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Appendix 1: An occupational health economic example

The following describes an occupational health economic example based on a relatively common event involving a patient transfer.

Lena, aged 45, works as an assistant nurse in a healthcare unit:

> *"I work in a healthcare unit at a hospital and enjoy my job very much. But two weeks ago, something happened. There was a lot to do at work and I was going to help a patient move from the bed to the wheelchair. I felt like I was standing a little oddly and had to adjust to prevent the patient from falling. I felt my back creak, but I clenched my teeth and finished working that day. Now, it's been a week and it has only become worse and I have been on sick leave for some time."*

What direct consequences did the event have? Lena suffered pain in her back but still finished her work that day. Immediately after the incident, Lena was on full-time sick leave for two weeks due to fully reduced work capacity; i.e. she could not do her work as she had difficulty bending and coping with the daily work at the unit, such as making beds and handling and moving patients. During Lena's sick leave, the employer pays her sick pay for two weeks.

What short- and long-term consequences might the event lead to? A stand-in needs to be appointed to replace Lena, unless her colleagues take over her tasks. If Lena is on sick leave for more than these two weeks, the costs will be passed on to the Swedish Social Insurance Agency, and the socio-economic costs will increase. Lower back problems usually go away, but they can persist, vary and recur, leading to reduced work capacity. This may mean that Lena will be on sick leave again, and the employer will then have a recurring cost for Lena's short-term sickness absence. The major cost for the employer, however, is that of loss of production for so-called sickness attendance. If Lena works with reduced capacity, this will affect the employer, as productivity decreases when the capacity to work does not match the tasks. Furthermore, her colleagues may end up with a higher workload if they take over tasks that Lena cannot carry out. The employer has an obligation to investigate whether the employee, in this case Lena, needs any work adaptations and, if so, carry out the adaptations and follow them up. Any adaptations must not adversely affect other workers. The employer can use occupational health as an expert resource in matters of work adaptation and rehabilitation. Lena may also need to visit her health centre for assessment and rehabilitation with a physiotherapist, as well as a doctor for pain relief medicine and a medical certificate, if she is unable to work because of her disorder.

In summary, the costs of an incident that does not seem serious can ultimately be costly for employers, society and the individual themself. The individual often suffers reduced work capacity, worse health, quality of life and a worse financial situation.

How could the incident have been prevented? What risks can be identified in the described case and how could the incident have been avoided? According to the description, there was much work to do, which can mean that the staffing level was low in relation to the needs, and Lena may have been stressed. Both of these factors increase the risk of incidents and actual injuries.

Furthermore, Lena carries out a transfer between a bed and a wheelchair and describes that she stood oddly and needed to adjust so that the patient would not fall. Does Lena need training in transfer skills? When was the last time training was given in the unit and what is the level of knowledge among employees? Has the employer budgeted for staff training? The cost of internal training in transfer knowledge is approximately SEK 3,000 per person. The case of Lena also raises the question of whether the unit has adequate work equipment and whether it has budgeted for the purchase and service of equipment. In this case, a so-called turner could have been used in the patient transfer to make the transfer safer for both the patient and the employee. A turner costs about SEK 3,500 including VAT to purchase.

When calculating the costs for the employer, the cost of purchasing work equipment and training can be related to the cost of loss of production in the case of sick leave and short- and long-term sickness absence. The standard calculation of the costs in the case of Lena is carried out according to 'Arbetshälsoekonomiskt analysverktyg - ett komplement till Riktlinjer för ländryggsbesvär' (occupational health economic analysis tool – a supplement to guidelines for lower back problems; Mynak 2019). The costs for society and the personal suffering are not included in this calculation.

Example of an orthopaedic unit

The median salary for an assistant nurse at an orthopaedic unit is SEK 25,659. The standard rate for short-term sickness absence, cost per day, is 10% of the monthly salary.

The standard rate for long-term sickness absence, cost per day, is 1% of the monthly salary. Reduced work capacity in the case of back problems means a production loss of 10–15%.

Case

Sick leave 100% for 2 weeks, then 50% for 2 weeks, and then work 100% but with reduced capacity due to back problems for another 3 months.

