

# Impact of Sustained Use of Digital Wound Care Technology on Time to Heal Diabetic Ulcers in Home Health: A Retrospective Study

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## Introduction

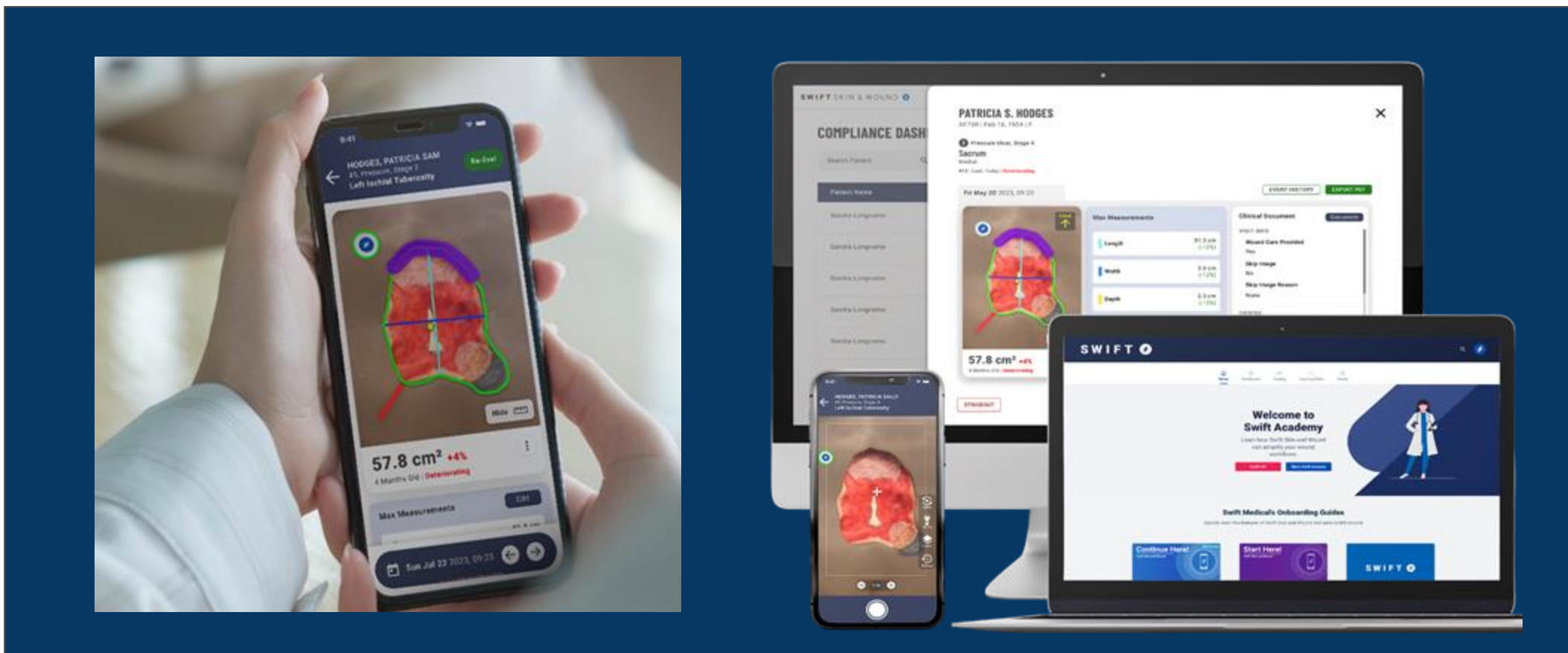
- The prevalence of diabetic foot ulcers (DFU) among the diabetic population ranges from 4-10%, with an annual incidence of 1-4% and a lifetime incidence as high as 25%.<sup>1,2</sup>
- The consequences of DFU are severe with an increased risk of infection, hospitalization and lower extremity amputation and 5-year mortality rate of 50-70%.<sup>2</sup>
- Addressing the burden of DFU is crucial as about 50% of complications and amputations can be prevented with proper care measures.<sup>2</sup>
- By leveraging AI-powered digital wound care solutions (DWCS), clinicians can identify high-risk patients more efficiently, monitor wound healing progress, and optimize treatment strategies, ultimately improving patients' outcomes.<sup>3,4</sup>

## Objective

- This study aimed to determine the average healing time for DFUs in home healthcare (HH) settings categorizing wounds by healing duration (<3 months or ≥ 3 months).
- The study explored the proportion of area reduction and improvement in non-healed but improving DFUs, subcategorized by initial surface area size (≤2 cm<sup>2</sup> and >2 cm<sup>2</sup>).

