

# Evidence to Decision Frameworks: Recommendations for Pressure Injury Risk Factors and Risk Assessment

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.1 Consider individuals with limited mobility, limited activity and a high potential for friction and shear to be at risk of pressure injuries.**

**Option:** N/A **Background:** Mobility and activity limitations are associated with pressure injury development through impact on mechanical boundary conditions (magnitude/duration/type of mechanical load) and can be considered a **necessary condition** for pressure injury development. In the absence of these conditions, other risk factors should not result in a pressure injury. There are a range of different ways in which mobility/activity limitations can be measured.

**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<table border="0"> <tr> <td>N/A</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Very low	Low	Moderate	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</p> <p><b>Evidence for mobility/activity related activities of daily living as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>One high quality study,<sup>1</sup> one moderate quality study<sup>2</sup> and five low quality studies<sup>3-7</sup> reported at least one measure of mobility/activity related activities of daily living factors as significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>One high quality study,<sup>1</sup> moderate quality study<sup>8</sup> and three low/very low quality studies<sup>7,9,10</sup> reported at least one measure of mobility/activity related activities of daily living factors as non-significant in multivariable analyses. (Level 3 prognostic)</li> </ul>
	N/A	Very low	Low	Moderate	High								
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p><b>Evidence for mobility subscale of a risk assessment tool as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in acute care settings (n=1,190),<sup>11</sup> score on a mobility subscale on a risk assessment tool was a significant pressure injury risk factor in multivariable analyses (odds ratio [OR] 1.4, 1.1 to 1.8). (Level 1 prognostic, high quality)</li> <li>One moderate quality study<sup>12</sup> and seven low/very low quality studies<sup>9,13-18</sup> reported mobility subscales on a risk assessment tool as significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>One moderate quality study<sup>19</sup> and seven low/very low quality studies<sup>20-26</sup> reported mobility subscales on a risk assessment tool as non-significant in multivariable analyses. (Level 3 prognostic)</li> </ul>
Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>									
How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td>N/A</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p><b>Evidence for activity subscale of a risk assessment tool as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>One moderate quality study<sup>12</sup> and one very low quality study<sup>17</sup> reported activity subscales on a risk assessment tool as significant in multivariable analyses. (Level 3 prognostic)</li> </ul>	
N/A	Not substantial	Probably not substantial	Probably substantial	Substantial									
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
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CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE
<p>Do the desirable effects outweigh the undesirable effects?</p>	<p>No <input type="checkbox"/>    Probably No <input type="checkbox"/>    Uncertain <input type="checkbox"/>    Probably Yes <input type="checkbox"/>    Yes <input type="checkbox"/>    N/A <input checked="" type="checkbox"/></p>	<p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in acute care settings (n=1,190),<sup>11</sup> score on the activity subscale of the Braden Scale was non-significant as a pressure injury risk factor in a multivariable analysis (OR not reported). (<i>Level 1 prognostic, high quality</i>)</li> <li>In older adults individuals (n=1,458),<sup>27</sup> score on the activity subscale of the Braden Scale was a non-significant as a pressure injury risk factor in a multivariable analysis (OR 0.8, 0.60 to 106). (<i>Level 1 prognostic, high quality</i>)</li> <li>In individuals in acute care settings (n=1,971), category on an activity subscale on the Braden scale was not significant as a pressure injury risk factor in a multivariable analysis (OR ranged from 0.36 to 0.91 depending upon category).<sup>28</sup> (<i>Level 1 prognostic, high quality</i>)</li> <li>One moderate quality<sup>19</sup> and eleven very low quality studies<sup>9,13-16,18,20,22,24-26</sup> reported activity subscales on a risk assessment tool as non-significant in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Evidence for activity descriptors (e.g. ‘bedfast’, ‘chairfast’) as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in critical care or surgical settings (n=463),<sup>29</sup> the activity descriptor “sitting in chair” was a significant pressure injury risk factor in a multivariable analysis (OR 0.08, 95% CI 0.02 to 0.27). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>Eight low/very low studies<sup>3,23,30-35</sup> reported activity descriptors as significant in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=1,938),<sup>36</sup> the descriptor ‘bedfast’ was non-significant in a multivariable analysis (Hazard ratio [HR] 1.03, 95% CI 0.76 to 1.41). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>In individuals in mixed acute care settings (n=399),<sup>37</sup>immobility and inactivity were both non-significant in a multivariable analysis (OR not reported).(<i>Level 1 prognostic, moderate quality</i>)</li> <li>In individuals in mixed acute care settings (n=463),<sup>29</sup> sitting in a chair for less than one hour was non-significant in a multivariable analysis (OR not reported). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>Six low/very low studies<sup>7,9,10,35,38,39</sup> reported activity descriptors as non-significant in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Evidence for general activities of daily living (ADL) measures as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=1,938),<sup>36</sup> number of ADL dependencies was a significant pressure injury risk factor in a multivariable analysis (OR 1.38, 95% CI 1.25 to 1.53). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>Two low/very low quality studies<sup>7,9</sup> reported ADL measures as significant in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>One high quality study<sup>1</sup> and five low/very low quality studies<sup>7,9,23,31,40</sup> reported ADL measures as non-significant in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Evidence for friction and shear measures as prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in acute care settings (n=1,190),<sup>11</sup> friction and shear on the Braden scale were significant pressure injury risk factors in a multivariable analysis (RH 1.5, 95% CI 1.0 to 2.2). (<i>Level 1 prognostic, high quality</i>)</li> <li>In individuals in mixed acute care settings (n=399),<sup>37</sup> friction and shear were significant pressure injury risk factors in a multivariable analysis (OR 1.3, 95% CI not reported). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>One moderate quality study<sup>12</sup> and two low quality studies<sup>22,25</sup> reported friction and shear measures as significant in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul>

CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE
		<p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults individuals (n=1,458),<sup>27</sup> friction (OR 1.21, 95% CI 0.87 to 1.68) and the Braden Scale subscale friction and shear (OR 0.86, 95% CI 0.65 to 1.14) were non-significant in a multivariable analysis (. <i>(Level 1 prognostic, high quality)</i>)</li> <li>Nine low/very low quality studies<sup>9,13-16,20,23,26,41</sup> reported friction and shear measures as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Evidence for other factors affecting mobility as prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=672),<sup>42</sup> having a lower limb fracture was a significant pressure injury risk factor in a multivariable analysis (OR 2.68, 95% CI 1.75 to 4.11).<i>(Level 1 prognostic, moderate quality)</i></li> <li>One moderate quality study<sup>8</sup> and three low/very low quality studies<sup>9,26,43</sup> reported other factors affecting mobility as significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults individuals (n=1,458),<sup>27</sup> spontaneous movement (OR 1.14, 0.98 to 1.31) and posture (OR 1.13, 0.77 to 1.66) were non-significant as pressure injury risk factors in a multivariable analysis <i>(Level 1 prognostic, high quality)</i></li> <li>In individuals in mixed acute care settings (n=399),<sup>37</sup> limited responsiveness/being non-responsive were non-significant as pressure injury risk factors in a multivariable analysis.<i>(Level 1 prognostic, moderate quality)</i></li> <li>Five low/very low quality studies<sup>6,9,25,31,44</sup> reported other factors affecting mobility as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Evidence for interface pressure as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In acute and critical care settings (n=253),<sup>45</sup> interface pressure &gt; 35mmHg was a significant pressure injury risk factor in a multivariable analysis (OR 2.2, 95% CI 1.6 to 2.9). <i>(Level 1 prognostic, moderate quality)</i></li> <li>One low quality study<sup>46</sup> reported interface pressure as significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>One low quality study<sup>47</sup> reported interface pressure as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Evidence for factors affecting mobility related to spinal cord injury (SCI)</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>One moderate<sup>19</sup> and three low/very low quality<sup>44,48,49</sup> studies reported SCI classification factors (e.g. ASIA classification, time since injury, extent of paralysis) affecting mobility as significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals with SCI (n=235), time since SCI lesion and reason for admission to a SCI center were non-significant factors in a multivariable analysis.<sup>50</sup> <i>(Level 1 prognostic, moderate quality)</i></li> <li>Two low/very low quality studies<sup>39,49</sup> reported factors affecting mobility related to SCI as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Strength of Evidence: A- More than one high quality Level I study providing direct evidence</b></p>

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Conducting a pressure injury risk assessment that considers factors related to mobility/activity is feasible in most clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input checked="" type="checkbox"/>
<b>Justification</b>	Fifty prognostic studies included factors associated with immobility in a multivariable analysis of risk factors. A large volume of evidence reported measures of mobility/activity limitations as significant in multivariable analyses, including one high <sup>11</sup> and five moderate quality <sup>29,36,37,42,45</sup> Level 1 studies, and one high quality, <sup>1</sup> four moderate quality <sup>2,8,12,19</sup> and 27 low/very low quality <sup>3-7,9,13-18,22,23,25,26,30-35,43,44,46,48,49</sup> Level 3 studies. Overall, 76% (38/50) of the prognostic studies reported at least one measure of mobility and activity limitation was a significant risk factor for pressure injuries. Twelve studies (24%) were unable to establish any measure of mobility/activity as a significant risk factor, including two high quality <sup>27,28</sup> and one moderate quality <sup>50</sup> Level 1 studies and nine low/very low quality <sup>10,20,21,24,38-41,47</sup> Level 3 studies. The wide range of clinical settings and types of participants, selection of different risk factors for modeling and range of assessment strategies explain the varied results between studies. Overall, a large body of evidence supports a recommendation to consider the impact of mobility/activity/friction and shear when assessing pressure injury risk.				

**Clinical question**

What factors put individuals at risk for pressure injury development?

**Recommendation 1.2**

**Consider individuals with a Category/Stage I pressure injury to be at risk of developing a Category/Stage II or greater pressure injury.**

**Option:** N/A

**Background:** A Category/ Stage I pressure injury is a clinical sign of deficits in one or more factors affecting susceptibility and tolerance of the individual, including mechanical properties of the tissue; the geometry (morphology) of the tissues; transport and thermal properties and physiology and repair).

**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p><b>Evidence for existing Category/Stage I pressure injury as a prognostic factor for developing a Category/Stage II or greater pressure injury</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in community centers and hospitals (n=602), existing Category/Stage I pressure injury was a significant pressure injury risk factor in multivariable analyses (odds ratio [OR] 3.25, 2.17 to 4.86).<sup>53</sup> (Level 1 prognostic, high quality)</li> <li>In individuals in acute care (n=1,971), existing Category/Stage I pressure injury was a significant pressure injury risk factor in multivariable analyses (OR 1.95, 95% CI 1.31 to 2.91).<sup>28</sup> (Level 1 prognostic, high quality)</li> <li>In individuals receiving medical care (n=2,771), existing Category/Stage I pressure injury was significant in multivariable analyses (OR 3.13, 95% CI 2.41 to 4.06).<sup>54</sup> (Level 3 prognostic, high quality)</li> <li>In individuals receiving medical care (n=286), existing Category/Stage I pressure injury was significant in multivariable analyses (relative risk [RR] 7.52, 95% CI 1.00 to 59.12).<sup>30</sup> (Level 3 prognostic, low quality)</li> <li>In individuals receiving medical care (n=97), existing Category/Stage I pressure injury was significant in multivariable analyses (OR 7.02, 95% CI 1.67 to 29.49).<sup>55</sup> (Level 3 prognostic, low quality)</li> <li>In individuals in geriatric and medical wards (n=610), existing Category/Stage I pressure injury was a significant pressure injury risk factor in multivariable analyses (OR 5.36, 95% CI 2.40 to 11.99).<sup>41</sup> (Level 3 prognostic, low quality)</li> </ul> <p><i>Non-significant factors</i></p> <p>None reported.</p>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
			<p><b>Strength of Evidence:</b> A- More than one high quality Level I study providing direct evidence</p>

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RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Identifying presence of pressure injuries is usually feasible in all clinical settings; however, health professionals require appropriate skills to identify and classify pressure injuries. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input checked="" type="checkbox"/>
<b>Justification</b>	Twenty-four prognostic studies included factors associated with skin status in multivariable analysis of risk factors. Six prognostic studies provided evidence that Category/Stage I pressure injuries are a prognostic factor for Category/Stage II or greater pressure injuries and no studies found this factor to be non-significant. Evidence from two high quality Level 1 studies <sup>28,53</sup> and one high quality <sup>54</sup> and three low quality <sup>30,41,55</sup> Level 3 studies supported the recommendation. Odds ratio of experiencing a Category/Stage II or greater pressure injury after experiencing a Category/Stage I pressure injury ranged from 1.95 to 7.02.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.3 Consider the potential impact of an existing pressure injury of any Category/Stage on development of additional pressure injuries.**

**Option:** N/A **Background:** Poor skin status is associated with the susceptibility and tolerance of the individual. Skin status may impact on or indicate deficits in one or more of the following: mechanical properties of the tissue; the geometry (morphology) of the tissues; transport and thermal properties and physiology and repair).

