile delirium and simple febrile seizures (Nelson & Ellenberg, 1978).*

Who may benefit from educational intervention on fever?

- *Caregivers who present to office or clinic with a child with fever and have not initiated treatment at home prior to seeking professional advice.*
- *Caregivers who have initiated inappropriate treatment prior to seeking professional advice.*
- *Caregivers who appear anxious or unsure of appropriate home management of fever.*
- *Caregivers who are <16 years of age, single parent/caregiver, lack of caregiver experience, low income, lack of familial support, low education.*

Figure 3. Fever Review Guide for the Family Nurse Practitioner

produced and activate the production of prostaglandins. Prostaglandins act on the thermoregulatory mechanism in the hypothalamus and upwardly readjust the body's thermostat. Raising the hypothalamic set-point initiates the process of heat production and conservation by increasing metabolism, triggering peripheral vasoconstriction, and less frequently by triggering shivering which increases heat production from muscles (Uphold & Graham, 1998).

Infection is the most common cause of fever in children. Most infections are viral in etiology, have temperatures of 101° F to 104° F, and last from 2-3 days (Schmidt, 1984). Other conditions which may cause fever include; hypersensitivity to drugs, recent immunizations with certain vaccines, vascular occlusive and/or inflammatory events, acute hemolytic episodes associated with acute autoimmune hemolytic anemia, neoplasms, collagen-vascular diseases, and central nervous system abnormalities. Different environmental causes of fever include; exercise, warm clothing or bundling, hot weather, or warm food or drinks (Uphold & Graham, 1998).

A benefit of fever is the inflammatory response, which is enhanced by a fever and appears to reduce the viability of the infecting organism (Kluger, 1980; Rosenthal & Silverstein, 1988; D'Auria, 1997). The most common side effects that children experience with fever include; mild dehydration, discomfort, febrile delirium and simple febrile seizures; all of which are generally harmless, transient and treatable (Nelson & Ellenberg, 1978). According to Schmidt (1980, 1984, 1993), all children experience fever, but only four percent will have a febrile seizure. Brain damage secondary to high fever does not occur unless the temperature reaches 107° F. Bacterial infections seem to be mostly linked with higher fevers (>105° F) (McCarthy & Dolan, 1976).

As stated in the literature review, the caregivers that must overcome negative burdens or barriers in order to make appropriate health care decisions for their children were identified as young (< 16 years old), single and poor, and lacked education, experience, resources and motivation (Ames, et al., 1982; Ford-Gilboe, 1997). However, those caregivers that do not face these negative social burdens still lack knowledge of what constitutes fever and what appropriate home management of fever includes. Studies conducted by Casey, et al. (1984) and Kelly, Morin & Young (1996) found many caregivers exhibit a great deal of concern and many misconceptions about fever and its management. Schmidt (1980) developed the term “fever phobia” to describe the intensity of caregivers’ unfounded fears concerning fever and its consequences. Therefore, it is important that the FNP recognizes that all caregivers may actually benefit from fever education. However, some caregivers may need more specific instruction than others. Thus, the WEM enables the tailoring of the interventions according to the needs of the caregiver and the situation.

The Educational Pamphlet

The educational pamphlet, C.A.R.E. (Figure 4.), summarizes the key factors that promote appropriate home management of pediatric fever. It includes a brief review of fever and its causes, reasons for reducing a fever, interventions to reduce a fever, appropriate dosage of antipyretic medications, and when to contact and/or see a health care professional.

This educational pamphlet provides the caregiver with written instructions that compliment the verbal instruction given by the FNP during the educational intervention. The information that patients and their families retain during a routine visit to a health

Acetaminophen (I.e. Children's Tylenol)

Please note: 1 (one) teaspoon = 5 ml or 5 cc

Age	Weight	Drops: 80mg/08ml dropper	Elixir 160/5cc=1tsp.	Chewable Tabs (80 mg each)	Ibuprofen (Children's Advil or Motrin) 100mg/tsp 100mg/tablet
0-3 mos	6-11lbs	1/2 dropper	1/2 tsp	---	1/4 tsp
4-11 mos	11-17 lbs	1 dropper	1/2 tsp	---	1/4 tsp
12-23 mos	18-23 lbs	1 1/2 droppers	3/4 tsp	1 1/2 tabs	1/4 tsp
2-3 yrs.	24-35 lbs	2 droppers	1tsp	2 tabs	1 tsp
4-5 yrs	36-47 lbs	4 droppers	1 1/4 tsp	3 tabs	1 1/2 tsp
6-8 yrs	48-59 lbs	5 1/2 droppers	2 tsp	4 tabs	2 tsp or 2 tablets
9-10 yrs	60-71 lbs	7 droppers	2 1/4 tsp	5 tabs	2 1/4 tsp or 2 tablets
11-12 yrs	72-95 lbs	---	3 tsp	6 tabs	3 tsp or 3 tablets
12+yrs	As an adult-- 2 adult acetaminophen tablets (ie. Tylenol 325mg)				

Source: Tylenol®, Motrin®, and Advil® inserts, 1998.

Medication Dosage of Acetaminophen (Children's Tylenol)

Acetaminophen can be given every 4-6 hours as needed and should NOT exceed more than 5 doses in a 24 hour period. Too much acetaminophen can cause liver damage and even death. See your health professional with any questions.

