

GUIDELINES FOR HEALTH CARE WORKERS

5.3.2 Effects of Exposure

Estimates indicate that up to 4 million women employed in hospitals may be exposed to reproductive hazards (Kooker 1987). Lists of teratogenic agents present in the hospital environment have been compiled by Beckman and Brent (1986) and Schardein (1985). Despite the presence of known human teratogens in the hospital, there is no clear evidence that exposure conditions in hospitals have resulted in an excess rate of birth defects among the offspring of hospital workers. For example, cytomegalovirus is recognized as a human teratogen, but exposed nursery and pediatric care personnel do not appear to be at increased risk of cytomegalovirus-induced birth defects (U.S. Congress 1985).

A number of studies have supported more general associations between employment in hospitals (or laboratories in general) and an increased risk of adverse reproductive effects, primarily spontaneous abortion. For example, spontaneous abortions and birth defects have been associated with exposure of female operating room personnel to waste anesthetic gases; a similar relationship was also suggested for the wives of exposed men (NIOSH 1977a). Exposure to sterilizing agents (primarily ethylene oxide) has also been associated with increased frequencies of spontaneous abortions (Hemminki et al. 1982) and with chromosomal abnormalities in circulating lymphocytes (Hogstedt et al. 1983; Laurent et al. 1984).

5.4 DERMATOLOGICAL HAZARDS

5.4.1 Introduction

Skin injuries and diseases account for a large proportion of all occupational injuries and diseases (ASPH/NIOSH 1988). Skin injuries in the hospital environment include cuts, lacerations, punctures, abrasions, and burns. Skin diseases and conditions of hospital workers include dermatitis, allergic sensitization, infections such as herpes, and skin cancer. In 1984, dermatologic diseases accounted for more than 34% of all chronic occupational illnesses in the United States. Of workers who develop a dermatologic disease, 20% to 25% lose an average of 11 working days each year. In the service industries (which include the health service industry), nearly 8,000 cases of dermatologic diseases were reported to the Bureau of Labor Statistics in 1984—an incidence of 5 cases per 10,000 fulltime workers (ASPH/NIOSH 1988).

5.4.2 Hazard Location

Skin problems among hospital workers have been associated with work in every part of the hospital, but they are especially common among housekeeping personnel, maintenance workers, orderlies, and aides. In one hospital, 60% of the workers with occupational dermatitis of the hands were aides and

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housekeepers, even though these two categories made up only 17% of the total workers in the hospital (Dahlquist and Fregart 1970). Half of the workers with dermatitis had suffered with the skin problem for 6 months or more.

The NIOSH publication Occupational Diseases: A Guide to Their Recognition (NIOSH 1977d) contains an extensive list of occupational irritants and causes of dermatologic allergy. Listed below are some of the common causes of skin problems for some categories of hospital workers:

<u>Category of worker</u>	<u>Common cause of skin irritation</u>
Food service workers.	Heat, moisture, <u>Candida</u> (yeast), bacteria, grease, synthetic detergents, water softeners, soaps, fruit, acids, spices, sugars, and vegetable juices
Housekeepers.	Bacteria, synthetic detergents, disinfectants, houseplants, polishes, waxes, soaps, solvents, rubber gloves, and bactericides
Laundry workers	Alkalis, bactericides, bleaches, synthetic detergents, enzymes, fiber glass, fungicides, heat, moisture, optical brighteners, and soaps
Nurses.	Local anesthetics, antibiotics, antiseptics, bacteria, synthetic detergents, disinfectants, ethylene oxide, rubber gloves, soaps, drugs, fungi, and moisture

5.4.3 Potential Health Effects

Chemicals can directly irritate the skin or cause an allergic sensitization. Physical agents can also damage the skin, and skin that has been chemically or physically damaged is vulnerable to infection.

5.4.3.1. Effects of Chemical Agents

Skin reactions (dermatitis) are the most common and often the most easily preventable of all job-related health problems. The skin is the natural defense system of the body: it has a rough, waxy coating, a layer of protein (keratin), and an outer layer of dead cells to help prevent chemicals from penetrating the tissues and being absorbed into the blood.

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5.4.3.1.1 Direct irritation

Many chemicals cause irritation on contact with the skin (irritant contact dermatitis) by dissolving the protective fats or keratin (protein) layer, dehydrating the skin, or killing skin cells. Symptoms of this kind of irritation are red, itchy, peeling, dry, or cracking skin. Some chemicals are not irritants under normal conditions, but they will irritate skin that has already been damaged by sunburn, scratching, prolonged soaking, or other means. Tars, oils, and solvents can plug the skin pores and hair follicles, causing blackheads, pimples, and folliculitis.

