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The investigation of a medical-pediatric intensive care unit: a multifaceted observation.

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THE INVESTIGATION OF A MEDICAL-PEDIATRIC INTENSIVE CARE UNIT: A MULTIFACETED OBSERVATION

A Dissertation Presented
By
ROBERT PATRICK CIULLA

Submitted to the Graduate School of the University of Massachusetts in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 1984

Department of Psychology
THE INVESTIGATION OF A MEDICAL/PEDIATRIC
INTENSIVE CARE UNIT:
A MULTIFACETED OBSERVATION

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ROBERT PATRICK CIULLA

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DEDICATION

TO MY FATHER
ACKNOWLEDGEMENT

Many people contributed in important ways. I owe much thanks to the University faculty, especially Pat Wisocki, Beth Sulzer-Azaroff, and Marian MacDonald. The flexibility and inventiveness they allowed me, the steadfast encouragement they provided, and the knowledge they imparted, gave me the tools and the support so necessary in the adequate conduct of applied research. A special thanks to Bruce Masek, whose pilot work in the area of acute care medicine, in collaboration with Dave DeMaso formed an essential basis for the ideas and methods included in the manuscript. Moreso, Bruce's supervision, concern, and capacity to find and describe a bit of humor in the midst of long hours made the work easier to bear. To past supervisors too numerous to mention, whose curiosity sparkled and sparked my own, many thanks. To name a few: Harold Gelfand, Dennis Russo and Michael Cataldo. The staff of Division 86 have my special thanks, as well. More than mere participants in the project, they graciously accepted the demands of the researcher, when clearly their professional responsibilities carried heavy demands in themselves.

Finally, I would like to acknowledge my heartfelt appreciation for JoAnne Baranoski, who was able to make a lengthy, typographically disabled manuscript look so good.
Intensive care units have been viewed as "the epitome of modern medical technology" (Eisendrath and Dunkel, 1979), highly specialized, controlled settings designed to ameliorate specific disease states. Besides the general medical and surgical therapy units found in most hospital settings, can be added units devoted to coronary care, oncology, renal dialysis, burn victims, and neonatal and pediatric intensive care. The aim of such units is to provide an immediate prophylactic service and restore and maintain vital body functions, such that medical and nursing personnel are trained to respond to variable physiologic dysfunction (hemorrhage, shock, respiratory and circulatory crisis, etc.). With the importance of continuous observation and evaluative procedures, practitioners must be notably vigilant (Vreeland and Ellis, 1969). The magnitude of illness is usually quite severe and a one-to-one ratio between the nurse and the "potentially salvageable" patient is often mandatory (Wellenkamp, 1968). Patients who are moderately ill, as well as those with clearly diagnosable terminal illnesses, would not be admitted to an intensive care unit (ICU). Intensive units are equipped with extensive and advanced medical resources, requiring unusual procedural and technical expertise; the professional must be able to both operate the machinery and be able to discuss its utility with patients and visiting family members (Strauss, 1968). The settings are independent, self-contained structures, with electronic, radiological and resuscitative equipment standard in most units (Pentecost, Mayne and Lamb, 1967). One writer has speculated that hospitals of the future will primarily be
"giant intensive care units" (Kornfeld, 1968).

As a workspace, the unit contains many potential stressors, including noise levels, the rapid mobilization of machinery, unusually complex decisions that must be made (often requiring a team consensus), the prevalence of death, families in crisis, ethical considerations, role diffusion, and staff friction, fatigue and concern with one's competency (Lippincott, 1979; Tordes, Howell and Shannon, 1974). In describing the hallucinatory, psychotic-like states observed among recovery room patients following open-heart surgery, Nahum (1965) argued that such reversible "madness" was a new "disease of medical progress." Subsequently, patient response to post-operative situational conditions, while mitigated by age, other diseases, and premorbid states, was viewed to be a product of the "intensive care syndrome" (McKegney, 1966), and the literature describing and investigating this area has grown.

Psychiatric difficulties can be the result of various factors: (1) psychological response to acute illness -- in this category, both patient and staff reactivity can be considered, and (2) response to environmental characteristics -- again, patient/staff reactivity may be evaluated (Kornfeld, 1969). Health care, technical skills, and the psychological status of both patient and professional care-giver comprise an interaction and determine treatment outcome (Hay and Oken, 1972). In any analysis of an intensive care setting as stressful, one should recognize that stress reactions (behavioral and/or physiological) are the product of interrelated factors. These include communicational difficulties (staff-staff, staff-patient, staff-family); environmental and architectural characteristics (staff scheduling, technological
features, noise levels, lighting); the necessity for and utilization of a broad knowledge base; patient care (intrusive procedures, death, emergencies); and family demands (death education, possible family disunity).

Several writers have eloquently described intensive care units. What follows are representative excerpts from the literature characterizing the complexities of this "special environment."

A stranger entering an ICU is at once bombarded with a massive array of sensory stimuli, some emotionally neutral, but many highly charged. Initially, the greatest impact comes from the intricate machinery with its flashing lights, buzzing and beeping monitors, gurgling suction pumps, and whooshing respirators. Simultaneously, one sees many people rushing around busily performing lifesaving tasks. The atmosphere is not unlike that of the tension-charged strategic war bunker...Desperately ill, sick and injured human beings are hooked up to that machinery. And, in addition to mechanical stimuli, one can discern moaning, crying, screaming and the last gasps of life. Sights of blood, vomitus and excreta, exposed genitalia, mutilated bodies, and unconscious and helpless people assault the sensibilities. Unceasingly, the ICU nurse must face these affect-laden stimuli...the nurse must reassure and comfort the man who is dying of cancer; she must change the dressings of a decomposing gangrenous limb; she must comfort the anguished young wife who knows her husband is dying...(Hay and Oken, 1972).

The impressions are powerful ones; working with the acutely and chronically ill in intensive care settings often comprises a continuous array of variable stimuli, the product of illness, technology, and psychological reactivity. A given day will hardly be routine:

Mrs. Larson, a 43-year-old housewife, was in her second postoperative day following a mitral valve replacement; nine-year-old Chucky was in his third day following a second stage Glalock-Hanlon procedure; Mr. Gregory, a young farmer, had just come from the recovery room after having an amputation of his entire right arm and shoulder following a farm accident; and Mrs. White, another middle-aged housewife, was in her second day following replacement of an aortic valve. They were typical patients in the
intensive care unit where I worked for the summer. (Hammes, 1968).

A heart patient insisted:

Either I was having a nightmare, or I was dead and in hell. I elected for the latter. Of course, I must be in hell. I couldn't be dreaming such things. The snakes, the jumping grasshopper, the tubes stuck in my body, the neon lights...the maddening whirring sound, the coughing, the gash in my chest - Hell! Let me out of here! It's all a mistake! (Abram, 1974).

And a poet observed:

...if they would give me back my watch, must now be morning. There are no windows though to judge that by, only those cones of light trained on our eyelids...high iron grills fencing in each of the nearly touchable beds constantly being (one man dying or making gurgling sounds of death, another in new-bloodied bandages arriving) trundled in or out. (Abrams, 1974).

The intensive care environment thus represents an enclave of mechanical, visual, auditory and tactile sensations. It has lead one writer to refer to an "illusion of constant crisis" (Lambertsen, 1968), and another to note the constancy of the "knife-edge present" (Strauss, 1968) wherein emergency medical procedures become routine work requirements. Immunity is by no means practicable, and patients, staff, and family receive the comprehensive impact of unit stressors (West, 1975).

The interactional qualities of the setting cannot be disregarded: staff work with complex machinery, patients lives are sustained by such machinery, staff work with and form attachments to patients, some of whom die, families must be educated about the disease process and informed of the possibility of death, physicians, nurses and technicians must work in a collegial manner that generally exceed traditional hospital
relationships, long hours of surveillance and sudden emergency procedures have an impact on everyone in proximity to the unit, and so on. Hence, the area must be seen as representing a composite of factors.

Chapter I addresses the literature that provides naturalistic, descriptive and empirical analyses of stress-inducing phenomena that have an impact on staff behavior. Chapters II, III and IV describe the research conducted on the medical/pediatric ICU at Children's Hospital, Boston during July, August and September, 1982.
ABSTRACT

THE INVESTIGATION OF A MEDICAL-PEDIATRIC INTENSIVE CARE UNIT: A MULTIFACETED OBSERVATION

September, 1984

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M.A., University of Maryland, Ph.D., University of Massachusetts
Directed by: Professors Patricia Wisocki, Beth Sulzer-Azaroff,
Marian MacDonald, Alberta Macione, Bruce Masek

Acute care medicine has received much attention over the past two decades. Reports from psychological, nursing, medical, and occupational journals have corroborated the stressful features of intensive care environments. Illness severity, death and dying, advanced medical technologies, and workload characteristics have been found to influence the reactions of patients and unit personnel. The present project was conducted on an eighteen-bed medical-pediatric intensive care unit. The study targeted the perceptions and reactions of unit staff, using a tripartite assessment methodology, in which self-report, performance, and cardiologic measures were gathered. Self-report findings indicated that the incidence of subjective symptomatology was related to the amount of time that staff were employed on the unit, with senior nurses reporting low overall subjective distress. Group scores revealed high rates of interpersonal sensitivity, obsessional-compulsive patterns, and depression. Performance measures underscored the constancy of patient care, as staff were engaged in medical procedures during the
majority of observations. Heart rate measures (beats per minute) typically were higher during on-unit sequences, compared with off-unit evaluations. A progressive muscle relaxation technique was taught as a coping strategy to a subgroup of fulltime nursing staff; based on self-report findings, the treatment group did not reveal improvement in subjective states following relaxation training.
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CHAPTER I

INTRODUCTION

Review of the Literature

The "intensive care syndrome" is a phenomenon, albeit unsystematically investigated, that has significant impact on the staff working in the setting no less than the patients who are being treated. The present section will be devoted to an assessment of the variable stress-inducing properties of intensive care units and the consequences of such properties for medical and nursing staff. Stress-inducing characteristics cited in the literature (for the most part non-experimentally determined) include, as broad categories, setting and work-related characteristics, e.g., patient care and required knowledge base, communication problems, ethical concerns, architectural features, and so forth. Complying with implicit standards of behavior for a professional in a hospital setting further restricts staff from acknowledging the often debilitating impact of their work (Michaels, 1971). The following sections will systematically review the areas in intensive care work that have been noted to be sources of stress.

The ICU Setting and Work-Related Characteristics

Self-report measures have been most frequently used -- questionnaires, checklists, mood inventories -- in which staff have been requested to identify perceived ICU stressors. Unfortunately, these measures have rarely been combined with direct observation of concomitant performance and physiological indices. Nonetheless, given the wide range in types
of instruments, formats, and the intended purposes of each investigator, there are reasonable commonalities among the findings. In some instances, the instruments applied by these investigators were widely known and validated scales; elsewhere, the scales were designed to meet the specifications and appurtenances of a given unit in a particular facility. Generally, setting characteristics include the required knowledge base (regarding advanced technology and disease states), patient care (acute illness, emergencies, intrusive procedures), and specific job-related features (workload, scheduling, clarity in assignments).

The amount of information needed to work in the highly technologized area is considerable (Cassem and Hackett, 1974; Dossett, 1978a; Gardam, 1969; Todres, Howell and Shannon, 1974; Tomlin, 1977). Staff must work each day in the presence of severe and advanced disease states, requiring special expertise in disease process and experimental procedures (Kornfeld, Maxwell and Momrow, 1968; Tomlin, 1977; Vreeland and Ellis, 1969). Staff must be prepared to work with short-term acutely ill, postoperative patients as well as longer-term chronically ill (Dossett, 1978b; Kornfeld, 1971; Kornfeld, Maxwell and Momrow, 1968). In one report, nurses working with chronically ill dialysis patients characterized themselves as depressed (Wertzel, Vollrath, Ritz and Ferner, 1977). Staff must also be sufficiently trained such that they are able to educate patients about life-sustaining equipment (Janken, 1974). Minckley (1968) listed the following categories as essential areas of knowledge:

1. Respiration
2. Circulation
3. Hydration-nutrition-excretion; electrolyte and acid-base balance
4. Shock and adaptation to stress
5. Infection, contamination, sterilization
6. Psychological response
7. Environmental effects
8. Response to pain

Patient care represents a broad stress-related category in the ICU work space. Each day staff work with a population in which some type of immediate action will be necessary. Emergency care is a constant (Ferrigan, 1966), as is the prevalence of death and dying (Eisendrath and Dunkel, 1979; Kornfeld, 1969). There are several indicators that the nurse is stressed by patient contact: an unrealistic appraisal of the patient's status, reduced contact and withdrawal from the patient, inordinate concern for equipment-based evaluations, heightened concern for a particular patient, reporting dissatisfaction with lack of progress and the ethical dilemmas in unnecessarily prolonging a patient's life (Janken, 1974; Kaplan De-Nour and Czaczkes, 1968; Lippincott, 1979). There are instances in intensive units when nursing staff must make medical decisions, often discriminating between "an immediate action emergency and a wait-until-the-physician-comes emergency" (Vreeland and Ellis, 1969). Emergencies and other crises are analogous to sudden, unexpected "disaster" conditions, in which medical responsibility is increased, physical demands exceed usual conditions, and disorganization must be managed (Laube, 1973). Emergency decisions usually require considerable knowledge and skill, may be made in the absence of a physician, and may determine the life or death of a critically ill patient. Moreover, increased responsibility for
decision-making and procedural sophistication is often punished by medical staff, who find the advent of "doctorettes" or "junior doctors" disturbing (Michaels, 1971; Strauss, 1968). Staff will often be required to perform difficult and highly invasive procedures, some of which are experimental, many of which inflict pain (Cassem and Hackett, 1975; Hay and Oken, 1972; Todres, Howell and Shannon, 1974; Vreeland and Ellis, 1969). Repetitive evaluative measures are typically necessary (Hammes, 1968; Hay and Oken, 1972; Melia, 1977), as well as continuous monitoring and intensive observation (Melia, 1977; Vreeland and Ellis, 1969). Tasks may be complex, may be arduous, e.g., lifting and transferring, and must often be completed within time limitations (Hay and Oken, 1972). Family needs must be met (Cassem and Hackett, 1972; Huckabay and Jagla, 1979), and strategies for reducing a patient's anxiety must be implemented (Kornfeld, Maxwell and Momrow, 1968). Frequently staff will observe no change or a worsening of the patient's symptomatology (Cassem and Hackett, 1975; Hammes, 1968; Lippincott, 1979; Strauss, 1968); indeed, successful treatment is often followed by a discharge from the unit, and staff are usually not able to follow patients after their discharge (Kornfeld, 1971).

There are other job-related features. Staff tend to be few in number, work in small, enclosed spaces for long periods (Vreeland, 1969), may work on a unit that is isolated from the rest of the hospital, must share common equipment and, given the size of the group, must consider how personal decisions such as vacations and sick time will affect coworkers. Turnover is high, with an average tour of duty approximating
2-5 years, and replacement is unusually problematic, given the workload and the expertise that is no less than mandatory (Gardam, 1969).

Turnover, for example, is a phenomenon more complex than one might initially suspect. It is influenced by demographic factors, job satisfaction, hospital size and location, and compensation plans (Bailey, 1980). Such "enforced interdependency" among staff can result in job tension (Hay and Oken, 1972). Traffic in the unit can reduce mobility (Michael, 1971), and the heightened pace and excessive workload can be stressful (Downey, 1972; Huckabay and Jagla, 1974; Lockoff, Cane, Buchanan and Cox, 1977).

Thus, it can be seen that the ICU is a facility with "multifactorial" properties. But questions about staff, morale, turnover, resource allocation, the predictability of death, etc., have received relatively few data-based inquiries by investigators (Greenburg, Civetta and Barnhill, 1979). For example, Greenburg et al. pointed out that the probability of predicting that a patient can survive his illness is approximately 90%, whereas the probability of predicting that an intensive unit patient will not survive is approximately 60%. Such uncertainty influences how staff and unit resources will be allocated and establishes the basis for a "high-tension environment." Mismanaged utilization of staff resources can be physically stressful; is there an optimal relationship between amount of time per hour or time per shift spent on the unit and output? If so, what is it? If such an equation were known, medical orders, breaks, and the staff-patient ratio could all be reevaluated to meet the requirements of such an equation.
Greenburg et al. argued that the demands of the setting (one can understand here that what is being referred to has been labeled task-related stressors, or environmental demands) and the emotional impact of the unit (e.g., the "high level of predictive uncertainty") are independent sources of stress, yet function synergistically to produce a more stressful work space than if either operated independently. Such a notion is surely related to statements made elsewhere in the present manuscript in which staff stress is a reaction to highly interrelated stimuli comprising interpersonal, architectural and environmental properties.

Indeed, Greenburg and his cohorts performed a "systems analysis" in order to evaluate ICU tasks that were in fact time consuming. Tasks were generated by physician's orders and the system's requirements. One hundred and eight tasks were identified, each requiring 6-7 minutes of nursing time. For example, the category Monitoring contained the following 13 tasks:

- ECG, rate
- Vital signs, Q 1 H
- Vital signs, Q 30 M
- Vital signs, Q 15 M
- Peripheral arterial line, BP
- CVP
- Pulmonary arterial line, pressures
- Neuro vital signs
- Measurement of cardiac output
- Left atrial pressure
- Intracranial pressure
- Peripheral pulses, Doppler
- ECG, rhythm

A systems analysis might be a useful way to assess the multifaceted intensive care unit. A systems model offers a "wider lens" (Satir, 1969) and the opportunity to consider behavioral patterns as a function
of both the individual and the array of available contextual elements. Information is exchanged between environments and people and dysfunction (stressor-induced behavior) which is less a product of intrapsychic phenomena as it is a manifestation of discordant interactions. The intensive setting then is characterized by the transactional effects of the relational units (patient care, staff interaction, experimental procedures, family grief, etc.). Konrad Lorenz (1959) has written: "Every real organic system is built upon both principles, mutual interaction of correlated parts playing a role as well as particulate elements influencing the whole in one-way causation." He continued: "a 'system of actions' is both a 'regulative whole' and 'a mosaic of relatively independent elements'." Hay and Oken (1972) have argued: "The quality of a patient's care and, hence, outcome depends greatly upon the people providing that care and the effectiveness of the latter is a function of their psychological state no less than of their technical expertise."

Checklists such as the Monitoring checklist cited can provide a discrete measure of work performance. Elsewhere, the principal author has developed a Nursing Intervention Score System (NISS) that notes the amount of time required to meet the needs of each patient and whether one or more staff will be required. "Were one to constantly and continuously place demands for time in excess of those reasonably available, a stressed system and eroded emotions would result." Greenburg et al. have furthermore developed computerized simulations of intensive units in which they have been able to program variable patient status, system demands, and staff/patient ratio and have, thereby, been able to determine
the interaction of such factors on resource allocation. A computerized system may have applications, e.g., for clerical and data-collection tasks. Yet, the simulated data indicated that even with a fully computerized system intact, a 1:1 nurse/patient ratio would still be essential.

What follows is a review of data-based work, most of which was designed to categorize intensive unit stressors. The research cited did not, in most instances, attempt to separate into components each determined category. Thus, if we take one category as an example of possible work-related stress, emergency procedures, the literature does not operationalize the term into its functional component parts. A functional analysis would provide the basis for observational work, and would more accurately define the relationship between work variables -- intrusive procedures, task complexity, continuous monitoring -- and observed behavior. The research conducted in air traffic settings (described in a later section) and the computerized model described by Greenburg et al. represent attempts to investigate correlations between stress-related setting characteristics and human performance. Similarly, the work discussed below generally fails to examine functional relationships; nonetheless, the descriptive studies cited have generated a range of options upon which future researchers can focus their empirical interests.

The following two reports, conducted in 1972 and 1980, respectively, typify the findings most often reported in the literature. A group of 16 nurses on a coronary care unit were given a 44-item questionnaire and asked to rate the frequency and severity of experienced conflict for each
item (Cassem and Hackett, 1972). Highest ranked items included heavy lifting (of nearly immobile heart patients), unpredictable staff scheduling, the weight of personal responsibility, overwrought families, the hectic pace, the severity of the patient's illness, personal feelings of insecurity and incompetence, poor communication with physicians as well as the general unavailability of physicians, and pain-inflicting procedures. Accordingly, the study cited major conflict-laden conditions for ICU staff, including an unresponsive administration, scheduling problems, family needs, intrusive medical and psychiatric research protocols, interpersonal staff conflict (nurse-nurse and nurse-physician), and the attendant difficulties in working with severely incapacitating disease.

Major sources of stress have been cited elsewhere and generally corroborate the findings mentioned above. A Stress Audit survey (Bailey, Steffen and Gout, 1980) was designed and administered regionally (1238 nurses in the San Francisco Bay area), nationally (556 nurses) and locally (Stanford; N=129) to evaluate both stressful and satisfying aspects of ICU nursing. Each sample reported the following three areas as most stressful: unit management, interpersonal conflicts, and patient care. Each category included several items. Most notable in the category Unit Management were inadequate staffing, apathetic staff, interruptions and paper work, the unavailability of physicians, and emergencies, transfers and admissions. In the area of Interpersonal Relationships, personality conflicts with staff, physicians, administration and residents received the highest ranking by all three samples.
This category further included disagreement with physicians over treatment protocols, unresponsive nursing leadership, and lack of respect from physicians. The category Patient Care constituted emergencies and arrests, unnecessary prolongation of life, critical/unstable patients, the death of "special" patients, an inability to meet patients' needs, and responsibility and decision-making. The remaining four categories were ranked as follows: Knowledge and Skills (inadequate knowledge, unfamiliar equipment, lack of experience and skills, unfamiliar situations, inadequate continuing education, lack of orientation); Physical Work Environment (insufficient/malfunctioning equipment, work space, noise, general work environment, lack of supplies, too many people, lighting); Life Events (personal, stamina, family); and Administrative Rewards (no opportunity for advancement, poor pay/benefits). Interestingly, at least two categories -- Patient Care and Knowledge and Skills -- were perceived as highly stressful and potentially satisfying events either by the same respondent or across respondents. The transaction between the stimulus and individual perception and responsivity is underscored with this finding. Bailey et al. concluded that based on the survey data, ICU stress is largely the product of work-related tasks, organizational characteristics, interpersonal difficulties, and an inadequate physical environment.

Medical unit stressors were compared between 40 black female nurses at the Baragwanath Hospital and 20 white female nurses at the Johannesburg General Hospital. Ten stressors were selected and each respondent was required to compare stressors and determine which was more or less
stressful. For example, if "making a mistake" was found to be more stressful than "pressure of time", "making a mistake" might be scored 75 and "pressure of time", 25. Each comparison was to sum 100 and each item was paired with the other 9 items on the list in this fashion. Group means for each item were then assessed. The Baragwanath group rank ordered the stressors from most to least stressful as follows in column A and the Johannesburg group as follows in column B:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute crisis</td>
<td>Making a mistake</td>
</tr>
<tr>
<td>Not understanding machines</td>
<td>Acute crisis</td>
</tr>
<tr>
<td>Caring for a dying patient</td>
<td>Caring for a dying patient</td>
</tr>
<tr>
<td>Making a mistake</td>
<td>Pressure of time</td>
</tr>
<tr>
<td>Threat of alarm going off</td>
<td>Having to make decisions</td>
</tr>
<tr>
<td>Having to make decisions</td>
<td>Coping with relatives</td>
</tr>
<tr>
<td>Danger to person</td>
<td>Death of a patient</td>
</tr>
<tr>
<td>Pressure of time</td>
<td>Not understanding machines</td>
</tr>
<tr>
<td>Death of a patient</td>
<td>Danger to person</td>
</tr>
<tr>
<td>Coping with relatives</td>
<td>Threat of alarm going off</td>
</tr>
</tbody>
</table>

Differences between groups can in part be understood as related to cultural, educational and economic factors, as well as structural and administrative variability between units. However, more important than the minor differences between the groups is the fact that staff on both units reported similar intensive unit circumstances as potentially stressful, categories corroborated elsewhere in the literature previously cited. Generally, emergencies, technology, death, personal competence, and decision-making were high on both lists. Staff communication is perhaps the only major category not presented on either list, the absence of which may well be the product of cultural determinants.

In a study employing a questionnaire (Oskins, 1979), twelve "stressful narratives" were identified. The respondents were asked to rate each
narrative according to four standard questions:

1. Do you perceive the situation as stressful;
2. Do you believe that the situation could be a threat or a challenge;
3. Identify the major source or sources in this situation which could cause you the most stress or discomfort:
   (a) ICU
   (b) ICU nurse
   (c) The patient and his care
   (d) The patient's family
   (e) Hospital administration
   (f) ICU personnel
4. Identify the coping method or coping methods from the attached list that you may use at or away from work in regard to this situation.

Importantly, the protocol was designed to cue the respondent to essentially categorize the source of the stress (from question three it can be noted that there is considerable agreement between identified stressors in the present study and those cited by investigators in other units) and describe coping methods, or stress-management strategies, that the respondent has used and found to be effective. The Rahe Life-Change Scale was used to assess life-change events (e.g., marriage, relocation, death of a loved one) over the previous year for each respondent. Thus, the investigator was interested in assessing identified stressors, specific coping strategies, and corresponding life-change situations.

Seventy-nine registered nurses from ICU's in five separate hospitals were sampled. As a group, the 79 sampled had had little exposure to range of related curriculum, including crisis intervention, death and dying, and stress management.

The respondents generally agreed that all the narratives were stressful. The narratives found to be most significant were as follows:
(1) need of a dying patient's family for counseling for which the nurse lacks time
(2) a young patient with a myocardial infarction making sexual advances to the nurse
(4) an ICU nurse with a personal crisis who is required to work in a busy ICU environment
(5) a typical ICU area with much congestion and noise, which irritates the nurses and patients
(7) an ICU unit inadequately staffed for the patient load and needs
(8) an ICU charge nurse having to work with a large percentage of inexperienced "floating" nurse personnel to cover the unit
(9) a difficult respiratory case in which consistent nursing care is needed but not received due to inconsistent nursing performance by staff
(11) a family threatening to sue the staff and the hospital for poor care received by their loved one
(12) a family not following visiting hours and giving support detrimental to the patient

The six seen as most stressful included items 1, 7, 8, 11, 4, and 5 (scenarios involving dying patients, a highly congested environment, and staff relationships. Items 4, 7, 8 and 11 were seen as most threatening (the possibility of future harm due to the stressor) by the nurses sampled. Items 2, 9 and 12 were rated as most challenging (situations producing stress, but nonetheless considered as enhancing one's well-being). Sources of stress were ranked as follows, from most stressful to least stressful:

Patient and his care
ICU unit
Patient's family
Administration
ICU personnel
ICU nurse

Most respondents reported using a variety of coping methods. Coping methods most often used indicated that "direct action" was usually preferred.Clarifying the properties of the stressor and utilizing
information obtained from previously similar situations were predominating strategies. However, coping methods used by the sample ranged from "I take some definite action on the basis of present understanding" and "I become involved in other activities to keep my mind off the problem" to "I become depressed or apathetic" and "I think of a supernatural power who cares about me." Missing among the questionnaire responses is any indication of the effectiveness of the strategies used and the situations in which they were proven to be most (least) effective. An alternative would have been for the respondents to specify an actual, non-narrative, situation in which could be identified a stressor, a coping response, and the outcome of the situation as a means for determining the efficacy of the coping response. The Rahe Scale was included primarily to assess stressful situations occurring outside the ICU setting. Only 15.2% of the sample scored in the high-risk category, a category defined as the likelihood of developing an illness due to extreme stress levels. Unfortunately, it is not at all clear what impact non-ICU stressors have on work-related tasks, if any.

The lack of objective data has been recognized — "are those stressors perceived by previous investigators the same stressors felt by the nurse, and are some more stressful than others?" (Huckabay and Jagla, 1979). Huckabay and his colleagues categorized ICU stressors into the following areas: (1) stressors associated with communication problems; (2) stressors resulting from the broad knowledge base required; (3) the complexities of patient care; and (4) the specialized features of the physical environment. This breakdown is a rather useful one and most of the
stressors identified in the literature can be subsumed under one of these categories. However, empirical verification has for Huckabay and Jagla a denotation similar to that presented by most other investigators in the area. Thus, data reported in the study were derived from questionnaires requesting the respondent to identify stressors and to provide demographic information. Respondents rank-ordered most to least stressful categories as follows: (1) patient care; (2) interpersonal communication; (3) environmental; and (4) knowledge base. Category components were ranked as well, with Workload ranked as most stressful and Patient Teaching ranked as least stressful:

Workload and amount of physical work
Death of a patient
Communication problems between staff and nursing office
Communication problems between staff and physicians
Meeting the needs of the family
Numerous pieces of equipment and their failure
Noise level in the ICU
Physical setup of the ICU
Number of rapid decisions that must be made in the ICU
Amount of knowledge needed to work in the ICU
Physical injury to the nurse
Communication problems between staff members
Meeting the psychological needs of the patient
Communication problems between staff and other departments in the hospital
Cardiac arrest
Patient teaching

In some areas, finer-grained itemizations may have been informative, e.g., what specific physical characterizations comprising the setup of the ICU were found to be stressful — presence of machinery limiting mobility, lighting, difficulty retrieving supplies? Furthermore, measures establishing the relationship between self-ratings and in-vivo performance were not obtained.
The investigators argued that patient care, as a category, was identified as most stressful inasmuch as care situations involved external stressors (workload, death) that could not be easily controlled by staff. The assumption here is that a stimulus has a greater stressful impact if the individual perceives the locus of control as external and if the stressor is perceived as unmanageable. A similar argument is proposed for the category interpersonal communication, i.e., that intra-staff conflict was highly stressful due to the perceived superiority of physicians and the power that they wielded. Accordingly, if one accepts such reasoning, environmental and knowledge base categories were seen as less stressful insofar as, in the former case, there is not much that can be done about the machinery and, in the latter case, the locus of control is internal and nurses have greater confidence in the continued development of their skills.