## Methodology

- This retrospective study systematically documented wound healing times using the validated DWCS dataset from 59 various HH organizations across the US that adopted the solution in 2021 and continued its use through 2022 and 2023.
- The study categorized wounds into wounds healed in < 3 months and wounds healed in > 3 months. A comparison of the proportion and the average days to heal across these time periods was conducted.
- DFUs were considered healed when area measurements recorded 0 and tissue was completely re-epithelialized.
- The study also investigated non-healed but improved DFUs that showed improvement and decreased surface area size by 40-50% during the study period, they were considered "improved."
- The study gathered data from 11,021 DFU wounds of adult patients assessed at the participating HH settings in 2022 and 2023. Specifically, 4,007 DFUs in 2022, and 7,014 DFUs in 2023.



## Results

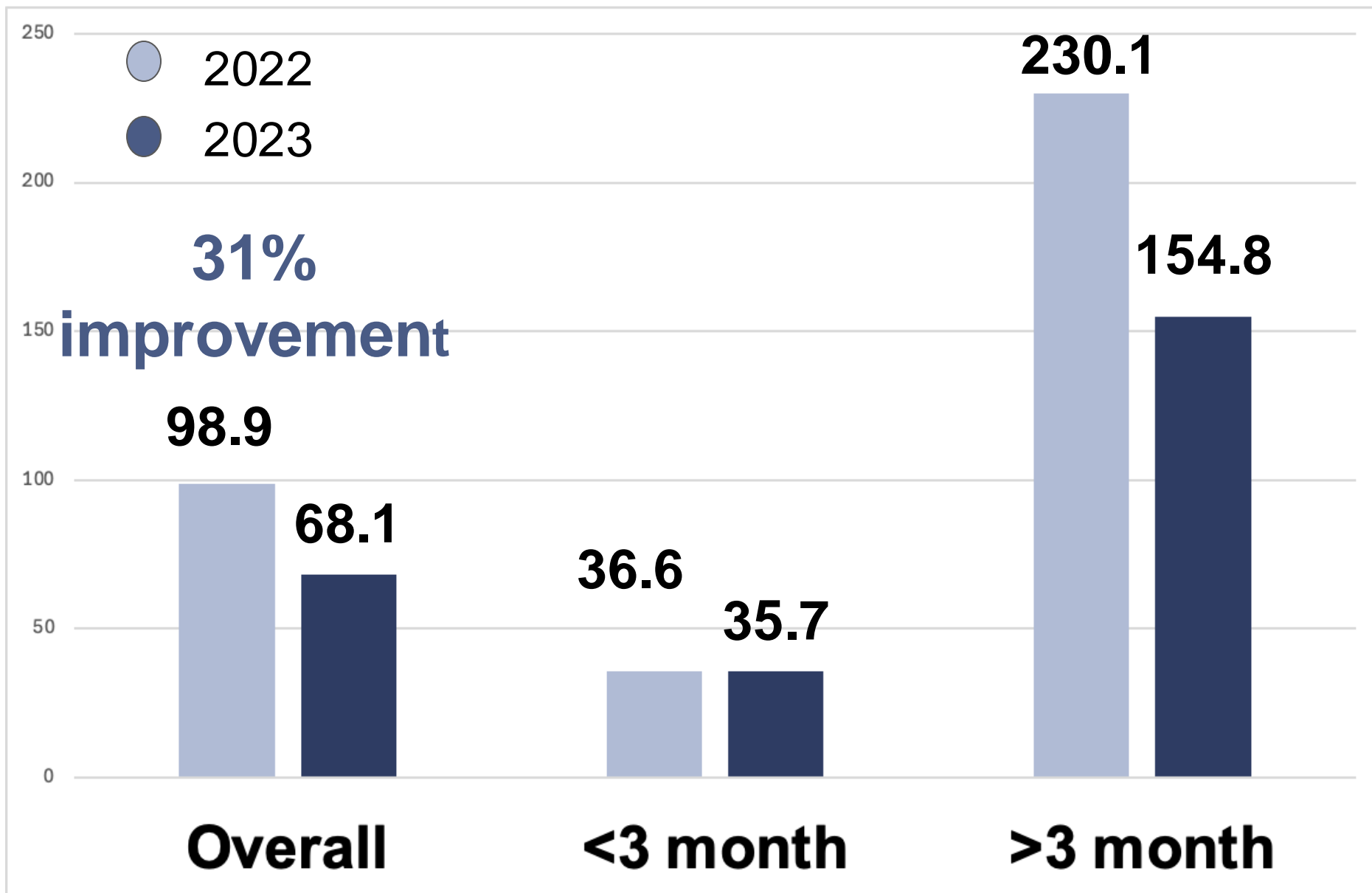
### Overall Characteristics of Healed Diabetic Ulcers (2022-2023)

Of the 2,368 healed DFUs (21.5%) in 2022–2023, 35.1% were female in 2022, decreasing to 29.0% in 2023. The mean age also decreased from 68.8 to 68.1 years, with no significant variation in DFU distribution across years.



