

# **The Adoption of Ergonomic Innovations for Injury Prevention**

**Bo Glimskär  
Tore J Larsson**

**Centre for Health and Building  
Royal Institute of Technology  
Sweden**

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**RISK**

***The decision-maker confronted with a general risk panorama (risk to others)***

**RISK EXPOSURE**

**RISK HANDLING**

**Types and ways of production**

**Cultural patterns**

**Technical-economic structure**

**Political-legal system**

**Arenas of activity**

**Norm systems**

**Patterns of activities**

**Individuals' /groups' attitudes**

**Conditions/situation of risk exposure**

**Personality, perceptions, reactions**

**Acute risk situation**

**Crisis handling**

***The person in an acute risk situation (risk to oneself and/or identified others)***

# Exposure to risks at work

**psychological risks  
leadership, organization**

**physical risks; machines, processes**

**work situation; demand/resources**

**work pace**

**working hours, shifts, rosters**

**work postures, visual load (eyesight)**

**static/dynamic physical load**

**noise, vibrations, chemicals  
temperatures**

## **Occupational trauma risks:**

- seen as dependent upon behaviour**
- unevenly distributed over industries**
- unevenly distributed over severity**
- unevenly distributed over costs**

**Concrete risk**

**Abstract risk**

**Internal  
control**

**Accidents**

**Tobacco and  
alcohol**

**External  
control**

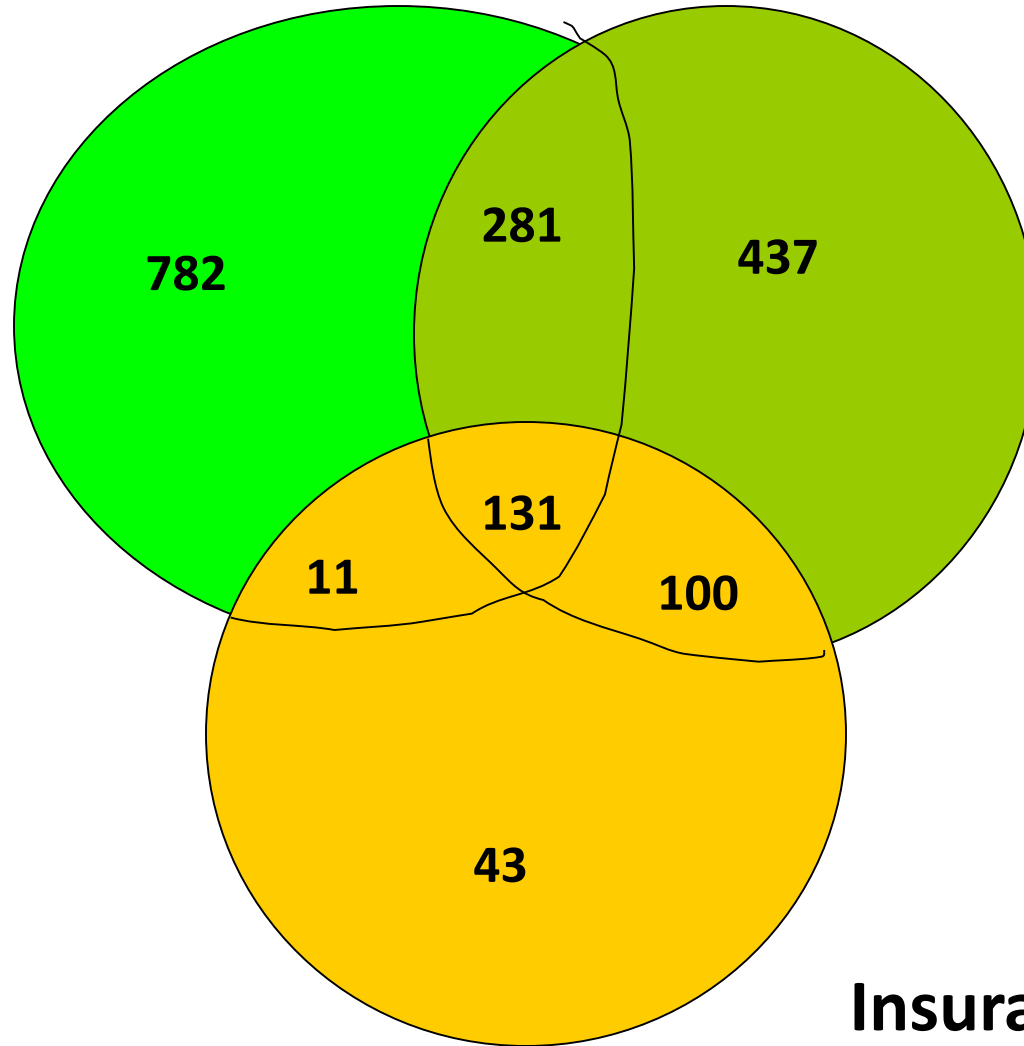
**Chemicals**

**Disasters**

	<b>Concrete risk</b>	<b>Abstract risk</b>
<b>Internal control</b>	<b>Accidents</b>	<b>Tobacco and alcohol</b>
<b>External control</b>	<b>Chemicals</b>	<b>Disasters</b>