Yet, Averill has cautioned that "no simple relationship exists between personal control and stress" (1973), that the "meaning" of the response, located within a specific situational context, is of utmost importance. Thompson (1981) has agreed that the important feature in control is the meaning of the behavior, i.e., the view that the aversive event will not exceed one's capacity to endure it. An event that appears uncontrollable has a different meaning than the same or some other event that is perceived as controllable. Experienced stress then, manifested behaviorally and/or physiologically, is in part dependent not so much on the stimulus properties of the stressor (cf. Mason, 1975a,b) as it is on the context in which it occurs, and the individual's
propensities for managing (or controlling) the event. Data cited by Thompson suggested that control can also be understood with respect to which member in the setting possesses it. For example, sitting in a dentist's chair or waiting to be examined by a physician, for most people, represent situations in which control is generally in the hands of the professional. Such situations can be less stressful if the patient assumes that the attending physician is both competent and dedicated to minimizing the potential pain from a given procedure. From this, one might argue that physicians in intensive units, with advanced knowledge and education, and therefore considerable control over variable intensive conditions, would serve a stress-reduction function for the rest of the staff. This may indeed be so, yet considerable physician-staff conflict is nonetheless generated, precisely because of such control.

As a group, intensive care physicians have received less discussion in the literature than have nursing staff. Interns, residents and medical students were interviewed in three successive stages during their rotation through a PICU, the first four days, immediately following the end of their rotation, and one to twelve months later (Todres, Howell and Shannon, 1974). Forty-six interviewees responded to questions concerning the frustrations and rewards of the work space. Responses were coded for procedural/technical learning, the emotions of the physician-trainee, and the response to interpersonal relations with other staff. Comments were ranked from most to least frequent, as follows: (1) satisfaction in developing procedural and technical competence;
(2) the death of a child seen as a personal failure; (3) the importance of teamwork and collaboration; (4) working with the child's parents; (5) reactions to severe illness or, in this instance, the fact that the patients were children; (6) unit structure as radically different from other care facilities in the hospital, e.g., the uncertainty about what type of case might at any moment be admitted; (7) fatigue from the long hours; (8) "the constant press and immediacy of the work"; (9) the complexity of the machinery; (10) concern that the necessary techniques would not be learned. The responses of the physician-trainees were grouped in order to conduct finer-grained analyses. Four groups were compared as follows: pediatricians vs. anesthesiologists, parents vs. nonparents, men vs. women, and trainees new to the unit compared with trainees completing their rotation. The results indicated that pediatricians were most likely to discuss their emotional reactions to severe illness, death and the demands of the setting than were anesthesiologists. Physicians who were also parents as well were more verbal about emotional reaction than were nonparents; they furthermore commented more frequently about discussion with the parents of the children of the unit, and the concept of teamwork; differences between men and women were more significant only insofar as men were less likely to complain about learning to use the equipment; participants interviewed during their first few days on the unit were less verbal concerning teamwork and experienced satisfaction with work tasks. Not unusual was the finding that, during the successive interview stages, more comments were made about feelings of increased competence and mastery
over the demands of the unit. Further statements about the unit included physician-nurse conflicts and the unavoidability of moral decisions. Sources of satisfaction were cited as well, such as increased procedural mastery, the often immediate physiologic response to medical intervention, and the advantages in a teamwork format.

Summary. The information cited describes the range and variety of characteristics present in an intensive care unit. The critical aim of the project was to prepare a multivariate assessment of a highly complex work environment. In this respect, the impact of machinery, emergency care, level of illness severity, requisite knowledge base, and patient care issues were variables addressed in the project. Communication was also frequently noted as problematic in acute care environments, and is reviewed in the next section.

Communication Among Intensive Care Staff

Nursing-medical staff teamwork comprises a highly significant feature in the successful operation of an intensive care unit (Todres, Howell and Shannon, 1974) and staff relationships can influence patient care (Drotar, 1976). Stoller (1980) has argued that, "The attitudes and behavior patterns of the staff determine to a large degree the social context in which dying occurs." A lack of interaction between nurse and physician can have negative consequences for a dying patient who requests, but is unable to obtain, information concerning his status (Quint, 1966b). Problems in communicating notably occur between staff, but can also occur between staff and patients and between staff and families of the patient. With teamwork among nursing, technicians and
medical staff so essential, unit pacing, division of labor, and a general absence of cohesive work relations can undermine effective staff communication (Drotar, 1976).

The unit's "social structure," often comprising inconsistent medical leadership and unclear guidelines directing staff in decision-making, can impede efforts at effective communication (Drotar, 1976). The nurse must contend with a surprising lack of clarity in her range of responsibilities, with a "blurring of the nursing and medical roles" (Melía, 1977). Stress may accompany the expanding nursing role, as accountability is increasingly emphasized, new settings and modes for delivery service, curriculum changes, and modified regulations in nursing practice begin to have an impact on nursing personnel (Bailey, 1980).

Job performance is influenced by work role assignments, organizational structure, and individual variables (Bedeian, Armenakis and Curran, 1980). Traditionally, the nurse has been seen as deferring to the physician for several reasons: The physician's supposed "omnipotence," the historical male-superordinate, female-subordinate hierarchy that has characterized many fields ("role and ideology conflicts"), the comparatively advanced level of education of most physicians, the lower socioeconomic status of most nurses, curriculums that support nurse passivity and fail to provide opportunities for multidisciplinary training, and a chain of command that is burdened with opposing factions, philosophies and demands (Drotar, 1976; Kalisch and Kalisch, 1977; Kornfeld, 1971). Gardam (1969) suggested
that physicians, beyond policy decisions, administrative positions and patient care, should view their roles as "surrogate father-big brother" and support nursing services. Physicians tend to be unavailable or inaccessible. They have been noted to provide infrequent reinforcement to staff and were often seen as delegating unwanted tasks, such as informing families about the imminent death of a loved one (Drotar, 1976). Residents, rotating through the unit, often lack the expertise required to operate the technical machinery and must, therefore, be trained by nursing personnel, often regarded as subordinates (Kornfeld, Maxwell and Momrow, 1968; Kornfeld, 1971). Such factors have lead one writer in the field to observe that intensive units can be characterized by the intensity of affect in interpersonal transactions (Koumans, 1965). Ethical questions regarding the utility of life-prolonging techniques is not only a personal dilemma for most staff, but can also engender overt disagreement between staff members (Drotar, 1976). Staff may disagree about whether radical procedures are warranted in a given situation and who among them should have input and decision-making responsibility. One staff member inquired, "Why couldn't we have let him die peacefully?" (Cassem and Hackett, 1975).

Conflict and miscommunication occurs for other reasons as well. Administration can be unresponsive, ignoring the special characteristics and unique workload of nursing staff (Huckabay and Jagla, 1979), creating a divisiveness between nursing and management. Nursing administration is "not always aware of the furious pace and rapidly changing physical, emotional, and intellectual demands of the ICU" (Huckabay et al.)
Disagreement can arise between units over admission and transfer policies. "Why is it that those patients always seem to be transferred on Friday afternoon?" Addressing the "competition-cooperation dilemma," Huckabay asked:

Why is it so difficult to share overlapping duties on the same patient? Why is it sometimes so hard to ask how a respirator works or about other aspects of a patient's medical state? And why is it so difficult to offer a helping hand?

Such questions apply to both across unit and within-unit miscommunication. Tentative answers, derived largely from group crisis meetings, indicate that staff reaction to ethical concerns, death, perceptions or personal inadequacy in the presence of acute illness, a highly advanced technology, and frequent emergency situations, function to raise questions about one's competence and produce miscommunication between staff. It is not surprising, therefore, that group crisis meetings have been the most highly selected interventions in intensive units in which the stressors mentioned above have been addressed as the sources of communication problems. The expression of personal reactions (fear, grief, incompetence) have been thwarted, leading one writer to insist that if intensive unit workers are to give support, they must receive it as well (Michaels, 1971). (Communicational difficulties will be further highlighted in the section in which interventions are discussed, notably where support groups have been implemented.)

Communication problems between staff and patient may occur. Severely ill patients cannot readily process and retain information (Cassem, Hackett, Bascom and Wishnie, 1970), machinery must be explained, a
patient may request more information that he is capable of grasping and may often attempt to explore death-related issues. Post-operative patients, often delirious, can present a communication problem (Michaels, 1971), and surgery and emergency procedures, e.g., laryngectomies and tracheostomies, may render the patient's vocal apparatus inoperative (Vreeland and Ellis, 1969). Attempts at communication are impeded and must be assisted with gesticulations and "wobbling, illegible" hand-written notes. During visitation, relatives will usually request as much information as is possible concerning the status of the sick patient. As with the patient, personnel must address the family's anxieties and provide the family with clear medical information. When a patient dies, it is the staff member's responsibility to inform the family and provide a supportive service during their grieving.

Summary. The literature emphasizes the impact of verbal transactions on the affective states and work performance of intensive care staff. The project, therefore, evaluated both mood and verbal exchanges with a series of self-report and observational measures. The next section, on death and dying, has been found to have substantial influence on staff's subjective experiences.

Death and Dying

There is not an article addressing the psychological aspects of intensive care units that does not mention, briefly or otherwise, the prevalence of death and its impact on the professional worker. Patients die more frequently in hospitals than in homes (Quint, 1966b) and particularly in intensive units, and staff must, therefore, confront death
more often (Huckabay and Jagla, 1979; Kornfeld, 1971; Kornfeld, Maxwell and Momrow, 1968). Clearly, "if exposure to death is merely frequent, that to dying is constant" (Hay and Oken, 1972). Personnel can become adept at interpreting vital signs and other cues indicating a worsening prognosis, but prediction is not usually warranted (Greenburg, Civetta and Barnhill, 1979), and the corresponding uncertainty can be anxiety-producing both for patient and staff. The certainty of death and the time of the death collapse into four possible conditions (Quint, 1966b): (1) death is certain and time of death is unknown; (2) death is certain but when is unclear; (3) death is uncertain, but the uncertainty will be eliminated at some known time; and (4) death is uncertain as well as a time when the uncertainty will be cleared.

Staff working in a critical care nursery will likely demonstrate behavior dissimilar from staff working on an oncology unit, in which patients can understand staff dialogue and "conversational guarding" may be necessary (Quint, 1966b). It is the physician that defines timing, must decide who to tell and how much information to disseminate, and is ultimately held accountable. His decisions will affect other personnel. In some cases, staff will be instructed that they should not inform the patient that his illness is terminal (Quint, 1966a; 1966b). There are several problems with this policy: (1) staff may be unsure about the information that they do have; (2) staff may be instructed as to what they can not say, but are not given general guidelines as to what they are allowed to say. This is problematic insofar as the staff person has information that cannot be divulged, a policy that may well
conflict with her own professional opinion; and (3) the staff person may not have a reasonable response to provide in the very likely event that the dying patient inquires about his status. Their is a high probability that in this situation the worker will present either unclear or incomplete information. Often the patient will want to have a statement about his deterioration and once obtained, will want to discuss his fears and prepare for his death, and he will typically look to a staff member for such discussion. But training has most often focused on technical, and not on the interactional, aspects of dying people (Quint, 1966b). Quint refers to four levels of awareness that may exist between staff and patient: (1) closed awareness: everyone but the patient knows about his imminent death; (2) suspected awareness: the patient surmises but is not sure that he is going to die; (3) mutual pretense awareness: staff and patient know but pretend that the other does not know; and (4) open awareness: both have the knowledge and actively discuss it with one another.

One consequence of a policy in which patients are given no information is that staff, unable to adequately address inquiries, will consider the situation aversive and reduce the amount of time they spend with the dying patient. Similarly, reduced patient contact, as a means for avoiding death related anxiety and inquiries, can take the form of increased time spent with machinery and data collection procedures; thus, concern with "efficiency" preempts direct care and conversation with the dying patient (Gluck, 1977). Avoidance behavior can take other forms as well: becoming involved in discussion only when
patient-initiated, engaging in "selective listening" whereby personal statements made by the patient are ignored, referring the patient to the physician, and shifting the topic (Quint, 1966b). Similarly, a nurse, for example, may choose to ignore medical data that indicates a poor prognosis and, thereby, cannot be conflicted about how to manage information that she has chosen not to consider.

A woman or man dying in an intensive unit will present a range of emotional difficulties: grief, depression, anger, anxiety, feelings of isolation, and frustration. The worker present who is neither immediately prepared nor generally trained to manage a dying patient's reaction may find the situation stressful. Families, themselves saddened, may express their unhappiness in angry exchanges with staff and complaints about the hospital (Gluck, 1977). An angry family may well effect a reduction in physician-patient contact as the angered physician withdraws his efforts (Schowalter, 1970). Indeed, the status of a dying patient is in direct conflict with medical personnel who define themselves as "savers of lives" (Quint, 1966b). Staff may decide that a dying patient no longer warrants maximal medical attention and may inadvertently reduce services usually provided; a dying patient is a "failure," someone who has not responded to the best medical treatment, and physicians and nurses alike may evaluate their skills and proficiency according to whether the patient lives or dies (Gluck, 1977; Greenburg, Civetta and Barnhill, 1979). Death, whether expected or sudden, can have a profound impact. Tomlin (1977) reported on the presumably ICU-related suicides of three nurses; in two of the three cases,
the apparent antecedent was the sudden and dramatic death of a patient. He argued that the technology and extraordinary medical care available in intensive environments has created a medical acumen previously unknown and has prompted the need to understand psychological and behavioral responding to acute and, in some cases, irreversible illness.

Attempts have been made to train staff to work with the dying, to evaluate stress-inducing components in interactions with the dying, and to consider ways to ameliorate death-related anxiety. Group approaches have generally been the standard format (Artiss and Levine, 1973; Beszterczey, 1977; Gluck, 1977). Gluck's work centered on patients and family who met once weekly with a psychiatric nurse. Yet, nursing was invariably involved inasmuch as discussion usually focused on questions about diagnosis, treatment, and disease process. The nurses in the group responded to such questions and furthermore provided each respective physician with feedback about the patient's level of understanding. The format, including patients and relatives, allowed the family to express their concerns and obtain information as well. Clearly, such an approach circumvented the problems that inhere in "closed" communication, cited earlier, when prognosis is poor.

The attitudes of pediatric house officers working with dying children have been somewhat informally observed (Schowalter, 1970). Pediatricians requesting the services of a psychiatrist often did so because of the chronic nature of the child's illness. A similar phenomenon has been noted elsewhere among a group of oncology fellows at the National Cancer Institute (Artiss and Levine, 1973). Perhaps with
good reason. Medical and technological advances provide families, in some instances, with misunderstanding and they fail to surmise the limitations that inhere in curing serious disease. Death then becomes "the doctor's enemy," the "accidental product of disease" (Noyes, 1977), and medicine is seen as "a critical instrument that society uses in pursuit of the project of controlling and eliminating death" (Price and Bergen, 1977). Oddly enough, medical advances may well prolong a life that has very little chance for long-term survival. The life span for children with leukemia, for example, has grown steadily (Wallace and Townes, 1969). The consequences of a life prolonged affect the patient, the family, and the attending staff. Staff must continue with monitoring, intrusive procedures, and emotional support in the presence of undiminished pain and a prognosis that is, at best, poor. The pediatricians surveyed in Schowalter's study most often held that the child was entirely unaware of the seriousness of his illness, a belief held primarily out of a lack of actual exchange between physician and child. Three phases were identified: (1) the impact of the diagnosis on the family; (2) the course of treatment; and (3) the "period of defeat" wherein treatment is indisputably ineffective and the child dies. During the second phase (the "period of battle") the physician may withdraw from the patient's bedside for a number of reasons. He may consider himself a failure, his skills less than adequate to save the life of the patient. He may also believe that he does not have enough knowledge to manage the situation, a direct result of the medical school curriculum.
A similar consequence has been described in an analysis of anticipatory mourning (Wallace and Townes, 1969). Phase one is characterized by a "denial of reality" in which the parents of the dying child respond with shock and hostility directed at staff. It is a small wonder that intensive unit staff often find it difficult to work with parents and family members. In phase two, the parents accept the diagnosis, but refuse to accept the prognosis. The phase is characterized by extreme concern about the treatment the child is receiving, as well as questions regarding the illness and its features. The final phase finds the parents accepting the prognosis along with the diagnosis. This "triphasic pattern" has been noted to transpire over a four-month interval between diagnosis and death. Anticipatory mourning, it was noted, is a phenomenon that can be monitored in staff as well as family, with the eventual death of the child reverberating throughout the clinic. Misplaced reports, a breakdown in admissions, "infighting," and so forth, can be observed. One can speculate that behavioral and physiological measures may well show systematic fluctuation following a death, as well as during and following emergency situations. There may be differences, as a group of CCU nurses reported greater anxiety with "lingering" patients than with emergency situations (Price and Berger, 1977). It might be interesting to note the correspondence between behavioral, physiological and subjective ratings as a function of emergencies -- in which staff can take a highly active role to relieve stress -- and a situation in which a patient lingers with a terminal illness -- in which staff will take a more passive management
role (cf. Oskins, 1979, in which staff preferred an active response to stress, and Weinstein et al., 1968, in which autonomic and self-ratings did not necessarily co-relate).

The kind of dying experience that a patient will have can be affected by the milieu that staff establish (Stoller, 1980), a context shaped by their behavior. Schowalter noted that suggestions for increasing contact and dialogue with a dying child were "universally resented". This may have been in part related to the discomfort reported by the physicians surveyed when they were subsequently required to perform an intrusive procedure on a child with whom a "relationship" had been established. Attachments -- to patients and families -- can contribute to staff discomfort where the patient does die (Quint, 1966b). Indeed, where relationships have been developed, personnel may experience bereavement along with the family of the patient. Stoller was interested in assessing the relation between amount of discomfort with dying patients and length of work experience (The study was conducted in a 450-bed hospital, but not principally on an intensive unit). Sixty-two nurses were required to rate their reactions to a questionnaire containing several statements. For example: "I would always prefer to be present myself when a death occurs on the floor where I work"; "The younger the dying patient, the harder I would find it to care for him", etc. Stoller discovered that for RN's (N=44), as experience increased, so did the amount of reported uneasiness, but that the reverse was true for LPN's (N=18). Stoller argued that with more experience, the RN was likely exposed to a greater amount of negative
death-related experiences. Additionally, task requirements for a RN allow for less frequent contact with patients, and as such may have prevented RN's from developing coping strategies. One area for research, it was suggested, would be to investigate the possible discrepancy between different units working with the dying, such as between an ICU and an obstetrics unit.

Withdrawing from dying patients may be an attempt to avoid grief, but also can be the result of a fear of one's own death. Presumably, an analysis of one's own death, the meaning that it has, can be a tactic for coping with the deaths of patients. A number of investigators have advocated the notion that self-assessment (or, "precrisis dynamics") is a valuable preparatory strategy in working with the dying. "New response patterns" can be rehearsed and can serve to diminish the initial difficulty in a death situation (Bugen, 1980). Nurses were presented with relaxation training and a one-hour audiotape presenting a fantasy situation around their own life and death (Ross, 1978). The subjects' written responses to the statements of dying patients (played by actors on videotapes) were rated as either "closed" -- providing minimal empathy and failing to encourage discussion -- or "open". Twenty-nine percent of the 58 subjects labeled "closed" before treatment (1-hour fantasy tape) were categorized as "open" following treatment and twelve percent remained open from pre-to posttreatment. Ross argued the data suggested that personal reflection (a function of fantasy, group discussion and relaxation) about one's own death can in fact increase one's openness toward the death statements
of others. Responding to videotaped statements from dying patients is a viable measure; however, it can be argued that such isolated samples cannot accurately reflect the type of in-vivo responding one might observe on an intensive unit. A continuous exchange must take place between patient and staff, that will be influenced by a number of factors not present in Ross' study: time constraints, other work responsibilities, and the fact that a relationship has likely been established. However verisimilar is a videotape of actors playing dying patients, direct observation has decided advantages.

Bugen (1980) evaluated the effects of a death education seminar with students from diverse occupations: nursing, health education and psychology. The experimental group (N=24) received an entire fifteen unit seminar on death and dying, whereas the control group (N=30) received only one unit. Both groups were pre- and posttested on a "Coping with Death Scale", containing 30 items measuring coping with self (increased capacity to be expressive) and coping with others (capacity to communicate with others). The purpose for administering the scale was to determine possible benefits associated with the seminar. The seminar contained both a didactic section and a group discussion section. The results indicated that the experimental group showed improvement on 23 of the 30 items following the seminar and the control group showed significant improvement on one of the 30 items. The stated conclusion, however, that coping has been enhanced among the experimental participants is suspect. First, it is not clear which component in the seminar was most effective, the experiential or the didactic,
ruling out Burgen's claim that both appear to be necessary. His comparison was not between experiential vs. didactic, but rather between experiential and didactic vs. a briefer exposure to experiential and didactic. The 14% of the seminar to which the control group had been exposed focused on epidemiological parameters of death. There were seven other components, including a unit on grief, on community resources, and on the dying process, to name a few. It can be argued that the negligible change on pre-post measures for the control group was not only a reflection of amount of exposure, but as well reflected the content of the material to which the control group had been exposed. One might argue that a discussion about grief would more likely produce changes in coping capacities than would a discussion about epidemiology. Further, the experimental group received the seminar over a three-week period during the summer and the control group met once a week during the fall semester, a possible confound. Lastly, self-reported data, at least in this instance, may not reflect actual behavioral change; a more convincing demonstration would be to directly evaluate coping with actual dying persons. In fairness, Bugen mentioned the potential shortcoming in self-reported data.

Death education programs have been used elsewhere, as with thirty nurses working in a 500-bed hospital in New York City (Murray, 1974). The program contained a number of components, including sensitivity training, lecture, role-playing, audio-visual material, and group dynamics. The Templer Death Anxiety Scale was administered at the outset of the program and four weeks following. There was a successive
decrease in mean anxiety for each administration, but a significant difference was noted only between posttest one and posttest two. Murray suggested that the four-week interval allowed for personal reflection, and a chance to utilize the presented program material. An alternative explanation, not cited, was that posttest data were obtained following recently presented death-related stimuli that may have functioned to evoke some amount of anxiety, whereas posttest two data, four weeks following, were collected in the absence of such stimuli. This then expresses an obvious shortcoming in self-reported data as a singular dependent measure, that it is under the control of the instrument's items and the context in which it is administered, and may have minimal correspondence with actual performance, in this instance, death anxiety. In any case, this and other death education studies here cited may well demonstrate that "death anxiety is not a fixed entity, but a state that is sensitive to environmental events, including therapeutic intervention" (Murray, 1974).

Support groups have also been employed to ameliorate death anxiety. A group of nurses on a CCU met with a psychiatrist once a week over an eight-month period (Price and Berger, 1977). The request was made inasmuch as the nurses, collectively, understood that vital signs were a measure of functioning and a reflection of the possible death of the patient. Although not the language used by Price, one might translate this phenomenon into the following terms: vital signs, in the past associated with crisis and death, become conditioned aversive stimuli for the staff that must monitor and interpret the signs. From data
cited by Raab (1966), if cardiac performance can be altered following the "symbolic" representation of emotional factors (that can be understood vis a vis a conditioning paradigm), then staff performance measures should be taken during periods when vital signs are monitored and recorded. Invariably, each nurse felt compelled to address the meaning that death had for them. A number of investigators have discussed the impact of continuous exposure to death in similar terms: what does working with dying people cue in the health care professional? Frustration, sadness, anger, fear, a sense of incompetence?

Nursing and medical staff may view hospital deaths as reminders of their own mortality and contacts with dying patients as vicarious rehearsals for their own dying process and/or that of persons close to them (Stoller, 1980).

Where a prognosis was poor to begin with, personnel find the death of the patient a relief; if the patient is young, staff experience a sense of personal failure (Michaels, 1971). Price's group indicated that the failure they reported was not about medical responsibilities, but a "sense of failing a responsibility they felt for controlling illness and death," an insurmountable dilemma, at that, when one considers the veritable uncontrollability of death, irrespective of one's talents. The nurses in Price's group were, in fact, concerned that they would be held accountable for the death of a patient. In light of the amount of information needed to work with the technology (Cassem and Hackett, 1974; Gardam, 1969; Hay and Oken, 1972), and with advanced disease states (Tomlin, 1977; Vreeland and Ellis, 1969), it is not surprising that personnel would be apprehensive about making mistakes.
Personal limitations were understood, yet staff felt responsible, nonetheless, for the death of a patient.

An intensive care nursery was the site for group discussions concerning staff reactions to death (Drotar, 1976). As is often the case, psychiatrists entering intensive care units for consultative purposes are often called in to manage a particular crisis situation. In the present study, the staff had recently experienced the death of an infant who had resided on the unit for over a month and were furthermore requiring assistance in working with the parents of severely ill infants. The nursing staff reported a number of difficulties: uncertainty about what to say to parents, the unavailability of physicians, staff working at cross-purposes, feelings of inadequacy following death, and ethical questions. Group discussions initiated plans for nurses and physicians to organize their approach toward working with parents, e.g., physicians, informed by nursing, began to talk more often with parents. No formal assessment device was used, but Drotar did approach the unit from an interactional model. As such, Drotar emphasized that the problems encountered with bereaving families and with dying infants were notably affected by intra-staff conflict, so that "the dramatic impact of staff relationships on patient care" became a targeted area in group discussion. Intra-staff conflict on the intensive care nursery was not at all different from that noted on other units: the required technical expertise, the unit's relative isolation, the constancy of acute illness, the heavy work demands, and failure vis a vis the death of a patient.
Finally, an interesting approach taken by one group of investigators is reviewed. Participant observation as a methodological approach can have considerable utility, particularly in field research (Lofland, 1971). Such an approach was used by a healthy 31-year-old man admitted to first a surgical and then a palliative unit under the pretense that he was suffering from pancreatic cancer and was going to die (Buckingham, Lack, Mount, MacLean and Collins, 1976). The purpose was to determine whether notable differences existed between the surgical unit and the palliative facility, the chief purpose of which is to tend to the dying and the focus is not on recovery (Mount, 1976). For example, vital signs are not monitored routinely. The observer found that the total frequency and duration of contacts with staff and other patients and their relatives did not differ between units, but the mean duration of contact was higher on the palliative unit. Mean number of minutes/contact with staff (nurse, physician, student nurse and volunteers inclusive) was 19 for the palliative unit and 5.5 for the surgical unit. Physicians were found to rarely enter a patient's room alone, but were most often accompanied by colleagues. This practice engendered discussion among colleagues, but not between the physician and the "dying" patient. The surgical unit was further seen as highly structured, with an emphasis on technical mastery, and monotonous for the patients in them. The palliative unit provided greater mobility and staff support.

Summary. Death and dying is prevalent in acute care environments. It's prominence was evaluated in the project insofar as it elicits change
in affective states and deterioration in work performance. Ethical issues in treating dying patients, e.g., life-support system maintenance, have received considerable attention in recent years and are considered in the next section.

Ethical Issues in Intensive Care Medicine

A recent article in the Sunday Republican (March 28, 1982) briefly recounted the case of Karen Ann Quinlan and observed that the time marked her 28th birthday. The actual case files surrounding the litigation reflect the unprecedented nature of the trial, a trial in which the court ultimately decided that they could not decide and placed the responsibility on the hospital's ethics committee. A review of the case follows.

In April, 1975, Karen Ann Quinlan was admitted to the Intensive Care Unit at Newton Memorial Hospital in New Jersey. At the time of admission she was comatose, apparently the result of a mixture of alcohol and tranquilizers. She was placed on a mechanical respirator while on the unit, an extraordinary life-sustaining measure, presumably without which Karen would have died. Karen's parents, however, argued from primarily a religious premise that "earthly existence" should not be preserved by artificial means and that the respirator should be disconnected.

Several issues were raised by the appeals of Mr. and Mrs. Quinlan: (1) how is death to be defined, both legally and medically?; (2) what is the state's position with respect to life-sustaining measures?;
(3) what is the church's position concerning intensive efforts at maintaining life?; (4) how much weight should the family's request be given?; (5) what is to be done when state, church, and family present seemingly irreconcilable views?; (6) what are the rights of the patient to refuse medical treatment, particularly when the patient's "chronic vegetative state", a condition which was at least that of "a severely retarded person", raises the question of individual competency in making such decisions?; and (7) how does one decide when to withdraw treatment if the patient is incompetent to do so and state, church, family and medical authorities disagree.

It was ruled that "the life or death decision of whether to remove artificial life support systems was not conducive to detailed judicial evaluation" and "there would be no civil or criminal liability for unhooking the machines upon the request of the family if a hospital ethics committee approved it" (In the matter of Karen Ann Quinlan, Vols. I and II). The article in the Republican commented: "The comatose young woman became a symbol of the dilemma of terminally ill patients kept alive with painful and futile treatment." Today Karen Ann resides in the Morris View Nursing Home, without a respirator. The respirator was removed in May, 1976, following the court ruling and the decision of the hospital's ethics committee. Since the Quinlan case, several states have taken measures to comply with the court's ruling.

Ethical problems in medical care are especially pronounced in intensive units in which severely ill, and in some instances terminally
ill, patients are treated with the most advanced procedures available in medicine. As death, itself, becomes increasingly controllable -- its probability and course -- debates have become heated. Who should have access to resources that are generally low in supply; how long should treatment continue that appears to be maintaining, but not enhancing the quality of a life, treatment requiring personnel and equipment that might be devoted to a less ill patient (the "ripple effect"); how should the beliefs of relatives be managed, particularly where they conflict with medical opinion, and how does each staff member manage his/her reaction to a human life sustained by the availability of advanced machinery? Intra-group conflict among staff can result when members pose highly diverse attitudes about the "sanctity of life" (Lippincott, 1979). It has been observed that staff discussion around discontinuing life support can involve angry exchanges, fidgeting, as well as the use of humor (Frader, 1979).

Intensive care is expensive: machinery, personnel, and blood products combine to comprise a rather costly medical enterprise that may be questioned, given the nature of recovery, particularly the quality of recovery (Cullen, 1977). Indeed, the very act of questioning suggests that intensive care may not be warranted in all cases and should actually be a selective provision; such questioning conflicts with usual health care practice in which it is believed that the best available treatment should be made unconditionally accessible.

The mere presence of intensive facilities affects non-intensive staff and patients. Patients in general wards may receive abbreviated
care insofar as staff determine that the patient belongs in an intensive facility. Similarly, recovering patients can be retained in ICU's so that general wards are not overburdened. Additionally, the concentration of highly skilled professionals in an ICU serves a few patients, but diminishes the total range of resources for the larger hospital setting. Ethics rounds have been used to facilitate discussion among medical staff (Davis, 1979). Typically, many of the staff do not have input into treatment decisions. The issues are potentially stressful, as is the lack of opportunity to substantively address the issues. Staff must contend with invasive procedures that inflict pain, the futility in providing extraordinary treatment for an individual that is in an irreversible vegetative state, the time required in monitoring that may be spent with less obtunded patients, and so forth.

