

Running Head: Work Environment and TAN

Work Environment Effects on Telephone Advice Nursing

By

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ABSTRACT

TITLE: **Work Environment Effects on Telephone Advice Nursing**

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Telephone advice services, which serve 100 million clients in the United States, are part of the health systems' efforts to improve access while encouraging self-care. The service provides resources to assist members in their own care, thus increasing efficiency and lowering costs of services. No research has addressed the work environment of telephone advice nursing (TAN). Identification of factors in the work environment that influence nursing practice could allow nurses in advice services to organize practice to better support patients.

The goal of this research was to describe the relationship between the work environment in TAN call centers and patient outcomes. A national health maintenance organization (HMO) undertook a significant study of telephone advice practice and patient outcomes. The study reported here is a secondary analysis of findings from that study. Study aims were: (1) to determine if ADVICE sites were a unique predictor of the work environment scores beyond nurse characteristics, (2) to determine if ADVICE sites were a unique predictor of patient outcomes beyond caller characteristics, and (3) to determine if there was a relationship between work environment scores and patient outcomes beyond both nurse and caller characteristics.

The setting included centralized advice sites in three regions of the United States. Ninety-six nurses completed questionnaires. Eighteen of these nurses recorded 1,068 calls from HMO members. Each caller agreed to have the call recorded then complete a questionnaire for analysis. Calls were recorded from August 2001 through February 2002.

Measures used were the work environment scores, patient outcomes, and covariates of nurse and caller characteristics. Work environment scores were five subscales from the nurse questionnaire including collaborative relationships, organizational support, work stress, communication, and autonomy/control of practice. Patient outcomes were four measures from the caller questionnaire and the call description of the recorded call. Outcomes were the callers' understanding of the interaction (CUI), the callers' experience of the interaction (CEI), overall satisfaction, and follow-through with offered advice. The CUI was a comparison of what the caller understood of the advice offered and what was identified from the recorded call. The CEI compared what was important to the caller in the advice call and what they actually received. Covariates were characteristics of nurses (nurses' education, years of RN experience, and years working in TAN) and characteristics of callers (years of HMO membership, years of education, use of the Internet for health information, and number of times the member called the advice service in the past 12 months).

A MANCOVA revealed overall differences among work environment scores and sites, $F(10, 154) = 3.145, p = .001$. There were statistically significant differences on three of the five work environment subscales: autonomy/control of practice, $F(2, 81) = 7.580, p = .001$, communication, $F(2, 81) = 5.251, p = .007$, and work stress, $F(2, 81) =$

4.376, $p=.016$. A MANCOVA indicated differences in caller outcomes among sites, $F(8, 1710) = 2.207, p = .024$. Of the individual sites, only the CEI, $F(2, 858) = 5.753, p=.003$, was significant. A hierarchical linear model (HLM) was used to assess relationship of the work environment scores to patient outcomes. The CUI was inversely related to the highest degree in nursing, $t(7) = -4.251, p<.01$ and years employed as a registered nurse, $t(7) = -4.297, p<.01$. There was a significant difference in the CEI in the Mid-Atlantic site compared to the Northwest site, $t(7) = 5.680, p<.01$. However, work environment scores were not related to patient outcome measures in this study.

Findings suggest that the work environment is a factor in TAN sites. Study of the work environment can guide managers with information to design training programs, quality assurance methods, and protocol use. The nurse appears to act as a buffer between work environment concerns and patient outcomes ensuring patients receive needed advice and contribute to caller satisfaction.

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Chapter One: Introduction

Telephone advice is a growing area of specialty nursing practice (American Academy of Ambulatory Care Nursing (AAACN), 1997; Blanchfield, 1996; Lazarus, 1997). It is intended to support prompt and efficient responses to callers' questions, enhance self-care ability, manage demand by directing callers to the appropriate level of care, assist in managing costs of care, and improve satisfaction with health plans (Greenberg, 2000; Valanis et al., 2003a). More than 40,000 calls are handled monthly in each regional call center of one national health maintenance organization (HMO) (Personal communication from Christine Tanner, RN, PhD, July 30, 2002). Indeed, it is estimated that 100 million Americans use telephone advice nursing (TAN) services each year (Crouch & Dale, 1998b; Sabin, 1998). These 100 million callers have concerns about their health, and they seek support in making healthcare decisions.

To provide advice in relation to a health care, the nurse must perform a non visual assessment related to the stated concern, devise an action plan, and identify alternative courses of action and possible consequences of each, then help the caller choose the most appropriate or workable actions in times of health care concerns (Edwards, 1998). Callers also use the telephone advice service to refill prescriptions, schedule appointment, and learn the results of laboratory tests. However, these uses do not require a nurse's professional skill. Instead, true advice services necessitate knowledgeable assessment by a nurse, and interventions of a nurse to advise the caller about what to do, whom to call, or where to go. The nurses' ability to advise—and lend a sympathetic ear—is a vital part of professional nursing practice.

The advice nurse connects the health care organization and appropriate care services. The nurses' work environment can constrain and limit the outcome of this interaction. This environment can influence the ability of the nurse to assess patient problems and help the patient find reasonable solutions. By identifying the influencing factors of the work environment in advice services, nurses in ambulatory settings can better organize advice practice to support advice services and utilize the comparable literature from inpatient settings to support practice improvements.

Previous research has found that the effectiveness of nursing practice is linked to the environment in which the practice is performed (Aiken & Sloane, 1998; Aiken, Sloane, Lake, Sochalski, & Weber, 1999; Aiken, Sloane, & Sochalski, 1998). Nurses repeatedly express concerns over autonomy and control of their professional practice environment and autonomy, management and leadership of the organization that provides support for nursing initiatives, and collaborative relationships with other health care providers (Aiken, Havens, & Sloane, 2000; Havens, 2001; Kramer & Schmalenberg, 2002b; Scott, Sochalski, & Aiken, 1999). These vital elements significantly influence the nurse's ability to provide care. To date, however, very little research has addressed the work environment of nurses involved in TAN.

For this study, the definition of work environment is the overall context where work is performed, including elements such as nurses' control of professional practice responsibilities and other aspects of autonomy, as well as managerial support and the ability to sustain collaborative relationships. This definition is derived from a number of sources, including research on organizational climate and on magnet hospitals. Studies of both organizational climate and magnet hospitals have found common elements for work

environments (Kramer & Schmalenberg, 2002b; McClure, Poulin, & Sovie, 1983). Elements in magnet hospital studies such as the nurse's control of the professional practice environment and his or her autonomy, reflect properties of structure, responsibility, risk, standards, and identity, found in organizational climate research (Moos & Schaefer, 1987). In magnet hospitals, "management support" mirrors the reward and support ideal that is used in organizational climate constructs. In magnet hospitals, collegial and collaborative relationships with other healthcare professionals are similar to the organizational climate concepts of responsibility, warmth, standards, conflict, and identity.

While much is known about optimal work environments in general and optimal work environments in healthcare professions in particular, the work environments of TAN have rarely been studied. One recent inquiry, the ADVICE study, supported by a national HMO, studied telephone advice services. Investigators in this study linked advice nurses with callers' perceptions of the advice call, outcomes from the advice call, characteristics of the setting in which advice practice occurred, and nursing perceptions of the advice setting that may influence advice practice. Conducted in two phases, the correlation study used the structure-process-outcome model (Donabedian, 1980) and focused on a comparison of centralized and decentralized call center models, while including other variables that might affect TAN practice and outcomes.

During the initial development phase of the ADVICE study, a literature review identified areas of investigation in advice nursing practice. While gathering background information for the study, the investigators confronted barriers to understanding the process of advice practice. Since it was deemed that additional information was needed

about the structure of advice services, focus groups were arranged and held (Valanis et al., 2003a). The ADVICE study focus groups reported a number of concerns about the practice environment in TAN. Using ADVICE study data from focus groups, the investigators developed a questionnaire for nurses working in the advice setting to assess their perceptions of the work environment in advice practice. The ADVICE study used the perceptions of the work environment and their identified study outcomes in their analysis of the data. Interestingly, the ADVICE study focus groups raised the same concerns as the review of nursing work environment literature (Aiken & Patrician, 2000; Kramer & Schmalenberg, 2002b; Laschinger, Sabiston, & Kutszcher, 1997), namely work-related stress, collaboration with primary health care providers, autonomy in nursing practice, and perceptions of levels of organizational support.

The purposes of this dissertation are to address characteristics of the work environment questions about in advice practice settings and to assess their influence on the outcomes of TAN. Specifically, I asked (1) Are ADVICE sites a stronger predictor than nurse characteristics of the nurses' perceptions of the work environment? (2) Is there a difference in patient outcomes across TAN sites when controlling for caller characteristics? (3) Is there a relationship between nurses' perceptions of their work environment and the outcomes of the caller's understanding of advice, their expectations of the advice interaction, their overall satisfaction with advice services, and their follow-through with offered advice when controlling for both nurse and caller characteristics?

I assume that if the work environment is a reflection of the organizational culture, differences in environment perceptions between work sites may be found despite individual characteristics of the advice nurse. Additionally, I assume that if the site

differences influence patient outcomes, outcomes may vary between sites despite the practice standards employed or differences found in patient characteristics. Finally, I assume that if the work environment perceptions influence advice nursing practice, differences in patient-related outcomes could be seen.

Chapter Two: Review of the Literature

The purpose of the research was to study advice practice settings and assess the influence of work environment on outcomes of TAN. Advice nurses in the ADVICE study identified several factors that they felt influenced their practice. These concerns included access to patient medical record information, consultation with advice peers, and restrictive protocol requirements (Moscato et al., 2003; Valanis et al., 2003a). The ability to work around these types of constraints to give the caller the advice needed is an essential skill of the advice nurse and a requirement of the setting in which he or she practices. Issues that influence caller satisfaction with advice services and the caller's ability to follow the advice offered are very important to the usefulness of the service. In the pilot work for the ADVICE study, callers identified several important aspects of the interaction with the nurse to understand the caller's particular problem, individualize the response to the patient concern, and provide the caller with information, reassurance, or support from the interaction. Healthcare organizations presume that if callers do not receive what they are seeking from an advice service, the service will not meet the caller's satisfaction, and they may or may not follow-through with the advice recommended (Hagan, Morin, & Le'pine, 2000). If this is the case, the caller's satisfaction with the healthcare provider may decrease and lead the caller to explore other service providers.

In this chapter, I review the literature surrounding telephone advice nursing practice and work environment issues. Specifically, I first (a) describe and review the findings from the preliminary phase of the ADVICE study that suggest the influence of the work environment in telephone advice practice identified from the focus groups. I

then (b) review the organization of telephone advice settings with a description of the setting, access to information, practice restrictions, management of call centers, and quality assurance programs. I also (c) provide a review of the telephone advice nursing literature. Second, I (a) examine the literature descriptive of work environments found in service-industry call centers, (b) review and synthesize the literature descriptive of best practice in nursing work environments, including the magnet hospital studies, and (c) discuss the key magnet elements pertinent to telephone advice nursing practice. Third, I review literature related to outcome criteria found to indicate (a) caller understanding of offered advice, (b) experience of the caller, (c) satisfaction with advice services, and (d) follow-through with advice. Finally, I conclude with a description and analysis of the structure-process-outcome model and the application of the model to the ADVICE study and the work environment study.

Telephone Advice Nursing

The ADVICE Study Focus Groups

In the ADVICE study, investigators linked advice nurses with patients, characteristics of the practice setting, patient's perception of the advice call, outcomes from the advice call, and nursing perceptions of the advice setting that influence advice practice. Focus groups held as part of Phase I of the ADVICE study included an assessment of advice nurses' perceptions of TAN and the work environment found in TAN. During the dialogue with the participants, it became clear that a more complete investigation was necessary to understand the context of advice practice (Personal communication from Susan Randles Moscato, RN, EdD, March 31, 2003). Nurses in advice were concerned about the limits placed on them by the organization, which they

felt impeded their ability to personalize the interactions with the caller and develop a plan of action to meet the caller's advice need. While they felt they did their best to work both within the system and around barriers, many expressed their concerns about the imposed constraints. The issues identified in the focus groups reflect elements of concern in the nursing work environment literature, specifically research in magnet hospitals (Aiken & Patrician, 2000; Kramer & Schmalenberg, 2002b; Laschinger et al., 1997). The issues of autonomy, control of the nursing professional practice environment, and collegial relationships were of greatest concern (Foley, Kee, Minick, Harvey, & Jennings, 2002; Kramer & Schmalenberg, 2002b; McClure, Poulin, Sovie, & Wandelt, 2002).

Advice nurses commented that work environment restrictions interfered with their ability to meet the callers' needs. Nurses expressed concerns about restrictions in call times, monitoring of call protocol use, limited access to peer consultation, limited information about follow-up care of patients, increased levels of stress, oversight control of their practice, and an inability to move around in the setting or, alternatively, too many responsibilities with little time to rest (Valanis et al., 2003a; Valanis et al., 2003d). They felt constrained in their ability to meet callers' needs and practice to the best of their professional capacity. Cited repeatedly were frustrations about issues of stress, autonomy of professional nursing practice, collaboration with primary care providers, and organizational monitoring and support (Personal communication from Susan Randles Moscato, RN, EdD, March 31, 2003).

The focus group information led the ADVICE study team to develop a questionnaire for nurses working in the advice setting to assess their perceptions of the work environment in advice practice. The questionnaire includes four subscales about

levels of stress, discernment of collaboration with primary health care providers, assessments of autonomy in practice, and perceptions of organizational support.

Organization of Advice Call Services in the ADVICE Study

Telephone advice services may be organized in a variety of ways. Investigators in the ADVICE study observed nurses in ten offices and four call centers in four regions of the country for a total of fourteen sites. During the preliminary ADVICE study, the investigators observed nurses in physician offices and clinics, where the offices provide advice along with other duties included in the office practice. In centralized centers, the only activity of the advice nurse is to give advice. These settings are similar to call centers designed by the airline industry for making flight reservations with work stations focused around computer terminals, notice boards with the number of calls waiting, and restricted movement within the cubicle (Valanis et al., 2003a). Concerns about centralized call centers focus on access to information, practice restrictions, management of the call centers, and quality assurance programs.

Access to information. Sites differ in their ability to connect the nurses to the patient information system and the computer with varying access to the patient record, protocols, providers, and pharmaceutical consultation. Some sites rely on a paper tracking method to refer caller information to primary care providers. While other sites had access to all the medical records, some had no access to a patient medical record and limited access to other member information such as pharmacy, laboratory, or call history (Valanis et al., 2003a).

Practice restrictions. Some sites require systematic adherence to the advice protocol, even if the protocol is not applicable. A report from one setting gave an

example of a patient who complains of chest pain for which the required protocol necessitated specific, detailed questioning. As the nurse explored the complaint, it became clear that the patient had a bad cold but the nurse could not access the 'cold' protocol until they finished with the 'chest pain' protocol. A more prompt disposition could have occurred, in the judgment of the advice nurse, with a change to the appropriate protocol. Other sites use the protocol as reference only. Nurses from focus groups reported that many protocols are often not current, or specific physicians require deviations from a standard protocol (Valanis et al., 2003a).

Management of call centers. According to reports from focus groups, management of call centers also varied. In some settings, advice nurses were free to interact with co-workers, but in others, nurses were restricted in their consultation with peers. In some settings, the supervisor emphasized time targets (e.g., call times, waiting times, abandonment rates, and documentation time) and oversight monitoring of all caller-nurse interactions to ensure the nurses asked the required questions. In one site, the behavior ratings posted for all staff to see were an effort to influence peer pressure and competition. An interesting observation showed that the nurses who were rated as the best advice nurses by their peers received the poorest ratings for required behaviors from their management. In those instances, the nurses reported they did what was best for the patient and ignored personal consequences (Valanis et al., 2003a).

Telephone advice nurses voiced concerns about restricted physical movement. In some centralized settings, the advice nurse was restricted in their inability to move about. They worked in a cubicle devoid of interaction outside of the advice call and found the restriction increased their discomfort. Some nurses may work in the call centers because

of an inability to do a more physically strenuous job, but found the movement restrictions difficult. Increased muscle or joint fatigue is a problem. In contrast, advice nurses working in decentralized call centers were rarely able to rest due to their multiple other responsibilities found in usual office practice (Valanis et al., 2003a).

Quality assurance programs. In centralized call centers, following the quality-assurance-based model originally used in service-industry call centers, the investigators found advice nurses monitored for the duration of calls, abandonment rate, number of calls waiting, use of protocols, and interaction skills. The quality assurance program emphasized the service aspects but not the actual therapeutic interaction between caller and nurse, nor the outcome of the call. The service aspects of the advice call are important because the callers want to be answered promptly and efficiently, but the essence of the advice call is the relationship established, the assessment done by the nurse, and the appropriateness of the advice given (Valanis et al., 2003d). The current quality assurance approach by itself cannot add to the understanding of how nursing advice contributes to patient outcomes because it focuses on measuring the data of timing, volume, and cost, rather than the relationship established and the health care nature of the exchange. This type of quality assurance monitoring was not a feature of medical offices.

Telephone Advice Literature

A review of the telephone advice and telephone triage literature sheds light on the practice of TAN. This literature describes telephone advice nursing as organized into four areas: (1) research studies, (2) descriptive articles of application of telephone advice

services, (3) articles explaining how to perform telephone advice, and (4) regulation concerns about telephone advice services.

Research studies. Poole and colleagues (1993) found benefits for patients, parents, and pediatric physicians in studies of pediatric telephone advice services. Satisfaction with an After-Hours Program (AHP) to assess and triage parent calls by a pediatric nurse trained in standardized protocols was significant. The subscribing physicians reported 100% satisfaction and the parents reported between 96% and 99% satisfaction depending on a variety of issues. The cost of the program ranged from 1% to 12% of the pediatrician's annual net income and was deemed worth the loss in income for the increase in time off. No adverse patient events were reported in the four years of the program related to nurse assessment, triage, and advice (Poole, Schmitt, Carruth, Peterson-Smith, & Slusarski, 1993).

Kempe and associates (2000) found in a follow-up study of the AHP, decreased level of inappropriate after-hours referrals compared to previous studies. The AHP service staffed by pediatric nurses referred 22.9% of the after-hours calls for urgent evaluation and of these, 90% were found to be appropriate referrals by physician evaluators. The conclusion from these two studies is that nurses working in telephone advice services not only provide an important service, but they make appropriate judgments during the telephone triage (Kempe et al., 2000).

Contrary to other studies, Salk and colleagues (1998) studied the difference in assessment from visual cues, vital signs, and protocols when comparing triage decisions in emergency units of both in-person and telephone interviews. In their two-phase randomized crossover design, every eligible patient underwent sequential in-person and

telephone triage interviews conducted by certified emergency nurses. Each nurse, after taking a history, was able to choose a hypothetical triage designation. Then, the nurse was told the patient's vital signs and was able to select the triage designation again. During phase one the designation was based on the nurse's clinical expertise, while in phase two, the nurse used complaint-based protocols. The study results found poor agreement between in-person and telephone-assessment triage decisions. As a result, the study raises questions about telephone triage as an adequate method of assigning patients to appropriate care levels (Salk, Schriger, Hubbell, & Schwartz, 1998). Threats to the study validity were reported, however. While the nurses were certified emergency nurses, they were not familiar with the use of telephone triage protocols and the protocol used did not increase interrater reliability. The researchers thus expressed concern that the protocols interfered with the natural interviewing and decision process of the triage nurse. This finding supports other concerns about rigid use of protocols (Valanis et al., 2003b).

Crouch and colleagues conducted a literature review and a number of studies in the United Kingdom during the late 1990's to assess the usefulness of telephone assessment and advice as part of the National Health Service (NHS) (Crouch, Woodfield, Dale, & Patel, 1997; Crouch & Dale, 1998b; Crouch & Dale, 1998a; Dale, Crouch, & Lloyd, 1998). They found the computerized decision support tools and skills of the nurses in telephone assessment to be essential in appropriate referrals to emergency settings. Telephone triaging of referrals decreased the number of emergency visits significantly and telephone support for self-care activities managed half of the out-of-hours calls using nursing advice services alone (Dale et al., 1998). Significantly, call durations were used as the primary assessment measure of process and that patient complaints (or lack

thereof) were used as a proxy for patient satisfaction (Dale et al., 1998). Researchers also found telephone services were helpful in follow-up programs and assisted in preventing problems as well as increasing patient and physician satisfaction with the service.

Compliance with advice varied. The explanation for non-compliance commonly presented was a stated lack of understanding or recall of the advice offered (Crouch & Dale, 1998b). A lack of understanding is a repeated concern seen in compliance research studies (Buchmann, 1997; Playle & Keeley, 1998).

Lattimer and colleagues (1998) reported another UK study on the safety and effectiveness of nurse telephone consultation. Previous services had referred calls directly to the general practitioner on call or directed the caller to the local emergency service. In their randomized controlled trial, which extended over a year using telephone consultation with an advice nurse within a general practice cooperative, they found that nurse consultation produces 'changes in telephone call management' for the NHS. The service interceded, redirected the caller during initial questioning, and reduced the workload for general practitioners up to 50%. By changing the management of calls to a consultation with an advice nurse, the telephone service allowed callers faster access to health service and advice without an increase in the number of adverse events (Lattimer et al., 1998). Additionally, Munro and colleagues (2000), found that while the NHS Direct, the advice call service of the NHS, had not reduced the pressure of the NHS for immediate care services, it did restrain the demand on after-hours services for general practitioners (Munro, Nicholl, O'Cathain, & Knowles, 2000).

Hagan, Morin, and Lépine (2000), reported a study from Quebec about Info-Santé CLSC, a telenursing advice program, to address an evaluation of care outcomes. Areas

studied were satisfaction, self-care practices, and cost savings. The province-wide survey was conducted using a stratified random sample of 4,696 callers. Study findings indicated that most respondents were highly satisfied with the service; they followed the nurse's advice and used the self-care recommendations; they felt more self-reliant and thought they could solve the same or similar problems if they should occur again; and they thought the call to the telenursing service was a useful solution to their health problem. Interestingly, the majority of the callers would have turned to another resource if the service was not available and half of the respondents would have sought emergency department care. From this perspective, the service was seen as a mechanism of both direct and indirect cost savings for the province's health system (Hagan et al., 2000).

Greenberg (2000) reported, in a study of telephone advice nurses, that the service using protocols and specially trained and experienced registered nurses was an efficient use of resources and referred patients to appropriate levels of care at the appropriate time. The study reported that 80% of the patients would have sought medical care elsewhere if the advice service had not been available (Greenberg, 2000). This finding, and that of Hagan and colleagues, adds support to the usefulness and cost-effectiveness of providing the service for health plan members.

Huber and Blanchfield (1999) researched the usefulness of telephone advice and the appropriateness of nurses to perform the advice function. They concluded that the interventions performed by nurses in telephone advice, such as information giving, guidance, and teaching, are well suited for nurses. The study identified nursing diagnoses and nursing interventions that the nurse documented with each telephone interaction. They found that while most interactions are brief, the crucial intervention for family

support with the nurse might not be captured in documentation. They suggested the use of the NANDA standardized nursing language to highlight the unique contribution of nursing to advice practice. Huber and Blanchfield also suggested that the recently developed telephone advice practice standards by the American Academy of Ambulatory Care Nurses (AAACN) should be incorporated into advice practice settings. The investigators support the creation and use of a NIC intervention for advice practice, where nurses provide acute interaction interventions (Huber & Blanchfield, 1999).

In a recent review by Omery (2003), research about advice nurse practice was evaluated for the content investigated and the quality of the evidence. An extensive search was conducted, finding 527 articles about advice nurse practice. A full text reviews were performed on sixty-two studies. The literature reviewed presented methodological issues of quality. Most studies were descriptive and many had small non-randomized samples. Recurrent themes arose: delivery and continuity of care, appropriateness of the advice offered, patient/provider satisfaction, disposition/utilization after calls, reasons for calling, cost analysis, the decision-making process, and documentation. Omery found that the advice service could improve outcomes for some chronic disease populations by providing social support, education, and symptom management. While the use of protocols and guidelines did not guarantee standardized care or appropriate advice, the consumer satisfaction ratings were high and appeared to be related to the intervention of a nurse (Omery, 2003). However, she did not report research that described the work environment of telephone advice nursing practice or its effect on nursing interventions.

Descriptive articles. Larson-Dahn (2000) reported the TeleNurse Practice (TNP) Model and described the connections among the nurse, caller/patient, and health concerns (Larson-Dahn, 2000). Essential elements of advice practice address the needs of the patient from primary prevention through secondary prevention to tertiary prevention paradigms. The model offers a helpful overview of practice components of advice nursing.

In a later article, Larson-Dahn (2001) presented additional model segments of standardized practice, documentation, and quality assurance. Larson-Dahn used a quality improvement format with indicators to measure documentation of telephone advice encounters and nursing-sensitive outcomes assuming that the indicators of care and advice would be found in the documentation of the call. Although no connection between documentation and quality indicators were found, the difficulty in capturing adequate assessment through documentation was thought to be related to a number of factors (Larson-Dahn, 2001). Those factors were assessment and critical thinking, patient outcomes, health status, and advice followed. Documentation of nurse-sensitive outcomes was the biggest challenge to efforts to demonstrate the validity and effectiveness of telephone nursing practice, a finding similar to that of Huber and Blanchfield.

Edwards (1998) discussed the ability to create a picture of the patient from the verbal interaction over the telephone. In addition to acknowledging the cognitive process that is bound in context and culture, Edwards described how nurses nevertheless 'built a picture' of the caller and the situation being dealt with. From this, the nurse was able to visualize the person, visualize the pathology, and then visualize the urgency (Edwards, 1998).

Performing telephone advice. A number of articles address the technique of performing telephone advice (Kellner, 2002; Wheeler & Siebelt, 1997; Wheeler, 2000). These articles were written by experienced practitioners in the field and add supportive information to a review of telephone advice practice. Another resource for advice practice is the AACN Standards for TAN.

Briggs (2000) offers telephone triage protocols and the AACN published standards for TAN (Briggs, 2000; Kellner, 2002; Schwarzentraub, 2001), while Wheeler (2002) markets training modules for telephone triage and advice nurses (Wheeler, 2002). Interaction skills, obtaining information, use of protocols, documentation, legal concerns, avoiding pitfalls, and caring at a distance are developed in practical guides (Wheeler & Siebelt, 1997). Rutenberg (2000) offers an article to guide assessment through the nursing process for telephone triage. Rutenberg gives a template for clinical decision-making, thus assisting the advice nurse in assessing the problem presented in a call (Rutenberg, 2000c).

In the descriptions of advice practice reviewed, however, no recommendations are given for the work settings where advice is practiced.

Regulatory concerns. An editorial in the Lancet described concerns about nurse telephone triage (2001). Citing the paucity of research about outcomes of advice practice, issues of actual cost savings and practice encroachment were raised. Although the service is growing quickly, the editors worried about the danger of a rapid expansion without proper evaluation.

Further, legal questions of practice restrictions differ among states, and nurses in telephone advice who work in catchments encompassing more than one state have raised

concerns. As a risk management issue, licensure in all states connected to a call area might be necessary (1999). In addition, the definitions of telephone triage and advice nursing vary among states. State boards may regulate this specialty practice differently. The advice offered is governed by the practice board's regulations and can thus change between jurisdictions (Rutenberg, 2000a; Rutenberg, 2000b). Regulations of advice nursing require protocol use and specific training of advice nurses, with restrictions on what the nurses can say and advise (1999; 2001; Coleman, 1997)—with variations among states.

Emergency nursing associations support advanced training for telephone advice and triage nurses, describing it as an area of specialty practice (Rutenberg, 2000c). These advocates have raised concerns about the inflexibility and limitation of protocol use, since such protocols may conflict with sound nursing judgment and lead to poor patient outcomes (Rutenberg, 2000c). While regulatory control of practice is important, imposition of restrictions can restrain professional nursing practice in such a way as to limit the usefulness of some advice services.

Summary. The research overwhelmingly attests to the usefulness of telephone advice nursing through appropriate triage, cost savings, patient, parent, and practitioner satisfaction, and resource utilization (Ballard, 1997; Egleston, Kelly, & Cope, 1994; Sabin, 1998; Shekelle & Roland, 1999). Practice standards have developed over time and resources are available to train advice nurses. Regulatory concerns continue to offer challenges to advice organizations. But nothing published has addressed the environment or context within which advice nursing is practiced except the ADVICE study (Valanis et al., 2003a). The literature acknowledges the skill of the nurse in offering advice and the

appropriateness of the use of protocols, training, and resources, but no research or standards address the practice environment.

Work Environment

Service-industry Call Center Literature

While nursing research has not specifically addressed call centers, another body of literature does exist. In the area of service-industry management, research has focused on (1) call centers characteristics, (2) call center stress, (3) staff retention, and (4) customer satisfaction. There are many commonalities between complaints from the service-industry management studies and concerns voiced from the ADVICE focus groups.

Call centers characteristics. Work environments in the service-industry, specifically call centers, have been criticized frequently for harboring a 1990s version of Taylorism that is the classical management theory of strict control of all work practice (Arkin, 1997). Environments with cubicles in row after row apply pressure to call center employees (Gustafson, 1999). They are impersonal and restrictive, focused on a computer screen with a headset telephone attached, and constantly remind workers of how many calls are waiting and how long the current call has taken.

Call center staff have complained of pressure to keep up with quotas while retaining little influence over their work practice. Call centers have been plagued with rapid turnover, stress, poor pay, and constant management oversight. A Victorian 'work-house' mentality has influenced perceptions of call centers (Arkin, 1997). Now, call centers are being designed to provide an environment that will attract employees to the job, as well as features within the physical plant that are conducive to employee comfort

and satisfaction. The rows of uniform cubicles are passé. High quality facilities are aimed at reducing attrition and maintaining production (Read, 1998).

Call center stress. High levels of stress challenge the call center employee, frustrated customers, high volumes of calls, and the expectation that the employee will solve the problem satisfactorily while the caller is on hold all the while aware that more calls are waiting for attention. To underscore the situation, Deeks (2000) reported that Inland Revenue in the UK provides stress counseling to staff in the call centers in an effort to retain experienced staff and improve the image of the department (Deeks, 2000).