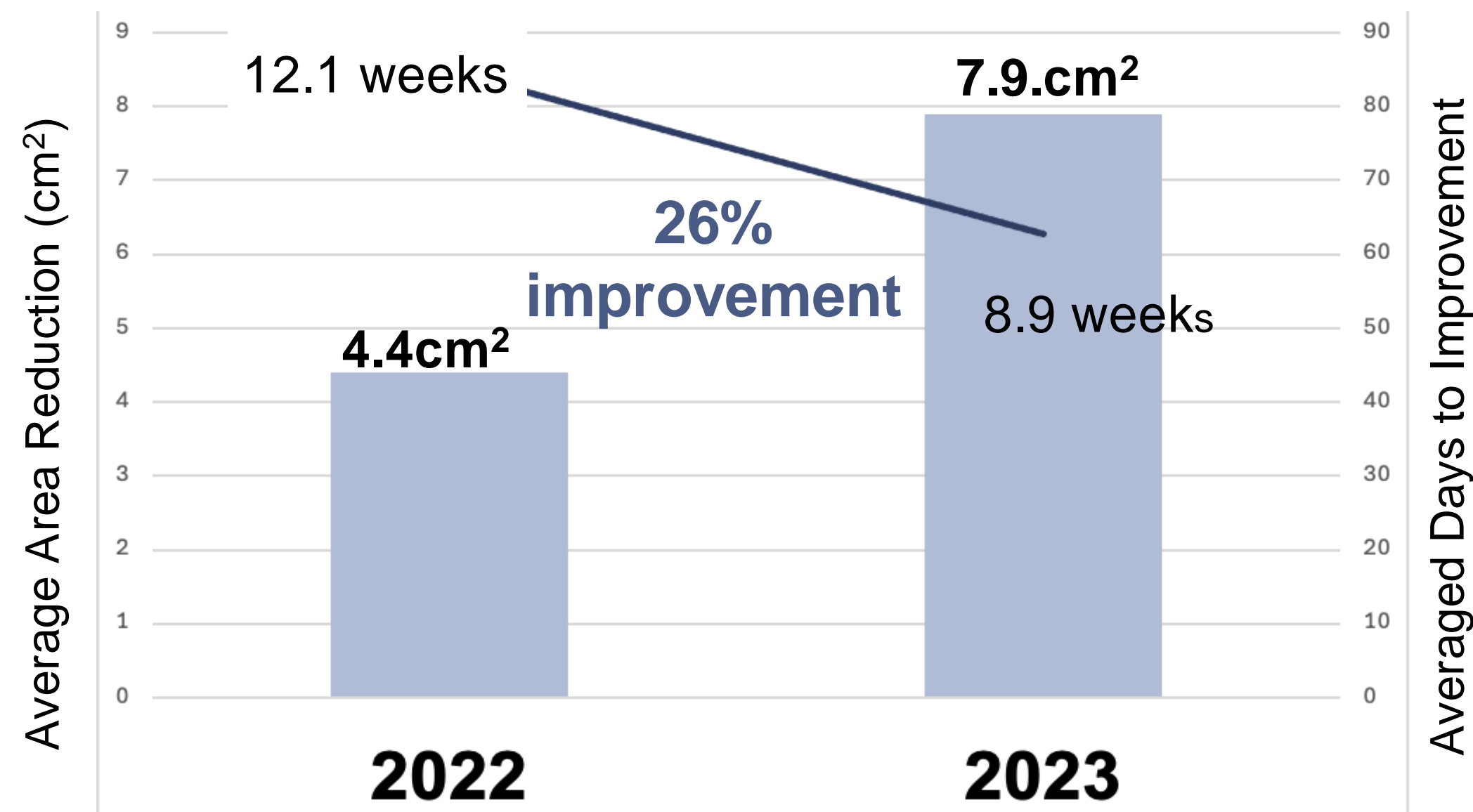
- This image depicting the left-hand-side wound shows an active DFU sized at 1.07 cm<sup>2</sup>. The wound bed is characterized by a mixed of granulation tissue and slough with the healing process ongoing. The skin surrounding the wound is inflamed and discolored.
- This wound to the right is fully closed with complete epithelialization and intact skin with slight scarring and some discoloration consistent with previous ulceration. It was a timely complete closure that indicates rapid improvement.