"Cost control" can be effected through strict admission policies, and by terminating treatment when it is decided that continued medical care will not result in "survival to a successful outcome". It has been suggested that it may well be dutiful to discontinue a "wrongful life" that has a "real negative value" for the patient (Engelhardt, 1973). Clearly, "survival to a successful outcome" is the criterion in which consensus among professionals may be most difficult to obtain. First, the probability that a critically ill patient will die is not easily predicted; second, a 'successful survival' can be adequately defined in a number of ways and family, staff and patient may find themselves in disagreement. The state may render a dissenting voice as well. A scale measuring severity of illness, the Therapeutic Intervention Scoring System (TISS), devised by Cullen (1977), is a means for evaluating magnitude
of disease and prognosis and may represent a data-analytic method in which some steps can be taken toward determining who should receive intensive treatment. TISS scores can be used to determine resource allocation, such as patient to staff ratios. As illness severity increases, so does medical staff attention, frequency of observations and procedures, and total medical cost. However, the decision to triage a patient from intensive care on the basis of survivability and subsequent quality of life must invariably meet with conflicting opinions.

Hence, philosophical stances and ethical questions can not be ignored. Cohen (1977) speculated:

- Should all ICU patients be given maximal care?
- Is it ever morally acceptable to allow a patient to die or to kill a patient?
- Who is morally empowered to make specific life-and-death decisions?
- In situations of scarce resources, how is intensive care to be distributed?

To the list could be added, what are the bases that can be used to inform the decision-making process? Medical data, professional reflection, the personal wishes of the patient who insists that continued treatment is simply prolonging pain? What is less than maximal care? Less than routine monitoring, transfer to a general ward, reduced medication? How does one "kill" a patient? By refusing admission or by discontinuing treatment? By using "ordinary" rather than "extraordinary" medical strategies? At that, there may be "a moral distinction between killing and letting die", and "extraordinary" measures can have several meanings (Davis, 1979). Davis distinguished between anti-,
passive, and active euthanasia, and Engelhardt (1973) noted that "letting die" becomes a more complicated issue when the patient is a child who likely cannot reason and defend a particular position as well as an adult.

Since treatment outcome is difficult to predict before intensive monitoring procedures can be implemented (Cohen, 1977), whether to admit or not is the most difficult question. What is difficult is justifying a discontinuation or reduction in medical intervention, an action that directly addresses the assumption that "the right to life is absolute." This proposition must be reviewed, wrote Cohen, before discontinued treatment can be ethically justified.

Our conclusions will not apply with absolute finality, like mathematical equations, to all cases of terminal illness with a chance for a brief extension of life or to all cases in which a salvageable patient risks permanent mental or physical impairment, or both, as individuals have very different conceptions of how to exercise their right to pursuit of happiness within the limits of the ethically possible. Instead, there will be a range of variation in application.

The right to life, furthermore, cannot be simply understood, or defined, by physical capacity; in other words, one's rights cannot be modulated in relation to an existing physician advantage or disadvantage. Cohen argues, however, that losing the capacity to freely think and act, such as in the case of a comatose patient, does diminish one's right to freedom of thought and action. Where irreversibly damaging illness precludes freedom of thought and action, and is a situation in which the recovery of free thought and action will be unlikely, then "there is no moral necessity to uphold the right to life by providing maximal
treatment." It is one thing to argue that the patient, so incapacitated as to be unable to express an opinion, will recover minimal bodily function and maximal treatment should, therefore, be denied or discontinued. It is entirely another thing to stipulate who, or what committee, shall make such a decision, and what ultimate data-base will be used to support the decision. Illness severity, range of organic dysfunction, prognosis, an estimable quality of life after recovery, represent some items that may comprise "disconnection decisions."

Summary. Ethical issues prevail in acute care and were assessed in the project to determine their influence on treatment staff. The next section, on burnout, addresses the long-term impact of a highly demanding work environment.

Burnout

Burnout: "a syndrome of physical and emotional exhaustion involving the development of negative self-concept, negative job attitudes, and loss of concern and feeling for clients" (Pines and Maslach, 1978). Burnout can be understood as the individual's reduced capacity to cope with prevailing stressors, and represents a process rather than a sudden outcome (Friel and Tehan, 1980). As coping strategies fail, the likelihood of burnout increases. Responses that characterize the condition are variable. The professional may "distance" herself from the perceived stressor. Distancing can take several forms, such as reduced contact with a patient, "compartmentalizing", i.e., making clear distinctions between work and non-work environments, and modulating the content of discussions with patients such that dialogue becomes highly "impersonal"
(Maslach, 1976; Pines and Maslach, 1978). There are other signs of burnout cited by Pines et al. Professional jargon and scientific language allows one to manage stressors by "recasting them in more intellectual and consequently less personal terms." Labeling -- "he's a coronary" -- can result in developing expectations about an individual that are not subsequently examined through direct contact. An increase in interactions with other staff during work hours (obviously incompatible with direct patient contact), seeking emotional support from other staff, and "going by the book" when presented with a unique work situation, are additional signs of burnout. Inordinate contact with machinery rather than the patient is a notable sign also:

...personnel may report the following: "Well, his blood pressure's good" or "His sinus rhythm is good." But, they never state directly how the patient says he's feeling or how he might actually look. It's never a central answer. It's more peripheral. They won't answer about the whole patient, but rather about one system at a time -- his kidneys or heart or blood pressure. (Shubin, 1978)

It is worthwhile to note that burnout, a psychological phenomenon, can be viewed as the outcome of repeated failure to adapt and somehow correct aversive events. If one considers Selye's model (Selye, 1973; Selye, 1974; Selye, 1976), there is evidence for a similar outcome at the physiological level: repeated failure to adapt to toxic agents can result in the development of disease entities, and possibly death. Clearly, there is an interaction between repeated stress and ensuing deficits in behavioral and physiological adaptation. Increased somatic complaints among professionals (e.g., the air traffic control literature) who have "burned out" is likely not a coincidence.
The consequences are numerous: somatic complaints (gastrointestinal difficulties, insomnia, headaches, fluctuations in weight, etc.), physical exhaustion, absenteeism, a decline in production, low morale and high staff turnover as well as possibly related marital problems, alcoholism and suicide (Maslach, 1976). Work relationships are also affected and compounded by the number of work hours demanded of staff and the severity of illness that the patient population presents (Pines and Maslach, 1978). One cannot emphasize too strongly that burnout has notable consequences for the recipient of the services. Just as staff relationships affect patient care (Drotar, 1976), just so can patient care be affected by a staff member that is repeatedly absent, exhausted and unable to establish consistent contact. The patient is best served when personnel have some knowledge about the presence of stressful conditions affecting the patient (Meyers, 1964), and themselves (Strain, 1978), and staff behavior -- describing treatment, answering questions -- influences patients' stress levels (Volicer and Bohannon, 1975).

Common antecedents of burnout include an unbalanced staff:patient ratio. As the ratio of patients to staff increases, staff become more dissatisfied with their work. Severity of patient illness, work relationships (both an antecedent and a consequence of burnout), the availability of "time-outs" (taking time away from the unit), the work schedule (with longer hours associated with greater stress), amount of direct contact with patients and amount of work sharing are variables that contribute to burnout (Pines and Maslach, 1978). Important to note is the interaction between number of hours and time spent in direct
patient contact. The number of work hours was found to be less aversive when less time was spent in direct contact compared with the same number of work hours involving greater direct contact (Maslach, 1976). As the amount of time spent in a mental health field increased, job satisfaction decreased. Staff who believed that they had input into the policies of the organization, and who obtained success with patients, found their work more satisfying.

One might argue that the indicators of burnout addressed above are in fact quite adaptive in reducing the intensity of a stressor. If a patient is difficult to work with, then avoiding contact with the patient eliminates an aversive event, and the avoidance response has marked advantages. Similarly, "going by the book" allows staff to escape a possible crisis in the least imaginative yet most economical manner, and spending more time with co-workers is clearly incompatible with contacting work-related stressors. As methods for reducing stress, the above examples are expedient and effective. But in the long term it is the patient that is at a disadvantage, rendering the "stress-management techniques" that staff demonstrate ultimately ineffectual.

Several strategies for reducing and preventing burnout have been suggested. Staff might try a "decompression routine", in which immediately after work and before returning home, a preferred activity can be engaged in regularly, e.g., physical exercise (Shubin, 1978). At the job site, recommended strategies have included schedule manipulations, in which patient contact is varied, the staff:patient ratio is reduced, work hours and breaks ("sanctioned time-outs") are
modified, caseloads are adjusted and/or shared, staff responsibilities are rotated, "mental health days" are provided, and volunteer services are solicited (Friel and Tehan, 1980). Support groups and regular meeting times have been recommended to enhance work relationships and provide a structured format in which staff can provide one another with appropriate feedback (Maslach, 1976; Pines and Maslach, 1978). Self-management, e.g., selecting reasonable goals, self-imposed constraints on work hours, relaxation techniques, and programming time for preferred activities, have been cited (Friel and Tehan, 1980; Pines and Maslach, 1978). Environmental changes have been suggested, such as work space decorations, as well as curricula designed to train staff to manage work-related stress (Friel et al.; Pines et al.). Courses may be offered in several areas, such as death and dying, ethical considerations, and self-management strategies. Unfortunately, the literature has not documented the effectiveness of the recommended strategies. The information reported by Pines and Maslach was derived from over 200 samples (psychiatric nurses, welfare workers, prison personnel) including interviews, "field observations" (the report does not describe such observations), and questionnaire data. The remaining reports cited were largely descriptive pieces, comprising statements derived from interviews.

Summary. Burnout, i.e., the accrued consequences of work stress, was evaluated in distinct terms in the project (subjective reports, work performance, autonomic excitability) in which such terms were ultimately pooled and contrasted. Data compilation, in this fashion, provided a
quantified assessment of work-induced stress.

The next section addresses the importance of the unit's physical parameters.

Architecture

The intensive care unit is a contemporary exercise in hospital planning, integrating knowledge of human physiology, sophisticated equipment, and staffing and behavioral patterns. The unit must be designed to be flexible, such that innovations in equipment and medical practice can be accommodated. Historically, the necessity for specialized care units stemmed from the number of staff inadequately trained to manage acute illness and the lack of available postoperative space to care for the acutely ill (Wallenkamp, 1968). The first intensive unit was founded in 1953 at the Manchester Memorial Hospital in Manchester, Connecticut. Conceptually, the units were developed to enhance surveillance of a group of acutely ill people and serve as a base for advances in medical science. Importantly, the units were seen as constituting a "progressive major care concept" in which staffing and technology could be consolidated in one space and where patient care could be gradated (Simon, 1980). The Manchester facility contained four beds.

A number of considerations go into planning a unit. A planning committee must be designated, preferably represented by the major departments that will staff the unit, e.g., anesthesiology, nursing, pediatrics (where the unit is a PICU). The architect and the committee must define the unit's purpose and estimate the space available. Will the
unit specialize in coronary care, pediatrics, oncology, neonatal, surgical, respiratory, burn or renal services? Where will the unit be placed in the hospital? Ordinarily, it will be located near the surgical facilities. Staffing patterns are crucial. The number of staff, types of assignments, and activity flow will affect how the available space is delegated and where elevators and circulatory systems will be placed (Grubbs and Short, 1979). Type, size and amount of equipment must be assessed. Will the equipment be stationary or mobile? If it is a mobile piece of equipment, then staffing traffic must be estimated. Barriers must be included in planning -- will they be "hard" or "soft", and how will the presence of barriers impede mobility and staff communication (Goldstein, 1979). Access to supplies and to equipment during repairs must be weighed. Access to critical departments, e.g., radiology, anesthesiology, and the emergency room must also be considered (Goodwin, 1979; Wallenkamp, 1968). At this point the design process can begin and two-dimensional blueprints are drawn. Inter-departmental consultation continues to provide input into the design process.

Goodwin (1979) lists the following space types:

- bed space
- treatment, diagnostic and consultation space
- charting, viewing and clerical space
- utility, support and storage space
- office, conference and educational space
- waiting, lounge and locker space

Space utilization, the number of staff expected to use the space, and the equipment that will occupy the space must be determined. Clearly, patients must be visible and readily accessible.
An "open" (N=33) and a "closed" (N=33) coronary care unit were compared to determine the difference between such settings on type of affect and interactional behavior (Leigh, Hofer, Cooper and Reiser, 1972). The open unit provided patients with greater visual access to others, beds were about four feet apart, and conversation with other patients was less restricted. In contrast, patients in the closed unit resided in isolated cubicles in which sounds, lighting and visual access were diminished and conversation with other patients was not possible. An anxiety scale (a questionnaire assessing depression, agitation and hostility), interviews, and direct observational measures comprised the data base. The results showed that "separation anxiety" and "covert anxiety" were higher on the closed unit and anxieties related to "shame", "mutilation", and "guilt", as well as "overt hostility", were greater on the open unit. Patient-patient and staff-staff interactional data indicated that auditory and tactile contact with nurses, physicians and visitors were generally higher on the open unit. Auditory contact between patients occurred at very low rates compared with auditory contact between patient and nurse. Demographic data, the course of illness, and the occurrence of complications were not significantly different between units.

It becomes clear from the above study that, despite the best laid plans of architects and hospital administrators, unit designs are not beyond reproach and a number of observers have decried the physical features of intensive care facilities. The unit is often isolated from other units and may lack adequate lounge space for staff (Hay and Oken,
1972; Strauss, 1968). The lights may be too bright, noise may exceed desirable levels, room temperatures may be inadequately adjusted (Eisendrath and Dunkel, 1979) and traffic may be excessive for the minimal amount of available space (Michaels, 1971). Furthermore, patients are often in close proximity (Huckabay and Jagla, 1979).

Raab (1966) has noted that, "sensory stresses, such as noise and light stimuli, can produce transient or prolonged hypertensive reactions," and observed that blood pressure and cardiac output can be affected by lighting, room temperature, and noises. Unfortunately, there have been relatively few studies that directly investigated the aforementioned architectural features. Sensory deprivation and/or monotony has been noted as causal in the onset of delirium (Kornfeld, 1969). In this regard, two intensive units, one windowless (sensory deprived) and one with windows that were visible to patients were compared (Wilson, 1972). The incidence of delirium among the 100 patients (fifty per unit) evaluated in the study served as the primary dependent measure. Eighteen percent of the patients in the ICU with windows were diagnosed with delirium, whereas 40% of those in the windowless unit were similarly diagnosed (p < 0.05). Mean temperature readings were higher for the windowless unit, but not significantly so, and 6% of the patients in the windowless unit were diagnosed with depressive reaction, compared with 2% for the windowed unit (a non-significant difference). More windowless patients (N=7) showed elevated hemoglobin levels than in the windowed unit (N=2; p <0.02). Wilson concluded that a windowless or sensory-deprived unit can produce higher delirium rates when compared with similar units
containing windows. A number of factors were controlled in the study that might otherwise have influenced the obtained results. The surgical procedures for each group were similar, the same physicians staffed both units, and sex and age characteristics were ruled out. However, it is not clear how, in fact, the windows were utilized in each unit and direct observation may have been useful in this regard. For example, did patients in the windowed units spend more time looking through the windows? How accessible were the windows for viewing purposes? Finally, how did the available light differ between windowed and non-windowed units? Amount of illumination (not necessarily natural light), the heat generated by incandescent lighting, wall colors, and illumination and color combinations have been found to influence both behavioral and physiological functioning (Birnen, 1979). Indeed, it has been asserted that lighting and coloring represent two dimensions in hospital settings that are most subject to modulation (Baj and Walker, 1980). Certainly, lighting and color combinations will be affected by the presence or absence of windows, that will either provide or impede the availability of natural light.

Noise level has also been evaluated. Noise levels were compared on three separate units: a hospital ward, an area off the ward, and an intensive unit (Bentley, Murphy and Dudley, 1977). Noise was measured on a decibel (dB) scale for five 24-hour work day periods in each respective setting. Average noise pollution levels for the intensive unit ranged from 62 dB to 72 dB, somewhat higher than the ward cubicle levels. Importantly, recommended noise limits should approximate 45 dB
in the daytime, 40 dB in the evening, and 30 dB at night. Clearly, the intensive unit averages were well above the recommended levels. Noisy equipment and staff conversation were the factors cited in the study producing the elevated rates, and the authors suggested that the noise levels are a disservice to patients, affecting their sleep. Insulating ceilings and floors was cited as possible noise-reducing strategies.

Similarly, Turner (1975) found noise levels in a medical-surgical intensive unit - 80 dB (7 a.m. to 10 p.m. shift); 91 dB (10 p.m. to 7 a.m. shift); and a coronary intensive unit - 73 dB (7 a.m. to 10 p.m.); 81 dB (10 p.m. to 7 a.m. shift) - to exceed an acceptable threshold for conversational speech (37 dB) and sleep (27 dB). Some of the sources cited as producing the noise levels noted included closing drawers, staff conversation, the intercom, and cleaning. Turner recommended that hinges and wheels be lubricated, absorbent materials be used, and the intensity of intercom speeches be reduced.

**Summary.** Staff's perception of the physical layout of the unit was evaluated in the project.

Given task-related, communicational, ethical and architectural factors, many investigators have attempted to offer staff directive-, supportive-, and cognitive-based strategies for coping with these factors. The next section focuses on such interventions.
Intervention Strategies

Unit Stress

Some nurses have reported that they are not stressed by intensive units, others believed that admitting stress was a sign of inadequacy, and others noted that reducing stress was tantamount to reducing the challenge of the unit (Baldwin and Bailey, 1980). Nonetheless, many change strategies have been suggested in the literature for alleviating intensive unit stressors. A number of recommendations have involved changes in setting characteristics, such as normalized break times (Downey, 1972), pay differential (Hay and Oken, 1972), vacation time (Gardam, 1969; Hay and Oken, 1972; Tomlin, 1977), establishing specialized positions such as unit coordinator (Hay and Oken, 1972; Melia, 1977), providing greater supervision (Cassem and Hackett, 1972), rotating staff (Downey, 1972; Kornfeld, 1971; Tomlin, 1977), revising work schedules and providing temporary transfers (Gardam, 1969; Hay and Oken, 1972; Melia, 1977), increasing staff exposure to a patient's improved medical status (Kornfeld, 1971); introducing positive sensory input (West, 1975), attenuating noise levels (Hay and Oken, 1972); establishing a lounge for staff privacy (Cassem and Hackett, 1972; Hay and Oken, 1972; West, 1975), clarifying work responsibilities (Kornfeld, 1969; Kornfeld, Maxwell and Momrow, 1968), presenting consistent performance feedback (Tomlin, 1977), regular staff conferences (Cassem and Hackett, 1972; Kornfeld, Maxwell and Momrow, 1968), and modifying the educational curricula, training and orientation that staff receive (Lochoff, Cane, Buchanan and Cox, 1977; Tomlin, 1977). The suggestions appear viable
but have rarely been tested to determine their effects on staff performance. This section will be a review of material that has conducted descriptive and/or empirical analyses of hospital-stress programs and intensive unit interventionary strategies. In many instances, outcome data were not reported.

**Group measures.** Most psychiatric-based strategies have had a stronger focus on group support and group crisis meetings (Shubin, 1979), in which staff response patterns are often highlighted and staff reaction to patients' needs can be examined (Reres, 1972). Group meetings are often formed and a psychiatric consultant enlisted to manage a variety of work-related issues, including staff miscommunication, problems in communicating with patients and families, work overloads, and the continuous presence of dying patients. The group facilitator may be a psychiatric nurse focusing the group in such a way as to foster mutual acceptance, prompt identification of feelings, prevent "premature closure" around difficult topics (Skinner, 1980), share perspectives, provide feedback in the form of criticism and reinforcement, and consider applying discussion outcomes to similar situations in the setting (Cassem and Hackett, 1975). "Problems of relationship" aptly characterizes group meetings in which unit policies, stereotyped roles, decision-making, work assignments, all of which are mitigated by staff interactions, can be addressed by the group through a specific forum (Rosini, Howell, Todres and Dorman, 1974). Staff participation at group meetings is actually crucial, inasmuch as the non-psychiatric staff member "must be present at the consultation to see and feel what is going on" (Leigh, 1973).
Group meetings are often arranged to meet one hour per week, but can vary, lasting longer each week or meeting less often than weekly. Discussion often begins around a specific patient who may be dying or may be especially demanding or depressed, or a patient making sexual advances; the consulting psychiatrist may role-play with the staff strategies for working with such a patient (Simon and Whiteley, 1977). Often, as with the Simon study, discussion around a recalcitrant patient develops into complaints about other staff, the administration, other units, etc., indicating a more profound dissatisfaction with unit policies and characteristics. Simon reported that the consultant prompted staff to discuss their concerns over ethical questions, anger towards other staff, patients and themselves and to point out the guilt and "transference-like reactions" contained in statements made by staff. As the group continued to meet, participation increased and staff members began to evaluate their own behavior, rather than the performance of other staff, as was done earlier. A support group comprising discussion, role playing, relaxation training, and communication skills was found to increase job satisfaction and reduce self-reported stress and staff turnover among a group of 17 hospice nurses. A "community-based" consultative approach has also been tried (Koumans, 1965). The high turnover rate among intensive unit patients and transient interns created a "community" in which nurses, in particular, were frequently exposed to the loss of developed attachments. As such, meeting weekly with the same consultant provided nursing with an opportunity to establish a stable relationship in which emotional issues could be addressed.
An attempt at direct evaluation of psychiatric consultation has been reported. Activity checklists in the form of questionnaires requiring self-reports and comfort/discomfort ratings were used (Dubovsky, Getto, Gross and Paley, 1977). Nurse respondents were asked to log daily the amount of time spent in patient care (medicating) using medical skills (reading monitors), meeting with physicians, charting, and patient contact when not engaged in nursing activities. The respondents were also requested to rate enjoyment with the activities and the patients. Charts were analyzed for the presence of care plans, revisions of such plans when necessary, progress notes indicating objectives met in the care plans, and the presence of nursing notes for each shift specifying medical interventions. Questionnaire data for the CCU nurses (the experimental group) were compared with a control group consisting of respondents in another hospital working a similar unit. The essential difference between the groups was the active intervention of a psychiatric consultant in the experimental group. The consultant conducted regular group meetings with the unit staff in which didactic material was presented concentrating on improving the delivery of medical and psychological care. The content of the meetings also included discussion regarding specific patients, death and dying, administrative issues, staffing concerns, inexperienced staff, depression, delirium, and alcohol abuse. Over an 18-month period, the experimental unit was spending approximately 80 minutes more per day in direct patient care and 30 minutes more per day in medical activities. Time spent off the unit declined and there was a corres-
ponding increase in comfort ratings related to medical activities. The control group data indicated a decrease in patient contact and in experienced comfort with work-related activities. Charting efficiency (a note in the chart corresponding with objectives stated in the care plans) was enhanced in the experimental group. Interestingly, there was an appreciable reduction in the mortality rate for the experimental unit that appeared not to be influenced by change in disease categories represented on the unit, radical changes in medical interventions, nor admission and discharge policies. Mean length of stay (patients) was found to decrease on the experimental unit, but non-significantly. The results, while provocative, should nonetheless be approached cautiously. It is not clear which features, if any, of the group meetings -- didactic presentation, specified content areas -- were effective change agents. Objectively based definitions for "patient care" and "medical skills" are lacking. Demographic data were collected but not presented. Information is unavailable concerning the participants' activities during consultation time, the frequency of participation for each respondent, and the turnover rate for the 18-month period. Charting efficiency was reviewed only monthly and no attempt was made to determine whether such reviews were reliably evaluated. Self-report data (patient care, medical activities, comfort ratings) could have been further substantiated by an independent observer recording frequency and type of contact with patients and medical activities practiced by the respondents. Nonetheless, Dubovsky et al. asserted that the efforts of the group meetings were instructive, prompting a
staff consensus around problem areas, reducing interpersonal tensions, educating staff about patient response to serious illness, and instilling confidence and a heightened sensitivity in staff working in a difficult area. Importantly, the study approaches the intensive unit as a milieu in which patient reactivity to illness affects staff and, conversely, change in staff behavior can have an impact on treatment outcome.

Communication skills training has been an important target of support groups (Stillman and Strasser, 1980). Ten nurses working critical care units met for nine weeks to manage difficulties in identifying their own emotional states (self-awareness) and managing the needs of others in the setting (empathy). Each meeting lasted two hours. Several exercises were introduced to enhance self-awareness: describing satisfying events, predicating one's age at death, and writing an epitath. The exercises cued a discussion among the group about death. Skills training followed in which group members role-played speaking with a dying patient. Empathy was targeted through a "feedback communication model" in which group members paraphrased statements made by others, focusing on emotional and content parameters. Again, role-playing was used, as well as films and written exercises. Role plays were videotaped and participants received feedback concerning verbal and non-verbal behavior. Unfortunately, the evaluation process consisted of self-ratings, in which participants rated aspects of the program, e.g., role-playing, as very useful, somewhat useful, and not useful, and as well rated the overall group experience, e.g.,
"As a result of this group I believe that I am more responsive to my co-workers." It is not clear which training component was most effective (written exercises, role-playing, films, videotapes, discussion, etc.). Further, as is the case with support groups data in general, associated behavioral change on the unit, as some reflection of the training package, was not investigated. Insofar as intensive unit stress is obviously situational, it can be argued that stress-management techniques would be most effective when conducted on the unit, in the presence of the stressor(s) (Baldwin and Bailey, 1980). Baldwin and cohort pointed out that stress-reduction on an intensive unit involves changing either the properties of the stressor (a variety of environmental changes have been previously cited) or modifying the individual's coping style in the presence of the stressor. Four strategies for modifying personal coping strategies were suggested. "Anticipatory guidance" is one method in which staff are encouraged to anticipate the onset of a unit stressor and plan a coping response accordingly. "Lending ego" as a second strategy involves unified staff support during a stressful event (cf. the section on the ICU team). "Debriefing" provides an opportunity to assess the stressful event after it has occurred, and "consultation" joins staff with a mental health expert in which problem-solving and staff relations can be evaluated. The latter strategy has clearly been the one ordinarily implemented in one form or another on intensive units. The other strategies represent opportunities for staff to formulate effective coping methods, enlist the supportive services of others, and provide an evaluative and feedback
mechanism after the stressful event. As such, they facilitate identification, problem-solving and assessment. As pointed out by the investigators, such interventions have a clear, contiguous relation with the events that they are designed to ameliorate. Support groups lack this feature. The suggested strategies (anticipatory guidance, lending ego, etc.) were not actually tested, although clinical examples were provided. Dependent measures were as well recommended, but lack precision (e.g., "Do nursing staff look calmer, seem more relieved, say thanks?" "Is the unit cohesion increasing?" "Is the unit self-esteem steady or increasing?"). Despite the lack of evidence, the strategies mentioned at least represent concrete methods for reducing stress.

**Personalogical measures.** The STAI, Symptoms of Stress (SOS) and the Perceived Stressor Inventory (PSI) were used to assess the effects of a stress-reduction program for nurses (Zindler-Wernet, Bailey, Walker and Holzemer, 1980). The program contained a series of training modules designed to manage work-related stress in several categories: physical and mental fatigue, interpersonal relationships, the nature of direct patient care, etc. (Bailey, Walker and Madsen, 1980). For example, training packages for the category Interpersonal Relationships included information on communication skills, assertiveness, group process and conflict resolution. One-day workshops were given in the areas of interpersonal relationships and direct patient care. One hundred and forty-two nurses participated from cardiovascular, medical and surgical units and were compared with normative samples. The SOS is a 118-item scale testing the presence of behavioral, cognitive and physical
symptomatology (anger, cardiopulmonary), and the PSI consisted of a series of potential unit stressors scored on several dimensions, including the identification of the item as a stressor, intensity and persistency of the stressor and perceived control over the stressor. Pretest-posttest scores indicated that nurses receiving the reductive program reported less perceived stress. A few comments are in order. The "norm groups" varied from instrument to instrument; the SOS norm group were 561 people (79% female, 52% undergraduates); the STAI norm group was 231 female undergraduates; and the PSI norm group was 143 nurses in the San Francisco Bay area. The lack of a uniform control group renders comparisons between dependent measures and between experimental and control groups suspect. Secondly, as often stated in the present review, subjective ratings may well be unrelated with direct observational and physiological measures. Finally, workshops or in-services that fail to establish consequences for staff behavior and provide performance feedback following the training modules will likely not be effective in maintaining changes in behavior (Quilitch, 1975).

Individual coping strategies can vary and several have been recommended, such as obtaining knowledge about the stressor (Huckabay and Jagla, 1979; Osking, 1979), and developing a "planned withdrawal" scheme from identified stressors (Michaels, 1971). Suggested stress management techniques have included dietary control (e.g., caffeine consumption), relaxation exercises, and environmental management (Hartl, 1979).
Interventions have not always taken the form of support groups. Though not an in-vivo technique, Stanford ICU nurses took part in a "jogging club" in an attempt to reduce work-related stress through aerobic conditioning (Zindler-Wernet and Bailey, 1980). Proper warm-up routines, clothing and heart rate factors were discussed in seminars. Initially, the designated goal was a 12-minute walk/run mile and runners were provided with instructions concerning how often and how fast to run. Evaluation of the program consisted of self-reports and was generally positive; unfortunately, the program in no way indicated improved performance on the unit along with some dimension. Though aerobic exercise is a notable way to manage physiologic stress (Eliot, Forker and Robertson, 1976), it can be time-consuming (depending upon the way the program is structured), may involve non-unit time, and may be a less accessible opportunity in hospitals located in colder climates.

Twelve-hour work shifts were assessed among 24 nurses in a medical-surgical intensive unit (Eaton and Gottselig, 1980). A variety of instruments were used to assess job satisfaction, the work environment, health status of nurses, quality of patient care, and fatigue and alertness. The Minnesota Satisfaction Questionnaire (MSQ) measured job satisfaction, the Work Environment Scale (WES) assessed the setting, the Personal Health Survey (PHS) evaluated health topics, a chart reviewed nursing performance, such as observation and supervision of patients, and body temperature and reaction times were used to monitor fatigue and alertness. Pre- and posttest measures were obtained on the afore-
mentioned scales one month before the onset of the 12-hour shift and six months after the shift had been implemented. Results indicated an increase in job satisfaction, a perception that the new shift reduced managerial control and a decline in cardiovascular complaints, anxiety-fear and anger-frustration measures. Reaction times (fatigue/alertness) did not change significantly from pre to post, patient care was not adversely affected, sick time did not increase over a 17-month period during which the 12-hour shift was intact, termination rates (among nurses) decreased, and unusual incidents (accidents, medication mistakes) decreased. The results -- self-reported and task-related -- suggested that the 12-hour shift, 4-day work week is a viable environmental change strategy in intensive care units.