DiTecco, Cwitco, Arsenault, and Andre (1992) reported a study conducted in the telecommunication industry that reviewed stress factors for telephone operators. The sample of more than 700 operators had a response rate of 88%. The investigators measured perceived stress, management practices, specific job stressors, and monitoring preferences. The study found that individual-call-time objectives set by management create conflict with management demands for quality and quantity. Some operators considered these objectives unachievable. Additionally, conflict between workers' values of quality and managers' value of productivity appear to be the most stress-inducing part of the job. Significantly, operators linked job stress most strongly to call-time pressures. Seventy percent of the operators felt that call-time limitations made it difficult to serve customers' needs and contributed to their feelings of stress. The study also reported that telephone monitoring contributed to the stress of the job and 44% of the operators preferred no monitoring (DiTecco, Cwitco, Arsenault, & Andre, 1992). The study raised conceptual issues of autonomy and control of the work environment.

Arkin (1997), also reported some service-industry research finding a significant relationship between levels of perceived control of the pace of the work, an employee's job satisfaction, and stress. The implementation of greater autonomy in call center settings has reduced stress without affecting productivity. He reported that the more controlling the environment, the greater the level of perceived stress. Likewise, researchers found that, with greater flexibility, the staff were more creative and motivated. Besides autonomy, compensation and flexible working patterns have improved call centers as attractive places to work (Arkin, 1997).

Staff retention. Gustafson (1999) reported that turnover could exceed 60% in Patient Financial and Services (PFS), which can be costly for the organization. Complaints include a laundry list of concerns. A stressful environment with arbitrary, unrealistic quotas, low and noncompetitive salaries, high inquiry volumes, and hostile customer attitudes incite dissatisfaction. Employees relate with "empathy distress" (personal anguish resulting from trying to respond to people in difficult personal situations) to caller concerns. Organizational inefficiencies of inadequate technical and customer interaction training, lack of independent authority to resolve issues without management approval, and the absence of an organization-wide, accountability-driven, commitment to customer service excellence influence employee turnover rates (Gustafson, 1999).

Franklin (2000) offered a number of suggestions for hiring and retaining good call center employees including finding the right personality for the job, providing effective training, inventing techniques for handling high call volumes, and networking with peers in the call center. The right personality is someone who is positive, sympathetic, and

focused on problem resolution but not confrontational. These personality traits are encouraged in the nursing profession as well. Franklin (2000) posits that training should include more than initial orientation—that it should also provide ongoing courses on systems, products, processes, and customer service. Interestingly, this type of ongoing course work is also the educational support requested by magnet nursing organizations (Aiken, 2002; Kramer & Schmalenberg, 2002b). Furthermore, managers also benefit from ongoing training. Managers can learn from each other and network to share ideas and information. Learning a variety of approaches from different business settings to address call center issues is seen as enriching to all (Franklin, 2000).

High call volumes can be very stressful, so some settings work at keeping the stress low by creating fun in the setting and have, as a result, shown improved staff retention. One center uses a ‘fish’ philosophy, with plastic fish, candy fish, fish blowups, etc. creating an atmosphere unique to their work setting. The shared fun enlivens the environment and engages the call center employees (Franklin, 2000).

Efforts have also been made to reverse turnover trends in call centers – which can reach as high as 80% - by providing sauna, swimming pools, and subsidized restaurants (Whitehead, 1999). In the end, to retain employees, the salary has had to improve and the environment has had to address concerns such as ‘repetitive brain injury’, which is an ongoing stressful condition of the work environment that causes brain damage (Whitehead, 1999).

Customer satisfaction. Well-staffed call centers have improved customer satisfaction, decreased call-abandonment rates, and faster answering with decreased wait times (Gustafson, 1999). Feinberg, et al (2000), reported a study of operational

determinants of caller satisfaction in call centers. Of all the operational determinants, only “percentage of calls closed on first contact” and “average abandonment” had even a weak relationship to caller satisfaction (Feinberg, Kim, Hokama, de Ruyter, & Keen, 2000).

In efforts to address customer satisfaction, some call centers have adopted the practice of having the customer service representative who answers the call be responsible for solving the customer’s problem (George & McClain, 1998). In this way, the customer is not passed around and has a sense of someone caring about the problem. The practice has shown to be cost-effective and augments satisfaction for the customer (George & McClain, 1998; Sambandam, 2001). In essence, the relationship developed between the caller and the customer service representative is the basis of any customer satisfaction. The same can be said of advice nursing practice.

Best Practice and Work Environment

Paradoxically, poor business environment practices discussed above, which were imported into telephone advice nursing at the inception of advice programs, contradict the components of the positive work environment identified by Moos for the business setting (Moos & Schaefer, 1987). Moos and Schaefer (1987) considered a diverse array of job-related and personal factors that influence the healthcare work environment. They suggest that staff morale and performance can influence the treatment milieu and the quality of healthcare. Physical features, organizational structure and policies, and suprapersonal and task factors help shape health care work climates. The Work Environment Scale (WES) developed by Moos has outlined dimensions to measure a supportive work climate. The scale includes relationship dimensions of involvement, peer

cohesion, and supervisor support; personal growth dimensions of autonomy, task orientation, and work pressure; and system maintenance and system change dimensions of clarity, control, innovation, and physical comfort (Moos & Schaefer, 1987). These dimensions resonate with factors identified in both the magnet hospital literature (Aiken, 2002; Kramer & Schmalenberg, 2002b) and in supportive work settings in other fields of the service-industry (Denison, 1996; Reichers & Schneider, 1990).

Since the structure of service-industry call centers was implemented into telephone advice nursing in the 1970s, it has had mixed results. Although TAN has been seen as a valuable addition to health care plans, work environment constraints affect individualization of advice. The advice nurses in the ADVICE study focus groups reported problems of dissatisfaction similar to those found from critiques of the call centers in service-industry settings (Valanis et al., 2003a). These concerns were directed at the management of advice practice, but not at the technology of the settings. The focus group nurses felt they could be more responsive to caller concerns if they were permitted to use their professional judgment, with a professional level of autonomy, for the patient population they serve (Valanis et al., 2001).

It appears that when implemented into healthcare, the call center's rigid quality assurance service-industry model has not always worked, in light of the professional relationship needed for the advice nurse to provide care over the telephone and address callers' needs. In telephone advice, a key component in the delivery of care is the ability of the nurse to inform and deliver the information. The skill of the advice nurse to address the caller's concerns is predicated on the development of a therapeutic relationship (Larson-Dahn, 2001). If the work environment creates a barrier to

assessment, interaction, planning, and advice, the result may be that callers less consistently follow-through with the advice given. Callers may question the reliability of the advice, and doubt can interrupt the follow-through. If, however, the nurse has fostered a trusting relationship and the patient believes the advice offered is credible, there is a greater chance the advice will be followed. Because of the referent authority of the advice center that represents the physician and the healthcare organization, the nurse can act as the authoritative practitioner to provide care in as short a time as a telephone call (Greenberg, 2000).

In settings such as customer service centers and hot lines, efforts to improve the work environment have had good results (Feinberg et al., 2000; Whitehead, 1999). Increased autonomy, flexible hours, managerial support with decreased restrictive surveillance, and collaboration with co-workers have helped improve service-industry call centers in customer service settings. Kinnie et al. (2000) found that a combination of fun and surveillance accounted for higher commitment and quality of performance than did rigid control of the work force (Kinnie, Hutchinson, & Purcell, 2000). Interestingly, the valued changes in customer service-industry call centers in recent years reflect basic interaction skills that are usual therapeutic nursing practice.

The relationship between a health care provider and a patient is unique when compared with any other call center interaction. The caller to telephone advice services is concerned about a medical or health problem. In the event of a health concern, callers are understandably more anxious than they would be if they called a different call center to complain, for example, about a heating bill. TAN calls often require only self-care management, but at the heart of the relationship is the interaction between the nurse and

the caller. The ability to listen to the concern and offer relevant individualized advice is the issue. An accurate assessment is necessary for triage decisions as well as self-care advice and reassurance (Edwards, 1998). Previous research has found customers to be satisfied with advice services because someone with knowledge has listened to them and told them what they could do about their health concern (Franklin, 2000; George & McClain, 1998). Taking the time to listen reduces the anxiety of the caller (or any customer) and creates the rapport required for health care delivery (Greenberg, 2000). A rushed atmosphere, with call-center restrictions imposed by a quality assurance indicator focused on call times, can limit the interaction needed for a complete assessment.

Magnet Hospital Studies

The magnet hospital studies and other relevant literature were reviewed to find important constructs for professional nursing practice and patient care outcomes in an effort to discover both evidence of best practice standards and elements of the work environment in nursing that supports practice. The vast majority of the studies to date that focus on work environments in nursing practice are from the inpatient setting. No studies were found that explored the work environment of telephone advice practice prior to the ADVICE study.

The American Academy of Nursing (AAN) commissioned a Task Force on Nursing Practice in Hospitals in 1981. It was charged to “examine characteristics of systems impeding and/or facilitating professional nursing practice in hospitals” P. 1, (McClure et al., 2002). McClure and colleagues (1983) studied and awarded 41 hospitals “magnet hospital” status, based on their ability to attract and retain nurses in highly competitive markets (McClure et al., 1983). The magnet hospital literature is an

interesting and complex body of work that describes the conceptual growth of magnet hospital since the mid 1980s. As an icon of the model hospital in the provision of nursing care - - and measured by recruitment and retention of staff - - the magnet hospital concept serves as an industry benchmark for the best nursing work environment.

Since first reported, the magnet hospital concept has been studied extensively (2000; Aiken et al., 2000; Brickman, 1998; Curran, 2000; Dugger, 1998; Fosbinder, 1995; Jones-Schenk, 2001; Kramer, 1990; Kramer & Schmalenberg, 2002b; Kramer & Schmalenberg, 2003b; Kramer & Schmalenberg, 2003a; Laschinger, Shamian, & Thomson, 2001; Rothrock, 1998; Scott et al., 1999; Upenieks, 2002). Follow-up research (McClure et al., 1983) has compared the original magnet hospitals to newly designated magnet health care institutions and non-magnet hospitals (Aiken et al., 2000; Aiken, 2002; Havens, 2001; Kramer & Schmalenberg, 2003b; Kramer & Schmalenberg, 2003a; Upenieks, 2002). Recent studies have found that magnet hospitals have significantly better patient care results, with decreased levels of complications in Medicare patients and improved status of AIDS/HIV patients (Aiken, Smith, & Lake, 1994; Aiken, Sloane, & Lake, 1996).

Magnet hospitals have positive patient outcomes that include decreased lengths of stay, fewer complications, and higher patient satisfaction than non-magnet hospitals (Aiken et al., 1994; Havens, 2001). Moreover, magnet hospitals have a more educated workforce who have worked at the magnet hospitals longer than their non-magnet peers (Havens, 2001). Staffing found in magnet hospitals and clinical practice is also better, with higher levels of job satisfaction (Scott et al., 1999; Upenieks, 2002).

An article by Aiken and colleagues (2003) highlighted improved patient outcomes of mortality and failure to rescue when hospitals employed more BSN nurses and improved staffing ratios. They were able to quantify the number of BSN nurses and patient to nurse ratio needed for improved patient outcomes by a logistic regression analysis of surveys completed in Pennsylvania (Aiken, Clarke, Cheung, Sloane, & Silber, 2003). Although their study supports higher levels of nurse education, specific nurse activities were not identified and the relationship explored was at the organizational level and not at the individual nurse/patient level. More study in this area is needed to fully define callers' expectations in light of the advice nurses' work environment concerns.

With another perspective, Sengin (2003) reviewed the work-related attributes of registered nurse job satisfaction in acute care hospitals. The author identified ten attributes: autonomy, interpersonal communication and collaboration, professional practice, administrative and management practices, status and recognition, job and task requirements, opportunity for advancement and promotion, working conditions and physical environment, pay, and fairness (Sengin, 2003). The author suggests that, in light of the nursing shortage, nursing administrators should formulate strategies focused on these attributes to enhance job satisfaction. Sengin's attributes are interestingly similar to the valued elements of the magnet hospital concept in nursing practice. Discussed below are elements, which contribute to the magnet hospital strengths.

Autonomy and control of the practice environment. Autonomy and control of the practice environment are two elements frequently found in studies of work environments. These elements are distinct, yet strongly connected in the work environment (Laschinger et al., 2001; Nakata & Saylor, 1994) and they are often measured together (Dwyer,

Schwartz, & Fox, 1992). Investigators of magnet hospital studies find that professionals are more satisfied with their work when they have control of their practice environment. The control over nursing practice is a combination of professional and clinical autonomy (Kramer & Schmalenberg, 2003a). Control of the professional practice environment is the freedom to make decisions and clinical judgments within a scope of practice; independence and discretion in scheduling the work to be accomplished; and exercising choice in procedures to be done (Kramer & Schmalenberg, 2002b). The decision-making and action on those decisions reflect control of professional nursing practice.

Similarly, autonomy is defined as the degree to which the job provides substantial freedom, independence, and discretion for the employee to carry out the assigned task or the ability to do what one has been educated to do (Dwyer et al., 1992). Others define autonomy as freedom to practice or control over work (Kramer & Schmalenberg, 2003b). Autonomous practice based in experience and knowledge has an empowering effect on the health practitioner (Laschinger & Havens, 1996). The empowering effect of autonomous practice is seen as a demonstration of trust in the employee and can support the organization through the employee's trust of management (Laschinger, Finegan, Shamian, & Casier, 2000). The establishment of trust is related to job satisfaction (Laschinger et al., 2001).

Irvine, Leatt, Evans, and Baker (1999) studied staff empowerment. They developed a measure validated via factor analysis, reliability estimation, and validity assessment; this measure included assessment of empowerment, leadership behavior, organizational citizenship behavior, and job behavior related to quality improvement. The three dimensions found in the factor analysis were labeled behavioral, verbal, and

outcome empowerment. Coefficient alphas ranged between .83 and .87. The identified dimensions were positively related to leadership behavior that encouraged self-leadership and negatively related to directive leadership. Discrimination between empowerment at management and non-management levels was compared. The empowerment score predicted organizational citizenship and job behaviors related to quality improvement (Irvine, Leatt, Evans, & Baker, 1999).

Autonomy and control over nursing practice were found to be higher in new magnet hospitals than in the original group of 41, with less burnout and greater job satisfaction than found in the older hospital group using the Nursing Work Index – Revised (NWI-R) (Aiken, 2002). Aiken and Sloane (1998) measured organizational traits of hospitals by studying nurses, because nurses are at the hub of interactions with most key groups in a hospital (Aiken & Sloane, 1998). The studies found the greater the control that nurses had of the clinical practice environment, the better the patient outcome and the more cohesive the work environment, as measured by was by using decreased length of stay, fewer complications, higher rates of patient satisfaction, and better job satisfaction.

Some have questioned whether the perceptions of magnet hospital work environments are due to better staffing alone (Curran, 2000). Staffing is only one measure of difference in magnet and non-magnet hospitals. The paradigm of the magnet hospital focuses on much more. Aiken and colleagues (2000) found, when judging the quality of patient care, that 43% of the nurses in new magnet hospitals (versus 21% in the original magnet hospital study) described the quality of care to be excellent, a percentage that reflects changes in the current health care management systems.

A significant component of the magnet environment is the increased autonomy and control of the professional nursing practice environment, with powerful nurse executives. Adequate support services and high quality care are also important components (Aiken et al., 2000; Curran, 2000). In a magnet environment, nurses are more satisfied, retained longer with sustained staffing levels. The nurse executive can influence staffing levels for hours per patient day (HPPD), thereby indicate management support and professional practice control (Hinshaw, 2002).

Management support. Management support within the work setting makes a significant difference in retention and involvement of the employee (Hines, 1996; Kennerly, 2000; Kramer & Schmalenberg, 1993; Upenieks, 2002). The organization shows management support by exercising the power to nurture and augment the practice of nursing. The positive characteristics of support are those that attract and retain nursing staff (Hinshaw, 2002). Support can range from developing continuing education courses for nursing staff to supporting a nursing employee during a conflict with a physician colleague (McClure et al., 2002). In magnet hospitals, "a strong, consistent administrative support is seen as a decentralized structure with clinical decision-making and control over practice devolved to the frontline nurses and a participative management style by visible, influential nursing leaders at the executive and unit levels" P. 99, (Hinshaw, 2002).

As health care organizations have changed, so have the roles of the nurse leader/manager. The nursing leader in a magnet hospital, as part of the executive team, is expected to provide a vision and set the direction for the organization in quality patient-centered care. When the visionary plan is shared with the unit leader and, later the unit staff, the nursing staff can implement the plan with close coordination and support of the

unit manager and chief nursing executive (Hinshaw, 2002; Kramer & Schmalenberg, 2002a). The participatory nature of the team interaction is the essence of magnet management support.

McClure and colleagues (1983) found that the specific key components in the magnet work environment that allow involvement are a flat organizational structure, unit-based decision-making process, influential nursing executives, and investment in the education and expertise of nurses (McClure et al., 1983). Techniques such as shared governance can be implemented through participatory organizational frameworks. Shared governance allows nurses to control their work and puts the power of operational control into the hands of the practitioners in the work group. With the power to control and change as well as the responsibility for the outcomes, nurses have greater unit and organizational commitment in areas where shared governance is employed (Jones, Stasiowski, Simons, Boyd, & Lucas, 1993; Prince, 1997).

Kennerly (2000) reported a study of shared governance implementation. The results revealed high levels of job satisfaction, perceived effectiveness, and organizational commitment both prior to and after implementation of shared governance. An interesting but unexpected finding was a return to pre-project levels of autonomy at 18 months after implementation. A ceiling effect may have been responsible for the decrease - along with interactions with other variables tested - due to high perceptions of autonomy at the beginning of the study. Though not always successful, principles of shared governance, as an example of a participative organization technique, do support the employee (Kennerly, 2000).

Stumpf (2001) compared governance types and patient satisfaction using a structure-process-outcome model. She used governance type (shared governance and traditional governance) as structure, nurse work satisfaction and nurse retention as process, and patient satisfaction as outcome. An analysis of the data found that patients cared for by registered nurses working in a shared governance model were more satisfied than patients cared for by nurses working in a traditional governance framework. The implication is that nurses' behaviors (culture) promote patient satisfaction and governance types can influence and promote positive nursing behaviors and culture (Stumpf, 2001).

Collaborative relationships with health professionals. Also seen as an essential element of work environment are collaborative professional relationships (Caruso & Payne, 1990). Collaborative relationships are defined as relationships that are good or great, where staff works well together with willing cooperation based on mutual trust, respect, and power, but where the physician's power is greater (Kramer & Schmalenberg, 2002b). Additionally, a collegial relationship is one in which relations are excellent and based on different but equal power and knowledge (Kramer & Schmalenberg, 2002b). Creation of the team and teamwork encourage all levels of care providers to perceive ownership of the environment and support organizational commitment and performance of activities vital for patient care. Collaborative and collegial relationship development is an essential element of a magnet hospital (Kramer & Schmalenberg, 2002b).

Studies in critical care have repeatedly found that a collaborative relationship as an element of the work environment, affects patient outcomes (Baggs et al., 1999; Koerner, 1992). Baggs, et al, (1999) reported a study conducted in a Medical ICU that

found nurses' reports of collaboration about patients' preparedness for transfer from the intensive care unit were associated positively with patient outcomes. No other associations between individual reports of collaboration and other patient outcomes were found in the study and nurses viewed the interaction as more meaningful than physicians (Baggs et al., 1999).

Collaboration between physicians and nurses in intensive care units significantly affect patient outcomes. Koerner (1992) reported that higher levels of physician-nurse collaboration were related to lower predicted death rates, lower risk-adjusted length of stay, decreased nurse turnover, and the perception of more effective family teaching (Koerner, 1992). In another study, Felten and colleagues (1997) found that interdisciplinary rounds were an effective strategy for planning patient care. Decreases in the patient length of stay and hospital costs were also attributed to the jointly held rounds. Nurses and medical students, as well as resident physicians, expressed their appreciation for the opportunity to question, learn, and increase interdisciplinary contacts. The coordination of care in their general surgery service, while challenging, was also rewarding for patient outcomes (Felten, Cady, Metzler, & Burton, 1997).

The magnet hospital studies found that positive relationships with peers are linked to all forms of group cohesion (Leveck & Jones, 1996; Scott et al., 1999). As stated by Havens and Aiken (1999):

The organization of nurses' work is a major determinant of patient and staff welfare. Magnet hospitals have demonstrated organizational attributes that enable nurses to fully use their knowledge and expertise to provide high-quality patient care. The empirical evidence that this type of organization produces better patient

and staff outcomes is compelling. Therefore, when hospitals reconfigure the delivery of care, the organizational form found in the magnet hospitals should shape systems to promote desired outcomes. (p.14)

Outcomes

Outcomes reported in the literature related to work environments address not only patient outcomes but also nurse outcomes such as job satisfaction. This study focuses on patient outcomes of caller understanding of advice, caller expectation of advice, overall satisfaction with advice services, and follow-through with telephone advice. It is clear that the work environment influences nursing practice. What is less clear is the impact it has on patient outcomes, although the literature suggest a link through environment effects on nursing care provided to patients (Aiken et al., 1999; Aiken, 2002; Blegen, Goode, & Reed, 1998; Buerhaus & Needleman, 2000; Cho, 2001; Stumpf, 2001).

Aiken et al. (2002) presented data from a number of studies that matched magnet to non-magnet hospitals for Medicare discharges. The mortality rate for magnet hospitals was 7.7% lower for the magnet hospitals when controlled for hospital characteristics such as teaching status, technology availability, board certification of physicians, and presence of an emergency room. Even after further adjustment to take into account severity of illness, the mortality rate of the magnet hospital was 4.6% less than the non-magnet comparison hospitals. The findings suggest that the same factors that identify hospitals as effective in the organization of nursing care are also associated with reduced mortality (Aiken, 2002). Clearly, the environment plays a role in patient outcomes.

Blegen, Goode, and Reed (1998) investigated the relationship among outcomes of medication error rates, patient falls, skin breakdown, patient and family complaints, as

well as infections and death and levels of nurse staffing. The correlations among staffing variables and outcome variables were determined. After multivariate analyses were completed, and controlling for patient acuity, the investigators found lower rates of medication errors and patient falls on units with higher-than-average patient acuity but higher rates of other adverse outcomes. When controlling for average patient acuity, the investigators found inversely related proportions of hours of care delivered by registered nurses to unit rates of medication errors, skin breakdown, and patient complaints. Unexpectedly, the relationship between registered nurse proportions of care was curvilinear. As the proportion of registered nurse care increased, adverse outcomes decreased up to 87.5% but above that, the adverse outcomes also increased. The study concluded that a higher skill mix with registered nurses, the lower the incidence of adverse occurrences on inpatient units (Blegen et al., 1998). As noted earlier, magnet hospitals are better able to recruit and retain staff thereby facilitating adequate staffing patterns.

Staffing level is an element of the work environment that affects patient care. Buerhaus and Needleman (2000) conducted a very large, data-based study about staffing related to patient outcomes. In their report to the U.S. Department of Health and Human Services, they compiled a comprehensive overview of nursing workforce studies, an examination of current efforts to investigate the relationship between hospital nurse staffing and patient outcomes that are sensitive to nursing, and a discussion of the implications for public and private policy-making. Consistent relationships were found between nurse staffing variables and patient outcomes of urinary tract infections, pneumonia, length of stay, upper gastrointestinal bleeding, shock in medical patients, and

failure to rescue in major surgical patients (Buerhaus & Needleman, 2000). Better staffing led to better patient outcomes.

Aiken and colleagues (1999) reported a study of organization and outcomes of inpatient AIDS care. When comparing magnet and non-magnet hospitals, they found that dedicated AIDS units in magnet hospitals offered important benefits to AIDS patients, specifically lower odds of dying within 30 days of admission, higher patient satisfaction, and care meeting professional standards. Improved patient outcomes were credited to better nurse staffing, AIDS physician specialty services, and more organizational control by bedside nurses (Aiken et al., 1999). The nursing work environment issues - notably better staffing, more control by the bedside nurse, and specialized physicians - from this study were found to be very important in accounting for differences in patient satisfaction between magnet hospitals and others (Aiken, 2002).

Cho (2001) presents a conceptual model connecting patient outcomes and nurse staffing levels. She posits that latent failures in organizational decisions may result in inadequate staffing levels. Concerns of cost containment, the need for medical equipment, and skill mix changes can influence inappropriate nurse staffing decisions. Active failures in organizational decisions can place nursing staff at greater risk for committing errors and violations while providing nursing care (Cho, 2001).

The Agency for Healthcare Research and Quality recently published a report completed by Oregon Health and Science University Evidenced-based Practice Center (2003) about the effect of health care working conditions on patient safety. The systematic review found that "strategies to increase staffing levels of licensed and unlicensed nurses in both acute-care hospitals and nursing homes will likely lead to

improved patient outcomes.” ((2003) p. 2). Preventable complications are lower when physicians perform the procedures more often; the duration of experience is associated with better patient outcomes in some patient populations; and decreased medication errors are found in systems that have reduced distractions and interruptions. The review also found that when there is a system to transfer information between health care organizations, the incidence of medication errors and, in some settings, hospital readmissions were decreased.

Lundstrom and colleagues (2002) were also interested in safety; they reviewed organizational factors that influence satisfaction, health, safety, and well-being of health care workers and subsequently satisfaction, safety, and quality of care for the patients for whom care is provided. Their findings include two important organizational features that bear on TAN practice environments. They are senior management support for safety programs and minimal conflict and good communication among staff members. The strong climate of safety is associated with positive attitudes among employees, the adoption of safe behaviors, and reduced accidents. This climate can influence not only patient safety but also job satisfaction and performance. A supportive safety climate from administrators conveys concern for employees, supports their efforts, uses information to address safety issues to improve the system, and addresses errors and problems without retribution (Lundstrom, Pugliese, Bartley, Cox, & Guither, 2002).

Lundstrom et al. (2002) also identified the magnet hospital concept as a benchmark for excellent patient care and professional environments for nursing. Seen as an environment that empowers nurses to utilize their professional knowledge and skills, the magnet organization allows nurses to initiate interventions that promote patient safety

and rescue them from dire and costly consequences. In doing so, the nurse also rescues the organization (Lundstrom et al., 2002).

Understanding of Advice

Patients must not only receive advice, but also must understand it. Understanding instructions given by the health care provider is essential to enacting the plan of care. Studies of communication patterns between health care professionals and patients have shown failures in understanding (Miller, 2002; Miller, 2003). Furthermore, the patient may fail to follow what was directed because they are embarrassed that they did not understand the instructions (Playle & Keeley, 1998). Clear communication is essential; so is eliminating any barriers to understanding and approachability. Most patients want to do what will improve their health and follow what they are told to do, but if they do not understand and are hesitant to ask questions, then both understanding and compliance are limited.

The individualized plan of care developed between the caller and the advice nurse is affected by the context within which the advice is given and received. Miller (2002) created a theoretical framework that addressed the physician-patient communication in telemedicine. Central to the model are the contextual issues in the delivery of care instructions. These contextual elements include geographical location, provider organization, participants, clinical setting, and other factors, but Miller found that a setting such as a telephone interaction—with a telephone call from a doctor in an office to a patient in their home—can interfere with understanding (Miller, 2002).

Understanding instructions given in the treatment encounter will influence satisfaction, adherence and compliance, health and clinical status, recall, and

psychological well-being (Buchmann, 1997; Miller, 2002; Miller, 2003). Barriers from the environment of practice, such as limited time to validate caller understanding or to mutually develop a plan of care, will reduce compliance. The literature is replete with instructions for physicians and nurses in techniques to enhance communication with patients to support better patient compliance (Giuffrida & Torgerson, 1997; Kyngas, Duffy, & Kroll, 2000; Miller, 2003; Miller, 2002). Nevertheless, in TAN environments, these techniques may fall by the wayside. A rushed advice call will reduce any clarification or reinforcement attempt by the advice nurse and can diminish the understanding of the caller.

Patient Satisfaction

Satisfaction as a measure of outcome can come under attack because of the many influences that color perceptions. Needs of acceptance, needs of safety and security, needs of care, needs of quality, need of thrift can all play a part in a perception of satisfaction. As a measure, the subjective nature of satisfaction speaks to an inherent bias. What is satisfactory to one person may be very unacceptable to another. In addition, satisfaction is culturally bound, reflecting prejudice and expectations based on regional and social needs.

Questions are about the validity of the findings from self-reports threaten satisfaction as a useful outcome measurement. Whether the perception of satisfaction is due to actual satisfaction or limited sensitivity of the measurement tool is not clear. In studies that evaluate advice services, ignorance of the survey respondents to the subtle differences in advice practice may explain a lack of variance in the levels of satisfaction.

This fact may account for the skepticism about satisfaction as an adequate outcome measure.

Rosenthal and Shannon (1997) suggest that the expectation for the health care service provided can indicate satisfaction. If the caller receives what he or she expects from the health care interaction, then expectations have been met. If the interaction provides more than the expected intervention, the expectation is exceeded, while if the interaction falls short of what is expected, the expected service is not met. The review of the satisfaction literature by Rosenthal and Shannon (1997) addressed concerns about patient satisfaction as a measurement criteria and found that patient self-reports are a reliable outcome measure (Rosenthal & Shannon, 1997). Individual judgment is still the best measure of personal satisfaction.

Lattimer and colleagues (1998) assessed the safety and effectiveness of nurse telephone consultation and concluded that callers reported faster access to health information and advice resulting in increased satisfaction with the NHS (Lattimer et al., 1998). As Donabedian (1980) noted, patient satisfaction is foremost in expected outcomes of care interactions (Donabedian, 1980). Patients generally report they are either satisfied or very satisfied with advice services (Valanis et al., 2003a). Patients who use the advice services report they are reassured by having the service available (Poole et al., 1993).

Follow-Through with Offered Advice

Follow-through is an important measure of patient outcomes in TAN. Nursing services produce patient care, and in telephone advice nursing, care is assessment, reassurance, and advice. Whether the advice is followed can be an indication of the

nurse-patient interaction. The delivery of credible advice that is accepted by the patient is a demonstration of the rapport established in the advice call. As the nurse tailors the advice for a specific patient and problem, the patient and nurse develop an understanding of what will be done. If the work environment regulations restrict the nurses' ability to engage in the negotiation process—by requiring strict adherence to call-time limitations or by using standardized protocols—the rapport and judgment between the patient and nurse could be diminished and the advice not followed.

Follow-through with advice can be thought of as compliance with prescriptions for care or adherence to a plan of care (Playle & Keeley, 1998). Conceptually, however, compliance is a problematic construct. Kyngas et al. (2000) and Playle and Keeley (1998) found, in extensive reviews, a lack of agreement in the definition of compliance and inadequate agreement on measurement methods. The disagreement around a commonly held definition of compliance has created confusion and debate (Kyngas et al., 2000). One definition offered is “the extent to which the patient’s behavior (in terms of taking medications, following diets or executing other lifestyle changes) coincides with medical or health care advice” ((Haynes, 1979) p. 2). Clearly, this definition places the onus on the patient to follow the prescribed treatment by a “wiser” health care advisor. Unfortunately, such a definition may be paternalistic, seeing the patient less as a partner in care and more as a child.