Medication Dosage of Ibuprofen (Motrin or Advil)

Ibuprofen can be given every 6-8 hours as needed and should NOT exceed more than 3-4 doses in a 24 hour period. Too much ibuprofen can be toxic to your child and can cause kidney failure. See your health professional with questions.

Developed by:

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When your child has a fever.



You can help your child at home with

C.A.R.E.

Home management guidelines for children with fever

An educational pamphlet provided for you by your health care provider:

Name

Date

Figure 4a. Educational Pamphlet

Fever

A fever by itself is not always harmful. A virus can often be the cause of very high fevers of which there is no antibiotic cure. The body may fight off infection better with fever.

Reasons for reducing a fever might be:

- The fever is very high
- The child is very uncomfortable
- The child will not eat or drink
- The child is known to have fever (febrile) seizures
- The child has other medical problems

If you think your child has a fever:

C.A.R.E.

Check

your child's temperature. A fever is a temperature over 100 °F orally or 99 °F under the arm (axillary).

Assess

for other symptoms. Does your child act fussy, sleepy, irritable, uncomfortable? Is he/she not drinking and eating enough? Does the child have seizures when he/she has a fever? Does he/she have other medical problems? (If the answer is "YES" to any of these-see your health care provider).

Reduce

the temperature.

- Keep your child lightly dressed.
- Make sure your child drinks plenty of cool liquids. Encourage frequent sips every 10-15 minutes.
- Encourage light, small meals or snacks.
- Have your child rest. Too much activity can raise your child's temperature.
- Give acetaminophen (Tylenol) every 4-6 hours or ibuprofen (Motrin or Advil) every 6-8 hours. Use chart on back of pamphlet for dose of medication. If possible use the child's weight to find the dose, otherwise use age.
- If you can not reduce the child's temperature with these measures you may sponge the child with lukewarm water. DO NOT use rubbing alcohol. DO NOT bathe or shower your child because this can cause shivering and actually raise the child's temperature.
- DO NOT give Aspirin or anything with salicylate in it such as Pepto-Bismol- it may cause Reyes Syndrome.

Evaluate

your child's behavior and temperature. Are you able to reduce the fever with these steps? Does your child appear better or worse? If worse, contact your health care provider.

See your health care provider if:

- Your child's fever is over 103 °F under the arm or 104 °F orally.
- Your child is less than 6 months old.
- Your child has seizures, is overly sleepy, fussy, has problems breathing or a stiff neck.
- Your child complains of ear pain, has a persistent sore throat, diarrhea, problems urinating, vomits or has purple spots on the skin.
- Your child is acting very sick or the fever has lasted longer than 3 days.

Call your health care provider for instructions if:

- Your child recently had surgery or has a chronic illness such as kidney disease, cancer, or diabetes or a history of seizures when they have a fever.
- Your child's fever has gone away for more than 24 hours and then returned
- Your child has returned recently from a foreign country.
- Your child has recently received an immunization (DTP or MMR shot).

Additional Information or Comments:

Figure 4b. Educational Pamphlet

care provider is no more than 50% (Falvo, 1994). This is due to anxiety, large amounts of information conveyed, minimal medical knowledge, and personal intellectual level. Supplemental written instruction should assist the caregiver to remember the provider's instructions when returning home (Falvo, 1994).

When developing an education pamphlet, Doak, Doak, and Root (1997) suggest the following points be considered to ensure comprehension by people at all literacy levels: (a) write how you talk, use active tense of verbs not passive; (b) use common words; (c) avoid medical jargon; and (d) use 12pt font or larger print. Falvo (1994) states that the material should be organized with clear and specific instructions that reinforce what was discussed during the provider-patient-caregiver contact. Rankin & Stallings (1996) recommend that pamphlets make points vivid, sequence information logically and include the smallest amount of information possible. Barnes (1996) states that in order for patient educational materials to be easily understood in the general population a sixth grade reading level is a reasonable goal. The educational pamphlet for the WEM utilized these suggestions and the final pamphlet was reviewed by an educational reading specialist and by several sixth graders. The pamphlet was found to be easy to read and understandable at the sixth grade reading level.

Based upon the review of the literature and current recommendations for the home management of pediatric fever, the WEM's pamphlet uses the acronym **C. A. R. E.** (Figure 4.) for the sequencing of the home management of fever. It is a one page tri-fold pamphlet with print on all sides and offers the following definitions for the letters: **C- Check your child's temperature.** If your child's temperature is over 100° F orally or 99° F axillary your child has a fever (Uphold & Graham, 1998). **A-Assess your child**

for other symptoms. How does your child look and act? Is the child active or appear sleepy? Is your child fussy or uncomfortable? Is your child eating and drinking? Has your child ever had a seizure or convulsion? Does your child have other medical problems? (Rosenthal & Silverstein, 1988). If your child is affected by the fever then, **R-Reduce the fever.** Keep child lightly dressed, make sure your child drinks plenty of cool liquids, encourage small light meals and snacks, give acetaminophen (Children's Tylenol) every 4-6 hours or ibuprofen every 6-8 hours. (See medication chart on back of pamphlet for proper dose). If possible use the child's weight to determine dose, otherwise use age (Uphold & Graham, 1998). Sponge the child with luke warm water if it makes your child more comfortable. **DO NOT** use rubbing alcohol or put child in a bath or shower (Schmidt, 1993; D'Auria, 1997; Uphold & Graham, 1998). **E-Evaluate your child's response.** If your child does not respond to these measures or more sick see your health care provider. In addition, the pamphlet includes a brief definition of fever, a guide about when to contact a health care provider, and a dosing chart for acetaminophen (Children's Tylenol) and ibuprofen (Motrin or Advil).