In conclusion, the empirical studies cited have primarily employed pretest/posttest experimental designs. A variety of scales testing job satisfaction, perceived stressors, anxiety and other mood states, the presence of psychosomatic symptoms, etc. were administered before and after a particular intervention. Interventions have typically involved support groups within which treatment comprised counseling and communication skills training. Support groups have addressed several problem areas: staff miscommunication, work overload, communicating with families and with patients, working with patients who are dying, and ethical dilemmas. Techniques have varied: problem identification, didactic presentation, role-playing, modeling, feedback, and so forth. However, component analyses were not considered, so that it is not
possible to determine the comparative effects of each treatment item. Further, direct performance measures were usually not recorded; treatment effectiveness, where cited, was largely determined by staff's self-ratings on the particular instrument used. Follow-up data do not exist in most instances.

Summary. A subgroup of full-time nursing staff were taught a progressive muscle relaxation technique, described elsewhere in the manuscript.

The next section addresses some of the physiological effects of stress.

**Stress and Physiological Reactions**

The body demonstrates multiple responses to stress, including cortisol and growth hormone elevation (Rose and Hurst, 1975), as well as changes in cholesterol and uric acid levels (Rahe, 1974) and free fatty acids in the blood (Minuchin, 1978). Notably, heart rate has been especially reactive to environmental and internal events. Anxiety, sudden fright, and anticipatory anxiety can act to accelerate heart rate and tachycardia can be induced by "intellectual effort under pressure" (Raab, 1966). Cardiac output can further be accelerated through conditioned effects, e.g., by simply discussing a stressor such as exercise.

Clinical studies have demonstrated enhanced cardiac pathology in the presence of stress. In one study, the stress-related task was broken into three parts: five minutes of mental arithmetic, five minutes of a Stroop color task, and a 20-minute interview in which emotional topics
were broached (Lown and DeSilva, 1978). Throughout the testing, ventricular activity was measured. Cardiovascular measures were also taken during a controlled, non-stressful period. Ventricular premature beats for the 19 patients tested showed a mean rate of 2.96/minute during the control period and 6.62/minute during the stress test (p < .05). All subjects had some form of cardiac disease to begin with. In reviewing the individual data, however, it becomes clear that differences in the obtained results between control and stress conditions were minimal in some cases. Additionally, 8 out of the 19 patients showed reduced ventricular activity during the stress test. Data is presented for one patient in which individual components of the stress test were considered; in the one case presented, only the third component (interview) produced serious ventricular change. A finer-grained analysis of the stress test may have been warranted. Further, a control group of normal subjects was tested, but only during control conditions (in which autonomic reflex activity was measured, e.g., head-tilting, breath-holding, hyperventilation, etc.). A measure of cardiac activity during the stress condition for normal subjects would have provided useful comparative information, but was not done. The data do suggest, however, that stress can influence cardiac performance.

In another clinical investigation, seventeen males with normal hearts and eighteen males with abnormal hearts were exposed to the intense heat of a sauna bath, comprising thermal, physical and emotional stress (Taggart, Parkinson and Carruthers, 1972). The sauna produced demonstrable increases in heart rates for both groups. Raab (1966) has
indicated that humidity and temperature can play a role in cardiac output and blood pressure regulation. As such, they represent controllable characteristics of a work setting.

The heart rate activity (sinus tachycardia) of ten physicians was found to change as a function of grand rounds (Moss and Wynar, 1970). Recordings from a portable electrocardiographic unit, attached to each house officer, were taken the hour before, during, and the hour after grand round. Heart rates were highest for all subjects the minute before a presentation was made, as well as the first minute of the presentation. The average heart rate increased from 73 beats/minute to 154 beats/minute. Moss noted that the change was equivalent to "moderately vigorous exercise". The physicians studied were young (mean age, 26 years); none demonstrated previous ischemic disease. Given findings reported with air traffic controllers (discussed below) in which somatic symptomatology showed a higher prevalence as years of experience increased, a replication of the study with older physicians could prove illuminating. The findings are also noteworthy in demonstrating that a potential stressor, or the corresponding stress reaction, has temporal features. Thompson (1981) identified the stress "process", noting its sequential properties and varying impact on the subsequent response: there is an "anticipatory period", an "impact period", an "immediate postevent period", and a "long-term postevent period". Just as Moss found increased tachycardia during the anticipatory and impact periods of grand rounds, one might anticipate the likelihood of systematic physiological changes during
situations on intensive units involving peer review, such as presenting and receiving change of shift reports, and medical/surgical and nursing rounds. Emergencies and notable patient care activities may also precipitate changes in heart rate.

The work environment has become a primary arena for investigating the deleterious effects of stressors and ineffective coping styles. Job stress produces a multitude of individual reactions, including complaints about the setting and somatic difficulties (Michaels, 1971), increased absenteeism, lowered production and energy levels, and a decline in morale (Bailey, 1980). Stress may reduce creative output (Mintz, 1969).

One of the more thoroughly investigated work spaces identified as stressful has been air traffic control ports. The air traffic control setting and the intensive care unit have similar properties: a constant vigilance is required, staff are responsible for no less than the lives of others, and tasks are often complex, requiring advanced knowledge and sophisticated procedural skills. However, air traffic stressors have been more clearly defined, in which physiological changes have been assessed insofar as they correspond with traffic density (the number of planes controlled/expected), shift rotation, inflight emergencies, and so forth. Far fewer systemic analyses exist describing the relation between physiology and environmental tasks in intensive units (Grout, 1980). As Grout pointed out, one difficulty in conducting stress research in applied settings is that the consequences of work performance may diminish psychological stress despite the concurrent
presence of increased physiological reactivity. Indeed, there can be intra-physiological covariation as well in which "homeostatic controls" may regulate the system in such a way that high blood pressure rates result in decreased cardiac output (Weinstein, Averill, Opton and Lazarus, 1968). Situational parameters and organic and psycho-dynamic factors (e.g., along a repression-sensitization continuum) mitigate associations between self-reports and physiological indices (Weinstein, et al.). Thus, subjective ratings may indicate well-being, whereas biochemical measures -- urinary catecholamine excretion, epinephrine and norepinephrine values, heart rates, etc. -- may indicate an augmented physiological response. Intensive unit surveys have indicated that stressors can also be perceived by personnel as challenging and stimulating and thereby satisfying (Bailey, Steffen and Grout, 1980). In this respect, it behooves the applied researcher to develop a data base derived from several sources, including behavioral activity, subjective ratings, and physiological correlates. The air traffic literature is a valuable model in this respect, inasmuch as a range of measurement systems and data-analytic methods have been implemented.

Two hundred assistant and journeyman controllers completed a stress survey for 90 consecutive days (Hauty, Trites and Berkley, 1965). Symptoms included headaches, indigestion, constipation, insomnia, chest pains, dizziness, asthma, etc. Percent pre- and postshift scores were highest for aching/burning eyes, headaches, sweating and body tenseness. Among all categories, a pre-post trend could not be detected, i.e.,
symptoms were not likely to be reported more often for pre-shift than for post-shift. Further, the presence of symptoms appeared to be positively related to years of experience, a finding reported as well in the following study (Dougherty, et al., 1965). There are ICU data indicating that increased service time is correlated with less experience stress (Huckabay and Jagla, 1979). However, somatic somplaints were not assessed in the report.

One thousand eighty-six (1,086) male air traffic controllers (ATC) were administered a questionnaire in which they were instructed to list the presence of stress-related symptoms (Dougherty, Trites and Dille, 1965). The symptoms list included stomach disturbances, hypertension, headaches and chest pain. The respondents were furthermore requested to indicate whether the symptom had appeared before becoming an ATC or after becoming an ATC (thereby constituting a work-induced "new symptom"). Biographical variables were also obtained, such as age, number of years with the Federal Aviation Agency (FAA), and the number of years as an ATC. In a comparison with non-ATC personnel, the results showed a higher incidence of new symptoms: headaches, chest pains, ulcers and indigestion. As the civil service grade level increased, there was a corresponding increase in ulcers, chest pain, and high blood pressure. After three years of service, ATCs reported significantly more symptoms than non-ATCs, a difference between groups that increased with successively more years in service. Statistical significance between ATCs and non-ATCs for chronological age was found for those between 30 and 40 years of age and those above 40, but not for
those between 20 and 29 years of age. The investigators argued that
an ATC will increasingly complain of somatic symptoms the longer that
he is at the job, and suggested that this is the result of work stress.
However, it must be pointed out that the data were derived from
self-report questionnaires and self-reported symptoms were not cross-
validated by physical examinations. Further, as is true of most, if not
all, the questionnaire data cited throughout this paper, there is an
absence of a clear relationship between the work task (presumably
stressful) and the physiological manifestation. However, this work,
and the work described subsequently, provide a basis for later studies
in which the relation between tasks and physiological outcomes are
better delineated. Indeed, in a later study (1967), Dougherty
measured electrocardiogram and blood pressure readings and conducted
urinalyses of 1,218 ATCs and 804 non-ATCs during working periods.
Urinalysis abnormalities were low and insignificant in both groups and
hypertension was significantly lower in the ATC population. ECG
readings showed increased abnormalities as chronological age increased,
but there was no appreciable difference between the total study
populations. However, a special study group consisting of journeyman
radar controllers did show a higher overall rate of ECG abnormality.
The journeyman also showed a higher prevalence of hypertension. Yet,
the results must be considered in light of several factors. First,
ATCs were carefully screened and examined before employment, and
would likely be in excellent physical condition to begin with. This
cannot be said necessarily of the non-ATC group. Second, the data do
not address pre-post employment changes for the special study group. Third, even though "on-duty" measures were taken, they were not collected during actual work performance; instead, physiological measures were collected just after work or during breaks.

Urinalyses have been used elsewhere, serving as the principal measure in ascertaining the effects of high work loads with 20 ATCs at O'Hare Airport in Chicago (Hale, Williams, Smith and Melton, 1971). Data were collected on two separate five day periods, once for an early morning shift and once for an evening shift. Urine specimens, collected twice per shift, were analyzed for epinephrine, norepinephrine, and 17-hydroxycorticosteroids. They were further assayed for sodium, potassium, inorganic phosphate, urea and creatinine. Members of the biomedical team that observed during these periods served as control subjects. Stress, measured by adrenomedullary activity, was assessed by way of epinephrine values. Epinephrine and norepinephrine values were statistically greater than control subjects, and rose appreciably during the latter work period (the seventh hour of each shift) and appeared directly related to amount of workload. Similarly, 17-OHCS declined during light work periods and rose during heavier periods. The measures appeared sensitive to stressor conditions vis a vis increased workloads. However, Hale et al. noted that changes in urinary values may "lag behind the physiologic events which they reflect." Further, if samples are taken at three and four hour intervals, early events may "blend with or obscure" subsequent work conditions. Urinary data, therefore, as a reflection of work stress,
should be considered with this caution. Samples collected during a latter period may reflect the impact of earlier circumstances and do not necessarily represent an immediate index of environmental conditions.

Concentrations of urine potassium have been used as a measurable stress index in a hospital setting (Price, 1968). Potassium concentrations as a primary measure was used to assess the stress levels of patients, and the relatedness between nursing care and patient status. The following important assumptions were stated, are considered in other forms in the present review, and are worthy of mention here: (1) hospitalization is a stress-producing experience; (2) the environmental stressors which create hospitalization stress are multiple; (3) human physiologic responses to environmental stimuli are predictable; (4) nursing activity affects the adaptive processes of patients; and (5) the adaptive processes of patients are enhanced by nursing care planned to meet individual patient needs.

Pride discovered that potassium levels decreased following the experimental approach, consisting of a series of procedures designed to maximize sensory input, clarify information, subdue anxiety, and prompt expression. The experimental approach was compared with a "friendly, unfocused" approach and a no-approach group. Mean potassium values decreased on the second day of hospitalization for all three groups. Pride concluded that urine potassium was, therefore, a sensitive measure of anticipatory stress, and as well a valid index of nursing effectiveness, insofar as mean values for the experimental group
were significantly lower than the unfocused and no-approach group.

A series of studies completed in the early 1970's in the German Federal Republic sought to assess both work-related characteristics as well as the worker continuously experiencing the setting. A variety of data-analyses were considered, including combined self- and observer-ratings (Philipp, Reiche and Kirchner, 1971) and heart rate measures paired with subjective ratings (Laurig, Becker-Biskaborn and Reiche, 1971). The latter study, a correlation of 0.62 (p<0.01) was found between the number of aircraft under control and heart rate, though only one subject was employed in the study.

With the assumption that stress affects performance, and inasmuch as performance can be measured over time, stress was also evaluated as "work difficulty per unit time" (Reiche, Kirchner and Laurig, 1971). Specifically, the investigators were interested in constructing a data-analysis for message types. Relative frequencies and syntactic level of information could be used to evaluate systematic changes as a function of work-related stress. Message types included instructions, acknowledgments, calls, reports and questions. A matrix was designed in which the relation between messages could be determined, as well as the sequencing among messages. It was suggested that the ratings could be compared with the subjective reports of the ATCs.

The studies are highly mathematical and probabilistic. Nonetheless, they demonstrated at least two important points. First, in order to measure environmental stress and resulting physical strain, it is necessary to operationally define some range of work tasks in the setting,
such as message types, workload, e.g., number of planes under control. Second, it is necessary to combine objective indices with subjective ratings (cf. Weinstein, et al.). Third, since physical and subjective ratings will vary with stress-related factors and stressors are time-dependent, a time series analysis has an advantage insofar as it assesses dependent measures over successive observations.

The high correlation between self-ratings, expert-observer ratings, and objective indices of workload have been reported (Hurst and Rose, 1978). Two "expert" raters were trained, one to rate behavioral responses (level of activity, scaled from one through sixteen), the other to record workload characteristics, such as communication time and traffic counts. It was discovered that instances of peak traffic produced considerable variance in level of activity. The data, combined with those of Laurig et al. (1971), in which heart rate was found to be affected by number of aircraft under control, suggested that peak moments in air traffic control increase levels of activity and corresponding heart rates.

**Summary.** Clearly, a careful analysis of work-produced stress must consider in-vivo physiological sensitivity. Since cardiovascular performance has been found to be notably sensitive to environmental input and fluctuation, heart rate was evaluated in the present project.

**Conclusion**

As medical technology, procedure and practice become increasingly advanced, intensive units will grow in importance in most, if not all,
hospital settings. Intensive units comprise a plethora of seemingly stressful characteristics, and staff working in such facilities must be highly qualified professionals, prepared to manage severe disease, complex equipment, interpersonal discord, ethical issues, family react-
tivity, and so on. Staff -- "intensivists" -- must be trained to manage the highly stressful properties of such units and a systematic analysis of the intensive care workplace is necessary to meet the demands of curriculum changes and proposed modifications in unit polities, design and individual self-management.

Repeated exposure to stressors have been associated with physiological disruption, such as irregular cardiovascular activity (Raab, 1966), an increase in somatic complaints -- migraines, ulcers, hypertension (Kornfeld, 1971) -- and where conditions are acute and unmanageable, death (Engel, 1970). Behaviorally, job dissatisfaction, absenteeism, extreme turnover rates, and work performance are often affected by work strain (Gardam, 1969; Hay and Oken, 1972; Vreeland, 1969). Personnel may experience "burnout", which can be understood as the individual's reduced capacity to cope with prevailing stressors (Friel and Tehan, 1980), and treatment outcome is jeopardized (Strain, 1978; Volicer and Bohannon, 1975). Importantly, subjective ratings, performance measures and physiological indices do not necessarily demonstrate systematic relationships (Grout, 1980).

Numerous studies have reported that ICUs are indeed stressful for medical, nursing and technical staff. To date, the literature provides highly corroborating evidence across various intensive facilities. The
majority of studies, however, described data derived from verbal reports obtained through questionnaires, inventories, and checklists. A review of the literature-base reveals shortcomings in the conduct of the research conducted in intensive care settings, but also suggests areas in which research may prove fruitful. Thus far, studies have failed to experimentally conduct component analyses when a range of independent factors have been implemented; discrete stressors, individual perception (or cognitive appraisal), and concomitant behavioral and physiological activity have, in most instances, been globally described and rarely concurrently evaluated; coping methods have been marginally assessed; there is a paucity of intervention strategies. The literature overwhelmingly points to the necessity for developing a comprehensive, ecologically-founded evaluation of the intensive care environment, stressors specific to such settings, and the self-reported observations and overt behavior of personnel.

The present study was an attempt to examine and characterize a medical/pediatric intensive unit. Staff behavior was evaluated for self-reported, behavioral and physiological responding to unit phenomena.

Four scales were used to evaluate subjective information reported by unit staff. The SCL-90-R (Derogatis, Lipman, Rickels, Uhlenhuth and Cori, 1974) is a multifactorial scale addressing somatic and characterological states. The Zung Depression Scale (Zung, 1965) was used to assess the presence of depression among personnel; earlier pilot work indicated a high incidence of depression among nursing staff. An Affect Scale was used to measure immediate affective responses. A Stressor Inventory was
prepared and administered to determine the range and severity of unit stressors.

A range of behavioral measures were evaluated, including illness severity, patient status, staff proximity at bedspaces, verbalization patterns, types of interactions, and overt mood.

Heart rate activity was monitored with a group of nursing staff to compare cardiac output during on-unit and off-unit hours.

Hypothetically, work stressors acquire stressful properties as they occur repeatedly, thereby evoking stress-related behavior. Presumably, work-related stressors continue to be so insofar as staff lack appropriate "coping" responses. An individual who is continuously exposed to a high demand setting may demonstrate a "catabolic" reaction, constituting manifest physical deterioration (Karasek, Russell and Theorell, 1980). Heightened production of catecholamines, cortisol secretion and hypertension comprise at least a few catabolic responses. Critically, where inadequate coping strategies prevail, irreversible myocardial damage may ensue. Behaviorally, "burnout" may occur, involving "physical and emotional exhaustion...the development of negative self-concept, negative job attitudes, and loss of concern and feeling for clients" (Pines and Maslach, 1978), a condition that is at least precipitated by ineffective coping strategies. Karasek et al. emphasize the importance of individual control in such settings. Strategies that provide the individual with methods to obtain control over environmental events may have an "anabolic", or regenerative functions, such that metabolic and hormonal changes associated with psychosocial stress
can be reversed. (It should be noted that notions concerning regeneration are, by Karasek's admission, at a developmental stage in which speculation and theory are prevalent. Similarly, much of the physiological data cited below concerning relaxation effects have been group averaged and at least a few investigators -- Benson, Dryer and Hartley, 1978; Klein and Deffenbacher, 1977 -- have indicated that different patterns can be found in the individual data. Physiological reactivity, therefore, can vary from individual to individual regarding intensity, trend and temporal characteristics.)

Stress-reduction approaches may target a change in the properties of the stressor, or may focus on some modification in the individual's coping style during the occurrence of the stressor. In the present study, a progressive muscle relaxation technique was implemented with a subgroup of nursing staff. Staff on Division 86 (of the pediatric intensive care unit at Children's Hospital Medical Center, Boston) originally met weekly with a consulting psychiatrist to discuss problematic areas and potential solutions, so that a "problem-solving" group was effectively operative. However, a fair body of evidence indicated that relaxation training is a viable treatment for a range of anxiety and tension-based disorders, including stimuli-specific phobias (Reeves and Mealiea, 1975), migraine headaches (Daniels, 1977), athletic performance (Horton and Shelton, 1978), test anxiety (Russell, Miller and June, 1974), and depression (O'Brien, 1978). Relaxation has been used as a primary mode of treatment (Kahn, Baker and Weiss, 1968) and in conjunction with other approaches, such as qualitative
sensory input (Fuller, Endress and Johnson, 1978), and exercise (Sime, 1977). It has proven effective under analog conditions in which anxiety was artificially or therapy-induced (Puente and Beiman, 1980).

Relaxation training was initiated with the work of Jacobson (1938), in which a "tension-release" cycle was designed to teach patients to alternately tense and relax muscle groups and discriminate between muscle activity and the differentiated sensations in both states. A rationale for relaxation therapy was further founded on "reciprocal inhibition" (Wolpe, 1958). That is, by progressively relaxing alternate muscle groups, an inhibitory relaxation response is made in the presence of the aversive stimulus. Repeated pairings of the relaxation response contingent with the noxious event gradually weakens the strength of the "bond" between the anxiety stimulus and the original anxiety response (Borkovec and Sides, 1979). Stated another way, an individual cannot repeatedly establish a relaxed physical state and remain psychologically tense (Vattano, 1978).

Outcome criteria, determining the effectiveness of the training, tend to fall within three categories: behavioral, self-report and physiological (Luiselli, Marholin, Steinman and Steinman, 1979), although Luiselli et al. found that as few as 5% of the studies that they reviewed collected information in more than one of the aforementioned measurement categories. Pre-post self-report scales have typically been used in which the participant evaluates the amount of experienced tension on a 0-100 scale (Goldfried and Davison, 1976). Physiological changes have been demonstrated in both systolic and diastolic blood pressure,
respiratory rates, carbon dioxide elimination, and oxygen consumption (Benson, Kotch, Crassweller and Greenwood, 1977), and plasma norepinephrine levels have been found to increase during relaxation with progressive increases in heart rate and blood pressure following laboratory-induced tension (Hoffman, Benson, Arns, Stainbrook, Landsberg, Young and Gill, 1978). Skin conductance (Matthews and Gelder, 1969) and frontalis electromyographic measures have also been found to be sensitive to relaxation training (Elkins, Anchor and Sandler, 1978; Ewing and Hughes, 1978).

There seems to be no one standard administration procedure. Administration can vary as to the number of trials within a session, the total number of training sessions, muscle groups worked, the order in which instructions are presented, the use of cued relaxation, and the use of audiotapes vs. the actual presence of the therapist (which translates into the amount of in-session control a patient has over the progression of treatment). However, most reports emphasize common features: (1) a review of the literature indicates that typically several training sessions are conducted for the relaxation response to be adequately obtained; (2) physical changes — respiration, heart rate — can be obtained within a single session (Christoph, Luborsky, Kron and Fishman, 1978); (3) cued relaxation (in which the subject subvocalizes, "RELAX", during exhalations) can be taught as a self-control method to prompt conditioned relaxation to stressful events (Daniels, 1977; Ewing and Hughes, 1978); and (4) the presence of a therapist conducting the training is considered superior to audiotaped
sessions (Borkovec and Sides, 1979; Russell, Sipich and Nipe, 1976).

The evidence suggests that with practice relaxation can potentially produce significant clinical changes in behavioral responding and physiological reactivity. Relaxation can be used with individuals presenting considerable tension, or as an ameliorative in settings in which a worker is not chronically tense, but who encounters situation- or time- or event-specific tension. Where such events evoke tension, either autonomic or subjective, and interrupt the individual's ability to manage the event, acquiring a counter-response such as relaxation (fundamentally an incompatible response with experienced tension), would enable the individual to calmly exploit strategies to manage the event (Goldfried and Davison, 1976). An important feature of the procedure is the emphasis, during training, on identifying tension and, subsequently, identifying tension in problematic situations. As skill is developed in self-evaluating behavioral and physiological cues that signal tension, strategies to modulate the tension can be implemented. Thus, relaxation can be taught as an effective "self-control" method (Cautela and Groden, 1978), an "active coping skill" (Deffenbacher and Michaels, 1980), to be used in-vivo, i.e., in conditions external to the training sessions.

Relaxation has been suggested as a viable coping strategy for hospital staff (Hartl, 1979), was found to reduce anxiety in test situations among nursing students (Charlesworth, Murphy and Beutler, 1981), and constituted one component in a support group package in which self-reported stress and staff turnover were reduced among 17 hospice nurses (Gray-Toft, 1980). At the outset of the study, what
was stressful on Division 86 was less clear than the fact that the unit was typically problematic for personnel, based on statements made by numerous staff, turnover rates, requests for psychiatric support, and pilot information obtained during a two-week period in February (in which a high incidence of depression was reported). Insofar as a given stressor may be differentially perceived and may produce distinctively disparate responses between individuals, the relaxation response, once obtained, can be selectively implemented. In this respect, a procedure that provided a generalized skill that can be applied to meet the demands of person-specific stressors, would be facilitative and should have utility for the staff exposed to the procedure.

The experimental, or relaxation, group was subsequently compared with a randomly selected control group on Zung, SCL-90-R and Affect Scale self-reported measures. Dependent measures, rationale, and experimental procedure are described in subsequent sections. The treatment technique described in a later section is derived from and closely adheres to instructions contained in a manual written by Bernstein and Borkovec (1973).

The essential tone of the study was principally exploratory. The aim of the research was to determine whether it was possible to validate (or operationalize) the presence of "stress," or work strain, on the intensive unit under observation, to evaluate the presence of (and possible relation between) self-reported affective states, external stressors, behavioral patterns and physiological indices, and to assess
an intervention to protocol that would potentiate a reduction in stress-related behavior and enhance work performance.
CHAPTER II

METHOD

Participants and Setting

The participants included full- and parttime medical, nursing and technical personnel either employed on or having contact with the medical/pediatric intensive care unit. Forty-nine staff members completed pre-intervention self-report packages. The 49 nursing participants were grouped as follows: senior nursing staff, junior nursing staff, new nursing staff, parttime nursing staff, physicians, and a group of nursing staff who received a treatment protocol. The latter group contained senior, junior and new nursing personnel. Senior nursing personnel were nurses who had been employed on the unit at least 20 months, junior nursing staff were nurses who had been on the unit between 12 and 20 months, and new nursing personnel had joined the unit within weeks of the study's inception. Table 1 indicates mean ages and time employed on the unit for each group.

Although 49 participants completed pretreatment scales, it should be noted that the total number of staff actually observed working on the unit was somewhat higher. This was so inasmuch as medical residents and fellows rotated on to the unit during the study, and laboratory technicians, therapists and medical personnel intermittently consulted to the unit when requested. The study's aim, particularly where self-report, physiological indices, and treatment approaches were concerned, was to address the behavior of staff principally assigned to the inten-
Table 1

The Mean Age, Age Ranges, Mean Time On Unit, and On Unit Time Ranges for each Group.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>X age</th>
<th>Age range</th>
<th>X time on unit (months)</th>
<th>On unit time range (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Nurses</td>
<td>7</td>
<td>27.00</td>
<td>25-31</td>
<td>26.83</td>
<td>24-30</td>
</tr>
<tr>
<td>Junior Nurses</td>
<td>9</td>
<td>26.67</td>
<td>23-35</td>
<td>15.22</td>
<td>12-21</td>
</tr>
<tr>
<td>New Nurses</td>
<td>5</td>
<td>25.60</td>
<td>23-28</td>
<td>1.40</td>
<td>3 wks-2 mos.</td>
</tr>
<tr>
<td>Parttime Nurses</td>
<td>11</td>
<td>28.50</td>
<td>22-35</td>
<td>21.30</td>
<td>9-36</td>
</tr>
<tr>
<td>Physicians</td>
<td>5</td>
<td>27.00</td>
<td>25-29</td>
<td>1.00</td>
<td>2 wks-1 mo.</td>
</tr>
<tr>
<td>Treatment Nurses</td>
<td>12</td>
<td>27.33</td>
<td>23-35</td>
<td>17.83</td>
<td>9-48</td>
</tr>
<tr>
<td>TOTAL N:</td>
<td></td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
pressive unit, with less emphasis accorded the activities of hospital personnel where contact with the unit was typically brief and occasional. Among the staff expressly assigned to the unit, approximately 85% completed self-report packages.

The medical/pediatric intensive care unit (PICU) was located at the Children's Hospital Medical Center (CHMC), Boston, Massachusetts. Pediatric intensive care at CHMC is divided into two units located on separated floors of the hospital. Each PICU is an 18-bed, acute-care facility. The study was conducted on one of the units, named Division 86.

Besides 18 operational bedspaces, the unit contained two nursing stations, a family resting area where relatives were able to stay overnight, a staff coffee room, conference areas, offices, and a centrally located supplies room. Monitoring equipment was available at each bedside; adjacent bedspaces were separated by either curtains or sliding glass doors. Windows, clocks and miniature television sets were installed in the majority of bedspaces. Telephones were available throughout the unit and were easily accessed just outside the bedrooms. Staff were able to receive and place calls throughout the hospital with these phones, and clerical personnel were able to contact a staff member at a bedspace through either the phone or the unit's intercom system.

The unit and each of the bedspace areas were spacious, providing considerable mobility and easily accommodating occasional heavy traffic (medical and nursing rounds, transferring patients, moving pieces of
equipment). Unlike other intensive care environments, the nursing stations did not function as central monitoring areas, nor did they contain monitoring equipment. For the most part, the nursing stations were repositories for medical equipment, medications, assignment protocols, and impromptu staff 'conferences'. However, staff -- medical and nursing -- largely conducted their activities at bedspaces. Medical residents and fellows generally occupied one of the units' available "fishbowls" (small rooms partially enclosed by glass panels) where personal possessions were stored and didactic presentations and interdisciplinary consultations were conducted. Although vital to a complete description of the setting, nursing stations, conference rooms, the family area, offices, the coffee room, and fishbowls were not targeted as areas for observation. Active bedspaces (i.e., a bedspace in which a patient was located) comprised the essential observed setting throughout the study.

Generally, family members were required to introduce themselves to one of the clerical staff upon entering the unit, following which they were permitted to visit with the patient. Unlike most general medical wards, families were permitted to remain at the patient's bedside throughout the day.

Dependent Measures

All self-report scales, observational data sheets, treatment scoring forms, and cover letters can be found in the Appendix.
Self-Report Scales

Intake information. Participants completed an intake sheet in which they listed information regarding their age, sex, marital status, level of education, their position on the unit, and the length of time they had worked on the intensive care unit at Children's Hospital.

The SCL-90-R. The SCL-90-R is a 90-item multifactorial checklist comprising 9 categories. The categories are as follows: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. Following the question, "How much were you distressed by?", respondents scored each of the items on a five-point scale with 0 denoting "not at all" and 4 denoting "extremely".

The Zung measurement of depression scale. The Zung contains 20 items. Respondents scored each of the items as either "None or a little of the time", "Some of the time", "Good part of the time", or "Most of the time".

Affect scale. The affect scale contained four positively-valenced items -- Satisfied, Hopeful, Cheerful, Calm -- and four negatively-valenced items -- Sad, Restless, Irritable, Blue. Respondents were required to rate their recent feelings experienced on the unit by placing a slash on the horizontal line next to each item. The line covered a continuum from "Not at all" to "Extremely".