The concerns of compliance focus on issues of power, professional control, self-efficacy, and paternalistic monitoring of patient behavior (Kyngas et al., 2000). Compliance and non compliance have generated considerable debate about patient rights, policy development, welfare of the community at large, maintenance of power structures,

cost of health care, and development of self-care attitudes (Buchmann, 1997). If follow-through is seen as a patient outcome, influence by the advice nurse is possible but control is not.

A number of studies address measurements of nursing interventions and documentation of advice (Crouch & Dale, 1998b; Dale et al., 1998; Eggleston et al., 1994; Huber & Blanchfield, 1999), but none report the incidence, or the type of actions taken by the patient to the advice given. Huber and Blanchfield (1999) advocated using the North American Nursing Diagnosis Association (NANDA) and Nursing Interventions Classification (NIC) language when documenting patient advice but did not report any measurable follow-through of offered advice.

Crouch and Dale (1998) reported on the soundness of judgments made during the telephone consultation, as well as the assessed accuracy and adequacy of those judgments, and how nurses made decisions during the telephone consultation. They did not report any follow-through data from their study (Crouch & Dale, 1998a).

Dale, Crouch, and Lloyd (1998) described the nurse-managed Telephone Advice Service (TAS) based on data of descriptions of the population, length, and timing of the calls. Outcome criteria did not include follow-through (Dale et al., 1998). Eggleston et al. (1994) reported a compliance rate of 95% with the advice given and patient outcome, although the assessment methods for the compliance were not clear (Eggleston et al., 1994).

Playle and Keeley (1998) contend that the patient and family share the responsibility and accountability to carry out the plan of care, thereby reflecting the success or failure of the advice given. Telephone advice nursing is an area where this

interdependence is prevalent (Larson-Dahn, 2001) and acceptance and follow-through with advice can affect patient outcomes (Buchmann, 1997; Giuffrida & Torgerson, 1997; Kyngas et al., 2000; Playle & Keeley, 1998).

Researchers of two TAN studies mention compliance with advice (Poole et al., 1993) and appropriate disposition (Greenberg, 2000). Both of these studies relied on documentation by the nurse as verification of offered advice but without subsequent chart review for actions taken by the patient. The investigators did not measure actual patient follow-through with advice.

The Structure-Process-Outcome Model

The ADVICE study aimed to explore nursing practice issues. The conceptual model chosen for the study was the structure-process-outcome model (Donabedian, 1980). Developed for use in the medical setting, it addresses issues of quality and satisfaction (Donabedian, 1980; Shi & Singh, 2001; Shortell & Kaluzny, 2000). The ADVICE study used the framework in a complex model of practice to show relationships among variables.

Description and Analysis.

The model is composed of structure, process, and outcome components.

Structure. Structure is defined as the “relatively stable characteristics of the providers of care, of the tools and resources they have at their disposal, and of the physical and organizational settings in which they work” (Donabedian, 1980) p. 81. The structural criteria refer to resource inputs such as facilities and equipment, staffing levels, staff qualifications, programs, and administrative organization. The health care organization has the ability or capacity to provide adequate levels of care (Shi & Singh,

2001) to the extent needed. Structure, then is the context of care. It is the indirect measure of quality, and it assumes that a good structure enables health care workers to employ good processes that will lead to good outcomes (Shi & Singh, 2001). The Joint Commission on Accreditation of Healthcare Organizations, along with licensing and other certification bodies has developed standards for structural expectations.

Process. Process refers to the specific way in which the care is provided (Donabedian, 1980). Examples of process include correct testing, correct prescriptions, correct medication administration, and, specific to TAN, correct assessment and advice to callers. Peer review is a method of assessing process, with a purpose of controlling costs and ensuring quality does not decrease (Shi & Singh, 2001). In the advice setting, practice is the primary process component. Mechanisms to address quality in process include practice standards, cost efficiency guides to monitor underutilization and over utilization, critical pathways, and risk management techniques. Practice standards, often developed by professional groups, provide explicit descriptions for preferred clinical processes. In this way, they attempt to guide best practice expectations. The American Association of Ambulatory Nurses (Schwarzentraub, 2001) has developed recent standards for telephone advice practice. Cost efficiency uses the health production function in process to evaluate the relationship between increasing medical expenditures or health risk and improvement in health levels (Shi & Singh, 2001).

Critical pathways and risk management are other proactive approaches to the process component in quality assurance. Critical pathways are outcome-based and patient-centered case management tools directed at interdisciplinary coordination of patient care. Risk management focused on preventative approaches to clinical care with

facilitation of operations, especially aimed at avoiding medical malpractice (Shi & Singh, 2001). Besides preventing injury to patients, risk management addresses concerns of litigation with an eye to preventing costly defensive medical practices. In advice nursing, protocol use is the approach by the organization to risk management.

Outcomes. Outcomes are the final results or effects of using the structure and process in health care delivery (Donabedian, 1992; Shi & Singh, 2001). As the bottom-line measure of effectiveness, positive outcomes suggest recovery from disease and health improvement, and in the case of TAN, understanding of offered advice, patient satisfaction, and follow-through. Comparative assessments are often used to assess outcome criteria. Some measures include postoperative infection rates, nosocomial infections, iatrogenic illnesses, and rates of re-hospitalization (Shi & Singh, 2001). No outcome measures are perfect, however. Agreement on outcome measures as indicators of quality depend on the aspect of quality being assessed (Donabedian, 1992).

Within the conceptual model, the components are interdependent. Linked in an underlying framework, the full development of all the model components is essential to provide the necessary connections from structure through process to outcome. Structural components are only useful to the extent that they motivate and encourage workers to choose efficacious, appropriate, and cost effective actions in the process. Process components are valid if they lead to better outcomes. Often used in quality investigations, the model lends itself to both a research framework as well as organizing a quality improvement project (Flood, Zinn, Shortell, & Scott, 2000).

Flood, et al (2000) identifies a number of threats to the model that could occur if the model is not taken as a whole:

Process measures focus on energy and effort expended but neglect effects achieved. Moreover, measures based on process alone can only compare performance values with some specified standard; they cannot themselves assess the appropriateness of the standards employed. If the process measures are once removed from effects, then structural indicators are twice removed, since they do not assess work performance or effort expended but only the organization's capacity to perform work. Presumed competencies may in practice turn out to be ineffectual and existing capacities may on specific occasions be unemployed or underemployed. (p. 367)

If the structural component is not fully developed, then the process component may also have gaps. While the researcher might never know all the connections or component parts to develop, as complete a development as possible will decrease validity threats to the study. Sustaining links between components of the model through full development ensures the connection in the quality evaluation.

Outcome measures focus attention on the changes produced and any results achieved. A drawback, however, is that outcomes in themselves do not provide evidence that can connect observed outcomes to the effects of performance. Causal factors could be beyond the control of the caregiver - whether positive or negative results - since superior performance can still have a poor outcome and vice versa. At the organizational level, good outcomes could be due more to selection procedures rather than positive process or structure (Flood et al., 2000). Measures can always be imperfect and subject to bias and misinterpretation. Overall, however, the Donabedian framework can give the

researcher an excellent foundation to build a study that assesses a process and seeks outcome measures when developed fully.

In the ADVICE study, the pivotal aim focused on the process components of advice nursing practice. In organizing the design and focus points for research, the investigators used their interests in nursing practice, epidemiology, and perceptions of power. Pursuing these directions, the investigators identified potential variables and conducted pilot studies where the taping of advice calls were able to reflect issues of communication, protocol use, centralized vs. decentralized settings, outcomes, etc. The system variables identified were the interaction of caller and nurse in a process, the perceptions of the caller, and the follow-through with advice. The ADVICE study conceptual framework developed the structural components of the organization as identified as system variables with measurable, reportable outcomes.

Application.

The work environment study focused on the effects of TAN settings on telephone advice practice, how the practice setting affects the ways nurses perform care, and further, the outcomes of that care. Telephone advice nursing was ripe for investigation. No previous research was found about work environments in advice practice.

A solid and expanding body of literature reflects study of the work environment and, more explicitly, work environments in hospital nursing practice. Literature from the customer service settings is also informative (Moos & Schaefer, 1987; Sleutel, 2000). Descriptions of draconian environments of service-industry call centers have found their way to the literature with insights of how to improve the work setting, increase job satisfaction and employment longevity as well as positively influence outcomes

(Franklin, 2000; Whitehead, 1999). The exploration of the work environment of advice services brought these concerns to light.

Furthermore, the organizing ability offered by the structure-process-outcome framework of the Donabedian model informed a broader view of organizational structure. The perspectives offered from the organizational literature thereby enrich the study. The initial phase of the ADVICE study neglected this vital component of review that affects the practice of advice nursing: the work environment. From the rich data obtained in the focus groups, the ADVICE study incorporated the concerns of the work environment into the study. It is interesting and provocative that the focus groups expressed similar concerns cited in the magnet hospital studies about autonomy, control of the nursing practice environment, and collegiality (Aiken, 2002; Kramer & Schmalenberg, 2002b; Valanis et al., 2003a). Based on magnet hospital's ability to retain staff, the studies have resonance in all areas of nursing practice.

A review of context can include both structure and process. Structure is the framework of the organization, connecting issues including organizational climate, organizational culture, and leadership style, support of the practice environment, autonomy, control of practice, and collegiality, as well as the elements in the practice environment such as setting, personnel, resources, staffing, and costs. All are vital to the assessment of any practice. Context also includes the process: the offering of advice. The interview and triage of the caller to the appropriate level of care is essential.

The work environment study also used the structure-process-outcome model as an organizing framework (Donabedian, 1980). The model provided an excellent organizing framework that brought perspective to the study of advice nursing work environments.

Summary

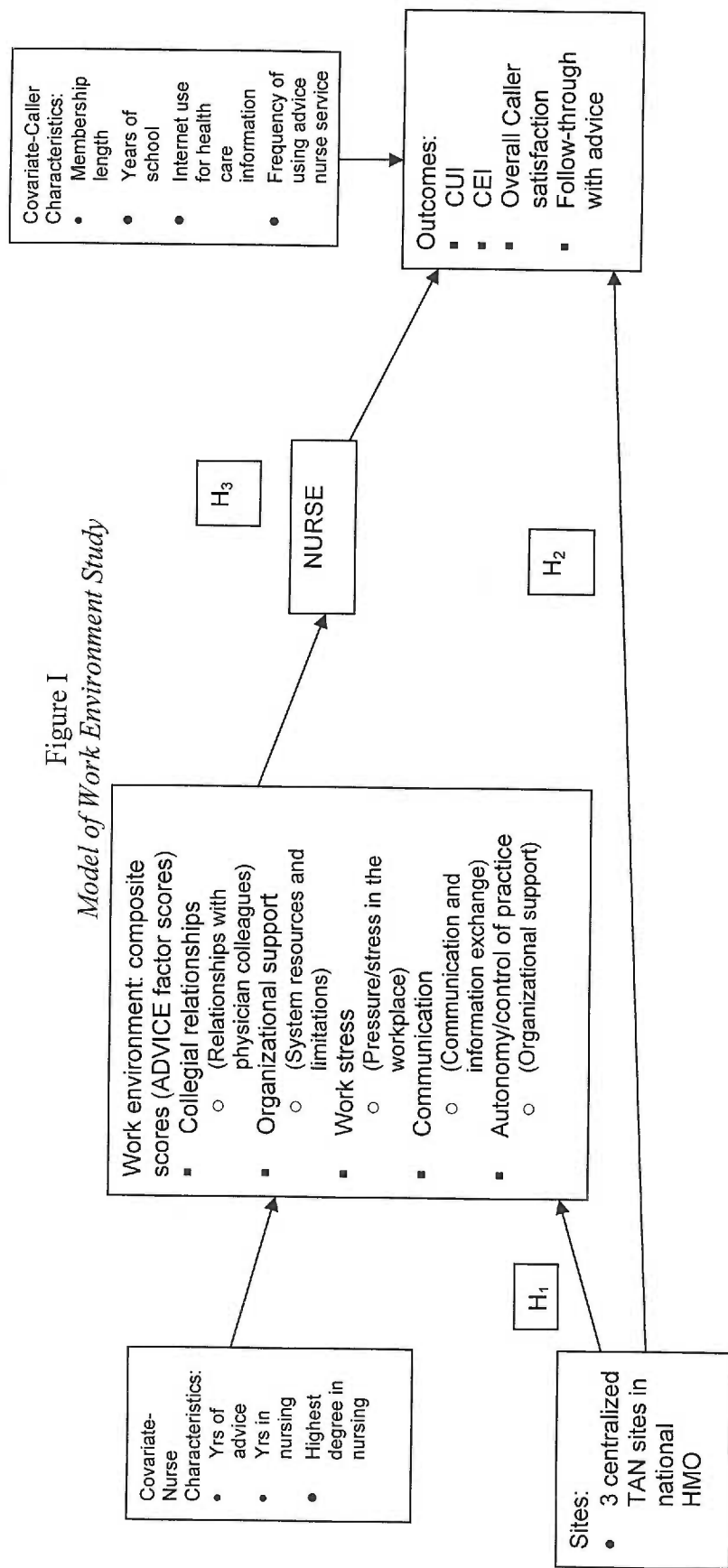
It is clear that the work environment plays a part in a nurse's ability to provide care. It is also clear that patient outcomes have shown improvement when nurses have control of their professional practice, autonomy, support from the organizational management, and a collegial relationship with professional colleagues. The focus of this dissertation was to determine if the perceptions of the work environment in the advice nursing practice setting were similar across multiple sites, if outcomes for the patients varied due to the advice site, and if the work environment had an effect on patient outcomes.

Research questions

The gap in the literature prompted a number of research questions that guided this dissertation. They are the following:

1. Are ADVICE sites a unique predictor of the nurses' perceptions of the work environment beyond nurse characteristics?
2. Are ADVICE sites a unique predictor of patient outcomes beyond caller characteristics?
3. Is there a relationship between nurses' perceptions of the work environment and caller understanding of advice, caller expectations of the advice interaction, overall satisfaction with advice services, and follow-through with offered advice when controlling for both nurse and caller characteristics?

Figure I
Model of Work Environment Study



H₁ = Site of the ADVICE study will be a unique predictor of nurses' perceptions of the work environment beyond nurse characteristics

H₂ = Site of the ADVICE study will be a unique predictor of patient outcomes beyond caller characteristics

H₃ = Work environment factors are predictive of patient outcomes

Chapter Three: Design and Methods

This study is a secondary analysis of data from the ADVICE study to address questions about the work environment and its relationship to patient outcomes, specifically, (1) are ADVICE sites a unique predictor of the nurses' perceptions of the work environment beyond nurse characteristics? (2) Is site a unique predictor of patient outcomes beyond caller characteristics? (3) Is there a relationship between nurses' perceptions of the work environment and callers' perceptions of the advice they receive—specifically, their understanding, experience, satisfaction, and follow-through—when controlling for both nurse and caller characteristics?

This chapter will present the design and methods of the ADVICE study followed by a description of the design and methods of this work environment study. The instruments developed for the ADVICE study are well described in the original ADVICE study (David, Gullion, & Reinhardt, 2003; Moscato et al., 2003; Shapiro et al., 2003; Valanis et al., 2003a). Copies of the instruments used are in Appendix II. However, specific elements from the instruments used in this study are defined and described here in order to elucidate these instruments and variables. Operational definitions and scoring of variables are presented in the descriptive portion of this chapter as well as in a table of variables (Appendix I).

ADVICE Study

The purpose of the ADVICE study was to explore how the structure and process variables of advice nursing practice relate to the outcomes of telephone advice nursing. The ADVICE study investigators selected and rated a sample of advice nurses from each of the four geographic regions of a national HMO; collected data on the nurse

characteristics and their perceptions of advice work environments; and recorded and evaluated phone calls handled by a subset of those nurses during a specified period. The study investigators also described call center characteristics and non medical factors that might affect the disposition of an advice call; reported a follow-up survey of those callers; and then described a medical record audit to examine the disposition, follow-up, and cost for the episode of care.

Design

The ADVICE study was a correlational study based on the structure-process-outcome model (Donabedian, 1980) and compared centralized and decentralized call center models, including characteristics of nurses and callers that might significantly affect the outcomes of advice call services.

The structural variables were comprised of nursing, call center, and patient characteristics. The process variables were the reason for the call, the quality of the assessment, the efficiency of call handling, call routing process, staffing/call volume measure, cost per call, and appropriateness of the advice. Outcomes, as dependent variables, included call disposition, appropriateness of the disposition, continuity of care (saw own physician), cost of the episode of care, and patient outcomes. Patient outcomes were examined in the ADVICE study through a questionnaire completed by the callers. They included satisfaction with the call, understanding of the advice given, perceptions of support, health information, and decision control, nurses' professional and technical competencies, confidence in the call disposition, capacity for self-care and follow-through with the advice offered, and what the patient would have done if the advice service had been unavailable (Moscato et al., 2003).

Setting

Settings for the ADVICE study were four geographically dispersed regions of Kaiser Permanente, a large national HMO. Selected regions were Northwest, Southern California, Mid-Atlantic, and Hawaii. The Northwest and Southern California regions were chosen because they have both centralized and decentralized advice models. The Mid-Atlantic region had a 24-hour centralized advice center, which utilized electronic protocols and had a physician on site in the advice center to support nurses. The Hawaiian region had an evening advice program provided by nurses from their homes. The Hawaiian sites were seen as a virtual centralized call center; thus, it was compared with centralized call centers in the other regions. Hawaii and Mid-Atlantic regions also had decentralized advice sites in clinics and offices.

These regions varied in their organization of nursing advice services, in the size of their membership, and in the ethnicity of members. The membership ranged from 350,000-500,000 persons in Northwest, Mid-Atlantic, and Hawaii to more than two million in Southern California. Members represented a range of socioeconomic status and generally reflected the ethnic distribution of the regional geographic area. The sites were chosen based on organization of the call center, access to patient information from the medical record, ethnic diversity of the membership, use of protocols, and access to provider and pharmacy consultation during the advice call. Data were from fourteen advice settings. Four were centralized and ten were decentralized.

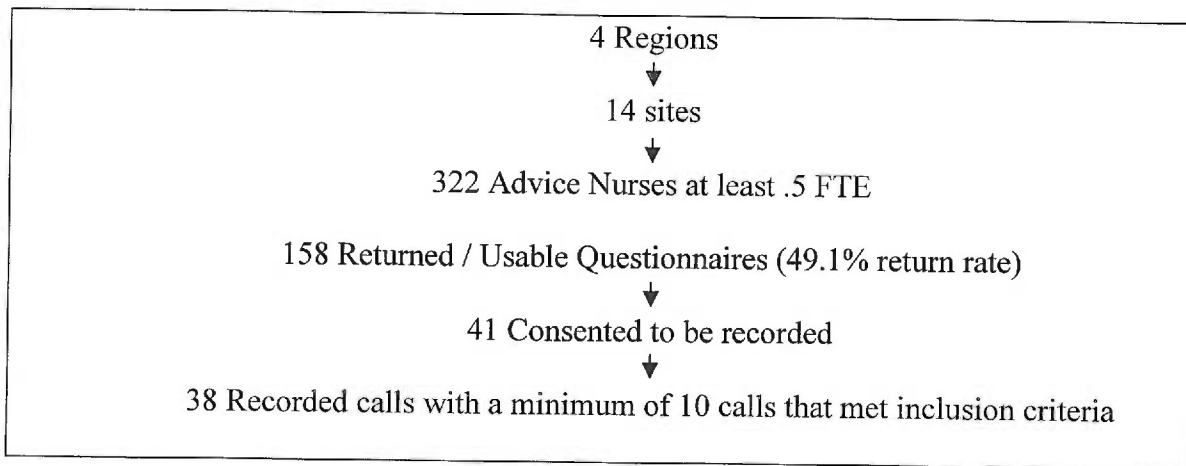
Sample

The study sample was composed of advice nurses and a sample of the calls made to those nurses while working in the advice setting.

The nurse sample. A convenience sample of advice nurses was recruited from nurses who worked at least .5 FTE in advice practice, agreed to participate in the study, and signed a consent form. Each of the 322 eligible nurses received a Nurse Questionnaire (NQ) and asked to assess provide demographic data as well as complete responses related to their perceptions of the advice work environment. One hundred fifty-eight usable questionnaires were returned, for a return rate of 49.1%. The majority of nurses completing the NQ were nurses from the Mid-Atlantic region. Southern California contributed seventeen nurse questionnaires, Hawaii contributed twelve, Northwest contributed thirty-four, and Mid-Atlantic contributed ninety-five.

Of the 158 who completed questionnaires, forty-one consented to have their calls recorded but only thirty-eight recorded sufficient usable calls to be included in the nurse sample. Most of the thirty-eight nurses (27 of 38) who participated in the ADVICE study recorded more than the target number of 150 calls over several weeks and had a minimum of ten calls that met the inclusion criteria (See Figure I Algorithm A). The ADVICE study intended to sample six nurses from centralized and decentralized sites in each region for call recording but ended with a smaller sample due to attrition and availability of consenting nurses (Valanis et al., 2003b).

Figure II

Algorithm A - Nurse Sample

The call sample. The convenience sample included calls from members seeking advice from the telephone advice service, consented to participate when asked by the advice nurse early in the call, and the nurse-caller conversation was clearly audible on the tape-recorded call. The sample of calls was collected over a nine-month period. The ADVICE study team recorded a total of 6,012 calls during the study. Following the call, a Caller Questionnaire (CQ) was mailed to the caller (CQ mailed, N=5,611). No questionnaires were sent to the homes of un-consented callers or when a questionnaire would place a caller at risk, such as a call about domestic violence. Of the mailed questionnaires, a return rate of 45% was obtained (CQ received, N=2,519). Questionnaires used were return via mail or completed by follow-up telephone call.

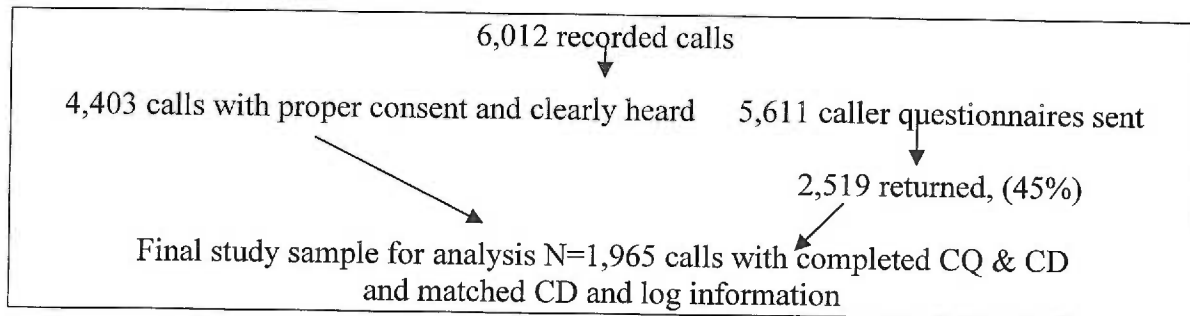
The Call Description Ratings Form (CD) was used to code calls. Four thousand four hundred three of the taped calls met the inclusion criteria in which the caller consented and the conversation was audible. The calls were coded for who called, reason for the call, symptoms described, emotional tone of the call, disposition of the call, and

language of the caller used. The investigators developed the CD form for the study use exclusively. Only the 4,403 that met all the inclusion criteria were rated, even though additional calls were recorded.

More of the recorded calls were from call centers than medical offices. In the Northwest region, the distribution between the medical office and centralized call centers was about equal (867 call center and 764 medical office) but in Mid-Atlantic region, more calls were from centralized sites (993 call center and 791 medical office). The ratio in Hawaii between medical office and the virtual call center was also about equal (496 call center and 459 medical office). Southern California showed the largest difference in recorded calls between the medical office and centralized call centers due to limited participation of medical office staff (810 call center and 30 medical office).

Data from 1,068 calls included in the study had a completed CD and CQ and the ID number and birth dates on the call log matched those on the CQ (See Figure II Algorithm B). The CQ and the call log occasionally did not match, for two reasons. First, there may have been multiple calls from the caller to the advice nurse and the caller could not distinguish which questionnaire referred to which call. Second, the caller who had called for another person, e.g. spouse or child, may have written their own birth date on the CQ rather than that of the person for whom the call was made.

Figure III

Algorithm B - Call Sample*Instruments*

Instruments developed and used in the ADVICE study included the Nurse Questionnaire (NQ), the Caller Questionnaire (CQ), and the Call Description Rating Form (CD). (See Appendix II) In addition, participating nurses kept a call log of advice calls recorded containing the caller's name, medical record number (member number), and birth date of the patient for whom the call was made.

Nurse Questionnaire (NQ). The ADVICE team assessed nursing staff demographics and work environment perceptions using the NQ. The investigators developed the NQ after input from the study focus groups in Phase I and a literature review of issues in the work environment. From the focus groups, they identified key themes of stress, autonomy, power, and job satisfaction. Because there were no tools found in the literature that addressed the environment of TAN, the investigators generated some of the items in the questionnaire that are unique to the advice environment. The tool also combined elements found in other surveys of work environments; specifically, it used the Nursing Work Index Revised (Aiken & Patrician, 2000) and the Profile of Organizational Characteristics developed by Likert in 1976, used

in other nursing studies (Leveck & Jones, 1996). Two other questionnaires influenced the development of the NQ: the Leiden Quality of Work Questionnaire (van der Doef & Maes, 1999) and a questionnaire developed and used to assess work environment stress among telephone operators in Canada (DiTecco et al., 1992). Additionally, the investigators used two scales developed to assess perceived control and autonomy (Dwyer et al., 1992; McGilton & Pringle, 1999).

The NQ was composed of five sections with 62 questions. The first section of the questionnaire addressed demographic information about nurse participants. To assess perceptions of the work environment, the second through fifth sections addressed elements of advice practice and work setting. The second section asked about relationships with clinicians; the third section asked about organizational decision-making; the fourth section asked about work stress; and the fifth section asked about organizational factors influencing advice practice. A final page in the questionnaire allowed free text contributions by the participants. Items in the first section included fill-in questions, multiple choice, and yes/no questions. The remaining questions requested the participant to indicate a level of agreement on a Likert scale.

Work environment assessment in the NQ. The validity of the work environment sections of the instrument was assessed by a factor analytic method in the NQ. Construct validity was completed using principal axis factoring with orthogonal rotation (varimax). Data were analyzed using SAS 8.2 computer programs based on 158 questionnaire responses. Only participants with complete data were included in the factor analysis.

Fifty-two items used a variety of rating scales. The scales in data fields 64 through 130 ranged from one to four, one to five, one to six, and one to seven responses,

depending on the question (See Attachment A). While most of the scales ranked the low value at one and the high value at four, five, six, or seven, depending on the question, a few questions were reverse coded. Missing data were treated using pairwise deletion, imputation, or average score when appropriate.

Fifty-two questions were initially available for factor analysis. Twelve related to the “Relationships with Clinicians” section, ten from the “Organizational Decision-Making” section, thirteen from the “Work Stress” section, and seventeen from the “Organizational Factors Influencing Advice” section. The items from the organizational factors affecting advice section asked both the extent to which the problem exists and the extent to which the problem affects the ability to give good advice. The scores were combined for each set of questions during the factor analysis.

Four questions were dropped from the original fifty-two because answers were missing from more than ten nurse responders. In addition, two questions were dropped because of low correlations with all the other items. In all, forty-six items contributed to the factor analysis. Eight factors with eigenvalues above 1.0 were found. An eigenvalue of 1.0 or greater indicates that the factor possesses at least as much total variance as contained in a single item (Huck, 2000).