Irritant contact dermatitis is diagnosed by a history of contact with a chemical and by the improvement or disappearance of symptoms when contact is discontinued.

Data from California (ASPH/NIOSH 1988) suggest that the following five types of agents are responsible for the greatest number of workers' compensation claims:

- Soaps, detergents, cleaning agents
- Solvents
- Hard, particulate dusts
- Food products
- Plastics and resins

5.4.3.1.2 Allergic contact dermatitis

Some persons become sensitized to chemicals days, months, or even years after their first exposure. This allergic reaction does not occur in every worker who contacts the chemical. Symptoms are red, itchy, and blistering skin (like a poison oak or ivy reaction) and may be much more severe than the direct irritation described in the previous subsection.

Sensitization is usually diagnosed by a history of contact and by patch testing, in which a physician applies a small amount of the suspect chemical to the skin under a patch to observe the reaction over 48 hr. Workers who are sensitized to a chemical will usually continue to have severe reactions unless all contact is prevented by substituting another chemical or transferring to another job. Common contact allergens include (ASPH/NIOSH 1988) the following:

- Metallic salts (i.e., salts of nickel, chrome, cobalt, gold, mercury)

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- Rubber accelerators and antioxidants (these may leach from rubber gloves) such as thiurans, dithiocarbamates, mercapto compounds, and paraphenylenediamine derivatives
- Plastic resins such as epoxies, phenolics, and acrylics
- Organic dyes such as those in photographic color-developing solutions
- First aid cabinet preparations such as neomycin, themerosal, and benzocaine
- Common laboratory chemicals such as phenol and formaldehyde.

5.4.3.2 Effects of Physical Agents

The skin can be damaged in a variety of ways including:

- Mechanical trauma (i.e., cuts, lacerations, abrasions, punctures)
- Burns from physical agents (electricity, heat, or UV radiation)
- Chemical burns

Although there are no data describing skin injuries among hospital workers specifically, data from the Bureau of Labor Statistics for 1983 indicate that almost 10% of the workers' compensation claims for skin injuries from 30 reporting states occurred among cooks and food service workers (ASPH/NIOSH 1988).

5.4.3.3 Skin cancer

The association between basal and squamous cell carcinomas and ultraviolet radiation has been well established. The association between skin cancer and exposure to other agents is less well documented, but ionizing radiation and anti-neoplastic drugs have been implicated. Other evidence indicates that malignant transformation of cells damaged by chronic allergic contact dermatitis may occur (ASPH/NIOSH 1988).

5.4.3.4 Effects of Biologic Agents

The skin can be damaged by a variety of microorganisms, including bacteria, fungi, viruses, and parasites. Herpes simplex is the most common dermatologic infection among dentists, physicians, and nurses. About 5% of all workers' compensation claims for skin diseases in 1985 were the result of primary skin infections. Biologic agents can also cause secondary skin

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infections when skin has been damaged chemically or physically. Secondary infections are particularly likely if good personal hygiene is not practiced (NIOSH 1987a).

5.4.4 Standards and Recommendations

There are no OSHA standards or NIOSH recommendations that specifically address dermatitis.

5.4.5 Exposure Control Methods

Relatively simple precautions can considerably reduce skin hazards. Effective measures include work practices and engineering controls that limit solvent exposure, the use of personal protective equipment, substitution of less irritating chemicals, and the institution of a good hygiene program. A more complete discussion of methods for controlling dermatologic hazards is contained in A Proposed National Strategy for the Prevention of Occupational Dermatologic Conditions (ASPH/NIOSH 1988).

5.5 STRESS

5.5.1 Introduction

At a 1986 symposium on 10 leading work-related diseases and injuries, NIOSH investigators presented a draft national strategy for the prevention of psychological disorders (ASPH/NIOSH 1988). The strategy identified the following clinical disorders as attributable to job stress:

- Affective disturbances such as anxiety, depression, and job dissatisfaction
- Maladaptive behavioral or lifestyle patterns
- Chemical dependencies and alcohol abuse

Estimates based on data obtained from the National Institute of Mental Health indicate that about 25% of the Americans aged 25 to 44 (the prime working age) suffered psychological disorders (ASPH/NIOSH 1988).

Hospital work often requires coping with some of the most stressful situations found in any workplace. Hospital workers must deal with life-threatening injuries and illnesses complicated by overwork, understaffing, tight schedules, paperwork, intricate or malfunctioning equipment, complex hierarchies of authority and skills, dependent and demanding patients, and patient deaths; all of these contribute to stress. In addition, the increasing size and bureaucracy of many hospitals may depersonalize the environment and leave many workers feeling isolated,

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fatigued, angry, powerless, and frustrated. The brunt of these feelings may be borne by other workers, patients, or the worker's family. These feelings may also be expressed as apathy, loss of self-confidence, withdrawal, or absenteeism. Failure to recognize and treat the sources of stress results in workers who suffer "burnout" (i.e., those who remain on the job but cease to function effectively).