**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p><b>Evidence for existing pressure injury of any Category/Stage as a prognostic factor for pressure injuries</b></p> <p><i>Significant factor</i></p> <ul style="list-style-type: none"> <li>In older adults (n=1,938),<sup>36</sup> an existing pressure injury of any Category/Stage was a significant pressure injury risk factor in multivariable analyses (hazard ratio [HR] 1.8, 95% CI 1.40 to 2.32). (Level 1 prognostic, moderate quality)</li> <li>In older adults (n=1,458),<sup>27</sup> an existing pressure injury of any Category/Stage was a significant pressure injury risk factor in multivariable analyses (OR 2.25, 95% CI 1.43 to 3.54). (Level 1 prognostic, high quality)</li> <li>In individuals in hospice and medical care (n=5,395),<sup>7</sup> an existing pressure injury of any Category/Stage was a significant pressure injury risk factor in multivariable analyses (OR 4.47, 95% CI 2.44 to 8.21). (Level 3 prognostic, very low quality)</li> </ul> <p><i>Non-significant factor</i></p> <ul style="list-style-type: none"> <li>In individuals in acute care (n=1,971),<sup>28</sup> an existing pressure injury of any Category/Stage was a non-significant pressure injury risk factor in multivariable analyses (OR 0.97, 95% CI 0.52 to 1.79). (Level 1 prognostic, high quality)</li> <li>In older adults receiving surgery (n=465),<sup>38</sup> an existing pressure injury of any Category/Stage was a non-significant pressure injury risk factor in multivariable analyses. (Level 3 prognostic, very low quality)</li> <li>In older adults in acute care (n=229),<sup>56</sup> an existing pressure injury of any Category/Stage was a non-significant pressure injury risk factor in multivariable analyses (OR 1.02, 95% CI 0.32 to 3.21). (Level 3 prognostic, very low quality)</li> <li>In adults in acute and surgical care (n=163),<sup>57</sup> an existing pressure injury of any Category/Stage was a non-significant pressure injury risk factor in multivariable analyses. (Level 3 prognostic, low quality)</li> <li>In older adults in acute care (n=291),<sup>25</sup> an existing pressure injury of any Category/Stage was a non-significant pressure injury risk factor in multivariable analyses. (Level 3 prognostic, low quality)</li> </ul> <p><b>Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic</b></p>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Identifying presence of pressure injuries is feasible in all clinical settings; however, health professionals require appropriate skills to identify and classify pressure injuries. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Of eight studies which included existing pressure injury in multivariable modelling, only three report this variable as significant, including one high quality and one moderate quality Level 1 studies, <sup>27,36</sup> and a very low quality Level 3 study. <sup>7</sup> The remaining five studies, including one high quality Level 1 prognostic study <sup>28</sup> and four low/very low quality Level 3 studies, <sup>25,38,56,57</sup> did not find existing pressure injury to be a significant predictor of a new pressure injury. This measure emerges less consistently than other measures of skin status. An existing pressure injury is de facto evidence that the individual can develop a pressure injury. If the risk factors contributing to the initial pressure injury are still present, the individual should be considered at risk for additional pressure injuries.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Good Practice Statement 1.4 Consider the potential impact of alterations to skin status over pressure points on pressure injury risk.**

**GOOD PRACTICE STATEMENT** **Background:** Poor skin status is associated with the susceptibility and tolerance of the individual. Skin status may impact on or indicate deficits in one or more of the following: mechanical properties of the tissue; the geometry (morphology) of the tissues; transport and thermal properties and physiology and repair).

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support the opinion (when available)**

**Evidence for variations in skin condition as a prognostic factor for pressure injuries**

*Significant factors*

- In adults in acute or community care (n=602),<sup>53</sup> alterations to intact skin was significant in a multivariable analysis (OR 1.98, 95% CI 1.30-3.00). (*Level 1 prognostic, high quality*)
- In older adults (n=1,458),<sup>27</sup> having any variations to skin condition was significant in a multivariable analysis (OR 1.49, 95% CI 1.21-1.85). (*Level 1 prognostic, high quality*)
- In adults in acute care (n=1,971),<sup>28</sup> baseline skin trauma was significant in a multivariable analysis (OR 1.67, 95% CI 0.999-2.80). (*Level 1 prognostic, high quality*)
- Nine additional low/very low studies<sup>5,21,24,30,33,49,58-60</sup> reported variations in skin condition (e.g., skin type, having previous skin problems, skin redness, skin quality, sub-epidermal moisture, dry skin, mottled skin) as significant in multivariable analyses. (*Level 3 prognostic*)

*Non-significant factors*

- Four low/very low studies<sup>41,43,59,60</sup> reported variations in skin condition (e.g., sub-epidermal moisture, hyperemic skin unhealthy skin, livid skin) as non-significant in multivariable analyses. (*Level 3 prognostic*)

**Justification**

Twelve of fourteen studies (85.7%) prognostic studies that reported variations in skin condition as a significant variable in multivariable modelling of pressure injury risk including three high quality Level one studies<sup>27,28,53</sup> and nine low/very low Level 3 prognostic studies.<sup>5,21,24,30,33,49,58-60</sup> Reported alterations in skin integrity were varied and often poorly defined (e.g., 'unhealthy skin', 'skin type', 'having previous skin problems'). Only two low quality studies<sup>41,43</sup> did not find an alteration in skin condition to be a significant risk factor.

**Clinical question** What factors put individuals at risk for pressure injury development?

**Good Practice Statement 1.5** Consider the potential impact of a previous pressure injury on additional pressure injury development.

**Background:** A history of previous pressure injury (especially when replaced with scar tissue) is a clinical sign of deficits in one or more factors affecting susceptibility and tolerance of the individual including mechanical properties of the tissue; the geometry (morphology) of the tissues; transport and thermal properties and physiology and repair).

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support the opinion (when available)**

**Evidence for previous history of a pressure injury as a prognostic factor for pressure injuries**

*Significant factors*

- In older adults (n=94),<sup>61</sup> having a previous history of a pressure injury (Category/Stage not specified) was significant in a multivariable analysis (OR 2.76, 95% CI 1.06-7.20). (*Level 3 prognostic, very low quality*)

*Non-significant factors*

- In individuals in mixed acute care settings (n=286),<sup>30</sup> a previous history of pressure injuries was non-significant factor in a multivariable analysis (OR not reported). (*Level 3 prognostic, low quality*)
- In individuals in mixed acute care settings (n=320),<sup>22</sup> a previous history of pressure injuries was non-significant factor in a multivariable analysis (OR not reported). (*Level 3 prognostic, low quality*)

**Justification**

Only one very low quality Level 3 study<sup>61</sup> found a previous history of pressure injuries was a significant factor in multivariable modelling. The remaining two low quality<sup>22,30</sup> Level 3 studies reported that a previous history of pressure injuries was not a significant factor for future pressure injuries.

**Clinical question** What factors put individuals at risk for pressure injury development?

**Good Practice Statement** **Consider the potential impact of pain at pressure points on pressure injury risk.**  
**1.6**

**Background:** Pain is an early indicator of tissue inflammation and when present at a pressure point is an early indicator of possible pressure injury.

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support the opinion (when available)**

**Evidence for skin pain at pressure points as a prognostic factor for pressure injuries**

*Significant factors*

- In adults in acute or community care (n=602),<sup>53</sup> pain alterations to intact skin at pressure points was significant in a multivariable analysis (OR 1.56, 95% CI 0.93-2.63).  
(*Level 1 prognostic, high quality*)

*Non-significant factors*

None reported

**Justification**

One high quality Level 1 study<sup>53</sup> reported that presence of skin pain in areas prone to pressure injuries was a prognostic factor for development of a pressure injury.

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.7 Consider the impact of diabetes mellitus on the risk of pressure injuries.**

**Option:** N/A **Background:** Diabetes mellitus may affect both the mechanical boundary condition (arising from sensory perception deficits) and the susceptibility and tolerance of the skin by impacting on one or more of the following: mechanical properties of the tissue; the geometry (morphology) of the tissues; transport and thermal properties and physiology and repair).  
**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/> Very low <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High <input type="checkbox"/>	<p><i>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</i></p> <p><b>Evidence for diabetes mellitus as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In mixed acute care settings (n=1971),<sup>28</sup> diabetes mellitus was a significant risk factor for pressure injuries in a multivariable analysis (OR 1.61, 95% CI 1.007 to 2.56). <i>(Level 1 prognostic, high quality)</i></li> <li>In mixed acute care settings (n=413),<sup>62</sup> presence of diabetes mellitus was a significant risk factor for pressure injuries in a multivariable analysis (OR 2.52, 95% CI 1.21 to 5.25). <i>(Level 1 prognostic, high quality)</i></li> <li>One high quality study,<sup>1</sup> three moderate quality studies<sup>2,8,63</sup> and two low/very low quality studies<sup>64,65</sup> reported diabetes as significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In adults in acute or community care (n=602),<sup>53</sup> a diagnosis of diabetes mellitus was non-significant in multivariable analysis (OR not reported). <i>(Level 1 prognostic, high quality)</i></li> <li>Ten low/very low quality studies<sup>4,10,22,26,31,57,59,66-68</sup> reported diabetes as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/> Possibly important uncertainty or variability <input type="checkbox"/> Probably no important uncertainty or variability <input type="checkbox"/> No important uncertainty or variability <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/> Probably No <input type="checkbox"/> Uncertain <input type="checkbox"/> Probably Yes <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
			<b>Strength of Evidence: A - more than 1 high quality level 1 study providing direct evidence</b>

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table> <tr> <td>Not clear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> <td>Varies</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
No	Probably No	Uncertain	Probably Yes	Yes	Varies											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Identifying the presence of diabetes mellitus is feasible in all clinical settings. ( <i>Expert opinion</i> )	
No	Probably No	Uncertain	Probably Yes	Yes	Varies											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input checked="" type="checkbox"/>

**Justification** Eight of nineteen (42%) prognostic studies reported a diagnosis of diabetes mellitus was a significant risk factor for pressure injuries including two high quality Level 1 studies,<sup>28,62</sup> one high quality Level 3 study<sup>1</sup> and three moderate<sup>2,8,63</sup> and two low/very low<sup>64,65</sup> quality Level 3 studies. Eleven studies reported the diabetes variable as non significant in multivariable modelling including one high quality Level 1 study<sup>53</sup> and ten low/very low quality Level 3 studies.<sup>4,10,22,26,31,57,59,66-68</sup>

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.8 Consider the impact of perfusion and circulation deficits on the risk of pressure injuries.**

**Option:** N/A **Background:** Perfusion and circulation factors may affect the susceptibility and tolerance of the skin, by impacting on one or both of the following: individual physiology and repair; and transport and thermal properties. There are a range of different ways in which perfusion and circulation can be measured (e.g., cardiovascular diseases, blood pressure variations, ankle brachial index). Perfusion may be reduced in smokers due to the vasoconstrictive effects of nicotine. Edema may be caused by impaired lymphatic drainage, capillary leak syndrome in sepsis, and low albumin with low oncotic pressure. The relationship to perfusion is that edematous tissues affects transmural pressure in the capillary bed, which affects perfusion to tissues.

