**PRE-ASSESSMENT**

*Patient Lift Technologies*

Before CCOHTA decides to undertake a health technology assessment, a pre-assessment of the literature is performed. Pre-assessments are based on a limited literature search; they are not extensive, systematic reviews of the literature. They are provided here as a quick guide to important, current assessment information on this topic. Readers are cautioned that the pre-assessments have not been externally peer reviewed.

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**Introduction**

In 2002, nurses in Ontario experienced back, neck and shoulder injuries that accounted for 52% of their lost-time compensable injuries.¹ The same year, over half the injuries to nurses and nursing assistants in hospitals were categorized as musculoskeletal sprains and strains. In the United States, nursing is considered to be the riskiest occupation with regards to back injury.¹ In a 2001 poll conducted by the American Nurses Association, 83% of the 5,000 nurses surveyed reported that they experienced back pain at work. Most of the pain was related to the lifting of patients.¹

Research conducted over the past three decades points to frequent and manual movement of patients, regardless of circumstances, as one of the main risk factors associated with back injuries to nurses.²³ It has been suggested in recent health care policies that the manual lifting of patients be eliminated.¹ Assistive technologies have been recommended as the primary intervention for reducing injuries associated with the lifting and transfer of patients.

Patient-lift technologies (patient lifts), also known as patient-handling systems or hoists, are used in hospitals, rehabilitation centres, nursing homes and private residences where patients are physically or mentally unable or unwilling to assist in the transfer; are unable to bear weight on one leg or both arms; are unable to maintain balance while standing; are unable to move or straighten their hip, knee, shoulder or elbow due to severe contracture or pain; or are displaying inconsistent or aggressive behaviour.¹⁴ There are two types of patient lifts available for caregivers to use in carrying patients.⁴⁵ The most common are the mobile lifting devices (mobile hoists), which require two caregivers to operate; and the ceiling mounted devices (fixed ceiling-track hoists), which can be operated by one or two caregivers. When using these devices, the caregiver typically transfers the patient from a bed or chair to a patient support (e.g., sling, hammock or harness). A lifting mechanism (e.g., battery-operated or mechanical-hydraulic cylinder) is used to raise the patient to the height required for the transfer. The caregiver then positions the patient over the new surface and uses the lifting mechanism to gently lower the patient.⁴ Some mobile lifts are specially constructed for transport. Most lifts in use, however, are designed for moving patients from one surface to another, not for transporting them over long distances (e.g., from one room to another via a hallway or elevator).⁶
**Research Questions**

1. What is the available evidence on patient lifts for the prevention of back injuries in health care providers?
2. What is the feasibility of undertaking a technology assessment on patient lifts?

**Assessment Process**

A search strategy for PubMed (1966-27 Aug 2003), The Cochrane Library (2003 Issue 3), web sites, clinical practice guidelines and clinical trials registries (according to the Canadian Coordinating Office for Health Technology Assessment HTA checklist) was developed. After corresponding in August 2002 via e-mail with the Agence d’évaluation des technologies et des modes d’intervention en santé (AETMIS) in Quebec, we learned that AETMIS is not considering this topic. AETMIS was consulted because of prior discussions that were held to explore possible areas of collaboration between the two agencies.

**Summary of Findings**

Table 1: Type and number of studies

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Number of Studies</th>
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<tr>
<td>Primary studies (8):</td>
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<tr>
<td>- Randomized controlled trials</td>
<td>1</td>
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<tr>
<td>- Case-control studies</td>
<td>3</td>
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<tr>
<td>- Pre-post studies</td>
<td>4</td>
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<tr>
<td>Systematic reviews</td>
<td>1</td>
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<tr>
<td>Evaluation reports</td>
<td>1</td>
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A) **Primary Studies**

Eight primary studies were identified through the search strategy. These consist of one randomized controlled trial (RCT), three case-control studies and four pre-post studies (one study published as two reports: clinical and the other economic). The RCT by Yassi et al. (2001) consisted of a “control arm,” a “safe-lifting” arm and a “no strenuous lifting” arm (Table 2). A medical ward, a surgical ward and a rehabilitation ward were randomly assigned to each arm. Personnel in the intervention arms received intensive training in back care, assessment of patients and handling techniques. Those in the “safe lifting” arm used improved handling techniques and manual assistive devices, whereas those in the “no strenuous lifting” arm aimed to eliminate manual methods through the use of additional mechanical devices. Musculoskeletal injury rates were not significantly altered in the two groups after up to a year of follow-up.
<table>
<thead>
<tr>
<th>Author, Year (Country)</th>
<th>Design</th>
<th>Patients and Setting</th>
<th>Intervention and Control Characteristics</th>
<th>Primary Outcome Measures</th>
<th>Results</th>
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<tbody>
<tr>
<td>Yassi, 2001 (Canada)</td>
<td>RCT</td>
<td>346 nurses and unit assistants employed on nine wards at Health Sciences Centre in Winnipeg</td>
<td>I1: &quot;No strenuous lifting&quot; program: new mechanical total body lifts, sit-stand lifts and set of sliding devices for each room I2: “Safe lifting” program: one mechanical total body lift on ward; transfer belts in each room; and two large and four small sliding devices on each ward C: &quot;Usual practice&quot;; staff received training in body mechanics or lifting techniques on request and received training for equipment that was in regular use on wards</td>
<td>Oswestry low back pain disability questionnaire for back pain and disability assessed at baseline, 6 months and 12 months</td>
<td>Self-perceived back pain and disability improved on both intervention arms, but staff on mechanical devices arm showed greater improvements; musculoskeletal injury rates were not significantly altered between groups</td>
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</table>

