

A black and white photograph of an operating room. In the foreground, a patient is lying on a table, covered with a dark, draped cloth. The table's metal frame and adjustment mechanisms are visible. In the background, two large, circular surgical lights are mounted on the ceiling, and a long, rectangular light fixture is also visible. The overall scene is clinical and brightly lit.

Patient safety
and hospital design

Patient safety

Patient safety and hospital design in Denmark.

The future process for hospital design in Denmark must be driven by a multitude of requirements and expectations from both patients and health care professionals.

The physical environment must be flexible and capable of accommodating increasingly sophisticated diagnostic and treatment processes many of which are adapted to the individual patient and involve different groups of health care professionals acting within a delimited timeframe. Treatment will primarily be provided on an out-patient basis, so that only very ill patients are admitted as inpatients. These perspectives imply special challenges in relation to patient safety.

In a collaborative effort with TrygFonden, the Danish Society for Patient Safety launched the project 'Facility design and patient safety' on 1 January 2008. The purpose of the project is to identify the ways in which well-considered architecture and design may contribute to preventing the occurrence of adverse events. The project involves the drawing up of a manual for use as a planning tool in future hospital design processes.

Patient safety

A hospital is a complex organization in which many health care professionals work together to resolve complicated tasks, often under acute circumstances. Safety systems have been implemented to ensure that potential causes of adverse events are anticipated and prevented, but systems may fail...

It may happen that safety systems are compromised by special circumstances acting in a combination with human factors, as a result of which adverse events happen that will cause patients harm or might have caused them harm.

In recognition thereof, patient safety is defined as the protection of patients against harm that occurs as a result of the efforts, or the lack of efforts, of the health care system. A high level of patient safety is achieved only in a culture characterised by openness and trust so that staff feels safe about raising issues on patient safety, the purpose being to extract learning that will protect the next patient from harm. This is possible in the Danish context.

According to part 61 of the Danish Health Act, health care professionals have a duty to report all adverse events occurring in connection with the hospitalisation of patients. The Act also protects the individual person against sanctions resulting from having made the report.

This leaflet gives a couple of examples of incidents, and asks some fundamental questions that are relevant in connection with the hospital design process.

Please note that the examples do not include any explanations of the clinical causes of the events, as focus here is on the contributory factors in the physical environment.



Another hip fracture

An elderly patient that had hip fracture surgery two days ago gets out of bed in the night to go to the bathroom. The patient falls and suffers a fracture of the hip recently operated on. The patient has to have surgery again, followed by a long and complicated period of hospitalisation at the end of which the patient has to be discharged to a nursing home.

Why?

Not wanting to wake the other patients in the room, the patient didn't turn on the light. In the dark he tripped over the neighbour patient's walker that had been left at the end of the bed. The patient was in a small four-patient room and it was difficult for him to manoeuvre in the dark with his two arm crutches.

*How can we design patient rooms that protect against falls?
Which requirements have to be addressed bathrooms in order for them to protect against falls?*

NOI

Intensive care unit – intense noise

Four critically ill patients all of whom are on ventilators as well as hooked up to several of infusion pumps and monitoring devices are sharing a room in the ICU. They are surrounded by a numerous health care professionals who communicate internally back and forth. A physician gives a verbal order for a patient to be given more anesthesia, but as the order is not properly understood the dose administered to the patient is too high.

Why?

In a setting filled with different levels of environmental noise from equipment and devices that are constantly beeping and giving out alarms, and with loud communication among the health care professionals, in a combination with the insufficient use of noise-absorbing materials in the room, both patients and staff were under stress.

The effect on patients was a prolonged period of admission.

The effect on staff was irritability and fatigue which increase the risk of misunderstandings and communication failures.

How can we reduce noise and achieve an acceptable noise level – not only in ICUs, but in hospital settings generally?

No 'quiet zone'

An unconscious patient is admitted to an emergency department (ED). The patient's respiration is irregular, the blood pressure is low, and the pulse is erratic. Staff begins initial treatment, and transfer to the intensive care unit is arranged, but just before the transfer goes ahead, the patient goes into cardiac arrest. Resuscitation is attempted, but to no avail. The physician on duty notifies the family of the death. The family arrives at the unit and is shown into the room of the deceased patient. The family goes into shock when it turns out that the patient is not a member of their family.

Why?

The nursing station in the Emergency Department had an open-plan layout with no separation between the station and the hallway. At the time the phone call was made to the wrong family, the atmosphere in the room was hectic as several acutely ill patients had been admitted over a short period of time: physicians were writing in the medical records and ordering medication; nurses were ordering blood tests and other tests; laboratory staff, orderlies and physicians checking on patients came by and interrupted with requests for information; worried relatives were asking for information, and phones were ringing. In this cacophony of sounds, combined with relations between people back and forth, the medical records of another patient had been used when making the call to the family.

How can we design a medical unit that signals approachability while, at the same time, allows staff to work in peace and protects them against unnecessary interruptions?