Stressor inventory. The stressor inventory was a 53-item scale divided into seven categories: Knowledge Base, Work Variables, Patient Care, Communication, Architecture, Unit Management and Ethics. Each
item was scored in a manner identical with the Zung scale (i.e., "None or a little of the time", etc.). When all items were scored, respondents were requested to rank order each stressor category, with 1 denoting the most stressful/most problematic category, and 7 denoting the least stressful/least problematic category.

**Self-Report Administration Procedure**

During the week preceding the beginning of the study, a notice was placed on a message board in the coffee room requesting that staff who did not want to participate in the project could express that preference by signing the notice or notifying someone associated with the project. No one requested exemption from the project. Consent forms had been completed by most staff during the pilot project; staff employed subsequently to the pilot project received consent forms attached to the preintervention packets.

At the outset of the baseline phase of the study (week two), each staff person received a packet containing a cover letter, an intake sheet, and four self-report scales (the SCL-90-R, Zung, Affect, and Stressor Inventory scales). The letter outlined in general terms a description of the study, the study's six-week schedule, the treatment component, intended physiological monitoring, and provided each participant with a code number to preserve anonymity. During the beginning of the post-intervention stage (week six), a similar packet was administered. The postpacket contained a concluding letter and identical SCL-90-R, Zung, and Affect scales. The intake form and the Stressor Inventory were not
included with the postpacket.

The principal investigator generated a listing of staff members and addressed each staff member when he or she could be located on the unit. The investigator briefly described the package, essentially reiterating the contents of the cover letter, and solicited questions during the exchange. Staff who were employed on the unit during the time of the pilot work were familiar with the Zung scale and a somewhat similar version of the Affect scale that was administered during that period. The Adaptation week provided staff with an opportunity to accommodate to the presence of an observer; nonetheless, individually presenting self-report packages allowed further questioning to take place, concerning either the packets or the observational procedure. Respondents were asked to place completed packets in a box available in the coffee room. The box was labeled, ICU STRESS STUDY. At the end of each shift, the principal investigator collected completed forms from the box.

Checklist Definitions and Recording Procedure

At the beginning of the 7 a.m. to 3 p.m. and the 3 p.m. to 11 p.m. shifts (hereafter referred to as day and evening shift, respectively), the investigator handed to the charge nurse for that shift a copy of the Specific Event Chart and Ward Acuity Scale.

Specific event chart. The Event Chart contained seven activity categories as follows: Cardiac/Respiratory Arrests, Deaths, Transfers, Admissions, Medical/Surgical Rounds, Nursing Rounds, Other. The Chart
was completed once during the day shift and once during the evening shift. The chart was scored by the charge nurse for the respective shift. The charge nurse was requested to score the occurrence of any of the categories by placing a marking in the YES column following each item. When YES was scored, the time and the bed number in which the event took place were also noted. Charge nurses deposited completed Event Chart forms in the box labeled ICU STRESS STUDY located in the coffee room.

Ward acuity scale. The Acuity Scale was a form that was already in use on the unit. The form contained numbers corresponding with each active bedspace on the unit. Similar to the Event Chart, the Acuity Scale was completed by the charge once per shift. The charge nurse was requested to rate the medical status of each patient, using the classificatory system described at the bottom of the form:

Class 1: Routine patient, not requiring intensive care
2: Patient physiologically stable, requires monitoring or closer nursing observation
3: Patient physiologically stable, but requires organ system support
4: Physiologically unstable patient requiring intensive physician and nursing care and support
5: Physiologically unstable, requiring at least 2 nurses at the bedside at all times.

Completed Acuity Scale forms were placed in the box labeled ICU STRESS STUDY.

Observational Measurement System and Recording Procedure

At the outset of the study, four possible observational sequences were generated. With eighteen unit bedspaces, the sequences were: bedspaces
A randomly calculated list determined the bedspace observation sequence for each day throughout the study.

Observations were conducted during the day and evening shifts, generally between the hours of 8 a.m. and 8 p.m., during both weekdays and weekends.

A time-sampling observational procedure was used. The observer began the trip at that bedspace that initiated the randomly determined sequence, and continued through the unit, stopping at each successive active bedspace. Standing just outside the bedspace, the recorder observed each bedspace for one minute, rating each coded behavior -- patient alertness, staff proximity, verbalizations, interactions, mood -- that occurred during the one-minute interval. Since each trip constituted between six and eighteen active bedspaces, the length of time required to complete each trip varied according to the census at the outset of the trip.

There were 36 possible ratings that could occur in any given one-minute interval:

<table>
<thead>
<tr>
<th>Category</th>
<th># of Possible Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient status</td>
<td>2</td>
</tr>
<tr>
<td>Proximity</td>
<td>5</td>
</tr>
<tr>
<td>Verbalizations</td>
<td>13</td>
</tr>
<tr>
<td>Interactions</td>
<td>13</td>
</tr>
<tr>
<td>Mood</td>
<td>3</td>
</tr>
</tbody>
</table>

In this respect, the recording procedure placed notable demands on the observer; to facilitate collecting highly accurate observations, the observer took time following each interval to examine his ratings.
Therefore, the recording process combined data collection through the 60-second interval, with a 15-second "off" period to review, inspect and collate rated observations. Hence, the procedure was similar to a partial-interval time-sampling strategy comprising a 60-second observe/record, followed by a 15-second review/record phase. After the 15-second review phase, the observer moved to the next bedspace and repeated the 60-second on, 15-second off procedure.

The observer positioned himself 2-5 meters from the bedspace, with adjustments occasionally necessary and observer proximity subject to slight variation from bed to bed. There were several factors to which the observer had to be sensitive, requiring adjustments: (1) family privacy (e.g., where decisions to discontinue life supports were imminent); (2) the privacy of the patient, notably where exposing procedures were being conducted; (3) rooms darkened or curtained; and (4) an active bedspace in which a patient was temporarily absent. In situations that were medically volatile, or where staff, parents and patients were especially reactive to the presence of an observer, the 15-second off interval was useful for recording away from a bedspace, offsetting, in these instances, reactivity to coding conducted in a highly visible manner.

The distances between bedspaces varied and the observer followed a basic rule: Positioning should take place nearby the targeted bedspace, unobtrusively, such that the entire area could be monitored for the duration of the time interval. Rarely was it possible to actually enter the defined bed area, but within a reasonable distance, all categories could be reliably measured.
Occasionally, the observer had reason to write information on to the data sheet. If the observer approached a bedspace with a curtain around it, the observer waited a few seconds to assess whether the curtain would be opened. If the curtain was not opened within ten seconds, the observer wrote CURTAIN on to the data sheet and moved to the next bedspace. When a curtain was closed around a bedspace during the interval, the observer moved to the next bedspace, assuming that the procedure, requiring privacy, would consume the remaining time allotted for observing the bedspace. Such instances were rare.

Isolation rooms, when occupied, were noted with the word ISOLATION written on to the data sheet. Isolation rooms were typically closed and verbalizations were often inaudible. Furthermore, where precautions were necessary to prevent contagion, masks were worn by staff assigned to the isolation areas. The word MASK was written on to the data sheet in such instances. Nonetheless, isolation rooms were observed for the entire 1-minute interval to note patient status, staff proximity and interactions. Verbalizations were recorded when it was possible to do so.

When rounds were taking place outside of the observed bedspace, the word ROUNDS was written on the data sheet in the respective bedspace. As well, ROOM DARK was noted when room lights were turned off, DOOR CLOSED when a room was not isolated, but the doors were nonetheless closed, and PARTIAL CURTAIN when the room was partly, but not entirely, curtained.
Observational Categories and Recording Procedure

A choice existed between designing an observational protocol that was elaborate, if not complex, but adequately canvassed a complex work setting, or preparing a protocol more simplistic, i.e., 'user-sensitive' (manageable), but one that excluded too much of the richness that the setting offered.

The behavioral data sheet provided space for the observer to identify himself with his initials and to note the date, the week of the study (adaptation, baseline, treatment week one, treatment week two, postphase), the shift (day, evening), the time of the observation, and the census at the time of the observation.

There were five primary behavioral categories: Patient Status, Staff Proximity, Verbalization, Interaction, and Overt Mood.

Patient status. A patient was scored as either Awake or Nonconscious. Additionally, there were occasions when status could not be determined, and was so designated on the data sheet. If the patient was nonconscious at the outset, a number 1 was written next to N on the data sheet. Nonconscious was defined as a patient who was asleep, comatose, or had his/her eyes closed. If the patient was Awake, a number 2 was placed next to A on the data sheet. Awake was defined eyes opened, crying, verbal behavior initiated or responded to, or physical contact initiated. Bodily movements such as tremors, seizures or muscle tics were not defined as Awake. If Awake was rated as 1, but the patient closed his eyes and kept them closed for longer than 30 seconds, a 2 was placed next to N on the data sheet, indicating a change in the patient's status during the interval that the patient was being observed. If, at the
outset of the recording interval, N was rated 1, but the patient showed signs of awareness for any duration during the interval, a 2 was placed next to A to denote the change in patient status. There were instances when patient status could not be determined. Patients may have rested in various positions that precluded accurate scoring. Staff performing medical procedures may also have hampered observations of the patient. In these instances, A and N on the data sheet were left blank, indicating that an accurate assessment of the patient's status was not possible.

**Staff proximity.** The cumulative number and category of individual at a bedspace in a given recorded interval. Staff proximity contained five subcategories:

- **Physician (D):** an individual with a medical degree. This category included house staff, medical students, interns, residents and fellows.
- **Nurse (N):** an individual with a nursing degree, including B.S.N., R.N., etc.
- **Parents (P):** parents, as well as immediate family members, were included in this category.
- **Medical Support (MS):** included laboratory technicians, therapists (e.g., physical therapists, social workers, psychologists), clerical personnel, chaplins.
- **Unknown (UK):** persons that were not identifiable during recording intervals.

All nurses, doctors, medical support personnel, family and unidentifiable persons were rated throughout the recording interval. Check marks were placed next to the letter denoting each person type on the data sheet. Therefore, two checks placed alongside N and one check placed next to MS indicated that two nurses and one medical support staff were in proximity to the target bedspace during the recording interval. If more than three members of a category were at the bedspace, the check
system could be discarded and replaced with cardinal numbers. Proximity was a concrete measure; in other words, the actual physical presence of the person within the targeted area was necessary before that person could be scored as in proximity.

An individual was in proximity to an observed bedspace if he/she was anywhere in the bedroom. The room was easily defined as the area circumscribed by doors or curtain tracks, and approximately two meters beyond. A number of rooms shared an adjoining space with another room; in such cases each room was defined by curtain tracks located in the ceiling. However, a staff member had immediate access to the adjoining bedspace. The criterion "2 meters beyond" in the cases of adjoining rooms not separated by walls did not apply to lateral movement by a staff member into the next bedspace. When such movement occurred, or when a staff member was out of the bedspace to the right or to the left, the staff member was not rated as in the targeted bedspace. This was so even though the observer had knowledge that the staff member was assigned to the targeted bedspace. The two-meter criterion specifically referred to that distance in front of the targeted bed area. In this way, chairs in which nurses and physicians sat to record information, conduct charting, engage in dialogue, were viewed as phenomena pertinent to the immediate area subject to observation. This was particularly important when phone contacts took place, inasmuch as phones were located to the front of most bedspaces. Furthermore, medical interactions frequently took place just outside of (i.e., in front of) a bedspace. Medical rounds were a notable example in which important information was communicated.
among staff just outside the bedspace area. During rounds, the number and type of personnel were rated.

The category, Proximity, was not a timed interval. An individual was rated as in proximity to the observed bedspace the instant that he/she crossed the defined threshold. However, staff merely walking past rooms and past rounds who demonstrated no orientation to or involvement with the targeted bedspace were not rated as in proximity. A timing criterion was not used for those persons who were rated to be in proximity since vital procedures may have been conducted, surveillance completed, and information obtained and/or disseminated within seconds following purposeful contact with the bedspace area.

Verbalizations. The occurrence of verbalizations between persons at a bedscape. Verbalizations were defined as all audible utterances — dialogus, screaming, expletives — irrespective of content, initiated by or received by the individuals categorized as in proximity (D,N,MS,P). With four primary person types, thirteen verbalization combinations were generated:

- DD: Doctor-Doctor
- DN: Doctor-Nurse
- DPT: Doctor-Patient
- DP: Doctor-Parent
- NN: Nurse-Nurse
- NPT: Nurse-Patient
- NP: Nurse-Parent
- PPT: Parent-Patient
- PP: Parent-Parent
- MSD: Medical Support-Doctor
- MSN: Medical Support-Nurse
- MSPT: Medical Support-Patient
- MSP: Medical Support-Parent

Whenever a verbalization occurred, the observer either circled or placed a slash through the symbols denoting the dyad on the data sheet. A
mark through the letters, NPT, therefore, indicated that a verbalization between a nurse and a patient had occurred during the recording interval. Verbalizations were not timed responses and were rated only once following an occurrence; hence, the frequency of verbalizations for the same interval was not scored.

It was intended that a scoring system that monitored occurrence but not content should be sensitive to the range of topographical possibilities observable among frequently 2-6 people in a relatively small, semi-enclosed environment, i.e., a bedscape. As such, and given the ubiquitous properties of audible vocalizations in a relatively contained work area, ratings were typically more inclusionary than exclusionary. However, verbalizations occurring in bedsaces did not automatically determine a rated communication between all individuals in that bedscape. For example, an observed bedscape may have contained a nurse, a physician and a parent. The nurse may have been aspirating the patient, and the physician and the parent may have been several meters from the bedside in conference. In this case, the rated verbalization was DP, not DP and DN, or DP and NP. If, during the same interval, it was clear to the observer that (1) the nurse directly addressed or was addressed by some other person in the bedscape, or (2) the content of the communication had immediate and observable consequences for the nurse in the bedscape, then the appropriate nurse verbalization dyad was scored. Verbalizations during medical rounds were treated in a similar manner, with regard for the apparent passivity of attending personnel. Rounds were conducted during shifts and were usually attended by 8 to 12 staff, most of whom were physicians. Rounds typically occurred directly in front of the bedscape
of the patient that was being discussed. A physician was usually responsible for conducting rounds, making formal presentations on several of the patients. Where other physicians, nurses and medical support staff were present, DD, DN, and MSD were rated, though attending staff may have been nonverbal, since (1) presumably, a staff member attending rounds was likely receiving information and (2) it can be assumed that the presenter was addressing all staff participating in such rounds.

The general rule for scoring verbalizations was that both members of the dyad were, unequivocally, participants in the exchange. A participant was someone who (1) initiated a verbal exchange; (2) directly received an other-initiated verbalization. Verbalizations were scored whether or not they were verbally reciprocated by the addressee. If a nurse said to a patient: "That's a good girl," a NPT verbalization was rated, whether or not the patient responded verbally, motorically or otherwise. An additional example is one in which one parent may have been at the child's bedside, was oriented toward the child, yet clearly made some comment to the other parent seated in a chair three meters from the bedspace, who demonstrated no overt reaction to the verbalization; (3) was one member in a group (indirectly) receiving verbally conveyed information; and (4) was a member in a verbal community who by his/her posture and bodily orientation was not part of the verbal exchange, but subsequently responded as if he/she had received the exchange.
An important consideration was the directionality of the communication. Who initiated the communication was not critical and was not reflected in the scoring. So, DN, where rated, did not indicate that a doctor initiated a verbal communication that was addressed to a nurse. DN indicated only that a communication between the nurse and the doctor took place in that bedspace.

Verbalizations may have also occurred (a) between persons occupying different bedspaces; (b) between persons in the targeted bedspace and personnel traversing the bedspace (personnel walking by a bedsapce and exchanging information with persons at the bedsapce were rated in proximity to that bedspace); (3) over intercom and phone lines. Since the party at the other end of the communication was not identifiable, the nonobserved party was rated as MS if any aspect of the communication had a medically-related purpose. (It should be noted that the MS rating in this instance refers to a verbalization dyad containing an MS, e.g., MSD, MSN. It was not the case that the observer also rated the presence of an MS for the category, Staff Proximity.) When the content could not be determined, an MS verbalization was nonetheless rated. When the content of the communication was clearly and exclusively of a social nature, the observer wrote on to the data sheet, "nurse-personal."

When three physicians, or three nurses, or three parents, etc., were in the same bedspace and verbal communication took place only between two of them, or between Nurse A and Nurse B at one point, and subsequently between Nurse B and Nurse C, the observer was limited to scoring NN (DP, PP, etc.). The system was not intended to be sensitive to whether each
nurse rated in proximity became engaged in the communication, but rather whether a communication occurred between, in this example, at least two same-type people.

An NN (DD, PP) communication did not necessarily indicate that two nurses (physicians, parents) were located in the same bedspace, since verbalizations between nurses (physicians, etc.) in different bedspaces was possible (and as aforementioned, a verbalization may have been rated during a phone contact between, for example, a nurse and medical support person -- MSN -- though the MS was unobserved and not rated in proximity). This was also true of other verbalization combinations.

Interactions. Medical, social and equipment interactions, as categories, primarily focused on the relationship between a staff person and the patient and the behavior and activities that took place within the constrictions of the staff-patient relationship. However, the investigation was designed to emphasize the behavior of staff in an intensive care unit and medical and social interactions were observed and scored when they took place between staff whether or not a patient was directly and immediately implicated. For example, rounds occurred in front of bedspaces, took the form of case presentations, often did not involve direct contact with the presented patient, yet involved medical information disseminated between professionals vital to the continued treatment of that patient. Therefore, medical, social and equipment-based interactions comprised behavior observable both between staff and patient and between staff. Family Interaction, however, constituted exchanges between family members and the patient, exclusively.
There were five Interactions subcategories:

Medical Interaction (MI): Included verbal and behavioral interactions implemented to induce or maintain treatment effects. As such, medical interactions were those activities having a direct bearing on the health care of the patient. Examples included medical procedures, medication, charting and evaluation, patient education, sterilizations, recording, medically-related communication between staff and between staff and family, contacting or discussing the technology, where such actions addressed the medical needs or had a bearing on the medical status of the patient. A medical interaction was rated when staff listened to a patient or family person describe the condition of the illness.

Social Interaction (SI): Included verbal and behavioral interactions that could be deemed important, but not necessarily instrumental in delivering a health care service. Examples included providing support and reassurance, touching and other physical contact having no medical basis. Essential medical care, receiving an MI rating, was defined as any procedure that was medically required, ordered or requested to sustain or enhance the patient's physiological status. Communication between patient and staff that did not comprise essential medical care was rated as SI.

Equipment-Based Interaction (EI): Included involvement with specialized machinery particularly characteristic of intensive care environments. Examples: preparing the equipment, observing equipment readings, recording data from equipment output, contact with the machiners (e.g., adjustments).

No Interaction (NI): An absence of verbal and/or behavioral responding in the bedspace pertinent to medical and hospital-related activities. Examples: watching television, listening to the radio, sitting or standing without orientation toward the patient or the machinery.

Family Interaction (FI): Physical contact between family members and the patient. The category FI did not include verbalizations, so that redundant scoring with patient-family verbalizations (PPT) could be avoided.

Interaction types were not timed, but were rated only for occurrence with single, but not multiple, occurrences being scored following the
occurrence in an interval. Excluding FI, each staff-related interaction category was scored according to the staff member engaging in the interaction. The observer scored MI, SI, EI and NI for occurrence by placing a slash (or circling) the respective staff person — physician, nurse, medical support — observed performing the interaction. Therefore, an MI (SI, EI) could only be defined as performed by a D, N, or MS or all three in an interval. An interaction typed was rated only when a D, N, or MS was rated as in proximity for the same interval. Nonobserved MS's rated as such vis a vis phone contacts were not rated along interaction categories. FI was slashed (circled) following any instance of physical contact between patient and family. As with Patient Status, Staff Proximity, and Verbalizations, Interactions were rated throughout the interval.

In most instances in which a D, N, or MS was present, the interval contained either an MI, SI, EI or NI. There were exceptions (i.e., interactions were not scored) in some intervals that a staff person was rated in proximity to the target bed area. There were occasions in which a verbalization was apparent but inaudible, impeding an accurate assessment of the type interaction inhering in the verbalization. The observer could be certain that the exchange should not be scored NI, but at the expense of accuracy, could not reliably score the exchange MI, SI, or EI. The observer's only recourse, in attempting to avoid ratings founded on assumptions, was to score the Verbalization and leave blank the Interaction categories. (Many verbalizations were indeed interaction-rated, but rarely in situations in which the verbalizations were inaudible.) Similar scoring decisions ensued when the respective staff person had his/her back turned toward the observer for the entire
interval. In this case, again, the observer could not be certain the staff person was non-interactive, since the staff person may have been scanning monitors, noting the regulatory of the patient's breathing patterns, or taking a pulse reading. In short, when in doubt, the observer chose no rating to an inaccurate appraisal of staff behavior.

The category NI could not be scored if MI, SI, or EI was scored in the same interval. This is to say that the staff categories D, N, MS could not be scored as medically-, socially- or equipment-interacting in the same interval that they were scored as no interaction. (There may have been instances in which, among multiple staff present, some were actively engaged and some were not, but no attempt was made in the scoring to so minutely pair interaction behavior with specific personnel.) MI, SI, and EI, however, were all possible inclusive categories, occurring in the same interval. A nurse, therefore, may have been rated as medically- and equipment-interacting in the same interval.

Verbalizations often contained social-, medical- or equipment-based content, such that verbalizations and interactions often proved to be concurrently scored categories. When a verbalization contained both social and medical content, the verbalization was rated both MI and SI. For example, phone contacts may have had a medically-related purpose, yet be interspersed with social dialogue. Requests for information from the patient in order to effectively carry out a procedure or develop a diagnosis were not examples of SI: "Tell me where it hurts". Verbalizations such as, "How are you today?" and "What can I do for you?" were rated both MI and SI. "Be back in a minute"; "OK, all done" were
also rated as MI and SI since the statements provided the patient with status feedback and so had a direct bearing on the health care of the patient (MI), but were likely not altogether essential medical communications (SI). Similarly, "Is that better?" was rated MI and SI: the statement contained social properties, but may also have been a request in which the staff person attempted to solicit information that, once obtained, shaped subsequent medical procedure. Where the content of the verbalization was entirely social, SI was singularly rated.

MI and EI were inclusive with each other and with a range of verbalization dyads. MI's for example, were rated when medically-related dialogue transpired between staff, between staff and patient, and between staff and family, where education, evaluation, recommendations and so forth were involved. So, mutually inclusive categories may have included: MI and DN, MSD, DPT, DP where a physician, nurse, medical support person and parent were present and the physician was addressing the group, demonstrating how to operate a medical device while indicating to the patient the amount of discomfort that the patient should anticipate as the device became engaged. In this situation, as happened often, depending upon the device, EI would be jointly scored with MI. The scenario presented also points to multiple personnel ratings for the category MI, since the nurse and medical support person were engaged by way of attending to and receiving disseminated medical information.

EI's may have been exclusively verbalized where staff colluded around a piece of equipment to discuss its readings.
Overt mood (nonverbal affect). The occurrence of smiling among staff at a bedsace. A smile was defined as the mouth extended and drawn back, with lips either parted or closed, and a detectable sign of pleasure or approbation. Smiling was rated throughout the interval, and was scored for occurrence only for physicians, nurses and medical support personnel. The category was not timed and single occurrences only were scored for each interval.

Cardiovascular Measures and Apparatus

Heart rate was evaluated with a Camscan Recorder (Model 7300) that provided 24-hour continuous cardiography monitoring. In addition to total beats per minute, the Camscan (also referred to as a Holter-monitor) indicates major arrythmias, tachycardia, and preventricular contractions. The Holter (named after its principal inventor) produced a cassette tape of heart activity during its activation. The tape would be subsequently removed and scanned and notable information was recorded on an HOURLY MONITORING REPORT (see Appendix). The Report sheet enabled the scanner to record heart rate on an hourly basis (a range denoting beats per minute) and the prevalence of ventricular premature beats and tachycardia, also on an hourly basis. A 'diary' was furthermore kept by each Holter participant in which they briefly listed their activities during the period that the machine was attached and the times that the activities took place. The activities that they listed included events such as cigarettes smoked, rounds attended, medical procedures conducted, and so forth. The diary, therefore, provided information concerning staff activity that could be compared with notable
changes in heart activity.

Selection of Participants for Holter-Monitoring

At least three variables were a priori considered important in determining staff selections: time on unit, work responsibilities, and personal control over the setting. Hence, nurses were randomly selected from the senior and new groups with stipulations as follows: (1) only full-time nursing staff were considered; (2) the staff members selected had to be persons who would be available throughout the conduct of the study; and (3) primarily working the day and evening shifts during the time of the study, those shifts during which behavioral measures were also taken.

The names of senior staff and new staff were randomly chosen and numbered. The investigator then began with the first name on each list and checked the master rotation and vacation schedule that contained the names and schedule assignments of every nurse that worked on the unit. If either (aforementioned) rotation and/or vacation stipulations were violated, then the next name on the list was addressed. If the first selected staff member met rotation and vacation stipulations, then the staff person was approached and notified about the selection process. Participation was, of course, optional. In the event that a staff person declined to participate, the next name on the list was considered and the same rules and strategy were applied. When a staff member chose to participate, he or she was asked to wear the monitor once per week, on five occasions, for an approximately 16-24 hour period. The days on which they would wear the monitor would necessarily change from
week to week according to their own rotation assignments and the assignments of the other participants. Three senior and three new staff were initially selected as participants. When disruptions in staff scheduling occurred, the investigator sought the participation of alternative full-time staff to preserve the continuous generation of cardiovascular data. Thus, in this respect, one senior, one new and two junior staff were subsequently selected to wear monitors during the fourth and fifth weeks of the study. Of the original six staff selected, two senior and two new staff were also selected and participated in the intervention phase. Three of the alternative Holter-participants were also treatment recipients.

Holter Scheduling and Recording Procedure

The aim of the heart monitoring was to compare heart rate during working and non-working periods (eight hours on the unit and eight hours off the unit). Staff were asked to wear the monitor for the entire 24-hour period, thereby including the sleep cycle, primarily to avoid disturbing an otherwise functional device, allowing the technicians to disconnent the apparatus at the end of the monitored cycle, insert new tapes, identify faulty leads, and replace worn batteries. However, the 24-hour cycle was often disrupted due to breakdowns in the machinery, battery dysfunction, or excessive physical activity resulting in a detached lead. Nonetheless, the essential criterion for comparison -- 8 hours on-unit vs. 8 hours off-unit -- was preserved in almost all cases.
Intervention

A progressive muscle relaxation technique was offered to full-time nursing staff. All full-time staff were first separated into three groups: senior (N=4), junior (N=6), and new (N=2). Each group was then further divided by randomly selecting and assigning half of the members to the treatment condition and half the members to the no-treatment condition. Thus, each group of full-time staff (senior, junior, new) was further subgrouped into treatment and no-treatment categories. Following assignment into treatment and no-treatment conditions, there were five senior, seven junior and three new staff assigned to the treatment condition. The staff persons chosen in the treatment group were informed by the investigator that they had been selected and had the option to refuse at that time.

Selection decisions were subject to similar stipulations that governed the random selection of Holter-participants. Selected treated staff were persons who would be available throughout the study and would preferably be working day and evening shifts throughout the project. The latter stipulation did not, however, exclude originally selected treatment staff. Staff beginning night shifts at some point in the study were less accessible to the investigator, but not entirely inaccessible, since such staff could be worked with at the end of their shift in the early morning. However, the selection process did include the proviso that at least one senior and one new staff member receiving the relaxation procedure were also Holter-participants.
Training sessions were typically conducted on the intensive unit, both for practical and theoretical reasons. Concerning practicality, the amount of time during any given shift that a nurse was allotted to spend away from the unit was extremely limited and such time, more often than not, was used for lunch (dinner) breaks. When a nurse was able to obtain from 15 to 30 minutes away from patient care, she preferred to remain on the unit to respond to any sudden changes in patient status. As well, there were simply no suitable alternative areas in which relaxation sessions could be conducted that were near to, but not directly on, the unit. From a theoretical vantage, it was intended that the procedure, once learned, be used on the unit, in the presence of precisely those particular setting characteristics (stressors) that might precipitate its use. Consequently, it was considered an advantage that the properties of the training environment(s) closely approximated the properties of the unit in which the procedure was designed to be used.

The Training Setting and Procedure

The primary training area was located in a small conference room just opposite to the clerk's area. The room was fairly small, did not have windows, and contained desks and severely fairly comfortable, cushioned chairs. The room was available to nursing staff, but was generally used by all medical fellows working on the unit. Before each training session a sign was placed on the door indicating that a study was in progress. There were occasions, however, when a training session was interrupted or when it was not possible to coordinate the room's availability with
the participants' schedules. Alternative training areas were, therefore, used -- most of which were also located on the unit. These included a small, enclosed, windowless office that contained a couch, a similarly enclosed, windowless laboratory with chairs, and, on one occasion, one of the fishbowls. During the latter weeks of the treatment phase, a carrel containing desks and chairs located in a separate division within the hospital complex was used with one of the participants who had just completed the night shift. The rooms were kept dim whenever possible and most often the more comfortable chairs, or carpeted, were selected. None of the training areas, however, were soundproofed and conversation and intercom activity could often be heard, and intrusions were occasional. Indeed, staff at times kept an 'open ear' for the possibility that they would be paged back to their assignment.

Training times varied, taking place anywhere from 7 a.m. to 8 p.m. depending sometimes on room availability, but most often determined by a nurse's schedule. As coordinating room and individual schedules was often problematic, group training sessions were conducted, with the number of staff present in a training session varying from one to four. On occasion, yet infrequently, two sessions were conducted on the same day with a given participant. A typical day, spanning two shifts, usually involved meeting with four to eight nurses either individually or in couples. There were a total of 17 training days broken in three phases:
In Phase I, the investigator introduced the procedure's rationale, on addressing the relation between muscle and psychological tension, and demonstrated the alternating tensing-relaxing cycle and deep breathing exercise. Cued-controlled relaxation was introduced and the participant was told to picture the word RELAX during tension release. The reader should refer to the manual prepared by Bernstein and Berkovec (1973) for detailed procedural information.

During Phase II, the "recall" procedure was introduced, in which the participant was asked to focus her attention on muscle tension, then "recall" the feelings associated with releasing the tension.

