

**Naval Facilities Engineering Command
Ergonomic Risk Assessment for
Naval Hospital, Labor & Delivery - Patient Transport**

INTRODUCTION

This report summarizes the ergonomic risk assessment conducted at a Hospital August 2001.

Two areas were observed in order to determine solutions to reduce ergonomic stressors: the Labor and Delivery patient rooms, and the Patient Transport by ambulance gurney. This assessment is based upon interviews with nurses, corpsmen, emergency medical technicians (EMTs), local fire department response personnel, and base safety personnel. Further input came via an evaluation by the Naval Facilities Engineering Command (NAVFACENGCOM) Hazard Abatement (HA) Ergonomist. In addition, the hospital Ergonomic Team identified the priority areas and suggested improvements.

The operations reviewed present opportunities to reduce the risk of work-related musculoskeletal disorders (WMSDs) and improve safety, health, and productivity. Musculoskeletal Disorders (MSDs) are injuries and illnesses that affect muscles, nerves, tendons, ligaments, joints, spinal discs, skin, subcutaneous tissues, blood vessels, and bones. Work-Related Musculoskeletal Disorders (WMSDs) are:

- X Musculoskeletal disorders to which the work environment and the performance of work contribute significantly or
- X Musculoskeletal disorders that are aggravated or prolonged by work conditions.

Recommendations to the command to further reduce the probability of injury include obtaining new equipment¹, implementation of administrative controls², training to avoid unsafe lifting practices (Appendix A) and considering new patient handling/transport resources (Appendix B).

LABOR AND DELIVERY WARD

Injury Data

None Available

Description of the Operation

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Patients arrive at the emergency room entrance via ambulance or personal vehicle. Typically, for patients arriving via personal vehicle, one or two nurses help the patient out of the personal vehicle and into a wheelchair, then out of the wheelchair and onto an OB/GYN stretcher for transport to the labor and delivery room.

For the labor and delivery procedure, the OB/GYN stretcher leg support collapses downward. As the leg support folds down, the nurse must pull on the seating area to slide the patient closer to the edge of the stretcher for care. Additionally, leg supports (stirrups) are difficult to adjust and in the labor and delivery room, the limited space makes it difficult to care for the patient from all sides. See Photo 1.



Photo 1: Nurse assumes awkward posture while exerting force to pull the patient and stretcher forward into the procedure position.

Ergonomic Issue Description

The major ergonomic risk factors for the labor and delivery task are excessive lifting from transferring patients, and awkward postures and excessive force caused by operating the stretcher.

Excessive Lifting

As long ago as 1965, a study of the physical loads on nurses noted that an adult human being is awkward to lift or carry because it is not a rigid load and it has no handles. The study further noted that a patient lying in a bed is particularly hard to lift just by virtue of physical position relative to the lifter. Added to the physical burden is the mental stress of knowing that a human being can be severely damaged if dropped or handled incorrectly. The study observed that loads on nurses may

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The study observed that loads on nurses may be worse than those on industrial workers.

Half a century later, the situation of nurses remains unchanged. Manually lifting and transferring patients is a high-risk activity, both for the healthcare worker and for the patient. Of all occupations, nursing has one of the highest incidences of work-related back problems.

Recommendations

- X Ensure that yearly back injury prevention training covers proper body mechanics, lifting techniques, stretching, and information on the use of patient transfer/handling equipment. Refer to Appendix A.
- X Where feasible, use a mechanical assist patient transfer aid such as a portable lift to transfer patients from a personal vehicle to the stretcher or wheelchair. Use raise-to-stand units to help patients stand and walk. Refer to Appendix B.
- X Where feasible, use manual assist patient transfer/handling aids such as gate belts to assist with patient movement and lateral transfer. Refer to Appendix B.
- X Where feasible, transfer the patient directly onto the OB/GYN stretcher.
- X Since OB patients are typically 30 to 60 pounds heavier than other patients, the hazard abatement program will provide bariatric wheelchairs; these larger wheelchairs allow more room for patient transfer and comfort.