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Rooms

Anesthesia awareness

A patient wakes up during surgery unable to move or speak up. The event happens because the infusion set disconnected so that the medication does not go into the patient's veins. At the same time, as part of the anaesthesia the patient has been given medication that paralyses the muscles. The patient now suffers from post-operative nightmares.

Why?

As the procedure involved laparoscopy, the operating room was kept dark. Also, there wasn't enough space, as the room was not originally designed to accommodate the many technical devices currently used. These two factors together compromise observation of the patient.

How can we secure that hospital design takes account of the introduction of new and advanced technology that requires space and increased flexibility?

How can we include in the design considerations that, because of their different nature, activities involve individual and different requirements with regard to light and/or darkness?

Reversed-design in operating rooms

A patient is about to have surgery of the right knee, which has been marked with the surgeon's initials. Due to changes in the operating schedule, the patient is moved to another operating room which is an exact copy of the first one, only reversed. The patient is prepared for surgery on the left knee. In connection with the last checks before surgery, the mistake is discovered and prevented. The patient has surgery of the right knee.

Why?

Because of having to make sudden, last-minute changes in the planned procedure, staff was affected by the well-known human factor phenomenon known as 'right-left confusion'. In this particular case it involved the risk of wrong-side surgery that was, however, prevented due to strict control measures.

How can we ensure standardisation in the design of operating rooms and other rooms?



Transtec 35 µg/l

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REN

Space

Medication room with insufficient space

In connection with the administration of medication, a patient points out that he usually only gets one morphine tablet in the morning – not three. The nurse checks the dispensed medication once again and discovers that the medication has been switched for two patients with almost identical names.

Why?

The medication room had recently been equipped with monitors and computers for the electronic medication system. This took up space, leaving less room and making it more difficult for staff working in the room – currently three nurses of whom one was in training. Moreover, the new equipment had raised the temperature in the room considerably. The aggregate effect of these distracting factors had been disruptive to the nurse when she dispensed the medication.

How can we secure a medication room design capable of accommodating future requirements?

A suicide

A patient suffering from depression has been admitted to an open psychiatric unit. As the patient is responding well to the medical treatment it is decided to lower the level of monitoring to once every hour. Early one morning the patient is found dead in the bathroom, hanging from the shower curtain rail and having used the strap of a bag as a noose.

Why?

Severe mental instability, a feeling of hopelessness or sudden impulses may cause patients - both in psychiatric units and somatic units – to plan, attempt or commit suicide. In hospital settings the most frequent methods are hanging, strangulation or jumping. Hanging may involve the use of drawing strings and cords from curtains, wires or the patient's own clothes (cords from jackets, belts, nylon stockings) that are tied to e.g. pipes and tubes, door hinges, shower fixtures or curtain rails. Strangulation involves the use of wires from radios and lamps, or a plastic bag pulled over the head. Jumping typically takes place from windows or balconies.

How can we design psychiatric units so that layout and equipment protect suicidal patients?

Sub-optimal facility use

An outpatient patient comes in for an ECG. When he gets up from the couch he collapses on the floor with convulsions and respiratory problems.

Staff has difficulty in treating the patient with medication and oxygen because the room is small and is fitted with different types of equipment. The couch does not have wheels and cannot be moved. It isn't possible to take a bed into the room, as the door isn't wide enough. Two orderlies have to carry the patient out into the hallway, where the patient is laid on a bed to be admitted for further treatment.

Why?

Because of a lack of space, a room originally used by physicians on duty had temporarily been turned into an examination room. In this connection no risk assessment had been made to identify potential sources of errors that might lead to adverse events.

How can we ensure that capacity is sufficient to accommodate new functions without compromising patient safety?

How can we include considerations of risk management in relation to patient safety in building and remodeling projects?

Is Failure Mode and Effect Analysis the best method available?

Interruption of the oxygen supply

In connection with the demolition of a building, the central oxygen supply to two operating rooms is cut off. Two patients are being prepared for surgery but have not yet been sedated. For that reason no patients come to any harm, but the operating schedule is delayed.

The interruption of the oxygen supply had been planned on beforehand, and an alternative supply of oxygen had been established for the other operating rooms. However, nobody had realised that the two operating rooms affected by the interruption were getting their oxygen supply from the line that was cut off.

*How do we make sure that construction drawings of old buildings are updated?
How do we secure the provision of care to patients in buildings undergoing remodelling work?*



nykløft

oxygen





TrygFonden

www.patientsikkerhed.dk:

The Danish Society for Patient Safety.

www.trygpatient.dk:

Teaching materials and cases on adverse events.

www.godtsygehusbyggeri.dk

The website of Danish Regions on hospital design.

www.dpsd.dk

The website of the National Board of Health.

Contact

More information on the project is available from the Danish Society for Patient Safety, project manager Elisabeth Brøgger Jensen, on tel. +45 3632 6022 or by email to elisabeth.broegger.jensen@regionh.dk.