Cost of sickness absence	SEK
Days 1–14 (10 working days):	25,659
Days 15–28 sick leave 50% (10 working days):	1,283
Loss of production sickness presence	
3 months with back pain:	14,210
Total cost of an injury from a transfer	**41,152**
Cost of measures	**SEK**
Purchase of turner* (incl. VAT)	3500
Cost of internal training (per person)	3000
Total cost of measures	**6500**

Return on investment

In this example, we do not know the proportion of injuries that could have been avoided through preventive measures (the effect of the measure). But by putting the cost of an injury in relation to the cost of preventive measures to reduce the proportion of injuries, we can calculate how great the effect of the measure needs to be for it to be worth the investment.

Break-even SEK 6,500/SEK 41,152 = 15.8%

If the measure (turner+training) reduces the proportion of injuries during transfers by at least 15.8%, then the measure is worth the investment.

** A turner is a piece of work equipment that all employees in the unit can use for patient transfers, not just Lena in this case.*

Appendix 2: Structured multidisciplinary work environment mapping

Structured multidisciplinary work environment mapping (SMET) – Occupational health services (OHS) method for support in systematic work environment management

Structured multidisciplinary work environment mapping is an OHS method of support for systematic work environment management and consists of four parts:

1. Start-up work
2. Mapping (the SMET survey and in-depth analysis)
3. Tailored interventions
4. Evaluation

Work is underway to develop a digital version of SMET. Ease of use and support are central to this work. The programme should guide the user through all the stages of the SMET method and then automatically compile results, reports and presentation material.

The SMET computer program is expected to be available for occupational health in 2023.

The SMET survey

While waiting for the SMET method and associated computer program to be ready, the paper version of the SMET questionnaire can be used to evaluate the working environment. The survey was developed through research in the field of the work environment and is divided into three types of factors: physical, physiotherapeutic and organisational/social factors. Each part ends with a question (which is worse?) and a free text question. The survey only contains 30 questions and is designed to be time-efficient and minimise the time taken from the workplace. The average response time is only 12 minutes. The survey has been scientifically evaluated and shown to have good psychometric properties. The questions in the survey identify problems in the work environment. After that, tailored interventions can be applied and their effects evaluated.

Scientific references

Haraldsson P, Jonker D, Rolander B, Strengbom E, Areskoug-Josefsson K. Structured multidisciplinary work evaluation tool (SMET): Reliability testing of a multi-disciplinary/multi-factorial work questionnaire. Work. 2019;62(2):287–997. Haraldsson P, Jonker D, Strengbom E, Areskoug-Josefsson K. Structured multidisciplinary work evaluation tool: Development and validation of a multidisciplinary work questionnaire. Work. 2016;55:883–91.

Read more about SMET and study the user manual on the website:
www.fhvmetodik.se

Appendix 3: Specific issues for patient handling and movement

Below are questions that can be used to map the safety work on patient handling and movement in the workplace. If employees are asked to answer the questions at the beginning of the work, their answers can form a basis for further work. You can appoint occupational health or an equivalent expert to get support with an independent compilation.

The areas of the questionnaire in which several employees choose the responses 'Not at all accurate' or 'Not very accurate' indicate particular aspects of the work environment that need improvement.

Part A. Please indicate to what extent you, as an employee, agree with the statements below on how you manage safety of patient handling and movement in your workplace.				
	Not at all accurate	**Not very accurate**	**Partly accurate**	**Completely accurate**
1. Those of us who work here endeavour to cooperate to carry out safe patient handling and movement.	Only put one X against each question			
2. At our workplace, we have access to work equipment and aids that we can use for patient handling and movement.				
3. At our workplace there are fixed ceiling lifts where they are needed.				
4. At our workplace, we have a procedure for maintenance of the equipment so that it is safe.				
5. Those of us who work here take joint responsibility for work equipment and aids being used for patient handling and movement.				
6. At our workplace, we work based on a work environment policy.				
7. At our workplace, we work based on a written guideline or guidance for patient handling and movement.				
8. At our workplace, we work based on an established procedure for how to conduct risk assessments during patient handling and movement.				
9. Before we carry out patient handling and movement, we evaluate the risks that may exist in each situation in a systematic way.				
10. Before we carry out patient handling and movement, we assess the health and functional capacity of the care recipient.				
11. Before we carry out patient handling and movement, we assess the care recipient's risk of a fall.				
12. Before we carry out patient handling and movement, we assess the care recipient's ability to move themself.				
13. Before we carry out patient handling and movement, we assess whether we need more healthcare professionals to be able to transfer the care recipient in a safe way.				
14. At our workplace, we have regular training in the field of patient handling and movement and transfer knowledge/ transfer technology.				
15. At our workplace, we regularly discuss how we can prevent injuries during patient handling and movement.				
16. At our workplace, we have a designated coach who can support the everyday work for safe patient handling and movement.				