Subsequent to Phases I and II, staff were encouraged to practice the procedure at home and were given take home instructions to remind them of the procedure and the order in which muscle groups were systematically relaxed. Muscle groups were individually relaxed during Phase I, and subsequently combined in Phases II and III (e.g., both hands and forearms, etc., were simultaneously relaxed).

Phase III, for most participants, was one session during which they were instructed in using the procedure on the unit. Each participant received individual feedback concerning the items and corresponding categories they had rated most problematic, denoting situations in which the relaxation procedure should be implemented.

Schedule of Baseline and Experimental Phases

The study was conducted in July and August over a six-week period, comprising 40 consecutive days of observation. The first week of the study was the Adaptation week, considered integral to the conduct of the study, in which staff were provided with the opportunity to 'observe the observer', ask questions, and become acquainted with having their work observed and recorded by an individual who was independent of the unit's activities.
Some of the staff were employed on the unit during the pilot study and were familiar with the observational procedure. Staff were also familiar with the present project through conversations with the head nurse and the collaborating psychiatrist consulting to the unit. When staff had questions, the investigator handled such questions (e.g., "What are you writing down?") with the general statement: "Basically, I'm looking at working procedures and interactional patterns among staff."

The Adaptation week lasted for six days; only observational measures -- patient status, staff proximity, verbalizations, interactions, overt mood -- were taken during this period.

At the end of the Adaptation week, preintervention materials were prepared and collated for distribution. The materials were handed out to all staff during the first days of the second week, the Baseline week. The preintervention packet included the cover letter, the Intake Sheet, SCL-90-R, Zung and Affect scales, and the Stressor Inventory. Respondents were asked to score and return the packet as early as possible. Behavioral observations begun during the Adaptation week were continued daily. On the first day of Baseline, the Ward Acuity Scale, Specific Events Chart, and cardiac measures were initiated and continued daily. Baseline information was collected for a period of nine days, during which all prepackets were administered and gathered, and treatment group assignments were completed.

Treatment Phase I was initiated during the third week. Behavioral, Ward Acuity, Specific Events, and cardiac measures continued to be collected daily (the exceptions to this were days when cardiac monitoring
was disrupted due to reasons cited earlier and when charge staff were unable to complete the Ward Acuity and Specific Events charts). Relaxation training was initiated with participants in the treatment group. Treatment Phase I continued for five days.

Treatment Phase II began with the onset of the fourth week. The routine was identical to week three, with treatment staff moving through treatment phases according to individual schedules. Treatment Phase II continued for seven days.

Treatment Phase III was begun at the onset of the fifth week. Again, the routine -- observations and treatment -- was identical with the two previous weeks. During the latter part of the third treatment phase, postintervention packets were prepared for dissemination. In the last two days of treatment, no sessions were conducted; staff were either unavailable or had completed the designated six training sessions. As treatment was effectively terminated by the end of the day shift on the last day of week five, behavioral measures were not collected. Treatment Phase III lasted for seven days.

Week six comprised the Posttest Phase. Behavioral, Ward Acuity, Specific Events, and cardiac measures were conducted throughout the Posttest Phase. At the beginning of the Posttest week, the postintervention packet was administered to all staff, containing a cover letter and the SCL-90-R, Zung and Affect scales. Staff were also informed, in the cover letter, that the investigator would be available to work with anyone who was not originally selected.
Self-Report Data Evaluation Methods

Descriptive analyses. Descriptive statistics were obtained for each of the self-report variables. The SCL-90-R contained 12 variables, including nine symptom dimensions and the three global indices; the Stressor Inventory contained seven variables; the Affect Scale was separated into positive and negative items, and analyses were conducted on total group scores for the Zung. For each of the variables mentioned, means, standard deviations and variances were obtained for pretreatment values.

Descriptive scores were obtained for all staff so that, for example, a single somatization and a single depression score was calculated, and for each group: senior staff, junior staff, parttime personnel, physicians, and treated nurses.

Inferential analyses. (a) Characteristics of the treatment group were described elsewhere. A control group was randomly selected among the 37 nursing staff who did not receive relaxation training. The control group was accordingly selected to match the number of staff represented in the treatment group. In this way, four controls were selected from the nontreated senior staff, six from the nontreated junior staff, and two from the nontreated new staff. A repeated measures, two-way analysis of variance with a within-subjects design was used to compare pretreatment-posttreatment differences for the relaxation group with pre-post differences obtained for the control group. Thus, change in pre-post somatization scores for the relaxation group was compared with change in pre-post somatization scores for the control
group, change in pre-post Zung scores were similarly compared, and so on. Hence, the pretreatment-posttreatment two-way analysis of variance was computed for the Affect Scale for the positive items and for the negative items, for the Zung scale, and for each of the 12 SCL-90-R categories. The analysis yielded three sources of variance: two main effects (group, time) and one interaction (group X time); (b) a one-way analysis of variance was conducted for each of the six groups to compare pretreatment means for each of the self-report variables. For example, presomatization scores for senior nursing staff were compared with the presomatization scores of junior nurses, new nurses, parttime nurses, physicians, and treated nurses; and (c) correlational analyses were conducted among a range of self-report variables to test the relationship, or strength of association, between categories. Items in the Affect Scale and the Stressor Inventory, scales not tested in previous research, were first tested for association using the Pearson Product-Moment Correlation statistic. The Pearson was subsequently used to generate correlation coefficients between many pairs of variables, including SCL-90-R symptom dimensions with Stressor categories, Zung scores with Affect Scale scores, Affect Scale scores with SCL-90-R dimensions, and so on.

Observational Data Evaluation Methods

Descriptive analyses. Descriptive analyses provided the major means for assessing the observational data, indicating the frequency of each category. In addition to frequency scores, "elaboration analyses" were conducted to determine the bivariate relation between significant
categories. To this end, many of the categories were cross-tabulated to determine the association between proximity, verbalization and interaction values. Frequency scores included information concerning the number of physicians (nurses, parents, etc.) present, the number of medical interactions performed, instances of smiling, and so on.

A series of 'if...then' statements were constructed, founded on the importance of staff presence in bedspaces, in calculating each ratio. After general frequencies were calculated, a range of proximity patterns were listed and frequencies were again calculated.

1. The frequency of, for example, medical interactions, was derived. A score was obtained indicating the total number of medical interactions performed by each of the targeted hospital staff: physicians, nurses, and medical support personnel. The total score obtained in this instance was a gross measure, with fairly limited utility.

2. The frequency of medical interactions was derived as a ratio score, with the total number of such interactions as the numerator and the actual presence of staff in bedspaces as the denominator. The analysis was not, "how many medical interactions do nurses perform?"; rather, the question was, "when a nurse is scored as in a bedspace, how many medical interactions does the nurse perform?" The obtained ratio provides a percentage score indicating the rate at which nurses perform medical interactions when observed in bedsapces.

3. Staff proximity, as the denominator, could be elaborated in a number of ways. For example,
a. How many medical interactions did nurses perform when only one nurse was scored in proximity:

IF N=1
THEN How many MI: the score obtained is the number of medical interactions completed by nursing staff during the course of the study spanning intervals when one nurse was present in a bedspace.

b. How many medical interactions did nurses perform when multiple nurses were present. Or, when multiple nurses were present, how often did they verbalize with one another. It was possible, in this fashion, to consider the impact of multiple staffing patterns on the rate of medical and social activities.

It can be pointed out that frequency scores, and chi-square analyses, could be conducted (a) for a wide range of single and multiple proximity combinations, (b) for all of the thirteen verbalization dyads, (c) for the entire thirteen interaction types, and (d) for the three overt mood indexes. The range of categories that were reviewed were as follows: proximity by verbalization, proximity by interaction, and proximity by mood.

Inferential analyses. The essential dichotomous properties of each of the variables -- occurrence, nonoccurrence -- lended itself to a concise test of association between the variables. Chi squares were conducted on each of the generated bivariate tables to measure the association between variables (e.g., verbalization rates during high acuity periods).

Cardiovascular Data Tabluation and Analyses

The heart rate data were essentially scored on an hour-to-hour basis. The range of heart rate activity, defined as beats per minute, was scored
for each hour by noting the lowest and the highest beats per minute scores. Scores were then grouped onto on-unit ranges and off-unit ranges. On-unit ranges were further grouped according to shift, yielding scores for the day shift, evening shift, and night shift. Off-unit scores were considered in two ways: entire off-unit scores, and off-unit scores that did not include sleep periods.

On-unit and off-unit scores for each participant was separated into weeks (e.g., Baseline week, Treatment week one) and mean rates were calculated. Mean rates were obtained by summing and averaging scores at the low end of the range for a respective shift and summing and averaging scores at the high end of the range for a respective shift. In this way, mean on-unit scores and mean off-unit scores, expressed in ranges, could be compared.

Diary information was also scanned for determining sleep cycles and unit activities that could be notable in influencing heart rate activity.

Relaxation Data Tabulation and Analyses

Relaxation data included: (1) a statement concerning whether staff

1Research questions of seeming importance were the possible effects of a 'highly ill unit' on work performance and whether behavioral distinctions could be found on the basis of shift. Scoring, analytic and reliability issues, as well as variable findings, rendered the results equivocal, necessitating alternate measurement techniques. Acuity and shift data, therefore, were not included in the manuscript. Acuity and shift measures are described throughout the manuscript, however, to provide the reader with the comprehensive information as to the manner in which the study was conducted. For similar reasons, observational data collected for nurses in the treatment group, though referred to in the manuscript, were generally not included in the manuscript.
had previous experience with relaxation procedures, (2) the number of times that staff practiced the technique external to the training sessions, and (3) the magnitude of tension encountered and self-rated before the onset of the relaxation session and the amount of tension experienced just subsequent to the relaxation session. Self-rated tension was measured in centimeters on a 0 to 10 scale.

The relaxation data were collected for the 12 staff comprising the treatment group. Three additional staff received some training with the technique, but were not able to participate in a minimal number of treatment sessions and, therefore, were not included in any of the analyses. Scores were grouped according to sessions; in other words, before relaxation (BR) scores and after relaxation (AR) scores were computed for each of the six sessions, for all participating staff. A composite average BR and AR score was obtained for the six sessions.

Each session was, in a sense, a reflection of skills developed in previous sessions. However, none of the training was stimulus-specific (i.e., the participant was not asked to address, during the training, a specific problematic stressor that was followed through sessions), and it can be assumed that the self-rated tension scored in a given session was largely independent of the tension scored in a previous session. Indeed, it was typically the case that scheduling resulted in a 1-3 day impasse between relaxation sessions for several of the participants. Furthermore, the contents of three of the six sessions varied as new material and changes in the technique were introduced. In this respect, the focus was not on comparing sessions, or on session to
session change (i.e., were staff more relaxed in session two than in session one), but on comparing the average BR score collapsed over the six sessions with the average AR score taken over the six sessions. The T-test, therefore, was used to test the magnitude of difference between tension before relaxation sessions with tension after relaxation sessions. Before relaxation and after relaxation values were, in this fashion, paired for each individual.

**Interobserver Reliability**

Observational measures. Reliability observations were periodically conducted throughout the study. All reliability observations were taken by the same two observers. The observers convened prior to the study and during the Adaptation week to review each measure and to discuss the manner in which observations at bedspaces -- distance from bedspace, reaction to questions posed by staff and parents, recording anecdotal information, etc. -- were to be conducted. One of the observers was principally involved in recording observational data during the pilot study and was familiar with the unit, some of the categories, and observational strategies appropriate to the setting. Nevertheless, both observers met several times to refine the recording system and address the multiple definitions that generally characterized each category.

The recording procedure, during reliability sessions, did not differ from the procedure described earlier. The observers maintained the same distance from bedspaces and attempted to maintain an unobtrusive presence. At the outset of each trip, both observers synchronized themselves to
time, date, shift, condition, and bedscape sequence information. Also, the principal observer commented on any unusual circumstances that might impact on the recording conducted for that trip. After the necessary identifying information was completed, both observers approached the first bedscape, standing approximately two meters from one another. The principal observer started the observation by announcing "Begin" or "Now", attended to an available clock with a second hand, then ended the observation by announcing, "O.K." or "That's it". Both observers would move to the next bedscape in the sequence and the procedure would be repeated until all active bedsparces had been observed. Occasionally, consecutive reliability observations were conducted so that, at the end of one trip, both observers would take fresh data sheets, complete the demographic information, and begin the observation sequence a second time, observing each active bedscape on the unit.

A total of 33 reliability sessions were conducted for the entire study, 12% of the total number of observation trips completed throughout the study. Table 2 shows the total number of observations for each week, the number of reliability observations, and the number of reliability sessions conducted for each respective shift.

Reliability was calculated with the following formula:

\[
\text{Reliability} = \left( \frac{\# \text{ of agreements}}{\# \text{ of agreements} + \text{disagreements}} \right) \times 100
\]

Agreements were scored when (1) both observers scored the occurrence of a behavior; for example, both observers scored the verbalization DN and (2) when both observers did not score a category as having occurred; for
Table 2

The Total Number of Observations and Interobserver Reliability Sessions Conducted on a Weekly Basis and the Total Number of Reliability Sessions Conducted for each Shift.

<table>
<thead>
<tr>
<th></th>
<th>Number observations</th>
<th>Number reliability sessions</th>
<th>No. reliability sessions (7-3 shift)</th>
<th>No. reliability sessions (3-11 shift)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation</td>
<td>50</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Baseline</td>
<td>68</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Treatment Week One</td>
<td>32</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Treatment Week Two</td>
<td>42</td>
<td>6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Treatment Week Three</td>
<td>40</td>
<td>8</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Posttest</td>
<td>41</td>
<td>10</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>273</td>
<td>33</td>
<td>12</td>
<td>21</td>
</tr>
</tbody>
</table>
example, both observers did not rate the verbalization DN for the same interval. Comparisons were made for each category for each bedspace; in other words, DN was rated for reliability for bedspace #1, bedspace #2, and so on. If both observers agreed that DN occurred in bedspaces #1 - #9, and also agreed that DN did not occur in bedspace #10, then the reliability score for the category DN for that particular reliability session was 10/10, or 100%. For the category, Staff Proximity, if both observers rated one nurse in proximity, then an agreement was scored; if one observer rated one nurse in proximity and the second observer rated two nurses in proximity, then a disagreement was scored for that bedspace.

Calculations were obtained both for six major categories by collapsing the subcategories for each of the major indexes, and for each of the 35 categories. Table 3 presents reliability data for the major categories and Table 4 shows the breakdown for each respective subcategory. Both tables are arranged to denote reliability scores for each subcategory and each major category for each week and as a grand total summation. Considerable differences can be seen between Tables 3 and 4 regarding the amount of interobserver reliability. When categories are collapsed (Table 3), reliability scores are markedly lower than the more minute analysis provided by inspecting each subcategory (Table 4). The range of reliability scores in Table 3 is from 70% to 89%; however, the observers were highly reliable when each specific index is individually calculated. Table 4 grand totals are all above 88%, with the exception of Patient Status.
Table 3

The Reliability Percentages for each Major Observational Category for each Week and Totaled Across Weeks.

<table>
<thead>
<tr>
<th>Category</th>
<th>Adaptation</th>
<th>Baseline</th>
<th>Treatment Week One</th>
<th>Treatment Week Two</th>
<th>Treatment Week Three</th>
<th>Posttest</th>
<th>Total across weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Status</td>
<td>.73</td>
<td>.57</td>
<td>.54</td>
<td>.65</td>
<td>.72</td>
<td>.79</td>
<td>.70</td>
</tr>
<tr>
<td>Staff Proximity</td>
<td>.73</td>
<td>.73</td>
<td>.89</td>
<td>.89</td>
<td>.83</td>
<td>.93</td>
<td>.86</td>
</tr>
<tr>
<td>Verbalizations</td>
<td>.73</td>
<td>.76</td>
<td>.65</td>
<td>.72</td>
<td>.84</td>
<td>.82</td>
<td>.78</td>
</tr>
<tr>
<td>Staff Interactions</td>
<td>.73</td>
<td>.67</td>
<td>.50</td>
<td>.74</td>
<td>.83</td>
<td>.72</td>
<td>.72</td>
</tr>
<tr>
<td>Family Interactions</td>
<td>1.00</td>
<td>.96</td>
<td>.98</td>
<td>.99</td>
<td>.97</td>
<td>.89</td>
<td>.95</td>
</tr>
<tr>
<td>Mood</td>
<td>.73</td>
<td>.88</td>
<td>.96</td>
<td>.90</td>
<td>.93</td>
<td>.86</td>
<td>.89</td>
</tr>
</tbody>
</table>
Table 4

The Reliability Percentages for each Observational Subcategory for each Week and Totaled Across Weeks.

<table>
<thead>
<tr>
<th></th>
<th>Adaptation</th>
<th>Baseline</th>
<th>Treatment Week One</th>
<th>Treatment Week Two</th>
<th>Treatment Week Three</th>
<th>Posttest</th>
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Checklists. Reliability was gathered for the Specific Events Chart. During a shift, in addition to requesting that the forms be completed by the charge nurse, a senior nurse was asked to complete each form as well. However, the senior nurse was, in every instance, assigned to one bedspace and rarely had the opportunity to have access to the general activities of the unit for that shift. The non-charge nurse, therefore, was typically unaware of transfers, admissions, and the illness status of each patient, information that the charge nurse was expected to have and which was critical to her routine. Often the non-charge nurses who were asked to fill out the checklists would point out that, having spent the shift assigned to one patient, they could at best estimate checklisted information, but that their estimates should be reviewed with caution.

Reliability was conducted on nine occasions. For the Specific Event Chart (Table 5), an agreement was defined as both nurses indicating that the event had occurred with whether or not they agreed concerning the frequency of the event. If both nurses scored on agreement for Admissions, then an agreement was rated, even if one nurse scored the occurrence of one admission and the second nurse scored the occurrence of two admissions.

Table 5 shows the reliability scores for the Specific Event Chart. Shift (day) scores ranged from 67% to 100% and category scores ranged from 56% to 100%.
Table 5
The Total Interobserver Reliability Scores for each Category on the Specific Event Chart

<table>
<thead>
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<th>Event</th>
<th>Reliability score</th>
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<td>Transfers</td>
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<tr>
<td>Admissions</td>
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<tr>
<td>Medical/Surgical Rounds</td>
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<tr>
<td>Nursing Rounds</td>
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CHAPTER III
RESULTS

The SCL-90-R

The mean number of total symptoms reported (PST) for the entire group was 34.18, indicating that less than half of the possible 90 items that could be rated as problematic were scored (Table 6). The treatment group averaged the highest number of scored symptoms ($\bar{X}=41.08$) and physicians departed most from the group mean, reporting the lowest number of symptoms ($\bar{X}=12.2$). Senior nurses, on the average, reported fewer symptoms ($\bar{X}=24.29$) than junior ($\bar{X}=36.44$), new ($\bar{X}=37.2$), and parttime nurses ($\bar{X}=39.72$). Forty-four of forty-nine participants in the study (90%) who completed self-report packages were nurses. The one-way analysis of variance conducted between the six groups indicated a moderately significant difference between group means ($p < .049$).

The Global Severity Index (GSI), indicating the total number and intensity of symptom reporting (i.e., including in its calculation whether an item received either a 1, 2, 3, or 4 rating), was highest for parttime ($\bar{X}=.833$) and treatment group ($\bar{X}=.759$) nurses, and lowest for physicians ($\bar{X}=.156$) and senior nursing staff ($\bar{X}=.351$). Mean intensity of symptom reporting for junior ($\bar{X}=.709$) and new nursing staff ($\bar{X}=.632$) were fairly similar. Mean severity of symptom reporting of new nurses, in fact, closely approximated the mean for the entire group ($\bar{X}=.634$). The one-way analysis of variance showed no significant difference between groups.
Table 6
The SCL-90-R Category and Global Index Mean and Standard Deviation Scores for Each Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Somatization</th>
<th>Obsessive-Compulsion</th>
<th>Interpersonal Sensitivity</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Hostility</th>
<th>Phobic Anxiety</th>
<th>Paranoid Ideation</th>
<th>Psychoticism</th>
<th>Total (T)</th>
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</thead>
<tbody>
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<td>Original Women (N=7)</td>
<td>.652</td>
<td>.306</td>
<td>.487</td>
<td>.554</td>
<td>.542</td>
<td>.536</td>
<td>.326</td>
<td>.367</td>
<td>.344</td>
<td>.285</td>
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<td>.515</td>
<td>.592</td>
<td>.543</td>
<td>.543</td>
<td>.379</td>
<td>.396</td>
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<td>.293</td>
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<tr>
<td>New Women (N=7)</td>
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<td>.408</td>
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<td>.560</td>
<td>.347</td>
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<td>.312</td>
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<td>.500</td>
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<td>.509</td>
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<td>.509</td>
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<td>.555</td>
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<td>.525</td>
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The Positive Symptom Distress Index (PSDI), measuring the average intensity of symptom reporting, did not approach an average rating of two for any of the groups (with one denoting the least intense rating any item can receive), suggesting that the magnitude or intensity of symptoms, when reported, was not especially problematic. Average intensity of symptom reporting was highest for part-time nurses ($\bar{X}=1.64$) and treatment nurses ($\bar{X}=1.56$) and lowest for physicians ($\bar{X}=1.14$) and senior nurses ($\bar{X}=1.29$). Mean scores for new nurses ($\bar{X}=1.47$) and junior nurses ($\bar{X}=1.54$) approximated the group mean ($\bar{X}=1.48$). Differences between group means were not significant.

Physicians and senior nursing staff reported fewer and overall less intense symptoms than any other group. Further, the average scores of physicians and senior nurses typically fell below the group average.

Comparing each of the nine dimensions, means for the entire staff were highest for the Obsessive-Compulsive ($\bar{X}=.866$) and Interpersonal Sensitivity ($\bar{X}=.829$) dimensions; and lowest for the categories Phobic Anxiety ($\bar{X}=.266$) and Psychoticism ($\bar{X}=.338$) (Table 9). Items comprising Depression ($\bar{X}=.779$), Paranoid Ideation ($\bar{X}=.627$) and Anxiety ($\bar{X}=.626$) dimensions were also frequently scored by staff. Bodily difficulties reflecting the Somatization category ($\bar{X}=.6$) and expressions characterizing the Hostility dimension ($\bar{X}=.555$) were less often cited by staff as problematic.

Table 7 shows mean and standard deviation scores for ICU personnel and a normative sample of nonpatients. ICU staff, though obviously a much smaller sample than the group of nonpatient normals cited in
Table 7
The SCL-90-R Mean and Standard Deviation Scores for ICU and Nonpatient Groups

<table>
<thead>
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<th>ICU Personnel(N=49)</th>
<th>Nonpatients(N=974)</th>
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<td></td>
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<td>$\sigma$</td>
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<td>.728</td>
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<td>.684</td>
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<td>.521</td>
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<td>.473</td>
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<td>.365</td>
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<td>.487</td>
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</table>

Note: GSI = Global Severity Index; PSDI = Positive Symptom Distress Index; PST = Positive Symptom Total
the table, nonetheless showed higher mean scores for each symptom dimension than the normative sample. Notable were the mean number of symptoms reported by ICU staff ($\bar{X}=34.18$), as well as the staff's response to items reflecting obsessiveness, marked sensitivity during interpersonal communication, depression, paranoid thoughts, and nervousness and apprehension. With somatic items inhering in the Anxiety and Depression categories, somatic difficulties may be more prevalent among staff than the Somatization dimension indicates ($\bar{X}=.6$). The PSDI group mean score ($\bar{X}=1.48$) approximated the normative mean ($\bar{X}=1.32$); ICU staff may have typically reported more symptoms, but the intensity of the symptoms reported did not differ very considerably from the symptom intensity reported by the larger comparison group. Psychoticism and Phobic Anxiety contained items least frequently scored by both samples.

Treatment nurses ($\bar{X}=1.08$) and parttime nurses ($\bar{X}=1.075$) provided the highest mean ratings for items comparing the Obsessive-Compulsive dimension (Table 6), followed by junior ($\bar{X}=0.939$) and new $\bar{X}=0.9$ nursing staff. Obsessive-Compulsive scores were generally characteristic of index means, with treatment and parttime staff reporting either a higher frequency or symptoms or a more intense symptom constellation, with junior and new staff closely approximating the overall group mean ($\bar{X}=0.866$), and senior nursing ($\bar{X}=0.486$) and physicians ($\bar{X}=0.260$) rating items least frequently and/or least intensely. Both junior and new staff, however, scored above the group mean. A one-way analysis of variance indicated that mean differences between groups were not statistically significant.
The trend in staff response was much the same for the category Interpersonal Sensitivity, the dimension receiving the second highest rating among the entire staff. Physicians (X=.198) and senior staff (X=.483) rated items in this category least often and intensely, and parttime (X=1.111) and treatment nurses (X=.978) most often and intensely. Junior nurses (X=.911) scored above the group mean (X=.911), but new staff scores (X=.822) fell just below the group average. Group differences were not significant.

Parttime and new nursing staff scored Depression items, on the average, with at least a one rating (X=1.014). Junior staff (X=.874) and treatment nurses (X=.808) also showed high scores on Depression items. Each group mentioned scored above the group mean (X=.779). Characteristically, physicians (X=.216) and senior nurses (X=.473) showed less reactivity to Depression items. Mean differences between groups did not exceed required alpha levels.

Paranoid Ideation was one of two categories that physicians found to characterize themselves not at all (X=0). Senior staff scored slightly higher (X=.381) than new staff (X=.366), but both groups rated items in this category less often than treatment (X=.886) and parttime staff (X=.912). The response of junior staff (X=.617) closely approximated group behavior (X=.627). Differences between groups were not significant.

Parttime staff (X=.836) were most responsive to Anxiety symptoms, with treatment (X=.7), junior (X=.697) and new staff (X=.66) each yielding similar mean scores and approximating the group value (X=.626).
The trend persisted, however, with senior nurses ($\bar{X}=.386$) and physicians ($\bar{X}=.16$) producing the lowest scores. Again, group mean differences did not approach significance.

The group mean for the category, Somatization, was $\bar{X}=.6$. Four of the groups fell below the group average, with physicians ($\bar{X}=.2$) and senior nursing ($\bar{X}=.294$) reporting the least number or intensity of somatic difficulties, followed by new nurses ($\bar{X}=.466$) and the treatment group ($\bar{X}=.569$). Junior staff ($\bar{X}=.788$) and parttime nurses ($\bar{X}=.917$) gave somatic items the highest ratings between groups. Group differences did not exceed significance levels.

On the category, Hostility, three groups surpassed the group mean ($\bar{X}=.555$): treatment ($\bar{X}=.662$), parttime ($\bar{X}=.651$), and senior nursing ($\bar{X}=.594$). Among the lowest scores were junior staff ($\bar{X}=.531$), new nurses ($\bar{X}=.458$) and physicians ($\bar{X}=.166$). Differences between group means were not significant.

The group mean for the category, Psychoticism, was fairly low ($\bar{X}=.338$). Physicians ($\bar{X}=.060$) and senior nurses ($\bar{X}=.086$) provided the lowest scores, and treatment staff ($\bar{X}=.497$) and junior nurses ($\bar{X}=.513$) the highest scores. New staff ($\bar{X}=.2$) also scored below the group average and, atypically, parttime staff ($\bar{X}=.373$) approximated the group average most closely. A one-way analysis of variance indicated no significant difference between groups.

Parttime nurses ($\bar{X}=.273$) best reflected the group average ($\bar{X}=.266$) for the category, Phobic Anxiety. New staff, when compared with the other groups, scored highest in this category ($\bar{X}=.458$), followed by
treatment staff ($\bar{X}=.377$), junior staff ($\bar{X}=.310$) and parttime nurses ($\bar{X}=.273$). Phobic Anxiety was the second of two dimensions in which physicians reported all respective items as not problematic. As with each previous symptom dimension, differences between group means were insignificant.

The Stressor Inventory

The items comprising each of the categories can be found in the Appendix. Examining first the response of the entire group (Table 8), the category rated most problematic was Patient Care ($\bar{X}=2.002$). Staff also gave high ratings to questions related to Ethics ($\bar{X}=1.976$) and Unit Management ($\bar{X}=1.937$). Work Variables ($\bar{X}=1.922$) and Knowledge Base ($\bar{X}=1.844$) received fairly high rankings as well. Least problematic for the staff overall were Communication ($\bar{X}=1.691$) and Architecture ($\bar{X}=1.556$) items.

Comparing groups on each stressor category, there were small differences; none of the differences, however, approached statistical significance.

New nursing staff rated Patient Care most problematic among staff ($\bar{X}=2.4$), as did treatment staff ($\bar{X}=2.102$) and junior nurses ($\bar{X}=2.086$). Senior nurses rated Patient Care items higher than both parttime nurses ($\bar{X}=1.818$) and physicians ($\bar{X}=1.8$).

Ethical issues (Ethics) received highest scores from treatment staff ($\bar{X}=2.18$), junior nurses ($\bar{X}=2.0$), and new nurses ($\bar{X}=2.0$). Scores for parttime nurses ($\bar{X}=1.98$) and physicians ($\bar{X}=1.84$) did not differ very much; senior nurses ($\bar{X}=1.66$) rated Ethics items the lowest among the groups.
Table 8

The Stressor Inventory Mean and Standard Deviation Scores for Each Group.

<table>
<thead>
<tr>
<th>Staff</th>
<th>Knowledge Base</th>
<th>Communication</th>
<th>Work Variables</th>
<th>Patient Care</th>
<th>Architecture</th>
<th>Unit Management</th>
<th>Ethics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{x}$</td>
<td>$\sigma$</td>
<td>$\bar{x}$</td>
<td>$\sigma$</td>
<td>$\bar{x}$</td>
<td>$\sigma$</td>
<td>$\bar{x}$</td>
</tr>
<tr>
<td>Treatment Nurses</td>
<td>1.429</td>
<td>.418</td>
<td>1.766</td>
<td>.507</td>
<td>1.883</td>
<td>.463</td>
<td>1.873</td>
</tr>
<tr>
<td>Junior Nurses</td>
<td>1.889</td>
<td>.707</td>
<td>1.873</td>
<td>.394</td>
<td>1.859</td>
<td>.391</td>
<td>2.086</td>
</tr>
<tr>
<td>New Nurses</td>
<td>2.267</td>
<td>.435</td>
<td>1.600</td>
<td>.310</td>
<td>1.945</td>
<td>.285</td>
<td>2.400</td>
</tr>
<tr>
<td>Part-time Nurses</td>
<td>1.818</td>
<td>.621</td>
<td>1.699</td>
<td>.599</td>
<td>1.884</td>
<td>.479</td>
<td>1.818</td>
</tr>
<tr>
<td>Physicians</td>
<td>1.600</td>
<td>.365</td>
<td>1.229</td>
<td>.278</td>
<td>1.927</td>
<td>.547</td>
<td>1.800</td>
</tr>
<tr>
<td>Treatment Group</td>
<td>2.000</td>
<td>.696</td>
<td>1.738</td>
<td>.412</td>
<td>2.015</td>
<td>.533</td>
<td>2.102</td>
</tr>
<tr>
<td>Entire Group</td>
<td>1.844</td>
<td>.617</td>
<td>1.691</td>
<td>.466</td>
<td>1.922</td>
<td>.448</td>
<td>2.002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The treatment group found Unit Management items most problematic ($\overline{X}=2.108$), followed by, in fact, the groups of nurses constituting the treatment group, senior nurses ($\overline{X}=2.09$), new nurses ($\overline{X}=2.08$), and junior nurses ($\overline{X}=1.9$). Parttime nurses ($\overline{X}=1.78$) and physicians ($\overline{X}=1.58$) reported the least difficulty with Unit Management items.