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<table style="width: 100%; text-align: center;"> <tr> <td>N/A</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Very low	Low	Moderate	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</p> <p><b>Evidence for vascular disease as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in critical care or having surgery (n=463),<sup>29</sup> a medical history of vascular disease was significant risk factor for pressure injuries in a multivariable analysis (OR 4.51, 95% CI 1.99 to 10.24). (Level 1 prognostic, moderate quality)</li> <li>Six low/very low quality studies<sup>23,26,31,65,68,69</sup> reported vascular disease as significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>Three moderate quality studies<sup>8,12,70</sup> and eight low/very low quality studies<sup>10,25,34,39,56,65,68,69</sup> reported vascular disease as non-significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><b>Evidence for measures of circulation (e.g. skin circulation, pulse pressure, ankle-brachial pulse index, etc.) as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>Three low quality studies<sup>32,35,59</sup> reported measures of circulation as significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=1,458)<sup>27</sup> skin circulation was non-significant in a multivariable analysis (OR 1.02, 95% CI 0.83 to 1.25). (Level 1 prognostic, high quality)</li> <li>Six low/very low quality studies<sup>25,35,56,59,68,69</sup> reported measures of circulation as non-significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><b>Evidence for blood pressure as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=200),<sup>71</sup> lower diastolic blood pressure was significant factor for an increased risk of pressure injuries in a multivariable analysis (OR not reported). (Level 1 prognostic, moderate quality)</li> <li>Ten low/very low quality studies<sup>24,26,40,43,55,56,69,72-74</sup> reported alterations to blood pressure (low systolic blood pressure) as significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p>
	N/A	Very low	Low	Moderate	High								
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
	Is there important uncertainty about how much people value the main outcomes?	<table style="width: 100%; text-align: center;"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A								
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How substantial are the desirable anticipated effects?	<table style="width: 100%; text-align: center;"> <tr> <td>N/A</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
N/A	Not substantial	Probably not substantial	Probably substantial	Substantial									
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How substantial are the undesirable anticipated effects?	<table style="width: 100%; text-align: center;"> <tr> <td>N/A</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
N/A	Not substantial	Probably not substantial	Probably substantial	Substantial									
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
Do the desirable effects outweigh the undesirable effects?	<table style="width: 100%; text-align: center;"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
No	Probably No	Uncertain	Probably Yes	Yes	N/A								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								

CRITERIA	JUDGEMENTS (WHERE APPLICABLE) N/A – PROGNOSTIC DATA	RESEARCH EVIDENCE	
		<ul style="list-style-type: none"> <li>• In older adults (n=200),<sup>71</sup> systolic blood pressure was non-significant in multivariable analysis. <i>(Level 1 prognostic, moderate quality)</i></li> <li>• Nine low/very low quality studies<sup>10,15,26,35,39,40,46,65,75</sup> reported alterations to blood pressure as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Evidence for edema as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• One low quality study<sup>59</sup> reported edema as significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• In individuals in critical care or having surgery (n=463),<sup>29</sup> pitting edema was non-significant in a multivariable analysis. <i>(Level 1 prognostic, moderate quality)</i></li> <li>• Two low quality studies<sup>9,10</sup> reported edema as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Evidence for smoking as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• In individuals in acute care (n=253),<sup>45</sup> smoking was significant risk factor for pressure injuries in a multivariable analysis. <i>(Level 1 prognostic, moderate quality)</i></li> <li>• Two low/very low quality studies<sup>46,64</sup> reported smoking as significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• Three low/very low quality study<sup>10,68,76</sup> reported smoking as non-significant in multivariable analyses. <i>(Level 3 prognostic)</i></li> </ul> <p><b>Strength of Evidence: B1 Level 1 studies of moderate or low quality providing direct evidence</b></p>	

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	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Feasibility of perfusion and circulation variables is dependent on the measure being considered and the health professional's experience and accessibility to resources (e.g. blood testing, equipment). ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Of 34 prognostic studies which included a perfusion/circulation variable in multivariable modelling, 22 (64.7%) reported one or more perfusion and circulation variables as significant including three moderate quality Level 1 studies. <sup>29,45,71</sup> and 19 low quality <sup>23,24,26,31,32,35,40,43,46,55,56,59,64,65,68,69,72-74</sup> Level 3 studies. Twelve prognostic studies reported no variables of perfusion and circulation to be significant in multivariable analyses including one high quality Level 1 study, <sup>27</sup> three moderate quality Level 3 studies <sup>8,12,70</sup> and eight low/very low quality Level 3 studies. <sup>9,10,15,25,34,39,75,76</sup> Inconsistencies in the evidence are likely related to the variation in outcome measures that were reported.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.9 Consider the impact of oxygenation deficits on the risk of pressure injuries.**

**Option:** N/A **Background:** Oxygenation factors are associated with the susceptibility and tolerance of the skin, with consideration given to the potential impact upon individual physiology and repair; and transport and thermal properties.  
**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p><b>Evidence for mechanical ventilation as a prognostic factor for pressure injuries in adults</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals who were ventilated for more than 48 hours (n=216), having a length of stay on mechanical ventilation &gt;20 days was a significant risk factor for pressure injuries in a multivariable analysis (OR 7.225, 95% CI 2.461 to 21.207).<sup>66</sup> (Level 3 prognostic, low quality)</li> <li>In individuals in ICU (n=2306), mechanical ventilation for ≥72 hours was a significant risk factor for pressure injuries in a multivariable analysis (OR 23.604, 95% CI 6.427 to 86.668).<sup>69</sup> (Level 3 prognostic, low quality)</li> <li>In individuals in ICU (n=9,605), mechanical ventilation during first 24 hours was a significant risk factor for pressure injuries in a multivariable analysis (HR 2.14, 95% CI 1.37 to 3.34).<sup>65</sup> (Level 3 prognostic, low quality)</li> <li>In individuals in ICU (n=299), time on mechanical ventilation was a significant risk factor for pressure injuries in a multivariable analysis (OR 1.042, 95% CI 1.005 to 1.080).<sup>77</sup> (Level 3 prognostic, very low quality)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in ICU (n=463), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>29</sup> (Level 1 prognostic, moderate quality)</li> <li>In individuals in ICU (n=698), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>59</sup> (Level 3 prognostic, low quality)</li> <li>In individuals in ICU (n=104), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR 0.51, 95% CI 0.16 to 1.60).<sup>48</sup> (Level 3 prognostic, very low quality)</li> <li>In individuals in ICU (n=299), days on mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>77</sup> (Level 3 prognostic, very low quality)</li> <li>In individuals in ICU (n=84), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>34</sup> (Level 3 prognostic, low quality)</li> </ul> <p><b>Evidence for oxygen use as a prognostic factor for pressure injuries in adults</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in community, aged care and non-surgical acute care (n=1567), using oxygen was a significant risk factor for pressure injuries in a multivariable analysis (OR 3.9458, 95% CI 2.0569 to 7.5692).<sup>9</sup> (Level 3 prognostic, low quality)</li> </ul> <p><b>Evidence for respiratory disease as a prognostic factor for pressure injuries in adults</b></p> <p><i>Significant</i></p> <ul style="list-style-type: none"> <li>In individuals in acute care and ICU (n=306),<sup>73</sup> having a history of pulmonary disease was a significant risk factor for</li> </ul>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE	
			<p>pressure injuries in a multivariable analysis (OR 2.37, 95% CI 1.07-5.24). (<i>Level 3 prognostic, very low quality</i>)</p> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• In individuals in community, aged care and non-surgical acute care (n=1567), abnormal breath sounds and total respiratory impairments were both non-significant risk factors for pressure injuries in a multivariable analysis (OR not reported).<sup>9</sup> (<i>Level 3 prognostic, low quality</i>)</li> <li>• In a trauma center (n=141), pulmonary complication was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>44</sup> (<i>Level 3 prognostic, low quality</i>)</li> <li>• In individuals with spinal cord injury in acute care (n=226), pulmonary disease was a non-significant risk factor for pressure injuries in a multivariable analysis (hazard ratio 0.0629).<sup>19</sup> (<i>Level 3 prognostic, moderate quality</i>)</li> </ul> <p><b>Strength of Evidence: C – mixed evidence</b></p>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Feasibility of oxygenation variables is dependent on the measure being considered and the health professional's experience and accessibility to resources (e.g. blood testing, equipment). ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Of 12 prognostic studies that included an oxygenation variable in multivariable modelling, six of the studies <sup>9,65,66,69,73,77</sup> reported that a measure of oxygenation was significant. All these six studies were Level 3 low/very low prognostic studies. <sup>9,65,66,69,73,77</sup> The other studies, including a moderate quality Level one study <sup>29</sup> and five moderate and low/very low Level 3 studies, <sup>9,34,44,48,59</sup> reported an oxygenation variable to be non-significant. The outcome measures varied, with some representing more long term oxygenation impairment and others representing short and medium term deficits, and studies demonstrating significance tended to have larger sample sizes.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.10 Consider at the impact of impaired nutritional status on the risk of pressure injuries.**

**Option:** N/A **Background:** Nutritional deficits may the susceptibility and tolerance of the individual by impacting on one or more of the following: transport and thermal properties, physiology and repair and the geometry (morphology) and mechanical properties of the tissues. There are a range of ways in which nutritional limitations can be measured.

