

## Introduction

- Pressure ulcers are areas of sustained localised damage to the skin and the underlying tissue caused by pressure, friction or mechanical forces. These areas of concentrated stress may lead to deformation-induced damage, inflammation and ischaemia.<sup>1</sup>
- Pressure ulcers are considered one of England's top-ten harms, costing the NHS £3.8 million daily.<sup>2,3</sup>
- Pressure-redistributing support surfaces (e.g. cushion, mattress) are the most important pressure ulcer prevention technology currently available.<sup>1</sup>
- Pressure mapping is a scientific tool for evaluating the pressure redistribution properties of devices, by measuring the interface pressure between the body and the support surface.
- Selecting a suitable support surface for each patient is challenging, as patients have varying risk profiles.
- Therefore, validated comparative pressure mapping tests and individual risk assessments can aid clinicians in selecting the most appropriate support surface for their patients.

The **Flexi support surface (WinnCare PAC Ltd)** – an advanced hybrid mattress combining a patented cell design\* and high-resilience foam – was compared with a competitor hybrid support mattress using pressure mapping analysis, clinical evaluations and patient questionnaires.

## Objectives

- To identify the differences in pressure redistribution between Flexi and a market-leading competitor product.
- To obtain clinical evaluations before and after using Flexi, as well as patient-reported feedback on its comfort and overall performance.

## Methods

### Pressure mapping analysis

- Flexi and the current market leading hybrid mattress that is widely used in the UK (competitor A) were pressure mapped:
  - Test was conducted using Force Sensitive Application pressure mapping system and commissioned a cell pressure-monitoring application to assure confidence in pressure output levels.
  - Sensors, placed on a bedframe above the support surface, recorded real-time pressure data, presented as a color-coded display (Figure 1).
  - A 70 kg dummy was used to apply pressure onto the sensors, resulting in a change in the resistance in proportion to the pressure applied (force was displayed on the screen in mmHg).
  - The cell pressure monitoring system provided internal air-cell support pressures throughout the test.



Figure 1: Pressure distribution test set-up.

### Clinical evaluation & product performance feedback

- Overall, 15 patients at risk of developing pressure ulcers and their healthcare providers completed a questionnaire related to the Flexi support surface, at admission and discharge.
- Patients and healthcare providers rated how well each feature of the Flexi support surface satisfied their needs on a scale of one (*not at all satisfied*) to five (*extremely satisfied*).
- Data on existing and new ulcers at baseline and at discharge were also collected.

## Results

### Pressure mapping analysis

- The Flexi support surface demonstrated improved pressure-reduction capabilities from baseline to 240 minutes, compared to competitor A (Figure 2).
- The Flexi support surface redistributed pressure more evenly across the dummy versus competitor A.
- Compared with its competitor, the Flexi support surface demonstrated improved pressure reduction in high-risk areas for pressure ulcers, such as the heels, sacrum, and hips.<sup>2</sup>

### Clinical evaluation & product performance feedback

- No patients developed new pressure ulcers while using the Flexi support surface.
- Of the patients with existing pressure ulcers (N=10) at baseline, 80% (n=8) experienced ulcer improvement.
- Patients found the Flexi support surface to be comfortable (median, 5; range, 3–5) and improve their quality of sleep, with one patient having the first good night's sleep since being admitted to the hospital two weeks earlier.
- Respondents were extremely satisfied with Flexi's pressure relief capabilities (median, 5; range, 3–5) and overall performance (median, 5; range, 3–5).
- All respondents (100%, N=15) indicated they would use the Flexi support surface again.

## Conclusions

- Selecting effective pressure ulcer-prevention solutions is crucial for reducing pressure ulcer-related costs and improving patient outcomes and quality of life.
- Digital tools like pressure mapping can support decision making and selection of appropriate support surfaces.
- **Flexi effectively redistributes and offloads pressure** compared with a market-leading competitor mattress.
- **Flexi improves patient- and provider-reported outcomes** and receives **high user satisfaction scores**, particularly regarding its comfort, pressure relief and overall performance.

