

## Biomechanical evaluation of hotel luxury bed making while using a mattress-lift tool and fitted sheets

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**Background.** The deployment of luxurious bed mattresses in hotels has been implicated as a source of physical exposure associated with musculoskeletal disorders (MSDs) in hotel room cleaners. The purpose of this study was to quantify biomechanical and cardiovascular exposure while making beds — with and without interventions (tool and fitted sheet).

**Methods.** 16 female hotel room cleaners with at least six months' experience and no severe pain over the prior week participated in this laboratory-based study of multi-factorial crossover design. Information concerning personal data, work experience and discomfort (NPS) was collected at baseline and fatigue (BORG-CR10) was collected after each condition. Participants made a queen size bed eight times, randomizing the order of interventions (tool and sheet). Muscle activity of the flexor digitorum superficialis (FDS), extensor digitorum (ED), biceps brachii (BB) and deltoid (DL) was quantified using surface electromyography (Delsys Trigno, Natick, MA) and summarized reporting median (APDF 50%) and peak (APDF 90%) amplitude probability distribution functions. Heart rate (HR) (Garmin, Olathe, KS) was collected continuously to assess cardiovascular load. Data were analyzed using a repeated measures ANOVA and a tukey post-hoc test.

**Results.** 11 of 16 individuals were Hispanic and 25% (n=4) had a BMI $\geq$ 30kg/m<sup>2</sup>. Discomfort over the past year was moderate in the hands/wrist (X=4.3,SD=3.4) and low back (X=5.0,SD=3.4). 50% reported taking medication for pain, and up to 25% reported days off or having difficulty maintaining their work pace due to pain. The average % relative HR (32%) and fatigue in the upper extremity (<2) and back (<3) was consistently lower following tool and fitted sheet use (p<0.05). Average mean ED (X=35%,SD=23) and peak FDS muscle activity (X= 60%, SD=25) was lower with tool use (p<0.05).

**Discussion.** Hotel room cleaners are exposed to high cardiovascular and biomechanical loads when making beds. Interventions such as a mattress lift tool used with fitted sheets reduced some muscle loads and fatigue.

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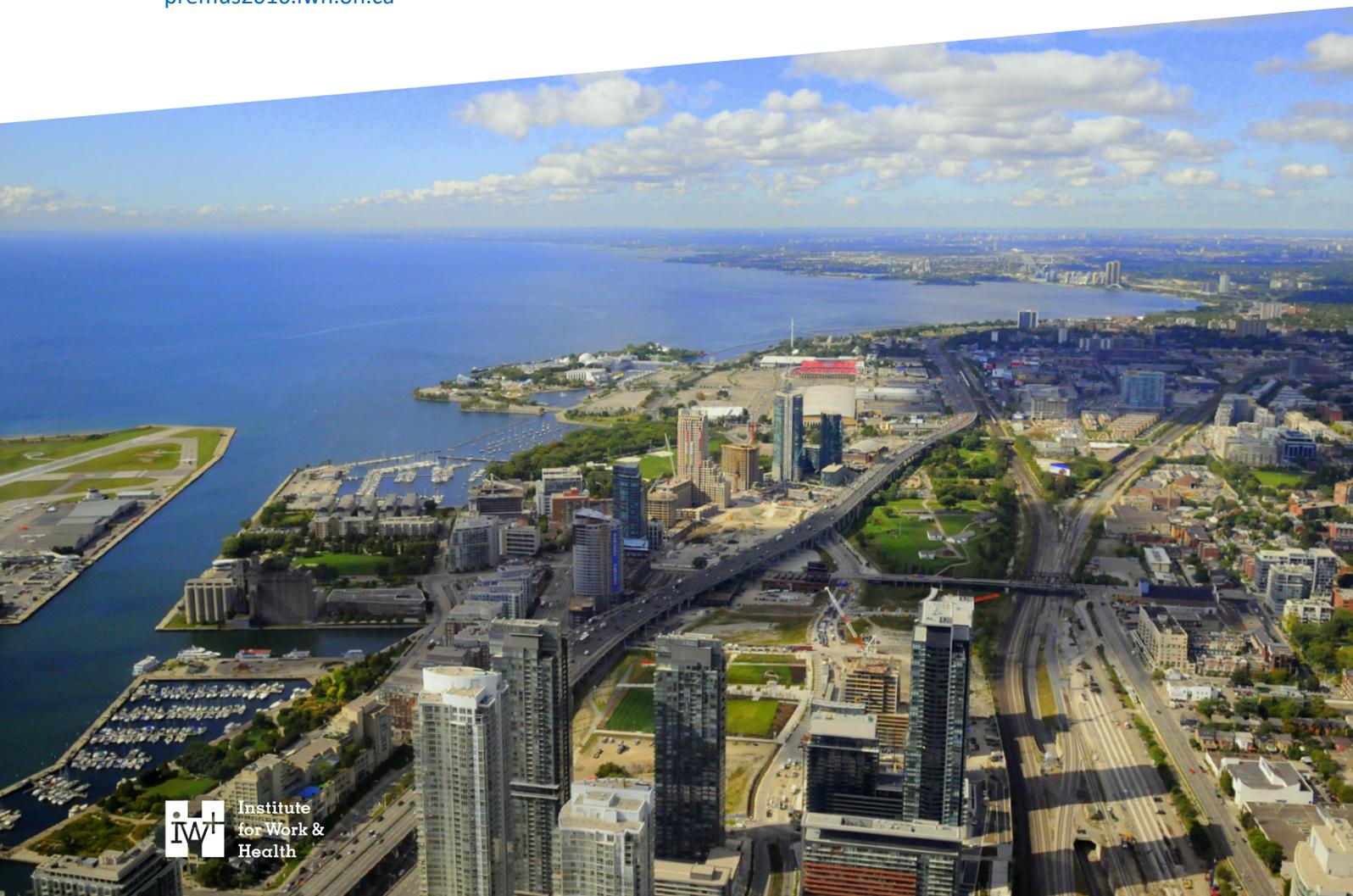
## BOOK OF ABSTRACTS

June 20-23, 2016

Allstream Centre

Toronto, Canada

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