

Using Artificial Intelligence to Scale Quality Assurance Monitoring of Home Health Wound Care Program

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Overview

- Chronic wounds impact 1-2% of the US population, putting a financial burden on the healthcare system and negatively impacting patients' quality of life.^{1,2}
- Despite these burdens, efficient wound management remains a challenge, particularly when using standard prognostic tools that rely on subjective assessments of wound dimensions and attributes to identify deteriorating wounds.³
- However, deep learning-based models have shown success in accurately measuring wound dimensions and identifying wound tissue segmentations, which are important prognostic features that determine wound extent and burden. These models can be utilized to identify deteriorating wounds objectively.^{4,5,6}
- CenterWell (CW) - a home health (HH) agency that provides in-home care services through 355 branches across 40 states in the US, has partnered with Swift Medical, an AI-wound management solution. The AI tool's HealingIndex feature relies on deep learning predictive features such as wound area, granulation, slough, slough, eschar and exudate amount and type to scan the entire wound history and identify healing trajectory, flagging deteriorating and delays to heal wounds in the process.⁷
- It is essential to objectively measure wound progress to avoid overlooking cases and effectively apply the correct management plan to expedite the healing process.



Trajectory of a non-healing wound⁷

Objective

This pilot study aimed to enhance the quality of wound care by achieving the following objectives:

- Identify wounds that exhibit deteriorating characteristics (such as size, tissue composition, edges, and exudate) despite being documented as improving in the latest evaluation by clinicians.
- Automate the reporting of deteriorating wounds and flagging them for further review by the branch manager to assess the patient chart and care plan.
- Assess clinicians' satisfaction with the HealingIndex escalation report.

Methodology

HealingIndex Wound Escalation Report

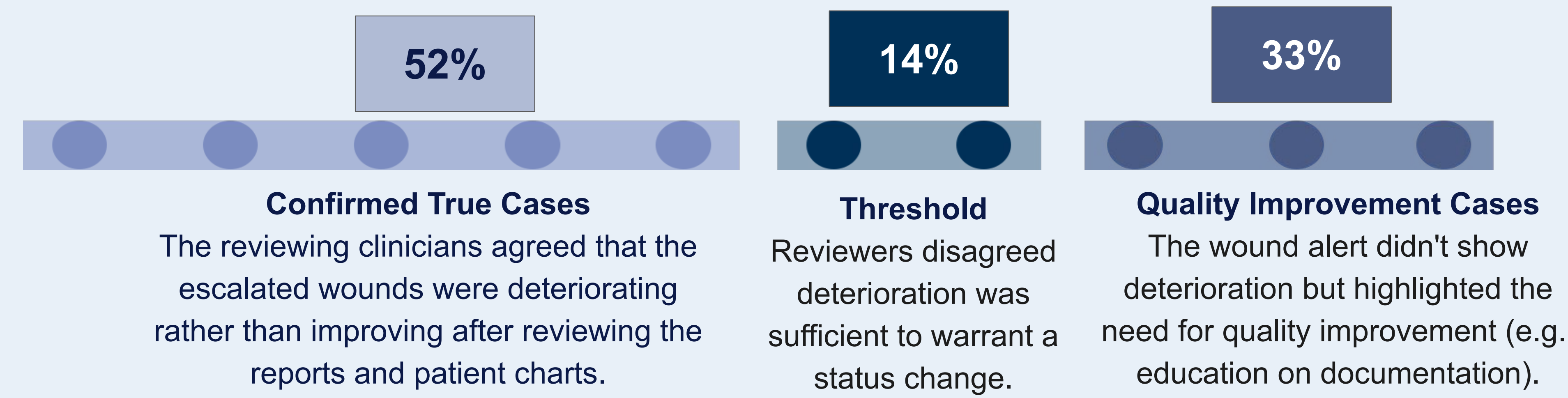
- Swift's HealingIndex (HI) was used to scan wounds at two participating branches in the pilot study at CW. The HI assessed all patient wound records clinicians reported as improving. Based on evaluating the patient's wound history, wound images and characteristics, HI is based on a Hazard Ratio, and assigns a value between 0 and 100. A threshold change in HI of greater than 20, on wounds larger than 1 cm², between evaluations 7-14 days apart, was flagged into the report to the branch managers.
- This pilot study was conducted in May 2023, during which 900 wound evaluations were carried out across two branches. Out of these, 595 wound evaluations were recorded as improving wounds and were subsequently scanned by the HI feature. Upon scanning, the HI flagged 4.5% of the assessments as deteriorating and needing further review.