In 1977, NIOSH investigators published a study of hospital admissions for mental health disorders among 130 major occupational categories. Of the 22 occupations with the highest admission rates for mental disorders, six were health care occupations--health technologists, practical nurses (LPN), clinical laboratory technicians, nurses' aides, health aides, registered nurses, and dental assistants (Colligan et al. 1977). Another study reported that the proportional mortality ratio (PMR) for suicide was elevated for male dentists, physicians, medical and dental technologists, and female nurses. The PMR for suicide was also elevated among chiropractors and veterinarians (NIOSH 1983c).

Hoiberg (1982) examined occupational stress and illness among white male enlisted Navy personnel and found that mess management specialists and hospital corpsmen were more frequently hospitalized for stress-related illnesses than Navy personnel in other occupational groups. She also reported that the rate of hospitalization increased with tenure; those in their second enlistment period had hospitalization rates for stress-related illnesses that were nearly five times the rates for personnel in their first enlistment period. Those in their third decade of service were hospitalized twice as frequently as personnel in their second decade of service. Hospitalization rates for neuroses, transient situational disturbances, hypertension, and ulcers exceeded the rates for six other stress-related causes of hospitalization. Hoiberg (1982) reported that the following factors contributed to the stress experienced by mess management specialists and corpsmen:

- Low job status
- Less favorable job characteristics such as work load, responsibility for the well being of others, and lack of participation in deciding work tasks
- Less satisfactory work environment composed of high physical demands, occasional high noise levels, occasional-to-frequent high temperatures, and occasionally dangerous work.

This study (Hoiberg 1982) reinforces existing information on stress among nurses and other occupational groups involved in direct patient care; it also indicates that hospital food service work should be considered a high-stress occupation.

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5.5.2 Hospital Locations Associated with Stress

Workers are most likely to encounter severe stress in intensive care units, burn units, emergency rooms, and operating rooms.

5.5.2.1 Intensive Care Unit

One of the most stressful areas of the hospital is the intensive care unit (ICU). Several studies of ICU nurses indicate that the following factors also lead to stress (Huckabay and Jagla 1979; Bailey et al. 1980; Gribbins and Marshall 1982):

- Interpersonal conflicts (nurse-physician, nurse-nurse, and nurse-supervisor)
- Knowledge base (complex disease states, treatments, and equipment)
- Management of the unit (staffing problems)
- Nature of direct patient care (emergencies, attempts to prolong life, sudden death, and the deaths of special patients)
- Physical work environment (malfunctioning or noisy equipment, lack of space, and physical injury)
- Lack of administrative rewards (pay, benefits, and advancement opportunity)

5.5.2.2 Neonatal Intensive Care Unit

Gribbins and Marshall (1982) also examined stress among nurses in the neonatal intensive care unit (NICU). Over several years of employment, nurses progressed through various stages of stress. Initially the nurses were concerned about their competence in the new job. Later they raised questions about the job itself (e.g., they questioned the quality of life for NICU survivors). Still later they felt they had mastered the job and were indifferent because they did not receive enough positive rewards for their work. Those still in the unit after 3 years had developed a number of coping mechanisms such as humor and tolerance.

5.5.2.3 Burn Units

Koran et al. (1983) explored the problems of 37 health care workers in the burn unit of a 425-bed county general hospital to determine how their job stresses affected morale and patient care. Koran et al. described the following emotional stressors of these workers:

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- The pain suffered by patients during dressing changes and debridement
- Uncooperative behavior, expressions of hostility and rejection by patients because of the necessity to inflict pain during debridement
- Unreasonable demands made by distraught family members
- Dealing with psychiatric disorders that frequently precede or accompany severe burns
- Problems common to staff members of other ICU's, including:
 - Lifting of heavy patients
 - Exposure to mutilated bodies
 - Conflicts with administrators over staffing and scheduling
 - Lack of emotional support from physicians
 - Concern about the inevitability of mistakes
 - Anguish caused by a patient's death.

5.5.3 Potential Health Effects

Stress has been associated with loss of appetite, ulcers, mental disorders, migraines, difficulty in sleeping, emotional instability, disruption of social and family life, and the increased use of cigarettes, alcohol, and drugs. Stress can also affect worker attitudes and behavior. Some frequently reported consequences of stress among hospital workers are difficulties in communicating with very ill patients, maintaining pleasant relations with coworkers, and judging the seriousness of a potential emergency.

