

LINET

**PROMOTING PRESSURE INJURY
PREVENTION AND ENHANCING
COMFORT FOR PATIENTS WITH USE
OF INTEGRATED MATTRESSES**



BACKGROUND

When a patient acquires a pressure injury in hospital (Hospital Acquired Pressure Injury - HAPI), it is categorised as an adverse event. As a patient's condition can fluctuate throughout the period of hospitalisation, it is a key role for the caregiver to reduce the potential of pressure injuries occurring. Therefore, linking pressure injury prevention to patient care. One of the factors of pressure injuries prevention strategies is the utilisation of an appropriate pressure relieving mattress.

There are many types of pressure relieving devices available for use in the prevention of pressure injuries including air mattresses. The most common air mattresses are mattress replacement systems i.e., they replace the foam mattress on a compatible bedframe. There are also integrated air mattresses available, which are usually designed to connect onto a specific bedframes and more commonly seen on beds intended for use in the intensive care arena.

Challenges arise when we attempt to develop an integrated mattress system that is compatible with bedframes that are used in the acute sector, the main concern being the financial investment. In response to this challenge and having listened to caregivers we have developed an affordable solution for both acute and long-term care sectors. The Essenza 300 series bedframe has the option of the Air2Care IN mattress system that is available in two models A2C IN 6 & A2C IN 8. This white paper intends to demonstrate the benefits this solution can bring to patients, caregivers, and organisations.

CONCLUSION

Creating the perfect environment that promotes patient healing can have many challenges. It is a well-documented fact the hospitals are noisy environments, and this may also be the case in long-term care facilities. Challenges for the patient during their period of hospitalisation may be both physical and psychological and the process of recovery is impacted by sleep quality. Sleep quality is an important element that supports healing, and it also supports the patient's ability to psychologically adapt to and sustain being in an unfamiliar environment. Evidence suggests that as well as sleep quality being important for the patient, noise levels may also impact on caregivers' mental well-being. Therefore, it goes without saying that manufacturers of medical devices should consider noise and light levels when designing new equipment and technology.

At LINET we did just this when we designed the Essenza 300 series bedframes and the Air2Care IN mattress system with its integrated compressor that offers lower noise levels and reduces vibrations that are related to external compressors. Therefore, creating an environment that supports patient comfort and their recovery.

Exploring the obstacles to patient comfort in hospitals

Creating a conducive sleep environment for patients within the hospital setting is crucial for promoting healing and recovery. However, it's important to acknowledge that achieving perfect sleep quality for every patient within the clinical environment may not always be feasible.

Patient sleep is influenced by various factors, including ambient noise, nighttime procedures, shared rooms, unfamiliar environment, frequent vital sign measurements, different sleep cycles, and others. Some of these factors are challenging to control as they necessitate changes in hospital protocols, which can be difficult to implement (Cho H, 2021).

HOW NOISE DISRUPTION AFFECTS SLEEP QUALITY

Did you know that noise in hospitals increased by about 30% from 1965 to 2010 during the night? Excessive noise poses risks to patients, including cardiovascular disturbances, miscommunication, prolonged length of stay, altered sleep patterns, and increased annoyance among both patients and caregivers (Choiniere, 2010). Gardner's study even discovered that reducing noise levels from 60 dB to 50 dB can help 2.5 times more patients fall asleep (Gardner G, 2009)

The World Health Organization (WHO) has taken this issue seriously and suggests that the average sound levels in hospitals should not exceed 35 dB, with a maximum of 40 dB overnight. According to these guidelines, the annual average night exposure should remain below 40 dB, which is comparable to the sound level of a quiet street in a residential area. This is because individuals exposed to higher levels over the course of a year may experience mild health effects, such as sleep disturbances and insomnia. Prolonged exposure to average levels exceeding 55 dB, akin to the noise from a bustling street, can lead to elevated blood pressure and an increased risk of heart attacks (Darbyshire JL, 2013; WHO, 2009).