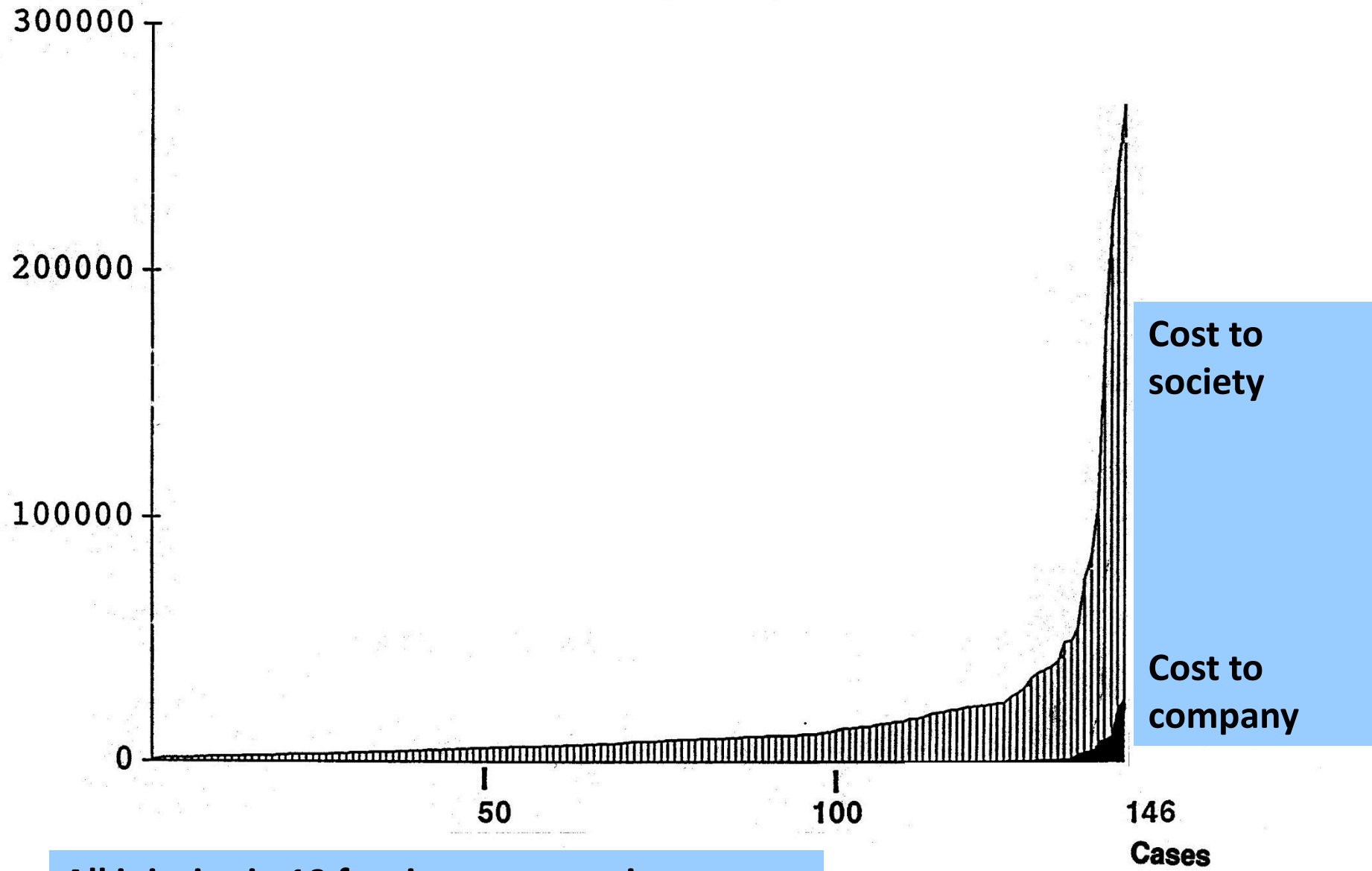
**Hospital (1205)**

**Inspectorate (949)**



**Insurance (285)**

**Total = 1785**



All injuries in 19 furniture companies over one year, N=146.



## UNITED KINGDOM 1884-94

<b>Occupation</b>	<b>Numbers employed</b>	<b>Work-related fatalities 1884-94</b>	
<b>Factory workers</b>	<b>5,270,835</b>	<b>4,047</b>	<b>1/10,000 pa</b>
<b>Railway employees</b>	<b>381,626</b>	<b>4,717</b>	<b>1/1,000 pa</b>
<b>Seafarers</b>	<b>188,391</b>	<b>21,241</b>	<b>1/100 pa</b>





**How can we  
make people  
cope with risk?**

In the Swedish female workforce,  
30% of the long-term disability due to MSD  
is sustained by nursing staff;

**Nursing Aides, Assistant Nurses and  
Personal Assistants.**

These occupational groups run a 35%  
higher risk of MSD-related long-term  
disability than the average in the labour  
market (AFA Insurance 2015).

Innovations to reduce the incidence of musculoskeletal disorder, MSD, have been introduced in different branches of industry, but with limited success.

Ergonomic innovations in the health care sector are of an incremental character and seem to have similar problems of adoption as the ones in the building and construction industry.

Three examples of ergonomic innovation are examined here:

- a glue spreader for floor layers
- a four-wheel walker with a lifting device
- a sonographer's scanning support device

**A glue-spreader for floor layers**





**A lifting walker**



**MediRob**  
--  
**sonography**  
**by joystick**



# Glue-spreader

This study has examined the current situation with regard to the use of the glue spreader 20 years after its introduction on the market. Forty-nine companies responded to a questionnaire.

It can be confirmed from this material that the companies admit that they have employees with knee problems. Despite this, they are **not** using the glue spreader, although it could reduce their knee problems in the long term.

The majority of the companies said that they did not want to change the way they work because it takes time to learn how to do things in a new way. Seven out of ten companies reported that their colleagues do not use the tool.

- From the ergonomic point of view it is easy to see that the task of gluing standing up, instead of crawling on your knees, represents a clear advantage. Since neither the quality of work performed nor the production time is affected, the relative advantage is strengthened.
- The flooring companies are well aware of the MSD problems, mainly to the knees, and a large proportion of the work force experience these problems.
- To understand and use the product is self-evident; the work is performed with the same material and equipment as before, with the addition of an extended handle for the task to be performed standing up.
- The solution has been generally available and is easy to try out, even at restricted surfaces.
- The solution was well known among flooring companies and most companies also had tried the product.



The solution has not been adopted by the majority of floor layers in spite of the problems related to MSD in the occupation.

