A Boost for Care Quality and the Work Environment

Two major test programmes at Nordsjællands Hospital and Regionshospitalet Gødstrup show that Careturner contributes to improved care, a better working environment, and enhanced patient quality of life.
Both hospitals chose to keep the solution.

Careturner® INNOVATIVE CARE TECHNOLOGY

COBI REHAB

Automated turning system supports prevention and treatment of delirium and pressure sores

Final report for testing Careturner in Nordsjællands Hospital

Specialist nurse Rikke Søholm Pedersen demonstrates the solution.
May 2025

Public-private innovation partnership between Nordsjællands Hospital and Careturner A/S, facilitated by Nordic Health Lab

The test was carried out in a collaboration between Nordsjællands Hospital, Careturner A/S and Nordic Health Lab. Nordic Health Lab was also responsible for compiling this report.

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Nordic Health Lab | Careturner | Region Nordsjælland Hospital

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Description of the test procedure

From November 2024 to April 2025, Nordsjællands Hospital tested Careturner in partnership with Nordic Health Lab. Able Nordic was also part of the project as suppliers of the solution. The project aimed to investigate whether the solution can support the treatment of delirium and pressure sores, contribute to an improvement in the working environment, use of pressure-relieving mattresses and the impact on logistics flow, bed cleaning and distribution. The project took place at the department of geriatric medicine and multiple long-term conditions at Nordsjællands Hospital. A total of 10 Careturners were made available to the department.

	Planned Timeline													
	2025									2024				
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Activities**	**Resources**
Phase 1 Baseline													Collecting baseline data	Nurse from the department
Phase 2 Training/installation													Ambassadors trained by the company.	Ambassadors from department, Careturner
Phase 3 Test													Testing Careturner on selected patients in the department	All department staff, department management, Careturner
Phase 4 Evaluation		6/2: mid-term		10/4: final								10/12: kick-off meeting	Initial, mid-term, and final evaluation.	Nordic Health Lab will conduct the evaluation. Department staff available.

Inclusion criteria

Three inclusion criteria were defined for the test: 1) patients with a positive CAM score or risk of delirium, 2) patients with a low Braden score or risk of pressure sores, 3) a combination of both.

Decupitus (pressure sores)

Pressure sores occur when the skin is exposed to sustained pressure, which reduces blood flow and leads to tissue damage (Sundhed.dk, 2024)[1]. Pressure sores typically occur on the lower back, hips, ankles and heels and the first sign is that the skin becomes red and swollen. The area then often becomes discoloured, eventually developing into a sore. Treating an incipient or existing pressure sore involves taking preventive measures to prevent it from worsening. This includes pressure-relieving measures, either through the use of a special mattress or manual measures where a bedridden patient is turned at least every two hours until the area of exposed skin does not deteriorate. In addition to turning the patient, the area of skin must be kept clean and dry. The Braden score was used for the test to assess a patient's risk of developing pressure sores. The score consists of six assessment areas: sensory perception, moisture, activity, mobility, nutrition and friction/shear. Each area is scored from 1 to 4 (friction/shear from 1 to 3) and the total score ranges between 6 and 23. The lower the score, the higher the risk of pressure sores.

Delirium

Delirium is an acute condition characterised by a significant deficit in attention and impaired cognition or thought patterns (Sundhed.dk, 2023)[2]. Delirium can occur as a result of somatic illness or the treatment of a somatic illness, such as urinary tract infection, pneumonia or dehydration. The duration of a delirious state varies from patient to patient (hours to days). The condition is seen in 10-50% of all hospitalised patients, and older people with dementia have up to 89% risk of developing delirium during hospitalisation (Danish Dementia Research Centre, 2023)[3]. To screen a patient for delirium, the Confusion Assessment Method (CAM) was used in this test. The CAM score consists of four criteria: acute onset and fluctuating course, lack of attention, disorganised thinking and altered level of consciousness. To be CAM-positive, the patient must fulfil the first two criteria and either the third or fourth. Treatment involves firstly recognising the condition and then attempting to prevent it and shorten its duration. This can be done by calming the patient, ensuring good sleep and in some cases using medication.

About the solution

Careturner is a 3-in-1 solution that attaches directly to the base of a care or hospital bed and works with all bed functions. Used for preventing pressure sores, assisting with transfers and sensory stimulation. Movement takes place at a gentle pace, with the patient enveloped by the mattress, creating a sense of reassurance and enhancing sleep.

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[1] Sundhed.dk, Pressure Sores - Patient Handbook, 2024, Pressure Sores - Patient Handbook at sundhed.dk
[2] Sundhed.dk, *Delirium - Lægehåndbogen (the Medical Handbook)*, 2023, https://www.sundhed.dk/sundhedsfaglig/laegehaandbogen/neurologi/symptomer-og-tegn/delir/
[3] Danish Dementia Research Centre, 2023, Delirium | Danish Dementia Research Centre



Main conclusions

The main conclusions of the test are that the Careturner turning system supports the treatment and prevention of pressure sores and delirium in hospitalised patients. The solution supports the treatment of pressure sores by automatically repositioning patients. In the case of delirious patients, the solution was seen as a non-pharmacological measure that helped calm patients. In this context, a reduction in the use of psychotropic drugs was observed in delirious patients. Hospital staff also report indications of an improvement in the physical and psychological working environment. The solution is considered a valuable complement to alternating pressure mattresses and has the potential for widespread use, while facilitating service logistics and improving the working environment for service personnel.

- Careturner supports the treatment and prevention of pressure sores by automatically repositioning patients who have or are at risk of pressure sores.
- Careturner supports the treatment and prevention of delirium, especially when using the hug and/or cradle function.
- A 54.3% reduction in average use of psychotropic medication per delirium patient was also observed.
- Overall, Careturner creates an increased sense of calm, reassurance and better sleep for hospitalised patients.

- Careturner supports the psychological working environment by offering staff a non-pharmacological measure and the solution reduces outwardly aggressive behaviour in patients.
- A low proportion of staff report an improvement in the physical working environment, as they perform less heavy lifting during transfers and when providing personal care for patients.

- A 36,7% reduction of alternating pressure mattresses was achieved.
- The test has also shown that Careturner and alternating pressure mattresses complement each other.
- Careturner can be used for a wider target group than existing pressure sore mattresses, including the prevention and treatment of delirium.
- There is potential for Careturner to be an alternative or supplement to full-time care in selected situations.

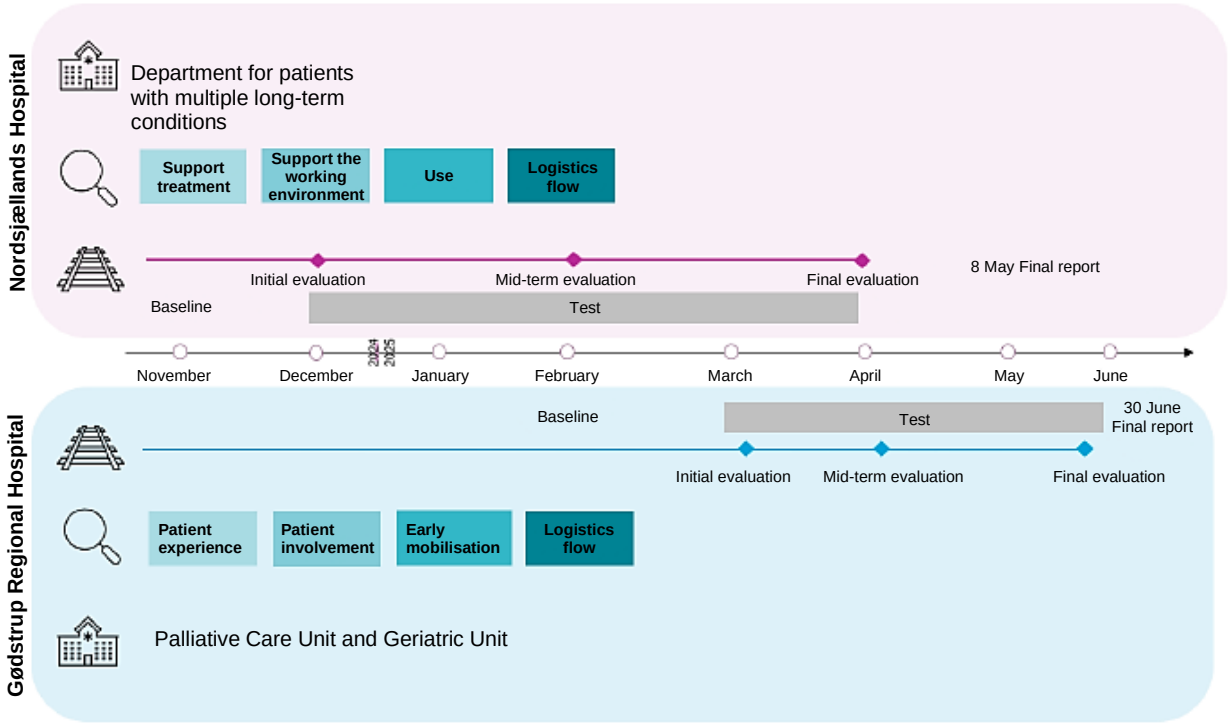
- Careturner has made workflows for service personnel easier and simpler, as it only needs to be installed once. This has resulted in less handling for preparation, distribution and cleaning of beds compared to alternating pressure mattresses.

Cross-regional collaboration with Gødstrup Regional Hospital

In addition to Nordsjællands Hospital testing the solution in a collaboration between the department of geriatric medicine and multiple long-term conditions, Careturner A/S and Able Nordic, they have also entered into a cross-regional collaboration with Gødstrup Regional Hospital to test the solution. The purpose of the cross-regional collaboration was to ensure knowledge sharing across departments for the benefit of the entire hospital, staff and patients. The collaboration allowed the solution to be tested on several different patient groups in two different hospitals, with several different evaluation parameters in mind. The solution is currently being tested at Gødstrup Regional Hospital in the palliative care unit and the department of geriatric medicine. The patient groups included in the test are patients with life-threatening diseases and hip fracture patients.

The collaboration between the two hospitals provides an opportunity to investigate the value of the solution across different specialities, patients and parameters, which will provide a better basis for decision-making after the test, as insights from both hospitals are shared.

The framework for interregional co-operation is illustrated below. The test at Gødstrup Regional Hospital is expected to be completed in June, and the results are expected to be published at the end of June.



Methodology

Quantitative and qualitative methods were used to investigate the project's objectives. EHR data were collected throughout the test in the form of CAM score, Braden score, length of stay and occupancy rate. Data on the number of reported occupational injuries and violence and threats against staff were also used. As part of the evaluation of the solution, 23 interviews were conducted with staff in the department. The interviewees were representative of all shifts. A workflow analysis of the logistics flow was also carried out based on observation and interviews. As part of the evaluation of the solution, the department collected data on the prescription and administration of psychotropic medication for patients with a positive CAM score.

The data that forms the basis of this evaluation report were collected over three primary evaluation rounds. First a baseline before test start, then a mid-term evaluation halfway through the test and finally a final evaluation at the end of the test.

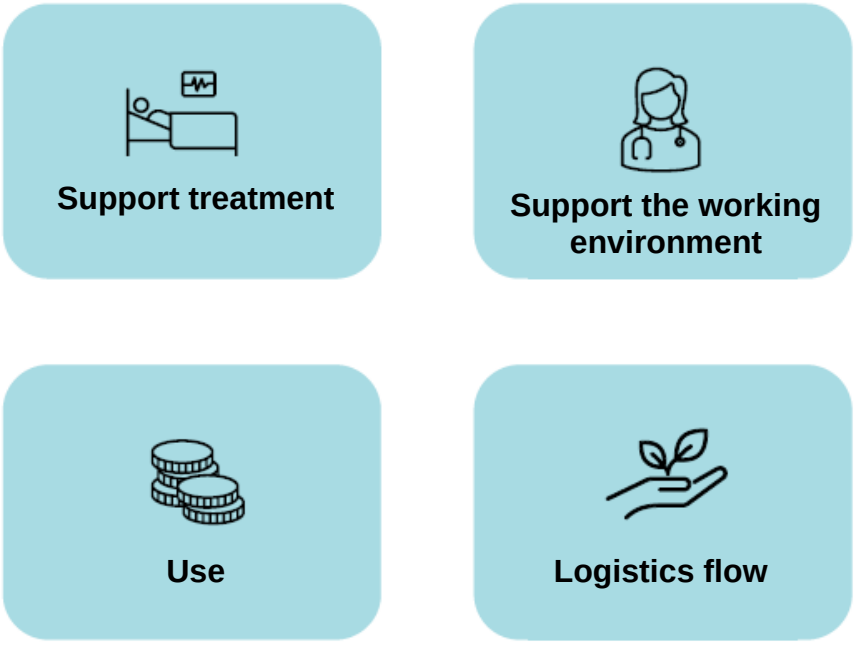
Respondents

The project included all staff in the department of geriatric medicine and multiple long-term conditions and the Logistics Department. The project group consisted of selected 'super users' in the department, department management and innovation consultants from Nordsjællands Hospital. Patients in the department who met the inclusion criteria were part of the test.

Project strategy and measurement parameters

The final project strategy and definition of measurement parameters and success criteria were identified in collaboration between Nordsjællands Hospital, Nordic Health Lab, Careturner and Able Nordic. Nordic Health Lab was responsible for the overall project management and thus facilitated the process of defining the project strategy, based on Nordic Health Lab's standardised test process and framework for evaluation of health and welfare technology solutions in the healthcare sector.

The defined measurement parameters that were evaluated during the test are as follows:



Measurement parameter I: Support treatment

The first measurement parameter aimed to investigate whether the solution could support the treatment of delirium and pressure sores. This measurement parameter had a number of success criteria covering the fact that the solution will support the treatment of delirium and thus reduce the number of days a patient is in a delirious state. The solution would also be used as a tranquilliser rather than the use of psychotropic drugs. In terms of pressure sores, the success criterion was that the solution would reduce the incidence and severity of pressure sores.

Measurement parameter II: Support the working environment

The second measurement parameter aimed to investigate whether the solution could contribute to an improved working environment. The success criteria included the physical and psychological working environments. For the physical working environment, the goal was for the solution to reduce the physical strain associated with care tasks. In terms of the psychological working environment, the success criterion was to reduce stress and the number of confrontations with patients.

Measurement parameter III: Use

The third measurement parameter was whether using the solution would have an effect on the use of pressure-relieving mattresses. The success criterion for this was that the solution would reduce the use of pressure-relieving mattresses.

Measurement parameter IV: Logistics flow

The last measurement parameter aimed to investigate how the solution affected the logistics flow for bed distribution, bed making and bed cleaning compared to the existing flow for pressure-relieving mattresses. In addition, the success criterion was that the solution should support a better and more efficient logistics flow and support workflows for cleaning of beds and mattresses after use.

Presentation of baseline

Before the solution was deployed, a baseline study was conducted. The purpose was to collect a range of relevant data, including EHR data on CAM scores and Braden scores, to understand the scope of this patient group and decide how many Careturner devices to test in practice. Data were also collected on the department's use of psychotropic medication for patients with positive CAM scores. Next, data were collected on the number of reports of inappropriate behaviour by patients towards staff and reports of occupational injuries. Key measurement parameters from the department, such as length of stay and occupancy rate, were also collected. The baseline period spanned one month and the results in this report are based on a comparison between data from this period and the test period when staff used the solution. It is therefore important to emphasise that the baseline period used is relatively short and does not represent an average over several months.

Results from baseline

In order to define the size of the patient group on which to test the solution, the department collected key data on the number of patients with positive CAM scores and Braden scores as part of the baseline. Data showed that the median number of patients with delirium and pressure sores and/or at risk of pressure sores over four weeks was 13. Therefore, the department decided to start with 10 Careturner units. This was sufficient for the department's needs throughout the test. The department has a total of 25 beds, meaning that the need for a Careturner accounts for 40% of the department's total number of beds.

In addition, the department also collected key data on the department's use of psychotropic medication for patients with a positive CAM score, i.e. patients with delirium. These data showed an average number of administrations per delirium patient of 7.29 in total.

Key figures were also collected on occupancy rates and average length of stay for patients in the department. It should be emphasised that these data are not sorted according to inclusion criteria for the test and thus represent an overall average for the entire department. For the month of November, the department had an average length of stay of 4.8 days and an occupancy rate of 75%.

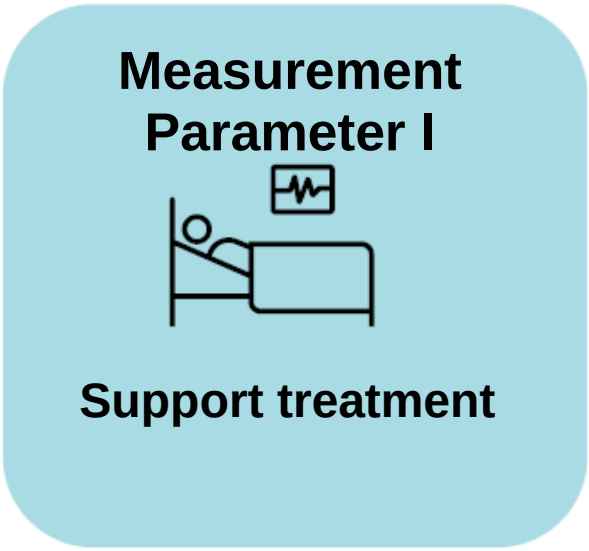
Finally, data were also collected on reported occupational injuries and reports of violence and threats against staff. There was a total of 0 reported occupational injuries in November and six reports of violence and threats.

The figures described are also shown in the table below:

Baseline data (November)	
Number of patients with delirium and pressure sores and/or risk of pressure sores (median)	13
Number of psychotropic drug administrations per delirium patient (average)	7.29
Average length of stay	4.8
Occupancy rate	75%
Reported occupational injuries	0
Reports of violence and threats	6

Results

In the following section, the results from the test will be explained and reviewed. The results will be presented in relation to the individual measurement parameters and compared with data from the baseline measurement.



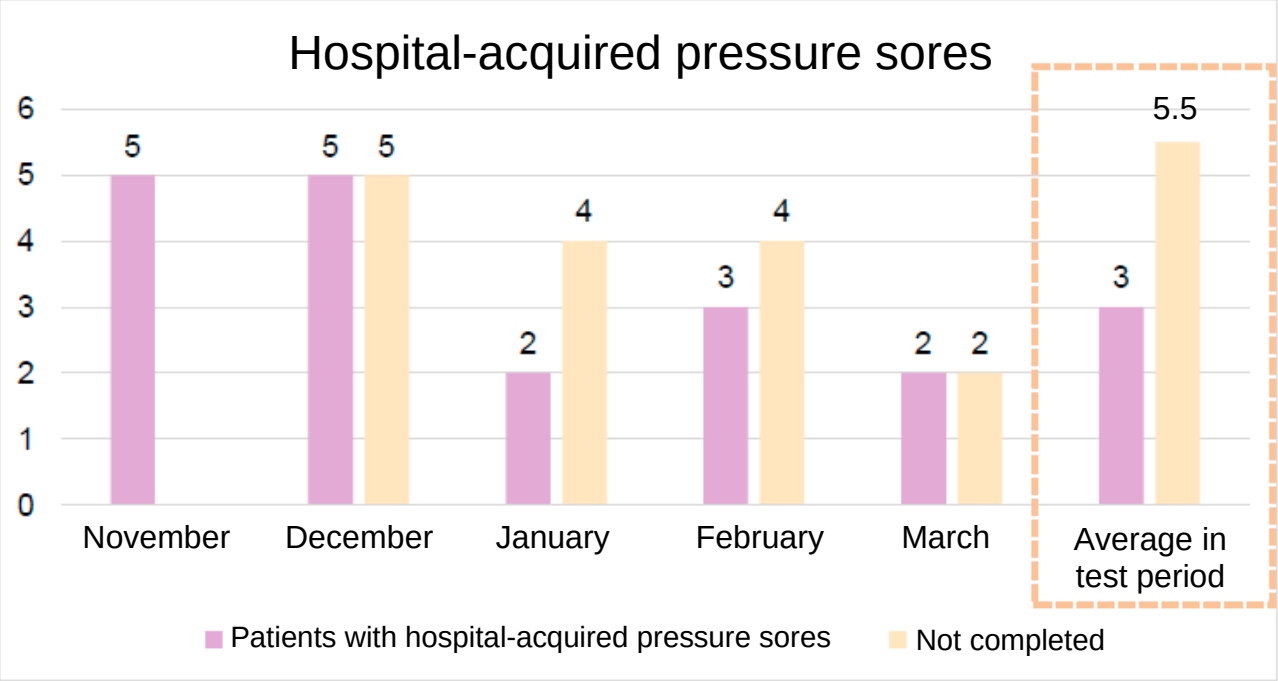
Measurement parameter I: Support treatment

This measurement parameter of treatment support was investigated for the treatment of pressure sores and delirium in hospitalised patients. With particular focus on the treatment and prevention of delirium.