**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</p> <p><b>Evidence for food intake as a prognostic factor for pressure injuries</b>  <b>Significant factors</b></p> <ul style="list-style-type: none"> <li>In older adults (n=200),<sup>71</sup> protein intake as a percent of recommended daily allowance was significant in a multivariable analysis (OR not reported). (Level 1, moderate quality)</li> <li>In older adults (n=672),<sup>42</sup> having received a nutrition intervention was significant in a multivariable analysis (OR 1.6, 95% CI 1.0-2.4). (Level 1, moderate quality)</li> <li>One high quality<sup>1</sup> and four low/very low quality studies,<sup>17,31,75,78</sup> reported measures of food intake (e.g., feeding ability, having impaired food intake, receiving extra nutrition, enteral feeding for more than seven days) were significant in multivariable analyses. (Level 3)</li> </ul> <p><b>Non-significant factors</b></p> <ul style="list-style-type: none"> <li>In older adults (n=1,458),<sup>27</sup> amount of fluid intake were reported as non-significant in a multivariable analysis. (Level 1, high quality)</li> <li>In older adults (n=200),<sup>71</sup> and in acute care (n=399),<sup>37</sup> caloric intake as a percent of recommended daily allowance<sup>71</sup> and having an inadequate food intake<sup>37</sup> were reported as non-significant in a multivariable analysis. (Level 1, moderate quality)</li> <li>Six low/very low studies<sup>9,16,23,59,79,80</sup> reported measures of food intake (e.g., mode of feeding, willingness to accept nutrition intervention, being dependent for feeding) as non-significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><b>Evidence for malnutrition as a prognostic factor for pressure injuries</b>  <b>Significant factors</b></p> <ul style="list-style-type: none"> <li>In adults in chronic care (n=2,771),<sup>54</sup> being malnourished was a significant factor in a multivariable analysis (OR 1.69, 95% CI 1.31-2.19). (Level 3 prognostic, high quality)</li> </ul> <p><b>Non-significant factors</b></p> <ul style="list-style-type: none"> <li>Two low<sup>10,81</sup> studies reported malnutrition as non-significant in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><b>Evidence for arm measurements as a prognostic factor for pressure injuries</b>  <b>Significant factors</b></p> <ul style="list-style-type: none"> <li>In individuals in acute care (n=187),<sup>24</sup> skin fold thickness was a significant factor in a multivariable analysis (OR 1.29, 95% CI 1.02-1.64). (Level 3 prognostic, low quality)</li> </ul> <p><b>Non-significant factors</b></p> <ul style="list-style-type: none"> <li>Two low quality studies<sup>30,80</sup> reported arm circumference and tricep skin folds were significant factors in multivariable analyses. (Level 3 prognostic, low quality)</li> </ul>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

### **Evidence for weight as a prognostic factor for pressure injuries**

#### *Significant factors*

- Four low/very low quality studies<sup>15,30,55,72</sup> reported low weight and weight loss were significant factors in multivariable analyses (OR/RR ranged from 0.29 to 2.18). (*Level 3 prognostic*)

#### *Non-significant factors*

- In older adults (n=200),<sup>71</sup> weight was a non-significant factor in a multivariable analysis. (*Level 1 prognostic, moderate quality*)
- Eight low/very low quality studies<sup>14,16,35,43,59,77,82,83</sup> reported weight was a non-significant factor in multivariable analyses. (*Level 3 prognostic*)

### **Evidence for body mass index (BMI) as a prognostic factor for pressure injuries**

#### *Significant factors*

- In individuals in acute and surgical care (n=413),<sup>62</sup> less body mass was a significant factor in a multivariable analysis (OR 0.91, 95% CI 0.85 to 0.98). (*Level 1 prognostic, high quality*)
- One moderate quality<sup>63</sup> and two low/very low quality studies<sup>39,79</sup> reported low<sup>39,63</sup> and very high<sup>79</sup> BMI were significant factors in multivariable analyses. (*Level 3 prognostic*)

#### *Non-significant factors*

- In older adults (n=1,458),<sup>27</sup> BMI was a non-significant factor in a multivariable analysis (OR 1.04, 95% CI 0.89 to 1.20). (*Level 1 prognostic, high quality*)
- One high quality<sup>1</sup>, one moderate quality<sup>12</sup> and ten low/very low quality studies<sup>15,22,26,38,59,68,74-76,80</sup> reported BMI was a non-significant factor in multivariable analyses. (*Level 3 prognostic*)

### **Evidence for nutrition assessment scales as a prognostic factor for pressure injuries**

#### *Significant factors*

- In hospitalized adults (n=170),<sup>80</sup> rating on the Subjective Global Nutritional Assessment of at risk or malnourished was a significant factor in a multivariable analysis (OR 1.579, 95% CI 1.221-2.042). (*Level 3 prognostic, low quality*)

#### *Non-significant factors*

- In adults in acute care (n=1,190),<sup>11</sup> the Braden nutrition scale was non-significant in multivariable analyses. (*Level 1 prognostic, high quality*)
- In older adults (n=1,458),<sup>27</sup> Braden Scale nutrition sub-scale score was not a significant factor in a multivariable analysis (OR 0.81, 95% CI 0.65 to 1.02). (*Level 1 prognostic, high quality*)
- In a mixed acute care setting (n=1971),<sup>28</sup> Braden Scale nutrition sub-scale score was not a significant factor in a multivariable analysis (OR not reported). (*Level 1 prognostic, high quality*)
- One moderate quality study,<sup>12</sup> and 12 low/very low quality<sup>13-16,18,20,22,24-26,41,80</sup> studies reported the Braden nutrition scale, the Norton nutrition scale and the RAPs food intake scale as non-significant in multivariable analyses. (*Level 3 prognostic*)

### **Evidence for other measures of nutrition status as a prognostic factor for pressure injuries**

#### *Significant factors*

- Two very low quality studies<sup>21,84</sup> reported having an abnormal body build for height and being referred to a dietitian were significant factors in multivariable analyses (OR ranged from 0.47 to 7.352) (*Level 3, very low quality*)

#### *Non-significant factors*

- Seven low/very low quality studies<sup>16,38,40,49,59,82,83</sup> reported other measures of nutritional status as non-significant factors in multivariable analyses. (*Level 3*)

**Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic**

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Screening nutritional status is usually feasible in most clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	<p>A total of 50 prognostic studies explored the relationship between one or more nutrition related variable and pressure injury development. In only 20 (40%) studies including three of high quality (Level 1 and 3),<sup>1,54,62</sup> three of moderate quality (Level 1 and 3),<sup>42,63,71</sup> and 14 of low/very low quality (all Level 3)<sup>15,17,21,24,30,31,39,55,72,75,78-80,84</sup> was a nutritional variable reported as a significant predictor in multivariable modelling.</p> <p>In 30 studies no measure of nutrition was found to be a significant risk factor. This included three high<sup>11,27,28</sup> and one moderate<sup>37</sup> Level 1 studies and one moderate<sup>12</sup> and 25 low/very low<sup>9,10,13,14,16,18,20,22,23,25,26,35,38,40,41,43,49,59,68,74,76,77,81-83</sup> Level 3 studies. There are a number of limitations associated with measures used to estimate nutritional status and study quality.</p>				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.12 Consider the impact of increased body temperature on the risk of pressure injuries.**

**Option:** N/A  
**Comparison:** N/A

**Background:** Body temperature may impact upon the susceptibility and tolerance of the skin by affecting physiology and repair; and transport and thermal properties. Increased body temperature increases metabolic demands on tissues making them less tolerant to pressure and shear forces.

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<table border="0"> <tr> <td>N/A</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Very low	Low	Moderate	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p><i>Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</i></p> <p><b>Evidence for body temperature as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• In older adults (n=200),<sup>71</sup> a higher temperature was significant in a multivariable analysis (OR not reported). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>• In individuals in critical care (n=463),<sup>29</sup> high body temperature (<math>\geq 38.5^{\circ}\text{C}</math>) had a negative association with pressure injuries in a multivariable analysis (OR 0.18, 95% CI 0.18-0.92). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>• In individuals in critical care (n=253),<sup>45</sup> a body temperature above <math>37.4^{\circ}\text{C}</math> was significant in a multivariable analysis (OR 2.0, 95% CI 1.7-2.5). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>• One moderate<sup>85</sup> and four low/very low<sup>5,41,46,47</sup> studies reported body temperature was a significant factor in a multivariable analysis. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• Four low/very low studies<sup>18,26,68,78</sup> reported body temperature was a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence</b></p>
	N/A	Very low	Low	Moderate	High								
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>									
How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td>N/A</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
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N/A	Not substantial	Probably not substantial	Probably substantial	Substantial									
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
Do the desirable effects outweigh the undesirable effects?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
No	Probably No	Uncertain	Probably Yes	Yes	N/A								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Measuring body temperature is feasible in most clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Seven of 12 studies (58.3%) reported that raised body temperature is a prognostic factor for pressure injuries in multivariable modelling. Two moderate quality level 1 studies, <sup>45,71</sup> a moderate quality Level 3 study <sup>85</sup> and four low/very low Level 3 studies <sup>5,41,46,47</sup> found body temperature to be a risk factor in multivariable modelling. The odds ratios for higher body temperature ranged from 1.44 <sup>47</sup> to 8.45. <sup>85</sup> Conversely, a moderate quality Level 1 study <sup>29</sup> reported a significant negative association between high body temperature ( $\geq 38.5^{\circ}\text{C}$ ) and pressure injuries in multivariable modelling. The remaining four studies, all low quality Level 3 <sup>18,26,68,78</sup> reported body temperature as a nonsignificant prognostic factor.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.11 Consider the potential impact of moist skin on the risk of pressure injuries.**

**Option:** N/A  
**Comparison:** N/A

**Background:** Excess moisture may impact both the mechanical boundary condition (type and effect of load) and the susceptibility and tolerance of the skin (mechanical properties of the tissues). There are a range of different ways in which presence of moisture of the skin can be measured.

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/> Very low <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High <input type="checkbox"/>	* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.  <b>Evidence for skin moisture as a prognostic factor for pressure injuries</b> <i>Significant factors</i> <ul style="list-style-type: none"> <li>In individuals undergoing neurosurgery (n=277),<sup>85</sup> presence of increased perspiration was a significant factor in a multivariable analysis. (Level 3, moderate quality)</li> <li>Three low quality studies<sup>9,46,59</sup> reported measures of skin moisture were significant in multivariable analyses. (Level 3, low quality)</li> </ul> <i>Non-significant factors</i> <ul style="list-style-type: none"> <li>In individuals in acute care (n=399),<sup>37</sup> being constantly moist was non-significant in a multivariable analysis. (Level 1, moderate quality)</li> <li>In individuals in acute care (n=320),<sup>22</sup> moisture from extreme sweating was non-significant in a multivariable analysis. (Level 3, low quality)</li> </ul>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/> Possibly important uncertainty or variability <input type="checkbox"/> Probably no important uncertainty or variability <input type="checkbox"/> No important uncertainty or variability <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	<b>Evidence for moisture subscale on a risk assessment tool as a prognostic factor for pressure injuries</b> <i>Significant factors</i> <ul style="list-style-type: none"> <li>Two moderate quality<sup>12,19</sup> and three low/very low quality studies<sup>13,22,25</sup> reported moisture subscales on a risk assessment tool (Braden and SCIPUS) were significant factors in multivariable analyses. (Level 3)</li> </ul> <i>Non-significant factors</i> <ul style="list-style-type: none"> <li>In individuals in acute care (n=1,190),<sup>11</sup> the Braden moisture subscale was a non-significant factor in a multivariable analysis. (Level 1, high quality)</li> <li>In older adults (n=1,458),<sup>27</sup> the Braden moisture subscale was a non-significant factor in a multivariable analysis. (Level 1, high quality)</li> <li>Six low/very low quality studies<sup>9,14,16,18,20,26</sup> reported the Braden moisture subscale was a non-significant factor in a multivariable analysis. (Level 3 prognostic)</li> </ul>
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/>	<b>Evidence for dual incontinence as a prognostic factor for pressure injuries</b> <i>Significant factors</i> <ul style="list-style-type: none"> <li>In older adults (n=5,518),<sup>2</sup> dual incontinence was a significant factor in a multivariable analysis (RR 1.56, 95% CI 1.24-1.96). (Level 3, moderate quality)</li> <li>Two low quality studies<sup>9,26</sup> reported dual incontinence was a significant factor in multivariable analyses. (Level 3 prognostic)</li> </ul> <i>Non-significant factors</i> <ul style="list-style-type: none"> <li>In older adults (n=1,938),<sup>36</sup> dual incontinence was a non-significant factor in a multivariable analysis. (Level 1, moderate quality)</li> </ul>
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/> Probably No <input type="checkbox"/> Uncertain <input type="checkbox"/> Probably Yes <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	

CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE	
		<ul style="list-style-type: none"> <li>• In individual in acute care (n=291),<sup>25</sup> any incontinence was a non-significant factor in a multivariable analysis. (<i>Level 3, low quality</i>)</li> </ul> <p><b>Evidence for urinary incontinence as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• In older adults (n=235),<sup>26</sup> urinary incontinence was a significant factor in multivariable analyses (OR 0.243, 95% CI 0.09-0.64). (<i>Level 3, low quality</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• In older adults (n=1,938),<sup>36</sup> urinary incontinence was a non-significant factor in multivariable analysis. (<i>Level 1, moderate quality</i>)</li> <li>• One high quality,<sup>1</sup> one moderate quality<sup>19</sup> and three low quality studies<sup>9,10,22</sup> reported urinary incontinence was a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Evidence for fecal incontinence as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• One high quality<sup>1</sup> and three very low quality studies<sup>7,58,64</sup> reported that fecal incontinence was a significant factor in a multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• In older adults (n=1,938),<sup>36</sup> fecal incontinence was a non-significant factor in a multivariable analysis (HR 1.39, 95% CI 0.90 to 2.15). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>• One high quality study,<sup>54</sup> and seven low quality studies<sup>10,22,30,35,39,43,46</sup> reported fecal incontinence was a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Evidence for unspecified incontinence as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• In individuals in acute care (n=187),<sup>24</sup> unspecified incontinence was a significant factor in multivariable analysis (OR 2.19, 95% CI 1.68-2.86). (<i>Level 3 prognostic, low quality</i>)</li> <li>• In individuals with hip fracture requiring surgery (n=1,083),<sup>3</sup> wearing a diaper was a significant factor in multivariable analysis (OR 1.55, 95% CI 0.98-2.467). (<i>Level 3 prognostic, low quality</i>)</li> </ul> <p><i>Non-significant factors</i></p> <p>None reported</p> <p><b>Evidence for urinary catheter in situ as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>• In hospitalized individuals (n=2,771),<sup>54</sup> urinary catheter in situ was a significant factor in multivariable analysis (OR 1.55, 95% CI 1.38-1.75). (<i>Level 3 prognostic, high quality</i>)</li> <li>• In individuals with hip fracture requiring surgery (n=1,083),<sup>3</sup> urinary catheter in situ was a significant factor in multivariable analysis (OR 1.013, 95% CI 1.008-1.018). (<i>Level 3 prognostic, low quality</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• Three low quality studies<sup>31,41,59</sup> reported urinary catheter in situ was non-significant in multivariable analyses. (<i>Level 3</i>)</li> </ul> <p><b>Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic</b></p>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Assessing moisture is usually feasible in most clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	<p>Of a total of 33 prognostic studies that included one or more measures of moisture in a multivariable analysis of pressure injury risk factors, 18 studies (54.5%) reported a measure of moisture as significant in multivariable analysis including two high,<sup>1,54</sup> four moderate,<sup>2,12,19,85</sup> and 12 low/very low quality<sup>3,7,9,13,22,24-26,46,58,59,64</sup> Level 3 studies. The reported factors included various measures related to incontinence or catheterization, moisture and assessment on a moisture subscale of a risk assessment tool.</p> <p>In 15 studies no measure of moisture was found to be significant. This included two high quality<sup>11,27</sup> and two moderate quality<sup>36,37</sup> Level 1 studies and 11 low/very low quality studies<sup>10,14,16,18,20,30,31,35,39,41,43</sup> Level 3 studies.</p> <p>The conflicting findings on the prognostic value of measures of moisture could relate to the diverse range of study participants, differences in methodology and the range of variables included in the modelling i.e. urinary incontinence, fecal incontinence, dual incontinence, other incontinence, urinary catheter, skin moisture, moisture subscales.</p>				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.12 Consider the impact of increased body temperature on the risk of pressure injuries.**

**Option:** N/A  
**Comparison:** N/A

**Background:** Body temperature may impact upon the susceptibility and tolerance of the skin by affecting physiology and repair; and transport and thermal properties. Increased body temperature increases metabolic demands on tissues making them less tolerant to pressure and shear forces.

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<table border="0"> <tr> <td>N/A</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Very low	Low	Moderate	High	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p><i>Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</i></p> <p><b>Evidence for body temperature as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=200),<sup>71</sup> a higher temperature was significant in a multivariable analysis (OR not reported). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>In individuals in critical care (n=463),<sup>29</sup> high body temperature (<math>\geq 38.5^{\circ}\text{C}</math>) had a negative association with pressure injuries in a multivariable analysis (OR 0.18, 95% CI 0.18-0.92). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>In individuals in critical care (n=253),<sup>45</sup> a body temperature above <math>37.4^{\circ}\text{C}</math> was significant in a multivariable analysis (OR 2.0, 95% CI 1.7-2.5). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>One moderate<sup>85</sup> and four low/very low<sup>5,41,46,47</sup> studies reported body temperature was a significant factor in a multivariable analysis. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>Four low/very low studies<sup>18,26,68,78</sup> reported body temperature was a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence</b></p>
	N/A	Very low	Low	Moderate	High								
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	N/A								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>									
How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td>N/A</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
N/A	Not substantial	Probably not substantial	Probably substantial	Substantial									
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
How substantial are the undesirable anticipated effects?	<table border="0"> <tr> <td>N/A</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	N/A	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
N/A	Not substantial	Probably not substantial	Probably substantial	Substantial									
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
Do the desirable effects outweigh the undesirable effects?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>N/A</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
No	Probably No	Uncertain	Probably Yes	Yes	N/A								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Measuring body temperature is feasible in most clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Seven of 12 studies (58.3%) reported that raised body temperature is a prognostic factor for pressure injuries in multivariable modelling. Two moderate quality level 1 studies, <sup>45,71</sup> a moderate quality Level 3 study <sup>85</sup> and four low/very low Level 3 studies <sup>5,41,46,47</sup> found body temperature to be a risk factor in multivariable modelling. The odds ratios for higher body temperature ranged from 1.44 <sup>47</sup> to 8.45. <sup>85</sup> Conversely, a moderate quality Level 1 study <sup>29</sup> reported a significant negative association between high body temperature ( $\geq 38.5^{\circ}\text{C}$ ) and pressure injuries in multivariable modelling. The remaining four studies, all low quality Level 3 <sup>18,26,68,78</sup> reported body temperature as a nonsignificant prognostic factor.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.13 Consider the potential impact of older age on the risk of pressure injuries.**

**Option:** N/A **Background:** Older age is associated with a number of factors such as immobility, poor skin status, nutritional deficits etc. and therefore may impact upon both the mechanical boundary conditions and all four components of susceptibility and tolerance of the skin (see *Figure 1*).  
**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</p> <p><b>Evidence for age as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in a mixed acute care setting (1,971),<sup>28</sup> older age was a significant factor in a multivariable analysis (OR 1.02, 95% CI 1.002 to 1.04). (<i>Level 1 prognostic, high quality</i>)</li> <li>In individuals in a mixed acute care setting (413),<sup>62</sup> older age was a significant factor in a multivariable analysis (OR 1.05, 95% CI 1.03 to 1.08). (<i>Level 1 prognostic, high quality</i>)</li> <li>In individuals in a range of settings (n=843),<sup>86</sup> older age was a significant factor in a multivariable analysis (OR 0.97, 95% CI 0.95-0.98). (<i>Level 1 prognostic, high quality</i>)</li> <li>In individuals in acute care (n=1,190),<sup>11</sup> being aged 60-69 years, 70-79 years and 80-89 years were all significant factors in a multivariable analysis (RH 1.5-3.8). (<i>Level 1 prognostic, high quality</i>)</li> <li>In older adults (n=200),<sup>71</sup> age was a significant factor in a multivariable analysis (OR not reported). (<i>Level 1 prognostic, moderate quality</i>)</li> <li>Two moderate quality studies<sup>2,87</sup> and 13 low/very low quality studies<sup>3,15,22,26,34,64,65,75,77,80,84,88,89</sup> reported older age as a significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in critical care (n=399),<sup>37</sup> age was a non-significant factor in a multivariable analysis. (<i>Level 1 prognostic, moderate quality</i>)</li> <li>In older adults (n=1,938),<sup>36</sup> age was a non-significant factor in a multivariable analysis. (<i>Level 1 prognostic, moderate quality</i>)</li> <li>In older adults (n=1,458),<sup>27</sup> age was a non-significant factor in a multivariable analysis. (<i>Level 1 prognostic, high quality</i>)</li> <li>One high quality study,<sup>1</sup> two moderate quality studies<sup>12,63</sup> and 25 low/very low quality studies<sup>4,9,14,16,25,30,31,35,36,39,48,55,56,59,66,68,72,74,76,78,82,83,90-92</sup> reported age was a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic</b></p>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Identifying individuals of advancing age is feasible in all clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	<p>In total, 51 prognostic studies included age as a factor in multivariable analyses. Of these, 19 studies (37.3%) reported that increasing age was significant prognostic factor for pressure injuries. Studies that reported a significant relationship included four high quality Level 1 studies,<sup>11,28,62,86</sup> and one moderate quality Level 1 study.<sup>71</sup> Two moderate<sup>2,87</sup> and 12 low/very low studies<sup>3,15,22,34,64,65,75,77,80,84,88,89</sup> supported the findings. Conversely, one low quality Level 3 study<sup>26</sup> reported a significant negative association between increased age and pressure injuries in multivariable models. The remaining 31 studies reported age as a non-significant factor including one was a high quality Level 1 study<sup>27</sup> and two were moderate quality Level 1 studies.<sup>36,37</sup> and one high quality,<sup>1</sup> two moderate quality,<sup>12,63</sup> and 28 low/very low quality.<sup>4,9,14,16,25,30,31,35,36,39,48,55,56,59,66,68,72,74,76,78,82,83,90-92</sup> Level 3 studies. The studies used either categorical or continuous measures of age and were conducted in a range of different populations.</p>				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.14 Consider the potential impact of impaired sensory perception on the risk of pressure injuries.**

**Option:** N/A  
**Comparison:** N/A

**Background:** Sensory perception may impact mechanical boundary conditions (magnitude/duration/type of load).

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</p> <p><b>Evidence for sensory perception subscale on the Braden scale as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=1,458),<sup>27</sup> the Braden sensory perception subscale score was a significant factor in a multivariable analysis. (<i>Level 1 prognostic, high quality</i>)</li> <li>One moderate quality<sup>12</sup> and two low/very low quality studies<sup>21,22</sup> reported the Braden sensory perception subscale score was a significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals in acute care (n=1,190),<sup>11</sup> the Braden sensory perception subscale was a non-significant factor in a multivariable analysis. (<i>Level 1 prognostic, high quality</i>)</li> <li>Seven low/very low quality studies<sup>13,14,16,20,23,25,26</sup> reported the Braden sensory perception subscale was a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic</b></p>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Identifying deficits to sensory perception is usually feasible in most clinical settings, but health professionals require appropriate skills and knowledge to undertake an assessment. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it	Weak negative recommendation: Probably don't do it	No specific recommendation	Weak positive recommendation: Probably do it	Strong positive recommendation: Definitely do it
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>Justification</b>	Of the 12 prognostic studies that included sensory perception as a factor in multivariable analyses, only four (25%) reported that this measure was a significant factor in the model including one high quality Level 1 study, <sup>27</sup> and one moderate quality <sup>12</sup> and two low/very low quality <sup>21,22</sup> Level 3 studies. The remaining eight studies consisted of a high quality <sup>11</sup> Level 1 study and low/very low <sup>13,14,16,20,23,25,26</sup> Level 3 studies. All studies used the Braden Scale sensory perception subscale to measure this variable.				

