Executive Summary: Integrating Thermal Imaging to Improve Early Assessment of Pressure Injury in a Medical Intensive Care Unit: 60-Day Pilot

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Executive Summary

Key Highlights

- 90% (n=1855) of assessments identified physiologic abnormalities before visible skin changes.
- 30% (n=436) of findings indicated increased pressure injury risk.
- Pressure injuries declined during the pilot from 5 to 1.
- Nurse knowledge and confidence increased.
- Assessment improved across diverse skin tones.
- Case studies demonstrated clinical and operational value.

Background

Pressure injuries remain a significant patient safety concern, particularly among critically ill patients, and are often identified only after visible skin changes occur through traditional assessment methods. At the organization, 181 hospital-acquired pressure injuries (HAPIs) were reported in 2025, including 96 deep tissue injuries (DTIs) and 23 in the Medical Intensive Care Unit (MICU). Thermal imaging offers a noninvasive approach to detect abnormalities before visible skin changes develop and may support more objective assessment across diverse patient populations (Koerner et al., 2019).

Purpose

The purpose of this quality improvement initiative was to pilot the integration of thermal imaging into routine nursing workflow within MICU as an adjunct to standard skin assessment. The project evaluated whether thermal imaging could enhance early detection of tissue compromise, support equitable pressure injury assessment across diverse patient populations, and

assess workflow feasibility, and its potential impact on hospital acquired pressure injury prevention and injury progression.

Methods

A 60-day improvement pilot was conducted in a 24-bed MICU to integrate thermal imaging into routine nursing skin assessments. The intervention included use of an FDA-cleared thermal imaging device (Scout), development of standardized workflows, and staff training for more than 70 nurses and leaders. Workflow implementation and compliance were monitored throughout the pilot, demonstrating variable thermal imaging compliance and consistently high skin assessment compliance (see Figure A1). Process and outcome measures were evaluated using imaging data, clinical documentation, quality dashboards, and pre- and post-implementation surveys

Results

Thermal imaging identified physiologic abnormalities before visible skin changes in approximately 90% of assessments and detected clinically significant temperature differentials associated with increased pressure injury risk in 30% of assessments (see Table A1). Thermal findings substantially exceeded visual indicators of tissue compromise, highlighting limitations of visual assessment alone. HAPIs declined during the 60-day pilot period (see Figure A2). Three case studies further demonstrated the technology's ability to support early detection, accurate classification of pressure injuries present on admission, and timely intervention (see Figures A3–A5). Survey results showed increased familiarity with thermal imaging, greater confidence in pressure injury assessment, and improved perceptions of assessment across diverse skin tones, although technology adoption and views of assessment methods and outcomes shifted following implementation (see Table A2).

Strengths

Strengths of this project included real-world implementation within a critical care environment and a diverse patient population of 228 individuals. Additional strengths were structured staff training, multidisciplinary oversight, and evaluation using multiple data sources. The project also emphasized equitable assessment practices, demonstrating the potential value of physiologic assessment across diverse skin tones.

Limitations

This project was conducted in a single intensive care unit over a 60-day pilot period, which may limit generalizability and evaluation of long-term sustainability. Workflow variability, missed scans, and manual documentation requirements may have affected compliance and data completeness. Additionally, thermal image interpretation relied on clinician judgment despite standardized training. Future implementation would benefit from integration with the electronic health record to improve efficiency, consistency, and adoption.

Implications

Thermal imaging is a useful complement to standard skin assessments, improving early identification of tissue issues before visible injuries appear. It detects physiologic changes and significant temperature differences earlier than visual checks, offering clinician's objective data to guide care. One major benefit is its reliable detection of pressure injuries across all skin tones, addressing disparities associated with traditional visual methods and supporting health equity in critical care. With timely information from thermal imaging, clinicians can act sooner to prevent injury progression. Overall, thermal imaging adds value to skin assessment practices by enabling objective evaluation, earlier intervention, and equitable care.

Conclusion

The pilot successfully integrated thermal imaging into routine nursing workflow and supported earlier identification of tissue compromise. Findings suggest potential benefits for pressure injury prevention, staff confidence, and equitable assessment practices. Future evaluation should explore long-term sustainability and broader implementation across healthcare settings.