Prevention and treatment of pressure sores

The overall conclusions about whether the solution supports the treatment and prevention of pressure sores in hospitalised patients are based primarily on statements, observations and experiences of hospital staff. Quantitative data on reported hospital-acquired pressure sores for the department is also included.

During the baseline period, five hospital-acquired pressure sores were recorded, this number varied during the test but never exceeded the number at baseline. Three hospital-acquired pressure sores were reported for the entire department on average throughout the test. For this data point, it is important to emphasise that the figures are subject to some uncertainty due to lack of recording practices. Thus, there is a large number of observed pressure sores that have not been properly documented and it is unclear whether they occurred during hospitalisation or before hospitalisation.



In addition to looking at the solution's impact on hospital-acquired pressure sores, the value of the solution was also identified in qualitative terms through interviews with staff. Overall, staff experiences and observations can be divided into three categories. The first concerns the solution's impact on patients at risk of pressure sores, the second concerns the solution's impact on staff workflows in relation to the prevention and treatment of pressure sores, and the third concerns the solution's impact on staff working environment.

Patients at risk of pressure sores

The solution was tested to investigate how it supports the treatment and prevention of pressure sores among hospitalised patients. The patients included were assessed for the risk of developing pressure sores using the Braden score and either found to be at risk or to have existing pressure sores.

Overall, hospital staff reported that the solution was used on a wide range of patients including elderly, terminal and patients with varying degrees of disability. This did not pose any particular problems. The solution was generally perceived as well-functioning and supportive in the care of pressure sores. It relieves existing pressure sores and often prevents them from getting worse. Fewer new pressure sores were reported and the solution was perceived as preventive. In addition, staff said that patients have better mobility in bed as no alternating pressure mattresses are used when Careturner is installed in the bed. Alternating pressure mattresses can inhibit the patient's range of movement because the mattress is filled with air, making it difficult for the patient to move on it, which can lead to further immobilisation.

"Their pressure sores began to heal, and I think we've also had fewer pressure sores develop"

Among patients with pressure sores who have good cognitive function, using the solution can be challenging. A high proportion of patients experienced discomfort here due to noise from motors or a feeling of not being in control due to the automated tilting system that turns patients at a set time interval. As a result, some patients declined to use the solution and were moved to an alternative. This is mainly because the movement can feel unfamiliar or disturbing when the patient is aware of the body movements and does not fully understand the purpose.

"Patients with pressure sores were cognisant and some found it uncomfortable to be tilted"

It became clear during the test that the practice of switching on the solution and starting a relevant programme had to be incorporated into the workflows. When the solution is not switched on, the patient does not benefit from the functions and has a high risk of developing pressure sores as they would be lying on a regular mattress. However, staff reported that when the solution was switched on, they observed a quick and effective improvement in existing pressure sores, and never a deterioration.

"If we forgot to start it, they got pressure sores, when we switched it on, they didn't"

Workflow support

When a patient is at risk of pressure sores or already has them, various nursing interventions are used to prevent and treat them. The most important thing is frequent repositioning, positioning and mobilisation. A high proportion of staff found that the solution supported them in repositioning tasks, as the solution automates this via different tilt programmes that can tilt patients to different degrees at different time intervals. The staff therefore felt that they were relieved of tasks related to the treatment and prevention of pressure sores and several also mentioned how the solution actually supports to a greater extent than they would have been able to do themselves during a shift.

"I found it reassuring that it repositions and relieves the patient's body. I rarely observed any new pressure sores and it gave me a clear conscience."

Mental relief

As the above quote indicates, the automated tilt function offered by the solution also had an effect on the staff's perceived working environment, including workload during a shift. Many reported how reassuring it was to know that patients were automatically repositioned to prevent and treat pressure sores. This gave staff peace of mind and a clear conscience when they went home after a busy shift. Night shift staff in particular mentioned how it was a relief not to disturb patients at night, giving them a good night's sleep and preventing the occurrence of pressure sores.

"For me, it was the automatic repositioning. That I had one less thing to think about. A weight off my mind."

Partial conclusion

Overall, it can be concluded that the solution supports the treatment and prevention of pressure sores among hospitalised patients. An average of three hospital-acquired pressure sores was recorded during the test, but it should be noted that a relatively large number of pressure sores were not recorded correctly and so the data are subject to some uncertainty. However, it became clear through interviews how the solution is a great support for staff in workflows related to the treatment and prevention of pressure sores, especially because repositioning is automated. Staff also reported an increased sense of calm and reassurance as patients are automatically prevented from getting pressure sores, which contributes to staff reporting a clear conscience at the end of their shift. Finally, it became apparent during the test which patient groups do not experience problems when using the solution and which ones do. In particular, patients with good cognitive function reported increased irritation or discomfort when using the solution. This was mainly because they were either irritated by the sound or felt a lack of control. In the majority of cases this could be accommodated by explaining the purpose of using the solution, in others patients had to be moved to a different bed with an alternating pressure mattress. All patients with pressure sores or incipient pressure sores were able to benefit from the solution and its features, however, some asked for an alternative for non-medical reasons.

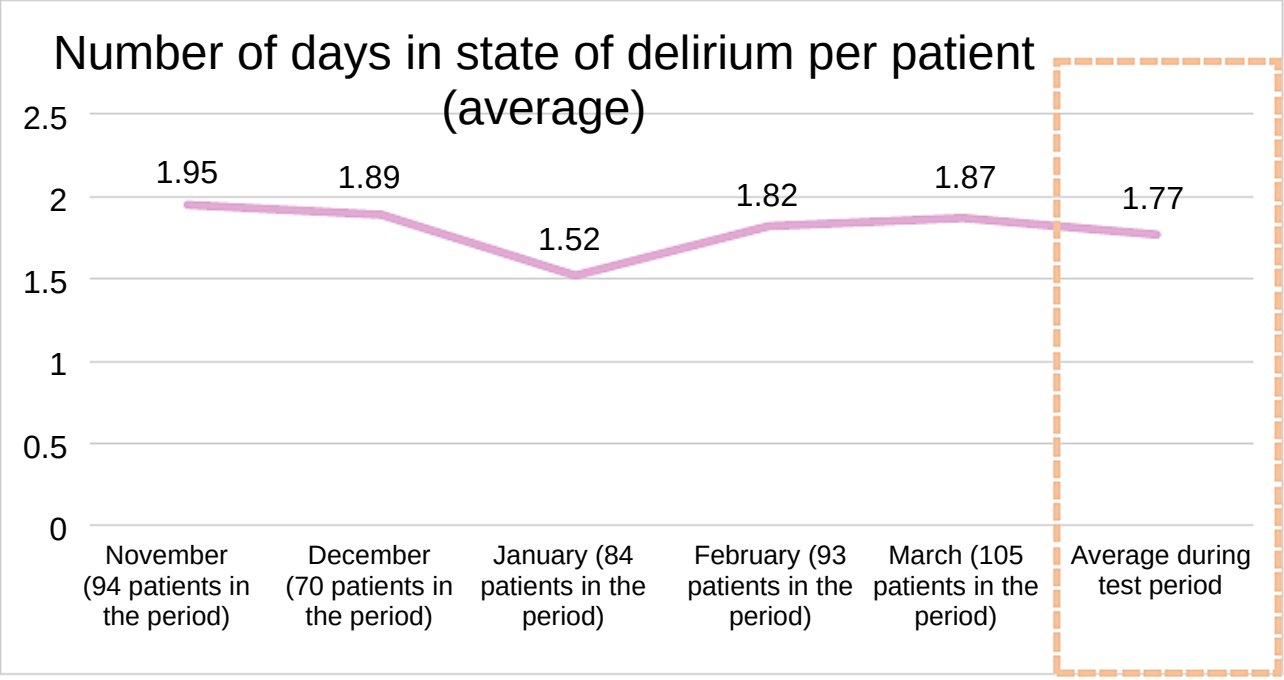
Prevention and treatment of delirium

Delirium among hospitalised patients is a growing problem in healthcare. Delirium is particularly common among elderly, patients with multiple long-term conditions and post-operative patients. The challenge with this condition is its treatment, as the best treatment is rest, sleep and isolation, which the condition often works against. Hence psychotropic drugs are now used in patients who cannot achieve calmness and sleep without medication. Studies show that the use of psychotropic drugs for patients with dementia increases mortality by 35% within six months and is why special attention is being paid to reducing their use.

In this context, greater focus is needed on the treatment of delirium without medication. Particular focus was therefore placed during the test on how the solution supports the treatment and prevention of delirium in hospitalised patients.

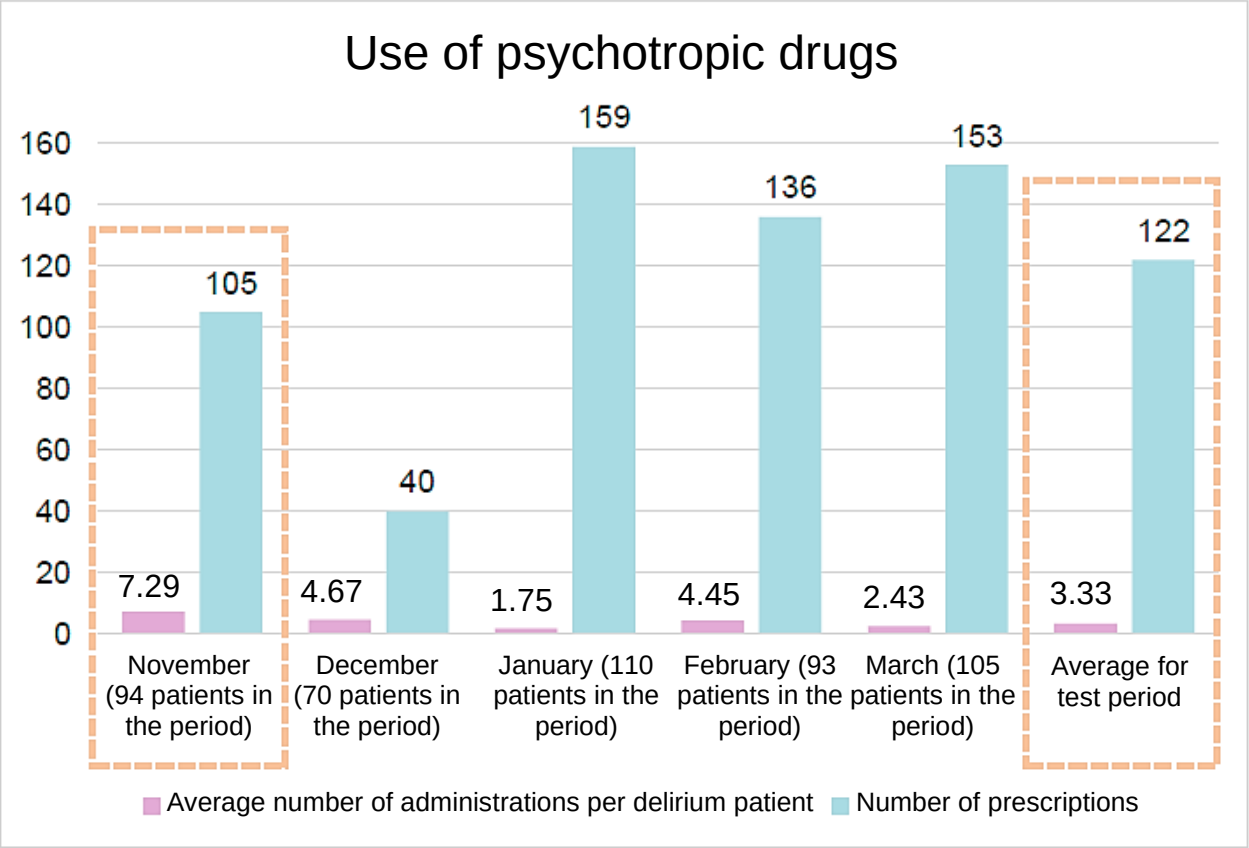
To evaluate this, quantitative and qualitative data in the form of interviews with hospital staff were used.

The graph below describes the average number of days patients were in a state of delirium, during the baseline period (November) and for the test months. An average was also calculated for the entire test period. A slight decrease in the average number of days a patient was in a state of delirium was observed. However, the difference did not decrease continuously and therefore it cannot be concluded that the solution reduces the number of days patients are in a state of delirium. But it must be emphasised for this data point that the data are associated with some uncertainty regarding recording practices. There are some similarities between delirium and dementia, so it is to be expected that some patients may have been categorised as delirious when they may have been suffering more from dementia, or vice versa.



Use of psychotropic drugs

For this measurement parameter, it was also investigated whether the solution supports the use of psychotropic drugs among delirium patients. The number of administrations (describing what is actually given to patients) and the number of prescriptions (what is prescribed by the doctor) were looked at.



The graph above clearly shows how the average number of psychotropic drug administrations per delirium patient in particular decreased during the test period. During the baseline period, the average number of administrations was 7.29, which decreased to a total of 3.33 administrations on average over the entire test period. This is a decrease of 54.3 per cent.

There are several different factors that may have influenced this decrease, among other things, the department had increased focus on reducing the use of psychotropic drugs over an extended period of time, and the medical group focused on the same. However, looking at the data from interviews with staff, it is reasonable to conclude that the solution has also had a significant impact on the observed reduction in use. This will be described below.

Cradle and hug as a non-pharmacological treatment tool

The solution's support of sensory stimulation through cradling and hugging was used during the test to treat and prevent delirium among hospitalised patients. Staff reported a variety of benefits, but particularly how the functions created increased calm and reassurance for delirious patients, enabling many to enjoy better and more restful sleep, which is particularly important for treating delirium.

The hug function in particular had a significant effect on patients with delirium. The staff found that patients were calmer and therefore stayed in bed and enjoyed better sleep. The hug function was also used in some cases when patients were seated in bed, as it relieves pressure on the tailbone. Others also emphasised how the cradle function had a calming effect on patients, preventing them from moving around so much. The function was perceived as an aid to create more calm especially for patients who are restless or have a tendency to leave their bed. But a few did mention that in some cases the function did not have the desired effect and could sometimes be disruptive, causing patients to get out of bed.

"The cradle function gives them peace and reassurance. They move around less"

Due to the increased level of calmness among patients with delirium, a greater proportion of staff also reported experiencing fewer incidents of violence and threats, and that patients generally exhibited less outwardly aggressive behaviour. This contributed to a safer and calmer work situation. Some also said that as a non-pharmacological approach to treating delirium, the solution also relieved their psychological working environment. This is partly because patients could be offered an alternative to psychotropic drugs, which gave staff a clear conscience because patients could be calmed without medication.

Partial conclusion

Overall, it can be concluded that the solution supports the treatment and prevention of delirium. Through interviews with hospital staff, it became clear how the solution's hug and cradle functions support treatment without medication and relief of delirium by creating increased calm, closeness, reassurance and better sleep for patients. All this helps to treat and prevent delirium. An average decrease of 54.3% in the number of average psychotropic drug administrations per patient with delirium and a slight decrease in the average number of days patients were in a state of delirium was also observed. However, the data are associated with some uncertainty as dementia and delirium can be difficult to distinguish between, creating uncertainty in correctly documenting a patient's condition.

Measurement Parameter II

Support the working environment

Measurement parameter II: Support the working environment

For the measurement parameter of supporting the working environment, the intention was to investigate the impact of the solution on the working environment of hospital staff. Perspectives on the physical working environment were included, including a focus on workload in relation to heavy lifting, mobilisation and personal care. Secondly, there was also a focus on the solution's impact on the psychological working environment, especially in relation to the amount of violence and threats from patients towards staff.

Physical working environment

Perspectives in relation to the solution's support of the physical working environment were not the primary focus during the test. However, a qualitative investigation was carried out in terms of hospital staff experience with the automated turning system, which relieves them of the burden of turning. A few also used the solution for mobilisation, personal care and heavy lifting.

Some had good experiences of using the solution in connection with personal care, where the tilt system helps the patient turn over on their side, also relieving the staff of heavy lifting. Some also used the solution when patients needed to be mobilised into a chair, walker or similar. Staff tilted one of the sides 70-90 degrees in these cases to help the patient sit up and get out of bed more easily. This was a more gentle method for both the patient and the staff. However, some did not use the solution to help in these situations, partly because they were used to other methods, but also because they felt that mobilisation took longer when using the solution compared to 'manual' methods.

"It's really clever that Careturner can lift the sides almost 90 degrees, which supports the changing of incontinence pads or similar."

Through the cross-regional collaboration with Gødstrup Regional Hospital, the department will gain more insight into how the solution supports the mobilisation of hip surgery patients. The existing workflows and the number of staff at each mobilisation are mapped against new workflows when using the solution.

For this perspective on the solution's impact on the physical working environment, it can be concluded that during the test there were indications of how the solution relieves healthcare staff in terms of mobilisation, heavy lifting and personal care. A targeted test that focuses on this is needed in order to explore this perspective further.

Psychological working environment

Focus during the test was on how the solution's functions and its impact on patients affected the psychological working environment among hospital staff. This is because before the test, the hypothesis was that calmer patients would also mean less outwardly aggressive behaviour and thus fewer reports of violence and threats against staff. The results are based on both quantitative data on the number of reports, but primarily on the experiences of hospital staff. At the end of the test, it was not possible to obtain data on reported violence and threats or reported occupational injuries. Only data for November, December and January are therefore included.

For the quantitative data, it was only possible to include key figures on the number of reports of violence and threats for half of the test period. A total of five reports of violence and threats were reported for the November baseline. There is one review for December and two for January. The data are not representative and therefore no conclusions can be drawn from these data. However, in light of the qualitative data that will be presented below, there are indications that the solution supports a better psychological working environment for hospital staff.

A high proportion of hospital staff reported fewer incidents of violence and threats and that patients generally exhibited less outwardly aggressive behaviour. This contributed to a safer and calmer work situation. Some doctors in the department also observed a calmer atmosphere. However, it should be emphasised that the psychological working environment, as well as the number of outwardly aggressive patients, was greatly influenced by the patient mix on the ward, which could vary significantly.

“It helps take the pressure of us in terms of full-time care and psychologically as we are not being shouted at.”

During interviews with staff, it also became clear that a high proportion found that the solution provided mental relief and that this affected their experience of the psychological working environment. Due to the automated turning system that the solution supports, staff experienced mental relief when performing their tasks. For them, it was one less thing they had to do and worry about, easing their burden at work. Some felt happier and less

exhausted at work.

"For me, it was the automatic repositioning. I had one less thing to think about. [It was] a weight off my mind."

In addition, a small number reported how being able to calm and treat patients with delirium without medication gave them something in terms of their professionalism, ethical considerations and moral compass. It mattered to some to be able to offer patients a non-pharmacological initiative rather than sedating them or giving them other medication, to give patients the peace, sleep and reassurance they needed.

"There is something ethical about being able to calm patients without medication."