Survey

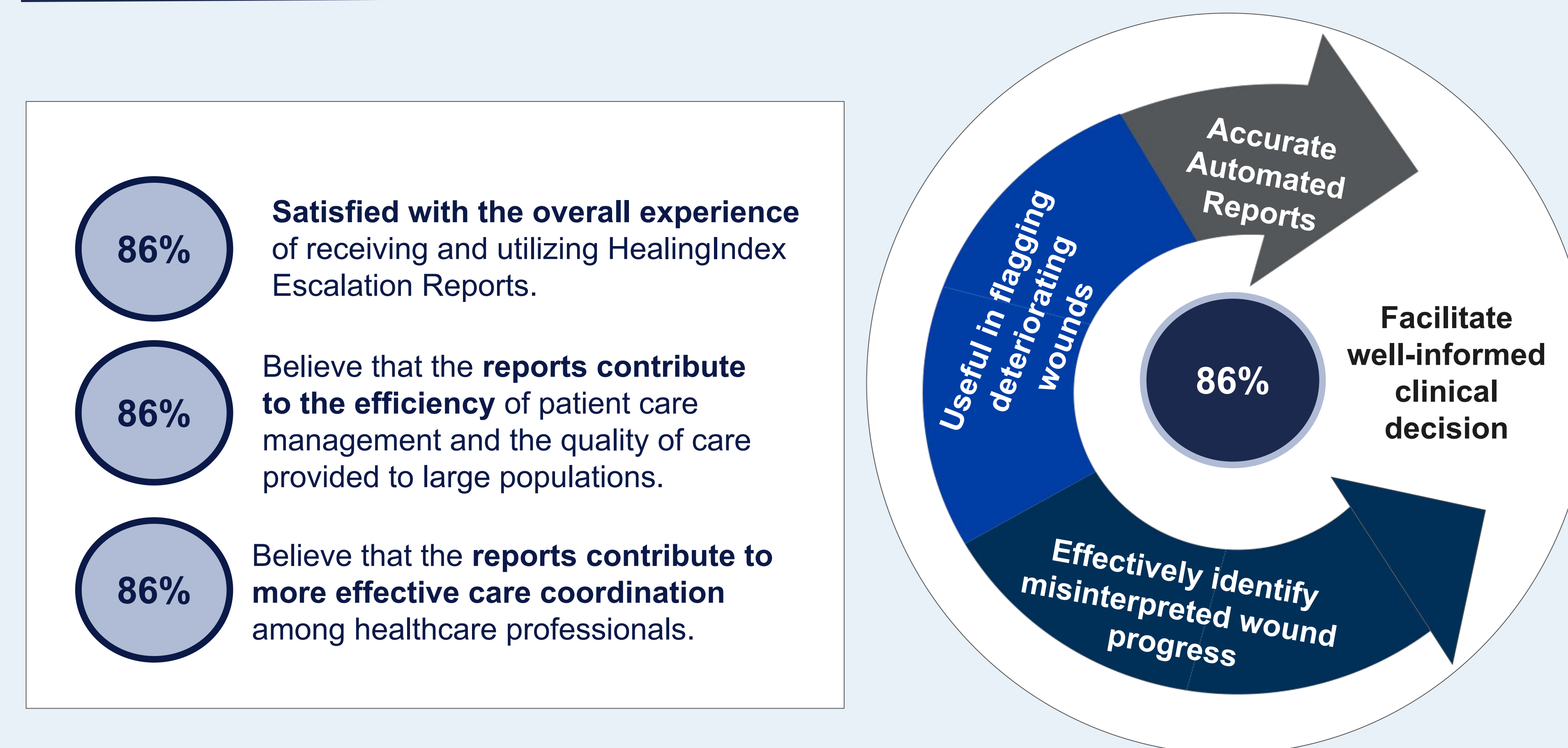
- An online survey of 7 quantitative questions and two open-ended questions was hosted on Survey Monkey and disseminated to clinicians and branch managers, who received escalation reports and reviewed cases as per HI recommendations. The survey was open for two weeks from Feb 26, 2024.