References

Koerner, S., Adams, D., Harper, S. L., Black, J. M., & Langemo, D. K. (2019). Use of thermal imaging to identify deep-tissue pressure injury on admission reduces clinical and financial burdens of hospital-acquired pressure injuries. *Advances in Skin & Wound Care, 32*(7), 312–320. https://www.nursingcenter.com/journalarticle?Article_ID=5021531

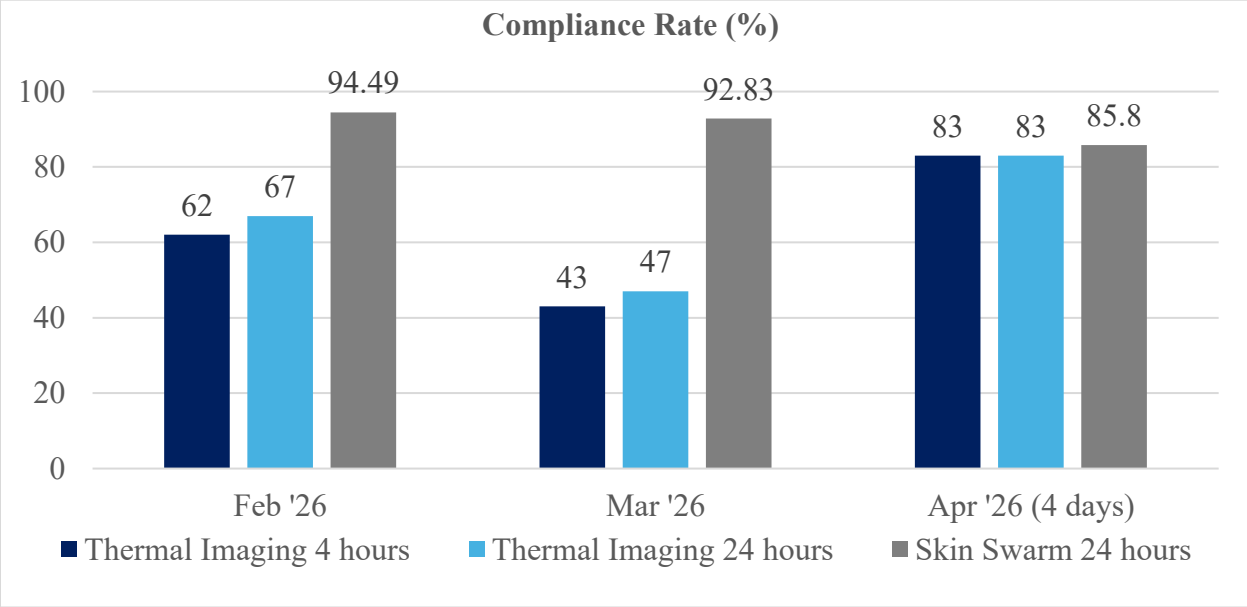
WoundVision. (n.d.). *WoundVision portal*. Retrieved June 18, 2026, from WoundVision Portal

Appendix A

Summary of Data Collection

Figure A1

Thermal Imaging Compliance Compared with Skin Swarm Compliance



Note. Thermal imaging compliance dipped as workflow adoption slowed but rebounded in the last four days of the pilot, while skin assessment compliance stayed consistently high. Data obtained from the WoundVision Portal. Figure created by the author.