Treatment staff gave Work Variables the highest rating ($\overline{X}=2.02$). The scores for the remaining groups were highly similar. New nurses ($\overline{X}=1.95$) and physicians ($\overline{X}=1.93$) gave the next highest ratings, followed by parttime nurses ($\overline{X}=1.88$), senior nurses ($\overline{X}=1.88$) and junior nurses ($\overline{X}=1.86$).

Knowledge Base items were most problematic for new nursing staff ($\overline{X}=2.27$) and least problematic for senior nursing staff ($\overline{X}=1.43$). Indeed, the score for senior nurses was lower than that of physicians ($\overline{X}=1.6$). Treatment group nurses ($\overline{X}=2.0$) rated this category higher than both junior ($\overline{X}=1.89$) and parttime nurses ($\overline{X}=1.82$).

Staff showed considerable commonality in addressing Communication items. Physicians rated Communication items least problematic ($\overline{X}=1.23$), whereas junior nurses scored these items the highest ($\overline{X}=1.87$). The other groups scored the items much the same: senior nurses topped the remaining groups of nurses ($\overline{X}=1.78$), followed by the treatment group ($\overline{X}=1.74$), parttime nurses ($\overline{X}=1.69$), and new nurses ($\overline{X}=1.6$).

Architecture items, similarly, did not evoke much difference between groups. New nurses ($\overline{X}=1.5$) and physicians ($\overline{X}=1.5$) were most pleased with the setting's physical features, but parttime nurses ($\overline{X}=1.52$), senior nurses ($\overline{X}=1.55$) and treatment staff ($\overline{X}=1.57$) were
Similarly satisfied. Junior nurses gave Architexture items the highest rating ($\bar{X}=1.64$).

The Zung Depression Scale

The mean score for the entire group was 36.39. This yields an index score of 45, indicating that the group had 45% of the depression that can be measured by the questionnaire. Junior staff expressed the highest depression score ($\bar{X}=40.68$) (see Table 9), followed by new nursing staff ($\bar{X}=39.2$). Physicians rated themselves least depressed ($\bar{X}=27.87$) despite giving depression a high rating among the symptom dimensions of the SCL-90-R -- a "high rating" used here should be understood as a higher rating for depression on the SCL-90-R compared with other SCL-90-R dimensions, but not compared with the ratings obtained for the other groups on this dimension. Parttime nurses ($\bar{X}=37.36$) and treatment staff ($\bar{X}=37.22$) ranked just below junior nurses and new nurses. Senior nurses indicated less depression than all other nursing groups ($\bar{X}=32$); further, consider that the senior nursing scores deviate only minimally from the mean score for that group (S.D. = 1.41). Differences between group means were significant at the .05 level.

The Affect Scale

On a scale measuring 10 centimeters, the mean score for positive items was 5.422, and for negative items 3.55. New staff ($\bar{X}=6.475$) and physicians ($\bar{X}=6.2$) showed the highest positive-item ratings, followed by senior nurses ($\bar{X}=5.35$), junior nurses ($\bar{X}=5.24$), and parttime nurses
Table 9

The Zung Depression Scale Mean, Standard Deviation, and Index Scores for each Group

<table>
<thead>
<tr>
<th>Category</th>
<th>X</th>
<th>σ</th>
<th>SDS Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Nurses (N=7)</td>
<td>32.000</td>
<td>1.414</td>
<td>40</td>
</tr>
<tr>
<td>Junior Nurses (N=9)</td>
<td>40.667</td>
<td>10.677</td>
<td>51</td>
</tr>
<tr>
<td>New Nurses (N=5)</td>
<td>39.200</td>
<td>7.950</td>
<td>49</td>
</tr>
<tr>
<td>Parttime Nurses (N=11)</td>
<td>37.364</td>
<td>7.487</td>
<td>46</td>
</tr>
<tr>
<td>Physicians (N=5)</td>
<td>27.874</td>
<td>4.368</td>
<td>35</td>
</tr>
<tr>
<td>Treatment Nurses (N=12)</td>
<td>37.224</td>
<td>7.937</td>
<td>46</td>
</tr>
<tr>
<td>Entire Group (N=49)</td>
<td>36.389</td>
<td>8.199</td>
<td>45</td>
</tr>
</tbody>
</table>
Treatment staff expressed the lowest positive affect ratings ($\bar{X}=5.23$). Negative affect self-ratings were lowest for physicians ($\bar{X}=4.99$) and new nurses ($\bar{X}=2.54$), and highest for junior nurses ($\bar{X}=4.16$) and the treatment group ($\bar{X}=4.02$). Senior ($\bar{X}=3.17$) and new nurses ($\bar{X}=3.035$) approximated the group average.

Differences between positive affect and negative affect were obtained. A large value indicated that the magnitude of difference between positive items and negative items was considerable and weighted in the direction of positive affect. Subtracting the average negative affect score from the average positive affect score yielded the largest differences among physicians (3.66) and new nurses (3.44) and the smallest differences among the treatment group (.979) and junior nurses (1.09). Senior nurses (1.88) and parttime nurses (1.96) approached the average difference score for the entire group (1.872). The group score suggests that, on the average, and on the day that staff completed the inventory packet, positive-laden items were scored approximately two units higher than negative laden items.

A one-way analysis of variance was conducted to test for significance between groups on both positive and negative items. Group differences did not approach statistical significance for either positive or negative affect items.

**Self-Report Data: Correlational Analyses**

Pearson Product Moment Correlational Analyses were conducted. Scores on the Affect Scale indicated a moderately positive association among
negative items, with an r ranging from +.44 to +.65, with each of the coefficients proving to be highly significant. Positive items were also positively correlated, with a range from +.33 to +.56, and the majority of coefficients proving to be significant.

Items on the Stressor Inventory showed correlations were positive, ranging from +.13 to +.68. The highest correlations occurred between Work Variables and Unit Management items (+.68) and Work Variables and Communication items (+.63). The lowest correlations occurred between Communication and Knowledge Base items (+.13) and Knowledge Base and Architecture items (+.22). Most coefficients exceeding +.30 were statistically significant.

The entire range of correlations between the SCL-90-R and the Stressor Inventory were positive, ranging from +.04 (Somatization and Unit Management) to +.47 (Somatization and Communication). Most correlation scores, however, approximated an r ranging between +.20 and +.35. The majority of coefficients did not approach statistical significance.

The SCL-90-R was more highly correlated with both the Affect and Zung scales. Items on the SCL-90-R generally indicated a positive association with negative affect items, and a moderately negative relationship between positive affect items. Symptom reporting (PST) and negative affect were strongly correlated (+.64), as were global symptom severity (GSI) and negative affect (+.60). The most significant negatively related relationships were between Phobic Anxiety and positive affect (-.43) and GSI and positive affect (-.42).
The Zung was also significantly correlated with the SCL-90-R, with coefficients ranging from +.42 (Zung and Hostility) to +.68 (Zung and GSI). Highly correlated with the Zung were items comprising the following dimensions: PST (+.67), Phobic Anxiety (+.66), Depression (+.64), Obsessive-Compulsive (+.62), Anxiety (+.61), Interpersonal Sensitivity (+.61), and Psychoticism (+.60).

Correlations among Zung, Affect and Stressor items showed the following: the Zung and negative affect items were significantly correlated (r= +.63) as was the Zung and positive affect items (r= -.58). Negative affect was minimally positively correlated with Stressor items, with the highest correlation between negative affect and Communication (+.51). Positive affect items were in each instance negatively correlated with Stressor categories; the highest correlations were between positive items and Knowledge Base (-.37), Work Variables (-.36), and Communication (-.36).

**Observational Data**

There were a total of 273 trips (observations) taken during the 40 days that the study was conducted. Table 10 indicates the number of observations conducted on a weekly basis, and the total number of

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*The data obtained and analyzed were voluminous in amount. This was particularly the case with observational and cardiologic measures. Therefore, a selective sample of observational and cardiologic data in the manuscript provides the reader with a representative survey of the project's large data base. The data presented do not comprise an exhaustive representation. Nonetheless, detailed methodological information was included in the manuscript to give the reader a comprehensive understanding of the manner in which the study was conducted and evaluated.*
Table 10

The Total Number of Observations Conducted for Each Week and Broken Down for Each Shift, and the Total Number of Observational Minutes Compiled Across Weeks.

<table>
<thead>
<tr>
<th>Phase</th>
<th># Days</th>
<th># Observ.</th>
<th># Observ. Day Shift</th>
<th># Observ. Evening Shift</th>
<th>Total # of Observ. Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation</td>
<td>6</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>619</td>
</tr>
<tr>
<td>Baseline</td>
<td>9</td>
<td>68</td>
<td>35</td>
<td>33</td>
<td>888</td>
</tr>
<tr>
<td>Treatment I</td>
<td>5</td>
<td>32</td>
<td>18</td>
<td>14</td>
<td>370</td>
</tr>
<tr>
<td>Treatment II</td>
<td>7</td>
<td>42</td>
<td>21</td>
<td>21</td>
<td>477</td>
</tr>
<tr>
<td>Treatment III</td>
<td>7</td>
<td>40</td>
<td>21</td>
<td>19</td>
<td>493</td>
</tr>
<tr>
<td>Posttest</td>
<td>6</td>
<td>41</td>
<td>20</td>
<td>21</td>
<td>529</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>40</td>
<td>273</td>
<td>140</td>
<td>133</td>
<td>3376</td>
</tr>
</tbody>
</table>
observational minutes compiled weekly. Since each bedspace was observed for one minute, each observation equaled one bedspace; therefore, during the Adaptation week, 619 observational minutes compiled indicates that 619 individual bedspaces were observed across both shifts. The number of observations conducted during the day shift and the evening shift, respectively, were also included in Table 10. Table 11 shows the distribution of observations on an hourly basis. During the course of the study, observations were conducted from 7 a.m. through 8 p.m.; however, the majority of observations took place between 9 a.m. and 7 p.m.

Figure 1 shows the ratio of Person Proximity frequency to the total number of bedspaces rated in the study. Nurses were observed in bedspaces in over half of the intervals (56.1%), followed by parents (41.6%), nurses-parents (22.5%), physicians (16.9%), and medical support staff (13.5%).

The percentage of physicians and medical support personnel observed in bedspaces was fairly even; nurses were present in bedspaces more often than physicians and medical support staff. Parents were more often present in bed areas than either physicians or medical support staff. Personnel were identifiable throughout the study, as the negligible frequency of the category, Unknown, testifies.

Two-person proximity scores indicated that nurses and parents were most frequently paired in bedspaces, followed by physicians and nurses, and nurses with medical support staff. Pairings between staff and parents, in fact, occurred more often than physician-medical support staff proximity.
Table 11

The Total Number of Observations Conducted on an Hourly Basis

<table>
<thead>
<tr>
<th>Hour</th>
<th># Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 a.m. - 8 a.m.</td>
<td>3</td>
</tr>
<tr>
<td>8 a.m. - 9 a.m.</td>
<td>11</td>
</tr>
<tr>
<td>9 a.m. - 10 a.m.</td>
<td>20</td>
</tr>
<tr>
<td>10 a.m. - 11 a.m.</td>
<td>22</td>
</tr>
<tr>
<td>11 a.m. - 12 a.m.</td>
<td>23</td>
</tr>
<tr>
<td>12 a.m. - 1 p.m.</td>
<td>15</td>
</tr>
<tr>
<td>1 p.m. - 2 p.m.</td>
<td>24</td>
</tr>
<tr>
<td>2 p.m. - 3 p.m.</td>
<td>23</td>
</tr>
<tr>
<td>3 p.m. - 4 p.m.</td>
<td>19</td>
</tr>
<tr>
<td>4 p.m. - 5 p.m.</td>
<td>33</td>
</tr>
<tr>
<td>5 p.m. - 6 p.m.</td>
<td>33</td>
</tr>
<tr>
<td>6 p.m. - 7 p.m.</td>
<td>23</td>
</tr>
<tr>
<td>7 p.m. - 8 p.m.</td>
<td>18</td>
</tr>
<tr>
<td>8 p.m. - 9 p.m.</td>
<td>6</td>
</tr>
</tbody>
</table>
Figure 1

Ratio of proximity to total bedspaces.
Three-person proximity scores shows that physicians-nurses-parents were the most frequently observed triad, followed by physicians-nurses-medical support staff and nurses-parents-medical support staff. Generally, three-person and four-person proximity patterns were observed less frequently than one-person and two-person patterns.

Figure 2 shows the verbalization percentages calculated by dividing each verbalization frequency by the total number of bedspaces observed over the course of the study. Among the possible staff exchanges, the most frequent exchanges occurred between medical support and nursing (MSN=7.96%), followed by DN (7.79%), and MSD (2.75%). NP exchanges (10.19%) occurred, at least globally, more often than MSP (2.37%) and DP (2.31%). Exchanges with the patient were most frequently observed for parents (PPT=8.59%), and nurses (NPT=7.2%), followed by medical support (MSPT=2.67%) and physicians (DPT=1.07%).

Figure 3 reports the percentage of Interactions based on the number of times that each respective person was rated in proximity. The ratio interaction:person proximity indicated that physicians, when present, performed a medical interaction 84.1% of the time, with nurses scoring 85.4% and medical support 74.1%. Percentages were lower for social interactions: physicians (12.9%), nurses (23.3%), medical support (20.4%). When present, medical support staff equipment-interacted most often (21.1%), followed by nurses (19.7%) and physicians (3.1%). When present, family members physically interacted with the patient 20.1% of the time.
Figure 2

Ratio of verbalization dyads to total bedspaces.
RATIO OF VERBALIZATION DYADS TO TOTAL BEDSPACES

PERCENT OF VERBALIZATION

VERBALIZATION DYADS

DN - PHYSICIAN-NURSE
MSD - MEDICAL SUPPORT-PHYSICIAN
MSN - MEDICAL SUPPORT-NURSE
DP - PHYSICIAN-NURSE
NP - NURSE-PATIENT
MSP - MEDICAL SUPPORT-PARENT
DD - PHYSICIAN-PHYSICIAN

NN - NURSE-NURSE
PP - PARENT-PARENT
DPT - PHYSICIAN-PATIENT
NPT - NURSE-PATIENT
PPT - PARENT-PATIENT
MSPT - MEDICAL SUPPORT-PATIENT
Figure 3

Ratio of interactions to total bedspaces.
RATIO OF INTERACTIONS TO TOTAL BEDSPACES

MID - MEDICAL INTERACTION PHYSICIAN
MIN - MEDICAL INTERACTION NURSE
MIMS - MEDICAL INTERACTION MEDICAL SUPPORT
SID - SOCIAL INTERACTION PHYSICIAN
SIN - SOCIAL INTERACTION NURSE
SIMS - SOCIAL INTERACTION MEDICAL SUPPORT
EID - EQUIPMENT INTERACTION PHYSICIAN
EIN - EQUIPMENT INTERACTION NURSE
EIMS - EQUIPMENT INTERACTION MEDICAL SUPPORT
NID - NO INTERACTION PHYSICIAN
NIN - NO INTERACTION NURSE
NIMS - NO INTERACTION MEDICAL SUPPORT
FI - FAMILY INTERACTION
Overt Mood data indicated that nurses generally smiled more often. Smiling, however, was observed in fewer than 7% of the intervals in which nursing staff were observed (6.7%) and occurred at a rate of 2.1% for physicians and 1.72% for medical support staff.

Observational Data: Chi-Square Analyses

Chi-squares were performed on 2x2 and 3x2 tables to evaluate the relationship between each of the observational categories (proximity, verbalizations, interaction, smiling) and shift measures. Of the many proximity patterns and associated categories, only a few showed a systematic relation.

Reviewing the cell frequencies indicated that a significant relation was found between the proximity of physicians and shift \( (X^2=3.97, 1 \text{ df}, \text{ sig.} = .0464) \). The number of physicians present during the day shift exceeded the number of physicians present during the evening shift; further, there were more single physicians observed than multiple physicians.

The parent-shift relationship was also significant \( (X^2=8.91, 1 \text{ df}, \text{ sig.} = .0028) \): there were more parents in proximity during the day shift, and a greater number of single parents observed.

When the nurse-parent-medical support proximity triad was considered, a relation was found for parent-shift \( (X^2=8.61, 1 \text{ df}, \text{ sig.} = .0033) \), and medical support-shift \( (X^2=4.853, 1 \text{ df}, \text{ sig.} = .0276) \). More parents were present during the day shift and more single parents were observed. Similarly, more medical support were observed during the day shift and more single compared with multiple medical support staff were found in proximity.
For the category, Verbalization, a review of the physician-nurse-medical support triad indicated a relation between physician-nurse verbalization and shift ($X^2 = 6.56, 2$ df, sig. = .0377), with slightly more DN verbalizations occurring during the day shift.

Specific Events Chart

The number of patients admitted to the unit and either transferred on to or transferred off of the unit was high for each week and for each shift. During the Baseline week, there were 11 Admissions/Transfers that occurred during the day shift and 25 Admissions/Transfers that occurred during the evening shift. During Treatment Week One, the day and evening shift breakdown for the category, Admissions/Transfers, was 11 and 11; for Treatment Week Two, the breakdown was 10 and 6; for Treatment Week Three, the breakdown was 13 and 4; and for the Post-treatment Week, the breakdown was 21 and 12. There were 5 Cardiac/Respiratory Arrests during the course of the study, 3 Deaths, 54 Medical/Surgical Rounds, and 5 Nursing Rounds.

The Cardiovascular Data

Table 12 provides mean on-unit and mean off-unit ranges for six Holter-monitored participants. Participant A's (senior nurse) baseline week scores (see Fig. 4) indicate a higher mean on-unit range

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1 One representative graph is included in the manuscript.
Table 12

The Mean On-Unit Compared with Off-Unit Heart Rate Scores Expressed in Ranges for Six Holter-Monitored Participants.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Week of Study</th>
<th>On-Unit</th>
<th>Off-Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 a.m. - 3 p.m.</td>
<td>3 p.m. - 11 p.m.</td>
<td>11 p.m. - 7 a.m.</td>
</tr>
<tr>
<td>A</td>
<td>Baseline</td>
<td>-</td>
<td>100.89-117.78</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. I</td>
<td>-</td>
<td>92.22-107.56</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. III</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>-</td>
<td>88.11-102.00</td>
</tr>
<tr>
<td>B</td>
<td>Baseline</td>
<td>70.00-95.25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. I</td>
<td>67.00-93.50</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>Baseline</td>
<td>80.43-107.14</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. I*</td>
<td>85.00-112.20</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. II</td>
<td>89.50-122.00</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>Baseline</td>
<td>-</td>
<td>83.14-107.86</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. I</td>
<td>81.60-106.40</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. III</td>
<td>79.00-96.38</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>84.17-98.00</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>Baseline</td>
<td>69.75-106.63</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. I</td>
<td>-</td>
<td>70.33-100.89</td>
</tr>
<tr>
<td></td>
<td>Treat. Wk. II</td>
<td>-</td>
<td>71.78-107.36</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>82.00-111.29</td>
<td>-</td>
</tr>
</tbody>
</table>

*Transport 9 p.m.-2 a.m.; 96.40-123.40
Figure 4

On-unit vs. off-unit heart rate scores
compared with off-unit scores. The same is the case for treatment week one. Participant A's scores revealed that off-unit scores were somewhat higher when the sleep cycle is not entered into the calculations. This was characteristically the case for all participants, reducing somewhat the differences between on-unit and off-unit mean ranges. The third reading for Participant A is without an on-unit measure, since the monitoring device dropped and became dysfunctional while the nurse was at home. Off-unit scores for treatment week three approximate previous off-unit scores. The posttest week scores provide two on-unit measures; on this occasion the participant agreed to work a double shift at the end of which a lead became loosened and monitoring was discontinued. However, the unexpected double shift provided the first of two night-shift recordings. Table 12 shows that heart activity was fairly stable across the 16-hour work period. Participant A's on-unit scores declined over the three weeks during which on-unit activity was recorded. Assessing the diary indicated that medical rounds were attended between 4:45 and 5:30 p.m.: Figure 4 indicates a gradual increase in heart rate between 3:00 p.m. (receiving report) and 6:00 p.m., followed by a decline. The sharp rise in activity at 2:00 p.m. (off-unit) is associated with preparation at home for returning to work, followed by a headache in the frontalis.

Two recordings were obtained for Participant B (senior treated nurse) during the Baseline week and first treatment week. Day shift on-unit scores were slightly higher than off-unit scores (Table 12). Notable diary entries included engaging in the relaxation exercise at
home between 5:40 and 5:49 p.m. The second recording for Participant B yielded elevated on-unit scores during the initial hours of the work shift with a gradual decline in activity over the course of the shift. On-unit scores during both recordings were fairly stable.

Participant C (senior treated nurse) was monitored on three occasions. The first two weeks comprised day-shift scores. Baseline week on-unit scores were higher than off-unit scores, whether or not sleep scores were included. Treatment week one scores, however, showed higher on-unit scores compared with off-unit scores only when sleep scores were included in off-unit averages. The participant was called out on an emergency ambulance transport between the hours of 9:00 p.m. and 2:00 a.m. An hour by hour analysis revealed that mean transport scores were highest during this period compared with all other scores for Participant C. The last reading for C took place during the second treatment week, on the evening shift. The evening shift on-unit range was higher than off-unit scores and was also higher than previous day shift on-unit scores. Treatment week one scores included a relaxation exercise (conducted on the unit at 4:00 p.m. after the nurse had completed her shift) that comprised the lowest off-unit score, and the transport scores, occurring between 9:00 p.m. and 2:00 a.m., generally showing higher activity rates than on-unit scores for the same date. The 3:00 p.m. score (report) for Treatment week one showed a slight increase from the previous hour, and is followed by a second on-unit relaxation score (at 4:15 p.m.), in which heart rate activity showed a slight decrease.
There were four recordings for Participant D (new treated nurse). During the Baseline week recording, the participant worked a double shift, rendering a night shift measure. Similar to Participant A, the night shift scores were somewhat lower than the evening shift scores. Subsequent on-unit scores, all of which took place during the day shift, were slightly higher than off-unit scores.

Four recordings were obtained for Participant E (new nurse); two day shift and two evening readings. The day shift readings (Baseline and Posttest weeks) were both higher during on-unit compared with off-unit. However, off-unit scores assessed without the sleeping cycle indicated higher upper-end scores for the two day shift scores. The two evening shift scores (Treatment weeks one and two) were higher during on-unit activity compared with off-unit readings. With the exception of the Posttest week, on-unit activity was fairly stable.

The Relaxation Measure

Four of the staff had previous training in muscle relaxation. Staff practiced a total of 22 times outside the sessions. There were a total of four practices following the first session, seven practices following the second session, five practices after the third session, 4 practices after the fourth session, and two practices following the fifth session.

Statistical tests were based on data from 71 cases, as one of the participants was not able to complete a six session. The mean Before
Relaxation response across the six sessions was 7.38 and the mean after Relaxation response was 3.53. The T-value with 70 degrees of freedom was 11.69, a value significant at the alpha level of .001.

Comparisons Between the Treatment Group and the Control Group

Two-way analyses of variance were conducted between the relaxation group and control group on each of the dimensions comprising the SCL-90-R, Zung and Affect Scales. Pretreatment and posttreatment means indicated that posttreatment value for the relaxation group increased on three symptom dimensions (Somatization, Depression, Hostility). Further, the relaxation group's GSI score increased, as well as the total number of symptoms reported (PST). Interestingly, all post-treatment means for the Control group decreased. One main effect (prepost) was found to be significant, for the category, Phobic Anxiety, and one interaction was determined to be significant at the .05 level, for Somatization. As noted above, however, the Relaxation group showed a mean posttreatment increase in somatic symptomatology.
Self-Report Data

The mean number of total symptoms reported (PST) varied significantly between groups. Although group differences were moderate, such differences likely reflected the influence of time on-unit and the qualities of work responsibilities. Senior staff (nurses who had worked on the unit the longest) reported the fewest number of symptoms. Physicians reported low PST scores also. Though many unit physicians had been on the unit only a brief time, they had in common with senior nursing more authority and decision-making powers. Senior staff and physicians were freer to manipulate the setting and/or their individual reactions to the setting. Importantly, GST and PSDI scores were highest for parttime staff (nurses who intermittently contacted unit characteristics, where such characteristics included both stressors and support systems). The parttime group was least likely to have an opportunity to identify and categorize stressors through repeated exposure and, critically, establish and test coping methods.

Symptoms dimension group means were highest for Obsessive-Compulsive (OC), Interpersonal Sensitivity (IS) and Depression (DEP). Both OC and IS categories may reflect the high degree of visibility and accountability that inhered in the setting. The OC cluster refers to repetition, routine and vigilance, problematic issues that numerous studies have cited. Despite the largely global features of the items that make up the category OC, it nonetheless suggests a response set characterized by
repetition and concern with "correctness" in actions and decision-making. Repitition and continuous concern with one's professional actions may contribute to the experience of work strain.

The high IS cluster score may be viewed as reflecting staff interaction, the prevalence of parents in the workspace, as well as consultants, administrators and researchers. IS can be construed as staff's response to patient care and conditions, the frequent turnover of interns and residents who, though less experienced than many of the nurses on the unit, were, nevertheless, further advanced than incoming residents, and the frequent turnover of patients, as documented by the high number of admissions and transfers during the six-week period. IS perhaps best reflects the notion of communication difficulties often cited in studies describing ICU stress.

The Depression (DEP) score was notable and consistent with previous pilot work. The constancy of work, supported by the observational data, particularly medical interaction rates and proximity-interaction ratios, may contribute to depression. The imminence of the unexpected -- admissions, transfers -- that cannot be a priori controlled may also be a crucial factor. The continuous, unavoidable presence of severe illness may have been a factor, as was the prevalence of the "chronic parent", a phrase used by one of the nursing staff.

Senior staff rated Hostility items, on the average, as most problematic, the only group to do so. The category largely represents statements concerning angry feelings, irritableness, thoughts of physical violence and argumentation. Senior nurses had been on the unit the
longest, had withstood the turnover rate for a longer period than their nursing colleagues, functioned as charge nurses -- a role requiring leadership skills and decision-making responses, and had worked within rotation schedules the longest. Moreso than other staff, they had the most extensive history with the unit and its demanding properties.

Senior staff also had the opportunity, over time, to develop intensive care nursing proficiency that may well challenge the 'novice' intern or resident and, thereby, the unit's suprastructure. Senior nurses encountered and implemented diagnoses and medical procedures with severely ill patients more often than their counterparts and, by virtue of their longevity on the unit, had highly qualified medical impressions regarding patient treatment. On the Stressor Inventory, in fact, senior nurses rated Knowledge Base (MB) items as less problematic than physicians, an indication that their experience had fostered considerable medical and technological expertise. Despite such expertise, senior nurses were invariably subsumed within a traditional hospital hierarchy in which typically less (intensive-care) experienced medical staff determined treatment policies.

Like other staff, senior nurses reported obsessiveness and compulsivity to be marked in their response style and indicated a particular sensitivity to interpersonal situations. Depression and Anxiety also received high ratings among senior staff. Yet, scores on the SCL-90-R scale (Hostility is the exception) indicated that, along with physicians, senior nurses reported a symptom picture with the lowest number of symptoms. Symptoms that were reported were less intense than all other
nursing groups. They reported less depression on the SCL-90-R and the Zung than did other nursing groups and, with treatment nurses, reported somaticizations least often, including physicians. The Affect Scale scores indicated that positive and negative self-ratings among senior staff closely approximated the group average, with positive affect receiving a higher rating than negative affect.

On the Stressor Inventory, senior nurses rated Patient Care less problematic than the categories Unit Management and Work Variables. Senior nurses, eligible and active as charge nurses, had more directly to confront managerial personnel both internal and external to the unit, make immediate decisions concerning admissions, transfers and obtaining consultative services, and often determined staff scheduling and patient assignments. Unit Management (e.g., "inadequate staffing", "unavailability of physicians", "staff scheduling") and Work Variable items (e.g., "rapid decision-making", "lack of advancement opportunities") received the highest Stressor ratings among senior nurses.

Junior staff typically reflected the behavior of the entire group. The highest rated symptom dimensions reported by junior nurses were identical with the responses of staff taken as a whole. Junior nurses were similarly concerned with compulsive and obsessive behavior and were sensitive to interpersonal/situational items. As a group, they were reactive to depression and somatic items on the SCL-90-R. Depression, determined by scores on the Zung, was most pronounced among junior staff; junior nurses also reported the highest negative affect on the Affect Scale. They rated Patient Care, Ethics and Unit Management as most problematic on the Stressor Inventory.
New nursing staff were the only group who gave Depression items (SCL-90-R) the highest frequency/intensity rating compared with other SCL-90-R dimensions. Their Zung score was high as well. After SCL-90-R Depression scores, new nurses rated OC and IS as most problematic symptom areas. New staff nurses, though expressing greater depression on self-report inventories, demonstrated more than any other group on SCL-90-R dimensions scores reflecting the group mean. Their GSI (overall distress) and PSDI (symptom intensity) scores closely approximated group mean values. However, along with Depression, new staff reported the highest Phobic Anxiety ratings, and Anxiety items ranked higher among symptom dimensions for new staff than it did for any other group. Despite reports of anxiety, phobic-sensitivity, and depression, new staff gave positive affect items on the Affect Scale the highest ratings and negative affect items the lowest ratings (among nurses). On the Stressor Inventory, they ranked Patient Care items as most problematic, followed by Knowledge Base items. Among nurses and physicians, overall PC and KB items received the highest scores (most problematic) from new nurses. This is consistent with charges in the literature that current nursing curricula do not adequately prepare the recently trained nurse for intensive unit medicine. High scores on PC and KB items likely reflect the impact of severe illness and the range of information demanded by the setting. To the extent that self-reported data reflected the influence of unit properties, high anxiety and depression scores suggest the extreme visibility of the nursing role, the limited experience that the new nurse brings with her, and the lack of unit time that the new nurse has had to
adapt to, deny, or otherwise strategize to cope with unit properties.

