

### Healthcare Economics

#### Benefit: Reduction in falls

Published NHS data<sup>1</sup> can be used to calculate the annual cost of falls from the bed space which result in harm. In an average **1000 bed hospital** there are approximately **1875 falls in total per year**.<sup>1</sup> Of these, **22% (413)** occur from the bed space,<sup>2</sup> and **28.1% (116)** result in harm<sup>1</sup> – **costing £379,320**. Different hospitals and health boards may have a higher or lower incidence of falls than this average. The table below sets out a range of scenarios for comparative purposes:

Total annual falls (1000 bed hospital)	Falls from bed space	Falls from bed space which cause harm	Annual cost of falls which cause harm
500	110	31	£101,370
1000	220	62	£202,740
<b>1875</b>	<b>413</b>	<b>116</b>	<b>£379,320</b>
2000	440	124	£405,480
3000	660	186	£608,220
4000	880	248	£810,960
5000	1100	310	£1,013,700

Over 2018 and 2019, 800 Medstrom med-surg beds with an ultra-low height capability were implemented into Blackpool Teaching Hospitals NHS Trust. In the 2019-2020 financial year, the trust reported a 59.7% reduction in falls that resulted in harm.<sup>3</sup>

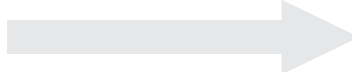
If 59.7% of falls resulting in harm from the bed space were eliminated (the trust average), annual, mid-term and lifetime savings would be as follows:



**Annual:**  
£181,185



**5 Years:**  
£905,925



**10 Years:**  
£1,811,850

### Programmable Custom Height for Safe Mobilisation

#### Benefit: Reduces the risk of falls and other injuries

The safest height from which to mobilise is the popliteal height (measured from the floor to the underside of the knee, with both feet flat on the floor).<sup>4</sup> Programming the bed to stop at that height means the patient will always be mobilising from their optimum egress height. It eliminates the risk of the bed being placed at an inappropriate egress height through guesswork.



22% of falls are from the bed space<sup>2</sup> and 77% of all reported in-patient falls happen to patients aged over 65<sup>1</sup>.

### Ultra-low Platform Height (21cm)

#### Benefit 1: Reduces the risk of falls which result in harm

The risk of injury from a fall can be predicted by the relationship between bed height and injury risk through calculating gravitational potential energy (GPE). Simply put – the further a person falls, the greater the impact (and therefore potential injury) will be. The relative increase in GPE based on bed height has been calculated:<sup>4</sup>

- **A bed height of 32cm increases GPE by 31% versus a bed height of 21cm**
- **A bed height of 38cm increases GPE by 49% versus a bed height of 21cm**

# Medstrom Solo +

## Evidenced Benefits



At least 25% of hospital beds are occupied by people with dementia.<sup>5</sup> Side rails are not designed or intended to limit the freedom of people by preventing them from intentionally leaving their beds.<sup>6</sup>

### Benefit 2: Allows safe mobilisation for almost all patients

Using average popliteal measurements for the most vulnerable falls demographic (over 65's), in conjunction with a bed's lowest height and a 14cm mattress, an optimum height for safe mobilisation can be determined:<sup>4</sup>

- A height of 21cm meets the popliteal height for >99% of females and 96% of males
- A height of 38cm meets the popliteal height for < 1% of males and < 1% of females



By 2030, one in five people in the UK will be aged 65 or over.<sup>7</sup> Falls cost the NHS approximately £2.3 billion per year.<sup>1</sup>

### Side Rails

#### Benefit 1: Split side rails aid mobilisation with no compromise on the bed's low height

The top split side rail incorporates a robust, ergonomic grip to aid patient mobilisation. Also, unlike any other split rail general hospital bed, the low height is not compromised.<sup>8</sup> This means almost all patients can mobilise safely from their popliteal height, and the falls reduction benefits are maintained.