After testing a number of solutions, the research team selected a five-factor solution that presented acceptable loadings. The solution was also largely consistent with concepts found in the literature related to work environments. The results of the five factors accounted for more than 46% of total variance. Loadings of items were used to name the factors. Factor 1 was labeled Pressure/Stress in the workplace, Factor 2 Relationships with Physician Colleagues and Factor 4 Organizational Support reflected

the NQ item groupings. Factor 3 System Limitations and Factor 5 Barriers to Communication and Information Exchange were not predicted before the study. A 0.30 cut-off for factor loading was used. In exploratory analysis, after factors are rotated, loadings of 0.30 or higher are acceptable (Nunnally & Bernstein, 1994). A full description of the tool and its development are presented elsewhere (David et al., 2003; Reinhardt, Moscato, Tanner, & Valanis, 2003). Details of item questions and the factor loadings follow. (See Table I)

Table I

Five factor solution to NQ factor analysis

Rotated Factor Pattern					
	Factor1 Pressure/ stress in the workplace	Factor2 Relationships with physician colleagues	Factor3 System resources and limitations	Factor4 Organizational support	Factor5 Barriers to communication and information exchange
F90 Monitoring of call activities by a manager.	.75	-.23	-.03	.17	.18
F89 Monitoring of your call activities (call time, number of calls, etc.) by the system.	.74	-.24	.00	.22	.12
F85 How often do you feel under pressure at work?	.73	.10	-.12	.05	.00
F88 Expected to maintain an average call time that is too low.	.71	-.15	-.03	.22	-.01
F87 Difficulty in serving callers well and still keeping time with each call down.	.71	-.05	-.02	.27	.01
F91 Calls that take a long time to process.	.70	-.03	.02	.25	-.03
F84 How would you describe the job pressure where you work?	.67	.09	-.12	-.03	.02
F86 Generally, how much of a problem is the pressure or stress you experience at work?	.55	.04	-.09	.05	.15
F93 Being expected to remain constantly at your workstation.	.55	-.19	-.10	.16	.22
F92 Seeing how many callers are in the queue or how many messages are piled up.	.53	.07	.04	-.06	.21

Rotated Factor Pattern (con't.)					
F95 Difficulty talking to co-workers at work station	.41	.04	.01	.26	.20
F94 Having to deal with difficult members.	.38	.17	.09	.12	.17
F66 I negotiate with the clinician to establish our responsibilities for discussion of different kinds of information with patients.	-.09	.87	.17	.01	.05
F68 I discuss with clinicians the degree to which I want to be involved in planning aspects of patient care.	-.04	.79	.12	.03	.04
F73 I inform clinicians about areas of practice that are unique to nursing.	-.01	.78	-.02	.10	-.05
F69 I suggest patient care approaches that I think would be useful.	-.01	.76	.07	-.01	-.10
F65 I ask clinicians about their expectations regarding the degree of my involvement with health care decisions.	-.09	.73	.20	.11	.03
F70 I discuss with clinicians areas of practice that reside more within the realm of medicine than nursing.	.00	.69	.00	-.06	-.10
F72 I tell clinicians of any difficulties I foresee in the patient's ability to deal with treatment options and their consequences.	.17	.65	-.02	-.09	-.26
F67 I clarify my scope of professional expertise when it is greater than the clinician thinks it is.	.06	.63	.01	-.02	.04
F71 I tell clinicians when, in my judgment, their orders seem inappropriate.	.11	.51	-.11	-.08	-.20
F64 When you know something of the clinicians' practice preferences, to what extent does this knowledge influence your handling of calls?	-.12	.46	.02	.02	.06
F74 In general, how much say or influence do you have over decisions affecting your work?	-.23	.40	.26	-.13	-.07
F80 In general, I am supported to do what is necessary to satisfy customers.	-.15	.07	.79	-.06	-.04
F81 Day to day decisions and activities in the organization demonstrate that quality is a top priority.	-.13	.10	.77	-.13	-.03
F78 Our leaders are committed to making customer satisfaction a high priority in the organization.	-.01	.06	.68	-.04	-.14
F79 I receive training that helps me give good service to customers.	-.05	-.06	.66	-.05	-.01
F76 The organization does a good job of letting me know what is going on.	.03	.04	.63	-.04	.04
F77 I understand how my work fits into the goals of the organization.	.10	-.01	.56	.03	-.03
F83 I would recommend KP to a close friend as a good place to get health care.	-.04	.15	.49	-.13	-.03
F82 Physicians in my work unit support me in providing quality service to our customers.	-.17	.13	.48	-.17	-.29
F123-124 Being required to adhere to protocols.	.32	-.04	-.05	.69	.06
F99-100 Lack of same day appointments.	.08	.04	-.10	.69	.23

Rotated Factor Pattern (con't.)					
F97-98 Not having enough appointments to meet patient need.	.05	.11	-.09	.67	.26
F117-118 Documentation Requirements.	.16	.04	.01	.60	.19
F125-126 Being required to use protocols that may not fit the particular situation.	.27	-.05	-.13	.58	.33
F129-130 Not being allowed to use my nursing judgment.	.30	-.11	-.14	.55	.03
F127-128 Not being allowed to give test results over the phone.	.36	-.02	-.12	.50	-.01
F113-114 Inability to consult with a physician.	.14	-.02	.09	.04	.66
F107-108 Too many handoffs from medical office.	-.01	-.07	-.03	.15	.61
F109-110 Lack of follow-through from provider.	.32	-.07	-.14	.30	.53
F119-120 Not having up to date information about preoperative/pre-procedure preparation.	.11	-.15	-.03	.29	.50
F111-112 Lack of response from provider to my requests for consult/information.	.23	.12	-.12	.15	.46
F103-104 Lack of communication between call center and medical offices.	.17	-.05	-.20	.29	.43
F115-116 Lack of accessibility to patient information.	.20	-.16	-.07	.03	.37
F121-122 Not having the most up-to-date protocols.	-.11	-.01	-.13	.36	.37
F=Field					

Caller Questionnaire (CQ). The CQ developed for the ADVICE study was also based in Phase I interviews with patients and a literature review of indicators of patient satisfaction (Rosenthal & Shannon, 1997) and follow-through with offered advice (Egleston et al., 1994; Hagan et al., 2000; Omery, 2003). In the Phase I, an iterative, purposive sample of 40 callers was interviewed by telephone. Using an emergent design, questions were developed to analyze the constructs of interest and test questions for a draft questionnaire. The draft questionnaire was tested in Phase II of the ADVICE study.

Items in the questionnaire assessed caller characteristics (age of patient, health status of the patient, education of the caller, length of membership in the HMO, and frequency of advice use), results of the call, amount of advice followed, what advice was not followed and why, expectations from the call, overall helpfulness of the nurse, and

satisfaction with the call. Responses to the questionnaire provided information about caller characteristics, advice call characteristics, and nurse practice behaviors that caused further revision of the final questionnaire used in the Phase II study (Moscato et al., 2003).

Some initial results from questions in the CQ indicated little variation in the answers. Of these questions, some were deleted from the final questionnaire and some combined with other questions. As initial questionnaire scores tended to cluster in high levels, concerns of a “halo” effect across items influenced the decision to focus on a specific component of care that callers valued and would give information that is more useful. Six nurse behaviors were explored specifically in the questionnaire: caring about the caller as a person, careful listening, ability to give clear information, knowledge about the member’s medical history, ability to work with the caller in decision-making and competent knowledge and skill (Moscato et al., 2003).

The questionnaire contained 28 questions in four sections (See Appendix II). The first section asked the reason for the call, perceived call outcomes, follow-through on offered advice, nurse attributes, caller satisfaction, and wait/talk times (17 items). The other three sections ask about the caller, specifically for whom they called, relationship of the patient with her/his primary care provider, and other pertinent information (Moscato et al., 2003). While most of the questions allow for only one selected answer from a list of options, others allowed multiple selections. The questionnaire contained fields for written personal responses to expand on the callers’ experience with advice services. If the CQ was not received in a timely manner, follow-up was carried out and the

questionnaire completed over the telephone with an ADVICE staff person (Valanis et al., 2003a).

Call Description Rating Form (CD). The CD form was developed as part of the ADVICE study to collect and rate data about the advice call (See Appendix II). The 45-item instrument was used to code information from the call including the relationship of the caller to the patient, the language spoken by the caller, the emotional tone or distress of the caller at the start of the call, the reasons for the call, and the disposition of the call. Additionally, the tool was used to record whether there was nursing management involved in the call in the form of self-care instruction, reassurance or explanation, teaching, or other nursing management specified by the rater, and any links established between the caller and the patient's primary care provider (Shapiro et al., 2003).

The ADVICE team trained undergraduate student raters to use the CD. They used both didactic materials and a training tape of 10 calls with which student raters' practiced their skills. After successfully completing the first portion of the training, the students rated 15 calls and were then re-evaluated by one of the ADVICE team. The investigators computed the inter-rater reliabilities for the entire instrument. Following this, the ADVICE team then met with the new rater. If problem areas were noted, the ADVICE team worked with the rater to attain satisfactory inter-rater agreement. The ADVICE team continued to review approximately 10% of all calls by all raters. Inter-rater agreement was consistent with an overall percent agreement of 90% and a range of 69% - 100%, depending on the CD item (Shapiro et al., 2003).

The investigators used the CQ to assess outcomes of patient satisfaction and follow-through with offered advice. Another predictor of patient outcomes used by

investigators to assess advice instructions was found by comparing items on the CD and CQ. This index of understanding assessed the caller's understanding of advice offered, comparing whether the caller understood the disposition of the call – that is, whether they understood exactly what the nurse told them to do, or whether they understood a higher or lower level of care.

Protection of Human Subjects

The Institutional Review Board at Oregon Health & Science University reviewed and approved the ADVICE project as did the Center for Health Research (CHR), Portland, Oregon and the IRB for each of the Kaiser Permanente Regions involved in the study. Institutional approval, consent, and confidentiality of responses were maintained per ethical guidelines based on IRB requirements.

Description of the involvement of human subjects. Patient calls were a convenience sample of HMO members who sought advice from the telephone advice service and who verbally consented to participate when asked by the advice nurse at the beginning of the call. The ADVICE team, using a purposive sample, assessed the nurse's perceptions of telephone advice nursing program with a questionnaire, which was given to all nurses working in the telephone advice settings that met the inclusion criteria.

Gender and minority inclusion. In the data collected by the ADVICE team, no selectivity was made in addition to that of the study. As is the case in the nursing profession, only 10% of the nurse sample was expected to be male. No restrictions were placed on the inclusion criteria other than percentage of employment in the advice settings. The selection of geographically diverse regions of the national HMO provided an ethnically diverse caller sample. No exclusions were made for callers based on racial

or ethnic distinctions. All callers who called the advice service during the data collection period were potential participants.

Inclusion of children. No age discrimination was made for callers to the advice service. All callers who called the advice service during the data collection period were potential participants.

Recruitment and informed consent. The plan for recruitment and consent of participants was obtained from all appropriate bodies prior to data collection in the ADVICE study with understanding that the data could be used for additional analysis. Callers were asked to participate over the telephone when they called and if they agreed to participate, gave consent over the telephone. Nurses were recruited from the overall sample of nurses meeting the inclusion criteria. All nurse participants signed an informed consent.

Potential risks and protection against risks. Participants were not exposed to any additional risk related to the study. Data are stored in a locked file at the Center for Health Research (CHR), Portland, Oregon and have been shared with Oregon Health & Science University for additional analysis using data transfer procedures approved by CHR and OHSU's IRB. While at Oregon Health & Science University, data are kept secure in a locked file and an electronic file that is password protected. Data were coded with an acrostic code that protects the identity of the respondent. All identifying data were removed from the data after linkage was made between the call description and the follow-up Caller Questionnaire. Caller data were analyzed in aggregate so no individual could be identified. Only the principal investigator, the co-principal investigators and trained research assistants of the ADVICE study have access to the data. All identifying

information about callers and the nurse respondents will be destroyed at the end of the ADVICE study.

Benefits. It is the intent of the study to provide organizations with the elements that support practice to provide the best care for patients of telephone advice services.

Design of Current Work Environment Study

The premise of the work environment study was that the work environment influences patient outcomes through nursing practice. The structure-process-outcome model from the ADVICE study was integrated into the work environment study (Donabedian, 1980). The structure issues of the work environment affect the performance of advice practice through elements in the setting such as policy restrictions (use of protocols, call time constraints, limited peer consultation, etc) placed on the advice nurses. These restrictions influence the process of advice. The outcome from advice practice was affected because process impacts outcome and all components of the model are linked. Ultimately, the advice work environment can influence the call results through understanding of advice, expectations of the advice call and overall satisfaction with advice services, and follow-through with the offered advice.

Design

The work environment study was a secondary analysis of the data from the ADVICE study.

The study hypotheses are:

1. Site of the ADVICE study will be a unique predictor of nurses' perceptions of the work environment beyond nurse characteristics. The nurse perception scales are:
 - 1.1. Collegial relationships

- 1.2. Organizational support
- 1.3. Work stress
- 1.4. Communication
- 1.5. Autonomy/control of the practice environment
2. Site of the ADVICE study will be a unique predictor of patient outcomes beyond caller characteristics. The patient outcomes are:
 - 2.1. Caller understanding of the advice interaction
 - 2.2. Caller experience of the advice interaction
 - 2.3. Overall satisfaction with advice services
 - 2.4. Follow-through with offered advice
3. Work environmental perception composite scores are predictive of the patient outcomes controlling for nurse and caller characteristics. The patient outcomes are:
 - 3.1. Caller understanding of the advice interaction
 - 3.2. Caller experience of the advice interaction
 - 3.3. Overall satisfaction with advice services
 - 3.4. Follow-through with offered advice

Setting

The current study used a sub-sample of the settings as described in the ADVICE study. The centralized sites were chosen to address the hypotheses based conceptually on similarity of the practice environments and the uniqueness of telephone practice. In addressing the similar work environments in diverse regions of the same organization, I was able to compare practice environments that use different strategies. This approach allowed me to address differences in use of protocols, computers, and support services

that affect the work environment as part of advice practice and limited the interference of confounding variables from decentralized settings such as individual physician preference in practice.

The centralized virtual call center in the Hawaii region was dropped from the study because of the small nurse sample size and the significant difference in the work environment in advice services operated from the nurses' homes. The work environment study utilized the three regions used in the ADVICE study, Northwest, Mid-Atlantic, and Southern California.

Sample

The study used a sub-sample of nurse and call data from the ADVICE study. The study used 96 nurses from three centralized sites that completed usable NQs to assess the perceptions of the centralized work environment. The study used 1,068 calls from those sites with matched CQ and CD for patient outcome related variables. Eighteen nurses at three centralized advice sites (six nurses from each site) recorded these 1,068 calls.

Nurse sample. The nurse sample consisted of 96 advice nurses employed at least .5 FTE in centralized advice centers. Nurse questionnaires were completed by the entire sample but only 88 NQ were used in the analysis due to missing data. Thus, 8% (n=8) were lost from the sub-sample. The sample distribution was Northwest (n=14), Mid-Atlantic (n=58), and Southern California (n=16). Demographic characteristics are described in Table II.

The educational preparation of nurses included Associate Degree in Nursing (ADN), diploma, and Baccalaureate Degree in Nursing (BSN). A question about the highest degree in a field other than nursing had a significant amount of missing data

(42% missing) and was dropped from the analysis. As it was, only two nurses in the sample stated they had a Master's degree but none had a Master's or PhD degree in nursing. (See Table II)

Table II

Demographics of nurse characteristic covariates (N=96)

<i>Covariates</i>		N	M (SD)	Range
Age (years)		96	46.46 (8.596)	25-66
Gender	Male	4		
	Female	92		
Basic nursing education	ADN	35		
	Diploma	24		
	BSN	35		
	MSN or MN	0		
Highest degree in Nursing: BS or higher	ADN	45		
	BSN	49		
Years employed as an RN		94	19.63 (9.089)	2 - 44
Years working in telephone advice		95	6.28 (5.762)	0 - 39
Years in current position		92	4.03 (4.031)	1 - 27

Call sample. The call sample consisted of 1,068 calls to three centralized advice call centers. As a convenience sample of calls, the only exclusion criteria were refusal to participate and inability to obtain an audible recording.

The most frequent users of the advice service were mothers (N=303, 28.4%) and members calling for themselves (N=570, 53.4%). See Table III for specific demographic details. The average years of education indicates the users of advice services have education beyond high school with some post-secondary education.

Table III

Demographics of caller characteristics and covariates (N=1068)

<i>Characteristics</i>		<i>N (% data)</i>		
Most Frequent Users	Members (Self)	570 (53.4%)		
	Parent (Mother/Father)	303 (28.4%)		
	Other	195 (18.2%)		
			<i>M (SD)</i>	<i>Range</i>
Years of Membership		989 (92.6%)	10.37 (9.105)	0-45
Years of School Completed		985 (92.2%)	14.01 (2.78)	0-26
Frequency of Internet for Health Information		1018 (95.3%)	2.34 (hardly ever) (1.28)	1-5 1=never 2=hardly ever 3=now and then 4=often 5=very often
Times in Past 12 months called Advice Nurse		967 (90.5%)	6.87 (9.97)	0-120

Instruments and Variables Definition

The work environment study used data from the Nurse Questionnaire (NQ), Caller Questionnaire (CQ), and Call Description Rating Form (CD) developed and used in the ADVICE study. Complete instruments are described elsewhere (David et al., 2003;

Moscato et al., 2003; Shapiro et al., 2003) but specific variables addressed in the work environment study are described below. (See Appendix II)

Perceptions of the work environment. The work environment scores refer to the scales identified from the discrete sections of the NQ. The five scales were labeled organizational support, work stress, communication, collegial relationships, and autonomy/control of practice. The labels reflect areas and issues of concern found in the work environment literature and specifically, the magnet hospital studies.

These five areas are connected with the five factors-scores identified in the ADVICE study: pressure/stress in the workplace, relationships with physician colleagues, system resources and limitations, organizational support, and barriers to communication and information exchange. However, in this study, the labels differ due to some differences in conceptual foundations. Specifically, items labeled as organizational support in the ADVICE study were linked to autonomy/control of practice items based on definitions in the work environment literature. Similarly, the ADVICE factor of system resources and limitations was reviewed as organizational support and labeled as such in the composite scale of the work environment study.

There were 46 items in the work environment scores of the NQ that group into five scales. (See Appendix I for operational definitions of variables.) All scales were recoded so 'not applicable' and 'not at all' were collapsed to only one option. Because the NQ scales had a variety of ranges, each sections was recoded to ensure a similarity of scale (See Table IV). The work environment scores were developed from the average score for each section of the questionnaire. Each nurse who completed the NQ had five work environment scores, one for each of the five work environment scales.

The first scale, collegial relationships, included NQ items in field 65 through field 73. Scoring was from one to six with one as “not applicable or never” and six as “always” was recoded from a scale of one to seven. A higher score indicated a more positive perception of relationships with colleagues.

The second scale, organizational support, included NQ items from field 74 through field 83. Items F 74 and F 75 were reverse coded and were therefore recoded to reflect the same orientation as those items within the same composite scale. Scoring ranged from one to five with one equal to “none” or “disagree completely,” two equal to “very little” or “disagree,” three equal to “some” or “partly agree; partly disagree,” four equal to “quite a bit” or “agree,” and five equal to “a great deal” or “agree completely.” A higher score indicated a more positive perception of organizational support.

The third scale, work stress, included NQ items from field 84 to field 96. This section was scored from one to five: one equal to “not applicable, not at all, none, never, and no problem”, five equal to “very high, always, very big problem, and to a very large extent” depending on the question. The questions were previously coded between one to five or six depending on the question. A higher score indicated increased perceptions of work stress.

For the final scales of the questionnaire, work environment scores used only the question option “extent to which problem exists,” to control for collinearity of the question “extent to which problem affects ability to give good advice.” (See Appendix II) The fourth work environment scale—communication—consisted of fields 103, 107, 109, 111, 113, 115, 119, and 121. The fifth work environment scale—autonomy/control of practice—included fields 97, 99, 101, 105, 117, 123, 125, 127, and 129. (See Table IV)

Both scales were scored from one to four, with one equal to “not applicable and not at all”, four equal to “a very large extent.” The original coding range was from one to five.

A higher score indicated a perception that the item was more of a problem.

Table IV

Recoding Scales from the Nurse Questionnaire

Sections Scale	ADVICE Study	Work Environment Study
Relationships with Clinicians (F65-73)	F65-73 1=N/A, 2=Never, 3=Almost Never, 4=Sometimes, 5=Most of the time, 6=Almost always, 7=Always	F65-73 1=N/A & Never, 2=Almost Never, 3=Sometimes, 4=Most of the time, 5=Almost always, 6=Always
Organizational Decision-Making (F74-83)	F74 & 75 1=A great deal to 5=None F76-F83 1=Disagree completely - 5=Agree completely	F74 & 75 1=None to 5=A great deal F76-F83 unchanged
Work Stress (F84-96)	F84 1=None, 2=Very low, 3=Low, 4=Average, 5=High, 6=Very high; F85 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always; F86 1=No problem, 2=Small problem, 3=Moderate problem, 4=Big problem, 5=Very big problem; F87-F96 1=N/A, 2=Not at all, 3=To a small extent, 4=To a moderate extent, 5=To a large extent, 6=To a very large extent	F84 1=None, 2=Very low & Low, 3=Average, 4=High, 5=Very high; F85 & F86 Unchanged; F87-96 1=N/A & Not at all, 2=To a small extent, 3=To a moderate extent, 4=To a large extent, 5=To a very large extent
Organizational Factors Influencing Advice Practice (F97-130)	F97-130 1=N/A, 2=Not at all, 3=To a small extent, 4=To a large extent, 5=To a very large extent	F97-130 1=N/A & Not at all, 2=To a small extent, 3=To a large extent, 4=To a very large extent

Reliability of the NQ work environment scores used in the study was assessed using Cronbach's alpha. The alpha for the subscale for collegial relationships was .87.

For the perceived organizational support subscale, the alpha was .86. Perceived work stress subscale alpha was .87. The communication subscale alpha was .75 and the autonomy/control of practice subscale alpha was .81. Scales above .7 are considered to have good internal consistency (Cronbach & Meehl, 1955; Huck, 2000).

Work environment scores for each nurse were generated from an average of the responses to each subscale. Missing data were treated using pairwise deletion, imputation, or average score when appropriate. Each nurse had five work environment scores, representing a scale of their perception of their work environment. (See Table V)

Table V

Items from NQ for Perceived Work Environment Subscales

Perceived Work Environment Subscales

Collegial Relationships

F64 When you know something of the clinicians' practice preferences, to what extent does this knowledge influence your handling of calls?

F65 I ask clinicians about their expectations regarding the degree of my involvement with health care decisions

F66 I negotiate with the clinician to establish our responsibilities for discussion of different kinds of information with patients.

F67 I clarify my scope of professional expertise when it is greater than the clinician thinks it is.

F68 I discuss with clinicians the degree to which I want to be involved in planning aspects of patient care.

F69 I suggest patient care approaches that I think would be useful.

F70 I discuss with clinicians areas of practice that reside more within the realm of medicine than nursing.

F71 I tell clinicians when, in my judgment, their orders seem inappropriate.

F72 I tell clinicians of any difficulties I foresee in the patient's ability to deal with treatment options and their consequences.

F73 I inform clinicians about areas of practice that are unique to nursing.

Perceived Work Environment Subscales

Organizational Support

- F74 In general, how much say or influence do you have over decisions affecting your work?
- F75 How much do you know about the goals of your department?
- F76 The organization does a good job of letting me know what is going on.
- F77 I understand how my work fits into the goals of the organization.
- F78 Our leaders are committed to making customer satisfaction a high priority in the organization.
- F79 I receive training that helps me give good service to customers.
- F80 In general, I am supported to do what is necessary to satisfy customers.
- F81 Day to day decisions and activities in the organization demonstrate that quality is a top priority.
- F82 Physicians in my work unit support me in providing quality service to our customers.
- F83 I would recommend KP to a close friend as a good place to get health care.

Work Stress

- F84 How would you describe the job pressure where you work?
- F85 How often do you feel under pressure at work?
- F86 Generally, how much of a problem is the pressure or stress you experience at work?
- F87 Difficulty in serving callers well and still keeping time with each call down.
- F88 Expected to maintain an average call time that is too low.
- F89 Monitoring of your call activities (call time, number of calls, etc.) by the system.
- F90 Monitoring of call activities by a manager.
- F91 Calls that take a long time to process.
- F92 Seeing how many callers are in the queue or how many messages are piled up.
- F93 Being expected to remain constantly at your workstation.
- F94 Having to deal with difficult members.
- F95 Difficulty talking to co-workers at work station

Communication

- F103 Lack of communication between call center and medical offices.
- F107 Too many handoffs from medical office.
- F109 Lack of follow-through from provider.
- F111 Lack of response from provider to my requests for consult/information.
- F113 Inability to consult with a physician.
- F115 Lack of accessibility to patient information.
- F119 Not having up to date information about preoperative/pre-procedure preparation.
- F121 Not having the most up-to-date protocols.

Autonomy/control of practice

- F97 Not having enough appointments to meet patient need.
- F99 Lack of same day appointments.
- F117 Documentation Requirements.
- F123 Being required to adhere to protocols.
- F125 Being required to use protocols that may not fit the particular situation.

Perceived Work Environment Subscales

F127 Not being allowed to give test results over the phone.

F129 Not being allowed to use my nursing judgment.

F=Field in questionnaire

Demographic characteristics of the advice nurse. In this study, I used the evaluation of demographic variables as covariates in relationship to perceptions of the work environment (See Appendix I for Operational Definitions of Variables). Specific nurse characteristics include the nurse's age, gender, years of experience in nursing and advice, basic nursing education, and highest nursing educational degree.

Outcomes. The outcomes of interest were the callers' understanding of the interaction (CUI), callers' experience of the interaction (CEI) and satisfaction of the caller, and the follow-through with advice offered from the CQ and CD for the 1,068 calls.. The higher the score, the better the patient outcome was rated. Individual outcomes are explained below.

Caller understanding of advice interaction (CUI). The CUI is the comparison of what the caller understood of the offered advice, the instructions given, and any interaction with the nurse about the advice given. The measure was the comparison from the CD of the advice offered in the call and the CQ reported understanding of the advice offered. (See Table VI)

By using both the CD and CQ, I compared six questions about the callers understanding of the interaction. Both tools were used to compare what the nurse rater noted the caller was told during the call and what the caller recalled about the disposition of the interaction. First, the CUI asked if the caller was "Sent for care," that is initial disposition. This item compared field 32 or field 34 on the CD to question three on the

CQ. If the response was yes for either field 32 or 34 in the CD, and response one, two, or three was marked for question three in the CQ, then the item was scored as one. If not, the item was scored as zero.

The second item queried the urgency of care advised. Three options to score understanding reflect the disposition of care. If CD field 33 was identified (with sub sections 11, 12, 13, or 14 indicated) and the CQ question three had response one, then there was agreement. If CD field 33 was identified (with subsections 15, 16, 17, or 10 indicated) and CQ question three had response two, there was agreement. If CD field 35 was identified (with sub sections 21, 22, 23, 24, or 20 indicated) and CQ question three had response three, there was agreement. Agreement to any of these three mutually exclusive options was scored as one. If none of these three options were matched, this item was scored as zero.

The CUI also included non-exclusive nurse/caller interactions. To assess the understanding of the nurse interaction in self-care instruction, the CD field 44 had to have a positive response and CQ question three response four was identified, a match was noted and a score of one was given. If not, then this item was scored as zero. If the nurse offered reassurance or explanation, as identified in CD field 43, and the caller identified response four or five to CQ question three, then the item received a score of one. If not, then this item was scored as zero. If a link to the primary care provider was understood from a positive response to CD field 40 and a response to CQ question three response seven, then this also received a score of one. If not, then this item was scored as zero. Finally, if either CQ question three responses eight or nine were indicated, the score was zero for that measure because there is no identified response on the CD. The summative

total for the six items in the CUI scale ranges from zero to five. The higher score shows more understanding from the interaction.

Table VI

Caller Understanding of the Interaction (CUI)

Caller Understanding of Advice Interaction	CQ Q3 Response 1 (the nurse directed me to urgency or emergency care); <i>OR</i> CQ Q3 Response 2 (nurse arranged for an appt. within 24 hrs.); <i>OR</i> CQ Q3 Response 3 (nurse arranged for or suggested get appt. after 24 hrs.)	CQ Q3 Response 1 (the nurse directed me to urgency or emergency care); CQ Q3 Response 2 (nurse arranged for an appt. within 24 hrs.); CQ Q3 Response 3 (nurse arranged for or suggested get appt. after 24 hrs.)	CQ Q3 Response 4 (the nurse told me what to do to take care of myself - self-care advice)	CQ Q3 Response 5 (the nurse asked me questions, then told me everything was fine and that I did not need to worry) <i>OR</i> Response 6 (the nurse gave me information or arranged the services I needed)	CQ Q3 Response 7 (the nurse communicated with my doctor or nurse practitioner for me)	CQ Q3 Responses 8 (nurse couldn't help) & 9 (other)
Sent for care: CD F32 (Urgent disposition - Was the disposition urgent or emergent?) or F34 (Appointment disposition - Was patient given an appointment?)	1	0	0	0	0	0
CD urgent disposition (F33) 11 (nurse called 911), 12 (caller to call 911), 13 (caller to ED), 14 (caller to urgency care); <i>OR</i> CD same day appointment (F33) 15 (same day w/ PCP), 16 (same day w/ non-PCP), 17 (nurse messaged med office for same day appt.), 10 (other urgent disposition); <i>OR</i> CD non-urgent appointment (F35) 21 (later appt w/ PCP), 22 (later appt. w/ non-PCP), 23 (non-urg same day appt w/ PCP), 24 (non-urg same day appt w/ non-PCP), 25 (referral to appt clerk), 20 (other appt.)	0	1	0	0	0	0
CD F44 (Nurse management - Did the nurse provide self-care management?)	0	0	1	0	0	0
CD F43 (Nurse management - Did the nurse provide explanation or reassurance?)	0	0	0	1	0	0
CD F40 (Link disposition - Link to Primary Care Provider?)	0	0	0	0	1	0
No link to the CD	0	0	0	0	0	0

Caller experience of the interaction (CEI) and overall satisfaction of the caller.

The two measures of satisfaction were comprised of the caller's experience of the interaction (CEI) and the overall satisfaction with the advice service.

The first measure compared answers to questions seven and eight and was adjusted by importance. These questions ask if advice services met the expectations of the caller through their experience of the interaction. By comparing the two questions, the study identified both the importance to the caller and the degree to which the nurse exhibited the necessary behavior in advice services. These questions identify the callers' perceptions of their interaction with the nurse and the ability of the nurse to meet their needs. Rosenthal and Shannon (1997) assert that this type of measure may reflect a more responsive approach to assessing the needs of patients and their satisfaction with services (Rosenthal & Shannon, 1997).

Question seven asks in six fields, "When you called, how **important** was it to you that the nurse would (1) 'Show that she/he cares about you as a person?' (2) 'Listen carefully to your ideas and your concerns?' (3) 'Give you clear, complete information or instructions?' (4) 'Know your (or your family member's) medical history?' (5) 'Work with you to make decisions that you were comfortable with?' (6) 'Appear skilled and knowledgeable?'" Question eight asks in six fields, "How much did the nurse **actually** (1) 'Show that she/he cares about you as a person?' (2) 'Listen carefully to your ideas and your concerns?' (3) 'Give you clear, complete information or instructions?' (4) 'Know your (or your family member's) medical history?' (5) 'Work with you to make decisions that you were comfortable with?' (6) 'Appear skilled and knowledgeable?'" Each field is

scored on a Likert scale from 1 (not very important/not applicable) to 4 (extremely important).

I recoded the importance and actual behavior into a range between zero and three. For question seven, "not very important/not applicable" for the first response was recoded as zero; "somewhat important" for the second response was recoded to one; and "important" for the third response recoded to two, and "extremely important" for the fourth response was recoded to three. For question eight, "not at all/non applicable" for response one was recoded to zero, "not very much" for response two was recoded as one; "somewhat" for response three was recoded as two; and "a great deal" for response four was recoded as three. The scores for each set of items were multiplied, then the mean score for each call identified. For example, CQ question 7a rating was multiplied by CQ question 8a rating. That value was averaged with the other item results from the product of questions seven and eight. The range of the average is zero to nine.

A second measure of satisfaction is question ten, "Overall, please rate your level of satisfaction with this call". The scoring range was one ("not at all helpful") to five ("extremely helpful").

Follow-through with advice. Follow-through is a determination of what the caller lists about following the advice call found in the CQ. Follow-through with advice is found in question four, "How much of the nurse's advice did you follow? (Please check only one box)". The responses were to reflect that the more advice followed, the higher the score. The possible responses were (1): "I followed all of the nurse's suggestions" with a score of three, (2): "I followed part but not all of the nurse's suggestions" scored as two, and (3): "I did not follow any of the nurse's suggestions" scored as one.