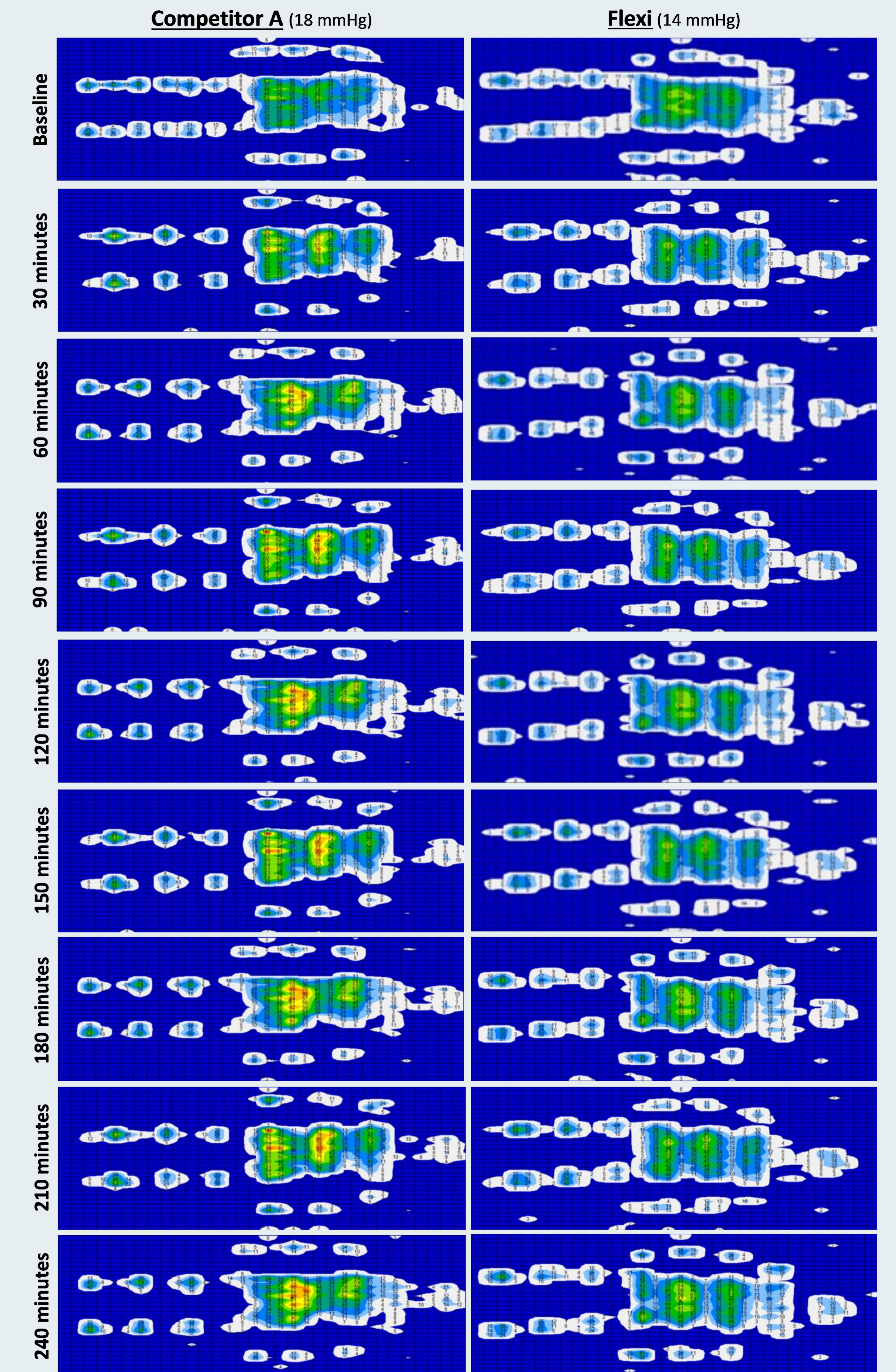


Figure 2: Heat maps at set time intervals throughout the pressure mapping test using a 70 kg test dummy on the Flexi support surface (Flexi) and on a competitor hybrid surface (competitor A). red = 100 mmHg, dark blue = 0 mmHg

## References

\*Patent number: GB2563190

1. Katz T and Gefen A (2023) *International Wound Journal* 20(8): 3148–56; 2. Stephenson J and Fletcher J (2020) NHS England/Improvement National Pressure Ulcer Prevalence and Quality of Care Audit – Cohorts 1 and 2 National Stop the Pressure Programme Audit Report. Available at: <https://www.nationalwoundcarestrategy.net/wp-content/uploads/2021/07/PU-audit-final.pdf>; 3. Fletcher J (2022) National Wound Care Strategy update: Pressure ulcers prevention and the PSIRF exemplar. Available at: <https://wounds-uk.com/journal-articles/national-wound-care-strategy-update-pressure-ulcers-prevention-and-psirf-exemplar/>

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