**Clinical question** What factors put individuals at risk for pressure injury development?

**Recommendation 1.15 Consider the potential impact of laboratory blood test results on the risk of pressure injuries.**

**Option:** N/A **Background:** Sensory perception may impact mechanical boundary conditions (magnitude/duration/type of load).  
**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p>* Due to the volume of supportive evidence, details are only provided for Level 1 studies. The volume and quality of Level 2 and Level 3 evidence is summarized.</p> <p><b>Evidence for lymphopenia as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>Two low quality studies<sup>24,30</sup> in hospitalized individuals reported lymphopenia was a significant factor in a multivariable analysis. (Level 3 prognostic, low quality)</li> </ul> <p><i>Non-significant factors</i>                      None reported</p> <p><b>Evidence for albumin level as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=672),<sup>42</sup> hypoalbuminemia was a significant factor in a multivariable analysis (RR 1.05, 95% CI 1.02-1.07). (Level 1 prognostic, moderate quality)</li> <li>One high quality<sup>54</sup> and five low/very low quality studies<sup>17,55,58,80,88</sup> reported albumin level was a significant factor in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In older adults (n=200),<sup>71</sup> serum albumin was a non-significant factor in a multivariable analysis. (Level 1 prognostic, moderate quality)</li> <li>One moderate quality<sup>19</sup> and five low/very low quality studies<sup>14,15,38,67,78</sup> reported albumin level was a non-significant factor in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><b>Evidence for hemoglobin level as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In hospitalized individuals (n=1,971),<sup>28</sup> hemoglobin on admission (or pre-operatively) was a significant factor in a multivariable analysis (OR 0.89, 95% CI 0.82 to 0.97). (Level 1 prognostic, high quality)</li> <li>Eight low/very low quality studies<sup>9,24,35,40,57,64,78,88</sup> reported the hemoglobin level was a significant factor in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>One moderate quality<sup>87</sup> and six low/very low quality studies<sup>32,55,67,68,75,80</sup> reported hemoglobin level was a non-significant factor in multivariable analyses. (Level 3 prognostic)</li> </ul> <p><b>Evidence for urea and electrolytes as a prognostic factor for pressure injuries</b>  <i>Significant factors</i></p>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE	
		<ul style="list-style-type: none"> <li>• In individuals in critical care (n=226),<sup>19</sup> serum creatinine was a significant factor in a multivariable analysis. (<i>Level 3 prognostic, moderate quality</i>)</li> <li>• In individuals in critical care (n=170),<sup>80</sup> urea was a significant factor in a multivariable analysis (OR 1.926, 95% CI 1.542-2.406). (<i>Level 3 prognostic, low quality</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>• Three low/very low studies<sup>31,32,80</sup> reported urea and electrolytes as a non-significant factor in multivariable analyses. (<i>Level 3 prognostic</i>)</li> </ul> <p><b>Evidence for C-reactive protein as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <p>In hospitalized individuals (n=149),<sup>88</sup> C-reactive protein was a significant factor in a multivariable analysis. (<i>Level 3 prognostic, low quality</i>)</p> <p><i>Non-significant factors</i></p> <p>Two low/very low quality studies<sup>6,58</sup> reported C-reactive protein was a non-significant factor in a multivariable analysis. (<i>Level 3 prognostic, low quality</i>)</p> <p><b>Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic</b></p>	

(c) EPUAP/NPIAP/PPPIA not for reproduction

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td>Not clear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> <td>Varies</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
No	Probably No	Uncertain	Probably Yes	Yes	Varies											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Accessing blood test results is not always feasible. ( <i>Expert opinion</i> )	
No	Probably No	Uncertain	Probably Yes	Yes	Varies											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input checked="" type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Twenty-eight prognostic studies included one or more blood test variables in their multivariable model. Of these studies, 17 (60.7%) reported a variable as significant in the model, including one high quality <sup>28</sup> and one moderate quality <sup>42</sup> Level 1 prognostic studies and one high quality, <sup>54</sup> one moderate quality <sup>19</sup> and thirteen low/very low Level 3 <sup>9,17,24,30,35,40,55,57,58,64,78,80,88</sup> prognostic studies. The largest body of evidence relates to albumin and hemoglobin. The remaining 11 studies, including one moderate quality level 1 prognostic study <sup>71</sup> and one moderate <sup>87</sup> and nine low/very low quality <sup>6,14,15,31,32,38,67,68,75</sup> Level 3 prognostic studies did not find any variable to be important in multivariable modelling.				

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**Clinical question**      What factors put individuals at risk for pressure injury development?

**Good Practice Statement 1.16**      **Consider the potential impact of general and mental health status on pressure injury risk.**

**Background:**      At an individual level, general health and mental health status may impact upon both the mechanical boundary conditions and all four components of the susceptibility and tolerance of the skin.

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**SUPPORTING EVIDENCE, WHEN AVAILABLE**

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**Evidence to support the opinion (when available)**      A number of indicators could be considered for general health and mental health. The following indicators are available:

- Chronic wounds: 50 % of studies 2 significant<sup>28</sup>
- Medication: 35% of studies 20 significant<sup>9,29,57,63,69,73,79</sup>
- Norton measures: 0% of 3studies significant<sup>11,18,27</sup>
- Infection: 44.4% of studies 9 significant<sup>8,44,48,83</sup>
- Length of hospital stay: 28.5% of 14 studies significant<sup>15,24,38,56</sup>
- Overall general health measures: 40% of studies 10 significant<sup>3,4,28,29,37,41,54,56,58,62,64,65,69,73,89,91</sup>
- Health scales: 50% of studies significant<sup>4,63,75,77,91</sup>
- Mental status study specific outcome measures:18.2% of studies 12 significant<sup>7,54</sup>
- Mental status subscale of a risk tool: 20% of studies 5 significant<sup>11</sup>

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**Justification**      The literature demonstrates moderate association between some measures of general health status and a very weak association between mental health status. It is suggested that general health and mental health status are confounding factors and general indicators of likely deficits in the main areas of risk including mobility/activity, skin status and perfusion, nutrition, skin moisture and sensory perception.

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**Clinical question** What are the unique pressure injury risk factors to consider for individuals in the operating room?

**Recommendation 1.17 Consider the impact of time spent immobilized before surgery, the duration of surgery and the American Society of Anesthesiologists (ASA) Physical Status Classification on surgery-related pressure injury risk.**

**Option:** N/A **Background:** During surgery, the individual is immobilized primarily in one position for the duration of the surgery. This places pressure on some anatomical areas for the extent of the surgery. It is feasible that longer surgery duration could increase pressure injury risk. The duration of time before surgery is performed on individuals (e.g., those with hip fracture) is a feasible risk factor because delayed surgery increases the time in which an individual is immobile.<sup>93</sup> The ASA classification is a feasible risk factor as it provides an indication as to the clinical status of an individual undergoing surgery.

**Comparison:** N/A

	CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<p><b>Evidence for duration of surgery as a prognostic factor for pressure injuries in adults</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In adults in intensive care who had undergone surgery (n=3,225), total operating time was one of seven significant risk factors for a Category/Stage I or greater pressure injury (multivariate logistic regression model, odds ratio [OR] 1.07, 95% CI 1.03 to 1.11, p&lt;0.001)<sup>63</sup> (Level 3 prognostic, low quality)</li> <li>In adults undergoing spinal surgery (n=209), surgery duration over 300 minutes was one of five significant risk factors for a Category/Stage I or greater pressure injury (logistic regression model, OR 8.12, p=0.005).<sup>49</sup> (Level 3 prognostic, low quality)</li> <li>In adults undergoing neurosurgery (n=277), surgery duration over 360 minutes/core temperature &gt;38.1°C as a composite factor was one of two significant risk factors for a Category/Stage I or greater pressure injury (logistic stepwise regression model, OR 8.45, 95% CI 3.04 to 27.46 p&lt;0.001).<sup>85</sup> (Level 3 prognostic, low quality)</li> <li>In adults undergoing surgery (n=208), surgery duration was the only significant risk factors for a Category/Stage II or greater pressure injury (logistic regression model, OR 1.00061, 95% CI 1.0037 to 1.0087.<sup>81</sup> (Level 3 prognostic, low quality)</li> <li>In adults undergoing urology surgery (n=538), duration of anesthesia was one of two significant risk factors for a Category/Stage I pressure injury (binary logistic regression, OR 1.005, 95% CI 1.000 to 1.010, p=0.038).<sup>74</sup> (Level 3 prognostic, low quality)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In individuals undergoing surgery (n=175), maximum time on operating room table was a non-significant factor in a multivariable analysis.<sup>68</sup> (Level 2 prognostic, low quality)</li> <li>One moderate quality<sup>63</sup> and four low/very low quality studies<sup>38,67,74,85</sup> reported measures of surgery duration were non-significant factor in a multivariable analysis. (Level 3 prognostic)</li> </ul> <p><b>Evidence for duration of surgery as a prognostic factor for pressure injuries in adults and children</b></p> <ul style="list-style-type: none"> <li>In adults and children undergoing cardiac surgery (n=286), surgery duration was one of two significant risk factors for a Category/Stage I or greater pressure injury (logistic regression, OR 1.005, 95% CI 1.000 to 2.022, p=0.036).<sup>94</sup> (Level 3 prognostic, low quality)</li> </ul> <p><b>Strength of Evidence: B2 - Level 3 or 4 studies (regardless of quality) providing direct evidence</b></p> <p><b>Evidence for duration of time immobilized before surgery as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In adults undergoing surgery (n=658), time to surgery of more than 24 hours was a one of four significant risk factors for</li> </ul>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	