The Demonstration Model for Taking an Axillary Temperature

The review of literature revealed that taking a child's temperature via the axillary route to be the safest and easiest in terms of accessibility and the caregiver's comfort level. The Axillary Temperature Demonstration Model for the Family Nurse Practitioner (Figure 5.) is presented as a three page guide for the FNP. It combines role playing by the FNP with step by step discussion points with the caregiver on the technique of taking an axillary temperature (Novitt-Moreno, 1997). It also includes a return demonstration and discussion guide.

Axillary Temperature Demonstration Model For the Family Nurse Practitioner

This demonstration model can be used to provide background information for the FNP or can be employed as a script and/or guide of conversation points for the FNP with the caregiver. It can facilitate the discussion with the caregiver on axillary temperature taking and promote feedback from the caregiver. Included is a step by step demonstration of the technique for properly taking and reading an axillary temperature on a child. The FNP should first discuss the importance of properly taking an axillary temperature and then demonstrate the technique on the child with the caregiver. A return demonstration by the caregiver with time allotted for questions should follow.

Introduction to taking an axillary temperature on a child

Choosing the Method

Babies and children younger than age four or five are too young to keep their mouths closed for oral temperature readings, so their temperatures must be taken either in the rectum or under the armpit (axilla).

You can usually take an older child's temperature orally (by mouth) if he is mature enough and alert enough to be able to keep his lips closed tightly around the thermometer. However, if your child has frequent coughs or is breathing through his mouth because of a very stuffy nose, he might not be able to keep his mouth closed long enough for an accurate oral reading. If this is the case, it would be better to take his temperature either in the rectum or under the arm. I recommend the armpit for taking the temperature at home as the safest, easiest and least invasive way.

*Temperature measured in the armpit (axilla) is called an **axillary temperature** reading. It is an alternative to the rectal method for infants and children younger than age four or five. It is also useful in older children who are so upset or uncomfortable from an illness that they can't cooperate in taking either a rectal or oral temperature. However, this is the least accurate way of taking a temperature and is usually $\frac{1}{2}$ -1 degree lower than an oral reading. To adjust the reading just add $\frac{1}{2}$ -1 degree to determine if child has a fever. Remember this is just to see if your child has a fever. You must always evaluate the child's overall condition to see how sick the child really is!*

Choosing the thermometer

Both glass mercury thermometers and digital thermometers will give you an accurate reading. What's most important is that you choose a thermometer that's easy to use and read.

The newest thermometers are the ear thermometers that quickly and easily measure temperature inside the ear canal. They are still fairly expensive compared with

the glass and electronic models, and learning how to use them correctly takes some training.

Forehead thermometers are convenient and comfortable to use, but they are not very accurate. They may be handy for quick screenings, but for exact readings use a glass thermometer or a digital one. Glass thermometers can shatter and release the harmful mercury inside, so handle them carefully. In fact, it is always wise to have a spare glass thermometer at home in case of accidents.

Taking an axillary temperature (all ages)

Use an oral thermometer for this method

- *Prepare the thermometer by washing it in cool (not hot) soapy water or rubbing alcohol.*
- *If using a glass thermometer, shake it down to below 96 degrees. Make sure that you have a watch or clock nearby for timing the reading. If you are using a digital thermometer, read the directions beforehand so that you know which beep, or series of beeps, is a sign that the thermometer is finished reading. Turn it on and check that the screen is clear of any earlier reading.*
- *Insert the thermometer in you child's armpit. Fold your child's arm across his chest, and hold the thermometer in place for 4 to 5 minutes before reading it. Axillary temperature readings tend to be about ½ to 1 degree lower than temperatures measured orally. Digital thermometers will automatically beep when done. Make sure the thermometer end is up in the armpit with the skin surrounding it and not in an air pocket in the space under the armpit. This will ensure a more accurate reading.*
- *For a glass thermometer, read and record the number at the end of the colored line. For a digital thermometer, read and record the number on the screen.*
- *Always note the time of day that the reading was taken. Temperatures in the morning are usually lower than in the late afternoon. Note also, what your child was doing, where he was at, i.e., in the sun or shade, and what he was wearing prior to taking the temperature. Remember activity, exercise, being indoors or outdoors in excessive heat or cold, and over-dressing can all effect a child's temperature. Assess the situation and your child's behavior prior to deciding if a fever is present. If any of these "environmental" elements occur, have your child rest, un-dress, drink cool fluids, and re-take the temperature later.*
- *An axillary temperature of 99 degrees can indicate that your child has a fever and may need to be treated. See flow-chart for caregiver assessment*

guidelines for home management of a fever.

