

## **MANAGING INJURY RISKS WHEN HANDLING PATIENTS ON AMBULANCE STRETCHERS IN A HOSPITAL**

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### **ABSTRACT**

An investigation following a significant forearm injury and reports of practical difficulties associated with lifting ambulance patients on stretchers identified this as an unsafe manual handling activity for hospital orderlies. The tasks involved with moving patients between ambulance and hospital ward were observed, photographed and analysed. Orderlies involved in the task were informally interviewed. The dimensions of equipment and workspaces were assessed. The highest risk task was identified as lifting the stretcher and patient onto the cradle trolley. The design of the ambulance stretcher was a key issue. Two solutions that could be actioned within the hospital organisation to reduce the risk of injury from this activity were proposed and considered. An adjustable height stretcher for hospital-only use was evaluated. Lifting the ambulance stretcher onto the cradle trolley was eliminated and replaced by an additional low-height lateral transfer of the patient from the ambulance stretcher onto the adjustable stretcher via a friction-reducing transfer board. Feedback from the orderlies raised concerns about the suitability of the adjustable stretcher, the extra transfer and organisational change. These issues have implications for a successful ergonomics intervention.

### **INTRODUCTION**

At The Princess Margaret Hospital, Christchurch, New Zealand, hospital orderlies assist St John's ambulance staff with loading and unloading patients in and out of the ambulances and transporting the patients to the wards. Accidents and injuries resulting from moving or handling patients have been identified as a primary cause of ill health and early retirement amongst ambulance workers in the United Kingdom (Boocock, 2002). Hospital orderlies are therefore also at risk of musculoskeletal injuries when assisting paramedics to lift patients on stretchers. A female orderly at the hospital sustained a significant forearm injury from lifting a patient on a stretcher. An incident follow-up identified this as an unsafe manual handling activity requiring corrective action. An investigation by an ergonomist was undertaken to identify and assess the risks associated with these tasks and recommend practicable solutions for the hospital orderlies.

The St John's Ambulance service was contracted to the hospital and operated outside the hospital organisation. The design of the ambulance stretcher was central to the problem, but it was considered unlikely that significant changes could be made as this would affect the service nationally. This limited the scope of the recommendations to those that could be actioned locally within the hospital.

## METHOD

A task analysis of manual handling activities when moving patients between the ambulance and hospital ward was undertaken using direct observation, photographs and informal interviews. Archival data on numbers of arranged admissions and ambulance arrival times were reviewed to ascertain task frequency. A dimensional analysis of the stretcher, cradle trolley, ambulance deck height and ambulance bay deck was made. Two other hospital ambulance bays were compared to the investigation site.

Following the analyses recommendations were discussed with relevant staff. It was decided to evaluate an adjustable stretcher for use within the hospital. A Samarit Rollbord (supplied by Keyport, Hamilton, NZ) was used as a friction-reducing transfer device for the lateral transfer between stretchers. The adjustable stretcher was evaluated using a product evaluation questionnaire (Product Evaluation Group, 2005) completed voluntarily by ten orderlies. Informal feedback was also provided at a team meeting. The orderlies' manager and the ergonomist met on one occasion with two St John's paramedics.

## RESULTS

### *Task analysis*

The patient arrives lying on an ambulance stretcher inside the ambulance. The stretcher may be a fixed-height or adjustable height stretcher. The adjustable height stretcher is treated as fixed height by staff as it is difficult to adjust. To unload, the stretcher is unlocked and wheeled to a suitable position within the ambulance where it is manually lifted onto the ambulance bay deck by two people (usually a paramedic and an orderly). The ambulance stretcher (weighing 35 kg) plus patient is then lifted to at least 900 mm above the floor onto a cradle trolley. The cradle trolley is purpose-built to carry the stretcher. It raises the pushing height, improves steering via two fixed wheels and provides luggage storage. The trolley and patient are pushed by the orderly to the ward, where a nurse helps the orderly laterally transfer the patient onto a bed using two transfer boards.

Four hazardous activities were identified: lifting to unload/load the stretcher from the ambulance, lifting/loading the stretcher onto the cradle trolley, transporting the patient to the ward and transferring the patient onto the ward bed. The highest risk task was identified as lifting the stretcher and patient onto the cradle trolley because of the excessive load and awkward height for lifting.