CRITERIA	JUDGEMENTS (WHERE APPLICABLE)	RESEARCH EVIDENCE	
		<p>Category/Stage II or greater pressure injuries (OR 1.64, 95% CI 1.26 to 2.14, p&lt;0.001).<sup>38</sup> (<i>Level 1 prognostic, moderate quality</i>)</p> <ul style="list-style-type: none"> <li>In adults undergoing hip fracture surgery (n=722), time to surgery of more than 12 hours was a one of five significant risk factors for Category/Stage II or greater pressure injuries (logistic regression, OR 1.7, 95% CI 1.2 to 2.6, p=0.008).<sup>8</sup> (<i>Level 3 prognostic, moderate quality</i>)</li> <li>In adults undergoing surgery (n=1,2566), time to surgery (within 5 days vs more than 5 days) was a one of seven significant risk factors for Category/Stage II or greater pressure injuries.<sup>12</sup> (<i>Level 3 prognostic, moderate quality</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>A moderate quality study (n=126) showed time between emergency department arrival and surgery was a non-significant factor in a multivariable analysis.<sup>87</sup> (<i>Level 3</i>)</li> </ul> <p><b>Association between time immobilized and pressure injuries</b></p> <ul style="list-style-type: none"> <li>In adults undergoing spinal surgery (n=112), individuals having surgery within 24 hours had significantly fewer pressure injuries than those with delayed surgery (2.4% versus 8.6%, p&lt;0.05).<sup>95</sup> (<i>Level 3, low quality</i>)</li> <li>In adults requiring hip fracture surgery (n=208,936), delay in having surgery was associated with a higher rate of pressure injuries than having surgery within two days of admission (1.6% versus 1%, p&lt;0.001).<sup>96</sup> (<i>Level 3, low quality</i>)</li> </ul> <p><b>Strength of Evidence: B2 - Level 3 or 4 studies (regardless of quality) providing direct evidence</b></p> <p><b>Evidence for ASA Classification as a prognostic factor for pressure injuries</b></p> <p><i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In adults undergoing hip fracture surgery (n=722), ASA Classification of III or IV was one of five significant risk factors for Category/Stage II or greater pressure injuries (logistic regression, OR 4.2, 95% CI 2.9 to 6.1, p=0.001).<sup>8</sup> (<i>Level 3 prognostic, moderate quality</i>)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In adults undergoing hip fracture surgery (n=239), ASA Classification was not a significant risk factors for Category/Stage II or greater pressure injuries.<sup>10</sup> (<i>Level 2 prognostic, low quality</i>)</li> </ul> <p><b>Strength of Evidence: B2 Level 3 or 4 studies (regardless of quality) providing direct evidence</b></p>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about pressure injury risk factors as an important or very important topic. <sup>52</sup> The survey did not specifically ask about risk factors in the operating room setting. <sup>51,52</sup> ( <i>Level 5</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Conducting a pressure injury risk assessment prior to surgery is feasible in all clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	<p>Six low quality Level 3 prognostics studies<sup>49,63,74,81,85,94</sup> reported multivariable analyses that found the duration of surgery to be a significant prognostic factor for development of a Category/Stage I or greater pressure injury in adults. The studies reported that risk of developing a pressure injury was up to eight times greater risk for surgeries of longer duration.<sup>85</sup> Studies with higher odds ratio used categorical outcome of surgery over 5 or 6 hours in duration,<sup>49,85</sup> and studies with lower odds ratio used surgery/anesthesia length as a continuous outcome measure.<sup>63,74,81,94</sup> One additional low quality Level 3 prognostic study<sup>94</sup> conducted with both adults and children also found surgery duration was a significant risk factor. Although one low quality Level 2 study<sup>68</sup> and five moderate<sup>63</sup> and low/very quality Level 3 studies<sup>38,47,67,74</sup> found duration of surgery was not significant, these studies were generally smaller than those with significant findings.</p> <p>Six low quality Level 3 prognostics studies<sup>49,63,74,81,85,94</sup> reported multivariable analyses that found the duration of surgery to be a significant prognostic factor for development of a Category/Stage I or greater pressure injury in a adult. The studies reported that risk of developing a pressure injury was up to eight times greater risk for surgeries of longer duration.<sup>85</sup> Studies with higher odds ratio used categorical outcome of surgery over 5 or 6 hours in duration,<sup>49,85</sup> and studies with lower odds ratio used surgery/anesthesia length as a continuous outcome measure.<sup>63,74,81,94</sup> One additional low quality Level 3 prognostic study<sup>94</sup> conducted with both adults and children also found surgery duration was a significant risk factor. Although one low quality Level 2 study<sup>68</sup> and five moderate<sup>63</sup> and low/very quality Level 3 studies<sup>38,47,67,74</sup> found duration of surgery was not significant, these studies were generally smaller than those with significant findings.</p> <p>One moderate quality Level 3 prognostic study<sup>8</sup> reported that the individual's classification on the ASA (American Society of Anaesthesiologists) Physical Status Classification System was a significant risk factor for development of a pressure injury following surgery. Individuals with a Classification of III (severe systemic disease) or IV (severe systemic disease that is a constant threat to life) on the ASA were more than four times more likely to develop a pressure injury. A smaller, low quality Level 2 study<sup>10</sup> found ASA Classifications of II, III or IV were not associated with significantly higher pressure injury risk.</p>				

**Clinical question** What are the unique pressure injury risk factors to consider for individuals in critical care?

**Good Practice Statement**  
1.18

**Consider the following as additional risk factors for the development pressure injuries in critically ill individuals:**

- **Duration of critical care stay**
- **Mechanical ventilation**
- **Use of vasopressors**
- **Acute Physiology and Chronic Health Evaluation (APACHE II) score.**

**Background:** Length of stay in intensive care unit (ICU) is a proxy indicator of length of time immobilized and disease severity.

Mechanical ventilation is an outcome measure of perfusion and circulation. Presence of mechanical ventilation may also increase risk of medical device related pressure injuries.

Acute Physiology and Chronic Health Evaluation (APACHE II) score is a disease severity score applied within 24 hours of admission to the intensive care unit (ICU). It includes a range of physiological measurements factors that may be associated with the susceptibility and tolerance of the skin, impact upon individual physiology and repair; and transport and thermal properties.

#### SUPPORTING EVIDENCE, WHEN AVAILABLE

**Evidence to support the opinion (when available)**

**Evidence for length of ICU admission as a prognostic factor for pressure injuries in adults**

*Significant factors*

- In individuals in ICU (n=140), length of ICU was a significant factor for pressure injuries in a multivariable analysis (OR 1.2, 95% CI 1.1 to 1.3).<sup>6</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=150), length of ICU was a significant factor for pressure injuries in a multivariable analysis (OR 1.1, 95% CI 1.1 to 1.2).<sup>83</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=351), days of hospitalization in ICU was a significant factor for pressure injuries in a multivariable analysis (OR 1.14, 95% CI 1.08 to 1.20).<sup>97</sup> (Level 3 prognostic, very low quality)
- In individuals in ICU (n=160), length of ICU was a significant factor for pressure injuries in a multivariable analysis (OR 1.12, 95% CI 1.043 to 1.202).<sup>91</sup> (Level 3 prognostic, very low quality)
- In individuals in ICU (n=144), length of ICU was a significant factor for pressure injuries in a multivariable analysis (OR not reported).<sup>82</sup> (Level 3 prognostic, very low quality)
- In individuals in ICU (n=352), length of ICU was a significant factor for pressure injuries in a multivariable analysis (OR 1.19, 95% CI 1.13 to 1.25).<sup>64</sup> (Level 3 prognostic, very low quality)

In individuals in ICU (n=84), length of ICU was a significant factor for pressure injuries in a multivariable analysis (OR 1.831, 95% CI 1.014 to 3.309).<sup>34</sup> (Level 3 prognostic, low quality) *Non-significant factors*

- In individuals in ICU (n=77), length of stay in ICU was reported as non-significant in a multivariable analysis.<sup>70</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=698), duration of ICU stay was reported as non-significant in a multivariable analysis.<sup>59</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=149), length of stay in ICU was reported as non-significant in a multivariable analysis.<sup>39</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=208), number of days in ICU was reported as non-significant in a multivariable analysis.<sup>81</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=163), length of stay in ICU was reported as non-significant in a multivariable analysis.<sup>57</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=299), length of stay was reported as non-significant in a multivariable analysis.<sup>77</sup> (Level 3 prognostic, very low quality)

**Evidence to support the opinion (when available)**

**Evidence for mechanical ventilation as a prognostic factor for pressure injuries in adults**

*Significant factors*

- In individuals in ICU who were ventilated for more than 48 hours (n=216), having a length of stay on mechanical ventilation >20 days was a significant risk factor for pressure injuries in a multivariable analysis (OR 7.225, 95% CI 2.461 to 21.207).<sup>66</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=2306), mechanical ventilation for ≥72 hours was a significant risk factor for pressure injuries in a multivariable analysis (OR 23.604, 95% CI 6.427 to 86.668).<sup>69</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=9,605), mechanical ventilation during first 24 hours was a significant risk factor for pressure injuries in a multivariable analysis (HR 2.14, 95% CI 1.37 to 3.34).<sup>65</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=299), time on mechanical ventilation was a significant risk factor for pressure injuries in a multivariable analysis (OR 1.042, 95% CI 1.005 to 1.080).<sup>77</sup> (Level 3 prognostic, very low quality)

*Non-significant factors*

- In individuals in ICU (n=463), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>29</sup> (Level 1 prognostic, moderate quality)
- In individuals in ICU (n=698), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>59</sup> (Level 3 prognostic, low quality)
- In individuals in ICU (n=104), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR 0.51, 95% CI 0.16 to 1.60).<sup>48</sup> (Level 3 prognostic, very low quality)
- In individuals in ICU (n=299), days on mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>77</sup> (Level 3 prognostic, very low quality)
- In individuals in ICU (n=84), mechanical ventilation was a non-significant risk factor for pressure injuries in a multivariable analysis (OR not reported).<sup>34</sup> (Level 3 prognostic, low quality)

**Evidence for length of ICU admission as a prognostic factor for pressure injuries in adults**

*Significant factors*

- In individuals in acute care and ICU (n=150), APACHE II score was a significant risk factor for pressure injuries in a multivariable analysis (OR 1.06, 95% CI 1.0 to 1.12).<sup>83</sup> (Level 3 prognostic, low quality)
- In individuals in acute care and ICU (n=351), APACHE II score above 50 was a significant risk factor for pressure injuries in a multivariable analysis (OR 16.19, 95% CI 7.16 to 36.61).<sup>97</sup> (Level 3 prognostic, very low quality)

*Non-significant factors*

- In individuals in acute care and ICU (n=463), APACHE II score was a non-significant risk factor for pressure injuries in a multivariable analysis.<sup>29</sup> (Level 1 prognostic, moderate quality)
- In individuals in acute care and ICU (n=698), APACHE II score was a non-significant risk factor for pressure injuries in a multivariable analysis.<sup>59</sup> (Level 3 prognostic, low quality)
- In individuals in acute care and ICU (n=144), APACHE II score was a non-significant risk factor for pressure injuries in a multivariable analysis.<sup>82</sup> (Level 3 prognostic, very low quality)

**Justification**

Five studies<sup>29,59,82,83,97</sup> included APACHE II score as a potential risk factor for pressure injuries in a multivariable analysis. Two of these studies, low<sup>83</sup> and very low<sup>97</sup> Level 3 studies, found the APACHE II score was a significant prognostic factor, with OR ranging from 1.06 to 16.19. However, a moderate quality level 1 study<sup>29</sup> and low<sup>59</sup> and very low<sup>82</sup> Level 3 studies found the APACHE II score was not a significant prognostic factor for pressure injuries in critically ill individuals.

Length of ICU stay was included in 13 multivariable analyses. Seven (53.8% of studies) Level 3 studies of low<sup>6,34,83</sup> and very low<sup>64,82,91,97</sup> quality found that length of time in the ICU was a significant risk factor for development of pressure injuries. The studies reported OR between 1.1 and 1.831. However, five low<sup>39,57,59,70,81</sup> and one very low<sup>77</sup> quality Level 3 studies found ICU duration to be non-significant.

Eight studies included mechanical ventilation in a multivariable analysis. Of these, four Level 3 prognostic studies<sup>65,66,69,77</sup> of low or very low quality reported mechanical ventilation was a significant risk factor, with odds ratio ranging from 1.042 to 23.604. However, one moderate quality Level 1 study<sup>29</sup> and four low and very low quality Level 3 studies<sup>34,48,59,77</sup> found mechanical ventilation was not a significant risk factor.

**Clinical question** What are the unique pressure injury risk factors to consider for neonates and children?

**Recommendation 1.19 Consider the impact of skin maturity, perfusion and oxygenation, and presence of a medical device on pressure injury risk in neonates and children.**

**Option:** Considering these factors in a risk assessment  
**Comparison:** N/A

**Background:** Early recognition of risk factors is the precursor to planning preventive care. The pediatric population is at risk of pressure ulcers due to inherent differences in their anatomical characteristics compared to adults.

