B.9. WOUND OUTCOMES MEASUREMENT TOOLS

B.9.2 Purpose and Instructions for Percentage Reduction in size

Purpose
Wound Assessment is critical to monitoring the effectiveness of treatment for all wounds. In clinical wound assessment using the same technique is the only way to monitor healing outcomes.

Before one can calculate the percentage reduction in wound size over time, one must measure the wound on at least two separate occasions, using the same method of measurement. However, the correct method to measure a wound is open to discussion, with varying experts advising different methods. The debate includes the following variations:

- Head to toe, side to side?
- Head to toe, side to side, perpendicular to each other?
- Longest by widest?
- Longest by widest perpendicular to each other?
- Stretch wound to largest size or let rest?

The longest by widest measurement perpendicular to each other is most commonly used and is describes as most reliable\(^1\),\(^2\), but others argue that greatest head to toe diameter (length) and the greatest width (left to right), perpendicular to each other gives the most accurate estimate \(^3\). The second method MUST be used for the PUSH tool (Section B.9.1).

All authors agree that whichever method an agency chooses to use, it must be standardized so that all clinicians who measure wounds must use the same technique, for comparative purposes over time. Any ruler technique will overestimate surface area, but if done using same technique, will overestimate consistently and allow for comparability.

Once two measurements have been obtained, the percentage reduction in healing from the time of the first measurement until the current one can be calculated (Figure 1).

\[
\text{SAI} - \text{SAC} \times 100 = \text{_______% reduction}
\]

*SAI= surface area (LxW) on admission, SAC = surface area currently

If one wishes to determine the percentage of healing since the last time the calculation was done, the same formula is used to calculate the current % reduction, from which the previous one can be subtracted to determine the change in % in the interval time. It is difficult to predict how much percentage reduction in size to expect after that initial report; wound size can reduce quickly initially and then slow down but should progress steadily as the wound moves through the phases of healing.
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The Initial percentage reduction in surface area is often used as an indicator that the wound is responding to the treatment, within health care organizations. For example, the Wound Care Guiding Framework program developed in 2004\textsuperscript{iv} used a 20-30\% healing in 4 weeks as an indicator of whether a wound care specialist consultation was required or not, for any type of wound being treated.

This is a broad generalization, using an indicator (28.79\% at four weeks) that was obtained with only one type of chronic wound, venous ulcers, as a predictor of that the wound would be healed by 24 weeks, provided that the client was receiving high compression therapy\textsuperscript{v}. Other research exists regarding healing of venous ulcers that demonstrates that several factors will influence whether the ulcer is going to heal, which include the initial size of the ulcer and the length of time that the ulcer has been present. For this reason, the SWCCAC has chosen to ensure that there is a wound care specialist consult for all clients with venous ulcers that are >5 cm\textsuperscript{2} \&/or if the wound is older than 6 months \textsuperscript{vi} because these wounds will not heal with only moist wound healing, debridement and appropriate compression therapy.

Similar research has been done on diabetic foot ulcers, where an 82\% reduction in wound size at 4 weeks meant that the wounds would be healed at 12 weeks. Best practices in this case included frequent debridement, adequate off-loading (with interventions from orthotist/podiatrist/chiropodist), and moist dressings\textsuperscript{xii}. Those who only had a 25\% reduction at 4 weeks did not heal at 12 weeks. A recent review recommends that DFUs not healed \(> 50\%\) at 4 weeks should have the Rx plan revisited\textsuperscript{viii}. Dr. Laura Bolton, a respected scientist in wound care, and professor of surgery at the University of Medicine and Dentistry, New Jersey, offers the following comment on this work:

\textsuperscript{v} The Snyder et al conclusion (DFUs not healed \(> 50\%\) at 4 weeks) is well worth heeding—if a DFU hasn’t reduced by half its area during the first 4 weeks of care, it is wise to re-evaluate the causes of tissue damage and the treatment regimen to avert catastrophe.\textsuperscript{vi}

For individuals with pressure ulcers who have adequate blood supply, are able to have their nutritional or co-morbid factors corrected, and receive pressure redistribution and moist wound healing, the pressure ulcers should begin to show healing within 2-4 weeks. Pressure ulcers may also need to have sharp debridement before the wound measurements start to reduce. Ulcers with a surface area decrease of at least 39\% after 2 weeks healed more quickly than those with a smaller \% decrease in size\textsuperscript{x} in a 1993 study, and the numbers have not changed significantly. Studies in 2003 and 2009 confirmed that pressure ulcers with <20\% to 40\% change in size over the initial 2 to 4 weeks is a reliable indicator that the wound is not responding well to treatment\textsuperscript{xi}, \textsuperscript{xii}

Surgical wounds in normal adults were studied in 1969\textsuperscript{xiii}, where an average reduction of 50\% occurred within 13 days for an estimated healing rate of 0.37cm\textsuperscript{2} per day, with healing in 21 days for wounds that were on average 10 cm\textsuperscript{2}. No more recent data was found.

There does not appear to be the same type of research around other types of wounds, so it is impossible to state with certainty that these same values as predictors of healing can be applied to inflammatory wounds, and malignant wounds may actually be expected to become larger. However, for these three etiologies of chronic wounds, which take up a significant portion of health care dollars and resources, they can be used as indicators that the current care plan, no matter how evidence-based, is not effective and must be evaluated by a health care professional with expertise in wound care to determine if more complex interventions are required\textsuperscript{v}. In addition, the South West CCAC expects to
receive the first report at 3 weeks post-admission, and the numbers for 2-week or 4 week expectations cannot be simply applied to a three week mark without modification. See Table 1 for the results:

Table 1: Interpretation of Expected % Reduction in Wounds Size at Week 3 if wound is responding to current Rx:

<table>
<thead>
<tr>
<th>Etiology</th>
<th>% reduction in surface area at ____ weeks as predictor of healing</th>
<th>Modified for SW CCAC % reduction in surface area at 3 weeks (calculations NOT validated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous Leg Ulcer</td>
<td>&gt;28.79% at 4 weeks will heal by 24 weeks</td>
<td>21.59% at 3 weeks</td>
</tr>
<tr>
<td>Diabetic Foot Ulcer</td>
<td>&gt; 50% at 4 weeks will heal by 12 weeks</td>
<td>37.5% at 3 weeks</td>
</tr>
<tr>
<td>Pressure Ulcer</td>
<td>&gt;39% after 2 weeks</td>
<td>58.5% at 3 weeks</td>
</tr>
<tr>
<td>Surgical Wound</td>
<td>50% in 13 days will heal at 21 days</td>
<td>80% at three weeks (if you look at % per day) or 100%</td>
</tr>
</tbody>
</table>

References:

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\[\text{Golden, R.J., Salcido, R. (2002) More than one way to measure a wound: An overview of tools and techniques Advances in Skin & Wound Care}\]