5.5.4 Causes of Stress

Factors commonly mentioned as causes of stress by all categories of hospital workers are as follows (NIOSH 1978c; Huckabay and Jagla 1979; Bailey 1980; Gribbins et al. 1982; Koran et al. 1983):

- Understaffing
- Role conflict and ambiguity
- Inadequate resources

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- Working in unfamiliar areas
- Excessive noise
- Lack of control (influence, power) and participation in planning and decisionmaking
- Lack of administrative rewards
- Under-utilization of talents and abilities
- Rotating shift work
- Exposure to toxic substances
- Exposure to infectious patients

Other important stress factors include job specialization, discrimination, concerns about money, lack of autonomy, work schedules, ergonomic factors, and technological changes. These factors are discussed briefly in the following subsections.

5.5.4.1 Job Specialization

Increased job specialization has made it more difficult for workers to move to higher positions in the hospital. Specialized jobs are stressful and involve a higher rate of occupational injuries such as back strain and dermatitis.

5.5.4.2 Discrimination

Despite recent trends to the contrary, women and minorities still tend to be clustered in lower-level hospital positions.

5.5.4.3 Concerns about Money

Money matters are a significant source of stress for many hospital workers. Although hospital workers' wages have increased over the past decade, the difference between the higher- and lower-paying hospital positions has also increased. Meeting financial obligations and facing the threat of possible unemployment can be real sources of stress, especially for workers who are the sole support of a family.

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5.5.4.4 Lack of Autonomy

Frustration over the frequent lack of decision-making power is a significant stressor. Nurses sometimes feel demeaned when their observations and recommendations for patient care are ignored or overruled.

5.5.4.5 Work Schedule

The effects of stress can be made worse by shift work, especially rotating shift work. A NIOSH study of the effects of rotating shifts indicated that about 25% of the 1,219 nurses in the study regularly worked rotating shifts. These nurses reported visiting clinics for medical problems significantly more often than those working regular shifts (NIOSH 1978a). More nurses on rotating shifts stated that they stayed away from work because of acute respiratory infections, upper and lower gastrointestinal symptoms, headaches, colds, and influenza. The nurses on rotating shifts also visited clinics more because of these complaints and complaints of otitis, pharyngitis, gastritis, menstrual disorders, dermatitis, nervous symptoms, sprains and strains, contusions, and crushed body parts (NIOSH 1978a).

5.5.4.6 Ergonomic Factors

Stress can also result from ergonomic factors such as the poor design of furniture, lighting, and equipment and the need to lift heavy patients.

5.5.4.7 Technological Changes

Technological changes have contributed increasingly to the stress of hospital workers in the past 5 years. The introduction of VDT's at ward desks, the rapid change in medication protocols, and the development of new procedures and equipment may all frustrate staff when they are not given adequate training and time to incorporate these changes into their work patterns.

5.5.5 Methods for Coping with Stress

Some of the methods that have successfully reduced hospital worker stress and dissatisfaction are as follows (Huckabay and Jagla 1979; Bailey et al. 1980; Koran et al. 1983):

- Regular staff meetings and discussions to communicate feelings, gain support, and share innovative ideas
- Institution of stress management programs

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- Readily available counseling from a nonjudgmental source
- Flexibility and innovation by supervisors to create alternative job arrangements
- Adequate staffing
- Reasonable shift schedules for house staff to allow adequate time for sleep each day
- Group therapy for staff with particularly difficult professional problems such as dealing with cancer patients, chronic illness, and death
- Organized and efficient work functions and environment
- Recognition of and action on legitimate complaints regarding overbearing physicians and supervisors
- Individual approaches such as relaxation exercises and biofeedback to relieve symptoms of stress until the sources are identified and evaluated
- Frequent in-service educational sessions and other opportunities to improve skills and confidence
- More flexibility and worker participation in scheduling (possibly a 10-hr, 4-day workweek)
- Scheduled rotation of unit assignments

Koran et al. (1983) attempted to improve the work environment in a burn unit by providing the nursing staff with feedback about their work setting and by helping the staff use that information to formulate and implement changes. Using survey results and a series of meetings between the staff and a psychiatrist, substantial improvements in staff morale were observed and the quality of patient care seemed to be improved. Koran et al. (1983) believed that these improvements were realized because:

- The staff was encouraged to think about the elements of their work setting in terms of those that were stressful and those that were nonstressful.
- The staff began to focus on work setting characteristics that are often overlooked, such as clarity of expectations.
- The staff attempted to effect change in only a few areas at a time rather than in many.

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- The staff's involvement in their work increased as they began to work together to effect change.
- The staff began to feel concern not only for their own patients but for all patients and staff.

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