HOW SUPPORT SURFACES AFFECT SLEEP COMFORT

Support surfaces are indispensable additions to any bed, serving as tools for pressure injury prevention. However, it's important to note that not every mattress qualifies as a "support surface," and not all support surfaces can equally address patient comfort and sleep. According to the European Pressure Ulcer Advisory Panel (EPUAP), support surfaces are specialized devices designed to manage tissue loads, microclimate, and therapeutic functions for pressure redistribution. These encompass a range of items, including mattresses, integrated bed systems, mattress replacements or overlays, as well as seat cushions and seat cushion overlays (EPUAP/NPIAP/PPPIA, 2019).

Patients at low risk of developing pressure injuries are often allocated basic foam mattresses, which offer limited pressure redistribution. However, it's worth considering that such mattresses can significantly impact patient comfort and sleep quality. Therefore, even for these patients, the adoption of mattresses featuring cold, or viscoelastic (memory) foam layers should be contemplated, as these can enhance patient comfort.

In the context of powered pressure air mattresses, they are employed for patients at risk of pressure injuries, particularly when their condition precludes complete offloading of critical body areas. However, it's noteworthy that utilizing pressure air mattresses doesn't necessarily guarantee improved sleeping conditions. The compressor noise can be disruptive, and certain mattresses lack modes beyond alternation, where constant air cell movement might significantly disturb the patient's rest.

Safety hazards around the patient bed

A patient's bed can become a potential tripping hazard due to the presence of electrical equipment. One such piece of equipment is the external compressor used for pressure air mattresses. The compressor is typically designed to be hung over the footboard of the bed, which introduces a problem arising from the power cords and air hoses. While one solution could involve positioning the compressor over the headboard, this reduces accessibility to the compressor controller and potentially increase patient disturbance from the compressor noise and vibrations. While certain pressure air mattresses incorporate cable management features, the responsibility for attaching cables still lies with caregivers.

This issue aligns with data from the U.S. Bureau of Labor Statistics concerning slip, trip, and fall incidents. The incidence rate of work-related injuries resulting from slips, trips, and falls (STFs) in hospital settings was reported as 38.2 per 10,000 employees, which is 90% higher than the average rate for all other private industries combined (20.1 per 10,000 employees). STFs stand as the second most prevalent cause of work-related injuries resulting in lost workdays within hospitals. Approximately 25% of all healthcare worker injuries are attributed to STFs, primarily due to factors such as clutter, including loose cords, hoses, wires, and medical tubing, which are recognized as potential tripping hazards (Bell J, 2010)

Another issue stemming from mattress replacement is the necessity to store and relocate the compressor when differentiated measures are required to prevent pressure injuries. Similarly, when transporting a patient in bed, the compressor can be vulnerable to damage during transit, leading to the dilemma of either placing it on the bed or leaving it in the patient's room. Both scenarios increase the likelihood of potential damage to the valuable equipment.

Essenza 300 solutions for enhanced patient sleep comfort and improved safety for caregivers

The Essenza 300 is suitable for the pressure air mattress Air2Care IN with an optional integrated compressor which may promote patient comfort and increase safety for caregivers.

On top of that, other Essenza 300 solutions may support patient sleep comfort as:

Wide range of support surfaces compatible with the bed platform dimensions

- Foam mattresses such as MediMatt or ViskoMatt from LINET
- Hybrid mattresses such as Clinicare 100 HF from LINET
- Pressure air mattresses
 - Integrated Air2Care IN 6 and 8
 - Mattress replacements such as Air2Care 6 and 8, Virtuoso range from LINET