#### Benefit 2: Deeper side rails provide extra safety and better clinical choice

The side rails accommodate mattresses up to 20cm deep (split), or 28cm (folding). The depth provides added safety and means a larger range of mattresses can be used, increasing clinical choice. The side rails are fully compliant to ISO 60601-2-52 (the international standard that focuses on design safety for adult medical beds). Safety elements it covers include reducing the risk of entrapment, ensuring lateral stability, and defining a safe side rail height.<sup>9</sup>

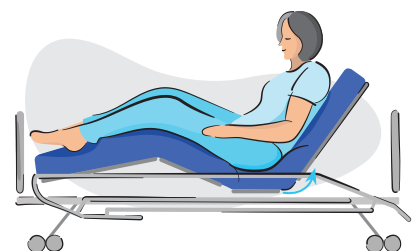


An insufficient side rail height does not protect patients and increases the risk of falling from the bedside.<sup>10</sup> In England between 2006-2016 there was a 58.9% increase in hospital admissions of people aged 85+.<sup>11</sup> Falls-related injuries are a common and serious problem for people aged 65 and older.<sup>11</sup>

### Elliptical Backrest Movement

#### Benefit 1: Zero heel travel, eliminating shear and friction

The backrest rises in an elliptical motion, which allows for the spine elongation which occurs when a person moves from a supine to sitting position. This prevents the patient being pushed down the bed by the backrest, and therefore also eliminates shear and friction on the patient's heels.<sup>12</sup>





Heel travel, resulting from ineffective bed articulation, can lead to the development of pressure ulcers.<sup>13</sup>  
The cost of a pressure ulcer ranges from £2,000 for a category I to £16,000 for a category IV.<sup>14</sup>

### **Benefit 2: Reduced abdominal crunching for comfort and respiratory benefits**

Beds which push the patient towards the foot end as the backrest rises can squash them between the backrest and knee-break when the auto-contour function is used. This doesn't happen on the Medstrom Solo + bed because the elliptical backrest movement eliminates this migration. The benefits include improved diaphragmatic excursion and comfort.

### **Benefit 3: Reduced risk of moving and handling injuries**

A frequent moving and handling task that caregivers perform is moving a patient back up a bed, either after they have slid down or been pushed down by the backrest. Zero patient travel on Medstrom Solo + when the auto-contour button is used means the number of times this is required will decrease – therefore reducing manual handling and the associated injury risks.



NHS staff who injure their backs in the course of their work, cost taxpayers over £400m a year.<sup>15</sup>  
Every year, 3,600 healthcare workers are forced to retire early due to back and musculoskeletal conditions.<sup>15</sup>

## **Ultra-high Height (97cm)**

### **Benefit: Safe working height for caregivers**

To maintain a straight back and safely perform moving and handling tasks, caregivers must be able to work at their umbilical height. The Medstrom Solo + bed platform (83cm) with a 14cm mattress gives a top height of 97cm. Anthropometric data shows that this provides a safe working height for 98% of all caregivers, helping to reduce bending, twisting and associated injuries during patient care and transportation.<sup>16,17</sup>



Tasks involving flexed torso postures have a high incidence of low back injuries.<sup>18</sup>  
Changes in lumbosacral angles may be influential in increasing the risk of lower back pain<sup>19</sup>

## **Manoeuvrability**

### **Benefit 1: 40% easier to manoeuvre than a standard hospital bed**

The Medstrom Solo + bed has eight double castors to provide greater manoeuvrability and control in transit. When tested against a standard hospital bed with four castors, the push and pull forces required to move the original Solo bed (which has the same castor design as Medstrom Solo +) were 40% lower.<sup>20</sup> This reduces manual handling effort and associated injuries.

Medstrom Solo + has two steer castors at the head end of the bed. This unique design eliminates the 'crabbing' effect that occurs in beds with one steer castor, together with the pulling and twisting required to return the bed to a straight line.



Friction and wheel design are among the push and pull factors that can contribute to musculoskeletal risk.<sup>21</sup>

# Medstrom Solo +

## Evidenced Benefits



### Benefit 2: Patient comfort

The double castor design helps to absorb the impact of uneven terrain such as lift entrances. This delivers a smoother, more comfortable ride for the patient.



Vibration is among the physiological alterations that can affect a safe patient transfer the most.<sup>21</sup>

### Bed Standardisation

#### Benefit 1: Every patient who needs an ultra-low bed gets one

The provision of standard, ultra-low beds hospital-wide guarantees availability for all vulnerable patients and removes the time-consuming tasks of locating ultra-low beds and swapping them between patients.



A 10-year study in Australia, involving over 350,000 patients, only demonstrated a statistically significant reduction in falls resulting in serious harm when the ratio of ultra-low beds to standard beds was increased from 1:9 to 1:3.<sup>22</sup>

#### Benefit 2: Reduction in human error

The Care Quality Commission recommends equipment standardisation to help reduce costs, mental workload and human error. It states that the range and number of configurations of devices in use should be minimised.<sup>23</sup>

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