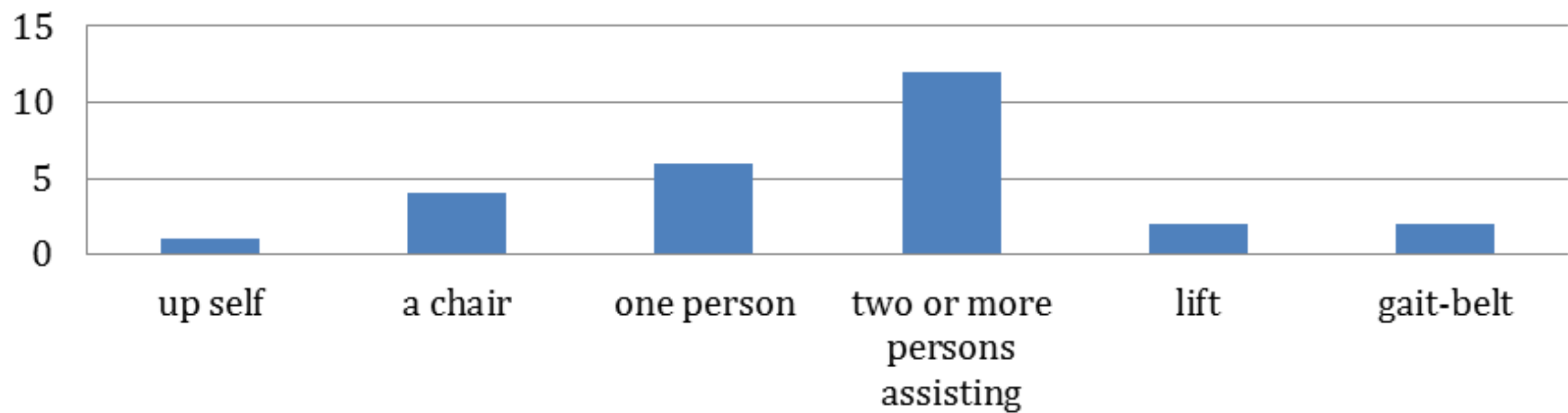
The solution is used to a limited degree and predominantly among those, who suffer knee injury problems.

# **The four-wheel walker with a lifting beam**

The study was conducted with nursing staff in a nursing home in order to examine the conditions for how a walker equipped with a lifting beam could facilitate the task of assisting patients who have had a fall.

The trial was conducted at a home for people with Parkinson's disease. The reason for the choice of an accommodation for Parkinson's disease is that the residents, due to their disease, often fall, which would provide a setting for a qualified evaluation.