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	N/A <input checked="" type="checkbox"/> Very low <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High <input type="checkbox"/>	<p><b>Evidence for skin texture/maturity as a risk factor</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In neonates (mean gestational age 32.5 weeks gestation) in neonatal intensive care (n=81), skin texture immaturity emerged as a significant risk factor for pressure injuries in multivariate analysis (odds ratio [OR] 7.6, 95% CI 1.58 to 36.71, p=0.012).<sup>98</sup> (Level 1 prognostic, moderate quality)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In neonates (mean gestational age 32.5 weeks gestation) in neonatal intensive care (n=81), birthweight was a non-significant factor in a multivariable analysis.<sup>98</sup> (Level 1 prognostic, moderate quality)</li> <li>In children admitted to intensive care (n=5,346), being aged two years or less was a non-significant factor in a multivariable analysis.<sup>99</sup> (Level 3 prognostic, moderate quality)</li> </ul> <p><b>Evidence for respiratory support as a risk factor</b>  <i>Significant factors</i></p> <ul style="list-style-type: none"> <li>In neonates (mean gestational age 32.5 weeks gestation) in neonatal intensive care (n=81), endotracheal intubation emerged as a significant risk factor in multivariate analysis (OR 4.0, 95% CI 1.04 to 15.42, p=0.047).<sup>98</sup> (Level 1 prognostic, moderate quality)</li> <li>In children admitted to intensive care (n=5,346), bilevel or CPAP OR 2.004, 95% CI 1.509 to 2.661, p&lt;0.001).<sup>99</sup> (Level 3 prognostic, moderate quality)</li> <li>In children admitted to intensive care (n=5,346), mechanical ventilation emerged as a significant risk factor in multivariate analysis (OR 1.334, 95% CI 1.031 to 1.726, p=0.03).<sup>99</sup> (Level 3 prognostic, moderate quality)</li> <li>In children admitted to intensive care (n=5,346), high frequency oscillatory ventilation emerged as a significant risk factor in multivariate analysis (OR 2.057, 95% CI 1.208 to 5.134, p=0.01).<sup>99</sup> (Level 3 prognostic, moderate quality)</li> <li>In children admitted to intensive care (n=5,346), extracorporeal membrane oxygenation emerged as a significant risk factor in multivariate analysis (OR 2.490, 95% CI 1.208 to 5.134, p=0.01).<sup>99</sup> (Level 3 prognostic, moderate quality)</li> </ul> <p><i>Non-significant factors</i></p> <ul style="list-style-type: none"> <li>In neonates (mean gestational age 32.5 weeks gestation) in neonatal intensive care (n=81), strategies for respiratory support (nasal CPAP and DPAP) were non-significant in a multivariable analysis.<sup>98</sup> (Level 1 prognostic, moderate quality)</li> </ul> <p><b>Strength of evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence</b></p>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/> Possibly important uncertainty or variability <input type="checkbox"/> Probably no important uncertainty or variability <input type="checkbox"/> No important uncertainty or variability <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/> Probably No <input type="checkbox"/> Uncertain <input type="checkbox"/> Probably Yes <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about factors that might increase their risk of pressure injury as an important or very important topic. <sup>52</sup> The survey did not specifically ask about risk factors in children and neonates. <sup>51,52</sup> ( <i>Indirect evidence</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Conducting a pressure injury risk assessment is feasible in all clinical settings. ( <i>Expert opinion</i> )	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											

<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input checked="" type="checkbox"/>
<b>Justification</b>	Evidence from a high quality Level 1 prognostic study <sup>98</sup> indicated that skin texture/maturity is a risk factor for pressure injuries in neonates. Two moderate quality studies providing Level 1 <sup>98</sup> and Level 3 <sup>99</sup> evidence indicated that birth weight was not a significant risk factor for either neonates <sup>98</sup> or children. <sup>99</sup> Evidence from a moderate quality Level 1 prognostic study <sup>98</sup> and a moderate quality Level 3 prognostic study <sup>99</sup> demonstrated in multivariate analyses the significance of measures of perfusion and oxygenation as a risk factor for pressure injuries in children. The outcome measures for oxygenation and perfusion included the presence of a wide range of oxygen delivery systems, which also increase pressure injury risk due to presence of medical devices. <sup>99</sup>				

**Clinical question** What are the unique pressure injury risk factors to consider for neonates and children?

**Recommendation 1.20 Consider the impact of illness severity and the duration of critical care unit stay on pressure injury risk in neonates and children.**

**Option:** Considering severity of illness and admission duration as a risk factor  
**Comparison:** N/A

**Background:** Early recognition of risk factors is the precursor to planning preventive care. The pediatric population is at risk of pressure ulcers due to inherent differences in their anatomical characteristics compared to adults.

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE PRACTICE	What is the overall certainty of the evidence?	N/A <input checked="" type="checkbox"/>   Very low <input type="checkbox"/>   Low <input type="checkbox"/>   Moderate <input type="checkbox"/>   High <input type="checkbox"/>	<b>Evidence for severity of illness as a risk factor</b> <ul style="list-style-type: none"> <li>In children admitted to intensive care (n=5,346), Pediatric Index of Mortality 2 score emerged as a significant risk factor in multivariate analysis for pressure injuries (OR 1.132, 95% CI 1.055 to 1.215, p&lt;0.001).<sup>99</sup> (Level 3 prognostic, moderate quality)</li> </ul>
	Is there important uncertainty about how much people value the main outcomes?	Important uncertainty or variability <input type="checkbox"/>   Possibly important uncertainty or variability <input type="checkbox"/>   Probably no important uncertainty or variability <input type="checkbox"/>   No important uncertainty or variability <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	
	How substantial are the desirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	How substantial are the undesirable anticipated effects?	N/A <input checked="" type="checkbox"/>   Not substantial <input type="checkbox"/>   Probably not substantial <input type="checkbox"/>   Probably substantial <input type="checkbox"/>   Substantial <input type="checkbox"/>	
	Do the desirable effects outweigh the undesirable effects?	No <input type="checkbox"/>   Probably No <input type="checkbox"/>   Uncertain <input type="checkbox"/>   Probably Yes <input type="checkbox"/>   Yes <input type="checkbox"/>   N/A <input checked="" type="checkbox"/>	<b>Strength of evidence: B2 -Level 1 or 2 studies of low quality providing direct evidence, Level 3 or 4 studies (regardless of quality) providing direct evidence</b>

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>										
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>									
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In an international consumer survey, 85.51% of patients (n=383) and of 87.32% informal caregivers (n=850) identified knowing more about factors that might increase their risk of pressure injury as an important or very important topic. <sup>52</sup> The survey did not specifically ask about risk factors in children and neonates. <sup>51,52</sup> ( <i>Indirect evidence</i> )
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>										
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Conducting a pressure injury risk assessment is feasible in all clinical settings. ( <i>Expert opinion</i> )
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
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<b>Balance of consequences</b>	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>
<b>Strength of recommendation</b>	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
<b>Justification</b>	Evidence from a moderate quality Level 3 prognostic study <sup>99</sup> demonstrated in multivariate analyses the significance of severity of illness and duration of hospital stay as risk factors for pressure injuries in children and neonates.				

**Clinical question** What are accurate and effective methods for pressure injury risk assessment?

**Good Practice Statement 1.21**

**Conduct a pressure injury risk screening as soon as possible after admission to the care service and periodically thereafter to identify individuals at risk of developing pressure injuries.**

**Background:** Risk assessment is undertaken to identify individuals at risk of pressure injuries so an individualized prevention plan can be initiated. Assessment can be organized into two stages, screening to identify individuals who are at risk of getting a pressure injury, followed by a full pressure injury risk assessment in those individuals screened as at risk.

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support opinion (when available)**

One national clinical guideline<sup>100</sup> and one study exploring development of a pressure injury risk tool<sup>101</sup> suggested that risk factors including mobility or activity limitations and measures of impaired skin status (especially the presence of a Category/ Stage I pressure injury are appropriate measures for screening pressure injury risk (*Expert opinion*).

**Justification**

Due to the burden and impact of pressure injury development on both the individual and the health service, it is accepted practice that risk assessment should be undertaken on individuals, with the aim of identifying those who are at potential risk, in order that individualized preventive interventions can be planned.

**Clinical question** What are accurate and effective methods for pressure injury risk assessment?

**Good Practice Statement 1.22**

**Conduct a full pressure injury risk assessment as guided by the screening outcome after admission and after any change in status.**

**Background:** Risk assessment is undertaken to identify individuals at risk of pressure injuries so an individualized prevention plan can be initiated. Assessment can be organized into two stages, screening to identify individuals who are at risk of getting a pressure injury, followed by a full pressure injury risk assessment in those individuals screened as at risk.

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support opinion (when available)**

One national clinical guideline<sup>100</sup> and one study exploring development of a pressure injury risk tool<sup>101</sup> suggested that risk factors including mobility or activity limitations and measures of impaired skin status (especially the presence of a Category/ Stage I pressure injury are appropriate measures for screening pressure injury risk (*Expert opinion*).

**Justification**

Due to the burden and impact of pressure injury development on both the individual and the health service, it is accepted practice that risk assessment should be undertaken on individuals, with the aim of identifying those who are at potential risk, in order that individualized preventive interventions can be planned.

**Clinical question** What are accurate and effective methods for pressure injury risk assessment?

**Good Practice 1.23 Develop and implement a risk-based prevention plan for individuals identified as being at risk of developing pressure injuries.**

**Background:** Risk assessment is undertaken to identify individuals at risk of pressure injuries so an individualized prevention plan can be initiated. Assessment can be organized into two stages, screening to identify individuals who are at risk of getting a pressure injury, followed by a full pressure injury risk assessment in those individuals screened as at risk.

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support opinion (when available)** One national clinical guideline<sup>100</sup> and one study exploring development of a pressure injury risk tool<sup>101</sup> suggested that risk factors including mobility or activity limitations and measures of impaired skin status (especially the presence of a Category/ Stage I pressure injury are appropriate measures for screening pressure injury risk (*Expert opinion*).

**Justification** Due to the burden and impact of pressure injury development on both the individual and the health service, it is accepted practice that risk assessment should be undertaken on individuals, with the aim of identifying those who are at potential risk, in order that individualized preventive interventions can be planned.

**Clinical question** What are accurate and effective methods for pressure injury risk assessment?

**Good Practice Statement**  
1.24

**When conducting a pressure injury risk assessment:**

- **Use a structured approach**
- **Include a comprehensive skin assessment**
- **Supplement use of a risk assessment tool with assessment of additional risk factors**
- **Interpret the assessment outcomes using clinical judgment**

**Background:** Risk assessment is undertaken to identify individuals at risk of pressure injuries so an individualized prevention plan can be initiated. Clinical judgement is as an overarching concept integrating all reasoning tasks and actions performed by health professionals to describe and assess a health condition of interest, and is a key ability of health professionals.

**SUPPORTING EVIDENCE, WHEN AVAILABLE**

**Evidence to support the opinion (when available)**

- Expert consensus<sup>102</sup> suggests that the approach be 'structured' in order to facilitate consideration of all relevant risk factors.
- A meta-analysis reported poor pooled predictive capacity indicators for clinical judgment alone (relative risk [RR] 1.95, 95% confidence interval [CI] 0.94 to 4.04).<sup>103</sup>
- A meta-analysis reported predictive capacity indicators for risk assessment tools ranging from RR 2.66 to RR 8.63.<sup>103</sup>
- A systematic reported that compared to risk assessment Waterlow Score for risk assessment was not significant different to using clinical judgment alone (pressure injuries of all stages: RR 1.10, 95% CI 0.68 to 1.81; 821 participants), or risk assessment using the Ramstadius tool (pressure injuries of all stages: RR 1.41, 95% CI 0.83 to 2.39; 821 participants).<sup>104</sup>

**Justification**

There is no universally agreed best approach for conducting a risk assessment; however, expert consensus<sup>102</sup> suggests that the approach be 'structured' in order to facilitate consideration of all relevant risk factors. Clinical judgment, which refers to the entirety of the health professional's diagnostic reasoning actions carried out to interpret and integrate available information on an individual's pressure injury risk, should be used in undertaking a comprehensive risk assessment. Risk assessment tools, which present structured approaches to risk assessment, can be used as a component of risk assessment, but clinical judgment is indivisibly inherent to any risk assessment task.

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