- *After using the thermometer, clean with warm soapy water or with rubbing alcohol and store in a safe cool place.*

Demonstration of taking an axillary temperature

- *Show the client both the glass thermometer and the digital thermometer.*
- *Demonstrate how to shake down the glass thermometer and how to turn on the digital thermometer.*
- *Demonstrate proper placement of the thermometer under the child's armpit. Stress the importance of the under arm skin contact to the end of the thermometer and holding the child's arm tightly across his chest. Demonstrate the "bear hug" as a gentler way of holding the child's arm across the chest and as a reassurance that this will not hurt the child.*
- *Reinforce the need to keep the thermometer under the arm for 4-5 minutes or until the digital beep goes off. Removing the thermometer before this time will not give an accurate reading.*
- *Demonstrate reading the glass thermometer by turning the thermometer in your fingers until you can see the end of the colored line. Show the caregiver the location of the reading display on the digital thermometer.*
- *Demonstrate shaking down the glass thermometer and turning off the digital thermometer. Discuss cleaning and proper storage of both thermometers.*
- *Allow the caregiver to perform a return demonstration of the techniques discussed.*
- *Allow for questions and continued reinforcement of the procedure.*
- *Document on the child's chart that a demonstration of the technique of taking an axillary temperature was done and that the caregiver verbalized understanding of the procedure.*

(Source: Moren-Novitt, 1997)

Figure 5. Demonstration model on taking an axillary temperature

Demonstration is useful for cognitive and psychomotor learning. It is most often used to teach skills and to present standards of performance. Demonstration may be done in person or via videotaped programs. The sense of sight is used in learning by demonstration, but hearing, smell, and taste may also be stimulated (Rankin & Stallings, 1996). According to Rankin & Stallings (1996) a demonstration should be performed slowly and the teacher should be certain that the learner can see and hear well, and that all equipment or supplies that will be used at home is available for the demonstration. The authors continue that repetition and return demonstration are needed for teaching procedures with multiple steps.

Role playing and return demonstration involve doing or practicing. They help the learner to apply knowledge or skills, usually after the demonstration (Rankin & Stallings, 1996). When used appropriately, role play and return demonstration tailor the learning to the individual's past or present life experiences while the teacher is there to offer feedback and advice. This incorporates the adult principles of learning that Knowles (1980) advocates and which were discussed previously.

Alternative Educational Resources for Home Management of Pediatric Fever

Health education has become an integral part of patient empowerment and the ability to apply the principles of home management and appropriate medical decision making for caregivers and their children. Learning can and should be enjoyable. Knowing how to use a variety of learning activities to meet educational objectives can make patient education more interesting, challenging, and effective for both the FNP and the learner. The WEM for home management of pediatric fever incorporates many learning activities such as guided discussion, demonstration and role play, simulation,

and practice. These are reflected in Figure 6., Alternative Educational Resources for Home Management of Pediatric Fever; and Figure 7., Pediatric Follow-up Call Sheet. Applying the use of creative mediums with learning activities not only enhances those learning activities, but can make the educational experience more enjoyable. Rankin & Stallings (1996) propose several forms of mediums available today which may strengthen learning activities. These include the media, posters, displays, flipcharts and bulletin boards, graphics, electronic media, objects, models, and demonstrations, community resources, games and simulations, photographs and drawings, audio materials and videotapes, and printed materials as pamphlets or bulletins. The authors further indicate that no one medium is best suited to all purposes and that the application of media should be consistent with learning objectives. Just as learning activities promote certain types of behaviors, media are also chosen to coincide with objectives. The media chosen must be compatible with the learning needs of the audience and the environment in which the learning takes place (Rankin & Stallings, 1996).

Effectively incorporating patient education into the primary care setting is particularly difficult. As Bonnel (1996) points out “the clock is ticking”, as a familiar phrase in the primary care clinic. The author suggests several ideas that can maximize the 10-minute teaching opportunity (Bonnel, 1996). These include: 1) good resources readily available, 2) good quality educational video tapes that can be viewed while at the health care setting or checked out and viewed at home, 3) instruction given to patients or caregivers to seek feedback on questions or concerns either with bringing questions in at another appointment time or by letting them know they can call a “phone nurse” to answer questions, 4) access to a list of phone numbers for community resources and

Alternative Educational Resources for Home Management of Pediatric Fever

Educational Videotapes:

The University of Wisconsin Medical School

Patient Education Video Tapes; The Facts about Fever

Order number 020294F \$19.95+tax and shipping

Milner and Fenwick Inc.

Patient Education Videos; When your baby's sick

\$25.95+tax and shipping

Computer based patient education-Web sites:

- www.medsch.wisc.edu/uwhosp/outreach/pohindex.html
- www.ama.assn.org/kidshealth
- www.pediatricneurology.com/febrile.html
- www.drkoop.com/adam/peds/top/003400.html
- ***Virtual Hospital web links***
- _____
- _____

Community Agencies/Parental Support Groups

Local Family Independence Agency or Department of Social Services:_____

Local Public Health Department:_____

Parental Support Groups:_____

Women Infants and Children (WIC) and Michigan Infants and Children (MIC):

Red Cross:_____

Local Hospitals-Case Management Departments:_____

Figure 6. Alternative Educational Resources

Pediatric Follow-up Call Sheet

Child's Name _____ ***FNP Name*** _____

Caregiver's Name and relation to child _____

Date of visit and educational intervention _____

Presented with c/o _____

How is child doing now?