For this perspective on the psychological working environment, there were indications of how the solution improves the working environment for staff. It was based primarily on statements from hospital staff who reported experiencing fewer outwardly aggressive patients and thus fewer assaults, threats, violent behaviour, etc.

Partial conclusion

For the measurement parameter of working environment, it can be concluded that there were indications of an improvement in both the physical and psychological working environment for hospital staff. In terms of the psychological working environment, staff reported a sense of calmer patients and mental relief due to the automated turning system. Some also mentioned how they experienced the solution as a non-pharmacological measure, as something that supported them in their professionalism, ethics and morals. For the physical working environment perspective, the results were neither clear-cut nor representative. However, a low proportion of staff reported that they experienced relief from heavy lifting during mobilisation and personal care.

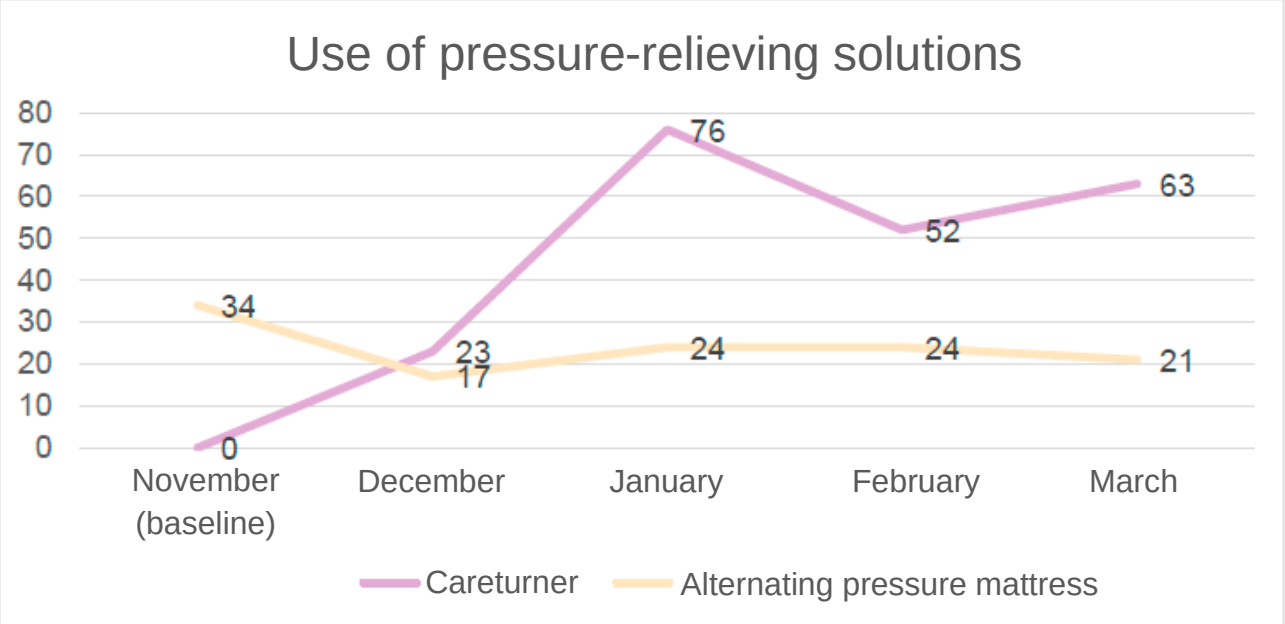
Measurement Parameter III

Use

Measurement parameter III Use

For this measurement parameter, the department's use (in terms of number of orders) of Careturner and alternating pressure mattresses was analysed. It also proved relevant to look at the solution's impact on the use of full-time care during the test, which is why this is also included in this report.

A gradual increase in the use of Careturner and a reduction in the use of alternating pressure mattresses was observed during the test. This was largely because patients at risk of pressure sores or with existing pressure sores were put in a bed with a Careturner versus an alternating pressure mattress. Careturner was also used for patients with delirium, which is why use was higher than the use of alternating pressure mattresses during the baseline period, as the solution could be used for several different patient groups.



As the graph also shows, the use of Careturner was much higher than the use of alternating pressure mattresses. Use of alternating pressure mattresses decreased by around 36,7%. It became particularly clear during test that the two solutions complement each other and do not cancel each other out. Some patients are more likely to need an alternating pressure mattress that uses air, while others benefit from a Careturner. It depends on the location of the pressure sores in particular, as well as the individual patient's preferences.

Use of full-time care

It also became relevant to look at the solution's support for patient groups requiring full-time care during the test. This perspective was not part of the project strategy, which is why data are sporadic and based primarily on statements from hospital staff and department management.

It was possible to extract data on the department's use of full-time care during the test. These data describe the department's overall use of full-time care and are not sorted based on the test's inclusion criteria. Based on these data, there are no indications that the solution affected the department's overall use of full-time care.

Nevertheless, a high proportion of hospital staff reported that they could see potential in the solution as an alternative to full-time care for patients who are calm, feel secure and fall asleep thanks to the bed's functions. However, this was only applicable at night and only for those patients who were calm.

To investigate the potential of the solution in relation to the use of full-time care, the final evaluation was based on predefined archetypes of patient groups requiring full-time care. The investigation was done as part of evaluating another solution, but was also relevant for the needs of the department of geriatric medicine and multiple long-term conditions.

A total of four patient groups requiring full-time care were defined:

1. Self-discharging patients
2. Patients who are prone to leaving their bed or the ward
3. Delirious patients with special needs
4. Uncategorised

Patient groups requiring full-time care

The analysis was taken from the final report of the test of an intelligent monitoring system at the department of neurology.

The three archetypes	Description	Careturner
Auto-discontinuation patients	Auto-discontinuation patients need full-time care to ensure that vital probes, tubes, drains etc. are not removed by the patient, which can have major consequences for the patient and require a lot of resources when probes, tubes etc. need to be re-inserted and in some cases surgery	Cannot be used as the solution does not support monitoring of patients, enabling staff to intervene before auto-discontinuation.
Patients prone to leaving their bed or the ward	'Patients prone to leaving their bed or the ward' is an umbrella term that covers several different types of patients. What they all have in common is that, for one reason or another, they leave their bed/room/ward. Causes: - Lack of understanding of their condition - Dementia - Tendency to fall	Can be used partly for those patients who are calmed by the bed's features and primarily during the night shift
Delirious patients with special needs	'Delirious patients with special needs' require full-time care on the ward to help create structure and calm. A delirious patient can be very sensitive to external stimuli, noise, etc. and has a particular need for calm and rest. It may therefore be necessary to provide a carer able to provide such conditions and in some cases to screen off the patient.	Can be used partly for those patients who are calmed by the bed's features and primarily during the night shift
Uncategorised	This category covers the various diagnoses that are atypical and therefore make up a very small proportion of patient groups requiring full-time care. Examples include patients with mental health diagnoses, suicidal tendencies or outwardly aggressive patients.	There are no data from this type of patient.

The table above describes the different archetypes and also shows where the solution has the potential to add value. There are indications that the solution could be a relevant alternative to full-time care for patients who are prone to leaving their bed or the ward, as well as delirious patients with special needs. However, only at night if the patient experiences increased calmness and therefore falls asleep. It would be relevant to explore this potential in more depth in order to draw definitive conclusions.

Partial conclusion

Overall, it can be concluded that the use of alternating pressure mattresses decreased by 36,7%. One of the reasons is that Careturner was aimed at a wider target group than alternating pressure mattresses. It also became clear that the two solutions complement each other and do not cancel each other out. Furthermore, based on qualitative data, it can be concluded that there were indications that the solution could be a relevant alternative to full-time care for patients who are prone to leaving their bed, as well as delirious patients with special needs.

Measurement Parameter IV

Logistics flow

Measurement parameter IV Logistics flow

Investigating the impact of the solution on logistics flow, including preparation, cleaning and distribution of beds, was included as part of the test. For this purpose, the flow for Careturner had to be defined and visualised, and the existing flow for alternating pressure mattresses was also defined so that they could be compared. Interviews were also conducted with service managers on their experience of using the solution and its impact on the workflow for service employees.

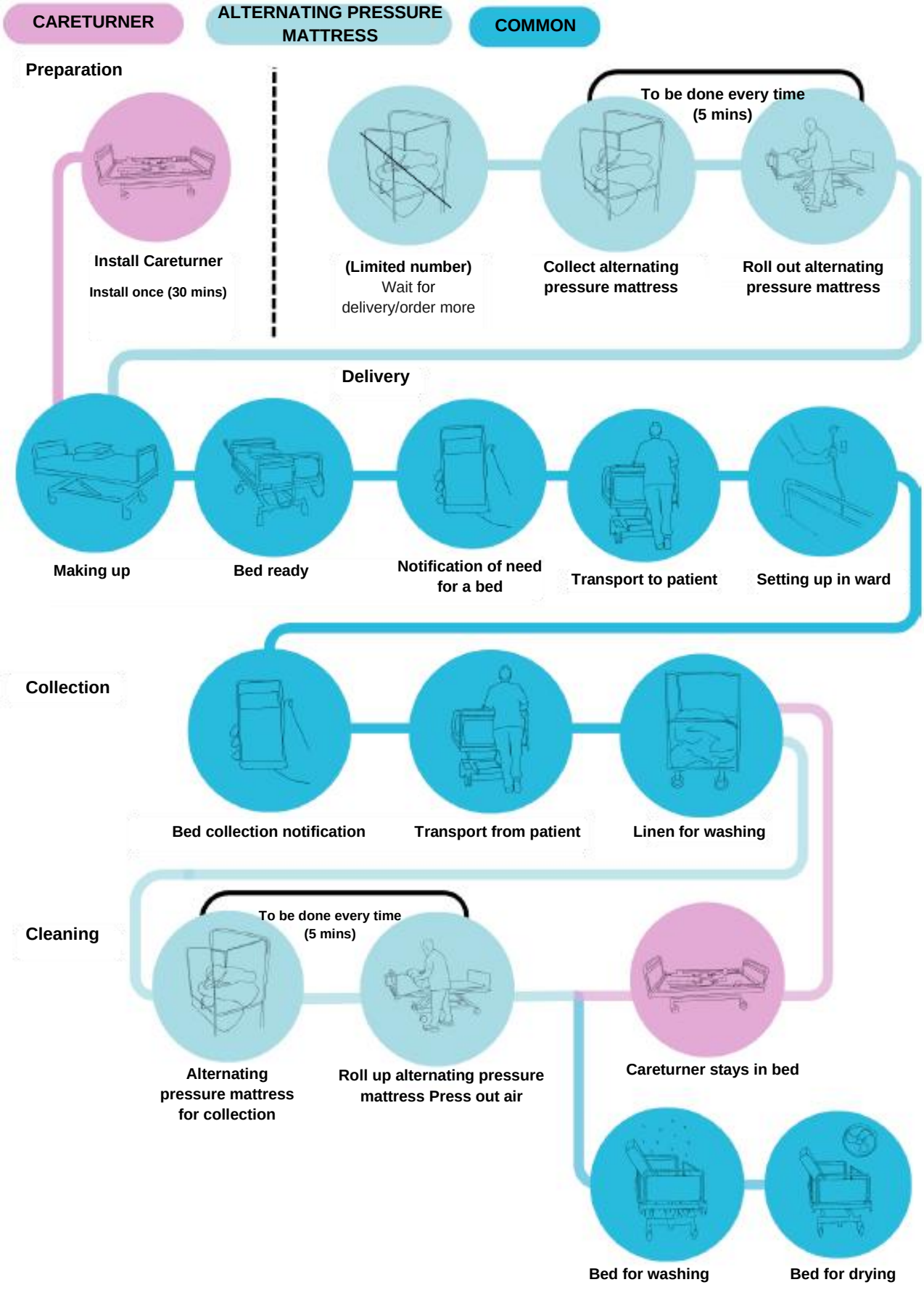
There were major differences in workflow, workload and experience for service staff. The solution tested involved training in assembly and technique, but the new solution was integrated quickly into the logistics flow as it functions as a standard bed. Service staff found it easy to learn and it could be easily implemented into daily routines. The value was clear as there was less handling with Careturner, making work easier. It was a simple and effective solution that was well received by employees.

The solution made the logistics flow easier, with less handling and less work with heavy air mattresses. This made working routines easier and simpler, with preparation and cleaning similar to standard beds.

Visualising and comparing logistics flows

To determine how the solution tested supported an easier and simpler logistics flow, an analysis was made, which is visualised below.

This was done through observation and interviews.


CARETURNER
ALTERNATING PRESSURE MATTRESS
COMMON
Preparation
Install Careturner
Install once (30 mins)
(Limited number)
Wait for delivery/order more
To be done every time
(5 mins)
Collect alternating pressure mattress
Roll out alternating pressure mattress
Delivery
Making up
Bed ready
Notification of need for a bed
Transport to patient
Setting up in ward
Collection
Bed collection notification
Transport from patient
Linen for washing
Cleaning
To be done every time
(5 mins)
Alternating pressure mattress for collection
Roll up alternating pressure mattress Press out air
Careturner stays in bed
Bed for washing
Bed for drying

Partial conclusion

Overall, the above flow visualises how the use of Careturner reduced the amount of handling required for preparation, distribution and cleaning. It also means that the work of service staff became easier and simpler, because regular mattresses could be used with Careturner instead of alternating pressure mattresses. The latter are heavy and more cumbersome to make up and pack than regular mattresses. Using Careturner was also associated with a small saving in time spent preparing and cleaning beds, more specifically 10 minutes in total per bed. But it should be emphasised that Careturner has to be installed in the bed and that this installation takes an average of 30 minutes. However, this only needs to be done once. Finally, the solution has the advantage of being able to be applied to a broader patient group and thus used both for the treatment and prevention of pressure sores and delirium.

Conclusions

From November 2024 to April 2025, an automated turning system was tested and evaluated at Nordsjællands Hospital in the department of geriatric medicine and multiple long-term conditions. The evaluation was based on three main evaluation meetings. A kick-off meeting with presentation of baseline data. A mid-term evaluation meeting at which preliminary data were compared to success criteria defined in the project strategy. A final evaluation meeting at which quantitative and qualitative data were presented in relation to the baseline and defined success criteria.

The test was facilitated by Nordic Health Lab and aimed to investigate whether Careturner can (1) support the treatment of delirium and pressure sores, (2) contribute to an improved working environment, (3) use of alternating pressure mattresses and (4) impact on logistics flow, bed cleaning and distribution.

Quantitative data points		
Data points	**November (baseline)**	**Average throughout the test period**
Hospital-acquired pressure sores	5	3
Pressure sores not properly documented	No data available	5.5
Number of days in state of delirium per patient (avg)	1.95	1.77
Number of psychotropic drug administrations per delirium patient (average)	7.29	3.33
Use of Careturner (orders)	0	42.8
Use of alternating pressure mattresses (orders)	34	24

The results from the test showed that Careturner's automated turning system supports the treatment and prevention of pressure sores among hospitalised patients. The automated repositioning feature was emphasised in particular as an essential support in staff workflows. The solution was considered beneficial for all patients with pressure sores or incipient pressure sores. The test also identified that some patients, especially those with good cognitive function, may experience discomfort, for example due to sound or lack of control. However, in many cases these issues could be overcome through information, and in other cases by offering alternatives such as alternating pressure mattresses.

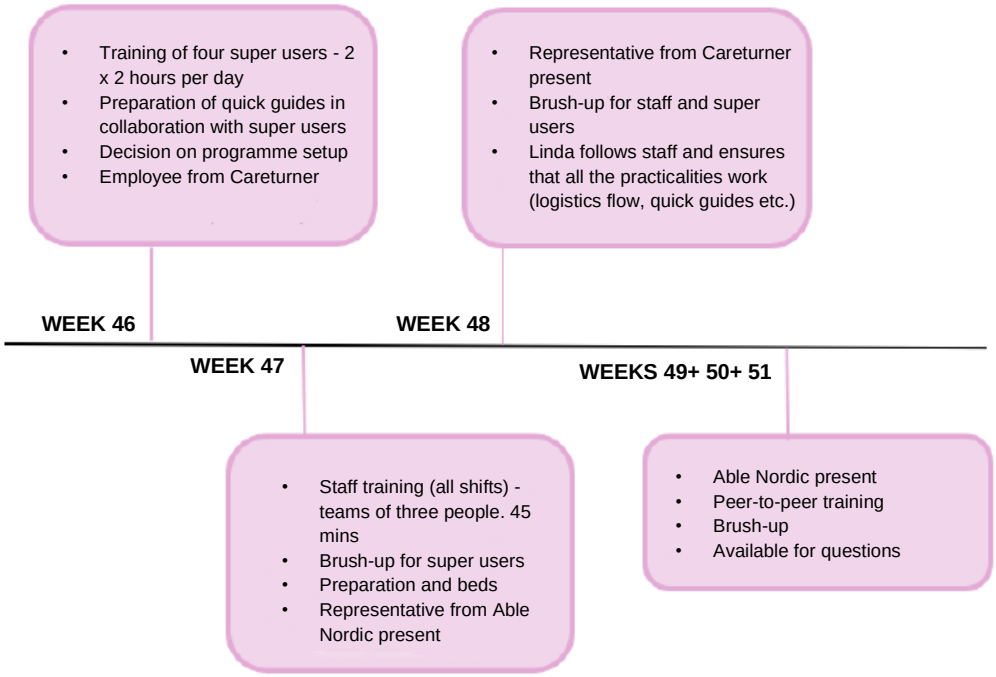
Furthermore, the test showed an average decrease of 54.3% in the use of psychotropic medication among patients with delirium. This result was supported by qualitative data, where staff described that patients seemed calmer, felt cocooned and slept better. The effect is considered to be related to the use of the hug and cradle function, thus supporting the treatment and prevention of delirium.
Careturner also had a positive impact on the physical and mental working environment. A low proportion of staff reported physical relief during transfers and personal care of patients. A high proportion of staff experienced a better psychological working environment as the solution was considered to be a non-pharmacological measure, giving staff a clear conscience as they could calm their patients without the use of pharmacological measures. They also reported that patients were less outwardly aggressive and less restless.

There was a reduction in alternating pressure mattresses of around 36,7% during the test period, but it is important to emphasise that Careturner does not replace these, but that the solutions complement each other. Alternating pressure mattresses are used for pressure sore patients, whereas Careturner can be used for several different patient groups including pressure sore patients and delirium patients. Through the collaboration with the Gødstrup Regional Hospital (see section on cross-regional collaboration), there was also potential for Careturner to be used for an even wider target group. Finally, the experiences of service staff indicated an easier workflow in terms of preparation, transport and cleaning, as Careturner was easier to handle than traditional alternating pressure mattresses. This is because Careturner only needed to be fitted to the beds once, whereas alternating pressure mattresses need to be taken off and put on every time a bed is cleaned.

Anchoring and implementation

To ensure that use of the solution was adopted, anchored and implemented in the department, the company spent a total of four to six weeks training the staff. The solution was also available in a meeting room in the department, which made it easy to train staff and allowed them to practice the bed's functions without involving patients. The company was physically present in the department several times a week, and also at different times, to ensure that all shifts had the opportunity for training. The company also trained a total of four super users on using the solution, who could help and train colleagues when the company was not present. This created a solid foundation in the department and their workflows and created confidence in using the solution. It is important to thoroughly integrate and embed the use of a new welfare technology into clinical practice and workflows. It is also demanding for hospital staff, super users and the company, as changing workflows and routines requires time, knowledge and persistence. However, in order to test a new solution, it is crucial that this is done properly to create the best conditions for a successful and authentic test. It became clear during the test that confidence and familiarity with the solution's functions are essential for practical use. If staff don't feel confident about the functions, they don't try them out on patients, which is why the 'test room' was also a good initiative so staff could practise.

The company was also physically present in the department at least three to four times a month throughout the test period, was available by phone throughout the test period, and there was a check-in every 14 days. This meant that errors, problems or challenges were recognised quickly and resolved.