### *Recommendations*

Two solutions were proposed that could be implemented within the hospital. One option was installation of a purpose-built mechanical lifting device to raise the patient on the stretcher and redesigning the cradle trolley. This was not favoured because it only focussed on eliminating the manual lifting of the stretcher without improving ease of transportation and ease of transferring the patient onto the bed in the ward. The preferred option was to trial an adjustable height stretcher. This eliminated the hazardous lifting of the ambulance stretcher, but required an additional low-height

lateral transfer off the ambulance stretcher onto the adjustable stretcher using a Rollbord in the ambulance bay, prior to transportation to the ward.

### ***Adjustable stretcher evaluation***

Ten orderlies completed forms evaluating the adjustable stretcher. Eight found it easy to use but only five thought it suitable for this situation. Five orderlies raised concerns about the need for an extra transfer, patient privacy, carrying luggage, difficulty transferring at the low stretcher height in the ambulance bay and the unwillingness of the St John's paramedics to try this solution. Issues raised by the two St John's representatives included alternative methods of transporting patients e.g. in wheelchairs rather than stretchers, uncertainties about their contract with the hospital and ways to improve compatibility between the heights of the ambulance and adjustable stretchers.

## **DISCUSSION**

The most hazardous activity identified was lifting the ambulance stretcher and patient onto the cradle trolley. This was necessary because the ambulance stretcher was not easily height adjustable and the wheels were unsuitable for long-distance travel within the hospital. These stretchers were owned by St John's and were unlikely to be replaced in the near future. This posed a major constraint on what could be done; therefore the immediate focus was how to reduce the risk for orderlies while using the current ambulance stretchers. Lavender et al (2000b) found that the limiting factor for a significant proportion of paramedics was the strength required to initiate lifting a stretcher plus a 48 kg dummy, hence the priority of eliminating the lifting in this project. Further study on the influence of hand strength and wrist angle when lifting may help to determine the significance of the forearm injury which triggered this investigation.

Retaining the cradle trolley and providing a lifting device to raise the patient on the ambulance stretcher only eliminated the lifting but did not improve the associated hazardous activities. Designing and manufacturing an appropriate lifting device raised concerns about safety compliance, timeframe, budget and doubts about the suitability of the final product. In contrast, the other option of using an adjustable stretcher could be evaluated prior to purchase.

Replacing the hazardous lifting with a safer low-level lateral transfer in the ambulance bay caused concern about potential discomfort for tall orderlies. A postural analysis of paramedics by Lavender et al (2000a) identified significant trunk and shoulder flexion when lifting a patient horizontally between a bed and stretcher 530 mm high and recommended an interface board to reduce frictional forces. For the current project, a Rollbord was used to eliminate lifting and reduce the pushing and pulling forces. By holding a sheet placed between the patient and Rollbord, the orderlies were able to remain more upright. Technique-specific training and practice may overcome the orderlies' objections and further help reduce risk of injury.

The paramedics suggested that a raised platform for the ambulance stretcher would improve the height for the extra transfer. This was not considered practical because

the platform would create a tripping hazard and constrain the working space in the ambulance bay. Several orderlies advocated for the status quo. Whysall, Haslam & Haslam (2004) recommend a collaborative problem-solving approach to enhance client understanding of the rationale for recommendations. Although participation and consultation with the orderlies was sought, the influence of the St John's paramedics was under-estimated by the investigators. The orderlies' manager leading the project was reluctant to involve the ambulance staff too early because of uncertainty about contract negotiations. Comments made by the paramedics indicated that they were unaware of current safe handling practices and did not appreciate the significance of eliminating the unsafe lifting. The orderlies who found the adjustable stretcher useful reported that they felt unable to insist on its use as the paramedics were "more qualified".

## CONCLUSIONS

In this study the design of the ambulance stretcher was the central problem, but its ownership by St Johns limited the scope of the recommendations to those that could be actioned within the hospital. The proposed solution of using an adjustable stretcher and additional transfer within the ambulance bay required compromises. The process of evaluating the proposed solution was challenging due to many organisational issues. In order for an intervention of this type to be successful extensive collaboration and change management are required.

## Acknowledgements

The author gratefully acknowledges the cooperation of Canterbury District Health Board and the help of Nicola Green in the preparation of this manuscript.

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