Table A1

Frequency of Thermal and Visual Tags Identified During Image Review

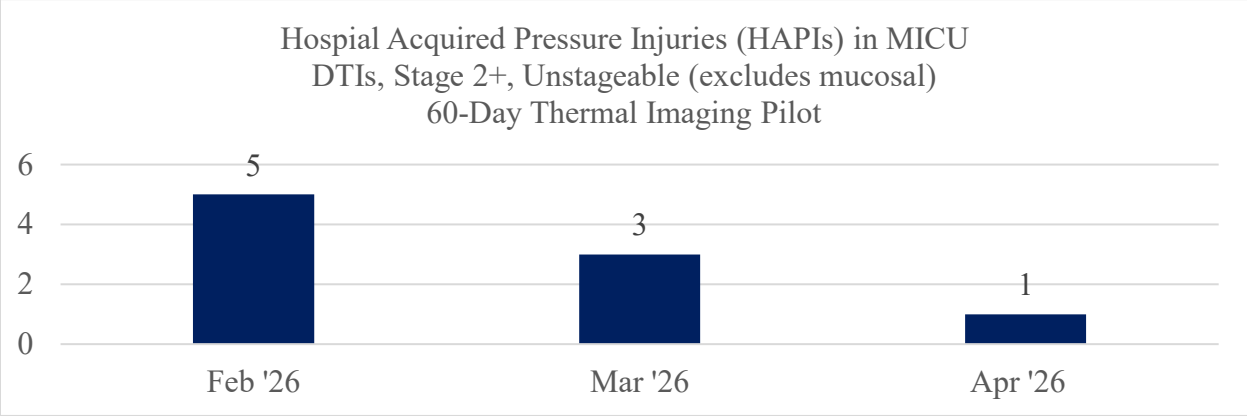
Thermal Tags	Total
Thermal - Image Review Assist	45
Thermal - Other	20
Thermal - VSD Without Localized Thermal Change	5
Thermal - Localized Cooler	332
Thermal - Present on Transfer	48
Thermal - Localized Warmer	61
Thermal - S/S of Inflammation/Hyperperfusion	60
Thermal - Present on Admission	360
Thermal - S/S of DTPI/PI	75
Thermal - S/S of Hypoperfusion/Ischemia	451

Visual Tags	Total
Visual - Medical Device Concern	3
Visual - Intact or Ruptured Blister	20
Visual - Incision	2
Visual - Hypopigmentation	4
Visual - Hyperpigmentation	23
Visual - Non-Blanchable Erythema	50
Visual - Moisture Present on Skin	18
Visual - Discolored Skin/Purple/Deep Red (VSD)	51
Visual - Blanchable Erythema	45
Visual - Open Wound	90
Visual - Dark Skin Tone	299

Note. Thermal assessment findings were most frequently associated with hypoperfusion/ischemia and localized temperature variation. Common visual findings included dark skin tone and open wound. Data obtained from the WoundVision Portal. Table created by the author.

Figure A2

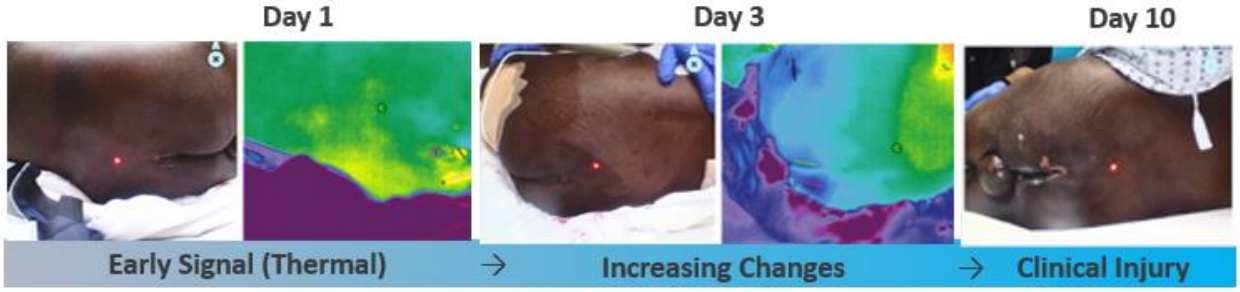
Pressure Injury Trends During the 60-Day Pilot



Note. Pressure injuries declined during the pilot period, reflecting positive trends associated with earlier detection and intervention. Data obtained from an internal tracking spreadsheet maintained by the Skin and Wound Team. Figure created by the author.