Next step

For this test period, the focus was on a total of four measurement parameters: 1) the solution's impact on the prevention and treatment of pressure sores and delirium, 2) the solution's impact on the working environment, 3) the solution's impact on the use of alternating pressure mattresses and 4) the solution's impact on logistics flow. There were indications during the test of other and more relevant measurement parameters that can be investigated further.

There were indications that the solution can reduce the use of full-time care for selected patient groups requiring full-time care. In addition, the solution supported the prevention and treatment of delirium among hospitalised patients and therefore it will be relevant over the longer term to investigate whether the solution can reduce the length of stay for hospitalised patients with delirium. Secondly, the test focused on the working environment of the hospital staff, demonstrating an improvement in both the physical and psychological working environment. Therefore, it may be relevant to investigate whether the solution can reduce sick leave, reports of violence and threats and occupational injuries over an extended period.

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Project group

The project group consisted of the Innovation Manager from the Innovation Department at Nordsjællands Hospital, a ward nurse from the department for patients with multiple long-term conditions, a specialist nurse and two super users from the staff group, both social and healthcare assistants. The Logistics Service Manager at the Frederikssund site was also part of the project group, as well as a pressure sore nurse from the orthopaedic surgery department. The company was anchored in the project group, which also included a representative from Able Nordic, a supplier and existing partner of Nordsjællands Hospital.

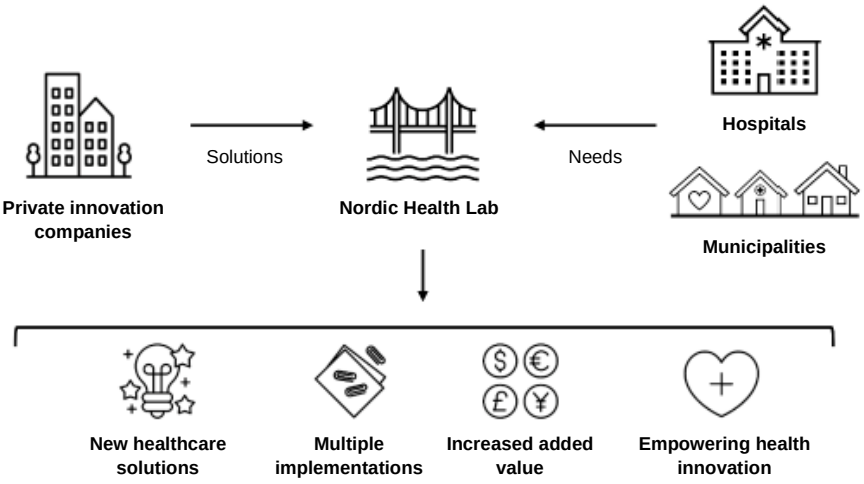
Info about the solution

Careturner is a '3-in-1' solution that gives existing hospital beds new enhanced features through customised pressure relief, transfer assistance and sensory stimulation in one product. The working environment is also improved by allowing manual patient transfers without heavy lifting for carers. Sensory stimulation, the cradle and hug function calms delirious patients and improves sleep and well-being. Careturner can be mounted on most commonly used hospital beds and follow the bed into the bed washer.

Image of the solution

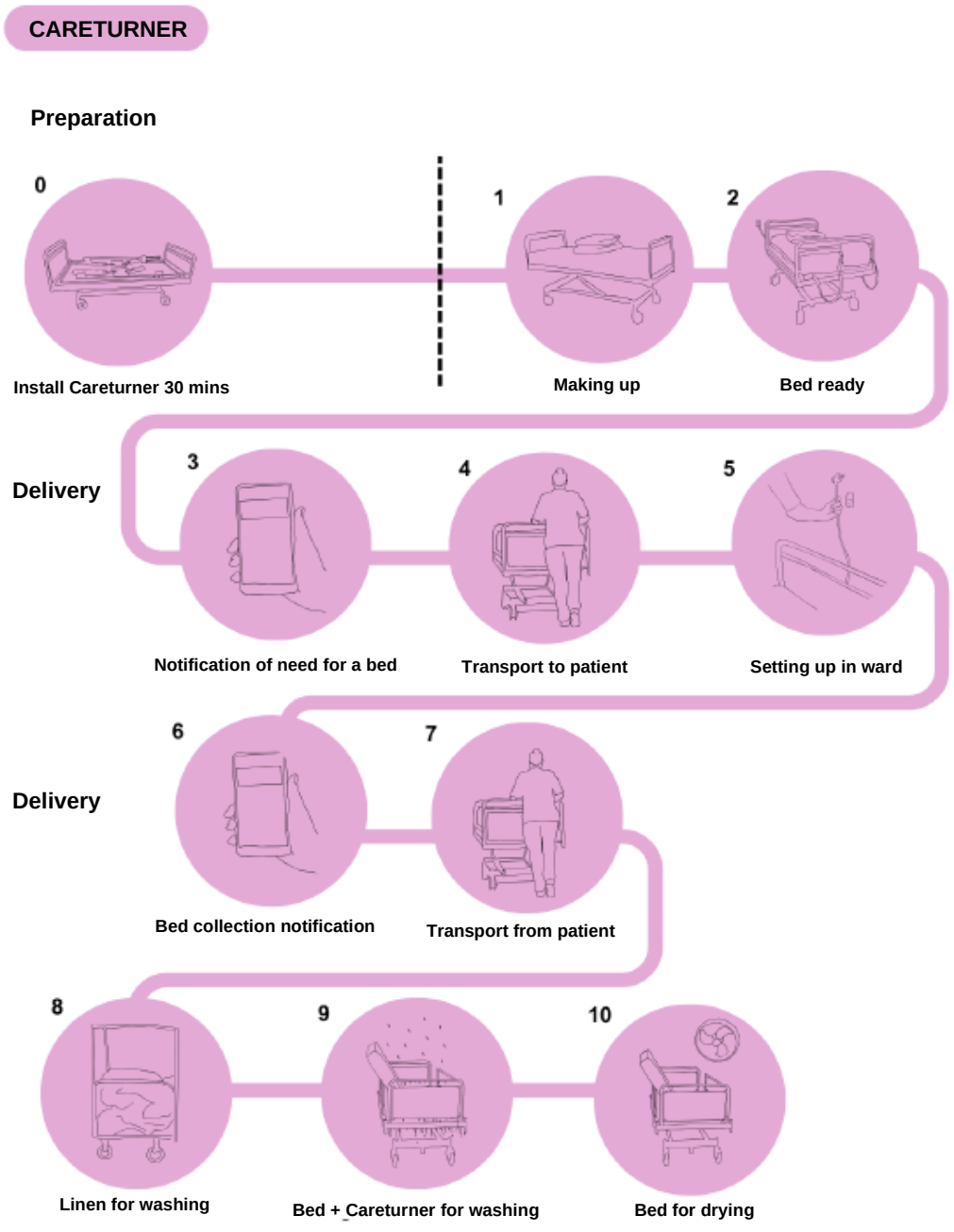
Nordic Health Lab

Nordic Health Lab is a non-profit organisation that bridges the gap between private entities and the public healthcare system. Our mission is to accelerate innovative solutions that safeguard our collective health in the future.

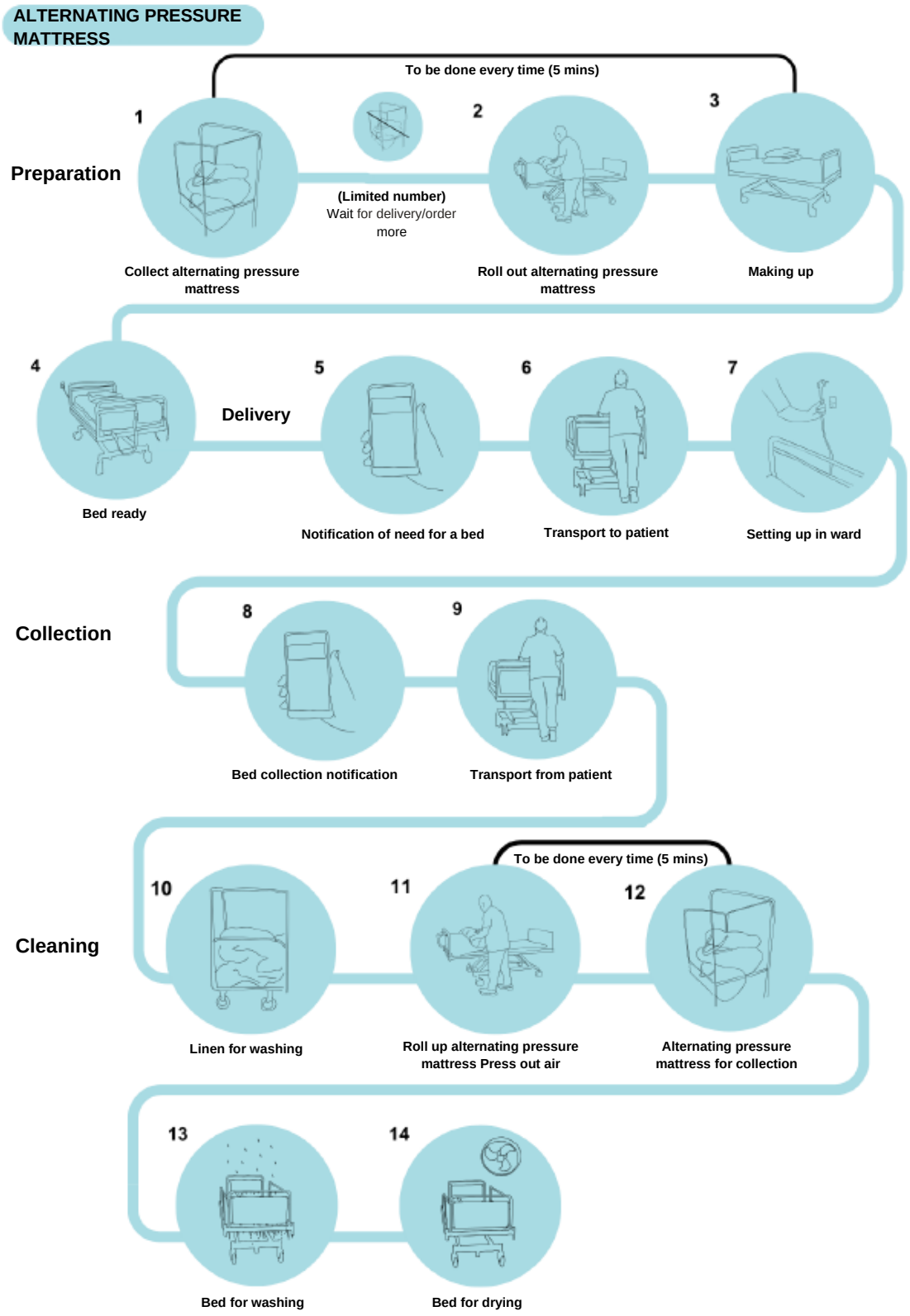


Appendices

Workflow description – Careturner

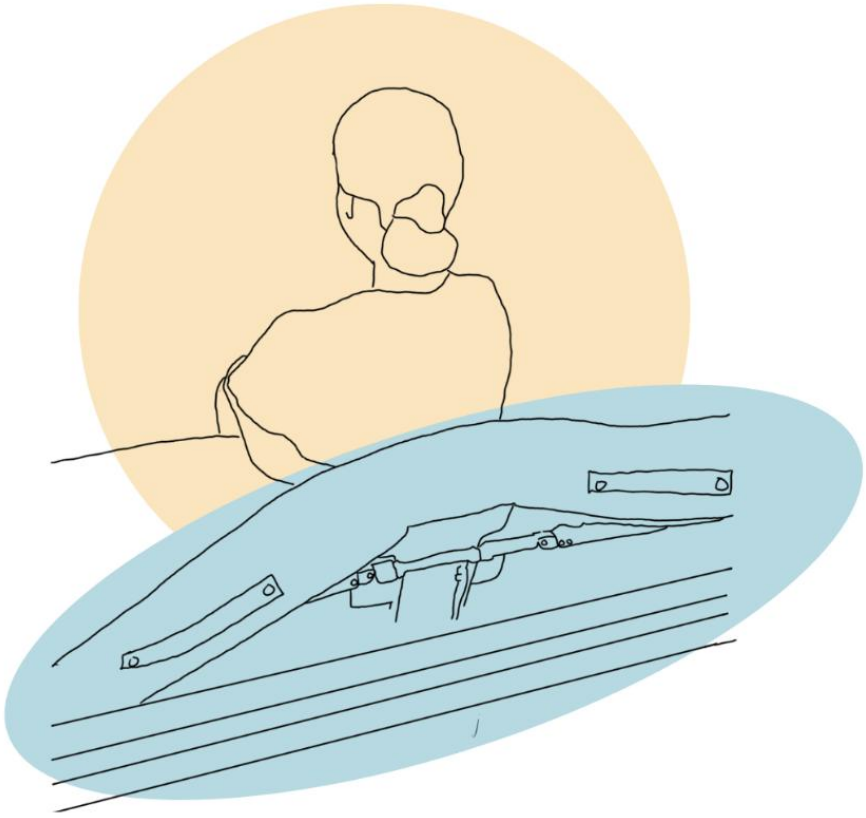


Workflow description – Alternating pressure mattress



Automated turning system supports healthcare staff in the mobilisation, pain relief and treatment of hospitalised patients

Final report for testing Careturner A/S at Regionshospitalet Gødstrup



July 2025

Public-private innovation collaboration between Regionshospitalet Gødstrup and Careturner A/S, facilitated by Nordic Health Lab

The test procedure was carried out in a collaboration between Regionshospitalet Gødstrup, Careturner A/S and Nordic Health Lab. Nordic Health Lab was also responsible for compiling this report.

For more information about the preparation of the report and submission of appendices, please contact project manager:

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Nordic Health Lab

Careturner

midt regionmidtjylland Regionshospitalet Gødstrup

Contents

Description of the test procedure

From February 2025 to May 2025, Regionshospitalet Gødstrup has tested Careturner in collaboration with Nordic Health Lab. Able Nordic was also part of the project as suppliers of the solution. The project aimed to investigate the impact of the solution on the patient experience, whether it supports mobilisation of hip patients and the possibility of involving the patient in their own treatment. Another aim of the test was to map the impact of the solution on the logistics flow and distribution of beds.

The project has taken place at Regionshospitalet Gødstrup. A total of 10 Careturners were made available to the departments. Six were based in the geriatric ward and four in the palliative care ward.

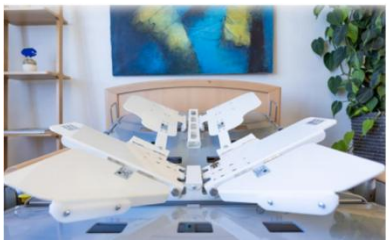
	Planned timeline 2025													
	Jan	Feb	Marc	April	May	June	July	Aug	Sep	Oct	Nov	Dec	**Activities**	**Resources**
Phase 1 Baseline													Collection of EHR data	Departments involved
Phase 2 Training/installation													Super users are trained by the company.	The company and super users from the departments
Phase 3 Test procedure													The solution is tested in clinical practice	Healthcare professionals and the company
Phase 4 Evaluation			7/3: Kickoff	23/4: Midway		16/6: Final							The solution is evaluated.	Nordic Health Lab facilitates evaluation meetings and data collection

Inclusion criteria

Two inclusion criteria were defined for the test procedure: 1) pain patients for palliative care, 2) hip fracture patients including total hip arthroplasty, sliding screw, intramedullary nail and girdlestone.

About the solution

Careturner is a 3-in-1 solution that attaches directly to the base of a care or hospital bed and works with all bed functions. It is used for preventing pressure sores, assisting with transfers and sensory stimulation. Movement takes place at a gentle pace, with the patient enveloped by the mattress, creating a sense of reassurance and improving sleep quality.



Main conclusions

Based on the data collected and the experience of both patients and healthcare staff, a clear picture emerges of Careturner as a relevant and valuable tool in clinical practice. The solution has proven to have a positive impact on several key areas of care - including patient experience, patient involvement, mobilisation, logistics and work environment.

The following key points summarise the main conclusions from the evaluation:

Patient experience

- Careturner contributes to increased comfort, calmness and improved sleep quality, especially among patients with complex care needs.
- Healthcare staff find that the solution contributes to reduced discomfort and increased well-being - especially when patients are given a thorough introduction and familiarisation.

Patient involvement

- The self-service feature is only used to a limited extent, mainly due to physical and cognitive barriers for patients. The takeaways from the test procedure will be used for further product development.
- To enhance utilisation, a simplified user interface, targeted introduction and systematic assessment of the patients' prerequisites are recommended.

Mobilisation

- Careturner enables gentle and efficient mobilisation, reducing the need for two carers and freeing up time in the care setting.
- Carers experience significant physical and mental relief, especially during night shifts, which contributes to a better working environment.
- During the test, an average decrease of 25% in the number of administrations of pain medication for hip fracture patients was observed.

Logistics

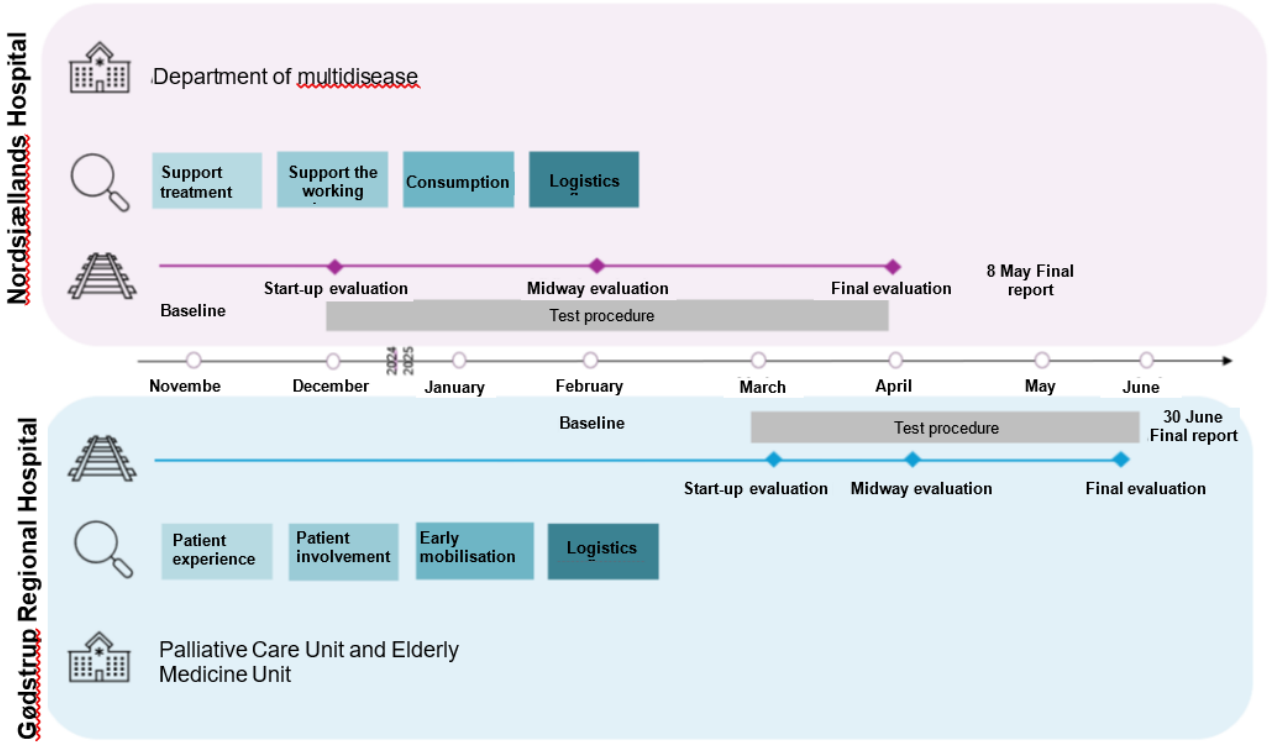
- Integration into the automated bed cleaning flow reduces time consumption and physical strain during cleaning and preparation.
- The solution supports a more efficient, viable and resource-efficient operation in daily care and cleaning work.