Do you have questions regarding your child's fever?

Explain how you would assess your child's physical condition when he is sick?

Describe how you would take an axillary temperature. What temperature suggests your child has a fever?

How much acetaminophen (Tylenol) or ibuprofen (Motrin or Advil) should you give your child and how often? Where would you look to find the proper dose?

What are the risks that overdosing of these medications can cause?

Are you comfortable with when to manage you child at home with a fever and when it is appropriate to see a health professional?

Is there anything else we can assist you with in the care of your child?

Figure 7. Pediatric Follow-up Call Sheet

support along with educational follow-up calls by the health provider, 5) identify all moments with the patient as “teachable moments”, which at times may just be to capture the patient’s interest and convey the importance of this content to their health by supplying pamphlets and teaching materials, and 6) follow-up of patient teaching either with a re-check appointment or a follow-up phone call.

The WEM provides for the essential elements of effectively incorporating caregiver education in the primary care setting by the FNP by utilizing these suggestions. The model includes a list of alternative resources and materials to enhance the proposed learning activities while allowing flexibility on the part of the FNP to individually apply the WEM to each caregiver’s educational need.

The follow-up call sheet can be a useful tool in evaluating caregiver learning outcomes. According to Rankin & Stallings (1996), evaluation of patient education involves collecting specific and descriptive data related to behaviors targeted as patient learning objectives. The Pediatric Follow-up Call Sheet (Figure 7.) which is based on the caregiver objectives, is meant to aid the FNP in evaluating the usefulness of the WEM and as an educational reinforcement on home management of pediatric fever.

Implications

As the FNP assumes a stronger role as a primary care provider it becomes increasingly important to demonstrate the quality of care at reduced costs. Patient education is one of the most significant ways to decrease health care costs by empowering patients and their families to make appropriate health care decisions prior to seeking professional advice and treatment which is often expensive. The following discussion examines the implications of this project and its product for research, practice,

and education.

Research

The ultimate goal of any profession is to establish a base of knowledge that will guide the practice of its members. As nursing has advanced, so has its members' commitment to research. FNPs can and do play an integral role in identifying key practice problems for which research is needed. An equally important role exists in the utilization of research findings in practice.

Evaluation and research are very similar. Many designs used for research are also applicable for evaluation studies, i.e., a pre-post test design may be used in research and evaluation (Hampton & Snyder, 1995). However, distinctions between these two processes exist. According to Hampton and Snyder (1995), research is conducted to generate knowledge that can be generalized to many populations or settings. Evaluation refers to studies in which a comparison is made to some standard of acceptability with two types of evaluation, i.e., formative evaluation is focused on the process, while summative evaluation is focused on outcomes.

Evaluation studies are common in practice settings and would be a necessary component when considering the implications for research on the WEM. Continuous Quality Improvement (CQI) requires ongoing evaluation of the product by the FNP. This could include designing a quality improvement study, determining the methods of measurement, and establishing standards. The FNP can provide input and promote research. Examples of this type of CQI study could be a pre-post test for both the caregiver, as well as the FNP about fever; its pathology, causes, treatment options, and appropriate home management. This method could evaluate the effectiveness of the

model and identify the specific interventions that were most helpful or improvements which need to be made. The post-test could be completed immediately after the intervention and repeated at intervals following the instruction (Rankin & Stallings, 1996). The suggested follow-up call sheet included in the model (Figure 7.) was designed to be used not only as an educational reinforcement, but also as an outcome indicator. Ideally, this should be done by the FNP that participated in the educational intervention using the WEM so that the follow-up can be consistent with the actual teaching provided. Data collection could be either qualitative or quantitative; due to the combination of yes/no and descriptive questions, the latter could be categorized to facilitate the data collection process.

The increasing emphasis on cost effectiveness in the delivery of health care makes evaluation a paramount activity in health care institutions. Hampton & Snyder (1995) state that several studies have demonstrated significant cost savings related to interventions by FNPs. Implementing new teaching strategies require follow-up evaluation of the cost effectiveness of the intervention. The question of whether the WEM, by properly educating caregivers on fever, is cost effective can be evaluated in several ways. Retrospective chart reviews on the number of visits in which the sole complaint of fever is addressed prior to and again after the implementation of the WEM at a particular setting can indicate whether the WEM may have impacted the number of visits and thus, decreased health care resources and costs. Another retrospective chart review could be done on the number of children admitted to the hospital for overdosing of antipyretics prior to implementation of the WEM and after the model was instituted.

Clinical research could extend to identify treatment options and specific

combinations of interventions for fever. This includes education for caregivers in the appropriate use of antipyretic suppositories and researching the use of alternating acetaminophen and ibuprofen.

Practice setting research directed towards the ease of use of the WEM in a time limited practice with data collected via questionnaires completed by the caregiver is another appropriate implication for research and would be another indicator of cost effectiveness in the clinical setting. Effectively incorporating patient education into the primary care setting is particularly difficult. As Bonnel (1996) points out, “the clock is ticking” and it is increasingly important to get the information to the caregiver in a concise, understandable, flexible way to meet their needs. The FNP can quickly assess the WEM for ease of use, conciseness, and flexibility.