The three case-control studies with small sample sizes identified for this review compared patient lifts to manual techniques. Silvia et al. (2002), using six volunteers as subjects with experience in transferring patients, found that the use of two mechanical devices (Barton Patient Transfer System and Sling-Suspension Lift) resulted in less stress on the lower back (partly assessed using electromyography) and they were more desirable to use than conventional manual methods. Garg (1991), using six nursing students as nurses and as passive patients, found that two of three mechanical devices (Hoyer Lift; Trans-Aid) were as physically stressful as manual methods. It took longer to make the transfer (bed to wheelchair and vice versa using these devices) than manually lifting the patients. The case-control study by Heacock (2002), reported in abstract form as a pilot trial, compared the BCIT lift (developed by the British Columbia Institute of Technology) to a manual method of transfer and lift. This study consisted of 38 home service workers in clients’ homes assisting with rehabilitation and activities of daily living. Heacock (2002) reported that the BCIT lift was an improvement over the manual method of transferring and approximated the more expensive automatic lifts (BCIT lift has a retail price of C$2,000) in terms of perceived exertion, ease of use and safety.
Four pre-post studies were also identified, with one study reported in abstract form. One of these studies was undertaken in British Columbia\textsuperscript{11} and one in Ontario,\textsuperscript{14} with one reporting pilot results for the SturdyLift\textsuperscript{TM} patient lift developed in Ontario.\textsuperscript{14} Musculoskeletal injury rates were assessed in three studies; all three studies reported a reduction in the number of injuries (range 50 to 100 health care providers) after the installation and implementation of patient lifts.\textsuperscript{11,13,15} Two studies also demonstrated cost reductions in the post-intervention phase.\textsuperscript{12,13}

**B) Systematic Review**

One systematic review by Hignett (2003)\textsuperscript{16} was identified (Table 3).

<table>
<thead>
<tr>
<th>Author, Year (Country)</th>
<th>Study Design</th>
<th>Results</th>
<th>Authors’ Conclusions</th>
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<tbody>
<tr>
<td>Hignett, 2003\textsuperscript{16} (UK)</td>
<td>Systematic review on 32 studies: nine studies on activities with patient starting in lying position</td>
<td>Use of manual assistive devices is recommended for moving patient in lying position</td>
<td>Evidence supports use of hoists (for non-weight bearing patients) and specific manual assistive devices; devices should be included on minimum requirement list in any clinical environment where handling of patients occurs regularly;</td>
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<td></td>
<td>23 studies related to patients in seated positions</td>
<td>A mechanical device (hoist) is recommended for moving non-weight bearing patients</td>
<td>lack of research relating to handling of patients in standing position is of concern; recommended that this area should be of high priority to address concerns about handling of patients in rehabilitation</td>
</tr>
<tr>
<td></td>
<td>No studies with respect to handling of patients who start from a standing position</td>
<td>Not applicable</td>
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**C) Evaluation Report**

One Canadian evaluation report on patient lifts was undertaken by the Conseil consultatif sur les aides technologiques (CCAT) in Quebec\textsuperscript{17} (Table 4).
Table 4: Summary of findings from evaluation of patient lifts

<table>
<thead>
<tr>
<th>Author, Year (Country)</th>
<th>Study Design</th>
<th>Results</th>
<th>Recommendations</th>
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<tr>
<td>CCAT, 1993(^{17}) (Canada)</td>
<td>Evaluation of patient lift technologies: 68 models listed, of which 39 were evaluated according to CCAT method and 29 were done basically</td>
<td>At the end of evaluations, 16 models accepted for eventual financing; only models destined for domestic use were of concern, in accordance with CCAT’s mandate</td>
<td>Patient lifts should be insured in framework of a universal program, according to allocation criteria for each type of device, taking into account its frequency of use, number of assistants needed and patient characteristics. Financed models have been identified accordingly. Among basically evaluated models, those judged to be pertinent should be object of experimental procedure, after evaluation.</td>
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**D) Ethical, Legal and Psychosocial Considerations**

Ethical issues include a patient’s right to autonomy, especially the right of a patient to refuse the use of mechanical devices; the rights and obligations of nurses and other caregivers involved in the transfers of patients; and the justification for influencing patients’ choice.\(^{18,19}\)

Legal issues include legal protection for staff nurses when patients are injured while using mechanical devices.\(^{20}\) In 1996, Health Canada received reports of seven incidents that resulted in injury and that involved the malfunction or misuse of six brands of mobile patient lifts.\(^{6}\) The injuries included one death, one skull fracture and five cases of less serious injuries involving minor bruising. Four of the incidents involved the release of the sling from the lift or the failure of the sling. In three of the four incidents, an unbalanced load caused by an improperly positioned patient leaning to one side or moving around was confirmed or suspected as the cause.\(^{6}\)

**Conclusion**

Based on the limited evidence available, it is proposed that CCOHTA does not undertake an assessment on patient lift technologies at this time. Findings from one completed RCT show no significant differences between the intervention and control groups with regard to the primary outcome of musculoskeletal injury to the health care provider. The intervention patients in these trials were randomized to various mechanical devices, thus making it difficult to assess the efficacy of individual patient lifts. In addition, a systematic review summarized by Hignett (2003) included the use of mechanical and manual assistive devices in the intervention groups.
Ongoing work on the efficacy of patient lifts is being undertaken by the Sunnybrook and Women’s College Health Sciences Centre in Ontario, and an assessment may be considered after the findings of this evaluation are published. Another Canadian organization involved in the study of patient lifts is the Association paritaire pour la santé et la sécurité du travail du secteur affaires sociales (ASSTSAS) in Quebec.

References