Cross-regional collaboration with Nordsjællands Hospital

In addition to the testing of the solution by Regionshospitalet Gødstrup in a collaboration between two wards, Careturner A/S and Able Nordic, a cross-regional collaboration has also been established with Nordsjællands Hospital to test the solution. The purpose of the cross-regional collaboration was to ensure knowledge sharing across departments for the benefit of the entire hospital, staff and patients. The collaboration allowed the solution to be tested on several different patient groups in two different hospitals, with several different evaluation parameters in mind. At Nordsjællands Hospital, the solution has been tested at the department of elderly medicine and multidisease. The patient groups included in the test procedure were patients at risk of pressure sores and delirium or in treatment for pressure sores and delirium.

The collaboration between the two hospitals provides an opportunity to investigate the value of the solution across different specialities, patients and parameters, which will provide a better basis for decision-making after the test procedure, as insights from both hospitals are shared.

The framework for interregional co-operation is illustrated below. The test at Nordsjællands Hospital was finalised with the publication of the evaluation report in May 2025.



Data basis

Quantitative and qualitative methods were used to investigate the project's objectives. Throughout the test period, EHR data have been collected on various relevant data points for hip fracture patients, including bed days, pre-operative pain relief, hip fracture types and mobilisation at discharge. In addition, data on bed/mattress orders have been collected for both departments. As part of the evaluation of the solution, 17 interviews were conducted with staff on the wards. The interviewees were representative of all shifts. A workflow analysis of the logistics flow was also carried out based on observation and interviews. In addition, workflows for mobilisation practices for hip fracture patients after surgery have also been mapped. Finally, questionnaire surveys were conducted on both wards. For the palliative care ward, questionnaires were collected before and after the test procedure, and for the elderly medicine ward, questionnaires were collected after the test procedure. There are a total of 31 completed questionnaire at the end of the test procedure and 11 at the start of the test procedure.

The data that form the basis of this evaluation report were collected over three primary evaluation setpoints. First a baseline before the start of the test, then a midway evaluation halfway through the test and lastly a final evaluation at the end of the test.

Respondents

The project included all staff in the palliative care and elderly medicine wards, as well as the service department. The project group consisted of selected super users in the department, department management, service manager, assistive technology department and innovation consultant from Regionshospitalet Gødstrup. Patients in the department who met the inclusion criteria were part of the test.

About the departments

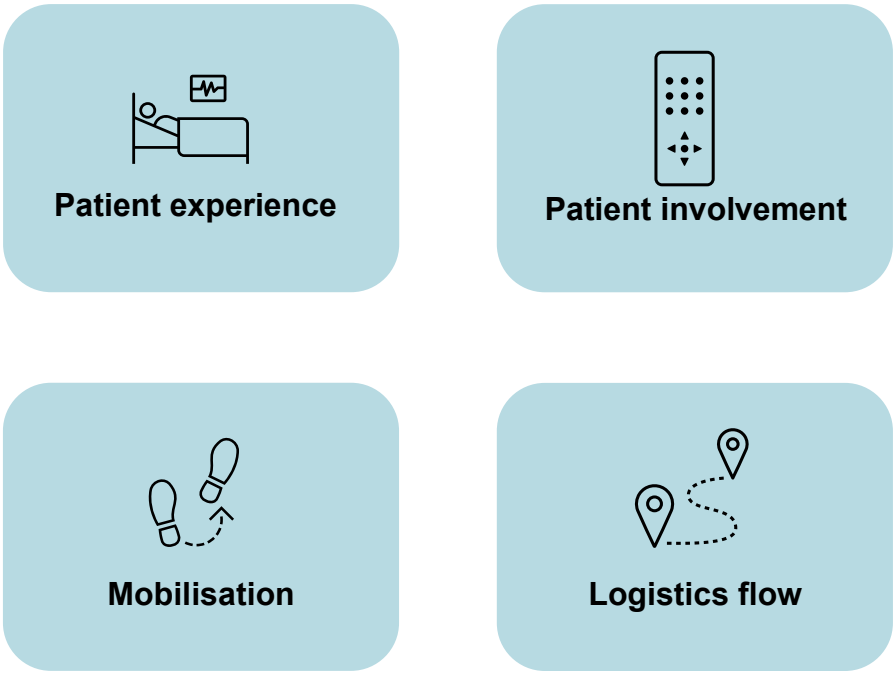
The elderly medicine ward is a ward with both general geriatric patients and geriatric hip fracture patients characterised by advanced age, frailty, multiple competing diseases and loss of function. The ward has capacity for 22 patients.

The palliative care ward is for patients with life-threatening or incurable diseases that require specialised multidisciplinary care. This can include pain, nausea and shortness of breath, but also psychological and social issues. The ward has capacity for 6 patients.

Project strategy and measurement parameters

The final project strategy and definition of measurement parameters and success criteria were identified in a collaboration between Regionshospitalet Gødstrup, Nordic Health Lab and Careturner A/S. Nordic Health Lab has been responsible for the overall project management and has thus facilitated the process of defining the project strategy, based on Nordic Health Lab's standardised test procedure and template for evaluation of health and welfare technology solutions in the healthcare sector.

The defined measurement parameters that have been evaluated during the test procedure are as follows:



Measurement parameter I: Patient experience

For the patient experience measurement parameter, the intention has been to investigate how the solution supports the patient experience during hospitalisation, including pain relief, general well-being and sleep. This measurement parameter has primarily been evaluated in the palliative care ward, as it was assumed that a larger proportion of these patients would be able to participate in interviews about their experience. The success criteria have therefore been 1) that patients predominantly report a good experience with the solution and the self-service function, and 2) that data from the NRS scale (pain scale) and total pain[1] show that solutions support pain relief.

[1] A term that describes the physical, mental, social and spiritual pain(Omsorg-2021-4_book.indb).

Measurement parameter II: Patient involvement

The focus of this measurement parameter has been to investigate the impact on staff when the patients are able to operate the solution themselves. Just like the above, this measurement parameter has been evaluated primarily in the palliative care ward because of the patient group. The success criteria for this measurement parameter were that 1) the solution is user-friendly, 2) the solution supports staff workflows through the self-service function, 3) the solution is used as pain relief for patients, 4) the solution improves the patient experience during transfers, mobilisation, personal care etc.

Measurement parameter III: Mobilisation

This measurement parameter has primarily been evaluated in the elderly medicine ward and has aimed to investigate how the solution supports the mobilisation of hip fracture patients, also with respect to pain relief and treatment quality. The success criteria for this have been 1) that the solution supports and simplifies workflows for mobilising hip fracture patients, 2) the solution frees up time for the core task by supporting easier workflows in connection with transfer and mobilisation practices and 3) that the solution improves the patient's experience in connection with transfer, mobilisation, personal care, etc.

Measurement parameter IIII: Logistics flow

The logistics flow measurement parameter has been evaluated in the service and logistics department and has aimed to investigate the impact of the solution on the logistics flow for bed distribution and cleaning. The success criteria were 1) to define and map the logistics flow for the solution, 2) to reduce the use of pressure-relieving mattresses for the included wards and 3) to define the logistics flow for distribution and cleaning.

Presentation of the baseline

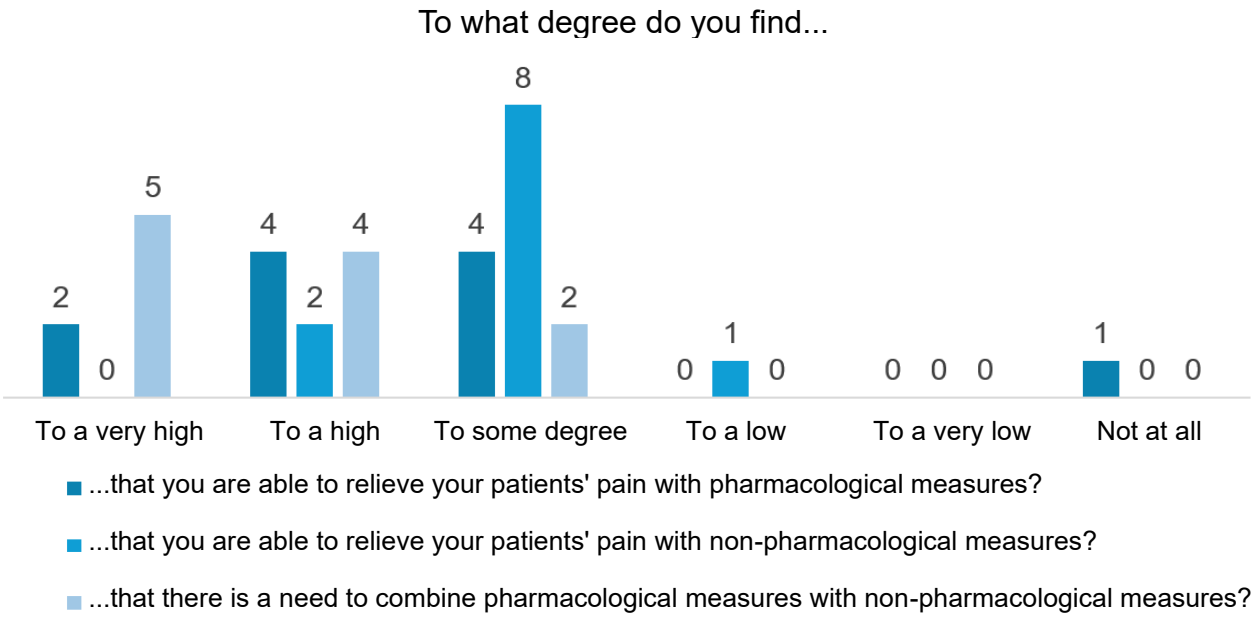
Before the solution was brought into use, a baseline study was conducted. The aim of this was to collect a range of relevant data, including questionnaire responses from healthcare staff on palliative care wards, on the practice for pharmacological and non-pharmacological pain relief. In addition, quantitative data were collected from the elderly medicine ward on hip fracture patients, including bed days for this patient group, preoperative pain relief, and mapping of workflows for mobilisation of hip fracture patients after surgery. Finally, data on the use of pressure-relieving mattresses were collected for both wards involved.

The baseline period spanned one month and the results in this report are based on a comparison between data from this period and the test period when staff used the solution. It is therefore important to emphasise that the baseline period used is relatively short and does not represent an average over several months.

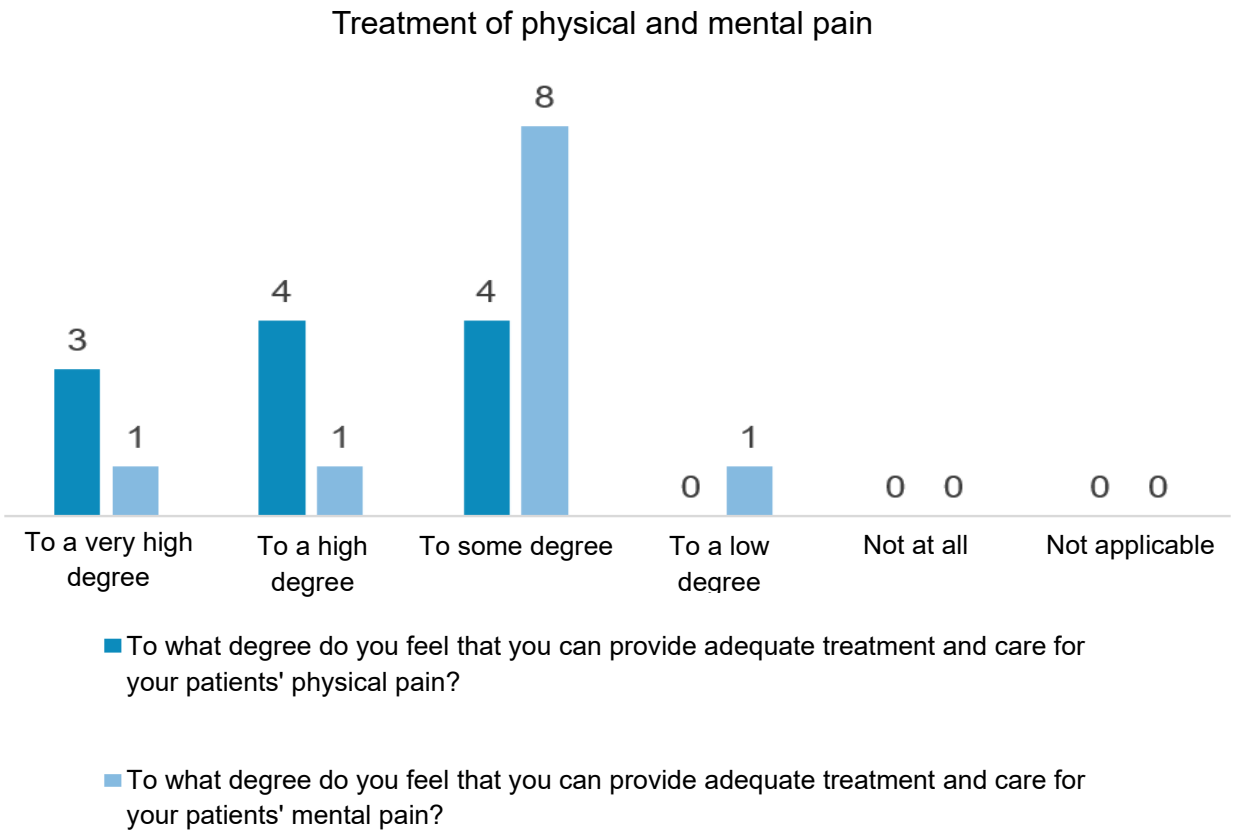
Pain relief for palliative patients

As part of the baseline study, a questionnaire was sent out to the staff group on the palliative care ward. The aim was to obtain knowledge about the palliative care practice for the department's patients, both pharmacological and non-pharmacological. The questionnaire was sent out to the entire staff group, which consists of approximately 18 staff members. There were a total of 11 responses, corresponding to a response rate of 61%. The majority of the respondents are nurses who have been employed in the ward for 1-5 years. The ward was established in connection with the commissioning of Regionshospitalet Gødstrup and is thus 4 years old.

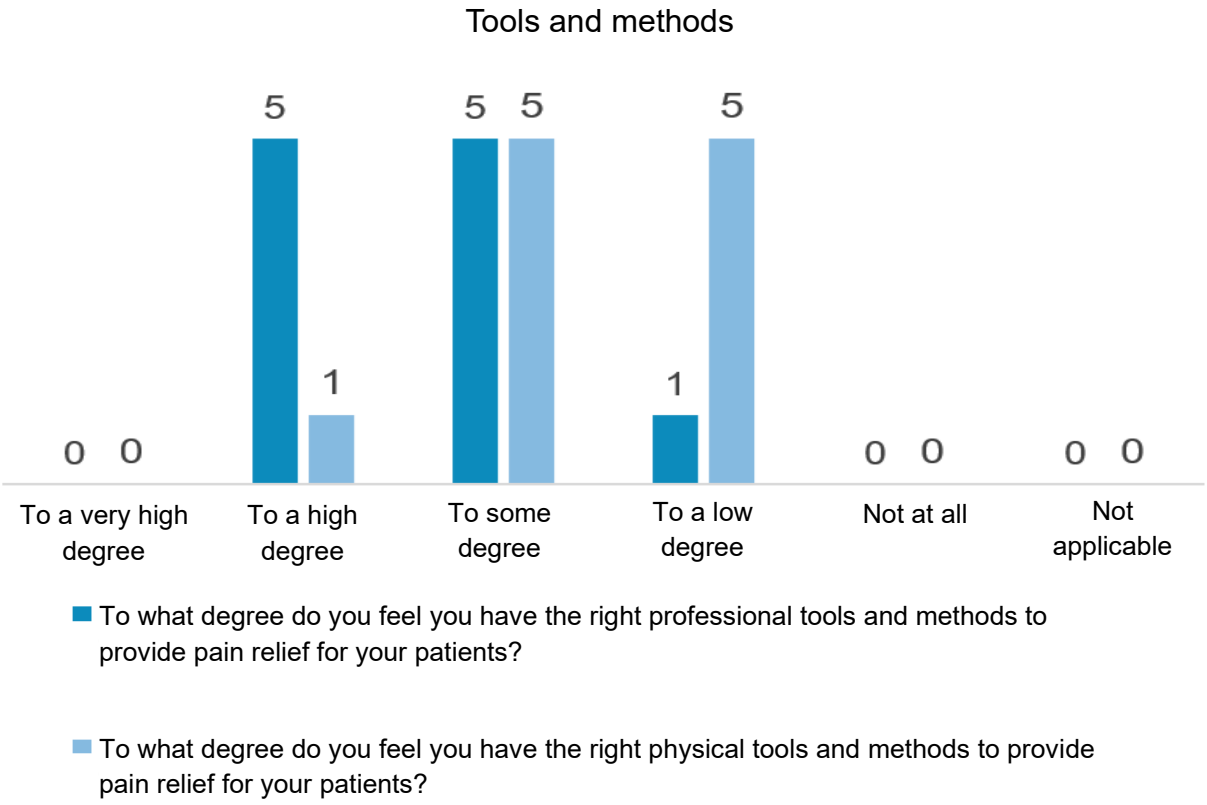
When asked about the healthcare staff's experience of being able to provide pharmacological and non-pharmacological pain relief for their patients, a higher proportion answered that they are able to provide non-pharmacological pain relief for their patients to some degree (see graph below). In addition, healthcare staff say that they combine pharmacological and non-pharmacological approaches to pain relief for their patients to a very high degree (see graph below).



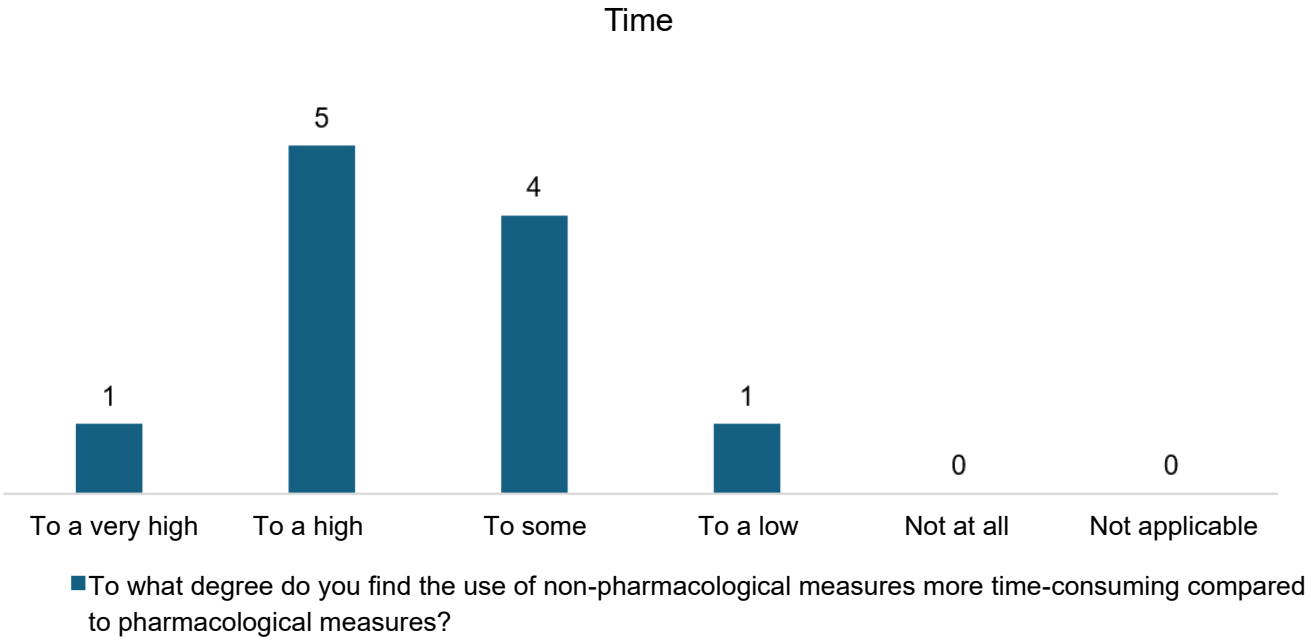
Furthermore, staff were asked about the degree to which they feel they are able to provide adequate care for both physical and mental pain. Here, a large proportion respond that they feel they are able to provide adequate care for patients' mental pain to some degree (see graph below).