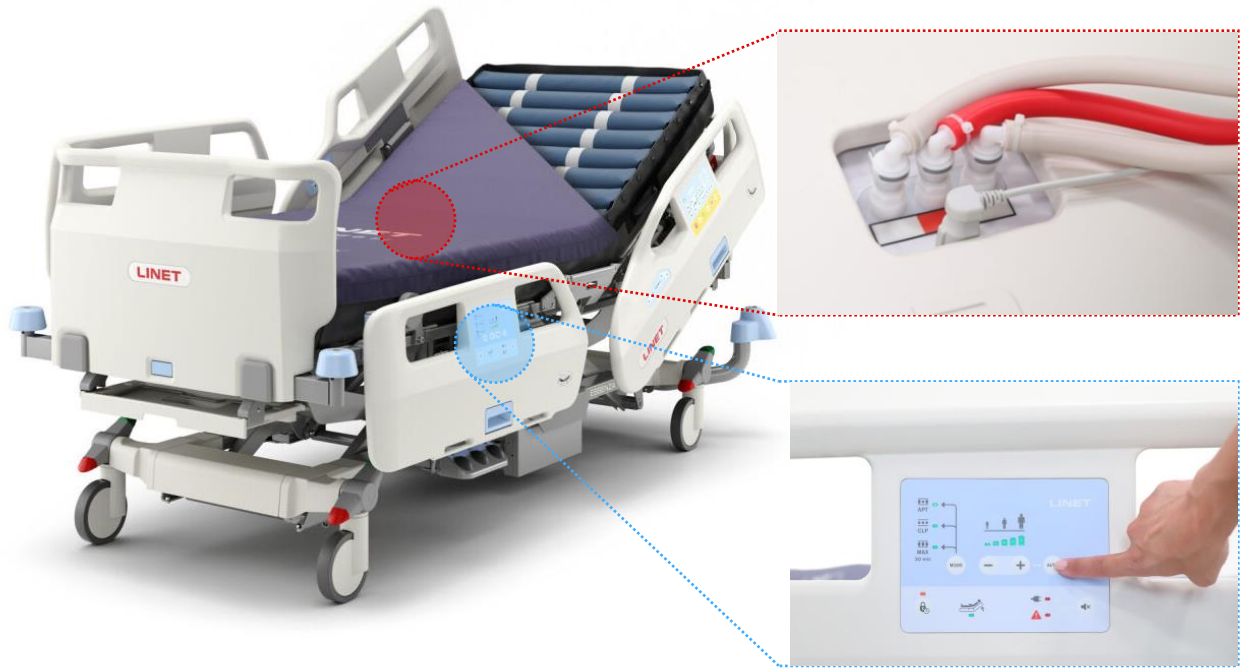
Keep low light condition during night, thanks to undercarriage light in the place of egress from the bed and integrated light torch in patient handset.



SafeSense 3 allows remote monitoring of patient's presence, mobility, and incontinence in bed reducing the number of necessary patient control checks and increasing patient safety.



AIR2CARE IN IS ALWAYS READY WHEN NEEDED TO ELEVATE PREVENTION AGAINST PRESSURE INJURY



LINET's integrated compressor design meets the nighttime noise requirements outlined by the World Health Organization (WHO). The incorporation of the Air2Care IN compressor beneath the bed platform effectively minimizes noise and reduces mattress vibration by 55% at the foot end and 65% at the head end, when compared to external air compressors used with mattress replacements.

The benefits of the integrated Air2Care IN compressor extend not only to patients but also to caregivers, offering the following advantages:

- Immediate accessibility to the compressor within the mattress platform.
- Control over mattress pressure and modes directly from the siderails.
- Enhanced ease of patient transportation while in bed.
- Maintenance of a clear area around the bed due to power cord sharing with the bed and the absence of hoses surrounding the bed.

The Air2Care IN mattress is a comprehensive pressure air mattress solution, offering the flexibility to configure therapy modes such as alternation, as well as constant low pressure for optimal patient comfort during rest and sleep. Air2Care IN can be set using different therapy modes and it can also perform automatically the pressure setting itself, which helps to make setting optimal pressure for patients easier.

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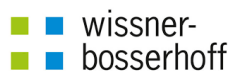
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