

Recommendation from the Danish Health Technology Council concerning

High-tech hospital beds for use in intensive and neurological wards

Recommendation from the Danish Health Technology Council:

The Danish Health Technology Council does not recommend a national implementation of high-tech hospital beds. But acknowledges that local conditions can promote the use of high-tech hospital beds in intensive wards.

About this recommendation:

The Danish Health Technology Council notes the evidence base is currently limited, which is why the recommendation is negative towards national implementation.

The Danish Health Technology Council acknowledges that high-tech hospital beds have been implemented in several of Denmark's intensive care units and does not recommend these are phased out. Based on the findings of the analysis, the Danish Health Technology Council also acknowledges that high-tech hospital beds have the potential to contribute to the release of staff resources related to the performance of certain tasks, especially in the case of unstable and immobile patients in intensive care units. However, these findings are subject to considerable uncertainty.

In addition, the analysis indicates that high-tech hospital beds can potentially contribute to an improved physical working environment when performing some tasks in intensive care units, e.g. daily weighing of intensive care patients. However, the extent of the potential is unclear. The Danish Health Technology Council emphasizes the value of high-tech hospital beds depends to a large extent on thorough training, continuous use of integrated functions and competence maintenance of staff.

The Danish Health Technology Council notes if a local implementation of high-tech hospital beds is desired, attention should be paid to the above elements, including the hospital's physical surroundings. In addition, the proportion of high-tech hospital beds should represent a minimum proportion of total bed capacity in order to maintain staff skills and make full use of bed functions.

Due to the need for further evidence in the area, the Danish Health Technology Council appeals to the regions and suppliers to contribute to generating new knowledge in these areas, preferably with a focus on the physical working environment and resource consumption.

In general, findings in the analysis show that high-tech hospital beds create the most value for critically ill and immobile patients who cannot be mobilized out of bed.

Based on the current evidence base, Danish Health Technology Council cannot comment on the value of high-tech hospital beds in the country's neurological wards.

About the technology	High-tech hospital beds are defined as hospital beds with control panels and the following integrated functions: weight (class III), bed-exit alarm, continuous lateral rotation therapy, pressure-relieving mattress with static function, and the ability to adjust the bed to seated mode.
Patient population	The recommendation concerns hospitalized adult patients who are at high risk of developing complications due to their medical condition and immobility. The population is further divided into the subgroups: • Unstable, intensive patients • Stable, intensive patients • Neurological patients
Scope of application	The recommendation applies to Danish public hospitals.
Implementation	If local conditions are favouring the use of high-tech hospital beds, the individual hospital should be aware of conditions that can ensure effective use in the daily workflow. In particular, the individual ward should consider the setting for transporting patients in high-tech hospital beds, adequate and continuous training, cooperation with relevant professional groups on changed workflows, and any local adaptations that may prove necessary. Where high-tech hospital beds are used, consideration should be given to gathering relevant data to contribute to the evidence base and future decisions on use.
Procurement procedure	No proposal for a national tendering procedure.

The Expert Committee's summary of the assessment report

About the assessment

The recommendation from the Danish Health Technology Council is based on the Expert Committee's analysis report regarding high-tech hospital beds for use in intensive care and neurological wards. The purpose of the analysis is to answer the following questions:

Should high-tech hospital beds be used instead of standard hospital beds, possibly with pressure-relieving mattresses, for patients admitted to intensive and neurological wards?

Clinical effectiveness and safety

The systematic literature search did not identify any relevant literature examining the effect on patients of high-tech hospital beds compared to standard hospital beds. Therefore, the outcomes have been answered based on two reviews, concerning alternating pressure air surfaces and reactive air surfaces as well as a prospective, randomized study regarding lateral rotation therapy. The Expert Committee notes the results from the included studies relate to a single function, which is not equivalent to high-tech hospital beds. In addition, the Expert Committee states that the confidence in the effect estimates from the prospective randomized study is very low. Therefore, the results are not included in the overall assessment. In addition, it has not been possible to identify evidence for several of the predefined outcomes or to consider the different subgroups due to the limited evidence. Overall, the Expert Committee states that the evidence for the effects of high-tech hospital beds compared to standard hospital beds is limited. Based on this, the Expert Committee concludes that the perspective *clinical effectiveness and safety* cannot be included in the overall assessment, and there should be more evidence before examining the effect of high-tech hospital beds.

Patient perspective

The Expert Committee states that the *patient perspective* cannot be included in the overall assessment, as it has not been possible to include the patients' experiences and attitudes towards high-tech hospital beds as opposed to standard hospital beds.