Finally, healthcare staff were asked to what degree they feel they have the right tools and methods for pain relief for palliative patients, including a breakdown of the professional and physical methods. Here, 5 out of 11 responded that they felt they had the right physical tools for pain relief to a low degree (see graph below).

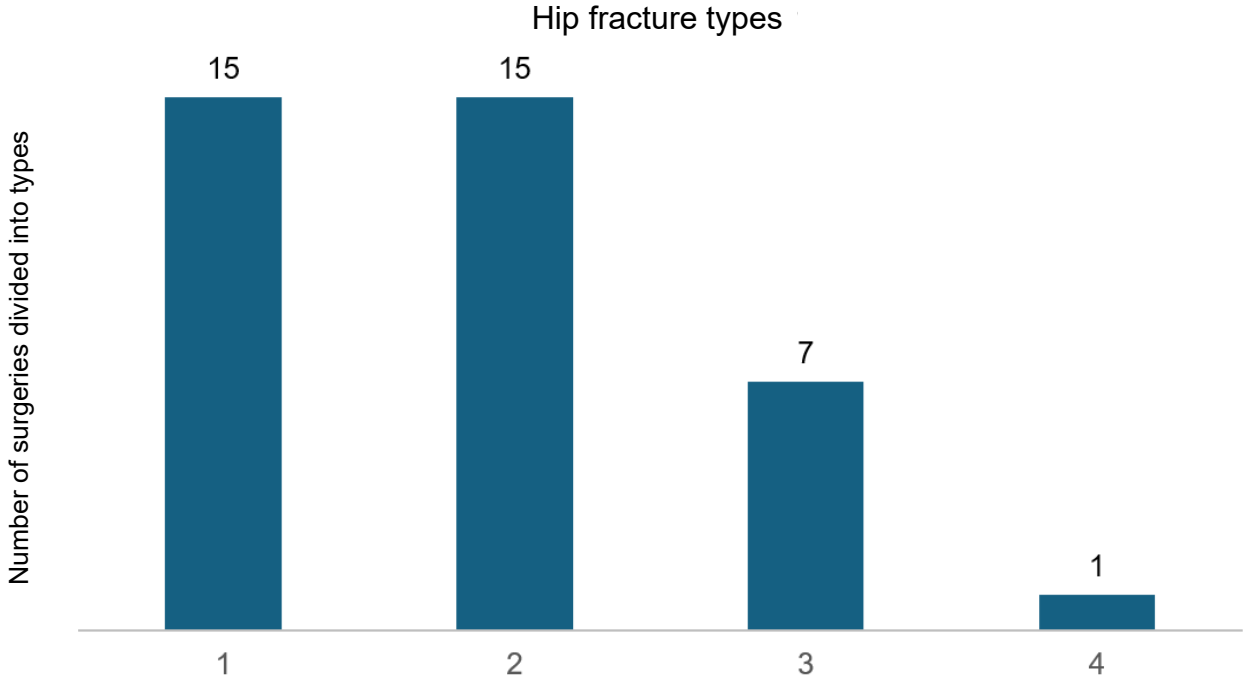


Finally, 50% of respondents indicated that they found the use of non-pharmacological approaches to pain relief to be more time-consuming than pharmacological approaches to a high degree.



Treatment of hip fracture patients

For elderly medicine wards, data on hip fracture patients and their treatment were collected prior to the start of the test. In the baseline period, the department had 38 hip fracture patients distributed on 4 hip fracture types; total hip arthroplasty (THA), sliding screw, intramedullary nail and girdlestone. Of these, the majority of hip fracture patients had THA and intramedullary nail.



Column 1: THA Column 2: Intramedullary nail Column 3: Sliding screw Column 4: Girdlestone

In addition, information was collected about pain medication before surgery, of which 68% had an EDC and 32% had a block.

It is relevant to include these data in the evaluation as well since there is a difference in how quickly hip fracture patients can receive pain relief with strong morphine drugs. Hip fracture patients who have had an epidural catheter inserted are not started on strong morphine treatment until two days after surgery, whereas hip fracture patients who have had a block are started directly on strong morphine treatment. One of the sub-goals of Careturner was to investigate whether the bed functions of Careturner could contribute to reducing the consumption of strong morphine by hip fracture patients, for example by turning hip fracture patients every hour and supporting mobilisation.

In the baseline for February, 135 p.n. administrations were given.

Use of pressure-relieving mattresses

For both wards, data were collected on the use of pressure-relieving mattresses, with the elderly medicine ward having 35 orders for pressure-relieving mattresses and the palliative care ward having 3.

Results

In the following section, the results from the test procedure will be explained and reviewed. The results will be presented in relation to the individual measurement parameters and data from the baseline measurement.

Measurement parameter I: Patient experience

For this measurement parameter, the intention was to investigate the patients' experience with the solution, including user experience with functions, comfort, etc. but also how the solution supports them with respect to pain relief, well-being and sleep. The measurement parameter is based on the patient groups in the palliative care ward, as it was assumed that these patients would be cognitively able to participate in interviews. However, contrary to the assumption, it was not possible to include these patients in the evaluation of the solution, as the majority were so poorly due to their illness and condition or did not have the mental energy to participate due to their life situation. This section on patient experience is based on the healthcare staff's insights into the patient experience and the feedback they have received directly from patients. The data consist exclusively of interviews with healthcare staff and are a collection of experiences from both the palliative care ward and the elderly medicine ward. The data are considered valid in this specific context as healthcare staff have continuously talked to patients about their experience with the solution throughout the test.

Positive reception by patients

Overall, the vast majority of patients have responded positively to the new solution. There is a clear trend that acceptance increases significantly when patients are given a thorough explanation of the purpose of the solution, how it works and how it affects their treatment and well-being. It has also become clear that giving patients enough time to get used to it - both mentally and physically - plays an important role.

However, a small number of patients have reported experiencing discomfort during use, especially at night. Here, factors such as equipment noise and movement in the surroundings can be disruptive and in some cases affect sleep quality negatively. These reactions have been individual and vary in severity and type. In addition, patients may have expressed dissatisfaction with the solution for a variety of reasons, which in some cases were not specifically about the solution, but more about their life situation. Here, annoyance over sound or movement becomes the most tangible for the patient, but it can be an expression of stress, grief or other mental pain.

In general, patient responses ranged from clear satisfaction and sense of security to irritation. In some cases, the solution has become so integrated into the patient's everyday life that they hardly notice it anymore. Thus, it is important to take into account individual

differences in experience and adaptation when implementing this type of solution in clinical practice.

Relevant patient groups

Careturner has been shown to be particularly beneficial in the care of patients with increased risk of pressure sores, reduced mobility, significant pain or cognitive impairment. The solution not only contributes to more gentle and ergonomically correct positioning, but also supports clinical care by reducing the need for manual transfers and alleviating physical strain on the staff.

"I think [it's relevant for] those with severe pain because of the gentleness and those who are confused in order to prevent delirium."

Especially in patients with delirium or dementia, Careturner has a calming effect. The rhythmic and quiet movement creates a sense of calm and envelopment, which can reduce restlessness and anxiety while increasing the sense of security - something that is crucial when working with these patient groups.

One of the strengths of the solution is its flexibility. Easily customisable to individual needs, the solution is effective for both very care-intensive patients with complex issues and more self-reliant patients who still need support for positioning or pressure sore prevention. In this way, Careturner supports a differentiated and person-centred approach to care and treatment.

Increased relief and quality of life

The solution plays a significant role in non-pharmacological symptom relief and may in some cases reduce the need for pain medication. By offering a more gentle and stable positioning and creating a sense of calm and security, the body's own mechanisms for pain relief are supported, which is especially relevant for patients with chronic pain, restlessness or cognitive challenges.

"If you can just go from an 8 to a 7 on a pain scale, it makes a difference."

Even modest improvements in a patient's pain perception can have a very positive impact on the quality of life of the individual patient. When pain is reduced - even to a small degree - the patient's ability to be mentally present, engage in social relationships and participate actively in daily tasks and decisions about their own care and treatment increases. This

increased participation strengthens both the rehabilitation potential and the perceived quality of life of the patient.

Supporting better treatment

Careturner contributes significantly to improved care by ensuring automated and regular repositioning, which is an essential element in preventing pressure sores - especially in immobile or care-intensive patients. The continuous and controlled movement reduces the need for manual turns, which not only increases comfort for the patient, but also reduces the risk of sleep disturbances and nocturnal restlessness. This has been shown to produce a more restful and stable nocturnal sleep, which is crucial for both physical recovery and mental well-being.

"It frees up resources for me to do something else with the patient."

While improving patient safety and supporting gentle care, the solution also frees up valuable time for caregivers. This freed-up time can instead be used for other care tasks, clinical observations or relationship building with patients.

Partial conclusion

Overall, Careturner contributes to an improved patient experience, especially among patients with complex care needs. Many patients experience increased comfort and a sense of security, especially when given a thorough introduction to the solution and time to get used to it. The automatic and gentle positioning creates calmness - especially at night - which improves sleep quality and reduces discomfort in both cognitively impaired and pain-stricken patients. Healthcare staff describe how even small reductions in pain can make a noticeable difference to patients' well-being and ability to participate in their own lives. Of course, everyone has a different experience, but overall, Careturner supports a good patient experience from the healthcare staff's perspective.

Measurement parameter II: Patient involvement

As with the patient experience measurement parameter, the intention with this measurement parameter was to investigate Careturner's self-service function (hand controls for controlling functions). This includes the impact it would have on the healthcare staff's workflows to be able to involve patients more in their own treatment. The measurement parameter was based on the palliative care ward, which is why these were the only beds where a hand control for the patient was mounted on the bed. This means that the elderly medicine wards are not able to test the self-service solution. This measurement parameter cannot conclude what impact patient involvement has on the healthcare staff's workflows, but the test has shown which prerequisites need to be present for the self-service function to be relevant. These takeaways will also be used by the company for further product development of the self-service feature.

Barrier when using hand controls

"They are dying, they are not able to use it. Maybe there are some who could but don't have the energy. Not everyone has the necessary level of consciousness."

The experience among healthcare staff is that the hand control on Careturner is rarely used by the patients themselves. This is due to several factors. A common reason is that a large proportion of patients using the solution are either physically impaired, cognitively impaired or in a condition where they have difficulty understanding and using technical aids. This applies to patients with, for example, dementia, delirium or reduced level of consciousness where motor and mental limitations make it difficult to use the hand control properly.

"No, I haven't seen that [patients using the hand control]. I think it's too difficult and confusing. They need to press hard on the control and they don't have much strength."

In addition, staff emphasise that the function requires a systematic and thorough introduction for the patients. Even among patients who would theoretically be able to operate the system, the hand control is perceived as relatively challenging. This means that, in practice, it is often the caregivers who control and monitor the use of Careturner, ensuring correct and safe use, but limiting the patient's own active participation.

Relevant patient groups

Based on the above insights from healthcare staff about the barriers to using the hand control, it can also be pointed out what prerequisites are needed for patients to be better qualified to use the self-service function.

1) Cognitive prerequisites

In order to use the hand control on Careturner, the patient must have a certain level of cognitive function. This means that the patient must be able to understand what the feature is intended for and how to use it in practice. This requires both an overview of the situation and the ability to recognise the consequences of activating the system - for example, what a change of position means for the body. The patient must also be oriented in time and place and be able to remember instructions so that the function does not seem unfamiliar or confusing. This typically excludes patients with moderate to severe dementia, delirium or other conditions that impair attention and judgement.

2) *Physical prerequisites*

The use of the hand control also makes demands on the patient's physical functionality. The patient must be able to reach for and hold the hand control - which requires mobility and minor muscle strength and coordination. In addition, pressing buttons correctly requires fine motor skills, and the patient must have sufficient vision and/or sense of touch to recognise which button is being pressed. For patients with physical limitations due to neurological disorders, severe illness or severe fatigue, these requirements can present a barrier to independent use.

3) *Mental and emotional resilience*

It is also a prerequisite for self-service that the patient feels comfortable with the technology and trusts that the system works safely. For some patients, taking responsibility for their own movement can feel overwhelming or anxiety-provoking - especially if they have had negative experiences with devices in the past, or if they fear pain when moving. Therefore, use of the solution requires not only technical ability, but also a certain degree of mental stability and mental calmness, which can be challenged by pain, anxiety or restlessness, for example.

4) *Need for training and support*

Finally, it is crucial that the patient is introduced to the function in an pedagogical and customised way. Without thorough, calm and clear instructions, many patients will not be able to use the hand control correctly - or feel comfortable doing so. It is important that the staff assess the patient's prerequisites and adapt the information to the individual needs. It must also be possible to have ongoing support and follow-up if the patient has doubts about use or feels uncertain. Even for patients with the necessary prerequisites, it is often a new and unfamiliar task that takes time and confidence to master.

Partial conclusion

The self-service functionality on Careturner is only used to a limited extent in clinical practice, primarily because many patients do not have the necessary prerequisites for operating the system independently. The experience of healthcare staff shows that both cognitive and physical barriers play a key role. Many patients are either too frail, cognitively impaired or lack understanding of the function, making it difficult to introduce hand controls in a meaningful way. In addition, operation is perceived as relatively demanding, especially for patients with impaired fine motor skills, vision or orientation.

Even among patients with potential for active participation, it takes motivation, mental energy and a safe introduction before the function can be used safely and appropriately. In practice, it is therefore often the caregivers who control the use of Careturner, which ensures consistent and safe use, but at the same time restricts the patient's opportunity for active participation.

Going forward, a more systematic assessment of the patients' individual prerequisites, combined with a pedagogical introduction and possibly a more intuitive user interface, can increase the use of the self-service function among patients who have the potential to use it actively.

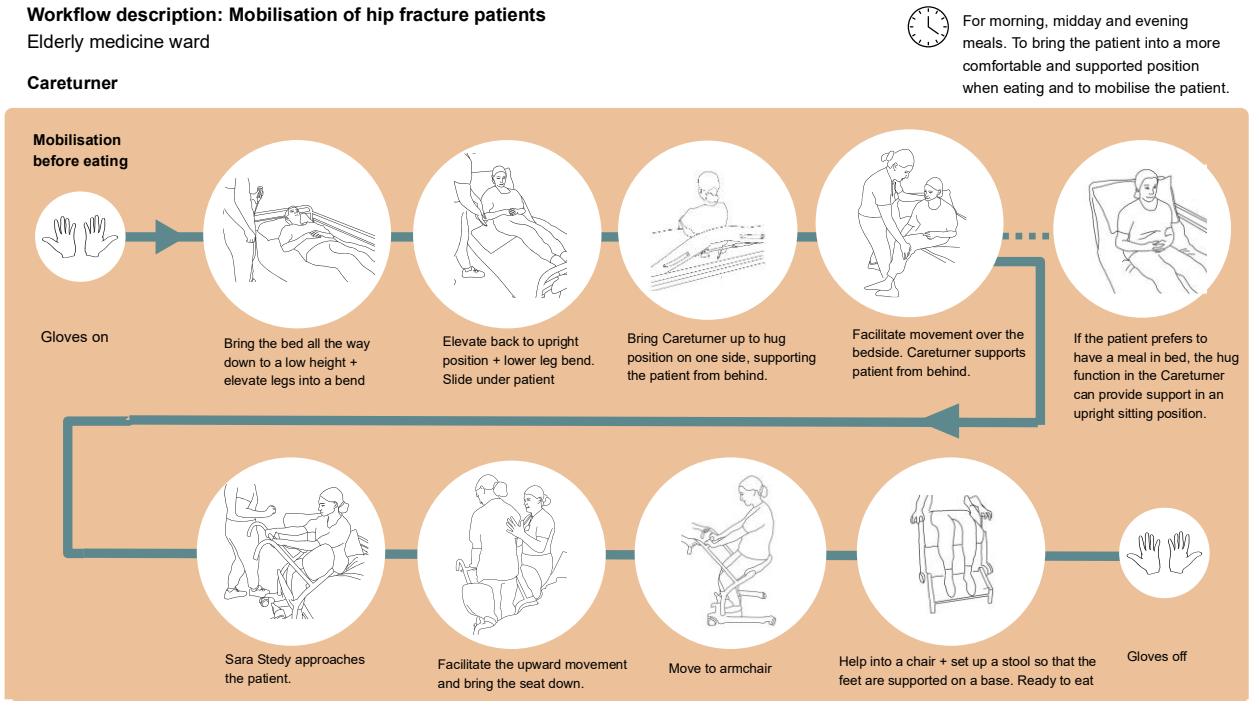
Measurement parameter III: Mobilisation

For the mobilisation measurement parameter, the intention was to investigate how the solution supports the healthcare staff in mobilising their hip fracture patients. This measurement parameter has focused on mapping workflows in relation to mobilisation of hip fracture patients as well as insights as to how the solution provides pain relief and affects the quality of treatment for this patient group. The data basis for responses to these questions consists of both qualitative and quantitative data, including interviews, questionnaires, medical record data and workflow analysis.

Workflow support

Careturner is actively used to turn, position and mobilise patients in bed. The built-in back support and the so-called 'hugging' function allow for more controlled and gentle mobilisation. This is especially valuable for patients who have difficulty supporting themselves or who may react unexpectedly by throwing themselves backwards during movement. By using one wing as support behind the patient, carers can ensure stable and safe movement - often with just one staff member, where previously two were needed. This reduces physical strain on staff and frees up time and resources.

Workflows for mobilisation of hip fracture patients are also visualised in a workflow analysis. Here, it also became clear how the solution, in many cases, enables more autonomous mobilisation.



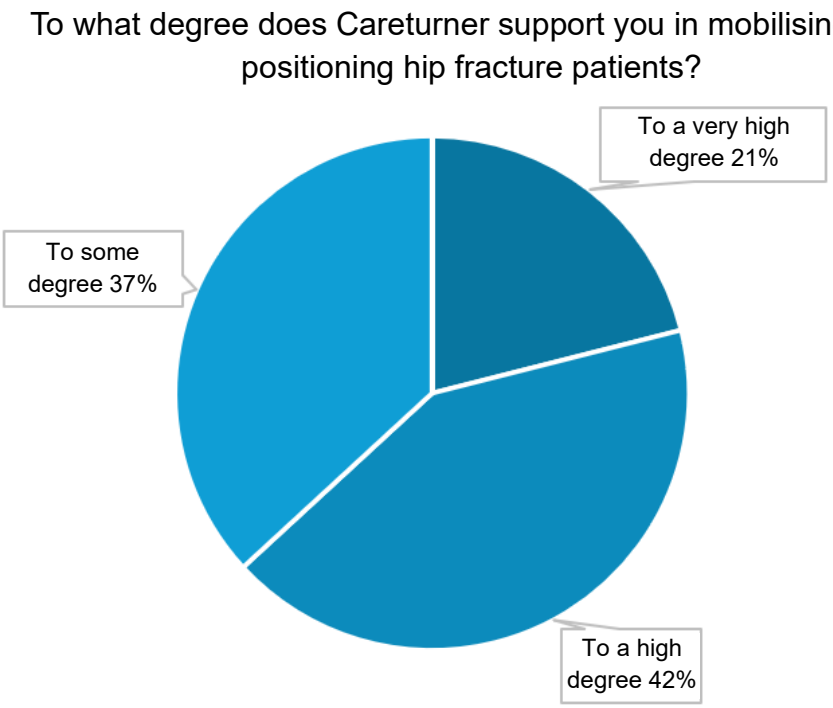
In addition, Careturner also contributes significantly to workflows in connection with meals and personal care. Many patients need to be mobilised from bed to chair several times a day for breakfast, lunch and dinner. Especially for patients with difficulty swallowing, correct and stable positioning is crucial. Here, the 'hugging' feature allows the patient to sit up in bed with appropriate support and in some cases eat the meal there, reducing the need for full mobilisation. This relieves staff and creates flexibility in planning.

