

Meta-analysis shows patient wearable sensor reduces incidence of hospital acquired pressure injuries in critically ill patients



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Background and Aims

- Each year, more than 2.5 million people in the United States develop pressure ulcers, which are the second most common but deadliest Hospital-Acquired Condition (HAC), yet the majority of them are preventable.
- Several best practices have been shown to be effective in reducing the occurrence of pressure ulcers, most notably regular and frequent repositioning of immobile patients around the clock.
- However, current methodologies such as paper clocks or musical chimes to prompt on-time repositioning have not been demonstrated to produce long-lasting, sustainable compliance to turn protocols and therefore sustained outcomes.
- A wearable patient sensor system (patient sensor) has been shown to provide an objective recording of patient turning practices.
- The purpose of this study was to assess the clinical effectiveness of patient sensor in the prevention of hospital acquired pressure injuries (HAPIs) in acutely ill patients.

Materials and methods

- Literature search**
- A targeted non-systematic literature review was performed to identify published studies and conference abstracts
 - We searched conference websites and used contacts from the marketing department to identify studies

- Inclusion Criteria**
- Comparative studies- comparing the patient sensor versus standard of care
 - Full publication or conference abstract
 - Report on incidence of HAPIs

- Meta-analysis**
- Meta-analyses were performed; a fixed effect model was used when heterogeneity was not significant ($I^2 < 50\%$) and a random effects model when it was significant ($I^2 \geq 50\%$) to estimate the overall effect of the patient sensor in reducing the HAPIs

Results

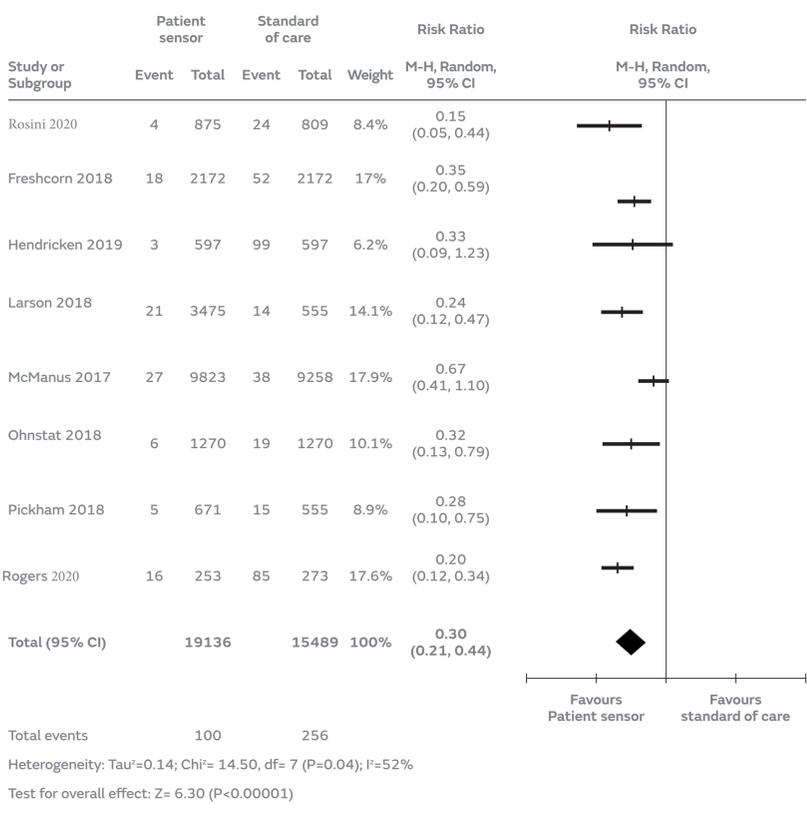
- Literature search identified 8 published studies
- 1 randomised controlled trial (RCT) and 7 conference abstracts
- A total of 34,711 patients were included in the studies
- 19,136 patients used the patient sensor.
- The majority of the patients were over 75 years of age.
- The patient sensor reduced incidence of HAPIs by 70% Risk ratio (RR) 0.30 (95% Confidence interval 0.21- 0.44) $p < 0.00001$.

Discussion & Conclusions

- Over 19,000 patients provided data on the effectiveness of the patient sensor in reducing HAPIs.
- The meta-analysis evidence suggests that the sensor reduces HAPIs by 70%.
- Evidence from one RCT reported the reduction at 73%.
- More controlled studies are needed to validate these results.

A meta-analysis of 19,136 patients demonstrated that the patient sensor* reduced the incidence of hospital acquired pressure injuries by 70% (p < 0.00001)

Meta-analysis results, Incidence of HAPI, patient sensor versus standard care



References

1. Agency for Healthcare Research and Quality: Preventing Pressure Ulcers in Hospitals. <https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/pu1.html> retrieved on September 30, 2019
2. Agency for Healthcare Research and Quality: AHRQ National Scorecard on Hospital-Acquired Conditions Updated Baseline Rates and Preliminary Results 2014–2016. June 2018. Retrieved from https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/pfp/natihcratereport-rebaselining-2014-2016_0.pdf on September 30, 2019

* Leaf Patient Monitoring system (Leaf Healthcare, Inc. Pleasanton, CA)