Demographic characteristics of the caller. Demographic data of caller characteristics were years of membership, years of education, frequency of Internet access for health information, and frequency of advice nurse use. These characteristics were chosen based on their relationship to an understanding about HMO members found in the pilot work in the ADVICE study. Specifically, years of membership in an HMO and years of education were expected to positively correlate with advice service usage. The reports found that members with chronic disease used the service more frequently than those without chronic problems did. Since advice services are a relatively new service, I thought that a member's use of the Internet could also be reflective of their health practices. Demographic variables were considered covariates related to patient outcomes of understanding of advice, caller experience of the interaction and satisfaction, and follow-through (See Appendix I for Operational Definitions of Variables).

Protection of human subjects

The Institutional Review Board at Oregon Health & Science University reviewed the work environment project. As no additional data was obtained from participants in the research, and an expedited review was completed and approved. Permission from the primary investigators of the ADVICE study was obtained.

Description of the involvement of human subjects. Calls were a convenience sample of HMO members who sought advice from the telephone advice service and who verbally consented to participate when asked by the advice nurse at the beginning of the call in the ADVICE study. The patient caller questionnaire from the member participants was used to assess patient understanding, satisfaction, and follow-through with offered

advice. Matched caller questionnaires to call descriptions were used for analysis of 1,068 calls in this sub-sample for the work environment study.

The ADVICE study, using a purposive sample, assessed the nurse's perceptions of telephone advice nursing program via a questionnaire, which was given to all nurses working in the telephone advice settings that met the inclusion criteria. The nurse questionnaire sub-sample for the work environment study of 96 was composed of nurses in the three regions studied who were employed at .5 FTE or greater in centralized advice settings. All nurses agreeing to participate in the study signed the consent.

Gender and minority inclusion. Because this is a secondary analysis of data collected by the ADVICE study, no selectivity was made in addition to that study based on gender or minority determinations. As is the case in the nursing profession, only 10% of the nurse sample was expected to be male but my sample had only four male participants (4%). No restrictions were placed on the inclusion criteria other than percentage of employment in advice settings. The selection of geographically diverse regions of the national HMO provides an ethnically diverse patient caller sample. No exclusions were made for callers based on racial or ethnic distinctions. All callers who called the advice service during the data collection period were potential participants.

Inclusion of children. No age discrimination was made for callers to the advice service. All callers who called the advice service during the data collection period were potential participants.

Sources of research material. As the study is a secondary data analysis, the permission of the ADVICE study principal investigators was obtained for access to the

data and a letter of data access was submitted to the IRB. The data has been de-identified and no identifiers are linked with call or nurse data.

Recruitment and informed consent. No additional recruitment of participants was indicated. The plan for recruitment and consent of participants was obtained from all appropriate bodies prior to data collection in the ADVICE study with understanding that the data could be used for additional analysis. Callers were asked to participate over the telephone when they called and if they agreed to participate, gave consent over the telephone. Nurses were recruited from the overall sample of nurses meeting the inclusion criteria. All nurse participants signed an informed consent.

Potential risks and protection against risks. Participants were not exposed to any additional risk related to the study. Data are stored in a locked file at the Center for Health Research (CHR), Portland, OR and has been shared with Oregon Health & Science University for additional analysis using data transfer procedures approved by CHR's and OHSU's IRBs. While at Oregon Health & Science University, data are kept secure in a locked file and an electronic file that is password protected. Data were coded with an acrostic code that protects the identity of the respondent. All identifying data was removed from the data after linkage was made between the call description and the follow-up Caller Questionnaire. Caller data were analyzed in aggregate so no individual could be identified. Only the principle investigator, the co-principle investigators and trained research assistants of the ADVICE study had access to the data. All identifying information about callers and the nurse respondents will be destroyed at the end of the ADVICE study. The data are kept secure in locked files.

Benefits. While no direct benefits were derived from the secondary analysis of the data from the ADVICE study, it is the intent of the study to provide organizations with the elements that support work environments to provide the best milieu for telephone advice services.

Statistical Analysis and Hypotheses

Multivariate analysis of covariance (MANCOVA) and hierarchical linear modeling (HLM) were used to test the research hypotheses. I linked databases with identification codes used in the ADVICE study. Missing data were treated using pairwise deletion, imputation, or average score when appropriate.

Multivariate analysis of variance (MANOVA). MANOVA is used appropriately when the design involves one or more categorical independent variables and two or more continuous dependent variables. The MANOVA allows a simultaneous test across all dependent variables by finding the linear combination of the dependent measures that maximizes separation among groups. A statistic test for which a p value for linear composite may be determined is also provided (Grimm & Yarnold, 2001).

Multivariate analysis of covariance (MANCOVA). A MANCOVA is like MANOVA, except it is the statistical method used to reduce error variance by measuring covariate variables known to affect the dependent measures. These continuous variables are factored out of the total variance then the independent variables are compared using means on the dependent variable that have been adjusted using the covariate. The MANCOVA will compare vectors on adjusted means rather than just comparing means. Using a covariate is appropriate when assumptions are met that there is a statistically significant linear relationship between the covariate and the dependent measure and the

homogeneity of the regressions is satisfied (Grimm & Yarnold, 2001). Although post hoc testing cannot be performed when covariates are included in the analysis, contrasts between levels of the analysis can point to relationships between the study levels.

MANCOVA was used to test hypotheses #1 and #2.

Hierarchical Linear Modeling (HLM). HLM is a multilevel analysis used to identify the relationship between nurses' perceptions of the work environment and patient outcomes of caller understanding of the interaction, caller experience of the interaction, overall satisfaction, and follow-through with offered advice. The HLM tool allows the investigator to think of the unit level organized into a hierarchy of successively higher-level units (Raudenbush & Bryk, 2002).

Initially used in educational research to study students in classes, classes in schools, schools in school districts, and so on, the statistical technique has increased in utility with the development of computers that are easier and faster to use. A model of this type can allow inferences to be drawn from data for population means at any level in the analysis (2002). A two-level HLM was used to test hypothesis #3.

Hypothesis #1. My first hypothesis was that site of the ADVICE study would be a unique predictor of nurses' perceptions of the work environment beyond nurse characteristics. I hypothesized that the elements in the work environment would influence the perceptions of nurses working in the site and be a significant predictor of nurse perceptions of the work environment when controlling for nurse characteristics.

Using SPSS, I determined the amount of correlation among the covariates. When two variables were highly correlated, only one was included in the MANCOVA as a

covariate. The composite scores were generated from perception scores from 96 nurses working in centralized advice sites who completed the NQ in the ADVICE study.

I performed a MANCOVA to test the first hypothesis using the five work environment composite scores of 96 nurses for dependent variables and site was the independent variable with three levels. Multiple covariates were included to control for nurse characteristics (years of experience in nursing, years of experience in advice, and highest nursing educational degree).

Hypothesis #2. My second hypothesis was that site of the ADVICE study would be a unique predictor of patient outcomes beyond caller characteristics. I hypothesized that the differences in sites would influence the patient outcomes and be a significant predictor of outcomes when controlling for caller characteristics.

Using SPSS, I determined the amount of correlation among the covariates. When two variables were highly correlated, only one was included in the MANCOVA as a covariate.

To test this hypothesis, I performed a MANCOVA with the outcome scores from the 1,068 advice calls for the dependent variables and site for the independent variable with three levels. Covariates were the caller characteristics (years of HMO membership, years of education, frequency of Internet access for health information, and frequency of advice nurse use) identified from the CQ data for 1,068 calls.

The outcome scores were callers' understanding of the interaction (CUI), callers' experience of the interaction (CEI), overall satisfaction, and follow-through with offered advice.

Hypothesis #3. My third hypothesis was that nurse perceptions of work environmental site factors are predictive of the patient outcomes when controlling for nurse and caller characteristics. I hypothesized that the elements in the work environment would influence the perceptions of nurses working in the site and be a significant predictor of patient outcomes of understanding, experience, satisfaction, and follow-through while controlling for nurse and caller characteristics. In this nested model, calls are nested in nurses and nurses are nested in sites.

A *t*-test was utilized to compare the larger sample of nurses from centralized sites to the smaller sample that recorded calls. The analysis assessed the similarity of the sample groups.

A two level HLM tested calls recorded by advice nurses differentiated by site. The Level 1 variable was the patient; the dependent variables were patient outcomes for the 1,068 calls and the covariates were caller characteristics (years of HMO membership, years of education, frequency of Internet access for health information, and frequency of advice nurse use). The Level 2 variable was nurse; the dependent variable was the intercept (average patient outcome for each nurse adjusted for patient characteristics) and the independent variables were the 18 work environment perception-scores from the nurses who recorded calls and site. Covariates were the nurse characteristics (years of experience in nursing and advice, and highest nursing educational degree).

The two level HLM analysis was completed for each patient outcome and controlled for both nurse and caller covariates. Although the sample size for calls was adequate, the nurse sample size was less than robust.

Specific operational definitions and variables used are in Appendix I.

Chapter Four: Results

This chapter presents the results of data analysis. I describe findings from correlations, MANCOVAs, and HLM analyses.

Research Question One:

Site of the ADVICE study will be a unique predictor of nurses' perceptions of the work environment beyond nurse characteristics

I performed correlations on the nurse characteristics considered as potential covariates. Not surprisingly, some were found to be collinear (Table VII). Age was highly correlated to years working as a registered nurse ($r=.701$); years working in telephone advice was collinear with years in the present position ($r=.345$); and basic nursing education was redundant to highest degree in nursing ($r=.695$). Age, gender, and basic nursing education were not included as covariates in the MANCOVA. Because years working in telephone advice and years in the present position were conceptually important to the analysis, I retained both variables. The variable "highest degree not in nursing" had a significant amount of missing data (missing $N=40$) and was dropped from the analysis.

Table VII

Correlation of Covariates in NQ

Nurses (N=96)							
Pearson Correlation	Basic degree as RN	Is highest degree in nursing?	Highest degree in other field	Years as an RN	Years working TAN	Years in current position	Age
Basic degree as RN	—	.695**	.384**	.069	-.083	.167	-.178
Is highest degree in nursing?		—	.321*	-.063	-.154	.161	-.164
Highest degree in other field			—	.121	.049	.218	.113
Years as an RN				—	.345*	.237*	.701**
Years TAN					—	.339**	.340**
Years in current position						—	.194
Age							—

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

I performed correlations on the work environment scores (Table VIII). Significant correlations were seen between perceived organizational support and collegiality ($r=.249$) and autonomy/control of practice ($r=-.280$). This finding reflected that the more the nurse perceived they were supported by the organization, the greater the perception of collegiality. This correlation leads me to believe that those who perceived organizational support also perceived positive collegial relationships. However, the more the nurse perceived organizational support, the less they perceived autonomy/control of practice as a problem within their practice setting.

Perceived work stress was correlated with communication ($r=.294$) and autonomy/control of practice ($r=.505$). Greater concerns of work stress indicated increased concerns in the ability to communicate within the setting and perceived autonomy/control of practice within the setting. Finally, communication was correlated significantly to perceived autonomy/control of practice ($r=.588$). This finding emphasized that if the perceived communication was positive then the perceived autonomy/control of practice was also positive.

I used all work environment scores in the analysis based on the conceptual underpinnings of the study.

Table VIII

Correlations Between Work environment scores

	Collegial Relationships Score	Organizational Support Score	Work Stress Score	Communication Score	Autonomy/Control of Practice Score
Collegial Relationships Score	—	.249*	.166	-.135	-.007
Organizational Support Score		—	-.157	-.195	-.280**
Work Stress Score			—	.294**	.505**
Communication Score				—	.588**
Autonomy/Control of Practice Score					—

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

I performed correlations between the work environment scores and the covariates to assess relationships (Table IX). No significant correlations were found between collegial relationships and the covariates. Perceptions of organizational support was significantly correlated to years employed as a registered nurse ($r=.289$) and age of the nurse ($r=.281$). This finding indicated that the age of the nurse and the years employed as a registered nurse was positively related to their perceived organizational support. That is, the older they were and the longer they had worked, the more they perceived the organization supported them.

A significant positive correlation was also found in perceived work stress with the highest educational degree as a nurse ($r=.287$). This meant that the more educated the

nurse; the more they perceived increases in work stress. A significant inverse relationship was identified between perceived communication scores with years employed as a registered nurse ($r=-.212$). This finding indicated that the more years of nurse experience, the less the nurse perceived a problem with communication. A significant positive relationship was found between autonomy/control of practice and years in the current position ($r=.221$). The longer a nurse was in their current position, the more autonomous and in control of their practice they felt. The assumption was that these nurses were satisfied in their current position and had perceived autonomy with practice control.

Table IX

Comparisons of Work environment scores and Covariates

	Collegial Relationships Score	Organizational Support Score	Work Stress Score	Communication Score	Autonomy Score
Is highest degree in nursing?	-.002	-.107	.287**	-.012	.139
Years as an RN	.014	.289**	-.075	-.212*	-.148
Years working in TAN	.025	.025	-.112	-.129	-.007
Years in current position	.123	.056	.090	-.094	.221*
Age	.152	.281**	-.132	-.182	-.031

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

A between subjects multivariate analysis of covariance (MANCOVA) was performed on five dependent variables associated with nurse perceptions of the work environment in telephone advice nursing centralized sites from 96 advice nurses. The dependent variables were perception composite scores of collegial relationships, organizational support, work stress, communication, and autonomy/control of practice. Three covariates: highest degree in nursing, years working as a registered nurse, and years working in telephone advice were included. The fixed factor or independent variable was advice call site.

Analysis was performed using SPSS 11.0 General Linear Model for multivariate tests. The total $N = 96$ was reduced to 88 with the deletion of NQs with incomplete data. Wilks' lambda indicated that the combined dependent variables were significantly related to the centralized advice sites, $F(10,154) = 3.145, p = .001$. When individual ANCOVAs were performed on the work environment scores, only autonomy/control of practice, $F(2, 81) = 7.580, p = .001$, communication, $F(2, 81) = 5.251, p = .007$, and work stress, $F(2, 81) = 4.376, p = .016$ reached significance (Table X).

Table X

Multivariate and Univariate Analysis of Variance F Ratios and p-Values for Work environment scores and Telephone Advice Site

		ANCOVA				
		Collegial	Organizational	Work		
		Relationships	Support	Stress	Communication	Autonomy
		Composite	Composite	Composite	Composite	Composite
MANCOVA		Score	Score	Score	Score	Score
F	3.145	.227	.924	4.376	5.251	7.580
p	.001**	.797	.401	.016*	.007*	.001**

Note: F ratios are Wilks' λ approximation of F s. MANCOVA = multivariate analysis of covariance; ANCOVA = Univariate analysis of covariance. * $p < .05$. ** $p < .01$.

Covariates appearing in the model were evaluated at the following values: Highest degree in nursing = .47, years employed as an RN = 19.33, and years working in telephone advice = 6.26.

I performed post hoc difference contrasts for work stress, communication, and autonomy/control of practice to identify differences between the advice centralized sites. Significant differences were found between the Southern California ($M=2.646$) and Mid-Atlantic ($M=3.149$) sites in scores of work stress. Mid-Atlantic reported higher mean levels of work stress than either the Southern California ($M=2.646$) or Northwest sites ($M=2.617$).

Site differences were also found in communication and autonomy/control of practice perceptions. The Northwest site scored significantly lower than Southern California and Mid-Atlantic in perceptions of communication ($M=1.858$) and autonomy/control of practice ($M=1.698$). The mean perception scores indicated that concerns about communication and autonomy were either not a problem or only a problem to a small extent (Table XI).

Table XI

Mean Scores and Standard Error for Measures of Work environment scores as a Function of Telephone Advice Centralized Sites

Mean Work environment scores										
Site	Collegial Relationships Score		Organizational Support Score		Work Stress Score		Communication Score		Autonomy /Control of Practice Score	
	<u>M</u>	<u>(SE)</u>	<u>M</u>	<u>(SE)</u>	<u>M</u>	<u>(SE)</u>	<u>M</u>	<u>(SE)</u>	<u>M</u>	<u>(SE)</u>
So.										
Cal	2.012	(.260)	3.631	(.150)	2.646	(.192)	2.477	(.143)	2.145	(.139)
Mid										
Atl.	2.212	(.130)	3.487	(.075)	3.149	(.096)	2.240	(.071)	2.314	(.070)
NW	2.159	(.254)	3.354	(.146)	2.617	(.187)	1.857	(.139)	1.698	(.136)

Covariates appearing in the model were evaluated at the following values: Highest degree in nursing = .47, years employed as an RN = 19.33, and years working in telephone advice = 6.26.

The first hypothesis that site would be a unique predictor of nurses' work environment scores beyond nurse characteristics was supported. There was a significant difference in overall work environment scores between ADVICE sites after controlling for nurse characteristics.

However, not all work environment scores were significant at the individual ANCOVA level. Collegial relationships and organizational support were not significantly different between sites. The range for perceived collegial relationships score was $M=2.012$ to $M=2.212$. On the scale from one to six, a mean around two indicated that interactions with the clinician were "almost never." Perceived organizational support was similarly not distinct between sites. Scores ranged between $M=3.354$ to $M=3.631$ within the range of one to five. A mean around three indicated the nurses' perception from the statements asked about the overall organizations' ability to communicate with and support their workers was "partly disagree; partly agree" to "agree" and "some" to statements about the ability of the nurse to influence their work setting.

Research Question Two:

Site of the ADVICE study will be a unique predictor of patient outcomes beyond caller characteristics

I performed correlation analyses of the four caller characteristic covariates and the four outcome measures. Two caller characteristics correlated with years of school completed: use of the internet for health information and length of membership. These findings indicated that the more years of education the member completed, the more likely they were to continue membership of the HMO. More years of education correlated to the more likely use the Internet of health information (Table XII). The range for Internet use was one to five with one indicating “never” and five indicating “very often.” The average use was $M=2.34$ or “hardly ever” to “now and then.”

All the outcome variables were correlated. Callers’ understanding of the interaction was related to the callers’ experience of the interaction ($r=.109$), overall satisfaction ($r=.169$), and amount of advice followed ($r=.146$). This finding indicates that the more the caller understood, they had a better experience, they had higher overall satisfaction, and they followed more of the offered advice. The callers’ experience of the interaction was related to overall satisfaction ($r=.597$) and the amount of the advice followed ($r=.345$) (Table XIII). Similarly, this finding indicates that the better the experience of the interaction with the advice nurse then their overall satisfaction was higher and they followed more of the advice. Overall satisfaction was related to amount of the advice followed ($r=.420$) indicating that overall satisfaction lead to more of the advice followed. That is, if the caller was satisfied with the call, had a positive experience

with the advice nurse, and understood what was advised, they followed more of the advice offered.

I performed correlations between the outcome measures and the caller covariates to assess for relationships (Table XIV). None of the variables was significantly correlated.

Table XII

Correlations of Caller Covariates

Pearson Correlation	Length of membership (years)	Years of school completed	Use of internet for health info	Number of times called past year
Length of membership (years)	—	.068*	-.006	-.040
Years of school completed		—	.212**	-.050
Use of internet for health info			—	-.023
Number of times called past 12 months				—

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table XIII

Correlations of Outcomes

	Total of CUI	CEI mean	Overall Satisfaction with the Advice Call	Amount of Advice Followed
Total CUI	—	.109**	.169**	.146**
CEI mean		—	.597**	.345**
Satisfaction			—	.420**
Follow- through				—

** Correlation is significant at the 0.01 level (2-tailed).

Table XIV

Correlations of Outcomes and Caller Characteristics

	Length of membership (years)	Years of school completed	Use of internet for health info	Number of times called past year
Overall Satisfaction	.008	.024	.041	-.054
CEI Mean	-.028	.016	.011	.051
Total CUI	-.025	.019	.017	-.022
Amount of advice followed	.034	.040	.020	-.009

I performed a second between-subjects multivariate analysis of covariance (MANCOVA) on four dependent variables from 1,068 advice calls from telephone advice nursing centralized sites. The dependent variables were scores of the caller understanding of the interaction (CUI), caller experience of the interaction (CEI), overall satisfaction with the advice call, and follow-through with the offered advice. I adjusted the analysis for four covariates: length of HMO membership in years, years of education, frequency of use of the Internet for health information, and number of times they have called the advice service in the past year. The fixed factor or independent variable was centralized advice call site.

I used SPSS 11.0 General Linear Model for multivariate tests for the data analysis. The total $N = 1,068$ advice calls was reduced to 865 with the deletion of calls for incomplete data. Wilks' lambda indicated the combined dependent variables were significantly related to the centralized advice sites, $F(8, 1710) = 2.207, p = .024$. When individual ANCOVAs were performed on the outcome scores, only overall satisfaction, $F(2, 858) = 3.327, p = .036$ and CEI, $F(2, 858) = 5.753, p = .003$ scales reached significance (Table XV).

Table XV

Multivariate and Univariate Analysis of Variance F Ratios and p-Values for Patient Outcomes and Telephone Advice Nursing Site

ANCOVA					
	MANCOVA	Total CUI Score	CEI Mean Score	Overall	Amount of Advice Followed Score
				Satisfaction with the Advice Call Score	
F	2.207	.670	5.753	3.327	.609
p	.024*	.512	.003**	.036*	.544

Computed using alpha = .05. * = $p < .05$; ** = $p < .01$

I performed post hoc difference contrasts for CEI and overall satisfaction to identify differences between the centralized advice sites. No significant differences were found between the Southern California and Mid-Atlantic sites in any of the outcome measures. The Northwest site (M=6.452) scored significantly lower than Southern California (M=6.798) and Mid-Atlantic (M=6.959) in the callers' experience of the interaction. The range of the measure was zero to nine and was a product of two questions that asked about the expectations and experience of the advice call. A higher score indicated a better experience. Scores had an overall range of zero to nine with an overall M=6.75.

The Northwest site (M=4.193) scored significantly lower than Southern California (M=4.368) and Mid-Atlantic (M=4.365) in overall satisfaction. The range was one to five but all ratings were scored in the “high” to “very high” range of the scale with an overall M=4.30 (Table XVI).

Table XVI

Mean Scores and Standard Deviations for Measures of Outcome as a Function of Telephone Advice Centralized Sites

Site	Outcome Measures							
					Overall		Amount of	
	Total CUI		CEI Mean		Satisfaction with		Advice	
	Score		Score		the Advice Call		Followed	
	M	(SE)	M	(SE)	M	(SE)	M	(SE)
Southern								
California	.902	(.037)	6.798	(.113)	4.368	(.056)	2.83	(.031)
Mid								
Atlantic	.945	(.033)	6.959	(.100)	4.365	(.050)	2.79	(.028)
Northwest	.961	(.037)	6.452	(.113)	4.193	(.056)	2.78	(.031)

The second hypothesis that site would be a unique predictor of patient outcomes beyond caller characteristics was supported. Individual contrasts of sites for CEI and

overall satisfaction measures indicated that scores in Northwest were lower than other sites. Even though differences were found in outcomes of CEI and overall satisfaction between advice sites, individual outcomes of CUI and follow-through were not significant. Little differences were found in mean scores for these two outcome measures.

Correlations among outcome measures and correlations among caller characteristics were found but no correlation was identified between outcome measure and caller characteristics.

Research Question Three:

Work environmental perception scores are predictive of the patient outcomes when controlling for nurse and caller characteristics

I performed *t*-tests to look for significant differences between the nurses who recorded calls and the nurses who did not record calls. Descriptive information is located in Table XVII.

The independent-sample *t*-tests found significant differences in organizational support composite scores, $t(93) = -2.981, p < .01$, and work stress composite scores, $t(94) = 2.266, p < .05$. The group who recorded calls had a higher perception of organizational support ($M=3.85$) than those who did not record calls ($M=3.43$). The group who recorded calls also had a lower perception of work stress ($M=2.62$) than those who did not record calls ($M=3.05$).

Table XVII

Independent Samples Test of Nurses Who Recorded Calls to Nurses Not Recording Calls

Variable	Recording nurses	N	Mean	Std. Deviation (Std. Error Mean)	<i>t</i>	<i>p</i>
Is highest degree in nursing	not recorded	76	.51	.503 (.058)	1.37	.173
	recorded	18	.33	.485 (.114)		
Years employed as an RN	not recorded	76	19.51	8.77 (1.01)	-.227	.821
	recorded	18	20.06	10.58 (2.49)		
Years working in TAN	not recorded	77	5.77	4.76 (.543)	-1.84	.070
	recorded	18	8.50	8.70 (2.05)		
Organizational support composite score	not recorded	77	3.42	.553 (.063)	-2.981	.004**
	recorded	18	3.85	.505 (.119)		
Work Stress composite score	not recorded	78	3.05	.752 (.085)	2.266	.026*
	recorded	18	2.62	.502 (.118)		
Communication composite score	not recorded	78	2.18	.532 (.060)	.132	.895
	recorded	18	2.16	.640 (.151)		
Collegial composite score	not recorded	75	2.23	.979 (.113)	.264	.792
	recorded	18	2.16	.908 (.214)		
Autonomy composite score	not recorded	77	2.19	.535 (.061)	.745	.458
	recorded	18	2.08	.574 (.135)		

Computed using $\alpha = .05$. * = $p < .05$; ** = $p < .01$

I used a hierarchical linear modeling, which included the advice calls nested within nurses who recorded the calls, who were nested in sites of the centralized advice setting. There were 1,068 calls for the 18 nurses who recorded the calls. The 18 nurses were equally divided among the three TAN sites. Six nurses recorded calls at each site.

I performed four two-level hierarchical linear models (HLM) (Raudenbush & Bryk, 2002) one each for CUI, CEI, overall satisfaction, and follow-through outcome measures. Site was dummy coded with the Northwest region as the comparison group. The Northwest region was compared to the Southern California and Mid-Atlantic regions because of the differences seen in the MANCOVA analyses in research questions one and two.

In the first HLM, the callers' understanding of the interaction (CUI) was the dependent variable with caller level covariates of years of HMO membership, years of education, Internet use for healthcare information, and number of times calling the advice service in the past twelve months. In the level 2 model, the intercept for the CUI score at level 1 (mean CUI for each nurse adjusted for caller covariates) was predicted from the site, organizational support composite score, work stress composite score, communication composite score, collegiality composite score, and autonomy composite score; and nurse characteristics covariates (highest degree in nursing education, years employed as a registered nurse, and years employed in TAN). The second through fourth HLM analyses were performed with the same covariates as independent variables substituting the other outcomes as dependent variables: CEI, overall satisfaction, and follow-through.

While the number of recorded calls lends weight to the level-one analysis, the small sample of recording nurses decreases the stability of the effects in the level 2 model. The robust standard errors estimation for the fixed effects is appropriate for datasets having a moderate to large number of level-two variables. Because the Level-2 sample size influences the standard error, the robust standard errors are underestimated in small samples creating too liberal a *t*-ratio and overestimation of significance (Raudenbush, Bryk, Cheong, & Congdon, 2001). Therefore, there is an increased risk of a Type I error, specifically, finding significance when none exists. Since my Level-2 data do not meet the size criterion, a lower level of significance ($p < .01$) was used to minimize Type I errors. Raudenbush and colleagues suggest that the significance tests associated with the robust standard errors are too liberal and a lower level of significance level is appropriate.

Table XVIII *Descriptive Statistics for HLM Level-1 Variables*

LEVEL-1 DESCRIPTIVE STATISTICS					
VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
Caller Understanding of the Interaction	1056	0.93	0.61	0.00	2.00
Caller Experience of the Interaction	1038	6.75	1.86	0.00	9.00
Overall Satisfaction	1054	4.30	0.92	1.00	5.00
Follow-through	1044	2.80	0.49	1.00	3.00
Years of HMO Membership	989	10.38	9.11	0.00	45.00
Years of Education	985	14.01	2.78	0.00	26.00
Use of Internet for Health Information	1018	2.34	1.28	1.00	5.00
Number of Times Used the Advice Services in Last 12 Months	967	6.87	9.97	0.00	120.00

Table XIX

Descriptive Statistics for HLM Level-2 Variables

<u>LEVEL-2 DESCRIPTIVE STATISTICS</u>					
<u>VARIABLE NAME</u>	<u>N</u>	<u>MEAN</u>	<u>SD</u>	<u>MINIMUM</u>	<u>MAXIMUM</u>
Highest Degree in Nursing	18	0.33	0.49	0.00	1.00
Years Employed as an RN	18	20.06	10.58	2.00	39.00
Years Employed in TAN	18	8.50	8.70	1.00	39.00
Gender	18	0.89	0.32	0.00	1.00
SITE Southern California	18	0.33	0.49	0.00	1.00
SITE Mid- Atlantic	18	0.33	0.49	0.00	1.00
Organizational Support Score	18	3.85	0.51	3.20	4.90
Work Stress Score	18	2.62	0.50	1.77	3.62
Communication Score	18	2.16	0.64	1.13	3.50
Collegial Relationships Score	18	2.16	0.91	1.00	4.14
Autonomy/Control of Practice Score	18	2.08	0.57	1.22	3.33

CUI. None of the Level-2 fixed effects were uniquely associated with CUI when tested with non adjusted standard errors (Table XX). Using robust standards errors at a significance level of $p < .01$, significance was found for the highest degree in nursing, $t(7) = -4.251, p = .004$ years of employment as a registered nurse, $t(7) = -4.297, p = .004$, and autonomy/control of practice, $t(7) = 3.541, p = .011$ (Table XXI). Nurses with higher degrees and more experience as a registered nurse had lower associated caller understanding than those with lower degrees and experience. As nurses' perception of autonomy increased the callers' understanding increased. When reviewing the variance unexplained by the model, it is desirable to find non-significant values. For the CUI, the variance parameter was not significant, $\chi^2(6) = 4.30968, p > .5$ (Table XXII), indicating the majority of the variance in CUI was explained by the model.