Part B. Use the questions below to reflect on how you as an employee carry out patient handling and movement at your workplace. **Discuss together in the working group.**
17. How often do you take part in tasks involving patient handling and movement?
18. How often do you carry out patient handling and movement with a colleague?
19. How often do you carry out patient handling and movement without using the work equipment needed to do so safely?
20. In the past week, what percentage of the care recipients do you consider to be independent enough not to need any help from healthcare workers?
21. In the past week, what percentage of care recipients do you think need a lot of help from healthcare workers for transfers?

Appendix 4 Action plan – An example

Risk and possible consequences	Causes	Risk level	Goals	Measures	Who	Schedule	Completed
Describe the risk and possible consequences.	Describe the reason that the risk exists or can arise.	Low Medium High	Set a measurable goal for the activity that can be followed up.	Describe which measures you intend to take to eliminate or reduce the risk.	Decide who will work on the measures being implemented.	When should the measure(s)/have been implemented. Adjust date for follow-up.	Tick off when the risk measure has been taken.
Example 1: Transferring a care recipient with impaired balance from a wheelchair to a shower chair is heavy and difficult to do. The different stages can carry a risk of exposing working postures that lead to problems such as back pain for healthcare workers. There is also a risk of injury to the care recipient in the transfer situation, with an increased risk of falls.	It is unclear for the healthcare workers how to carry out the transfer in the safest way. Ignorance of how to best carry out the transfer. Ignorance and lack of work equipment.	Means	All healthcare workers should learn/increase their knowledge of basic transfer skills. Ensure that the unit has adapted work equipment for the transfers that are to be carried out.	Basic training in transfer skills. Height-adjustable shower chairs to be purchased. A method for assessing the risk of falls to be used in the daily work. Purchase and service of work equipment.	The Head of Unit takes responsibility for managing and allocating the work and planning training and purchasing of suitable work equipment. Tasks are delegated according to a specific plan.	The manager, in dialogue with the safety representative, decides on a plan that means that during the coming year (20XX) all employees should have been offered training. The purchase of equipment takes place gradually over years. The plan must be completed at the latest by 15 December 20XX.	
Example 2: When assessing the care recipient's mobility and at the first mobilisation/transfer of the care recipient, there is uncertainty about what the employees should do. There is also uncertainty about who to turn to for questions about transfers.	There is currently no explicit working method for patient handling and movement at the unit. There are currently no clear procedures for what to do in different types of difficult transfer situations.	Means	A written procedure for how the unit works with safe patient handling and movement.	Develop a procedure for how the work with patient handling and movement should be done. It should, in part, contain how and who makes the assessment of transfer ability, procedures for difficult transfers and which work equipment should be used for different transfers. Include how new employees and summer workers are informed about the work with patient handling and movement.	The Head of Unit takes responsibility together with the collaboration group for establishing a procedure for patient handling and movement.	The procedure must be completed by 30 January 20XX.	

Appendix 5: Registers and checklist of equipment for work and transfer aids

This is a checklist to support the inventory and creation of a register of work equipment and mobility aids that are used in the care environment concerned. Having access to safe and appropriate products is a prerequisite for carrying out safe patient handling and movement. Therefore, it is essential to check that you have the right type of work equipment, in sufficient quantity and that it is safe to use and is maintained regularly.