Figure A3

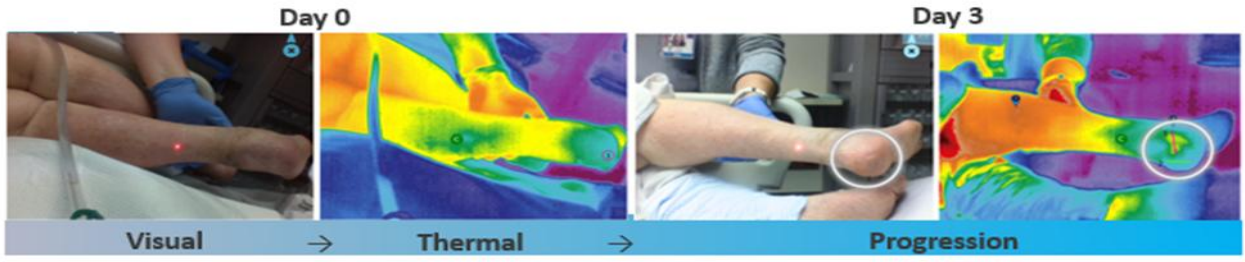
Case Study 1: Thermal Imaging Detects Subtle Tissue Changes



Note. Thermal imaging identified physiologic abnormalities before visible skin changes were apparent, supporting earlier recognition of tissue compromise. Representative image obtained during project implementation. Image retrieved from the WoundVision database.

Figure A4

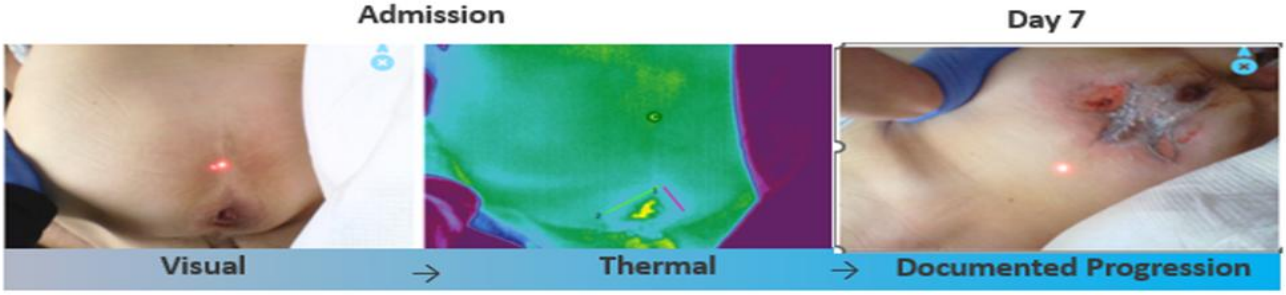
Case Study 2: Early Detection and Clinical Progression



Note. Thermal imaging demonstrated evolving tissue compromise prior to visible clinical progression. Representative image obtained during project implementation. Image retrieved from the WoundVision database.

Figure A5

Case Study 3: Thermal Imaging Supports Documentation and Cost Avoidance



Note. Thermal findings supported accurate classification of tissue compromise as present on admission and contributed to avoidance of preventable costs associated with pressure injury progression. Representative image obtained during project implementation. Image retrieved from the WoundVision database.

Table A2

Pre- and Post-Implementation Survey Results (N = 70)

	Pre; n = 27	Post; n =25
Familiarity (Very, Moderately)	26%	↑70%
Confidence (Very, Moderately)	7%	↑88.4%
Current methods sufficient? (Yes/No)	59% = No	46.2% = Yes ↓34.6% = No
Challenges Assessing in Dark Skin Tones (Often/Sometimes/Rarely)	96% = Sometimes 3.7% = Rarely	↓69.3% = Often/sometimes ↑23.1% = Rarely
Openness to Using Thermal Imaging (Moderately/Very Open)	93%	↓34.6%
Confidence in Learning the Device (Moderately/Very)	96%	↓84.6%
Belief that Improves Assessment Yes/No	66.7% = Yes 0% = No	↓42.3% = Yes ↑23.1% = No
Perceived impact on Outcomes Moderate/Significant/No Impact	85% = Moderate/significant	↓38.5% = Moderate/significant 30.8% = No impact

Note. Familiarity with thermal imaging and confidence in pressure injury assessment increased, but perceived outcome impact and adoption rates decreased after implementation. Responses reflect pre- and post-implementation survey data collected from Medical Intensive Care Unit nursing staff using Microsoft Forms. Figure created by the author from original project data.