"It has made it easier for me to be able to do it myself. More controlled. The bed acts as the extra person I would normally use."

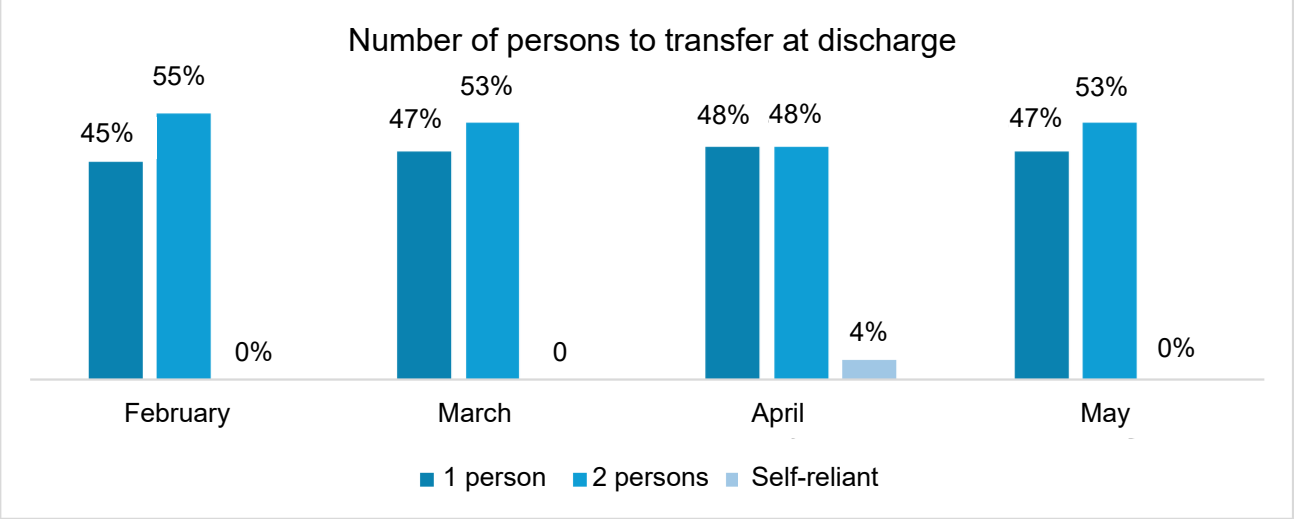
Similarly, experience shows that Careturner can be used to advantage in personal care, such as washing and dressing. Turning and support can now be carried out by one staff member in several situations, where previously two were needed. This is a great advantage in terms of resource management and allows staff to work more independently. At the same time, patients feel more secure in the process because the movements feel calm and predictable.

Careturner integrates easily into existing workflows and helps improve both quality of care and patient safety. By giving staff practical tools to handle mobilisation, meals and personal care with greater flexibility and fewer resources, the solution supports a more efficient and autonomous task performance by staff.

In addition to interviews, a questionnaire survey was also conducted among healthcare staff. In the elderly medicine ward, staff answered the question of whether the solution supports them in mobilising and positioning hip fracture patients. Here, 63% answered that the solution supports them in this task.



In addition to questionnaires, the elderly medicine ward has also investigated this perspective of independent mobilisation through medical record data.



There is not much difference between transfers by 1 or 2 persons at discharge during the test procedure. However, this should be seen in the context of the patient composition in the

ward during the test procedure. A number of patients have been hospitalised who were either dying, had very complicated treatment courses or were lift users before they were admitted. Their habitual condition on admission has thus in any event required mobilisation by two persons.

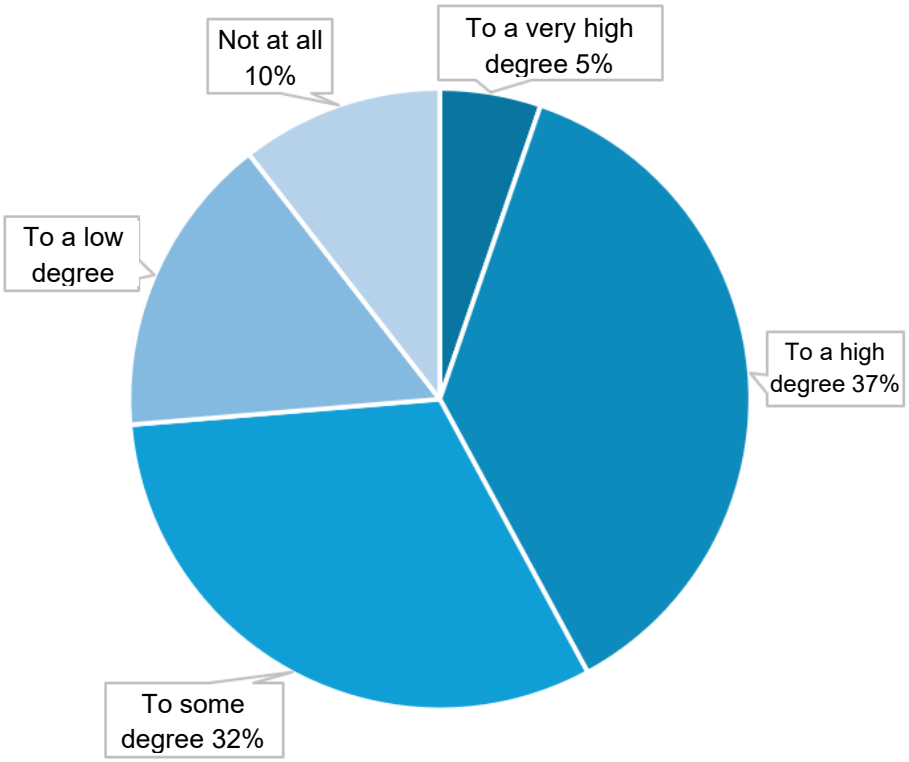
Freed-up time

Careturner helps to free up time in daily workflows by enabling employees to mobilise patients without necessarily having to wait for assistance from a colleague. In addition, the solution also frees up time in connection with the automated positionings, as healthcare staff no longer have to manually turn and position patients. This is especially valuable during night shifts, where there are fewer staff at work, but still the same number of patients to turn and position at specific time intervals. Several employees describe that the bed acts as an "extra hand" and creates increased freedom of action - especially in pressed situations and during night shifts where staffing is limited. This independence reduces waiting time and allows for a smoother workflow.

However, it is emphasised that initially there may be an increased time consumption while learning to use Careturner correctly. Using the features takes some getting used to, and some staff members find that the solution is overlooked in busy situations if it has not yet become an integrated part of the routine. In the long term, however, it is assessed that the investment in training and routine building is outweighed by the time savings and increased flexibility that Careturner brings to everyday life.

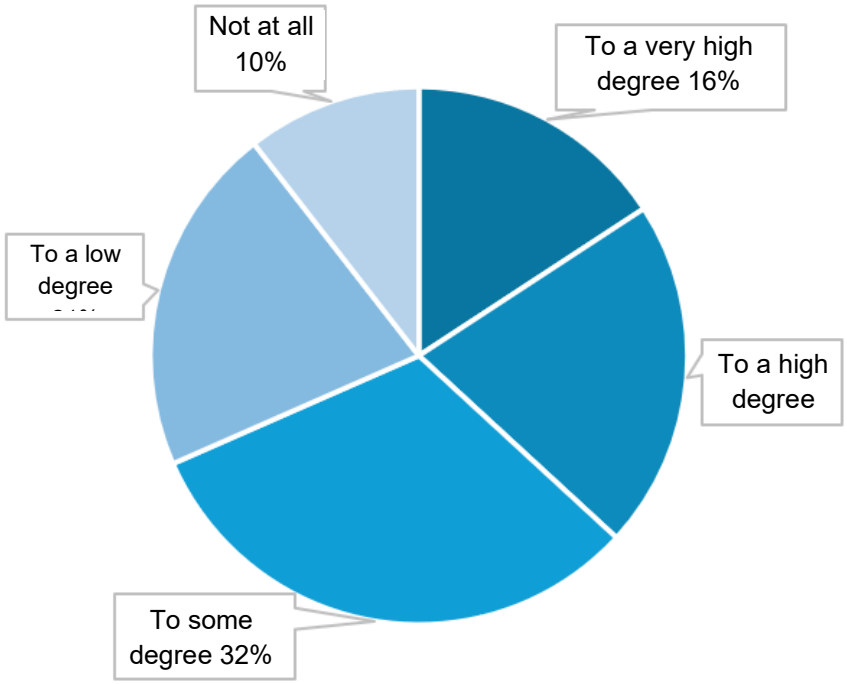
Furthermore, the perspective of time has also been further explored in a questionnaire survey completed by the staff. Here, 42% answered that they find that the solution has freed up time for other tasks during a shift to a very high or high degree.

To what degree has Careturner freed up time for other tasks?



In addition to this, staff were also asked whether the solution supports them in mobilising hip fracture patients without the help of a colleague. Here, 37% answered that the solution supports them in mobilising patients without the help of a colleague to a very high or high degree.

To what degree does Careturner support you in mobilising hip fracture patients without the help of a colleague?



This is not time specifically freed up for the individual employee as mobilisation still needs to be done, but instead of requiring time, resources and help from a colleague, the task can now be done independently, freeing up time in general.

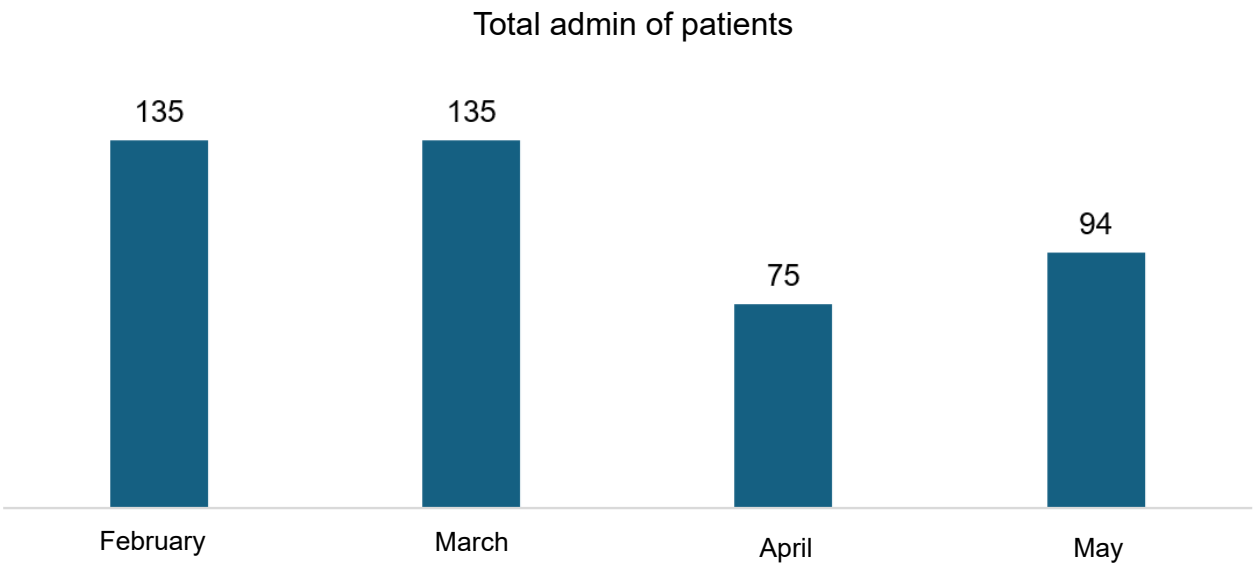
Increased independence

As pointed out in the above section, the solution supports more independent task performance by healthcare staff by enabling them to mobilise, position and turn patients without the help of a colleague. In addition, the solution also automates the turning and positioning of hip fracture patients and the prevention and treatment of pressure sores, which also means more independence for healthcare staff as the treatment of certain patient groups requires only one person.

In addition to this, the solution also makes it possible for patients to be more involved in their own treatment, and in some cases contributes to care tasks in connection with, for example, mobilisation, turning and personal care. This is because movements are slower and more gentle, and the patient obtains more support and can push off or hold on to the bed side rail, lie on their side, etc.

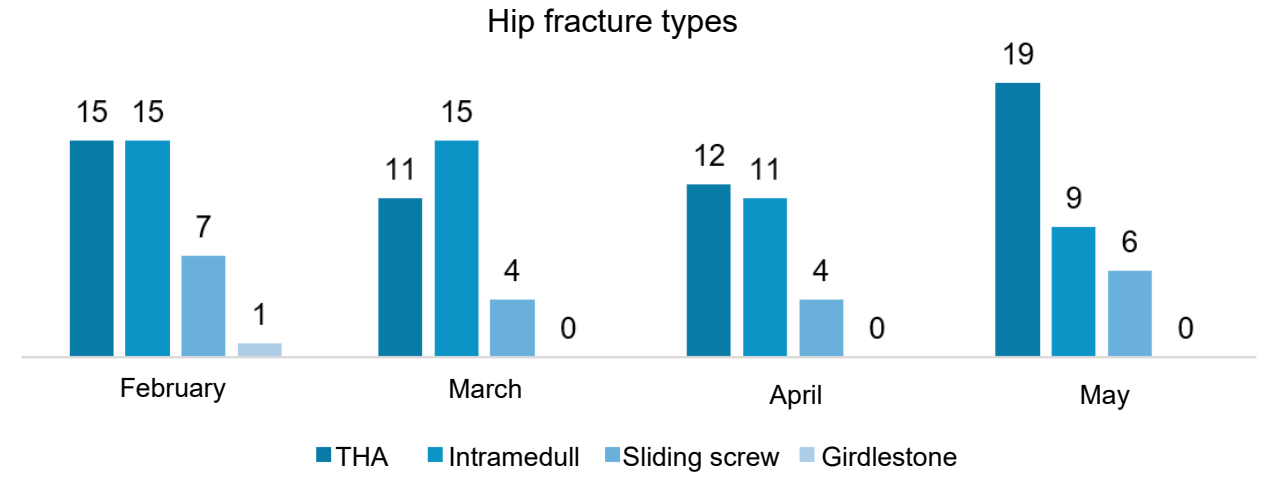
Medicine consumption

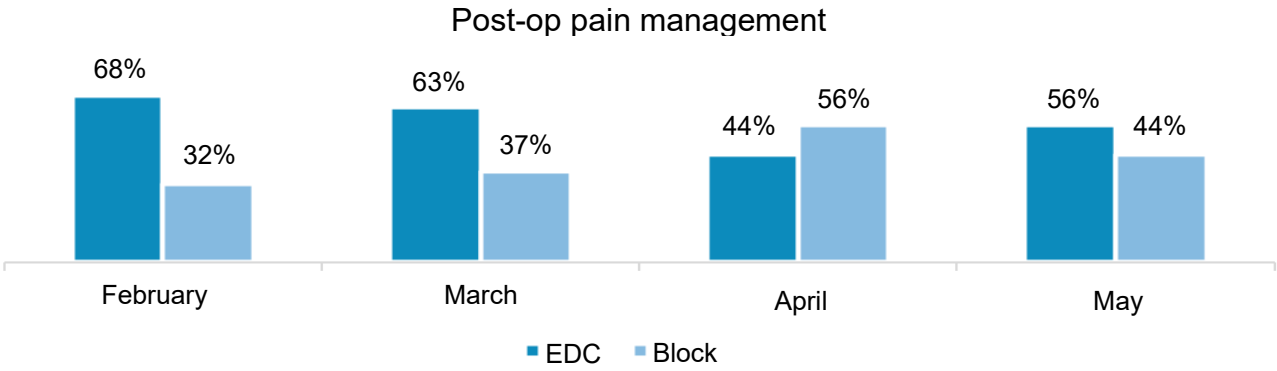
During the test, the elderly medicine ward also analysed the consumption of pain medication during the test procedure. They identified an average decrease of 25% in the number of p.n. administrations over the test period from baseline compared to the average number of administrations (March, April and May).



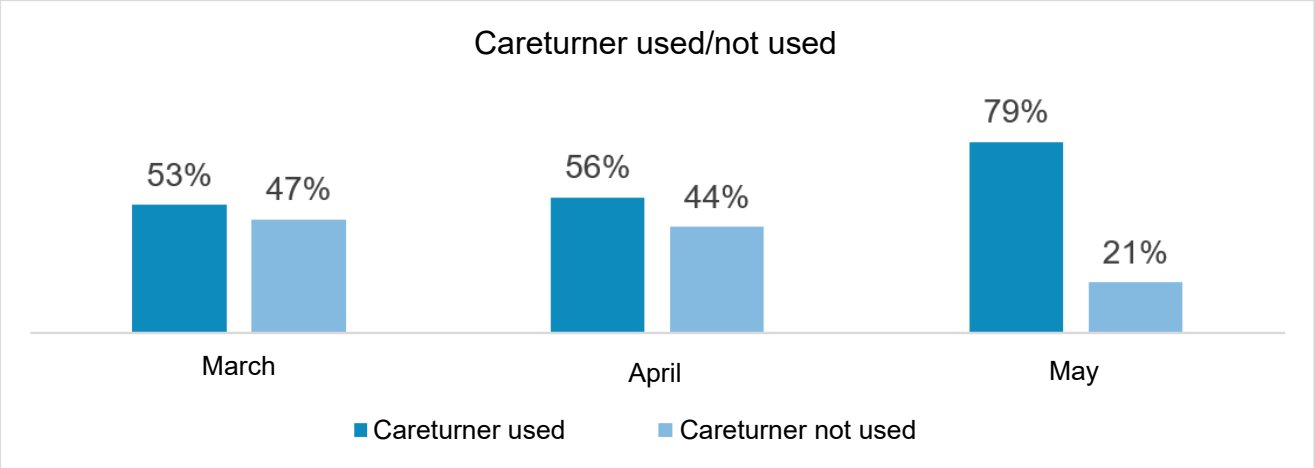
From February to March, the graphs show that the number of hip fracture patients who had intramedullary nail surgery almost corresponded to the number of patients who had total hip

arthroplasty (THA). In the same period, there is a clear predominance in the use of epidural catheters compared to blocks and a very high consumption of strong morphine drugs administered as needed (p.n.), with a total of 270 p.n. administrations (February and March combined).





However, the figures for April to May show that more hip fracture patients underwent THA surgery. In April, blocks are more common, while in May epidural catheters are used most often. There is a significant reduction in the use of strong morphine p.n. during this period with a total number of p.n. administrations of 169 (April and May combines).



The use of the Careturner device has also changed significantly over the period. In February, Careturner was only used by a few patients due to the training phase. In March, utilisation increased to 53.33% of hip fracture patients. This increase continued in April, with 55.55% using Careturner, and in May the percentage reached 79.41%.

Pain relief and comfort

In addition to quantitative data from the ward, healthcare staff were also asked about the support from the solution with respect to pain relief. This has been the focus for both wards, and the following therefore reflects the general and overall themes across the wards.

The Careturner is seen by many staff members as a tool that can help alleviate pain and increase patient comfort in some cases. The gentle, automated movements and gentle positioning help to relieve the body and calm the mind, which is especially beneficial for patients who experience pain from manual turning or restlessness in bed. The solution reduces the need for physical handling by staff and allows for more stable rest and better sleep quality.

More patients show signs of greater relaxation and seem more secure and calm, especially at night where there are minimal disturbances. At the same time, Careturner provides a non-pharmacological form of relief that in some cases can reduce the need for pain medication. This is especially important in a clinical everyday environment where there is increasing focus on reducing medication consumption and side effects.