Table XX

Final Estimation of Fixed Effects for CUI

Fixed Effect	Coefficient	Standard Error	t-ratio	App. df.	p-value
Intercept	0.935243	(0.343)	2.724	7	
Highest degree	-0.136348	(0.061)	-2.231	7	0.060
Employed as an RN	-0.007627	(0.003)	-2.335	7	0.052
Employed in TAN	0.005255	(0.004)	1.411	7	0.201
SITE So. CA	-0.100029	(0.086)	-1.168	7	0.281
SITE Mid-Atlantic	-0.014104	(0.075)	-0.187	7	0.857
Organizational Support	-0.053844	(0.090)	-0.598	7	0.569
Work Stress	0.036612	(0.068)	0.539	7	0.606
Communication	0.005286	(0.058)	0.091	7	0.931
Collegial Relationships	0.046724	(0.050)	0.926	7	0.386
Autonomy	0.065253	(0.068)	0.961	7	0.369

Table XXI

Final Estimation of Fixed Effects with Robust Standard Errors for CUI

Fixed Effect	Coefficient	Robust Standard Error	t-ratio	App. df.	p-value
Intercept	0.935243	(0.123)	7.682	7	
Highest degree	-0.136348	(0.032)	-4.251	7	0.004**
Employed as an RN	-0.007627	(0.001)	-4.297	7	0.004**
Employed in TAN	0.005255	(0.002)	3.069	7	0.019
SITE So. CA	-0.100029	(0.038)	-2.633	7	0.034
SITE Mid-Atlantic	0.014104	(0.030)	0.383	7	0.715
Organizational Support	-0.090007	(0.063)	-0.477	7	0.647
Work Stress	0.036612	(0.033)	1.096	7	0.310
Communication	0.005286	(0.020)	0.268	7	0.797
Collegial Relationships	0.046724	(0.037)	1.311	7	0.232
Autonomy	0.065253	(0.018)	3.541	7	0.011*

Significance alpha * = $p < .05$; ** = $p < .01$

Table XXII

Final Estimation of Variance Components for CUI

Random Effect	Standard Deviation	Variance Component	df	Chi-square	p-value
Intercept	0.00891	0.00008	7	4.30968	>.500
Level-1	0.60778	0.36940			

CEI. Only the comparison of the Northwest site and the Mid-Atlantic site, $t(7) = 2.458$, $p=.043$ of the Level-2 fixed effects was uniquely associated with *CEI* when tested with non adjusted standard errors (Table XXIII). Using robust standards errors at a significance level of $p<.01$, significance was not found in any other variable (Table XXIV). Callers to the Mid-Atlantic site had increased levels of callers' experience of the interaction compared to callers at the Northwest site. The variance parameter was not significant, $\chi^2(7) = 11.79162$, $p=.107$ (Table XXV), indicating the majority of the variance in *CEI* was explained by the model.

Table XXIII

Final Estimation of Fixed Effects for CEI

Fixed Effect	Coefficient	Standard Error	t-ratio	App. df.	p-value
Intercept	4.938804	(1.285)	3.884	7	
Highest degree	-0.230894	(0.233)	-0.990	7	0.356
Employed as an RN	-0.008383	(0.013)	-0.664	7	0.528
Employed in TAN	0.013036	(0.014)	0.930	7	0.384
SITE So. CA	0.211724	(0.324)	0.654	7	0.534
SITE Mid-Atlantic	0.705416	(0.287)	2.458	7	0.043*
Organizational Support	0.507232	(0.339)	1.494	7	0.179
Work Stress	-0.152104	(0.255)	-0.597	7	0.569
Communication	-0.118735	(0.226)	-0.525	7	0.615
Collegial Relationships	-0.284164	(0.191)	-1.485	7	0.181
Autonomy	0.390045	(0.252)	1.547	7	0.165

Significance alpha * = $p<.05$; ** = $p<.01$

Table XXIV

Final Estimation of Fixed Effects with Robust Standard Errors for CEI

Fixed Effect	Coefficient	Robust Standard Error	t-ratio	App. df.	p-value
Intercept	4.938804	(0.777)	6.360	7	
Highest degree	-0.230894	(0.121)	-1.909	7	0.097
Employed as an RN	-0.008383	(0.009)	-0.900	7	0.398
Employed in TAN	0.013036	(0.008)	1.713	7	0.130
SITE So. CA	0.211724	(0.218)	0.971	7	0.364
SITE Mid-Atlantic	0.705416	(0.151)	4.680	7	0.002**
Organizational Support	0.507232	(0.206)	2.456	7	0.044
Work Stress	-0.152104	(0.171)	-0.889	7	0.404
Communication	-0.118735	(0.133)	-0.894	7	0.402
Collegial Relationships	-0.284164	(0.127)	-2.232	7	0.060
Autonomy	0.390045	(0.193)	2.021	7	0.082

Significance alpha * = $p < .05$; ** = $p < .01$

Table XXV

Final Estimation of Variance Components for CEI

Random Effect	Standard Deviation	Variance Component	df	Chi-square	p-value
Intercept	0.19471	0.03791	7	11.79152	0.107
Level-1	1.81845	3.30674			

Overall Satisfaction. None of the level 2 fixed effects were uniquely associated with overall satisfaction when tested with non adjusted standard errors (Table XXVI) or robust standards errors at a significance level of $p < .01$ (Table XXVII). The variance parameter was significant, $\chi^2(6) = 19.71271$, $p = .003$ (Table XXVIII) indicating that the model left a significant portion of variance in overall satisfaction unexplained.

Table XXVI

Final Estimation of Fixed Effects for Overall Satisfaction

Fixed Effect	Coefficient	Standard Error	t-ratio	App. df.	p-value
Intercept	3.215965	(0.818)	3.929	7	
Highest degree	-0.044144	(0.151)	-0.293	7	0.778
Employed as an RN	-0.002977	(0.008)	-0.362	7	0.728
Employed in TAN	0.007992	(0.009)	0.890	7	0.403
SITE So. CA	0.111217	(0.207)	0.537	7	0.607
SITE Mid-Atlantic	0.109471	(0.185)	1.028	7	0.339
Organizational Support	0.208177	(0.217)	0.957	7	0.371
Work Stress	-0.034038	(0.161)	-0.211	7	0.839
Communication	0.031120	(0.148)	0.211	7	0.839
Collegial Relationships	-0.062434	(0.123)	-0.507	7	0.627
Autonomy	0.112514	(0.158)	0.712	7	0.499

Significance alpha * = $p < .05$; ** = $p < .01$

Table XXVII

Final Estimation of Fixed Effects with Robust Standard Errors for Overall Satisfaction

Fixed Effect	Coefficient	Robust Standard Error	<i>t</i> -ratio	App. df.	<i>p</i> -value
Intercept	3.215965	(0.436)	7.375	7	
Highest degree	-0.044144	(0.064)	-0.695	7	0.509
Employed as an RN	-0.002977	(0.007)	-0.438	7	0.674
Employed in TAN	0.007992	(0.005)	1.480	7	0.182
SITE So. CA	0.111217	(0.164)	0.680	7	0.518
SITE Mid-Atlantic	0.109471	(0.107)	1.770	7	0.119
Organizational Support	0.208177	(0.141)	1.475	7	0.184
Work Stress	-0.034038	(0.079)	-0.428	7	0.681
Communication	0.031120	(0.087)	0.356	7	0.732
Collegial Relationships	-0.062434	(0.088)	-0.708	7	0.502
Autonomy	0.112514	(0.084)	1.347	7	0.220

Significance alpha * = $p < .05$; ** = $p < .01$

Table XXVIII

Final Estimation of Variance Components for Overall Satisfaction

Random Effect	Standard Deviation	Variance Component	df	Chi-square	<i>p</i> -value
Intercept	0.16155	0.02610	7	20.36544	0.005**
Level-1	0.90548	0.81990			

Significance alpha * = $p < .05$; ** = $p < .01$

Follow-through. None of the level 2 fixed effects were uniquely associated with follow-through when tested with non adjusted standard errors (Table XXIX) or robust standards errors at a significance level of $p < .01$ (Table XXX). The variance parameter was not significant, $\chi^2(7) = 9.27033, p = .233$ (Table XXXI), indicating the majority of the variance in follow-through was explained by the model.

Table XXIX

Final Estimation of Fixed Effects for Follow-through

Fixed Effect	Coefficient	Standard Error	<i>t</i> -ratio	App. df.	<i>p</i> -value
INTRCPET	2.644562	(0.309)	8.562	7	
Highest degree	-0.022556	(0.056)	-0.405	7	0.697
Employed as an RN	-0.004306	(0.003)	-1.436	7	0.194
Employed in TAN	-0.001257	(0.003)	-0.374	7	0.719
SITE So. CA	-0.048745	(0.078)	-0.628	7	0.549
SITE Mid-Atlantic	-0.050865	(0.068)	-0.743	7	0.482
Organizational Support	0.051302	(0.081)	0.630	7	0.548
Work Stress	-0.077407	(0.061)	-1.263	7	0.247
Communication	0.049075	(0.054)	0.916	7	0.390
Collegial Relationships	0.008841	(0.046)	0.193	7	0.853
Autonomy	0.029119	(0.061)	0.478	7	0.647

Significance alpha * = $p < .05$; ** = $p < .01$

Table XXX

Final Estimation of Fixed Effects with Robust Standard Errors for Follow-through

Fixed Effect	Coefficient	Robust Standard Error	<i>t</i> -ratio	App. df.	<i>p</i> -value
Intercept	2.644562	(0.182)	14.519	7	
Highest degree	-0.022556	(0.029)	-0.780	7	0.461
Employed as an RN	-0.004306	(0.002)	-1.931	7	0.094
Employed in TAN	-0.001257	(0.002)	-0.533	7	0.610
SITE So. CA	-0.048745	(0.056)	-0.872	7	0.412
SITE Mid-Atlantic	-0.050865	(0.034)	-1.461	7	0.182
Organizational Support	0.051302	(0.056)	0.911	7	0.393
Work Stress	-0.077407	(0.030)	-2.548	7	0.038
Communication	0.049075	(0.027)	1.842	7	0.107
Collegial Relationships	0.008841	(0.035)	0.250	7	0.810
Autonomy	0.029119	(0.030)	0.991	7	0.355

Significance alpha * = $p < .05$; ** = $p < .01$

Table XXXI

Final Estimation of Variance Components for Follow-through

Random Effect	Standard Deviation	Variance Component	df	Chi-square	<i>p</i> -value
Intercept	0.03686	0.00136	6	9.27033	0.233
Level-1	0.48221	0.23253			

The third hypothesis that perceived work environmental scores are predictive of the patient outcomes when controlling for nurse and caller characteristics had little support. The only work environment score that was close to statistical significance with an outcome measure was autonomy/control of the practice environment with CUI. However, the relationship did not meet the significance level required by the parameters of the study even though it was very close. None of the other work environment scores reached significance to any of the outcome measures.

Site differences to outcome measures were found to be significant for CEI between the Mid-Atlantic site and the Northwest site. Site was not a significant variable for any other outcome. Nurse characteristics of highest degree of nursing education and years of registered nurse experience with robust standard error were significant in relation to CUI. The inverse relationship between the education and experience to the CUI indicates that the more education and experience the nurse has, the less the caller understands. Caution should be made when reviewing this result due to the very small sample size of nurses in the Level-2 model.

Overall, the third hypothesis was not supported.

Summary

A MANCOVA was performed on the NQ dataset. The dependent variables were the work environment perception composite scores for collegial relationships, organizational support, work stress, communication, and autonomy/control of practice. The fixed factor was site with three levels: Northwest, Southern California, and Mid-Atlantic. The covariates were characteristics of the nurses: highest degree in nursing, years of registered nurse experience, and years of working in TAN.

The findings revealed that there were differences between nurse perceptions of the work environment sites. Using a multivariate analysis with covariates (MANCOVA) with Wilks' lambda significant differences were noted. When individual ANCOVAs were performed on the perception composite scores, only autonomy/control of practice, communication, and work stress reached significance. The first hypothesis—site of the ADVICE study will be a unique predictor of nurses' perceptions of the work environment beyond nurse characteristics—was supported.

A second MANCOVA was performed on the data from the CQ and CD dataset. The dependent variables were the caller outcomes: CUI, CEI, overall satisfaction, and follow-through. The fixed factor was site with three levels: Northwest, Southern California, and Mid-Atlantic. Covariates were years of HMO membership, years of education, frequency of Internet use for health information, and the number of times called the advice service in the past 12 months.

The findings revealed significant differences for patient outcomes between ADVICE sites using Wilks' lambda. When individual ANCOVAs were performed on the outcome scores, only overall satisfaction and the callers' experience of the interaction scales reached significance. The second hypothesis—site of the ADVICE study will be a unique predictor of patient outcomes beyond caller characteristics—was supported.

I performed four two-level hierarchical linear modeling (HLM) (Raudenbush & Bryk, 2002) one for each outcome measure CUI, CEI, overall satisfaction, and follow-through. Site was dummy coded with the Northwest site as the comparison group.

In the Level-1 HLM, the CUI was the dependent variable with covariates of caller characteristics. In the Level-2 model, the intercept for the CUI score at Level-1 (mean

CUI for each nurse adjusted for caller covariates) was predicted from the site; nurse perception composite scores, and nurse characteristics covariates. The second through fourth HLM analyses were performed with the same covariates as independent variables and substituting the other outcomes as dependent variables: CEI, overall satisfaction, and follow-through.

I found that the callers' understanding of the interaction was influenced by the highest degree in nursing and years employed as a registered nurse. Nurses with higher education and more experience as a registered nurse had lower levels of caller understanding. This was an inverse relationship to caller understanding and should be interpreted with caution due to the small sample size of nurses in the Level-2 model. I also found that CUI suggested a positive relationship with perception of autonomy/control of practice but study level significance was not reached.

The CEI was significantly related to the Mid-Atlantic site compared to the Northwest site. Callers experienced a more positive interaction when calling the Mid-Atlantic site when compared to Northwest. No other items reached significance for CEI.

Although the HLM analysis of overall satisfaction did not account for all the variance in the model, none of the items was significant. No significance was found in the HLM analysis for follow-through. Finally, the third hypothesis—perceived work environmental scores are predictive of the patient outcomes when controlling for nurse and caller characteristics—was not supported.

Chapter Five: Discussion, Implications, and Conclusions

The availability of telephone advice nursing services meets a need of today's healthcare consumer (Baker, Schubert, Kirwan, Lenkauskas, & Spaeth, 1999; Dale et al., 1998; Egleston et al., 1994; George & McClain, 1998; Greenberg, 2000; Hagan et al., 2000; Omery, 2003; Poole et al., 1993; Shekelle & Roland, 1999). Advice services offer the HMO members support in self-care approaches to health concerns, as well as directing them to needed care through a scheduled appointment or urgent or emergency care. Nevertheless, can TAN services be successful if the nurses giving the advice work in unsupportive conditions? This dissertation was a study of the relationship between work environment influences and patient outcomes in telephone advice. Using data from the study "Predictors of Outcomes of Telephone Advice Nursing" (ADVANCE) (Valanis et al., 2003d; Valanis et al., 2003c), I performed a secondary analysis of the data from centralized call sites to see whether a relationship existed between work environments of the study's telephone advice sites and patient outcomes. I used nurses' individual work environment scores as a measure of their perceived collegial relationships, organizational support, work stress, communication in the organization, and autonomy/control of nursing practice. Caller outcomes included caller understanding of the interaction, caller experience of the interaction, overall satisfaction with the advice call, and follow-through with the offered advice.

In this chapter, I discuss study findings and their implications for nursing practice, research, and theory. The chapter is divided into three sections. First, I discuss the results related to each hypothesis in light of the literature. Second, I examine the structure-

process-outcome model as an organizing framework for this dissertation taking into consideration the results found in the analysis. Finally, I present a summary of the research with implications, limitations, and directions for further investigation.

Differing work environment scores among ADVICE sites: MANCOVA #1

Work environment—as part of the conceptual framework of the structure-process-outcome model—can influence worker perceptions (Donabedian, 1985; Shortell & Kaluzny, 2000). However, Aiken (2003) found that the work environment is a characteristic of the work site and not just an individual nurse perception (Aiken et al., 2003). The employee's understanding of how work is organized, who performs the work, what activities regulate the work, what expectations the organization has of the workers, what access the workers have to information, how the workers are managed, and what restrictions are placed on the workers are characteristic of individual organizations (del Bueno & Vincent, 1986; Denison, 1996; Moos & Schaefer, 1987; Reichers & Schneider, 1990). In addition to these organizational characteristics, regional, social, and cultural factors can affect both the work practice and the workers' perceptions of the work environment (McDaniel & Stumpf, 1993; Stratton, 1990; Denison, 1996). Behavioral traits in ethnic communities and moral, as well as ethical, characteristics of groups can have a considerable effect on organizations in the inherent work environment (Ramirez, Teresi, Holmes, & Fairchild, 1998; Leininger, 1993).

Although the investigators in the ADVICE study assumed that there would be commonalities among sites, differences in management of practice and the nurse characteristics were identified in the pilot work of the ADVICE study (Valanis et al., 2003a; Valanis et al., 2003d; Valanis et al., 2003c). There were objective differences

among sites in protocol use, information access and documentation, quality assurance techniques, and call center management (Valanis et al., 2003d; Valanis et al., 2003c). Structural differences among sites included restrictions in nurse movement, restrictions on nurse interactions, monitoring of call times, answer rates, abandonment rates, time on hold, and work schedules. Process differences included information access to the medical record, documentation requirements, protocol requirements, call-back practices, and access to other health care professionals for information. Differences in sites were examined in reference to these influencing factors.

In focus groups, nurses described their perceptions of their work environment—in some sites, nurses described limited control over their own practice. To identify differences among sites in reference to these influencing factors—information access, protocol use, and quality assurance activities—the investigators in the ADVICE study developed the nurse questionnaire to try to capture the variations in nurses' perceptions of the work environment to identify the amount of perceived stress and the effect on practice. These perceptions were then used as work environment scores for each nurse participant in the work environment study. Additionally, the ADVICE study assessed nurse characteristics. These were age, gender, education, experience in nursing practice, and experience in TAN then used as covariates in the work environment study.

I expected to see differences among sites for the five work environment scores as well as overall site scores. I assumed that the nurse characteristics such as the highest degree in nursing education and experience both in nursing and in advice would interact with the work environment to produce differential effects on practice. For example, I expected that scores for work stress would vary depending on educational preparation

and years of experience. I expected differences in experience, to influence scores for autonomy/control of practice and communication. I also thought I would find differences among site scores for organizational support and collaboration based on years of RN and advice practice experience.

To assess differences in work environment scores among advice sites I performed a MANCOVA. Controlling for nurses' education, years of RN experience, and years working in telephone advice, I found significant differences among ADVICE sites. Individual ANCOVA results specifically in work stress, communication, and autonomy/control of practice were also significant.

Post hoc contrast of the work environment scores for sites showed the Mid-Atlantic site had significantly higher work stress scores than the other sites. This finding indicated that the Mid-Atlantic nurses expressed significantly more concerns about work stress than the other sites of Northwest or Southern California. The Northwest site scores were significantly lower than Mid-Atlantic and Southern California for concerns of communication difficulty and autonomy/control of practice. This finding reflected that the Northwest had very few concerns about autonomy/control of practice or communication difficulty. These findings were consistent with the results from focus groups in the pilot work of the ADVICE study.

Mid-Atlantic. The Mid-Atlantic site scored the highest in concerns of work stress compared to the other sites. A higher score in the work stress scale indicated a greater level of perceived stress. After a review of the ADVICE study pilot work, differences among sites were identified. Ninety percent of the staff worked part-time via a union driven contract although all sites were unionized. Physicians and pharmacists were either

present on site or on call. The Northwest site also had a high percentage of part-time workers but in Southern California, the majority of nurses worked full-time. Sites other than Mid-Atlantic did not have on-site access to physician consultation.

Specific structural and process issues in Mid-Atlantic could be implicated in the site differences found in the work stress scores. Nurses had limited movement and peer interaction due to their workstation design. Nurses were situated in cubicles with their focus on the computer screen and the call. In all sites, continuous notification was provided indicating how many calls were waiting and how long the current call had been.

Supervisors monitored calls for quality assurance by periodically listening to the advice nurse and caller interaction. Continuous monitoring of the calls by a supervisor has been found to increase work stress (DiTecco et al., 1992). Although call-hold times were the shortest (2.6 minutes) of the three call centers and the lowest rate of abandonment (8%), charting took the longest time (9.2 minutes) (Valanis et al., 2001). Monitoring of call-times, setting unrealistic expectations on call quotas, and limiting worker input to practice design are all elements that have had an impact in service-industry call settings. These quality assurance techniques have lead to a dissatisfied work force (Deeks, 2000; DiTecco et al., 1992; Feinberg et al., 2000; Franklin, 2000). Monitoring of call-times, wait-times, abandonment rates, and call-back times subject the professional practice in healthcare to restrictions of dubious value and foster stress (Arkin, 1997; DiTecco et al., 1992). Continuous oversight of employee activities in a professional healthcare setting gives a message of mistrust and threatens employee empowerment (Aiken, 2002; Laschinger et al., 1997). Questions remain about finding the best approach to quality assurance in advice practice.

Nurses at the Mid-Atlantic site were expected to document on the computer as well as to complete a paper back-up record of the advice call. However, programs to assess documentation as a quality indicator have been inadequate in advice settings (Larson-Dahn, 2001). Larson-Dahn found that random checking of practice through documentation has been limited since it is difficult to capture an adequate assessment influenced by critical thinking skills, patient outcomes, health status, and advice followed. Expectations to control wait times and the need for 'hard copy' documentation can place additional burdens on nurses who are trying to attend to patient needs. Use of computerized medical records for ease of documentation has been seen to improve job satisfaction and support professional decision-making (Omery, 2003; Scherb, 2001; Yancey, Given, White, DeVoss, & Coyle, 1998). Nevertheless, at this site, only limited medical record information was available to the advice nurses via the computer and the primary patient's medical record was located in their decentralized clinic. This difficult process encumbered documentation. In contrast, the Northwest site had the medical record available on-line which eased record keeping and communication.

Other practice differences in the Mid-Atlantic site included required computer-based protocol use. Standardized protocol use may improve outcomes for both patient and primary-care provider (Poole et al., 1993), but concerns remain about the triage decisions made without visual cues (Salk et al., 1998). Omery (2003) found, in a recent review of literature about advice practice, that protocols and guidelines did not guarantee standardized care, advice, or outcomes. However, protocols are widely used and thus how they are implemented is important. In the Mid-Atlantic site, once a protocol was selected, the advice nurse had to complete all questions before any change in protocol could be

made. That is, if they selected a protocol that turned out to be inappropriate for the call, they had to complete it before they could access a more appropriate one. This practice increased stress (Valanis et al., 2003a) particularly in light of the expectation to keep call times to a minimum.

Computerized protocol programs with flexibility to switch protocols mid-call if indicated would not only allow the advice nurse to exercise professional judgment and critical thinking, but would provide a vehicle for appropriate documentation (Huber & Blanchfield, 1999). Huber and colleagues suggest the use of the North American Nursing Diagnosis Association (NANDA) criteria and create and use of a Nursing Intervention Criteria (NIC) for advice practice, where nurses provides care for an acute problem through a telephone intervention. Additionally, such protocols could be kept current as needed to adjust to changing care trends instead of the current situation, in which, some protocol currency was questioned (Valanis et al., 2003a).

In professional practice, the nurse expects to make an independent judgment about what data should be collected in an assessment of the patient. As an essential nursing skill, an independent assessment is included in professional autonomy (George, Burke, & Rodgers, 1997; Kennerly, 2000). The focus groups in the ADVICE study pilot work expressed concern of getting 'stuck' in the wrong protocol and having to complete it before moving to a correct one. The Mid-Atlantic site's autonomy/control of practice scores indicated they had the most concern about their autonomy/control of practice of the three sites. Even though strict protocols support legal issues in advice practice (1999), they also restrict advice nurses' autonomy/control of practice and can increase stress (Rutenberg, 2000a). The standardized protocol can limit the professional assessment and

interaction of the advice nurse. By limiting the advice nurses' ability to use their professional knowledge and assessment skills, the autonomy/control of practice is affected (Blegen, 1993; Dwyer et al., 1992; Kramer & Schmalenberg, 2003b). In the Northwest, where autonomy/control of practice was higher, protocols were used as guidelines.

Finally, even with physicians and pharmacists available for consultation, the Mid-Atlantic site that focused on answering as many calls as possible in as short a time as possible did not always leave the nurse time to consult others, especially when they were locked in a protocol and unable to escape until they answer all questions (Valanis et al., 2001). Communication and collegial relationships scores in the Mid-Atlantic site were in the middle range of the three sites. There was no statistically significant difference between sites for organizational support.

Northwest. Communication and autonomy/control of practice perceptions are very important to job satisfaction in nurse work settings (Blegen, 1993; Foley et al., 2002; McGilton & Pringle, 1999). The Northwest region was different from both the Southern California and Mid-Atlantic regions in post hoc contrasts for communication and autonomy/control of practice. Nurses working in the Northwest site indicated communication ($M=1.857$) and autonomy/control of practice ($M=1.698$) scores were of less concern than other sites (Mid-Atlantic communication $M=2.240$ and autonomy/control of practice $M=2.314$; Southern California communication $M=2.477$ and autonomy/control of practice $M=2.145$). Since job satisfaction is linked to autonomy/control of practice (Blegen, 1993), this finding could help explain why they had more years in their current position than did nurses in the other sites.

The Northwest site also had protocol requirements but use flexible. Protocols were available and advice nurses had the option of changing which protocol they were using to meet the callers' needs during the call if a more appropriate protocol was indicated. Flexibility has been found to improve autonomy/control of practice in other settings (Feinberg et al., 2000). Advice nurses were expected to use the appropriate protocol. The ability to identify and act on patient needs supports autonomy/control of practice (Dwyer et al., 1992; Laschinger et al., 2001; Kramer & Schmalenberg, 2003b; Kramer & Schmalenberg, 2003a).

The documentation requirements were all on-line. Additionally, the complete medical record of the patient was available on-line for advice nurses in the all-inclusive computer system, standard for the Northwest region. An advice nurse could access the record, use information in the record to assess and assist the patient, and then relay information to the primary care provider about the advice call. In addition, the call center allowed nurses to consult with nursing peers if questions arose about advice. The ability to communicate information electronically, as well as among peers at the site, could explain lower communication scores.

In the Northwest site, quality assurance activities of advice practice were required annually but did not include systematic call monitoring or monthly audits as in other sites. While hold-times found in the pilot study were higher than at the Mid-Atlantic site (Northwest M=4.4 minutes; Mid-Atlantic M=2.6 minutes), the advice nurses in the Northwest had the flexibility to call the member back and averaged 95% of the callbacks within two hours (Valanis et al., 2003c).

Autonomy/control of practice was potentially supported by another element in this region: staffing patterns. Advice nurses in the Northwest region, unlike the other regions, were staffed according to a “7/70 rotation” of 7 ten-hour shifts per day on, then seven days off. Such flexible work patterns have had an impact on worker satisfaction in other service-industry settings (Franklin, 2000). Arkin (1997) reported that the more controlling the environment, the greater the perceived stress and that with more flexibility, staff become more creative and motivated. Autonomy and flexible working patterns improved call centers in other service-industry settings (Arkin, 1997). Clearly, this approach had a positive effect in the Northwest and could explain my findings.

Southern California. No significant findings were noted specific to the Southern California site in the post hoc contrasts (Valanis et al., 2003d). The pilot work from the ADVICE study found the Southern California site also had protocols with flexible requirements. There were standard questions required in all calls but advice nurses had the option of changing which protocol they were using to meet the callers’ needs during the call. Other site demographic criteria were not specified in the pilot data except that documentation was performed on-line, part of the medical record was available on-line, and they had pharmacist consultation available. The quality assurance measures included call volume, abandonment rates, call-backs, hold times, and talk times, though no specific measures were given. Nurses were monitored for adherence in at least three calls per month per nurse. No unique staffing pattern was used and 80% of the staff worked full-time. During the ADVICE study, participation in Southern California was limited. Although data were collected, multiple problems surfaced with nurse participants and their willingness to have calls recorded.

Summary. Certainly, there is a difference in work environment scores among advice sites and this finding supports the first hypothesis. Specific work environment scores of work stress, communication, and autonomy/control of practice were significant, but organizational support and collegial relationships were not. I expected there to be differences among the sites for all work environment scores so I was surprised that collegial relationships and organizational support did not differ significantly among sites.

When reviewing the mean scores among sites for collegial relationships, I found all scores were uniformly low. With a possible range of one to six, all scores were in the low two range of the scale (Southern California $M=2.012$; Mid-Atlantic $M=2.212$; Northwest $M=2.159$). A score of two equated to a collegial relationship rating of “almost never” and suggested that the advice nurses rarely ask, negotiated, clarified, discussed, suggested, informed, or told anything to their physician colleagues.

The finding could be related to the tool used to measure collegial relationship scores. In the ADVICE study, both centralized and decentralized sites were investigated. When designing the NQ, the investigators used questions that reflected primarily practice in a decentralized site to assess collegial relationships. As a result, the questions were specific for most office practices and not specific to centralized advice settings. Because the subscale was developed with the office practice in mind, the items were not relevant to a centralized call center advice practice and did not identify any variation or practice difference found in centralized advice practice. Therefore, the tool may not have been sensitive or relevant for assessing collegial relationships in centralized advice settings. Conclusions from the data about collegial relationships in advice practice should be interpreted with caution.

Work environment scores for organizational support were, similarly, not statistically different among sites. The range of scores was one to five and all sites scored in a mid three score (Southern California $M=3.631$; Mid-Atlantic $M=3.487$; Northwest $M=3.354$). The score of three indicated that the nurses perceived that they “partly agree, partly disagree” with the organizational management of advice services. Since this portion of the NQ was based on a previous survey given to Kaiser Permanente staff, it is not surprising that no differences were found among sites. Because the items were not specific to advice settings, they may not have been sensitive enough to pick up any differences if they did exist.

The Mid-Atlantic site had significantly higher work stress scores and concerns of autonomy/control of practice. After reviewing elements of the practice environment, data from the ADVICE study pilot work suggest four structure and process issues were important and could account for these findings. First, restrictions in the work setting and quality assurance practices can increase stress. Monitoring of call-times, setting unrealistic expectations on call quotas, wait-times, and abandonment rates, as well as limited worker input to work design were areas where practice could change and give advice nurses more environmental control. Second, double documentation practices were wasteful of both the nurses’ time and the organization’s resources. A computerized medical record to support on-line documentation was needed and would support an appropriate flow of information. Third, protocols that limit the nurses’ professional judgment by restricting the correct protocol use threatened autonomy/control of practice and resultant job satisfaction and organizational commitment. Lower autonomy can increase stress (Dwyer et al., 1992; Foley et al., 2002). Fourth, even though consultation

was available on-site in the Mid-Atlantic site, if advice nurses were so preoccupied with keeping the call times down and maintaining an answering quota, they would not be able to use these consultants readily.

The Northwest site nurses communication and autonomy/control of practice scores indicated less concern than for other sites. After reviewing elements of the practice environment found in the ADVICE study pilot data, three issues of practice were important and could guide nurse managers. First, quality assurance practices in Northwest did not increase stress. Nurses had more flexibility and practice control. Monitoring of practice appeared to be based on a professional model. Second, in Northwest records were computerized with on-line documentation. Third, protocols in Northwest allowed the nurses to use their professional judgment in the flexibility to use the appropriate protocol. As a result, autonomy/control of practice and communication scores indicated that these areas of satisfaction for nurses were not a concern. Higher levels of autonomy can decrease stress (Dwyer et al., 1992; Foley et al., 2002).