## The way to get up

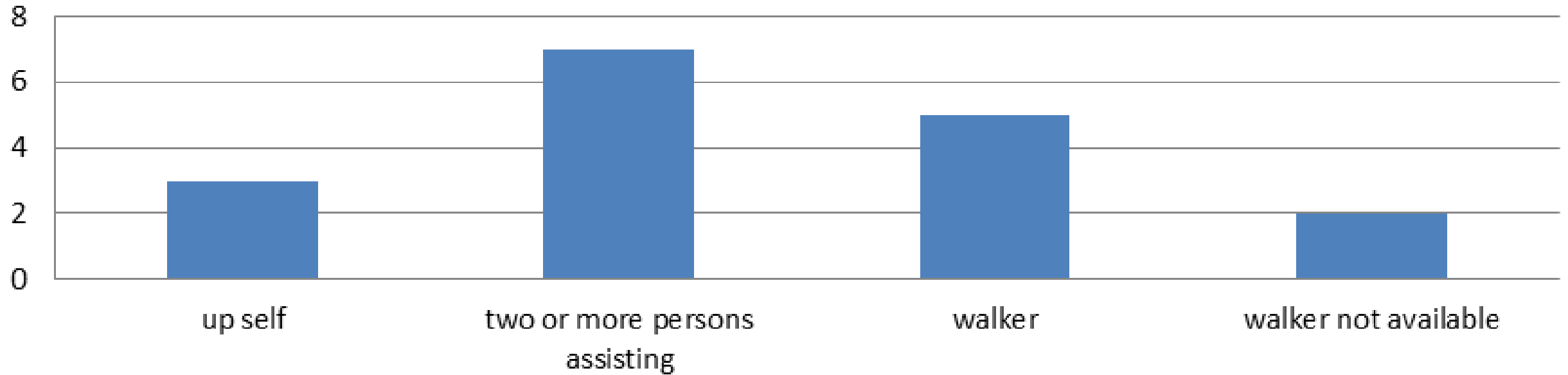




The walker with the lifting beam was presented and demonstrated at the monthly meeting of staff. The staff was instructed in how to handle the walker and tested using the walker to get up themselves. After this introduction the walker was left at the nursing home. The intention was that the staff would use the walker as much as possible in falls during the next month.

A total of 17 falls were recorded the following month.

## The way to get up



In the seven falls where the walker has not been used, two or more of the staff helped the patient up and therefore they did not consider that any aids were necessary.



- For care staff dealing frequently with people who fall, this assistive device can decrease the risk of occupational injuries.
- The lifting of patients from the floor, without assistive devices, exposes staff to high workloads in awkward postures. The solution implies that health care staff, who frequently assists people getting up from the floor, will have a reduced risk of MSD.
- The solution could potentially reduce a large work environment problem for the health care staff.
- The solution has proven easy to understand and to use. Compared to the lifting devices available, this solution is simpler to use.
- The solution is easy to trial. It is easy to understand how to use the device and to realize its advantages.

To break through into the market requires decision makers to prioritize measures directed at MSD and increase the availability of assistive devices.

In addition, the health care staff must decide to increase their use of assistive devices in order to prevent the injury risks.

## **Medirob - sonography by joystick**

The purpose of the study was to investigate if an ergonomic innovation – Medirob - aimed at eliminating a hazardous exposure related to an increased risk of MSD among Sonographers will be adopted by the User for prevention purposes solely based on its ergonomic properties, or if it will require the inclusion of other production technology properties.

A total of 9 clinic/department heads were interviewed; 3 who bought the equipment, 3 who had tested the equipment but have chosen not to buy and 3 that have chosen not to test the equipment.

The results of the interviews show that all respondents were aware of the equipment, the Medirob, and all admitted that they have MSD problems in each department.

The approach to the MSD problems has primarily been job-rotation; 8 of 9 state that the Sonographers only work with ultrasounds examinations either morning or afternoon. However, MSD problems persist, but on a somewhat reduced level.

*How do you think or know Medirob affects the time for an examination?*

	positive	no change	negative
I		2	1
II		1	2
III			3

Non-users were asked if, hypothetically, the examination time was decreased by 20% per patient, would that have an effect on the decision to purchase. All of the non-users claimed that this would have a positive impact on the decision.





- The solution reduces the ergonomic load of the Sonographer to a minimum. This eliminates the major hazardous exposure resulting in MSD in this occupational group.
- The solution fulfils all the requirements for a correctly performed ultrasound investigation.
- The solution is more complex than the old technology and requires a learning period. After this, the sonographer experiences an improvement.
- The solution is easy to trial and requires no added previous knowledge.
- It is easy to see the advantages of the solution.

# Conclusions

Taken together, the studies show that ergonomic innovations have difficulties with reaching a big market; the investigated innovations are adopted by those who have suffered injury, but not taken up for prevention.

The relative advantage will depend on whether or not you are injured, or if you represent some form of interest group (work environment organisation), which might have been involved in initiating the product development

The studies support the hypothesis that an ergonomic innovation is not adopted for prevention of occupational injury unless the innovation also has other relative advantages apart from the ergonomic ones.

For the group who already has sustained an injury, it is enough that the ergonomic problems are solved, while the other, symptom-free group, requires other advantages in order to adopt the innovation; increased production economy seems to be the most prominent potential advantage.