Register and checklist of equipment for work and transfer aids

Available in the workplace?		Are there enough?		Has the work equipment been inspected?		Work equipment/mobility aids
Yes	No	Yes	No	Yes	No	
						When moving/walking:
						Walking stick/crutch/four-point support
						Walking frame with wheels
						Stand tall walker
						Support belt
						When washing, bathing and showering
						Bath and shower chair on wheels, manual
						Bath and shower chair on wheels, electric
						When moving and turning
						Sliding sheet
						Sliding sheet, sliding mat, turning mat
						Anti-slip mat, anti-slip sock
						Sliding board
						Lifting stretcher/bed with handles
						Swivel plate (turntable) Swivel plate with handles (without wheels)
						Transfer platform (with wheels)
						For lifting patients
						Mobile personal lift
						Stand lift
						Ceiling lift
						Slings
						Electric adjustable bed
						Bed accessories: bed gate/lifting pole/rope ladder

Are there procedures for checking that the equipment works and is available? Yes/No
Person responsible for the checks. Name:

About producing this guide

This research-based guide has been compiled on behalf of the Swedish Agency for Work Environment Expertise. The work to establish, discuss and write it was done during 2022 and launched in December 2022.

The guide "Safe patient handling and movement – A research-based guide for a better work environment" was translated from Swedish into English in collaboration with Charlotte Wåhlin, Glykeria Skamagki and Liv Nilsson. This version of the guide was launched 2024.

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Dialogue groups and partners have communicated knowledge and experiences that have been taken into account during the work with the preparation of the guide. The working group would like to thank experts, technical specialists and organisations for their valuable input into the work.

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Dialogue with networks and reference group

Nätverket för aktivt lärande och utveckling om personförflyttningar (NALUP; network for active learning and development on patient handling and movement). The network is made up of various representatives from regions and municipalities, and private actors with an interest in developing the area of patient handling and movement and knowledge pertaining to it. Various professions are involved, such as reg. physiotherapists, reg. occupational therapists, ergonomists, reg. nurses and assistant nurses.

The reference group for the research project Patient and Workers Safety Study (PAWSS).

The group is made up of representatives such as a healthcare unit manager, HR strategist, the Swedish Association of Health Professionals (Vårdförbundet), Kommunal (trade union), Swedish Confederation of Professional Associations (Saco; Sveriges akademikers centralorganisation), Swedish Association of Local Authorities and Regions (Sveriges kommuner och regioner), the Swedish Work Environment Authority, and the Innovation Office of Region Östergötland.

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Sveriges Företagshälsor (Swedish Association of Occupational Health and Safety)

The Swedish Disability Rights Federation (Funktionsrätt) *Östergötland*

More reading, in-depth study and literature

Web pages

As a reader you can download more information from the following websites about issues related to work environment, health care, patient safety, patient handling and movement, and ergonomics.

Authorities

The Swedish Agency for Work Environment Expertise: **www.mynak.se**
Swedish work Environment Authority: **www.av.se**
National Board of Health and Welfare: **www.socialstyrelsen.se**
National Board of Health and Welfare. Support for patient safety
https://patientsakerhet.socialstyrelsen.se/

The parties

Swedish Association of Local Authorities and Regions: **www.skr.se**
Suntarbetsliv: **www.suntarbetsliv.se**
Prevent: **www.prevent.se**

International

European Agency for Safety and Health at work, EU-OSHA:
www.osha.europa.eu/en
International EU projects: Safe Transfer technique: **https://velfaerdsteknologi.aarhus.dk/eu-projekter/safe-transfer-techniques/**
E-learning: Safe patient handling and movement E-Training (SE) – Safe patient handling and movement (STT)
(elaer.dk)

Methods and ways of working

Risk assessment with TilThermometer: **www.tilthermometer.com**
Joint website of the Occupational and Environmental Medicine Units:
www.fhvmetodik.se

Other

Vårdhandboken: **www.vardhandboken.se**. Read the pages on occupational ergonomics in healthcare and care, and on responsibilities and regulations.

National system for knowledge-driven management within Swedish healthcare:
www.kunskapsstyrningvard.se

Senior Alert. National quality registers and tools for healthcare prevention:

www.senioralert.se

Literature

A selection of the literature that has been used in the preparation of this research-based guide is presented below, divided by subject area. The selection was put together to provide tips on further reading and in-depth study. The literature is divided into the following areas:

- Injuries, exposure disorders and injuries in healthcare and care
- System perspective, safety culture, leadership, work environment and patient safety
- Work environment mapping, risk assessment, health promotion and ergonomics
- Policies and guidelines for safe patient handling and movement
- Learning and measures for safe patient handling and movement
- Aids and work equipment, purchasing and use
- Physical activity, variation and movement, recovery
- Evaluation and implementation
- Occupational health economics

Injuries, exposure disorders and injuries in healthcare and care

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