Some of the demographic characteristics in the advice nurse population in the Northwest advice centers were not controlled in the MANCOVA and may account for difference among sites. While other regions provided a nurse educator for orientation, the Northwest region also assigned a preceptor when hiring and orienting new staff. The mean age of the nurses was 53 years of age while both Mid-Atlantic and Southern California was 45 years of age. The Northwest site required more nursing experience than either of the other sites did (Northwest 2+ years; Mid-Atlantic and Southern California 1-2 years).

Items in the analysis controlled as covariates included educational preparation and experience. No statistically significant difference was found among the sites for levels of education or experience. Less familiarity with advice services can affect the skill of the nurse who provides advice (Greenberg, 2000; Hagan et al., 2000; Huber & Blanchfield, 1999). Studies have found that the nurses' experience did assist the nurse in performing advice services (Omery, 2003).

The variables indicate differences between measuring organizational characteristics and nurse characteristics. My study focused on individual characteristics and individual sites.

Differing patient outcomes among ADVICE sites: MANCOVA #2

I analyzed differences between sites on patient outcomes of understanding, experience, satisfaction, and follow-through with advice using a MANCOVA and controlling for the caller characteristics of years of HMO membership, years of education, use of the Internet for health information, and number of times the member called the advice service in the past 12 months. I found statistically significant differences among the CEI with the advice nurse and overall satisfaction with the advice call when performing individual ANCOVAs. The post hoc contrast identified that the Northwest site scored significantly lower than the other sites in these two outcomes.

Experience and overall satisfaction. Statistically significant differences among the Northwest and the other sites in the CEI and overall satisfaction with the advice call are surprising. The Northwest site callers had significantly lower scores on positive CEI and overall satisfaction levels than other sites. In an attempt to explain these differences, I reviewed the pilot work measures of site surveys from the ADVICE study. Wait times for

callback (average callbacks within two hours were 95%) and time spent on hold (M=4.4 minutes) might influence the callers perception of satisfaction. Other regions did not report wait times for callback but hold time was only 2.6 minutes for Mid-Atlantic. Southern California did not report time on hold.

In caller perceptions from the CQ data, the final ADVICE study reported that one indicator of caller satisfaction was the caller's perception of the amount of time on hold. The longer on hold or waiting for a return call, the lower the satisfaction score (Valanis et al., 2003c). This finding supports service-industry call centers research that found the caller wanted to be helped by the person who answered the phone, did not want to have the call transferred, and did not like to be left on hold or called back (Arkin, 1997; DiTecco et al., 1992; Franklin, 2000; Feinberg et al., 2000; George & McClain, 1998). The ADVICE study data also indicated that the caller expectations for listening, clarity of information, collaboration, and competence were an even stronger indication of satisfaction than longer hold-time (Valanis et al., 2003c). Satisfaction levels were higher in the ADVICE study when expectations of the caller were met.

In the work environment study, the CEI scores were tightly grouped with the range possible of zero to nine. The mean scores were Southern California 6.798, Mid-Atlantic 6.959, and Northwest 6.452. While there were statistically significant differences found between the Northwest site and the other sites, the differences may not be practically significant. The score was derived from the product of two questions in the CQ. The questions asked the extent to which the characteristic was important to the caller and the extent to which it was actually delivered. For example, the caller was asked if clear communication with complete information or instructions was important and how

much of this did the nurse actually provide to the caller. A score of six or seven indicated above mid range for caller experience. Zero would be an experience that was neither important nor delivered and nine meant the nurse did what was important. Conceptually, it may be a more accurate measure of patient satisfaction than an overall statement of satisfaction (Rosenthal & Shannon, 1997; Scalise, 2003). The experience query asked a more complex question than 'Were you satisfied with what was done?' In asking about the experience, the caller was questioned about not only what was important but also about whether they got what was important.

I expected the CEI to vary among sites but did not expect the Northwest site to be significantly lower, due to the positive scores in autonomy/control of practice and communication work environment scales. I expected that advice nurses who felt they were autonomous would practice more independently and would be able to tailor information to callers and the caller would have a better experience of the interaction (Dwyer et al., 1992; Kramer & Schmalenberg, 1993). This was not the case in this study, however.

It was noted that the overall satisfaction rating was high for all sites, creating a ceiling effect. With a possible range between one and five, Southern California's mean was 4.368, Mid-Atlantic 4.365, and Northwest 4.193, meaning that a four was "high" and five was "very high." The literature supports substantial consumer satisfaction with advice services (Dale et al., 1998; Hagan et al., 2000; Omery, 2003; Poole et al., 1993), so many measures have shown significant levels of satisfaction and possible ceiling effects have been noted before (Rosenthal & Shannon, 1997; Valanis et al., 2003a). Because all scores were high, the sensitivity of the measure can be questioned. A sample

large can indicate significance more readily than a smaller sample and induce a Type I error. The large sample size increases the power of the study—1,068 calls were analyzed, so that a very small difference can be statistically significant. Whether the differences are practically significant is another matter.

Other outcomes measures—the understanding of the interaction (CUI) and follow-through—were not statistically significant in comparison among sites. This finding indicated that these measures did not vary by site. Again, there may be methodological reasons that account for this lack of difference.

The CUI was based on a calculation of compared caller understanding from the CQ and recorded information from the CD. In developing the measure, more than one score point was possible from the CD items but only one score from the CQ. As a result, the scores for understanding, which were expected to be from zero to five, were all less than one for all sites. Since all scores were uniformly low, no statistical difference was seen.

The measure for follow-through was rated on a three-point scale. All sites scored $>M=2.78$, the high end of the range. Since this measure came solely from the caller, the validity of actual follow-through could be questioned but there was not a difference among sites. A restriction of range could also threaten the validity of this measure.

Work environment effects on patient outcomes: HLM

Nurse samples. Caller outcomes were available for only those nurses who recorded calls. Of the total sample of 96 nurses, only 18 (18.75%) consented to have their calls recorded. To determine if there was a sampling bias, I compared the work environment scores and nurse characteristics of the recording nurses with those who did

not record calls. Using a *t*-test for independent samples, there was a statically significant difference between the groups in perceived organizational support and work stress. The recording nurses had higher work environment scores in organizational support and lower scores in work stress than the non-recording nurses.

The mean scores for organizational support were significantly higher among the nurses who recorded calls ($n=18$, score 3.85) than for nurses who did not record calls ($n=77$, score 3.42). I concluded that nurses who recorded calls had a more positive perception of the organization than those who did not record calls but the number of recording nurses was considerably smaller than those not recording calls.

The means between groups for the work stress score was lower for the recording nurses ($n=18$, score 2.62) than for non-recording nurses ($n=78$, score 3.05). Again, the range of scores was from one to five but lower scores indicated less perception of stress and higher scores indicated more stress-inducing influences in the job. The nurses recording calls indicated that stress was a problem 'to a small extent' or 'to a moderate extent.' The non-recording nurses identified work stress was a problem 'to a moderate extent.'

The comparison of the two groups leads me to believe that the nurses who recorded calls perceived more organizational support and fewer concerns about work stress than the non-recording nurses did. It would follow, then, that the nurses with a positive perception of the organization and the job would be more likely to do additional things, such as research, for the good of the organization (Abraham, 1999; Aiken, 2002; Blegen, 1993; Keuter, Byrne, Voell, & Larson, 2000; Laschinger et al., 2000). Since the nurses recording calls had more favorable perceptions of the organization, it is possible

that a sampling bias could attenuate any effects of the work environment. The range was restricted by a small sample size of recording nurses. However, I completed the HLM analysis using the recording nurses at the Level-2 analysis with this in mind. I expected the work environment scores to have a strong enough relationship to outcomes that the bias would not matter and a relationship would be found.

The HLM. I performed four two-level hierarchical linear models (HLM) to assess the effects of the work environment on patient outcomes. The outcomes were CUI, CEI, overall satisfaction, and follow-through with offered advice. The Level-1 analysis was of calls with the dependent variables of patient outcomes and the caller characteristics. The Level-2 analysis was of recording nurses with the dependent variables of the intercept (average patient outcome for each nurse adjusted for caller characteristics) and the independent variables were the work environment scores, site, and nurse characteristics. Since the HLM is a multivariate analysis, the characteristics of callers, the characteristics of nurses, work environment scores, and sites were all variables in the analysis. The HLM addresses all the variables and indicates the amount of significance they have on the outcome variable. From my experience in nursing practice and the literature reviewed, I expected the advice nurses' work environment scores to relate significantly to caller outcomes.

Understanding of the interaction. The callers' understanding of the interaction (CUI) with the advice nurse is essential to callers' ability to follow-through. If the caller does not understand what the nurse has directed the caller to do—whether it is going to the emergency room or to call the doctor in the morning—then the caller is at risk. The HLM results challenge assumptions about best practice. I found an inverse relationship

between the CUI and the nurse characteristics of highest degree in nursing and years of registered nurse experience. This was a surprise. The inverse relationship implied that the more educated and experienced the nurse was, the less the patient understood. Since there was no statistically significant difference between recording and non-recording nurses in education characteristics, my expectation was that the more educated and experienced the nurse, then the better able he or she would be to give understandable advice information to the caller (Benner, 1984; Benner, Tanner, & et al, 1992; Benner, Tanner, & Chesla, 1996; Valanis et al., 2003a).

One explanation for this finding is a relationship to education and experience may not be the case in advice practice. If the more educated and experienced nurse communicated the information in an unclear manner—in a way that was clear to the experienced practitioner but perhaps not to the layperson—then the understanding of the caller may be threatened. On the other hand, if the caller has a barrier to understanding the information—such as their educational level, primary language, or emotional concern related to the reason for the advice call—then the information may not be received correctly (Farrell, 1996; Miller, 2002; Miller, 2003; Northouse & Northouse, 1998). Any barrier to understanding in a two-way conversation between the advice nurse and the caller is a problem. Certainly, the advice nurse should develop the skill of assessing the callers' understanding of advice before completing the call.

Experience of the interaction. In the HLM, the CEI was significantly statistically related to the Mid-Atlantic site when compared to the Northwest site. This is an interesting finding when I reflect on the higher levels of work stress expressed in the

work environment scores from the Mid-Atlantic site. However, I had expected the work environment scores to be related to the CEI and they were not.

Overall satisfaction. I expected to find a relationship between work environment scores and patient satisfaction. I thought that I would see patient satisfaction scores that would find one site more satisfactory than another site and be able to make a connection to the work practice in that site. My HLM findings for overall satisfaction with advice services were not statistically significant with respect to any of the other variables in the model. The ADVICE study reported that the one of the strongest indicators of satisfaction in their model was time left on hold (Valanis et al., 2003c). Since my model did not include 'time-on-hold', this variable might account for variance not explained.

Follow-through. I expected to find a relationship between work environment scores and follow-through. I thought that I would see follow-through measures that would find one site with more follow-through than another site and be able to make a connection to the work environment in that site. My analysis of the follow-through outcome found no such relationship. Since there was no statistical difference seen in the ANCOVA for this measure, I was not surprised because I suspect that the nurse to patient interaction buffered any work environment effect that would impact patient follow-through.

HLM summary. I expected the HLM to identify a relationship between caller outcomes and work environment scores and to find only a limited relationship with the covariates from the nurse or the caller. It was a surprise, then, to find a negative relationship between caller understanding and the covariates of educational preparation in nursing and experience as a registered nurse. None of the work environment scores were

related to patient outcomes. Why nothing was significant is the question. Doesn't work environment affect patient outcomes? From the MANCOVA we know that there were work stress, autonomy/control of practice, and communication issues for the advice nurses among sites, yet no significant relationship was found to patient outcomes in the HLM. We also know that there were differences among sites for the CEI and overall satisfaction but only the difference among the Mid-Atlantic and Northwest sites in the CEI were statistically significant in the HLM.

In the HLM models, no work environment scores found any relationship to patient outcomes. Three methodological reasons may explain this finding. First, because the sample size in the Level-2 HLM was so small, the power of the study was limited. If there were significant work environment factors, it would have been difficult to see significance because the sample size was small.

Second, some of the measures used may have been insensitive to the concept being measured. For example, collaborative practice items were designed for the decentralized sites and not the sites used in this analysis. In addition, organizational support items were not developed specifically for advice nursing and may not have captured organizational issues reflective of the issues at these sites. Differences were found among sites for measures specifically designed for use in advice call center practice but not in the HLM. Outcome measures of caller understanding may not have been sensitive due to scoring requirements and the range used to score the item was restricted for the follow-through outcome.

Third, the limited findings may have been due to the difference between the recording and non-recording nurses. The response bias toward the organization could

have limited the surfacing of any issue with the work environment. Only the 'best' nurses recorded calls and these nurses had good opinions of the organization and levels of work stress. If nurses with less positive opinions of the organization and work stress had recorded calls and participated in the second level of the study, then findings might have been different. This is certainly an area for further investigation.

Theoretical explanation. I conclude that although there may be issues in the work environment for this sample of nurses, the nurses acted as a buffer for callers and did not allow the work environment concerns to influence their work performance. The 'better' nurses—more positive perceptions of the organization and less perceived work stress—who recorded calls seem to mask the negatives of the practice environment. The ability to act as a buffer in a difficult work environment may be related to experience as well as other things that were not measured in this study. The cohort of nurses recording calls was very experienced so if a broader range of experience for nurses were used, a different result could have been found. Since there was a restriction in the range of experience for this study, I was unable to identify this relationship either.

Structure-Process-Outcome Model

The Donabedian structure-process-outcome model has been incorporated into research design for many years. It provides an excellent organizing framework for researchers to investigate elements of care and measure their outcomes. In this dissertation research, I used the model to organize and inform a broader view of the organizational structure of advice nursing practice. By reviewing the elements of structure in telephone advice services in the work environment scores, the process component was revealed. The work environment structural components influence the

process of advice, and this process—the nurse-to-caller interaction—was measured. Using outcomes of understanding, experience, satisfaction, and follow-through, the model of structure-process-outcome is complete (see Figure I). While none of the outcomes was statistically significantly related to work environment scores, there are sufficient methodological limitations that account for this.

Summary, Implications, and Limitations

Advice services are on the rise (George & McClain, 1998). Both for those nurses who work in an advice setting and callers who ask for advice from a healthcare service provider, research to support best practice is needed. Although nursing work environment is a hot topic today, no research was found investigating nursing practice environments in telephone advice services. Current research addressing telephone advice services focuses predominantly on advice practice. Studies seek to answer questions about satisfaction with advice services (Poole et al., 1993; Kempe et al., 2000), appropriateness of the advice offered (Crouch & Dale, 1998a; Lattimer et al., 1998), costs of the service (Hagan et al., 2000), and overall usefulness of the service (Dale et al., 1998; Greenberg, 2000; Hagan et al., 2000; Sabin, 1998). In this study, I investigated the effects of work environments in advice practice on patient outcomes of understanding, experience, satisfaction, and follow-through.

Summary. I performed a secondary analysis of the ADVICE study data. I found that the nurses' work environment scores are site variables, since there were statistically significant differences among the advice sites. Specifically, work environment scores of work stress, communication, and autonomy/control of practice were unique to advice sites. There were not significant differences among sites in collegial relationships scores

and all scores were uniformly low. This indicated that collegial relationships between advice nurses in centralized sites and physician colleagues were infrequent among all sites. However, this finding could be a reflection of irrelevant questions asked of centralized advice nurses. Organizational support scores did not vary among sites. Both concerns could be an artifact from the NQ instrument.

The Mid-Atlantic site scored the most concern about work stress also scored the most concern about limited autonomy/control of practice. In the practice setting, this site had rigid protocol use requirements, strict call-time limits, a limited ability to obtain patient record information, and a requirement for a hard copy documentation of the call. All these issues have been found to increase stress for the worker (Arkin, 1997; DiTecco et al., 1992; Feinberg et al., 2000; George & McClain, 1998; Larson-Dahn, 2001).

The Northwest site did not find communication and autonomy/control of practice as a problem and used protocols as references but could change the protocol depending on their assessment during patient questioning. They also had access to the complete patient medical record and could assess follow-up questions on-line. All documentation was computer based. These nurses had flexible work hours and most worked part-time. The work stress scores was the lowest of the three sites.

Additionally, caller outcomes were related to sites. The Northwest site had the best autonomy/control of practice scores but had the lowest caller scores in CEI and overall satisfaction. This finding was contrary to my assumptions and required more investigation since the literature supported the expectation that an increase in nurse autonomy results in improved patient satisfaction (Aiken et al., 1996; Kangas, Kee, & McKee-Waddle, 1999; Stumpf, 2001).

Clarification was found in the HLM analysis. The CEI was significantly related to the Mid-Atlantic site where the work stress was the highest (in the MANCOVA) but the CEI was also the highest. From the pilot work in the ADVICE study, this site had the shortest time-on-hold for all the sites. The Northwest site scored the lowest in CEI and overall satisfaction (in the MANCOVA) and had, from the pilot study, the longest time-on-hold. The CEI is a measure of the callers' perception of hold time and could be related to other factors that were not measured. Findings from the ADVICE study indicated that time-on-hold was predictive of patient satisfaction (Valanis et al., 2003c) but also found that expectations met was a stronger predictor of satisfaction. My analyses mirror that result. While it appears that callers' satisfaction was related to hold time without concern for nurses' work stress levels, these results could be explained by the buffering activity of nurses performing patient-oriented care.

Another interesting finding from the HLM is that an inverse relationship exists between the education of the nurse and the years employed as a registered nurse to the CUI. This finding suggests that the communication between the caller and the experienced, educated nurse may not always be clear for the caller. The importance of the CUI finding for nurse managers is to assure that advice nurses have practical training in advice and are given a vocabulary to help their patients recognize and understand what the nurse is trying to advise them to do. Advice practice standards (American Academy of Ambulatory Care Nursing (AAACN), 1997) supports the need for flexible protocol use and the call-time allowing the nurse to create the rapport with the patient and ensure that the caller understands what they have been advised to do.

Implications for further practice and research. The implications for nursing practice include advice services training. The advice nurse could benefit from language specific to their needs in interacting with the caller and creating the ability to understand and be understood. Perceived autonomy/control of practice can improve caller understanding if the nurse is able to develop the required connection with the patient and negotiate a plan of action and care. Utilization of research in other nursing work environments and service-industry call centers can inform practice in advice services. Many of the advice nurse concerns are similar to other call center and care settings.

Work stress issues can be addressed with appropriate quality assurance techniques that are geared to professional nursing practice. Issues of protocol use, monitoring of call times, and recording the number of calls answered have limited effectiveness to ensure professional practice. System issues such as documentation and on-line access to patient information should be addressed in light of the professionals working in advice services.

Future research into the effectiveness of telephone advice services could be measured by identifying the disposition of the advice call on-line at the time of the call then following up via the on-line record to ascertain if the caller followed the advice. That is, if they were instructed to make an appointment to see their primary care physician within two days, a quality assurance check could see if they, in fact, did make and keep the appointment as advised. Additionally, research comparing different organizations that have advice services could be fruitful if the work environment of the service was included in the analysis.

Limitations. The limitations of the work environment study are important to note. First, since this was a secondary analysis of data from the ADVICE study, I had no

control over the questions in the original study. Instead, I designed my study using data previously obtained and tried to extract information to meet my study aims. As a result, not all the outcome measures were as reliable and accurate a measure of the construct I was attempting to assess. Specifically, the CUI was a problematic construction of questions from the CQ and the CD. Instead of being able to match the two questions easily, the instructions to callers on the CQ limited responses and may have skewed the scale. The follow-through outcome measure was restricted by range with scoring only from one to three. Fewer problems were found in the other outcome measures.

Second, the tools used in the study were designed for the ADVICE study and had, with the exception of the CD, not been validated prior to use in that investigation. The work environment scale composed of five scores was closely linked to the ADVICE study and Cronbach's reliabilities were acceptable for the scores. The NQ was developed from concerns by the ADVICE study pilot-phase focus groups. While it incorporated questions from survey tools used in research about work environments (Aiken & Patrician, 2000; DiTecco et al., 1992; Leveck & Jones, 1996; van der Doef & Maes, 1999), it also included questions from a specific Kaiser Permanente tool (the People Pulse) that was used to measure organizational variables previously. The questions asked were broad and not specific enough to the advice environment.

The NQ section that assessed collegial relationships was designed primarily for decentralized advice sites and contained questions that were inappropriate for centralized settings. As a result, findings from this area may not truly reflect any true relationship between nurse and physician colleagues in a centralized call center. This might explain the lack of variability in collegial support and organizational support scores.

Third, the study was limited to only three sites because I chose to investigate only centralized sites where the practice settings had similarities. In addition, I used only one organization. Further study of work environments in advice services would benefit from a larger number of sites and more than one organization when comparing practice settings.

Last, the study is limited in the HLM analysis. The Level-2 nurse sample is small. The sample size, in this case, decreases the stability of the effects in the Level-2 model. With only eighteen nurses at Level-2, the results are challenged by a possible Type 2 error. If the sample size had been bigger or less organization-oriented nurses were included in the sample, more connections to work environment concerns might have been found.

A primary difference between this dissertation and the original ADVICE study was that I used the work environment scores from the NQ and the caller variables from the CD and CQ as outcome variables rather than predictor variables in the MANCOVA. In addition, this dissertation analyzed data only from centralized sites. In the ADVICE study, the investigators differentiated between centralized and decentralized sites for predicting use and satisfaction with advice services (Valanis et al., 2003c).

Conclusion

Studies about work environment influences on the practice of nursing are important for the profession. As new practice arenas develop, researchers must assess relationships between the ability to practice and the setting in which practice takes place. Significant work has been done in magnet hospital studies to assess the important principles that support nursing best practice. Additionally, service-industry studies can inform areas of nursing practice about elements that support or detract from the ability to

perform work. In the ADVICE study, focus groups gave a wealth of information about the work environment in advice services that reinforced information from hospital and service-industry studies. With this study, some of those issues were validated and can open the ambulatory setting—specifically telephone advice services—to the use of research about work environments from other settings.

I find that even though nurses found issues in the work environment that create practice challenges and concerns, they act as a buffer to prevent these concerns affecting patient care. Even the most stressful work environments had the most satisfied HMO members. Nurses are clearly using their professional skills to deliver quality care to patients, no matter how stressful their own job or how dysfunctional the work environment.

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Appendix

Appendix I

Variables Table

Hypothesis #1	Variable	Data Source	Sample	Operational Definition	Analysis
The site of the ADVICE study will be a unique predictor of nurses' perceptions of the work environment beyond nurse characteristics.	IV's: <i>ADVICE</i> site (3 levels) DV's: Work environment perception composite scale 1. Collegial relationships 2. Organizational support 3. Work stress 4. Communication 5. Autonomy/control of practice Covariates: Nurse Characteristics 6. yrs in nursing, yrs of advice, highest degree in nursing	Site code: Centralized sites Work environment portion of NQ 1. NQF65-73 2. NQF74-83 3. NQF84-96 4. NQF103,107,109,111,113,115,119,121 5. NQF97,99,101,105,117,123,125,127,129 6. NQF5, F30, F3	88 nurses	<u>Work sites:</u> 3 centralized ADVICE sites from 3 regions in the KP HMO system <u>Perceptions of the Work Environment:</u> Five composite scales from NQ: Nurse scores are 5 composite scales for each nurse. The site scores are the average of the nurse scores for nurses working at the site. 1. <u>Collegial:</u> Recode scale as 1-6. Recode the NA as never; never=1 almost never=2, sometimes=3, most of the time=4, almost always=5, always=6. 2. <u>Organizational:</u> Recode scale as 1-3. Reverse code: F74&75 (1=none; 2=very little, some; 3=quite a bit, a great deal.) Recode F76-83 disagree completely & disagree=1; partly agree, partly disagree & agree=2; agree completely=3 3. <u>Work stress:</u> Recode F84 none=1; very low & low=2; average=3; high=4; very high=5. Recode F87-96 NA & not at all=1; to a small extent=2; to a moderate extent=3; to a large extent=4; to a very large extent=5. 4. <u>Communication:</u> Recode: F103,107,109,111,113,115,119,121 to NA & not at all=1; to a small extent=2; to a large extent=3; to a very large extent=4. 5. <u>Autonomy:</u> Recode F97,99,101,105,117,123,125,127,129 to NA & not at all=1; to a small extent=2; to a large extent=3; to a very large extent=4. <u>Covariates are the nurse characteristics</u> 6. continuous; continuous; Assoc/Diploma (1,2); BS+ (3,4,5);	MANCOVA

Hypothesis #2	Variable	Data Source	Sample	Operational Definition	Analysis
The 3 centralized sites of the ADVICE study will be a stronger predictor of patient outcomes than caller characteristics.	IV's: 3 <i>centralized ADVICE sites</i>	Site code CQ & CD	1068 calls with CD & CQ	<i>Work sites:</i> 3 centralized ADVICE sites in the KP HMO system <i>Outcomes:</i> 1. <i>Caller understanding of interaction</i> (CUI): The measurement of what the caller understands of the offered advice. Comparison of the CD of the advice offered in the call and the CQ reported understanding of the advice offered. • <i>Sent for care:</i> CD F32 (Urgent disposition - Was the disposition urgent or emergent?) or F34 (Appointment disposition - Was patient given an appointment?) <i>to</i> CQ Q3 Response 1, 2, or 3. • <i>Identified disposition:</i> CD urgent disposition (F33) 11 (nurse called 911), 12 (caller to call 911), 13 (caller to ED), 14 (caller to urgency care) <i>to</i> CQ Q3 Response 1 (the nurse directed me to urgency or emergency care); OR CD same day appointment (F33) 15 (same day w/ PCP), 16 (same day w/ non-PCP), 17 (nurse messaged med office for same day appt.), 10 (other urgent disposition) <i>to</i> CQ Q3 Response 2 (nurse arranged for an appt. within 24 hrs.); OR CD non-urgent appointment (F35) 21 (later appt w/ PCP), 22 (later appt. w/ non-PCP), 23 (non-urg same day appt w/ PCP), 24 (non-urg same day appt w/ non-PCP), 25 (referral to appt clerk), 20 (other appt.) <i>to</i> CQ Q3 Response 3 (nurse arranged for or suggested get appt. after 24 hrs.); • <i>Self-care:</i> CD F44 (Nurse Management - Did the nurse provide self-care management?) <i>to</i> CQ Q3 Response 4 (self-care advice). • <i>Explanation/reassurance:</i> CD F43	MANCOVA
	DV's: <i>Outcomes:</i> Understanding, Experience, Satisfaction, Follow-through with advice				
	1. caller understanding of the interaction (CUI)	1. CDF32,33,34,35,40, 43,44; CQ Q3F4 responses 1-9			
	2. caller experience of the interaction (CEI)	2. CQ Q7F8-13 and Q8F14-19			
	3. overall satisfaction	3. Q10F21			
	4. follow-through with advice	4. CQ Q4F5			

					(Nurse Management – Did the nurse provide explanation or reassurance?) to CQ Q3 Response 5 (reassurance) or 6 (arranged other services) • Link to PCP: CD F40 (Link disposition – Link to Primary Care Provider?) to CQ Q3 Response 7 (communicated w/ PCP) • Other: CQ Q3 Responses 8 (nurse could not help) & 9 (other). Scored = 0 if present. ❖ One point for each variable except response 8 & 9; Range for CUI is 0-5 2. CEI Satisfaction: Caller experience of the interaction (CEI) of RN behavior • CQ Q 7 F8-13 & CQ Q8 F13-19 • The importance and actual behavior of the advice nurse to the caller score (12 items) is multiplied then sums of the 6 items are averaged for CEI mean score. ❖ Range: 0-9. 3. Overall satisfaction: Range from very low (1) to very high (5). ❖ Range: 1-5. 4. Follow-through with advice: Determination of what the caller lists about following the advice offered • CQ Q4F5 code as all (1)=2; part but not all (2) as =1; not any (3) =0 ❖ Range: 0-2.
					Covariates – caller characteristics:
					• Years of membership - continuous
					• Years of school - continuous
					• Frequency of use of Internet for health care information - continuous
					• Frequency of using advice nurse – continuous

Hypothesis #3	Variable	Data Source	Sample	Operational Definition	Analysis
Work environmental factors are predictive of patient outcomes when controlling for nurse and caller characteristics.	<p>Level-1 variable: patient; Dependent Variables: patient outcomes; Covariates: caller characteristics</p> <p>Level-2 variable: nurse; Dependent Variable: intercept (average patient outcome for each nurse adjusted for caller characteristics)</p> <p>Independent Variable: work environment perception composite scores and site; Covariates: nurse characteristics</p>	<p>1,068 patient outcome scores from CQ & CD</p> <ol style="list-style-type: none"> 1. CDF32, 33, 34, 35, 40, 43, 44; CQ Q3F4; responses 1-9 2. CQ Q7F8-13; CQ Q8F13-19 3. CQ Q10F21 4. CQ Q4F5 <p>18 nurse work environment perception composite scales</p> <p>NQF65-73 - Collegial NQF74-83 - Organizational support NQF84-96 - Work stress NQF103, 107, 109, 111, 113, 115, 119, 121 - Communication NQF97, 99, 101, 105, 117, 123, 125, 127, 129 - Autonomy</p> <p>3 centralized ADVICE work environment perception site scores</p>	1,068 calls	<p><u>Outcomes:</u> Understanding: CUI of advice call (range from 0-5). Satisfaction: CEI of advice call (range from 0-9) and overall satisfaction (range from 1-5); Follow-through with advice: range from 0-2.</p> <p>Total score for outcome is the summative score for the four outcomes listed and can range from 1 to 21. (See above for item breakdown in H₂ operational definition)</p> <p><u>Perceptions of the Work Environment:</u> Five composite scores from NQ: Nurse scores are 5 composite scores for each nurse. The site scores are the average of the nurse scores for nurses working at the site. (See above for item breakdown in H₁ operational definitions)</p>	HLM-2 Level model for each patient outcome variable.

APPENDIX II

NURSE QUESTIONNAIRE

**NURSING ADVICE STUDY
NURSE QUESTIONNAIRE**

Name _____ ID LABEL HERE: _____

INSTRUCTIONS:

The attached questionnaire has 6 sections. During our focus groups with advice nurses conducted early in the year 2000, we found several factors that may influence your stress level and ability to give advice. These factors are reflected in several sections of the questionnaire: your relationships with clinicians, organizational decision-making, work stress, and practice environment. In addition, we have included several questions about your experience and educational background. The last section requests you to nominate up to 3 nurses in your setting who you believe are outstanding advice nurses. We want to be sure that we have included in our sample of recorded calls, those handled by nurses who are viewed by their colleagues as being exceptional nurses. The information you provide will help us select those nurses.