More than other groups, junior and new nursing staff had more constricted work responsibilities (e.g., being at a bedspace for an entire shift), limited instrumental control over unit phenomena, and generally briefer time to develop and test strategies for managing the unit.

Parttime staff also rated IS and OC categories most frequently problematic, with DEP ranking third. Parttime nurses demonstrated the highest ratings for five of the nine SCL-90-R dimensions (SOM, IS, DEP, ANX, PAR) and the second-highest Zung depression score. Their overall distress level (GSI) was highest among the groups and though the treatment staff reported more symptoms (PST), the average intensity of symptom reporting (PSDI) was highest among parttime nurses. Their Affect Scale and Work Variables items were scored as most problematic. Parttime employment in the intensive care setting involved at least a few factors. First, parttime scheduling offset adjustments to shift rotations. Secondly, there were fewer opportunities for establishing and sustaining work relationships (IS items were ranked highest among SCL-90-R dimensions), and less time on the unit to build medical and coping skills. Finally, feedback may be less frequent and perhaps more inconsistent: consider that Paranoid Ideation received the highest ranking among parttime nurses than all other groups.

The treatment group showed the highest OC and HOS scores and reported the highest number of symptoms. Their overall distress index score (GSI) was second-highest. However, the group was heterogeneous, composed of senior, junior and new nurses, so that time on unit, work responsibilities, instrumental control over unit activities, and so forth
cannot be the singular indicators of treatment group scores. The treatment group expressed low positive affect and high negative affect scores on the Affect scale, and scored above the group mean Zung depression score. On the Stressor Inventory, they rated Ethics and Unit Management most problematic.

Comparisons between physicians and other groups was actually a comparison between physicians, since 'other groups' constituted nursing staff. Physicians' overall distress index score was lowest among the five groups, as was the average intensity of symptoms reported. Strikingly, in a 90-item inventory, the average number of items rated at any intensity was 12. Without exception they reported the lowest frequency/intensity on each of the symptom dimensions, and were below the group mean in every instance. Nonetheless, physicians rated OC items highest, generally in line with other groups. Although considerably below group means, physicians ranked DEP, SOM, and IS, in that order, as most problematic. Thus, while reporting less symptom frequency and intensity, physicians typically rated highest the same symptom dimension that received high ratings by nursing staff. They rated high positive affect items and gave the lowest ratings among staff to negative affect items. Most problematic were Work Variables and Ethic Issues. Their Zung depression score was lowest among staff.

While physicians had more control over unit phenomena, they were also highly responsible for diagnostic and treatment decisions. They physicians solicited in the present project included staff who had been on the unit only a brief period of time. It may be that the authority inhering
in the physicians' role may have precluded expression of psychological difficulty.

Self report findings largely support previous research. Results from the Stressor Inventory indicated the impact of patient care -- emergencies, arrests, acute illness, intrusive procedures, continuous observation, family needs, etc., unit management -- inadequate staffing, interruptions, discharges and transfers, etc., and work variables -- workload, turnover rate, task complexity, rapid decision-making, etc. as categories receiving particular attention in stressor audits conducted in other intensive care facilities. The architectural characteristics of the unit were viewed as adequate by staff, or at least less problematic than staff reaction on other units. The SCL-90-R pointed to concerns with correctness in patient care and interpersonal issues, dimensions also receiving attention in other studies. While communication received high ranking in other studies, it was rated less problematic in the present project. Nonetheless, the categories Ethics and Unit Management, which did receive high rankings, contained communication-related items ("staff conflict over treatment"; "unavailability of physicians"). Correspondingly, IS items obtained high ratings. Indeed, each of the three top-ranked Stressor categories (Patient Care, Ethics, Unit Management) have an essential interpersonal focus; such focus may be between staff, between staff and patient, or between staff and relatives of the patient.
Observational Data

It can be argued, from the proximity data in any case, that nursing staff ran the unit. They were present at bedspaces more often than other personnel and completed more unit-related medical and social activities than did other staff. However, though physicians and medical support staff were observed in bedspaces less often, the rate of productive activity (i.e., the frequency of medical interactions) was high for each respective staff member. When physicians were present, they were least likely to socially-interact and least likely to handle equipment. Medical support staff worked with the technology most often, a finding not unusual, since many medical support personnel were technicians and respiratory and occupational therapists whose particular expertise was with the existing technology. Nurses engaged more often than other staff in social (i.e., non-medically-essential) interactions. However, it should be pointed out that, apart from the psychological benefits that the patient may have received from such 'non-essential' services, social-interaction, as defined in the present study, did contain medically-related components.

Two-person proximity patterns revealed that nurses often worked in the presence of family members; indeed, nurses spent more time in bedspaces with patients' families they they did with colleagues. Families were found at bedspaces more often than physicians and medical support staff. The prevalence of parents characterized the intensive care visitation policy and created a workspace unlike general hospital wards. One report has indicated that family members may feel helpless, can be overwhelmed
by the unit's visual characteristics, may be unclear about prognosis, may be far from home, and may have financial worries (Gardner and Steward, 1978). Staff, in addition to their patient care assignment, must provide information, education and support, discuss the patient's diagnosis, unit policies, and the most effective ways to communicate with the patient.

General verbalization rates indicated that physician-nurse and nurse-medical support dialogue occurred at fairly similar rates; nurses verbalized more often with parents than their colleagues, and more often with patients.

Medical interactions were more likely to be performed than social or equipment interactions, irrespective of the proximity pattern. The no-interaction category, nearly without exception, points to the constant activity level of all staff. If a staff person was observed in a bed-space, she or he was typically (over 75% of intervals) active and appropriately engaged in some facet of patient care. This finding would certainly underscore the notion that the intensive care environment demands continuous staff activity.

Cardiovascular Data

The heart rate data showed a consistent trend: heart rate (beats per minute) was higher during on-units periods nearly without exception. The on-unit trend was especially notable when off-unit activities were taken into view. The diary format indicated that off-unit activities included driving, bicycling, walking, emotional experiences, and social entertaining. Aside from walking to and from the hospital
cafeteria, on-unit behavior could be characterized as sedentary when compared with off-unit activities.

With sinus tachycardia defined as a heart rate exceeding 100 beats per minute, many of the upper level on-unit scores exceeded tachycardia ranges (heart beats exceeding 100 bpm). Accelerated heart rate often occurred during the outset of a shift, a time when report and medical rounds were conducted. No noticeable differences can be reported between the day and evening shift; however, the two night shift readings were slightly lower than the evening shift rates that preceded them. A participant with variable on-unit scores (extreme low and extreme high scores) generally showed variability in subsequent readings, whereas stable on-unit scores were typically stable across readings.

**Relaxation Group Data**

The relaxation data indicated that the training sessions were effective in reducing immediate-tension states. The procedure, however, did not have an impact on self-reported subjective states. Either the procedure was not powerful enough to effect change, or the time-span between pretesting and posttesting was too brief to evoke changes in subjective experiences. Interestingly, mean scores increased on three dimensions among the relaxation group participants, and GSI and PST values also increased. Consider the characteristics of the intervention technique: participants received information and training to promote both self-observation and an assessment of setting cues that may elicit stress-related behavior. The relaxation group was taught to identify and systematically relax musculature-based tension, rather than avoid such
physical sensations. Each member of the treatment group also received a sheet listing the stressors that she originally rated as most problematic. In these respects, increases in symptom reporting may have reflected changes in skills necessary before physical and psychological tension could be adequately identified. Clearly, identification must precede remediation.

Conclusion

With the range of data sets available to review, simplified statements that would encapsulate the data are unlikely. The unit was an active, multifaceted domain. Response demands, illness severity, staff backgrounds, behavioral dispositions and previous training, organizational demands, the presence of families, the rapidity and frequency of patients admitted and discharged: all functioned synergistically, resulting in an intensive care unit 'gestalt'. Evidence of the interactive balance in staff actions is perhaps best noted by the verbalization and interaction patterns of nursing staff and parents: nurses were more or less interactive with parents depending on the presence of other disciplines.

The data also suggest that intensive care cannot be equated with isolated staff activity, however often staff were individually observed at bedsaces. Rather, staff activities had a transactional quality, perhaps justifying the unit 'team' concept. The team, furthermore, showed fairly stable activity patterns, as shift distinctions indicate.
Nonetheless, the unit presented characteristics that fostered high obsessive-compulsive, interpersonal sensitivity, and depression scores. Alternatively, it may be argued that intensive care medicine attracts personnel who demonstrate compulsivity, extreme sensitivity and depression before work experience on the unit. Such a proposition is worth examining in the future, but cannot be taken very far in the present study, since none of the staff completed self-report protocols before becoming employed on the unit.

Clearly, staff worked highly active shifts, as indicated by interaction rates. Personal and professional scheduling was subject to the demands of shift rotations every two weeks. The high rate of admissions and transfers supports the idea that the unit functioned at a 'high level of predictive uncertainty'. A typical shift, with numerous admissions, involved a broad range of physical symptomatology that had to be diagnosed and treated, a different family constellation that had to be addressed, and a new patient -- apart from presenting symptoms -- who was received. Staff usually were unable to follow (with the exception of the long-term leukemic patients) the progress of patients who were on the unit for only brief periods. Somewhat paradoxically, staff who were accustomed to the acute-treatment focus of the unit were less likely to prefer contact with longterm, often irreversibly ill patients.

Staff activity was highly visible -- families, consultants, supportive staff, researchers, and medical trainees could often be observed on the unit. Breaks were infrequent, staff's ethical positions were occasionally
tested with the most severely ill patients primarily surviving on life-support machiners, and staff were occasionally requested to work 16-hour shifts to fill in for personnel calling in sick. If a unit 'team' existed, disruptions in it (e.g., staff scheduling) had a ripple effect on other members of the team. The amount, or range of knowledge required was problematic for new nursing staff, perhaps reflecting the need for curriculum changes. Clearly, the way that the unit was managed was problematic for staff who had been on the unit the longest; such staff had more authority and more contact with managerial staff. Architecturally, however, the unit generally received positive ratings.

The heart rate data provide clear evidence that the unit demanded an active and stable reaction from staff that exceeded the multiple demands of environments outside the hospital. Rates were often accelerated during the beginning of shifts and showed declines following rounds and reports.

Future research must consider the relation between depression and employment on the unit and especially the impact of repetition and continuous activity. Heart rate monitoring should be limited to one or two participants who can be minutely tracked on a day-to-day basis, with immediate stimulus-response patterns recorded. Qualitative or content analyses of verbalizations would be useful, to discriminate between medical compared with non-medical exchanges. An analysis of coping strategies would be productive. With stressors quantitatively determined, staff could list the strategies that they have used to manage such events.
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APPENDIX
Appendix A

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There have been many reports (over 300 articles) that have indicated that intensive care units - pediatric, coronary, dialysis, burn, surgical, etc. - are "stressful" places in which to work. Most of these reports, unfortunately, have been descriptive, and have not been based on sound experimental work.

A "stress study" implies that someone is experiencing stress; you may or may not be feeling any. Or, the stress that you feel may not be continuous, but periodic instead. On the other hand, one of your colleagues may have a different reaction to the demands of the Unit.

In any case, a rigorous study of the intensive care setting, along subjective, physiological and behavioral dimensions, has really not been done, and the medical community can only benefit from the findings of the present study. The study that is presently being conducted on the unit is especially concerned with intensive unit work patterns, interactions, and patient status.

To gather such information involves some cost to you. It means being observed for the next four or five weeks and filling out this packet. I know that you don't have much spare time; however, the entire packet should only take between 10-15 minutes to complete. I will ask you to fill out the packet one more time, but the Stressor Inventory will not be included the second time around. That is basically all the paper work that is necessary during the course of the study. So as to get an entirely personal reaction to the packet, it would be best if you filled out the packet on an individual basis.

Over the next 3 weeks I will be providing a progressive muscle relaxation technique to a group of nurses. We have essentially divided all full-time staff into two groups based on a random selection process. One group will go through the relaxation training, and the other group will not. As you probably know, this is done to best estimate whether the procedure is at all effective. So that the group going through the training can be distinctive from the group that isn't, if you are in the relaxation group please refrain from discussing the procedure with others. We will meet three times a week, for three weeks, in small groups, as scheduling allows. Each meeting will take about 15 minutes, except the first meeting, which will run a little longer since the procedure must first be demonstrated. At the end of the study, I will schedule times to meet with anyone who was not a part of the initial training, but would like to learn the procedure.

Just as relaxation groups were randomly selected, six nurses (three nurses new to the Unit, and three nurses who have worked on the unit for some time) have been similarly selected and asked to wear Holter monitors once per week for the five weeks that the study will be in effect.

Each intake form has a code # that identifies your completed materials and is used to preserve anonymity in looking over the information that you provide us. Completed packets can be placed in a box (labeled "ICU Stress Study") that is located in the coffee room. If you could, please return the packet by Friday, August 6th.

Your time and participation is very much appreciated. Thank you.

Dave DeMaso, M.D.
Bruce Masok, Ph.D.
Bob Ciulla
This is the final week of the stress study! The next step is to analyze the physiological, behavioral and subjective information that was (and is being) collected. We anticipate that data analyses will generate comprehensive statements concerning Unit phenomena, forming the basis for a presentation to the staff. Hopefully, a thorough data analysis can be completed in the next couple of months.

The postpacket accompanying this letter contains some of the forms that were included in the prepacket. The packet should take about 10 minutes to complete. Again, in order to get an entirely personal reaction to the packet, it would be best if you filled it out on an individual basis. As with the prepacket, completed packets can be placed in the box labeled "ICU Stress Study" that is located in the coffee room. If you could, please return the packet by Friday, September 3rd.

If anyone who was not in the initial relaxation training group would like to learn the procedure please let me know, and we can arrange times to meet.

We would like to express our gratitude to all of you who at some time or other filled out packets and forms, and were either observed, Holtered or relaxed. Or all of the above. That a study of this magnitude ran so smoothly is testimony to the considerable efforts of everyone. Your help, participation, and time devoted have been genuinely appreciated. Thank you!

Dave DeMaso, M.D.
Bruce Masek, PH.D.
Bob Ciulla
Appendix C

INTAKE INFORMATION

Please fill in the blank space below, and draw a circle around your answer where needed.

Your Name: ______________________________________
Your Age: ___________________
Your Sex: Male    Female
Marital Status: Single    Married    Divorced    Separated
Education (include any present school: )

Specific ICU position (ie., senior staff nurse, 1st year resident, etc):

Length of time working in ICU: ______________________

Your code # is: ________
Appendix D

JOHNS HOPKINS CHECKLIST

Code #
Date ______
Shift ______

INSTRUCTIONS: Below is a list of problems and complaints that people sometimes have. Read each one carefully and select one of the numbered descriptors that best describes HOW MUCH DISCOMFORT THAT PROBLEM HAS CAUSED YOU DURING THE PAST THREE MONTHS INCLUDING TODAY. Circle that number to the right of the problem. Do not skip any items. If you change your mind, erase your first response and circle some other number. Read the example below before beginning, and feel free to ask any questions that you may have.

DESCRIPTORS: 0 Not at all 1 A little bit 2 Moderately 3 Quite a bit 4 Extremely

Example - How much were you distressed by: Body Aches

1. Headaches 0 1 2 3 4
2. Nervousness or shakiness inside 0 1 2 3 4
3. Repeated unpleasant thoughts that won't leave your mind 0 1 2 3 4
4. Faintness or dizziness 0 1 2 3 4
5. Loss of sexual interest or pleasure 0 1 2 3 4
6. Feeling critical of others 0 1 2 3 4
7. The idea that someone else can control your thoughts 0 1 2 3 4
8. Feeling others are to blame for most of your troubles 0 1 2 3 4
9. Trouble remembering things 0 1 2 3 4
10. Worried about sloppiness or carelessness 0 1 2 3 4
11. Feeling easily annoyed or irritated 0 1 2 3 4
12. Pains in heart or chest 0 1 2 3 4
13. Feeling afraid in open spaces or on the streets 0 1 2 3 4
14. Feeling low in energy or slowed down 0 1 2 3 4
15. Thoughts of ending your life 0 1 2 3 4
16. Hearing voices that other people do not hear 0 1 2 3 4
17. Trembling 0 1 2 3 4
18. Feeling that most people cannot be trusted 0 1 2 3 4
19. Poor appetite 0 1 2 3 4
20. Crying easily 0 1 2 3 4
21. Feeling shy or uneasy with the opposite sex 0 1 2 3 4
22. Feelings of being trapped or caught 0 1 2 3 4
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>23</td>
<td>Suddenly scared for no reason</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>24</td>
<td>Temper outbursts that you could not control</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>25</td>
<td>Feeling afraid to go out of your house alone</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>26</td>
<td>Blaming yourself for things</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>27</td>
<td>Pains in lower back</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>28</td>
<td>Feeling blocked in getting things done</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>29</td>
<td>Feeling lonely</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>30</td>
<td>Feeling blue</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>31</td>
<td>Worrying too much about things</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>32</td>
<td>Feeling no interest in things</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>33</td>
<td>Feeling fearful</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>34</td>
<td>Your feelings being easily hurt</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>35</td>
<td>Other people being aware of your private thoughts</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>36</td>
<td>Feeling others do not understand you or are unsympathetic</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>37</td>
<td>Feeling that people are unfriendly or dislike you</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>38</td>
<td>Having to do things very slowly to insure correctness</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>39</td>
<td>Heart pounding or racing</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>40</td>
<td>Nausea or upset stomach</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>41</td>
<td>Feeling inferior to others</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>42</td>
<td>Soreness of your muscles</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>43</td>
<td>Feeling that you are watched or talked about by others</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>44</td>
<td>Trouble falling asleep</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>45</td>
<td>Having to check and doublecheck what you do</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>46</td>
<td>Difficulty making decisions</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>47</td>
<td>Feeling afraid to travel on buses, subways, or trains</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>48</td>
<td>Trouble getting your breath</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>49</td>
<td>Hot or cold spells</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>50</td>
<td>Having to avoid certain things, places, or activities because they frighten you</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>51</td>
<td>Your mind going blank</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>52</td>
<td>Numbness or tingling in parts of your body</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>53</td>
<td>A lump in your throat</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>54</td>
<td>Feeling hopeless about the future</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>55</td>
<td>Trouble concentrating</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>56</td>
<td>Feeling weak in parts of your body</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>57</td>
<td>Feeling tense or keyed up</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>58</td>
<td>Heavy feelings in your arms or legs</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>59</td>
<td>Thoughts of death or dying</td>
<td>0 1 2 3 4</td>
</tr>
</tbody>
</table>
60. Overeating
61. Feeling uneasy when people are watching or talking about you
62. Having thoughts that are not your own
63. Having urges to beat, injure, or harm someone
64. Awakening in the early morning
65. Having to repeat the same actions such as touching, counting, washing
66. Sleep that is restless or disturbed
67. Having urges to break or smash things
68. Having ideas or beliefs that others do not share
69. Feeling very self-conscious with others
70. Feeling uneasy in crowds, such as shopping or at a movie
71. Feeling everything is an effort
72. Spells of terror or panic
73. Feeling uncomfortable about eating or drinking in public
74. Getting into frequent arguments
75. Feeling nervous when you are left alone
76. Others not giving you proper credit for your achievements
77. Feeling lonely even when you are with people
78. Feeling so restless you couldn't sit still
79. Feelings of worthlessness
80. The feeling that something bad is going to happen to you
81. Shouting or throwing things
82. Feeling afraid you will faint in public
83. Feeling that people will take advantage of you if you let them
84. Having thoughts about sex that bother you a lot
85. The idea that you should be punished for your sins
86. Thoughts and images of a frightening nature
87. The idea that something serious is wrong with your body
88. Never feeling close to another person
89. Feelings of guilt
90. The idea that something is wrong with your mind
Appendix E

The Zung Depression Scale

<table>
<thead>
<tr>
<th>Code Number</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>None OR a Little of the Time</th>
<th>Some of the Time</th>
<th>Good Part of the Time</th>
<th>Most OR All of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>12.</td>
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<td>19.</td>
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<tr>
<td>20.</td>
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</tr>
</tbody>
</table>

1. I feel down hearted, blue, and sad
2. Morning is when I feel the best
3. I have crying spells or feel like it
4. I have trouble sleeping through the night
5. I eat as much as I used to
6. I enjoy looking at, talking to and being with attractive women/men
7. I notice that I am losing weight
8. I have trouble with constipation
9. My heart beats faster than usual
10. I get tired for no reason
11. My mind is as clear as it used to be
12. I find it easy to do the things I used to
13. I am restless and can't keep still
14. I feel hopeful about the future
15. I am more irritable than usual
16. I find it easy to make decisions
17. I feel that I am useful and needed
18. My life is pretty full
19. I feel that others would be better off if I were dead
20. I still enjoy the things I used to do
## Appendix F

### The Stressor Inventory

<table>
<thead>
<tr>
<th>Code #</th>
<th>Date</th>
</tr>
</thead>
</table>

The following categories and subitems represent potentially stressful situations for intensive care unit staff. Please give one rating for each item with a check mark in the column that best represents how problematic that item is for you.

<table>
<thead>
<tr>
<th>Knowledge Base:</th>
<th>None Or A Little of the Time</th>
<th>Some Of The Time</th>
<th>Good Part Of The Time</th>
<th>Most Or All Of The Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>level of technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>range of disease states encountered</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>advanced training required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Variables:</th>
<th>None Or A Little of the Time</th>
<th>Some Of The Time</th>
<th>Good Part Of The Time</th>
<th>Most Or All Of The Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>workload amount</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>time constraints</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>long hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>infrequent breaks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>poor pay/benefits</td>
<td></td>
<td></td>
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<tr>
<td>rapid decision-making</td>
<td></td>
<td></td>
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<tr>
<td>turnover rate among staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>task complexity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>amount of physical work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>possible physical injury</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lack of advancement opportunities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Care:</th>
<th>None Or A Little of the Time</th>
<th>Some Of The Time</th>
<th>Good Part Of The Time</th>
<th>Most Or All Of The Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>emergencies/arrests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>illness severity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>death and dying</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>intrusive procedures that cause pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>repetitive evaluations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>continuous observation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>educating families about medical process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>responding to anxiety expressed by patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>responding to anxiety expressed by family</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication:</th>
<th>None Or A Little of the Time</th>
<th>Some Of The Time</th>
<th>Good Part Of The Time</th>
<th>Most Or All Of The Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>clarity in work assignments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>unresponsive administration (medical)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>unresponsive nursing leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>interpersonal staff conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>traditional medical roles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>position in organizational hierarchy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>staff apathy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Architecture:</th>
<th>None Or A Little of the Time</th>
<th>Some Of The Time</th>
<th>Good Part Of The Time</th>
<th>Most Or All Of The Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>lack of private space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>unit physically isolated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>absence of time-orienting objects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>insufficient/malfunctioning equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lack of supplies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>inadequate lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>staff traffic is unwieldy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Unit Management:**
- inadequate staffing
- phone calls that interrupt
- excessive paperwork
- unavailability of physicians
- frequent admissions
- discharges and transfers
- staff scheduling
- undue responsibility
- inadequate continuing education
- lack of orientation

**Ethics:**
- staff conflict over treatment plan
- unnecessary prolongation of life
- discontinuing a support system
- religious beliefs violated with a discontinuation of support systems
- lack of input into decision-making over discontinuation of life supports

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>None Or A Little of the Time</th>
<th>Some of the Time</th>
<th>Good Part of the Time</th>
<th>Most Or All of the Time</th>
</tr>
</thead>
</table>

Please rank order the categories below from most stressful/most problematic, to least stressful/least problematic, with the number 1 denoting most stressful.

**CATEGORY RANKINGS (1-7):**
- Knowledge Base
- Work Variables
- Patient Care
- Communication
- Ethics
- Architecture
- Unit Management
Appendix G

Code * Date

Affect Analogue Scale

Rapid first impressions are best. Please use a vertical marking in this way:

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Extremely</th>
</tr>
</thead>
</table>

Recently on the Unit I have been feeling:

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>sad</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>satisfied</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>restless</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>hopeful</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>irritable</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>cheerful</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>blue</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>calm</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Observer</td>
<td>Condition</td>
</tr>
<tr>
<td>------</td>
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<td>-----------</td>
</tr>
<tr>
<td>A</td>
<td>D</td>
<td>N</td>
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<td>N</td>
<td>D</td>
<td>D</td>
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<td>d</td>
<td>d</td>
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</tr>
</tbody>
</table>

The Observational Data Scoring Form
**Appendix I**

Date ______ Recorder _______ Shift 7-3 ___ 3-11 ___ 11-7 ___ Census ______

**Specific Event Chart**

Please note whether any of the following events occurred or did not occur, and if so, the time that the event took place.

Also, please note the number of times that the event occurred.

<table>
<thead>
<tr>
<th>Occurred/#</th>
<th>If Yes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes  No</td>
<td>Time</td>
</tr>
</tbody>
</table>

1. Cardiac/Respiratory Arrest  
2. Deaths  
3. Transfers  
4. Admissions  
5. Medical/Surgical Rounds  
6. Nursing Rounds  
7. Other

**Example:**

1. Cardiac/Respiratory Arrest  
   11  
   7:45  
   9:30  
   7

2. Deaths  
   ✔
Appendix J

Ward Acuity Scale

<table>
<thead>
<tr>
<th>Class</th>
<th>ICU Days (Day shift only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
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<td>17</td>
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<td>18</td>
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</tbody>
</table>

Class 1: Routine patient, not requiring intensive care
2: Patient physiologically stable, requires monitoring or closer nursing observation
3: Patient physiologically stable, but requires organ system support
4: Physiologically unstable patient, requiring intensive physician and nursing care and support
5: Physiologically unstable, requiring at least 2 nurses at the bedside at all times
Appendix K

The Cardiovascular Data Scoring Form

<table>
<thead>
<tr>
<th>Heart Rhythm &amp; Rate</th>
<th>VPB's</th>
<th>Forms</th>
<th>Coup.</th>
<th>V. Tach</th>
<th>A.E.A.</th>
<th>SLEEP/WAKE</th>
<th>MEDICATIONS</th>
<th>Symptoms &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: S.R.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2: A. Fibr.</td>
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<td></td>
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</tr>
<tr>
<td>3: A. Flut.</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4: SV Tach</td>
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<tr>
<td>5: Paced</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6: V Tach</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7: Other</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Start Time A.M.P.M. |       |       |       |         |        |            |             |                     |

| Reading Date        |       |       |       |         |        |            |             |                     |

| Name                |       |       |       |         |        |            |             |                     |

| Tape #              |       |       |       |         |        |            |             |                     |

| Scanner             |       |       |       |         |        |            |             |                     |
Appendix L

Relaxation Training Self-Report Scoring Form

Date __________ Code # __________

Please indicate your response with a vertical mark:

Have you had previous experience with relaxation techniques? Yes ____ No ____

If yes: Self-Taught? ____ Through A Professional? ____

Are you presently involved with learning or using relaxation procedures, for example:
Progressive Muscle Relaxation ____ Meditation ____ Other (please specify) ________

Before Relaxation:

<table>
<thead>
<tr>
<th>No tension, completely relaxed</th>
<th>0</th>
<th>Moderately tense</th>
<th>Maximum tension</th>
</tr>
</thead>
</table>

After Relaxation:

<table>
<thead>
<tr>
<th>No tension, completely relaxed</th>
<th>0</th>
<th>Moderately tense</th>
<th>Maximum tension</th>
</tr>
</thead>
</table>

Date __________ Code # __________ Shift 7-3 ____ 3-11 ____ 11-7 ____

Have you practiced the technique since our last meeting? Yes ____ No ____

If yes, please indicate the number of practices since the last relaxation session:

Before Relaxation:

<table>
<thead>
<tr>
<th>No tension, completely relaxed</th>
<th>0</th>
<th>Moderately tense</th>
<th>Maximum tension</th>
</tr>
</thead>
</table>

After Relaxation:

<table>
<thead>
<tr>
<th>No tension, completely relaxed</th>
<th>0</th>
<th>Moderately tense</th>
<th>Maximum tension</th>
</tr>
</thead>
</table>
Appendix M

Relaxation Training Home Practice Reminders

A Reminder Of The Sequence For Home Practice:

We have practiced the relaxation technique with these muscle groups, in this sequence:

- hand and forearm (both right and left);
- biceps (both right and left);
- facial muscles (forehead, then nose & upper cheeks, then lower cheeks & jaw);
- neck and throat;
- chest, shoulders, upper back;
- abdomen;
- thigh (both right and left);
- calves (both right and left);
- feet (both right and left).

As a reminder, the procedure is as follows. Find a fairly quiet, dimly lit room. Alternately tense then relax each muscle group. Tense the muscle group for about 7 seconds, then deeply relax that muscle group for about 30 seconds, concentrating on the sensations that accompany tension, and the sensations that accompany relaxation. Do the deep-breathing exercise along with each tensing-release cycle. Inhale and hold during the tensing, and exhale during the release, saying to yourself, RELAX°. Do each muscle group twice in succession before moving on to the next group until you have gone through each of the groups mentioned above. As you go on to a new muscle group, keep the previous groups relaxed.

The technique is best learned the more that it is practiced. Practicing two times each day at home for about 10 minutes is a good idea as one begins to learn the procedure.

We have combined muscle groups and relaxed them in the following sequence:

- hand, forearm, bicep (both right and left);
- facial group (forehead, cheeks & nose, jaw);
- neck and throat;
- chest, shoulders, upper back and abdomen;
- thighs, calf, (both right and left).

As a reminder, focus your attention on the first muscle group to carefully identify any feelings of tightness. Do this without actually tensing the muscles, for about 7 seconds. Then recall the sensations you experienced when you released these muscles, letting them go deeply relaxed. Concentrate on these sensations for about 10 seconds. Repeat the procedure with the same muscle group, then go on to the next group, concentrating on the tension, then recalling the feelings of relaxation.

Skill in recalling feelings of relaxation also requires practice, preferably twice a day for about 10 minutes each time.