"I feel that I have to give less medicine."

However, the effect varies from patient to patient and is highly dependent on individual pain patterns and health status. Nevertheless, it is emphasised that even small improvements in pain perception are of great importance - both for patients' quality of life and for their ability

to actively participate in their own lives and rehabilitation. The solution is thus seen not just as a practical aid, but as a support tool for a more holistic and gentle care practice.

Working environment

In connection with the final evaluation of the solution, healthcare staff were also asked about the solution's impact on the physical as well as the mental working environment. In both areas, the solution seems to have had an impact on a larger proportion of staff.

Several staff members emphasise that Careturner has had a noticeable and positive effect on the physical working environment in the care setting. Especially during heavy lifting, turning and positioning of patients, the solution is perceived as a significant relief for the body, especially for the back and shoulders. Careturner makes it possible to perform these often physically demanding tasks more gently and ergonomically correct, reducing the risk of work-related injuries and attrition.

An important benefit is that many tasks can be performed without the need for an extra colleague for support, thus relieving the individual employee and creating greater flexibility in the daily work. However, several staff members mention that it takes time and training to learn how to use Careturner effectively and remember to integrate it into the work routines. When used correctly, the solution is found to be a real physical relief - especially during night shifts and in situations with patients who have high body weight or complex pain issues.

"It relieves us physically in connection with turns, heavy lifting and such."

Overall, Careturner contributes to an improved working environment by reducing physical strain and promoting a more ergonomic and safer way of working to the benefit of both job satisfaction and working capacity of the healthcare staff in the long term.

When it comes to the mental working environment, healthcare staff feel that Careturner has had a positive impact on this, especially during night shifts where staffing is often lower and work pressure can be high. The solution helps reduce stress and guilt because staff can rest assured that patients are automatically and safely positioned, even when they are busy with other tasks. This automation creates a sense of calm and security, not only for the individual staff member, but also in the ward in general, as there is less worry about patients' positioning being overlooked.

"I don't have the same stress about having x number of patients to turn during the night. And when I'm with someone who is acutely ill, I have more time to be present with the patient."

Although a few staff members have not seen a clear effect on their mental working environment, the majority emphasise a clear mental relief. This includes fewer worries, a better overview and a feeling of being able to focus more on other care tasks without compromising patient safety and well-being. This relief improves staff satisfaction and can help create a more balanced and viable working environment.

Partial conclusion

Looking at the solution's impact on clinical workflows, it can be concluded that the solution produces positive effects in several key areas of care work and contributes to improved workflow, patient comfort and a better working environment. Careturner supports more gentle and efficient mobilisation, with features like the back support and the 'hug' allowing tasks that previously required two staff members to be performed by one person alone. This frees up valuable time and increases flexibility in a busy workday, especially in pressed situations and during night shifts.

The physical working environment is perceived as significantly improved when using Careturner, as the solution relieves the back, shoulders and other strained muscle groups during heavy lifting and turning. The staff report a reduction in physical strain and a more ergonomic working posture. Although training and familiarisation are needed to ensure correct use, Careturner is perceived as a real physical relief, especially when handling heavy or pain-stricken patients.

At the same time, Careturner has a positive impact on the mental working environment, especially during night shifts where staffing is often lower. The automation of positioning reduces stress and guilt for staff, who feel confident that patients' needs are being met even when attention is divided between multiple tasks. This mental relief increases clarity and creates calm.

At the patient level, Careturner supports more comfortable care, where gentle, automated movements and stable positioning can contribute to non-pharmacological pain relief and better sleep quality. Although the effect varies depending on the individual patient's condition, even small improvements in pain perception have a significant impact on quality of life and the ability to actively participate in own care and rehabilitation. In addition, potential effects are observed in the consumption of pain medication after hip surgery, with a 25% average decrease in p.n. administrations from baseline compared to average administrations during test months.

In summary, experience suggests that the Careturner is not just a practical aid, but an important tool for creating more effective, gentle and holistic care.

Measurement parameter IIII: Logistics flow

The logistics flow measurement parameter aimed to investigate the solution's impact on flow in connection with bed distribution and cleaning. To investigate this, interviews were conducted with the service manager, and the flow for the solution was mapped and defined compared to the flow for alternating pressure mattresses. A comprehensive workflow description has been elaborated for both flows.

Training and integration into workflows

During the test procedure, service personnel were thoroughly introduced to the key principles behind the solution and the associated cleaning procedures. Emphasis was placed on ensuring a clear understanding of the workflows and creating confidence in using the solution. Logistical conditions and integration into existing workflows were handled quickly and efficiently.

The test period with Careturner has been positively received by the team. The product is perceived as intuitive and comparable to a standard hospital bed, which has contributed to smooth everyday use. In general, the training was completed without major challenges. It is necessary to ensure that all staff members are thoroughly introduced to Careturner, including their physical location and how they are separated from other types of bed and mattress solutions.

Logistics flow analysis

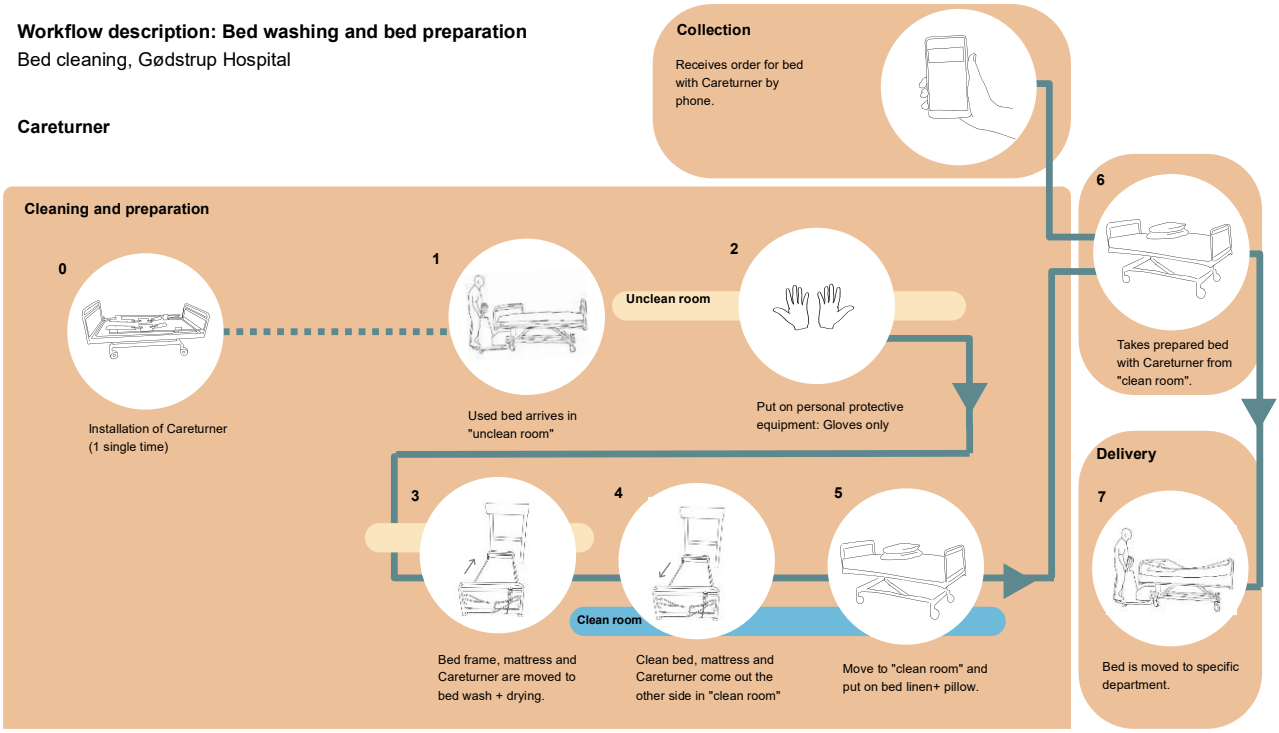
As part of the test procedure, a detailed workflow analysis was conducted to map the logistics flow for both Careturner and the existing alternating pressure mattresses. The analysis has identified significant differences in the handling of the two solutions.

The Careturner differs significantly in that, unlike alternating pressure mattresses, it can follow the bed through the automated bed washing process. This means that Careturner does not increase the burden on the logistical flow, but can be treated in the same way as a standard hospital bed and mattress. This property results in both reduced physical strain on staff and significant time savings in daily operations. On average, it takes 8 minutes to clean and prepare standard beds, including standard beds with a Careturner fitted. Bed cleaning is done automatically in the bed wash unit. For a standard bed with an alternating pressure mattress, it is estimated that it takes an average of 10-15 minutes to clean and prepare it. This is because the alternating pressure mattresses used do not tolerate water and must be cleaned manually. In addition, it takes two persons to lift the mattress on and off the bed.

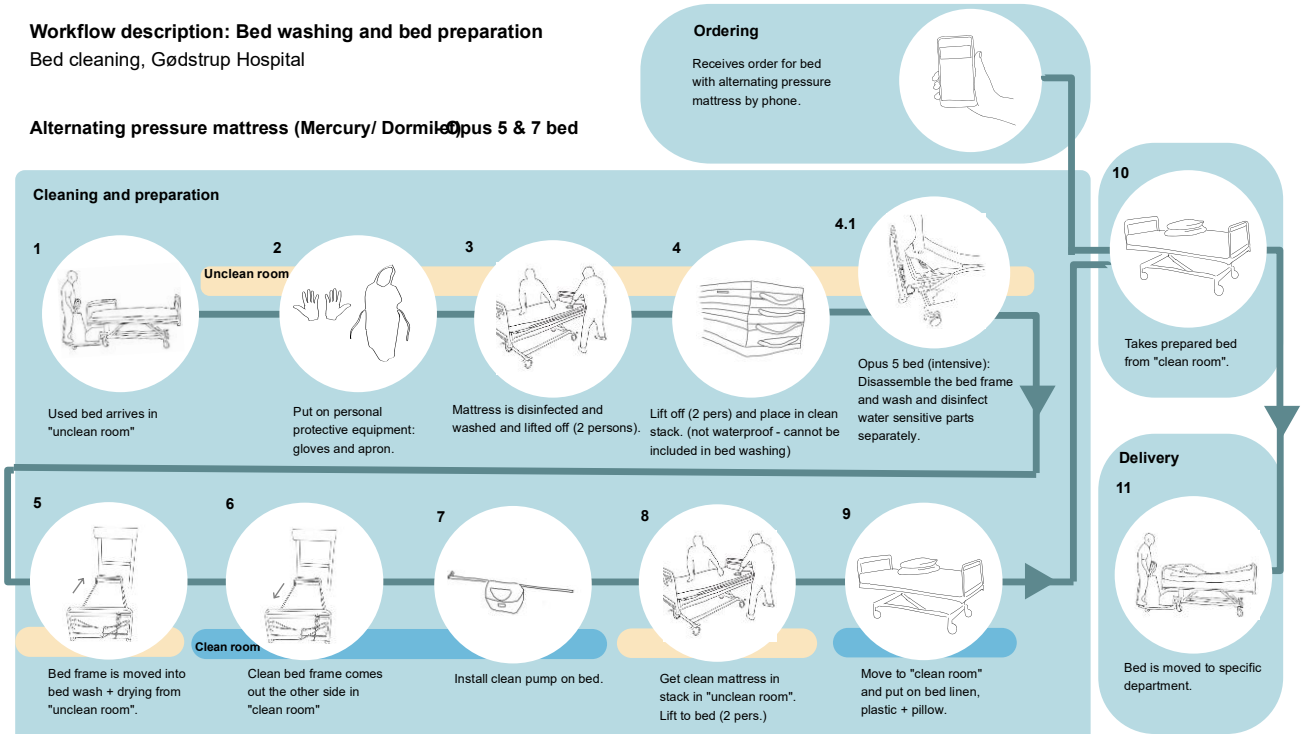
It is estimated that an average of 2-7 minutes per bed can be saved on cleaning and preparation when using Careturner instead of a traditional alternating pressure mattress. In addition, handling Careturner requires only one staff member, as the entire cleaning process can be carried out automatically together with the bed. In comparison, cleaning alternating pressure mattresses requires two staff members: the mattress must be manually removed

and cleaned separately as it does not tolerate the automated bed wash. This workflow simplification not only contributes to efficiency and optimisation, but also to a reduced work load for the staff.

Flow for Careturner



Flow for alternating pressure mattress



Partial conclusion

The workflow analysis has clearly shown that the implementation of Careturner brings a number of benefits related to logistics and working environment compared to the existing alternating pressure mattresses. Full integration into the automated flow of the bed wash reduces both time and staff requirements for cleaning and preparation. Not only is less time spent on cleaning and preparation, but this task can be handled by one person instead of two. This contributes to more efficient operations and less physical strain on the staff. Overall, the results indicate that Careturner supports a more viable and resource-efficient workflow in the daily care and cleaning work.

Conclusions

From February 2025 to May 2025, an automated turning system has been tested and evaluated at Regionshospitalet Gødstrup in collaboration with the palliative care ward and the elderly medicine ward. The evaluation was based on three main evaluation meetings. A kick-off meeting with presentation of baseline data. A mid-term evaluation meeting at which preliminary data were compared to success criteria defined in the project strategy. A final evaluation meeting at which quantitative and qualitative data were presented in relation to the baseline and defined success criteria.

The evaluation of Careturner shows that the solution contributes positively to the patient experience, workflows and working environment in clinical practice. Especially among patients with complex care needs, Careturner is considered to have a beneficial effect on comfort, sense of security and sleep quality. The automated, gentle positioning reduces discomfort and supports non-pharmacological pain relief, which is found to be a significant improvement in patients' overall well-being.

However, patient involvement through the self-service feature is limited. The study suggests that many patients have physical or cognitive barriers that make meaningful and safe use of the feature difficult. To strengthen the patient's ability to actively participate, a more systematic assessment of individual prerequisites and a simplified and more intuitive user interface are recommended. Takeaways will be used by the company for future product development.

With respect to mobilisation and workflows, it is assessed that Careturner brings significant benefits. The solution enables gentle mobilisation, which in many cases can be handled by one staff member rather than two, increasing flexibility and reducing staff resources in pressed situations. Staff report an improved physical working environment with less heavy lifting and a more ergonomic working posture, which is considered to have a preventive effect in relation to strain injuries. There is also a positive effect on the mental working environment, especially during night shifts, where automation contributes to improved overview and reduced stress levels.

In addition, effects on the administration of pain medication after hip surgery have been observed during the test procedure. Here, the department has reduced the number of administrations by 25% compared to the consumption in the baseline month.

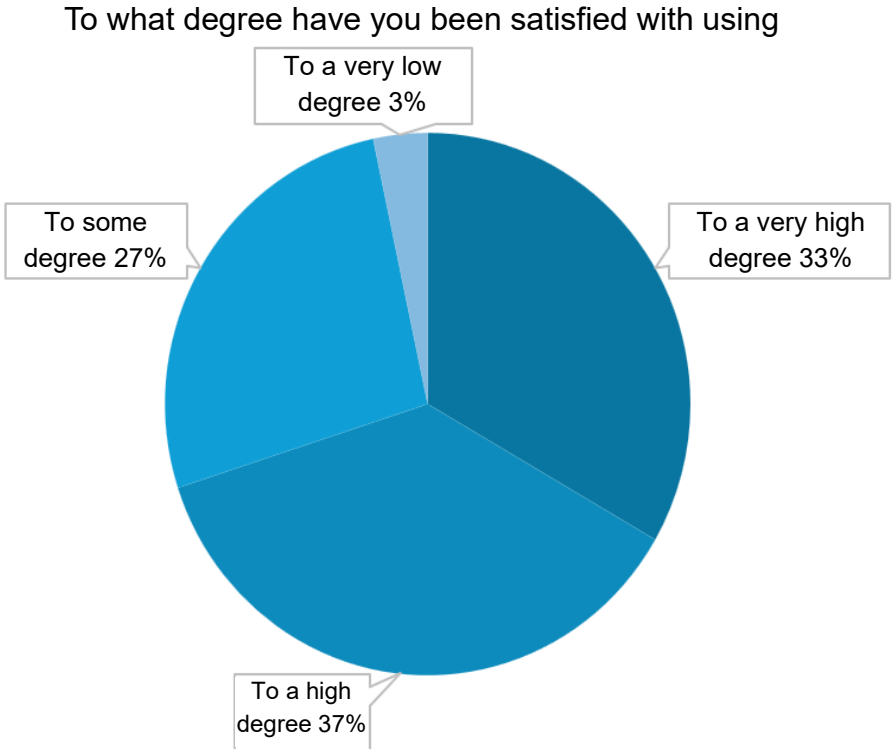
With respect to logistics, efficiency improvements in cleaning and preparation have been documented due to the integration with the automated flow of the bed wash, among other things. This results in both time savings and a reduction in physical strain on the staff.

In summary, the overall experience indicates that Careturner is a relevant and valuable tool that supports more efficient, gentle and holistic care, while contributing to a viable healthcare system with a good working environment.

Anchoring and implementation

To ensure that use of the solution was adopted, anchored and implemented in the department, the company spent a total of four to six weeks training the staff. The solution was also available in a meeting room in the department, which made it easy to train staff and allowed them to practice the bed's functions without involving patients. The company was physically present in the department several times a week, and also at different times, to ensure that all shifts had the opportunity for training. In addition, the company also trained a total of seven super users in using the solution, who could help and train colleagues when the company was not present. This created a solid foundation in the departments and their workflows and made the staff feel confident in using the solution. It is important to thoroughly integrate and embed the use of a new welfare technology into clinical practice and workflows. It is also demanding for hospital staff, super users and the company, as it takes time, knowledge and persistence to change workflows and routines. However, in order to test a new solution, it is crucial that this is done properly to create the best conditions for a successful and authentic test. It became clear during the test that a sense of security and familiarity with the solution's functions are essential for practical use.

The vast majority of staff have been trained by the company itself in the use of Careturner. The introduction was predominantly found to be satisfactory, with almost 85% of respondents stating that they feel, to a high or very high degree, that they have received an adequate introduction to the device. Careturner has been used by almost all survey participants - only one respondent has not used it. The use of Careturner varies among staff. 40% have used the programme with turns once every hour, while 30% have used the programme with turns every half hour. In addition, 20% have made use of all the features offered by Careturner.



Overall, there is a high level of satisfaction with the product. 70% of respondents indicate that they are very or extremely satisfied with the use of Careturner. Only one person has expressed a low level of satisfaction.

The company was also physically present in the department at least three to four times a month throughout the test procedure, and they were available by phone throughout the test period, and there was a check-in every 14 days. This meant that errors, problems or challenges were recognised quickly and resolved.

Next step

Regionshospitalet Gødstrup and the departments involved have entered into a dialogue with the company and supplier about the possibility of keeping the solution and exploring the possibility of using the solution in more departments at the hospital.

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Project group

The project group consisted of the innovation manager from the innovation department at Regionshospitalet Gødstrup, head nurse from both wards, as well as nurses and physiotherapists based in the staff group in both wards. In addition, the service manager and assistive technology manager have also been part of the project team. Next, the company has been anchored in the project group, including a representative from Able Nordic, which is a supplier and existing partner with the Regionshospitalet Gødstrup.

Info about the solution

Careturner is a '3-in-1' solution that gives existing hospital beds new enhanced features through customised pressure relief, transfer assistance and sensory stimulation in one product. The working environment is also improved by allowing manual patient transfers without heavy lifting for caregivers. Sensory stimulation, the cradle and hug function calms delirious patients and improves sleep and well-being. Careturner can be mounted on most commonly used hospital beds and follow the bed into the bed washer.

Image of the solution

Nordic Health Lab

is a non-profit organisation that bridges the gap between private entities and the public healthcare system. Our mission is to accelerate innovative solutions that safeguard our collective health in the future.