### Average Time to Heal Diabetic Ulcer in Days (2022 vs. 2023)



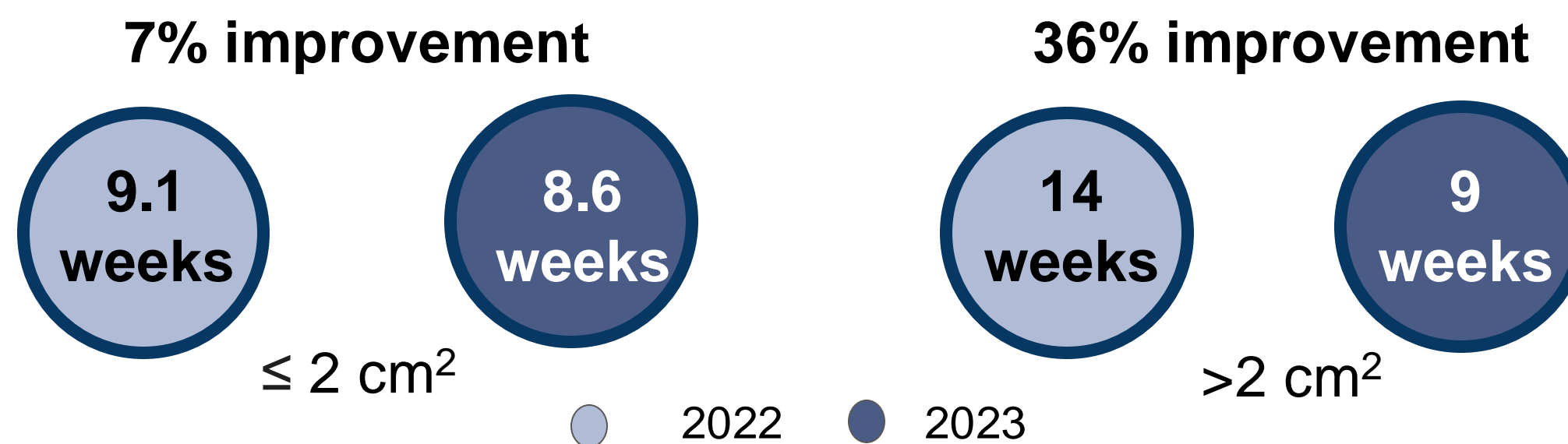
- Overall the average time to heal a DFU significantly decreased by 30.8 days (4.4 weeks), from 98.9 days in 2022 to 68.1 days in 2023, a 31.1% improvement (P < .001).
- For DFUs taking longer than three months, healing time reduced significantly (P < .001) by 75.3 days (10.7 weeks).

### Average Reduction in Area Size in Non-healed but Improved Diabetic Ulcer



- In 2022, 45.3% of non-healed DFU showed an improvement in area size, compared to 29.5% in 2023.
- The average reduction in area size for non-healed increased with an average reduction of 3.5 cm<sup>2</sup> in 2023 vs. 2022.
- The time to observe improvement decreased from 84.8 days (12.1 weeks) in 2022 to 62.8 days (8.9 weeks) in 2023, a 25.9% improvement.

### Average Time to Observe Improvement in Non-healed DU by Initial Surface Area



- A diabetic foot ulcer that shows significant improvement after a 39-day period.
- The ulcer in the first image (left) is larger, measuring about 2.07 cm<sup>2</sup>, with visible open wound tissue, 0.1 cm depth, and redness indicative of active inflammation.
- The second image (right), taken 39 days later, demonstrates marked healing with a total reduced wound size of about 0.3 cm<sup>2</sup>. The wound bed itself appears healthier with reduced inflammation, and evidence of granulation tissue, highlighting success in healing progress.

The average time required for DFU to improve decreased significantly for areas larger than 2 cm<sup>2</sup> (P<0.001), from 98.7 days (14 weeks) to 63.8 days (9.1 weeks), representing a 35.6% improvement.

## Discussion

- The study reported a significant improvement of 31% in time to heal a DU with the sustainable use of DWCS from 2022 to 2023 across 59 HHAs.
- Integrating DWCS into a comprehensive wound care program significantly accelerated DU surface area reduction for non-healed wounds, reducing the time by 26%, achieving faster reductions within 3.2 weeks.
- The average time to observe improvement in non-healed DU surface area significantly decreased for both larger and smaller than 2 cm<sup>2</sup> (p < 0.001).
- These findings are likely attributable to the DWCS's monitoring of wound healing progress over time and its comprehensive documentation features. This enables clinicians to identify trends and patterns, guiding subsequent treatment strategies. The data-centric solution enhances the understanding of wound healing dynamics and supports the development of targeted interventions to address specific challenges encountered by patients with non-healed wounds.

## References

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