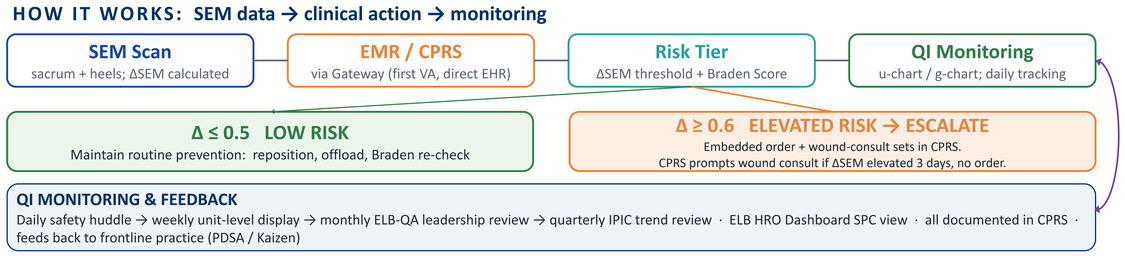
# Utilizing Sub-epidermal Moisture Measurement for the Prevention of Pressure Injuries in a Surgical ICU: A Quality Improvement Initiative

VA Pittsburgh Healthcare System | University of Pittsburgh, Department of Plastic Surgery

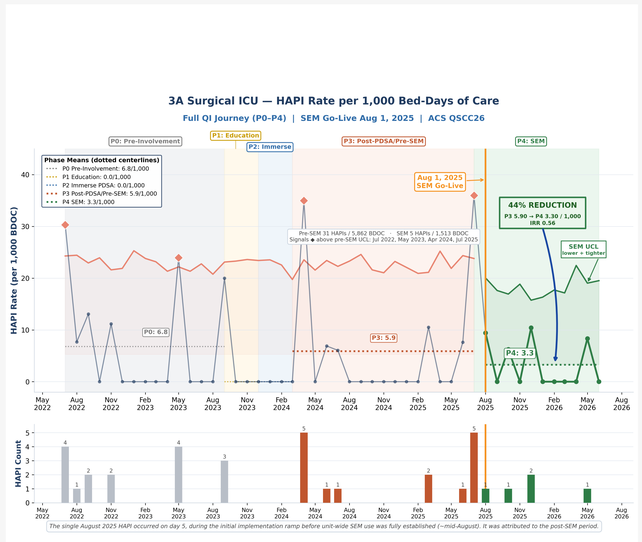
## SEM-guided prevention cut pressure injuries 44% in our Surgical ICU and the improvement is holding

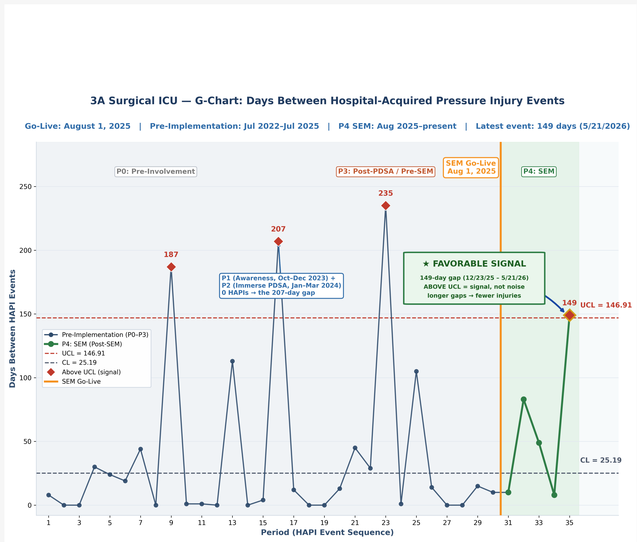
Sub-epidermal moisture (SEM) scanning, added to an interprofessional prevention program, lowered the rate from 5.9 to 3.3 per 1,000 bed-days of care and extended the time between injuries




## Why This Matters

- Hospital acquired pressure injuries (HAPIs/POPIs) are a largely preventable source of patient harm, pain, and cost, and critically ill surgical patients are among the highest risk.
- Traditional prevention relies on visual skin assessment, which detects damage only after it becomes visible.
- SEM scanning detects the tissue changes that precede visible injury, opening a window to intervene before the tissue dies, on average 5 days earlier.[1]
- Integrating SEM into frontline ICU workflow, and into the EHR, offers a scalable prevention model for the VA and beyond.




## Data Source / Population and Results

### Setting & Population

- 3A Surgical ICU, VA Pittsburgh Healthcare System
- Monthly HAPI surveillance, full QI journey (Jul 2022–Jun 2026), per 1,000 bed-days of care (BDOC)

### Intervention

- Interprofessional prevention program, designed and continuously improved by the Interprofessional Pressure Injury Committee (IPIC)
- Frontline nurses embedded in every subcommittee: Governance/Policy, Education, Clinical/Documentation, Data
- Frontline staff lead implementation
- SEM scanning integrated into CPRS via Gateway (first VA site with direct EHR integration)
- Rollout and optimization use PDSA and Kaizen continuous improvement
- SEM 3A Surgical ICU go-live: August 1, 2025

### Results

- HAPI rate fell **5.9 → 3.3 per 1,000 BDOC** (P3→P4): a **44% reduction** (IRR 0.56)
- Pre-SEM 31 HAPIs / 5,862 BDOC (5.29/1,000); SEM 5 HAPIs / 1,513 BDOC (3.30/1,000): sustained
- Longest injury-free interval (**149 days**) after go-live, above g-chart UCL: a favorable signal

Note: 4-month interim (abstract) showed 55% from a higher early baseline (8.9/1,000); full-journey 44% is more conservative and stable. The single Aug 2025 HAPI occurred on day 5 of the ramp, attributed to post-SEM.

## Lessons Learned

- **EMR integration drives adoption.** Direct CPRS/Gateway integration made SEM part of the existing workflow rather than an extra task.
- **Phased, unit-by-unit rollout builds reliability.** PDSA cycles let the team stabilize practice before scaling.
- **Implementation ramps are real.** Early post-go-live learning curve events do not equal program failure
- **Frontline-led, interprofessional design sustains gains.** Embedding nurses and multidisciplinary partners in every IPIC subcommittee, with PDSA/Kaizen optimization, kept improvement owned by the people doing the work.
- **Statistical Process Control (SPC) tells the fuller story.** Rate charts plus days-between-events together show both the drop and its durability.

Dawn Wang, MD, MS, FACS[1]; Katherine Collins, BSN[2]; Brandy Faux, RN, MSN[2]; Crystal Melkon, RN, MSN[2]; Erik Reiche, MD[3]; Jason Yoo, MD, FACS[1]; Catherine Novak, MSN, FNP-C, CWCN[2]; Alexa Duran, RN, WOCN[2]; Barbara Buccigrossi, BS, MS[2]; Bree Hansen, RN, MSN[2]; Matthew Wardo, BS[2]; Bryan Luther, BS[2]; Mark Thompson, RN, CIS[2]; Asher Harrington[3]; Shelly Larson, DPM, CWSP[2]
[1]VA Pittsburgh Healthcare System / University of Pittsburgh [2]VA Pittsburgh Healthcare System [3]University of Pittsburgh

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**References:** 1. Gefen A. Wounds International; 2023. 2. QI Macros for Excel [software]. U-chart and g-chart creation, KnowWare International; 2026. 3. Anthropic. Claude [LLM, Opus 4.8]; 2026, SPC figure generation formatting from QI Macros supplied data; all data and analysis by the authors.

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