To participate in the study, simply complete the questionnaire, place it in the envelope provided, seal it, and sign across the seal. **Then return it to:**

**Gail Morgan
Research Dept.
CHR
(503) 528-2485 or 16-2485**

By: Monday, January 22, 2001

If you choose not to participate, please place your blank questionnaire in the envelope provided, seal it, and sign across the seal and return it following the instructions above.

NURSING ADVICE Study

NURSE QUESTIONNAIRE

Part I: ABOUT YOU AND YOUR BACKGROUND

Educational Background:

1. What is your basic preparation for RN Licensure?

2

Associate Degree ☐ 1

Diploma ☐ 2

Bachelor's Degree ☐ 3

Master's Degree ☐ 4

2. What is your highest degree in nursing?

3

Associate Degree ☐ 1

Diploma ☐ 2

Bachelor's Degree ☐ 3

Master's Degree ☐ 4

Doctoral Degree ☐ 5

3. What is your highest degree in a field other than nursing?

4

Associate Degree ☐ 1

Diploma ☐ 2

Bachelor's Degree ☐ 3

Master's Degree ☐ 4

Doctoral Degree ☐ 5

Nursing Experience:

4. How long have you worked as a nurse since you became an RN (include part-time and full time employment)?

_____ years

5

Please list below the positions (e.g. staff nurse, team leader, manager) you held prior to your current position with Kaiser Permanente, the type of setting and specialty (e.g. inpatient peds, outpatient surgery, ER general), and the length of time in years that you were employed there.

Position	Setting/Specialty	# of Years of Employment
1.		6
2.		10
3.		14
4.		18
5.		22
6.		26

5. How long have you worked as a registered nurse in a practice that included telephone advice and/or triage?	_____ years	30														
6. How long have you been in your current position?	_____ years	31														
7. Do you consider yourself a specialist in any area of nursing?	Yes <input type="checkbox"/> 1 No <input type="checkbox"/> 2	32														
<div style="border: 1px solid black; padding: 10px;"> <p>If <u>YES</u>, please check which areas:</p> <table border="0" style="width: 100%;"> <tr> <td>Adult Health <input type="checkbox"/></td> <td>33</td> </tr> <tr> <td>Med-Surg <input type="checkbox"/></td> <td>34</td> </tr> <tr> <td>Pediatrics <input type="checkbox"/></td> <td>35</td> </tr> <tr> <td>Ob-Gyn <input type="checkbox"/></td> <td>36</td> </tr> <tr> <td>Mental Health <input type="checkbox"/></td> <td>37</td> </tr> <tr> <td>Other <input type="checkbox"/></td> <td>38</td> </tr> <tr> <td>(Please Specify) _____</td> <td>39</td> </tr> </table> </div>			Adult Health <input type="checkbox"/>	33	Med-Surg <input type="checkbox"/>	34	Pediatrics <input type="checkbox"/>	35	Ob-Gyn <input type="checkbox"/>	36	Mental Health <input type="checkbox"/>	37	Other <input type="checkbox"/>	38	(Please Specify) _____	39
Adult Health <input type="checkbox"/>	33															
Med-Surg <input type="checkbox"/>	34															
Pediatrics <input type="checkbox"/>	35															
Ob-Gyn <input type="checkbox"/>	36															
Mental Health <input type="checkbox"/>	37															
Other <input type="checkbox"/>	38															
(Please Specify) _____	39															
8. What kind of training have you had for your practice as an Advice Nurse? (Check any that apply.)	No specific orientation to or training for advice/triage <input type="checkbox"/> 40 Orientation to advice/triage provided <input type="checkbox"/> 41 Periodic staff development specifically for advice/triage <input type="checkbox"/> 42 Sent to continuing education conferences on advice/triage or related subjects <input type="checkbox"/> 43 Other <input type="checkbox"/> 44 (Please Specify) _____ 45															
9. Are you currently employed ?	Full-time <input type="checkbox"/> 1 Part-time <input type="checkbox"/> 2 If part-time, how many hours per week? _____ 47															
10. What percentage of your time per week do you spend in the following activities? (Total should add up to 100%)	Telephone triage and advice _____ 48 Treatments _____ 49 Walk-in triage _____ 50 Rooming patients (include initial assessment) _____ 51 Face-to-face patient teaching _____ 52 Other <input type="checkbox"/> 53 (Please specify for "Other": Type of activity and % of time for that activity) _____ 54															

11. Think about your **typical** advice phone call.

- INCLUDE calls that require assessment, medical triage and/or nursing advice.
- EXCLUDE calls that are for test results, appointments, system questions, or prescription refill.
- How long does your typical advice call take on average for the following:

Phone time actually speaking with the caller (*average minutes*) _____ 55

Work time after speaking with the caller doing follow-up phone calls to other providers, documentation, etc., *minutes average* _____ 56

ABOUT YOU:

12. Date of birth _____ / _____ / _____ 57

13. Gender (Male or Female) _____ 58

Male ☐ 1

Female ☐ 2

14. Race _____ 59

15. Do you speak a language other than English? _____ 60

Yes ☐ 1

No ☐ 2

If **YES**, what language(s) do you speak fluently enough to communicate with members?

_____ 61

Part II: YOUR RELATIONSHIPS WITH CLINICIANS

1. When you are doing telephone advice nursing, for how many clinicians (physicians, physician assistants or nurse practitioners) might you be handling advice calls? 62

4-8 clinicians ☐ 1

8-25 clinicians ☐ 2

25-100 clinicians ☐ 3

More than 100 ☐ 4

2. In general, for how many of the clinicians do you know preferences for management of routine problems? 63

None ☐ 1

Some of the clinicians ☐ 2

Most of the clinicians ☐ 3

All of the clinicians ☐ 4

3. When you know something of the clinicians' practice preferences, to what extent does this knowledge influence your handling of calls?

64

Not applicable ☐ 1

Not at all ☐ 2

To some extent ☐ 3

A great deal ☐ 4

Your relationships with clinicians are extremely important. The following questions are designed to help us understand your interactions with the clinicians that you work with frequently or on a daily basis.

PLEASE INDICATE YOUR RESPONSE BY PLACING AN "X" IN THE APPROPRIATE BOX.

	N/A	Never	Almost Never	Some- times	Most of the time	Almost Always	Always	
4. I ask clinicians about their expectations regarding the degree of my involvement with health care decisions.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	65
5. I negotiate with the clinician to establish our responsibilities for discussion of different kinds of information with patients.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	66
6. I clarify my scope of professional expertise when it is greater than the clinician thinks it is.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	67
7. I discuss with clinicians the degree to which I want to be involved in planning aspects of patient care.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	68
8. I suggest patient care approaches that I think would be useful.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	69
9. I discuss with clinicians areas of practice that reside more within the realm of medicine than nursing.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	70
10. I tell clinicians when, in my judgment, their orders seem inappropriate.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	71
11. I tell clinicians of any difficulties I foresee in the patient's ability to deal with treatment options and their consequences.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	72
12. I inform clinicians about areas of practice that are unique to nursing.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	73

Part III. ORGANIZATIONAL DECISION-MAKING

PLEASE INDICATE YOUR RESPONSE BY PLACING AN "X" IN THE APPROPRIATE BOX.

Statement	A Great Deal	Quite a Bit	Some	Very Little	None	
1. In general, how much say or influence do you have over decisions affecting your work?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	74
2. How much do you know about the goals of your department?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	75

How much do you agree or disagree with each of the following statements?

PLEASE INDICATE YOUR RESPONSE BY PLACING AN "X" IN THE APPROPRIATE BOX:

	Disagree Completely	Disagree	Partly agree, Partly disagree	Agree	Agree Completely	
3. The organization does a good job of letting me know what is going on.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	76
4. I understand how my work fits into the goals of the organization.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	77
5. Our leaders are committed to making customer satisfaction a high priority in the organization.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	78
6. I receive training that helps me give good service to customers.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	79
7. In general, I am supported to do what is necessary to satisfy customers.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	80
8. Day to day decisions and activities in the organization demonstrate that quality is a top priority.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	81
9. Physicians in my work unit support me in providing quality service to our customers.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	82
10. I would recommend KP to a close friend as a good place to get health care.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	83

Part IV: WORK STRESS

Many nurses in call centers and medical offices report that their jobs are quite stressful. In this section we ask you to describe your experience with feeling stressed, and the specific stressors associated with your job.

PLEASE INDICATE YOUR RESPONSE BY PLACING AN "X" IN THE APPROPRIATE BOX:

1. How would you describe the job pressure where you work? 84

- | | | |
|-------------------------------------|------------------------------------|--------------------------------------|
| <input type="checkbox"/> 1 None | <input type="checkbox"/> 3 Low | <input type="checkbox"/> 5 High |
| <input type="checkbox"/> 2 Very Low | <input type="checkbox"/> 4 Average | <input type="checkbox"/> 6 Very High |

2. How often do you feel under pressure at work? 85

- | | | |
|-----------------------------------|--------------------------------------|-----------------------------------|
| <input type="checkbox"/> 1 Never | <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 5 Always |
| <input type="checkbox"/> 2 Rarely | <input type="checkbox"/> 4 Often | |

3. Generally, how much of a problem is the pressure or stress you experience at work? 86

- | | | |
|--|---|---|
| <input type="checkbox"/> 1 No Problem | <input type="checkbox"/> 3 Moderate Problem | <input type="checkbox"/> 5 Very Big Problem |
| <input type="checkbox"/> 2 Small Problem | <input type="checkbox"/> 4 Big Problem | |

STRESSFUL EVENTS: Each of the following events may be stressful to advice nurses. Please rate the extent to which these specific events contribute to your overall feeling of stress from your work.

Specific Event	Not applicable	Not at all	To a small extent	To a moderate extent	To a large extent	To a very large extent	
4. Difficulty in serving callers well and still keeping time with each call down.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	87
5. Expected to maintain an average call time that is too low.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	88
6. Monitoring of your call activities (call time, number of calls, etc.) by the system.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	89
7. Monitoring of call activities by a manager.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	90
8. Calls that take a long time to process.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	91
9. Seeing how many callers are in the queue or how many messages are piled up.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	92
10. Being expected to remain constantly at your workstation.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	93
11. Having to deal with difficult members.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	94
12. Difficulty talking to co-workers at work station	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	95
13. Being distracted by other nurses or call agents around you.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	96

Part V: ORGANIZATIONAL FACTORS INFLUENCING ADVICE PRACTICE

There are several potential problems in the way that member calls are managed in both call centers and medical offices. These are listed below.

- Please indicate in the first column the **extent to which the problem exists** in your setting, from “Not at all” to “A very large extent”.
- Please indicate in the second column the extent to which this problem **affects your ability to give good advice**, from “Not at all” to “A very large extent”.

Problem	Extent to which problem exists					Extent to which problem affects ability to give good advice					
	Not Applicable	Not at all	To a small extent	To a large extent	To a very large extent	Not applicable	Not at all	To a small extent	To a large extent	To a very large extent	
1. Not having enough appointments to meet patient need.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	97
2. Lack of same day appointments.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	99
3. Call agent/appointment clerks giving out all same day appointments.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	101
4. Lack of communication between call center and medical offices.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	103
5. Too many handoffs from call center.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	105
6. Too many handoffs from medical office.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	107
7. Lack of follow-through from provider.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	109
8. Lack of response from provider to my requests for consult/information.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	111

Problem	Extent to which problem exists					Extent to which problem affects ability to give good advice				
	Not Applicable	Not at all	To a small extent	To a large extent	To a very large extent	Not applicable	Not at all	To a small extent	To a large extent	To a very large extent
9. Inability to consult with a physician.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10. Lack of accessibility to patient information.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. Documentation Requirements.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12. Not having up to date information about preoperative/pre-procedure preparation.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13. Not having the most up-to-date protocols.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14. Being required to adhere to protocols.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
15. Being required to use protocols that may not fit the particular situation.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
16. Not being allowed to give test results over the phone.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
17. Not being allowed to use my nursing judgment.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Do you have other comments or opinions you would like to share about the delivery of nursing advice in your setting?

131

[illegible]

NURSING ADVICE STUDY

Part VI: COLLEAGUE NOMINATION

Instructions: Considering all of the nurses you have worked with at Kaiser Permanente Call Center or in your KP medical office, who stands out as being the most expert in telephone triage and advice; who would you turn to for advice?

Please list the first two or three nurses who come to mind:

- | | |
|----------|-----|
| 1. _____ | 132 |
| 2. _____ | 133 |
| 3. _____ | 134 |

THANK YOU!

ADVICE

QUESTIONNAIRE

Dear Member,

Last week, you talked with an advice nurse on the telephone. Please tell us how the call went.

1. What was your **main reason** for calling the advice nurse? Please check **only one box**.

- I wanted advice on how to care for myself (or a family member). ☐ 1 **2**
- I was concerned about a new symptom or a change in a health condition. ☐ 2
- I wanted an appointment. ☐ 3
- I wanted a prescription filled. ☐ 4
- I had some questions about a medication. ☐ 5
- I had some questions after an appointment or treatment. ☐ 6
- I wanted to get lab test results. ☐ 7
- I wanted to speak to my doctor or nurse practitioner, but couldn't. ☐ 8
- I had a question about how to do something within the Kaiser Permanente system. ☐ 9
- Other, please explain: _____ ☐ 10

2. What was the **main thing** you hoped to get from the advice nurse? Please check **only one box**.

- Advice or information. ☐ 1 **3**
- Peace of mind (reassurance). ☐ 2
- Help in figuring out how to get what I needed from the Kaiser Permanente system. ☐ 3
- An appointment. ☐ 4
- Other, please explain: _____ ☐ 5

3. What happened as the result of your call? Please check the **main result**. (Check **only one box**.)

- The nurse told me that I (or my family member) should be seen right away *and* directed me (or my family member) to urgency or emergency care. ☐ 1 **4**
- The nurse told me that I (or my family member) should be seen right away *and* helped get me (or my family member) an appointment at a medical office **within 24 hours of the time I called**. ☐ 2
- The nurse helped get me (or my family member) an appointment for a time more than 24 hours after the time I called. ☐ 3
- The nurse told me what to do to take care of myself (or my family member). ☐ 4
- The nurse asked me questions, then told me everything was fine and that I did not need to worry. ☐ 5
- The nurse gave me information or arranged the services I needed. ☐ 6
- The nurse communicated with my (or my family member's) doctor or nurse practitioner for me. ☐ 7
- The nurse was not able to help me. ☐ 8
- Other, please explain: _____ ☐ 9

4. How much of the nurse's advice did you follow? (Please check **only one box**.)

- I followed **all** of the nurse's suggestions. ☐ 1 **5**
- I followed **part** but **not all** of the nurse's suggestions. ☐ 2
- I **did not follow any** of the nurse's suggestions. (Skip Question #5. Go to Question #6.) ☐ 3

5. What parts of the nurse's suggestions did you follow? (Please check **all boxes that apply.**)

- I went to an appointment, as the nurse advised. ☐ 1 6
- I went for urgency or emergency care, as the nurse advised. ☐ 2
- I did what the nurse told me to do to take care of myself (or my family member). ☐ 3
- I did what the nurse suggested I do to get the services or help that I needed. ☐ 4
- I didn't follow any of the nurse's suggestions. ☐ 5
- Other, please indicate: _____ ☐ 6

6. If you did not follow all or part of the Advice Nurse's suggestions, what were your reasons for not following the advice? (Please check **all boxes that apply.**)

- I couldn't afford to. ☐ 1 7
- I didn't understand the nurse's suggestions. ☐ 2
- I couldn't get care for my child or other adult dependent. ☐ 3
- I didn't have transportation. ☐ 4
- I couldn't get an appointment. ☐ 5
- I didn't have time to follow the advice nurse's suggestion. ☐ 6
- I didn't agree with the advice nurse's suggestion. ☐ 7
- I couldn't get what was needed from the Kaiser Permanente system. ☐ 8
- I followed all of the nurse's suggestions. ☐ 9
- Other, please indicate: _____ ☐ 10

7. When you called, how important was it to you that the nurse would:

	EXTREMELY IMPORTANT	IMPORTANT	SOMEWHAT IMPORTANT	NOT VERY IMPORTANT/ NOT APPLICABLE	
Show that she/he cares about you as a person?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	8
Listen carefully to your ideas and your concerns?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	9
Give you clear, complete information or instructions?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	10
Know your (or your family member's) medical history?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	11
Work with you to make decisions that you were comfortable with?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	12
Appear skilled and knowledgeable?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	13

8. How much did the nurse actually

A GREAT DEAL SOMEWHAT NOT VERY MUCH NOT AT ALL/ NOT APPLICABLE

- | | | | | | |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----|
| Show that she/he cares about you as a person? | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 14 |
| Listen carefully to your idea and concerns? | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 15 |
| Give you clear, complete information or instructions? | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 16 |
| Seem to know your (or your family member's) medical history? | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 17 |
| Work with you to make decisions that you were comfortable with? | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 18 |
| Appear skilled and knowledgeable? | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 19 |

9. Overall, how helpful was the nurse?

(Please check only one box.)

EXTREMELY HELPFUL VERY HELPFUL SOMEWHAT HELPFUL NOT VERY HELPFUL NOT AT ALL HELPFUL

- | | | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|
| <input type="checkbox"/> 5 | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 20 |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|

10. Overall, please rate your level of satisfaction with this call.

(Please check only one box.)

VERY HIGH HIGH MODERATE LOW VERY LOW

- | | | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|
| <input type="checkbox"/> 5 | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 21 |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|

11. Has the problem that prompted you to call been taken care of to your satisfaction?

(Please check only one box.)

Yes ☐ 1 22

No ☐ 2

If the problem has not been taken care of to your satisfaction, then why?

23

12. What would you have done, if you had not been able to speak with an advice nurse? (Please check only one box.)

Called 911. ☐ 1 24

Gone to the emergency room (ER) or urgent care. ☐ 2

Gone to the medical office on my own. ☐ 3

Taken care of myself (or a family member), rather than seeing a health care professional. ☐ 4

Tried to get medical care from someone other than Kaiser Permanente. ☐ 5

Gotten advice from another source—family, friend, book, internet. ☐ 6

Done nothing. ☐ 7

Done something else. (Please explain): _____ ☐ 8

13. How likely are you to call the Advice Nurse again?

(Please check
only one box.)

VERY LIKELY

LIKELY

SOMEWHAT
LIKELY

NOT VERY
LIKELY

NOT
AT ALL LIKELY

☐ 5

☐ 4

☐ 3

☐ 2

☐ 1

25

14. Were you on hold before you were able to talk with the advice nurse?

Yes, I was on hold for _____ minutes.

☐ 1

26

No, I was not on hold.

☐ 2

15. When you called the advice line, what happened? (Please check only one box.)

I talked directly with a nurse.

☐ 1

27

I talked with a nurse, after speaking with _____ other people.

☐ 1

I left a message, and the nurse called me back in about _____ minutes.

☐ 2

_____ hours.

_____ days.

I left a message, but the nurse never called me back.

☐ 3

Other, please explain: _____

☐ 4

16. How much time did you spend on the phone with the advice nurse? _____ minutes.

28

17. Do you have any comments you'd like to make to Kaiser Permanente about the advice nurse?

29

Please tell us about the person for whom you called.

18. The person I called for advice about was?

Myself

☐ 1

30

Child

☐ 2

Partner or Spouse

☐ 3

Parent

☐ 4

Other: _____

☐ 5

19. How would you rate the overall health of the person you called about?

(Please check
only one box.)

EXCELLENT

VERY GOOD

GOOD

FAIR

POOR

☐ 5

☐ 4

☐ 3

☐ 2

☐ 1

31

20. Please give the birthday of the person you called about:

Month _____ | Day _____ | Year _____

32

Or, if you do not know the birthday, indicate the age of the person you called about: _____

Please... **Now tell us about yourself.**

21. How long have you been a Kaiser Permanente member? _____ Years 33
22. What race do you consider yourself? _____ 34
23. How many years of school did you complete? _____ 35
24. How often do you use the Internet to obtain information about health?
(Please check only one box.)
- | VERY OFTEN | OFTEN | NOW AND THEN | HARDLY EVER | NEVER | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|
| <input type="checkbox"/> 5 | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 36 |
25. In the past 12 months, about how many times
did you call a Kaiser Permanente advice nurse? _____ 37

Please... **Now tell us about your relationship with your doctor.**

26. During the past year, what percentage (%) of your medical office visits
at Kaiser Permanente were with your own doctor?
- | | | |
|------------|----------------------------|----|
| 0% - 25% | <input type="checkbox"/> 1 | 38 |
| 26% - 50% | <input type="checkbox"/> 2 | |
| 51% - 75% | <input type="checkbox"/> 3 | |
| 76% - 100% | <input type="checkbox"/> 4 | |
27. How important is it to you that you see your own doctor?
- | EXTREMELY
IMPORTANT | IMPORTANT | SOMEWHAT
IMPORTANT | NOT VERY
IMPORTANT | |
|----------------------------|----------------------------|----------------------------|----------------------------|----|
| <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 39 |
28. It would not bother me if I had to choose a new regular doctor.
- | STRONGLY
AGREE | SOMEWHAT
AGREE | AGREE | SOMEWHAT
DISAGREE | STRONGLY
DISAGREE | DISAGREE | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|
| <input type="checkbox"/> 6 | <input type="checkbox"/> 5 | <input type="checkbox"/> 4 | <input type="checkbox"/> 3 | <input type="checkbox"/> 2 | <input type="checkbox"/> 1 | 40 |

Thank you ... **for completing and returning this questionnaire.**

CALL DESCRIPTION RATING FORM

2.5.3
Nursing Advice Project

Dataset #: _____

CALL DESCRIPTION RATING FORM

SUBJECT ID # _____ 1

RATER # _____ 2

TIME STARTED: _____ 3 TIME COMPLETED: _____ 4

Field Name	Possible values	Field dependencies	CODE	Field #
RELATIONSHIP: Relationship of caller to patient	Self 1 Child 2 Partner or Spouse 3 Parent 4 Other 5			5
INITIATION: Person initiating call	Nurse initiated call (RN called patient back after pt. left a message) 1 Patient initiated call (Pt. called and talked with nurse – no message) 2 Unable to identify 9			6
INTERPRETER: Need for interpreter	Yes 1 No 2			7
LANGUAGE: Language used during call	English (default) 0 Spanish 1 Chinese 2 Thai/Vietnamese 3 Japanese 4 Russian 5 Other (can be determined) 6 Cannot be determined 7			8
PEDS: Pediatric Case?	Yes 1 No 2 Unable to identify 9			9
EMOTION: Caller's emotional tone at the beginning of the call	Matter-of-fact, business-like 1 Apologetic, embarrassed, reticent 2 Appreciative, relieved 3 Anxious, fearful 4 Angry, frustrated 5 Other 6			10

Problems coding this page:

Specify other:

Field Name	Possible values	Field dependencies	CODE	Field #
REASON1A: Reason for call: Concern about new or recurring symptom #1?	Yes 1 No 2	If field 11=2 then field 12 = 99		11
SYMPTOM1: First Symptom	See legend below			12
REASON1B: Reason for call: Concern about new or recurring symptom #2?	Yes 1 No 2	If field 13=2 then field 14 = 99		13
SYMPTOM2: Second Symptom	See legend below			14
REASON1C: Reason for call: Concern about new or recurring symptom #3?	Yes 1 No 2	If field 15=2 then field 16 = 99		15
SYMPTOM3: Third symptom	See symptom codes below			16

Symptom Values

Not applicable = 99

System/General Category	Symptom	Values	System/General Category	Symptom	Values
Pain	Chest pain	11	Genitourinary	UTI Sx.	51
	Headache	12		Other GU	50
	Muscular/joint/back pain	13	Skin	Rash, itching	61
	Abdominal pain	14		Edema	62
	Other pain	10		Wound or burn	63
EENT	Earache; pulling on ears	21		Insect bite(s)	64
	Sore throat	22		Other skin	60
	Runny nose, cold Sx	23	Other Gen'l Symptoms	Fever, sweating, chills	71
	Eye symptoms	24		Weakness, fatigue, Dizziness	72
	Other EENT Sx.	20		Increased Blood pressure	73
Respiratory	Cough	31		Irregular heartbeat, Palpitations	74
	Wheezing	32		Allergic reaction Sx. (swelling, hives)	75
	Shortness of breath	33	Trauma	Swollen lymph nodes	76
	Other respiratory Sx.	30		Trauma related	77
(4) G-I	Nausea, vomiting,	41	Pregnancy-related	Pregnancy-related symptoms	78
	Heartburn	42	Other Gen'l	Other general symptoms not specified elsewhere	70
	Diarrhea or constipation	43			
	Other GI	40			

Problems coding this page:

Specify other:

Field Name	Possible values	Field dependencies	CODE	Field #
REASON for call 2a: FIRST CHRONIC PROBLEM: Was there a chronic illness mentioned in the call?	Yes 1 No 2	If field 17=2 then field 18 = 99		17
CHRONIC1	SEE LEGEND BELOW			18
REASON for call 2b: Was there a chronic illness mentioned in the call?	Yes 1 No 2	If field 19=2 then field 20 = 99		19
CHRONIC2	SEE LEGEND BELOW			20
REASON for call 2c: Was there a chronic illness mentioned in the call?	Yes 1 No 2	If field 21=2 then field 22 = 99		21
CHRONIC3	SEE LEGEND BELOW			22

Chronic Health Problem Values

NOT Applicable = 99

System/General Category	Problem	Value	System/General Category	Problem	Value
Cardiovascular	Hypertension	11	Chronic Pain Syndromes	Arthritis	41
	Congestive Heart Failure	12		Headache/migraine	42
	Other Cardiovascular	10		Other chronic pain	40
Pulmonary	Asthma	21	Cancer		50
	Other chronic lung problem	20	Other Chronic Problems		60
Endocrine	Diabetes	31			
	Other endocrine	30			

Field Name	Possible values	Field dependencies	CODE	Field #
REASON3: Third reason for call: General health or self-care question	Yes 1 No 2			23
REASON4: Fourth reason for call: Wanted an appointment?	Yes 1 No 2			24
REASON5: Fifth reason for call: Wanted a prescription refill?	Yes 1 No 2			25
REASON6: Sixth reason for call: Medication question?	Yes 1 No 2			26
REASON7: Seventh reason for call: question following office visit/procedure?	Yes 1 No 2			27
REASON8: Eighth reason for call: Wanted test results?	Yes 1 No 2			28
REASON9: Ninth reason for call: Wanted to report progress to/speak to provider?	Yes 1 No 2			29
REASON10: Tenth reason for call: System question?	Yes 1 No 2			30
REASON11: Eleventh reason for call: Other reason	Yes 1 No 2			31

Problems coding reason for call:

Field Name	Possible values	Field dependencies	CODE	Field #
URGENT DISPOSITION: Was the disposition urgent or emergent?	Yes 1 No 2	If field 32=2 then field 33 = 99		32
URGENT DETAIL	Not applicable (default) 99 Nurse called 911 11 Caller instructed to call 911 12 Patient sent to ED 13 Patient sent to Urgent care 14 Pt. Given same-day appt. with PCP 15 Pt. Given same-day appt. with non-PCP 16 Message to medical office for same-day appt. 17 Other urgent disposition 10			33
APPOINTMENT DISPOSITION: Was pt. Given an appt.?	Yes 1 No 2	If field 34=2 then field 35 = 99		34
APPOINTMENT DETAIL	Not applicable (default) 99 Non-same-day appt. with PCP 21 Non-same-day appt. with non-PCP 22 Non-urgent same day appt. with PCP 23 Non-urgent same day appt. with non-PCP 24 Referred to appt. clerk 25 Other appointment 20			35
CONDITIONAL DISPOSITION: Was pt. asked to come in if condition worsens?	Yes 1 No 2	If field 36=2 then field 37 = 99		36
CONDITIONAL DETAIL	Not applicable 99 Go to ER if condition worsens/doesn't improve 31 Go to urgent care if condition worsens/doesn't improve 32 Make appt. if condition worsens/doesn't improve 33 Call back if condition worsens/doesn't improve 34 Other conditional disposition 30			37
HANDOFF DISPOSITION: Was the caller handed off to another provider?	Yes 1 No 2	If field 38=2 then field 39 = 99		38
HANDOFF DETAIL	Not applicable 99 Handoff to pharmacist 41 Handoff to advice nurse practitioner 42 Handoff to specialty advice – emergency 43 Handoff to specialty advice – peds 44 Handoff to specialty advice – OB 45 Handoff to specialty advice – other 46 Other handoff 40			39

Field Name	Possible values	Field dependencies	CODE	Field #
LINK DISPOSITION: Link to PCP?	Yes 1 No 2	If field 40=2 then field 41 = 99		40
LINK TO PCP DETAIL	Not applicable 99 Message to PCP: no plan to call back 51 Message to or consultation with PCP: PCP to call back 52 Message to or consultation with PCP: advice nurse or office nurse to call back 53 Other link to PCP 54			41
NURSING MANAGEMENT DISPOSITION: Was there nursing management?	Yes 1 No 2			42
NURSING MANAGEMENT: Did the nurse provide explanation or reassurance?	Yes 1 No 2			43
NURSING MANAGEMENT: Did the nurse provide self-care advice?	Yes 1 No 2			44
NURSING MANAGEMENT: Did the nurse provide other nursing management?	Yes 1 No 2			45
OTHER DISPOSITION	Yes 1 No 2			46
APPOINTMENT REQUESTED: Did caller request appt.?	Yes 1 No 2			47
APPOINTMENT ADVISED: Did RN advise appt.?	Yes 1 No 2			48
SERVICE AVAILABILITY: Was disposition affected by availability of services?	Yes 1 No 2	If field 48=2 then field 50 = 9		49
SERVICE AVAILABILITY DETAIL	Not applicable 9 Referred to ER b/c no other services available when needed 1 Referred to ER for caller convenience (time, location) 2 Referred to urgent care b/c no other services available when needed 3 Referred to urgent care for caller convenience 4 Appointment affected by no appts. With PCP 5 Appointment affected by no appts. At PCP's medical office 6 Appointment affected by caller convenience 7 Other effect of availability of services on disposition 8			50

Field Name	Possible values	Field dependencies	CODE	Field #
REFERENCE TO CARE: Did RN refer to care that caller has received?	Yes 1 No 2			51
REFERENCE TO PCP: Did RN mention the PCP?	Yes 1 No 2			52
REFERENCE TO PCP PREFERENCES: Did RN identify PCP's preferences?	Yes 1 No 2			53
PCP COMMUNICATION: Did RN indicate intent to communicate caller's concerns to PCP?	Yes 1 No 2			54