Results

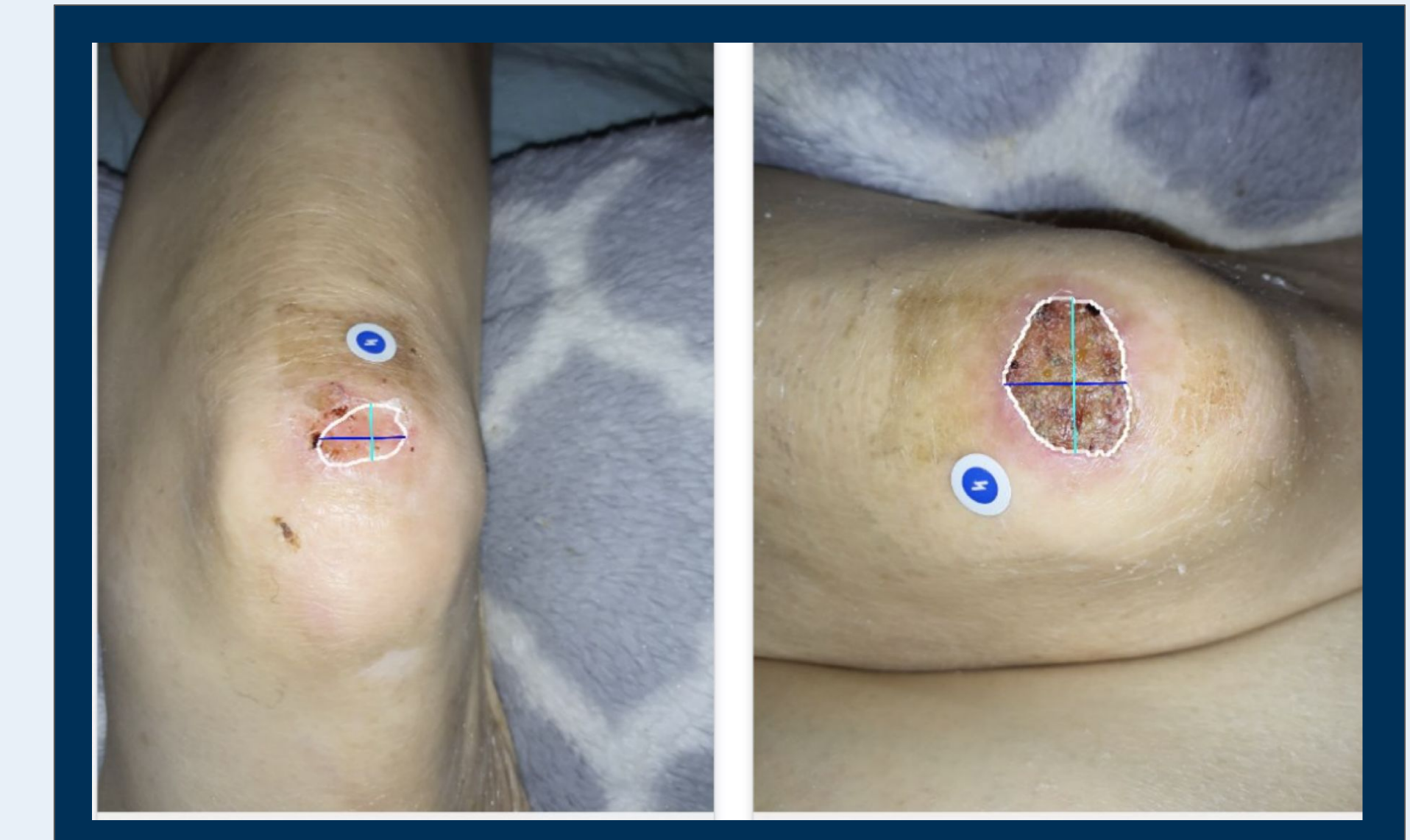
Overview of HealingIndex Escalation Reports



Exploring the Views of Home Health Care Staff on HealingIndex Escalation Reports



Case Studies: Confirmed Deteriorating Wounds



The above right image, taken 9 days after the left image, was marked as improving. The documentation noted 75%-100% soft black eschar, with wound depth obscured by necrosis, and HI flagged the wound as deteriorating. Upon further review, the branch manager agreed with the signs of deterioration and suggested orders changes (antimicrobial and moisture promoting dressing for dry wound bed).



The wound was initially marked as improving, but the HI escalation report flagged a deterioration. Upon review, it was found that the wound depth measurement was inaccurately documented as partial thickness instead of full thickness, and the wound edges were incorrectly documented as not attached when they were clearly attached.

Discussion

- The Swift HealingIndex feature can leverage AI to screen wound data, providing clinicians with insights into potential patient risks.
- Objective and precise assessment of wound measurement, extent, and burden using AI-based modelling technology can help monitor treatment progress and identify wounds at risk of delayed healing, thus preventing clinical complications.
- Furthermore, using AI in wound assessment can help standardize and streamline the evaluation process, reducing variability and improving accuracy across different healthcare settings.
- The Swift HealingIndex feature has the potential to significantly impact clinical decision-making and treatment management plans, ultimately improving patient outcomes and reducing healthcare costs associated with chronic wounds.
- Given the increasing number of wounds requiring care, this technology offers a scalable solution to support quality assurance management and deliver high-quality wound care.**

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