What Does “Validated” Mean?
A wound assessment tool is a specific part of your assessment that you use to objectively measure what is going on in the wound. Typically, using a wound assessment tool results in a score or numeric value that signifies a clinical change. But what clinical change you measure depends on how the tool was designed and validated. A wound assessment tool is distinct from a form or document that you use to guide your assessment of a patient with a wound. A comprehensive assessment should be an organized approach that includes questions and examinations that collectively help you decide the underlying cause(s) of the wound and wound etiology, the factors contributing to delayed healing and the patient’s perspective and experience related to the wound. Using information obtained in this initial assessment, you will be able to plan an integrated, interprofessional care plan that assists the patient and helps heal the wound.

What does it mean to say, “This is a validated tool”? It means some research has been conducted to ensure the tool measures what it is intended to measure. Recognize, however, that
there are many types of validation studies. So, when you’re told a tool is validated, the question you need to ask is this: “Validated to do what?”

Three common properties that are tested in validation studies are reliability, validity and responsiveness. Consult a previous review I have written to see formal definitions of each of these clinometric properties of assessment tools.1

Reliability

Reliability is a property indicating that values you get when using the tool are reproducible. That is, you can rely on getting a similar value when repeating the measure on a wound that has not changed. Two types of reliability include intrarater reliability and interrater reliability. If a tool is known to have good intrarater reliability, you can expect that you will get a similar value if you repeat the assessment on the same wound. If a tool has good interrater reliability, you can be sure that a similar value will be obtained if you and your colleague apply the tool to the same wound.

When you are determining the reliability of a wound assessment tool, assessments using the tool are repeated over a short time period (later that day or within a few days) when the wound status has not changed and you expect similar results. Statistical expression of agreement between and within assessors is done using correlation coefficients (i.e., intraclass correlation coefficients [ICC]) with values ranging between 0.0 and 1.0. Values closer to 1.0 indicate better reliability. Some variation in the numbers will always exist. Correlation coefficients of 0.80 or higher are considered excellent, whereas those less than 0.50 indicate that the tool is not very reliable, or there is poor agreement.2 Less agreement (lower ICC values) is expected when comparing values from two assessors (interrater reliability) than those generated by the same assessor (intrarater reliability).

In general, the more clinical judgement is involved in the assessment, the more variability between assessments and lower ICC values will exist. Consistency is key to good reliability when using wound assessment tools. Therefore, clear instructions and adequate training in applying the tool help standardize the approach of all assessors and minimize any guesswork.

Validity

Validity refers to the accuracy of the assessment tool, and demonstrates that a tool measures what it is intended to measure. There are different types of validity including content, concurrent and predictive validity.1

Intrarater reliability is the extent to which the same rater obtains a similar rating on subsequent testing with the same instrument, when no change has occurred.

Interrater reliability is the extent to which two or more raters obtain similar ratings when measuring the same thing using the same instrument.
Content validity is the most common type considered when developing an assessment tool. A panel of experts will confirm that the tool contains all the necessary components. To do so, they need to know the intended purpose of the tool and the type(s) of wounds it will be used to assess. The strength of this kind of validation study lies in the breadth and depth of expertise of the members of the panel.

Concurrent validity is a form of criterion-related validation and involves comparing results obtained using the new tool to an established tool commonly used in the field—or the existing “gold standard.” For example: if a tool is designed to detect wound healing (improvement), a reduction in wound surface area is often used as a surrogate gold standard. Correlation coefficients such as Pearson R or Spearman Rho are used to express the extent of the association between values generated by the new tool and those of an established one. Higher values (R between 0.8 to 1.0) demonstrate that a strong association exists between the two tests; in other words, as values derived from using the new tool increase, so do the values generated by the gold standard test.

Predictive validity is quite a distinct form of validity that is not always evaluated on wound assessment tools. A validation study that indicates an assessment tool has predictive validity shows that certain values obtained when using the tool indicate a greater likelihood that a particular event or outcome will occur in the future. A commonly used tool that allows us to predict future events is the Braden Scale for Predicting Pressure Sore Risk, where values indicate whether patients are highly likely to develop a pressure ulcer. The future event that most clinicians wish you could predict is complete healing of the wound.

Responsiveness
This property reflects the ability of a tool to detect a change in wound status. Tools that measure this can help you decide whether the wound is getting better or worse. For a wound assessment tool to be responsive, it should contain only features that are known to change as the wound heals. Another common name for a wound assessment tool that is responsive is an outcome measure. Validation studies that show a tool is responsive should involve collecting data from a study group with a defined type(s) of wound and over time (e.g., four to 12 weeks). A wound assessment tool that is responsive should be able to detect a significant difference between scores obtained when the tool is applied to a group of wounds that are healing (improving) and another group that are staying the same over time. Another way to confirm a tool is responsive, or that it can detect change in wound status, is to use a tool in a controlled clinical trial with active and sham treatments and show a significant difference between values derived from each.