Practice

Prior to the implementation and use of the WEM in practice a expert panel must evaluate the model for accuracy and clarity. This expert panel would ideally comprise of an experienced FNP, a Certified Pediatric Nurse Practitioner (CPNP), a health or patient educational specialist, and a pediatrician. This would ensure the accuracy and the credibility of the model and appropriate changes would be made prior to clinical use.

The development of the WEM on the home management of pediatric fever creates a reference and intervention resource for the FNP. The model is evidenced based and thus enhances the FNP’s role in practice. It will be necessary for the WEM to be updated according to new advances in research. The FNP must keep current on new developments in nursing, medicine, and patient education by attending conferences and reading peer reviewed journals. It will also be important for the FNP to perform

evaluations of the effectiveness of the model by evaluating the various interventions to determine those used most frequently, those items which are never used or used infrequently, and ways of adding or improving the educational interventions. This may be accomplished on an individual FNP basis or through the involvement of the professional nursing organization. The role of evaluator will be utilized through the development of quality outcome monitoring such as chart and follow-up call reviews.

By encouraging the family nurse practitioner to participate in creating an educational model for individual practice, the role of change agent can be utilized. If the individual practitioner participates in governing his/her practice by creating patient education models that provide higher quality of care at lower costs, there will be a greater positive recognition of the profession. The nursing profession will be able to further justify the importance and necessity of the FNP role in primary care. Through the use of the roles such as change agent and clinician, the FNP can utilize positive clinical outcome indicators as leverage when negotiating reimbursement with third party payer as well as showing the benefits of patient education.

The roles of collaborator and consultant can be utilized as the FNP develops a scientific evidence based practice by development of educational models. This allows the FNP to become a valued team member. The FNP can advise other members of the team such as those in other clinics and offices on effective home management and education for caregivers on pediatric fever. The information can be shared at advanced practice nursing conferences as well as at health fairs and local nursing associations. The WEM can be utilized within the hospital setting for education interventions by clinical nurse specialists, nursing educators, and staff R.N.s on many different units. These could

include the emergency/urgent care departments, pediatrics, and post-partum units. The educational pamphlet can be self explanatory and given to all caregivers of small children on these units. However, its greatest impact may be in concert with the FNP's instruction, demonstration and return demonstration.

The role of case manager is becoming more crucial in today's managed care environment. The use and effectiveness of the WEM, in its entirety or of its components, on home management of pediatric fever prior to seeking expensive health advice should be an invaluable vehicle for patient education. Educating caregivers on appropriate home management of pediatric fever may reduce health care costs by decreasing the number of inappropriate visits to primary care offices and emergency rooms. This could consequently reduce the number of inappropriate hospital admissions by decreasing the number of negative outcomes of inappropriate management of fever, i.e., over dosage of antipyretics, dehydration, and febrile seizures.

In addition, the FNP as a case manager may identify those caregivers most at risk as discussed in the literature review and pro-actively intervene with the WEM by teaching parenting skills in the home management of a child's fever. It is important that the FNP be aware of and refer to the available community resources as needed for these caregivers. Such services as the State of Michigan's Family Independence Agency or Department of Social Services, Parenting Support Groups, Catholic Social Services, the American Red Cross, and the public health department may be able to provide the caregiver and their family with financial assistance, medication assistance, shelter, food, and other support services.

Education

The development of the WEM enhances the family nurse practitioner's role as an educator. As stated previously, the educator role is one of the most important and significant roles of the FNP and encompasses education of patient and colleague alike. In general, advanced practice nurses are committed to not only furthering their own education, but also assume the responsibility for providing continuing education for other nurses. It also has implications for educational use at the graduate level with the new FNP as an educational tool guide.

The internet has become a virtual haven for educational tools and a web site dedicated to educational interventions for the FNP has implications for not only the FNP, but certainly for the general public who may access the information. The WEM could be utilized in this way on the internet as a web site on pediatric fever and or as a web site on educational models for use by the FNP.

As educational models are developed for use by the FNP in his/her practice, it is likely they will reinforce the importance that education and health promotion have in the FNP's role as primary health care provider, as well as distinguishing advanced practice nurses apart from other health providers.

Conclusion

Fever accounts for approximately 30% of the chief complaints presenting at outpatient visits (Murphy, 1972). Furthermore, despite the availability of over the counter antipyretics, caregivers continue to demonstrate a lack of understanding and confusion about fever. The result has been increasingly inappropriate visits to primary care providers' offices and emergency departments. Over dosing of antipyretics has serious

consequences, and yet many caregivers are uninformed of the dangers. The development of the Wilson Educational Model (WEM) on the Home Management of Pediatric Fever provides the FNP with an evidenced based guide or lesson plan to effectively address these issues with the caregivers of children. Implementation of the WEM has the potential to promote positive patient outcomes by increasing caregiver satisfaction and self care behaviors to decrease inappropriate use of primary care offices and emergency departments, and to ultimately reduce health care costs.

