Driving Health Equity: An AI-Powered Imaging Technology for Early Detection of Pressure Injuries

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Introduction: Project Need

Pressure injuries (PIs) occur when prolonged pressure on bony areas of the body reduces blood flow, damaging the skin and underlying tissue. Early signs include changes in texture, tone, temperature, and pain. Without timely intervention, PIs can progress into deep wounds that may expose cartilage or bone, and in severe cases, cause life-threatening infections such as sepsis. At Hamilton Health Sciences (HHS), an audit conducted between 2005 and 2018 revealed a historically high pressure injury (PI) prevalence of 24% and an incidence rate of 8.9%, underscoring the substantial burden of PIs and the critical need for more effective prevention.[1,2] These tools are subjective, time-consuming, and less accurate for individuals with dark skin tones—who are 1.8 times more likely to develop later-stage PIs.[2] This initiative focuses on earlier and more objective detection, with particular attention to improving equity in patients with dark skin tones. Its importance was reinforced at the 2024 Canadian Pressure Injury Advisory Panel Summit, which called for more equitable prevention strategies.[3]

Project Aim

An artificial intelligence (AI)-powered imaging solution, the MIMOSA Pro imaging device, was evaluated at HHS across adult and pediatric inpatient units—including surgical, intensive care, and complex care units. Digital, thermal, and oximetry images were collected over four months and compared to standard Braden assessments (Braden Scale and Braden QD) to evaluate each tool's ability to detect PI risk. This quality improvement initiative aimed to enhance patient outcomes and improve health equity by enabling earlier identification of PI risk, while assessing the MIMOSA Pro device's efficacy against the Braden assessments.

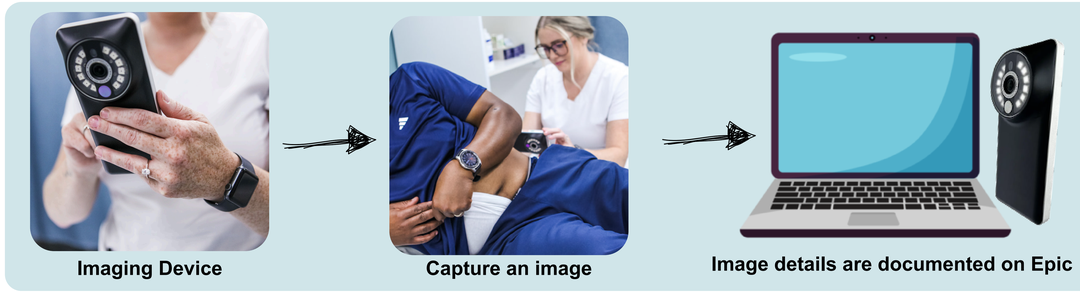

Figure 1. MIMOSA Pro imaging device workflow

Findings and Results

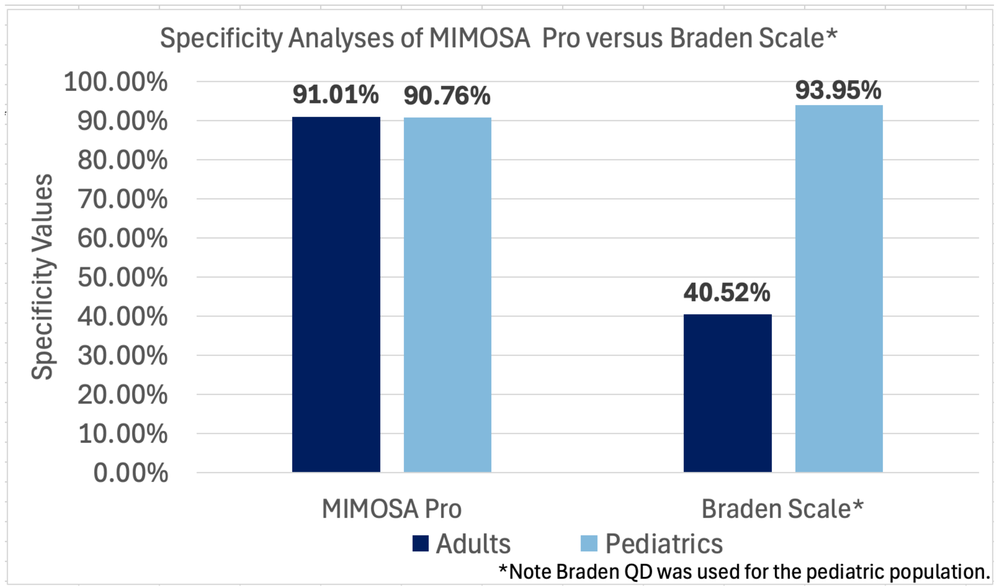

Figure 2. Specificity Analyses of MIMOSA Pro Imaging Tool versus Braden Scale (Braden QD for Pediatrics)

Over a course of four months from December 2024 to March 2025, more than 3,500 imaging assessments were completed using the MIMOSA Pro imaging device. The Kappa analysis indicated fair agreement in pediatrics (κ = 0.299) but slight agreement in adults (κ = 0.053). In pediatrics, the Kappa test indicates that the MIMOSA Pro and Braden QD classify patients similarly; however, in adults, it reveals significant differences in classification between the MIMOSA Pro and the Braden Scale. Pediatric specificity remained high (Braden QD: 93.95%, MIMOSA Pro: 90.76%), indicating both tools effectively identify non-risk patients. In adults, however, the MIMOSA Pro demonstrated notably higher specificity (91.01%) compared to the Braden Scale (40.52%), highlighting its stronger ability to identify non-risk patients and reduce unnecessary interventions. Alongside these performance outcomes, feedback from research nurses and assistants emphasized that the MIMOSA Pro was straightforward to learn and integrated well into workflows, supporting early intervention without causing fatigue or safety concerns. The clinical impact was further underscored by cost comparisons: in fiscal year 2023–2024, patients who developed PIs incurred costs approximately 7.6 times higher than general medicine patients. Sensitivity analysis was excluded due to sample size limitations, unrepresentative patient distribution (particularly among those with dark skin tones), the absence of an untreated control group, and early intervention bias.

Implications and Applications

Early findings from this quality improvement initiative support the use of AI-powered imaging, specifically the MIMOSA Pro, to enhance standard PI prevention pract-ices. By enabling earlier and more objective detection, this technology may reduce hospital-acquired PIs and improve patient outcomes. The project increased awareness of PI protocols among participating clinical units and prompted a review of adherence to Braden Scale and Braden QD guidelines. Clinical teams expressed a strong interest in adopting technology to improve care, and insights were shared with other healthcare organizations to inform broader implementation.

Next Steps

The next steps involve proceeding with Epic integration by enabling image uploads and streamlining documentation workflows. In parallel, there are plans to publish the outcomes of this project. To strengthen the analysis, additional data will be collected at high-risk HHS sites using the MIMOSA Pro devices, with a particular focus on enrolling patients with dark skin tones.

References

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3. Canadian Pressure Injury Advisory Panel. Report on a nation under pressure: Canadian pressure injury summit. Nurses Specialized in Wound, Ostomy and Continence Canada; 2024, Nov 18. 28 p. Available from: https://www.cpiap.com