Awkward Posture

The patient rooms do not allow the nurse to easily care for the patient from all sides. The space restriction forces the nurses to bend forward or twist at the trunk while providing care. Depending on the type of care being administered, the nurse may have to assume this posture for a few seconds to a few minutes. The muscles must apply considerably more contraction force to hold awkward postures, particularly if the position is maintained for more than a couple of seconds.

Excessive Force

The height of the hands affects the amount of force needed to push or pull an object. When the hands are slightly above waist height, a worker gets the most from the muscles. As the hands are moved lower or higher, the working posture becomes more awkward, and the muscles must exert more force. Nurses in the labor and delivery ward exert force while in an awkward posture to position the patient for treatment. The nurse's hands are well below waist height when pulling on the leg support to position the patient. Performing forceful exertions can irritate tendons, joints, and discs, leading to inflammation, fluid build up, and constriction of blood vessels and nerves in the area.

Recommendation

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- X Replace the dated OB/GYN stretcher. The staff is evaluating three OB/GYN stretchers with smaller dimensions to increase space in the patient room and reduce reaching. Features of the new model include lightweight construction; side rails; 8-inch locking casters; and easy glide controls that are operated from a standing, not stooped, posture to provide quick and easy patient positioning with reduced force. This stretcher also has integrated foot supports that increase patient comfort and provide ease of operation by the nurse.

Description	Vendor	Model	Figure
OB/GYN Stretcher			
	Stryker Medical 206.295.3737	Gynnie OB/GYN Stretcher	
	Hill-Rom 800.445.3730	TransStar Stretcher Affinity Three Birthi	

PATIENT TRANSPORT

Injury Data

Documented shoulder and arm strain from attempting to arrest a falling gurney with patient when the equipment failed to lock into position.

Description of the Operation

Ambulance personnel are faced with an ever-changing, uncontrolled work environment in which patients are commonly moved from homes with narrow passageways to the ambulance for transportation to hospitals. Once at the hospital, the ambulance crew transports the patient from the ambulance to the emergency room, then transfers the patient to a short-term care ward stretcher for treatment.

Loading the gurney. At the pick up site, with the patient on the gurney, the ambulance technicians position the gurney at the rear of the ambulance. One technician folds up the gurney's legs, disengages the wheel locks, and pushes the gurney into the ambulance (Photo 2). The second technician stands at the side of the gurney to help with guiding and to reassure the patient. During this process the technician at the end of the gurney bears the weight of both the gurney and

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the weight of both the gurney and the patient while pushing the gurney into the ambulance. The process is complicated because the patient's feet interfere with the gurney's base controls and handhold at the foot end, as shown in Photos 2 and 4.



Photo 2: Ambulance technician bears the weight of the gurney and patient while pushing the gurney into the ambulance

Unloading the gurney. The gurney is removed from the ambulance with one technician outside the ambulance at the foot of the gurney and the other technician inside the ambulance. The technician at the foot pulls the gurney out until the base drops and supports the gurney weight. Again, the patient's feet can obstruct the handhold and require the technician to bend, as shown in Photos 2 and 3. The gurney lacks standard safety equipment to arrest a fall from the ambulance in the event the base does not engage or technician footing is compromised.

Gurney operation. The gurney is raised and lowered with one technician at each end, as shown in photos 3 and 4. To lower the gurney, the technician at the foot of the gurney disengages a lock located beneath the patient's feet. The feet of a tall patient make it difficult for the technician to grasp the mechanism. Locks at the head and the foot of the gurney must be disengaged at the same time. Once the locks are disengaged, the crew bears the weight of both the gurney and the patient while lowering the gurney. If one end disengages without the other, the gurney can fall. To raise the gurney, the technicians disengage the locks and lift the gurney until they hear an audible indication. As seen in Photo 4, the shorter technician must compensate for the taller technician's height advantage by leaning back.