Organizational implications

The *organisational implications* of using high-tech hospital beds compared to standard hospital beds are considered in relation to the topics of physical work environment, dissemination, experiences, needs, resource consumption and implementation.

Based on the available data, the analysis indicates that high-tech hospital beds may have certain advantages for specific patients admitted to intensive care units. Overall, the data indicate that there is a demand and a clinical need for high-tech hospital beds in intensive care units. This is based on experiences from professionals who have experience with high-tech hospital beds. The data

indicates that there may be an improvement in the physical work environment if the functions of the high-tech hospital beds are used continuously and according to the instructions.

Based on the current evidence, the Expert Committee cannot conclude whether it is reasonable to use this type of high-tech hospital beds in neurological wards. However, the analysis indicates that it might not be the functions of the defined high-tech hospital beds that are meaningful and resource-saving for neurological patients.

However, the Expert Committee have identified some relevant factors that regions or departments should consider if they were to purchase high-tech hospital beds. Overall, the Expert Committee states that the hospital's physical design must be compatible with the high-tech hospital. Secondly, to achieve value for the professionals, there must be a certain amount of high-tech hospital beds so that the health professionals can gain routine in the use of the functions. Next, the findings of the analysis indicate that it is the critically ill and immobile intensive care patients who gain the most value from high-tech hospital beds. However, it will always depend on an assessment from the health professionals. Functions such as integrated weight and chair are experienced as beneficial in relation to the physical work environment and the release of staff time, whereas the bed-exit alarm is not considered relevant for intensive patients.

The analysis also indicates that high-tech hospital beds are perceived as a disadvantage when the patient is fully or partially mobile. In addition, the Expert Committee notes that the width and height of the high-tech hospital bed, the location of the control panels and the lack of compatibility with other aids are a challenge for the health professionals' physical working environment. Cleaning high-tech hospital beds is more time-consuming, and often the high-tech hospital beds must be cleaned on the ward, which can be experienced as a disadvantage.

The Expert Committee notes that the analysis does not include bariatric patients. However, this may be relevant as the BMI of the population is increasing and high-tech hospital beds are wider and longer compared to standard hospital beds.

Overall, the Expert Committee concludes that there is a need for more evidence on the organisational implications of high-tech hospital beds. Furthermore, the current evidence is both for and against the use of high-tech hospital beds. Therefore, the Expert Committee cannot conclude whether the intensive and neurological wards should use high-tech hospital beds rather than standard hospital beds.

Health economics

Cost analyses within health economics represent the best possible estimate that can currently be made based on the data collected in connection with the analysis. The results of cost analyses indicate that it is cost-saving to use high-tech hospital beds for the care and treatment of unstable and stable intensive care

patients, as the performance of a range of tasks is associated with reduced resource consumption compared to the same tasks performed in standard hospital beds. The cost savings should be interpreted as possible release of staff time for other treatment tasks. For neurological patients, the results point towards an additional cost when admitting this patient group to the type of high-tech hospital bed defined in this analysis.

The Expert Committee concludes that the uncertainty associated with the data makes it impossible for the committee to state with certainty whether the use of high-tech hospital beds potentially could release staff time and what the extent of any such release of staff time in clinical practice would mean. This is due to the fact that workflows are organized differently in the country's intensive care units and are complex processes where multiple tasks are often performed simultaneously and in succession depending on organization, staffing, procedures, guidelines, etc.

The Expert Committee concludes that stronger evidence is needed before it is possible to conclude on the health economic consequences of using high-tech hospital beds compared to standard hospital beds.

Budgetary consequence analysis and cost analysis should be viewed in context, as the purchase and implementation of high-tech hospital beds are associated with greater budgetary costs, but which have the potential to result in the release of staff time. Technologies that can release staff time can be valuable due to the current shortage of personnel in the region's intensive care units. However, the Expert Committee overall assesses that further evidence is needed to conclude whether high-tech hospital beds have the potential to meet this goal.

About the recommendation from the Danish Health Technology Council

The Danish Health Technology Council's recommendation is addressed to the regions for use in their decision on the use of a given health technology or the organisation of a treatment area. The assessment report reviews the following perspectives: 1) Clinical efficacy and safety, 2) The patient perspective, 3) Organizational implications, and 4) Health economics.

This recommendation is based on the Danish Health Technology Council's assessment report on high-tech hospital beds for use in intensive and neurological wards, which has been prepared jointly by the Expert Committee and the Secretariat. The assessment report has been prepared on the basis of the assessment design as well as the Danish Health Technology Council's process manual and methods guidance. The terms of reference of the Expert Committee, together with other relevant documents, are available on the website of the Danish Health Technology Council.

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