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APPENDIX A

***The Wilson Educational Model for the
Family Nurse Practitioner:
Home Management of Pediatric Fever***

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1999***

Educational Objectives

For the Caregiver:

- *Caregivers will demonstrate an improved knowledge of fever as evidenced by defining “fever” describing its causes and identifying the harmful and beneficial effects associated with fever.*
- *Caregivers will verbalize appropriate home management of their child's fever.*
- *Caregivers will accurately demonstrate the taking and reading of an axillary temperature.*
- *Caregivers will state when they can manage the child's fever at home and appropriately identify when they must see a health care professional.*
- *Caregivers will verbalize where to find appropriate dosing instructions about antipyretic medications and describe the dangers of over dosing of these over the counter medications.*
- *Caregivers will identify other comfort measures that they can initiate in caring for the child's fever at home.*

For the FNP:

- *The FNP will increase his/her knowledge of pediatric fever and enhance the caregiver's knowledge and management of fever through the use of the WEM.*
- *The FNP will identify alternative teaching strategies and resources available in his/her community.*
- *The FNP will utilize the follow-up call sheet to evaluate the effectiveness of the WEM.*

Fever Review Guide for the Family Nurse Practitioner

What is a fever?

- *An elevation of body temperature greater than 100 °F orally, 100.4 °F rectally, or greater than 99 °F axillary (Uphold & Graham, 1998).*

What causes a fever?

- *Infection is most common cause of fever in children with most infections viral in etiology and lasting from two to three days (Schmitt, 1984).*
- *Other medical conditions and causes for fever include: Hypersensitivity to drugs, recent immunizations with certain vaccines, vascular occlusive and/or inflammatory events, acute hemolytic episodes associated with acute auto-immune hemolytic anemia, neoplasms, collagen-vascular diseases, and central nervous system abnormalities (Uphold & Graham).*
- *Environmental causes of fever include; exercise, warm clothing or bundling, hot weather, or warm food or drinks (Schmitt, 1984).*

What is the pathology of fever?

Fever occurs when bacteria, viruses, toxins, or other agents are phagocytosed by leukocytes. Interleukin-1 and other chemical mediators (previously known as endogenous pyrogenes) are produced and activate the production of prostaglandins. Prostaglandins act on the thermoregulatory mechanism in the hypothalamus and upwardly readjust the body's thermostat. Raising the hypothalamic set-point initiates the process of heat production and conservation by increasing metabolism, triggering peripheral vasoconstriction, and less frequently by triggering shivering which increase heat production from the muscles (Uphold & Graham, 1998).

What are the benefits and harmful effects of fever?

- *Fever enhances the inflammatory response which results in a reduction of viability of the infecting organism, within a range of slight temperature elevation (D'Auria, 1997).*
- *Children usually suffer no harmful effects and a fever by itself causes no brain damage or harm unless it reaches 107 °F (McCarthy & Dolan, 1976).*
- *Bacterial infections seem to be most usually linked with higher fevers 105 °F and greater (McCarthy & Dolan, 1976).*
- *The most common side effects of fever are harmless and include mild dehydration, discomfort, febrile delirium and simple febrile seizures (Nelson & Ellenberg, 1978).*

Who may benefit from educational intervention on fever?

- *Caregivers who present to office or clinic with a child with fever and have not initiated treatment at home prior to seeking professional advice.*
- *Caregivers who have initiated inappropriate treatment prior to seeking professional advice.*
- *Caregivers who appear anxious or unsure of appropriate home management of fever.*
- *Caregivers who are <16 years of age, single parent/caregiver, lack of caregiver experience, low income, lack of familial support, low education.*

*When your child has a
fever.*



*You can help your child
at home with*

C.A.R.E.

*Home management guidelines for
children with fever*

*An educational pamphlet provided for you by
your health care provider:*

Name

Date

Axillary Temperature Demonstration Model For the Family Nurse Practitioner

This demonstration model can be used to provide background information for the FNP or can be employed as a script and/or guide of conversation points for the FNP with the caregiver. It can facilitate the discussion with the caregiver on axillary temperature taking and promote feedback from the caregiver. Included is a step by step demonstration of the technique for properly taking and reading an axillary temperature on a child. The FNP should first discuss the importance of properly taking an axillary temperature and then demonstrate the technique on the child with the caregiver. A return demonstration by the caregiver with time allotted for questions should follow.

Introduction to taking an axillary temperature on a child

Choosing the Method

Babies and children younger than age four or five are too young to keep their mouths closed for oral temperature readings, so their temperatures must be taken either in the rectum or under the armpit (axilla).

You can usually take an older child's temperature orally (by mouth) if he is mature enough and alert enough to be able to keep his lips closed tightly around the thermometer. However, if your child has frequent coughs or is breathing through his mouth because of a very stuffy nose, he might not be able to keep his mouth closed long enough for an accurate oral reading. If this is the case, it would be better to take his temperature either in the rectum or under the arm. I recommend the armpit for taking the temperature at home as the safest, easiest and least invasive way.

*Temperature measured in the armpit (axilla) is called an **axillary temperature** reading. It is an alternative to the rectal method for infants and children younger than age four or five. It is also useful in older children who are so upset or uncomfortable from an illness that they can't cooperate in taking either a rectal or oral temperature. However, this is the least accurate way of taking a temperature and is usually $\frac{1}{2}$ -1 degree lower than an oral reading. To adjust the reading just add $\frac{1}{2}$ -1 degree to determine if child has a fever. Remember this is just to see if your child has a fever. You must always evaluate the child's overall condition to see how sick the child really is!*

Choosing the thermometer

Both glass mercury thermometers and digital thermometers will give you an accurate reading. What's most important is that you choose a thermometer that's easy to use and read.

