



THE POWER
TO SIMPLIFY

FALLS MANAGEMENT
PATIENT HANDLING & MOBILITY

CLINICAL STUDY

USE OF 42" LOW BED INCREASES PATIENT/RESIDENT SAFETY

EXECUTIVE SUMMARY

- ⌚ 36" has been historically accepted as standard healthcare sleep surface width
- ⌚ There is a 51% chance of falling while repositioning in standard 36" width bed frame
- ⌚ Simply adding 3" to both sides of the bed can reduce fall risk by 36% (42")

Patient/resident falls from the healthcare bed have been documented as a prevalent occurrence in healthcare facilities. Previously, bed rails were used to address this issue; however, they often led to injury due to entrapment or entanglement. As such, much emphasis has been placed on investigating other environmental changes that could be made to reduce the prevalence and severity of patient/resident falls and associated injuries. Bed height has been proven to contribute to the severity of injury when a fall from bed occurs (Bowers et al, 2008). As a result, the use of low beds has been implemented with great success in managing injury severity; however, to date there has been little evidence to support the hypothesis that patient/resident safety may be further improved by reducing the frequency of falls with the use of wider beds. Hereafter, patients and residents will be identified as patients.

Beds placed in healthcare facilities traditionally have surfaces that are 35-inch to 36-inch wide; however, this requires a patient to reposition on a bed that is significantly narrower than common consumer products, which range from 39-inch for twin beds up to 60-inch for queen sized beds. According to an

article by Patrece Banks, patients often fall from bed while repositioning or reaching for an object placed on a side table (Banks, 2010). The inequality of bed width noted between consumer and healthcare products may directly contribute to the risk of falling from bed as the traditional healthcare products provide less surface area for repositioning.

To investigate this correlation between bed width and risk of falling, male and female subjects were chosen to represent the 70-79 year old patient populations of healthcare facilities. As patient falls from bed are often the result of repositioning or reaching for an object, the assumption was made that the fall event occurs due to a patient's inability to arrest momentum; thus, each subject's center of gravity was tracked using XSensor pressure mapping technology during a reposition from a center lying supine to side-lying position on three mattress widths: 35-inch, 39-inch and 42-inch (Figure 1 and Figure 2). The measured center of gravity for each subject was then extrapolated to estimate its position if a subject continued moving from a side-lying to a prone position and was recorded in inches from the mattress edge.

Figure 1: Center of Gravity Position of 50th Percentile Male Before a Reposition Event

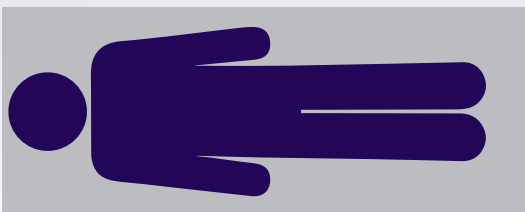


Figure 2: Center of Gravity Position of 50th Percentile Male After a Reposition Event



42"

STUDY SHOWS INCREASE IN
PATIENT SAFETY DUE TO USE OF
42-INCH LOW BED

36%

REDUCE THE FALL RISK BY 36%
WITH A 42-INCH SURFACE

51%

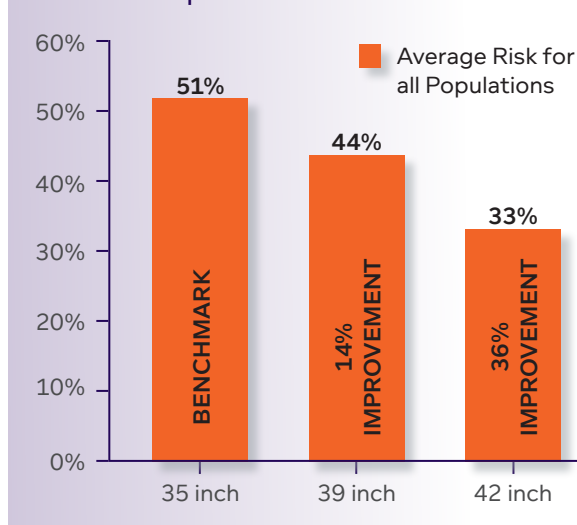
PATIENT/RESIDENT HAS A 51%
CHANCE OF FALLING FROM A
35-INCH SURFACE

For the purposes of this study, the risk of falling from the bed was defined as a function of the position of the center of gravity and the hip width. The center of gravity is a critical point as it is defined as the point around which a body is balanced and through which gravity acts. If the center of gravity was not supported by the mattress, falling from bed was considered imminent when the subject was in prone position. Consequently, all patient populations were at risk for falling from a 35-inch mattress, except the 10th percentile male population. This exception may be the result of repositioning technique and indicates further study is needed.

The position of the center of gravity is a clear indication of risk; however, a patient's hip width also contributes to whether or not he will fall from bed during a reposition event. Although a patient's center of gravity may be supported by a mattress, there may be some portion of the patient that is not. As a patient's hip width increases, more of his body will be unsupported by the mattress as the center of gravity moves closer to the edge during a reposition from supine to prone. This lack of support from the mattress introduces risk of falling as the likelihood of an extremity sliding off the mattress increases. The risk contributed by hip width for all target populations was averaged for each mattress and is presented in Figure 3.

Currently, there is little information available that defines an acceptable level of risk to a patient; however, making environmental changes will contribute to improving the safety of a patient. It has been proven that increasing bed height has a direct correlation to the severity of injuries associated with falls from the bed. Improving patient safety can be accomplished not only through decreasing severity of injuries, but also by decreasing the frequency of falls from bed. As shown in Figure 3, a patient has approximately a 51 percent chance of falling from a 35-inch mattress while repositioning. This risk is reduced exponentially as the bed width is increased to 39-inches and 42-inches. Even though an acceptable level of risk has not yet been defined, a patient's risk for falling from bed can be reduced by 36 percent simply by replacing 35-inch beds with 42-inch beds. The frequency of falling from bed and the severity of injuries associated with those falls contribute to the overall issue of patient safety. Implementing low beds with wider surfaces may make great strides towards the goal of a safe environment for patients/residents by decreasing the incidence of falls from bed and reducing the severity of injuries associated with those falls.

Figure 3: Percent Risk of Falling Due to Hip Width Contribution



THE TEAM

Bonnie Perry is as a Biomedical Systems and Test Engineer with a focus in support surface performance and patient safety. She brings research experience and field application of patient safety and medical devices. The current study was conducted tin collaboration with Dr. Guy Fragala at the Center of Excellence in Baldwyn, MS.

Dr. Guy Fragala is nationally known in both ergonomics and healthcare safety. He is currently a senior advisor for ergonomics at the Patient Safety Center of Inquiry, Tampa, Florida, and has published over 100 publications related to occupational safety and health and ergonomics.



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REFERENCES

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2. Bowers, B., Lloyd, J., Lee, W., Powell-Cope, G., & Baptiste, A. (2008). Biomechanical Evaluation of Injury Severity Associated with Patient Falls from Bed. *Rehabilitation Nursing*, 33 (6), 253-259.