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Photo 3: Lowering the gurney



Photo 4: Raising the gurney

Ergonomic Issue Description

The major ergonomic risk factor for the ambulance technicians is excessive lifting and force due to manual handling of the gurney.

The gurneys used at Oak Harbor have limited height positions. Their short wheelbase and small diameter wheels make them unstable on some terrain, thus creating a risk to both the technician and the patient if a gurney falls. The gurneys are not tension controlled; therefore, the technician bears the weight of the patient and gurney during lifting and lowering. The handles on the foot end of the gurney are under the cot, forcing the technician into awkward postures. The gurneys have no catch system to arrest a gurney falling from the back of the ambulance.

Excessive Lifting

When technicians bend over to perform a lift, such as when raising and lowering the gurney, the muscles in the back must exert a lot of force to raise and lower the weight of the upper body. This causes the back muscles to fatigue more rapidly and puts pressure on the discs in the lower back. When technicians have to maintain awkward postures for more than a few seconds, their back muscles and discs experience the application of a large amount of static force. The problem becomes worse when either greater weight or greater distance is required.

If the weight of the load were to suddenly shift while being lifted, the resulting awkward posture, combined with the weight and distance of the load from the lower spine, could tear tendons, ligaments, and muscles.

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Recommendations

- X Ensure that yearly back injury prevention training covers proper body mechanics, lifting techniques, stretching, and information on the use of patient transfer/handling equipment. Refer to Appendix A.
- X The Hazard Abatement program will replace dated ambulance gurneys with a model that has state-of-the-art features and a stable wheelbase. The ER staff is evaluating two stretchers with the following features: a catch mounted at the rear of the ambulance to arrest a fall; a minimum of five height positions; weight-sensitive tension control or lift assist; a single hand lever to set cot height and lock release; lightweight construction; 6-inch-diameter wheels with locks; foot-end lifting system; and four-point patient restraining harness.

Description	Vendor	Model	Figure
Stretcher / Gurney /			
	Stryker Medical 206.295.3737	EZPro2 MXPro	

OTHER CONSIDERATIONS

During the site evaluation, the staff discussed a possible change in the number of long-term care patients and the ability of the hospital’s equipment to effectively care for them. At the time of the assessment, the Ergo Team did not feel patient handling equipment was necessary because of the low volume of long-term care or mobility challenged patients.

The goal of the hospital Hazard Abatement project is to provide equipment that reduces risk and that the staff accepts. If the patient demographics change, the command may consider obtaining patient-handling equipment such as that described in Appendix B to aid the nursing staff in caring for the long-term care patients. Patient handling equipment reduces the exposure to, and risk from, ergonomic stressors and related WMSDs.

The command may request additional funds from the Chief of Naval Operations (CNO) Hazard Abatement Program to abate the risk of injury. Naval Facilities Engineering Command (NAVFACENGCOM) manages the CNO Hazard Abatement Program, which is a centrally managed fund to correct safety and health deficiencies beyond the funding capabilities of the activity. The Hazard Abatement Request Form and Mini Guide is available at <http://www.navfac-safety.navy.mil/docs/pdf/haminiguide/mg-toc.pdf>.

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Notes

¹ Equipment purchase without proper and repeated training will not mitigate risk and may in fact increase hazards. This report does not constitute an endorsement of any particular product. Rather, it is a recitation of how Navy personnel have addressed a particular work place safety issue. Neither the Navy nor its employees and agents warrant any product described in this report for any use, either general or particular.

² Administrative controls are management-controlled work practices and policies designed to reduce exposures to work-related musculoskeletal disorders (WMSDs) hazards by changing the way work is assigned or scheduled. Administrative controls reduce the exposure to ergonomic stressors and thus reduce the cumulative dose to any one worker. Examples of administrative controls used in the ergonomics context are employee rotation, employer-authorized changes in the pace of work, and team lifting.