The newest thermometers are the ear thermometers that quickly and easily measure temperature inside the ear canal. They are still fairly expensive compared with

the glass and electronic models, and learning how to use them correctly takes some training.

Forehead thermometers are convenient and comfortable to use, but they are not very accurate. They may be handy for quick screenings, but for exact readings use a glass thermometer or a digital one. Glass thermometers can shatter and release the harmful mercury inside, so handle them carefully. In fact, it is always wise to have a spare glass thermometer at home in case of accidents.

Taking an axillary temperature (all ages)

Use an oral thermometer for this method

- *Prepare the thermometer by washing it in cool (not hot) soapy water or rubbing alcohol.*
- *If using a glass thermometer, shake it down to below 96 degrees. Make sure that you have a watch or clock nearby for timing the reading. If you are using a digital thermometer, read the directions beforehand so that you know which beep, or series of beeps, is a sign that the thermometer is finished reading. Turn it on and check that the screen is clear of any earlier reading.*
- *Insert the thermometer in you child's armpit. Fold your child's arm across his chest, and hold the thermometer in place for 4 to 5 minutes before reading it. Axillary temperature readings tend to be about ½ to 1 degree lower than temperatures measured orally. Digital thermometers will automatically beep when done. Make sure the thermometer end is up in the armpit with the skin surrounding it and not in an air pocket in the space under the armpit. This will ensure a more accurate reading.*
- *For a glass thermometer, read and record the number at the end of the colored line. For a digital thermometer, read and record the number on the screen.*
- *Always note the time of day that the reading was taken. Temperatures in the morning are usually lower than in the late afternoon. Note also, what your child was doing, where he was at, i.e., in the sun or shade, and what he was wearing prior to taking the temperature. Remember activity, exercise, being indoors or outdoors in excessive heat or cold, and over-dressing can all effect a child's temperature. Assess the situation and your child's behavior prior to deciding if a fever is present. If any of these "environmental" elements occur, have your child rest, un-dress, drink cool fluids, and re-take the temperature later.*
- *An axillary temperature of 99 degrees can indicate that your child has a fever and may need to be treated. See flow-chart for caregiver assessment guidelines for home management of a fever.*

- *After using the thermometer, clean with warm soapy water or with rubbing alcohol and store in a safe cool place.*

Demonstration of taking an axillary temperature

- *Show the client both the glass thermometer and the digital thermometer.*
- *Demonstrate how to shake down the glass thermometer and how to turn on the digital thermometer.*
- *Demonstrate proper placement of the thermometer under the child's armpit. Stress the importance of the under arm skin contact to the end of the thermometer and holding the child's arm tightly across his chest. Demonstrate the "bear hug" as a gentler way of holding the child's arm across the chest and as a reassurance that this will not hurt the child.*
- *Reinforce the need to keep the thermometer under the arm for 4-5 minutes or until the digital beep goes off. Removing the thermometer before this time will not give an accurate reading.*
- *Demonstrate reading the glass thermometer by turning the thermometer in your fingers until you can see the end of the colored line. Show the caregiver the location of the reading display on the digital thermometer.*
- *Demonstrate shaking down the glass thermometer and turning off the digital thermometer. Discuss cleaning and proper storage of both thermometers.*
- *Allow the caregiver to perform a return demonstration of the techniques discussed.*
- *Allow for questions and continued reinforcement of the procedure.*
- *Document on the child's chart that a demonstration of the technique of taking an axillary temperature was done and that the caregiver verbalized understanding of the procedure.*

(Source: Moren-Novitt, 1997)

Alternative Educational Resources for Home Management of Pediatric Fever

Educational Videotapes:

The University of Wisconsin Medical School
Patient Education Video Tapes; The Facts about Fever
Order number 020294F \$19.95+tax and shipping

Milner and Fenwick Inc.
Patient Education Videos; When your baby's sick
\$25.95+tax and shipping

Computer based patient education-Web sites:

- www.medsch.wisc.edu/uwhosp/outreach/pohindex.html
- www.ama-assn.org/kidshealth
- www.pediatricneurology.com/febrile.html
- www.drkoop.com/adam/peds/top/003400.html
- *Virtual Hospital web links*
- _____
- _____

Community Agencies/Parental Support Groups

Local Family Independence Agency or Department of Social Services: _____

Local Public Health Department: _____

Parental Support Groups: _____

Women Infants and Children (WIC) and Michigan Infants and Children (MIC):

Red Cross: _____

Local Hospitals-Case Management Departments: _____

Pediatric Follow-up Call Sheet

Child's Name _____ FNP Name _____

Caregiver's Name and relation to child _____

Date of visit and educational intervention _____

Presented with c/o _____

How is child doing now?

Do you have questions regarding your child's fever?

Explain how you would assess your child's physical condition when he is sick?

Describe how you would take an axillary temperature. What temperature suggests your child has a fever?

How much acetaminophen (Tylenol) or ibuprofen (Motrin or Advil) should you give your child and how often? Where would you look to find the proper dose?

What are the risks that overdosing of these medications can cause?

Are you comfortable with when to manage you child at home with a fever and when it is appropriate to see a health professional?

Is there anything else we can assist you with in the care of your child?

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