Unfortunately, it is common in wound care practice to use wound assessment tools that are not very sensitive to changes in wound status (i.e., they have not been shown to be responsive). If you use an assessment tool that is not designed to be responsive, you will not be able to readily detect deterioration or improvements in wound
status, and you cannot be confident that you will observe when the wound is getting better or worse. It will take a large amount of change in scores on the assessment tool to indicate to you that the wound is changing or to determine if your treatment is working. This will result in delays in re-evaluation or changes to treatment.

A lot of time is spent by busy clinicians completing wound assessment that do not inform clinical decisions about treatments. Clearly, it is important to match the right tool to a particular clinical scenario.

**Different Tools, Different Objectives**

To determine if a validated tool suits your purposes, the first question to ask is what the tool was designed to do. In general, wound assessment tools serve one of three main purposes. While it would be nice if we had one tool to satisfy all these objectives, this is seldom possible. Most wound assessment tools are designed with just one of the following purposes in mind:

- to describe or categorize what the wound looks like (e.g., NPUAP, CEAP, Inlow)
- to evaluate whether the wound is improving or deteriorating—whether your treatment plan is working (e.g., wound surface area reduction measured using acetate tracing, DESIGN-R, LUMT)
- to predict whether the wound will change or heal at some point in the future (e.g., percentage wound area reduction in the first four weeks of treatment [PAR-4])

**The Bates Jensen Wound Assessment Tool**

The Bates Jensen Wound Assessment Tool (BWAT) was designed to fully describe all aspects of a wound and is commonly used in clinical practice across Canada. The BWAT represents a modificati-
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tion of the former Pressure Sore Status Tool (PSST) in that it can be used on more than just pressure ulcers. This 14-item tool evaluates all aspects of the wound, including periulcer skin, granulation tissue and necrotic tissue, using a 1–5 scale and total BWAT score derived from total scores between 14 and 70, with lower scores indicating better wound appearance.5

The former PSST was developed with input from a large panel of experts.6 Validation studies indicate that in addition to having good content validity, the PSST has excellent intra- and interrater reliability when used by experienced wound-care clinicians.7 There are very detailed instructions for using the BWAT, and Harris and colleagues created a pictorial guide to help novice clinicians.8 While the BWAT is often used to detect changes in wound status, results have been mixed: significant differences in healing between groups and over time have,9,10 and have not11–12 been detected using total PSST/BWAT scores. A descriptive tool like the BWAT that is made up of numerous items is not set up to be an outcome measure. Rather, based on how the BWAT was developed and validated, it is best used for initial assessment, as a way to fully describe wound appearance at a point in time.

The Pressure Ulcer Scale for Healing
The Pressure Ulcer Scale for Healing (PUSH) was developed by the NPUAP panel and is available via their weblink.13 An assessment with this tool can be completed in five minutes and focuses on three aspects of the wound: the amount of wound exudate, the proportion of granulation and necrotic tissue in the wound base, and wound size as measured by a ruler placed in head-to-toe direction. The first version of the PUSH had many more items that described all aspects of wound appearance; however, through pilot testing during which the PUSH tool was applied to a group of patients’ wounds over time, most items were found to not change as the wound healed, and therefore were eliminated.14 While the PUSH was originally designed to measure healing of pressure ulcers, it has been shown to effectively detect wound healing in other types of wounds.15

Photography Wound Assessment Tool
The Photographic Wound Assessment Tool (PWAT) was originally created by taking six components of the PSST that could be evaluated using a two-dimensional wound photograph.16 It was later revised to have eight items with a total PWAT score of zero indicating a completely healed wound.17 A validation study involving images taken from more than 300 wounds showed that the latest version of

Examples of Validated Tools Used in Wound Care

National Pressure Ulcer Advisory Panel (NPUAP) Pressure Injury Stages

International Working Group on the Diabetic Foot (IWGDF) Risk classification system

The Clinical-Etiological-Anatomical-Pathological (CEAP) classification system for people with Chronic Venous Insufficiency (CVI)
the PWAT has excellent intra-reliability and good interrater reliability, provided assessors had completed one to two hours of training and followed instructions consistently. Excellent agreement also has been shown between PWAT scores derived using digital wound images and those from bedside assessments. Total PWAT scores have been shown to progressively decrease as the wound heals and have been used in clinical trials to detect changes in wound appearance over time and significant differences between control and active treatment groups.

Table 1: Validity of Common Tools

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<thead>
<tr>
<th>Content Validity</th>
<th>Reliability</th>
<th>Responsiveness</th>
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<tbody>
<tr>
<td>BWAT</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PUSH</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PWAT</td>
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X indicates positive results from validation studies.

Conclusion
This article is intended to help clinicians recognize that research studies are designed to validate different aspects of a wound assessment tool. With the right knowledge and training, clinicians will use the right tool for the right purpose in each situation.

References
From its conceptual and programmatic underpinnings to lived experiences of faculty, students, nurse executives, and direct care nurses—the book—in its transparency, leaves no stone unturned, allowing readers to gain a full understanding of a nurse’s role in developing, using, and evaluating the impact of knowledge tools in healthcare.

Authors Doris Grinspun and Irmajean Bajnok designed this text to be a practical, go-to book for healthcare organizations, policy makers, executives, clinicians, faculty, students, and others learning how to create an evidence-based culture, how to get started, move forward, and achieve practice and policy results.

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