

## Supplementary Material S5: risk factor domain “susceptibility and tolerance of the individual”

**Table S3:** Summary of evidence for risk factor domains and subdomains: “susceptibility and tolerance of the individual”

Variables	Studies with <u>significant</u> variables in multivariate model Overall RoB, Study author, variable name		Studies with <u>non-significant</u> variables in multivariate model Overall RoB, Study author, variable name	
Domain 2: susceptibility and tolerance of the individual	Stage ≥ 1 PI	Stage ≥ 2 PI	Stage ≥ 1 PI	Stage ≥ 2 PI
Age	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>
41 Studies	Bergstrom (1996) Cox (2011) Cox (2020) Han (2018) Kim (2019) Latimer (2019) Perneger (2002) Rondinelli (2018) Strazzieri-Pulido (2018) Schultz (1999)	Manzano (2013) Nixon (2006) O'Brien et al. (2014) Ooi (1999)	Artico (2020) Defloor and Grypdonck (2005)	Cox (2011) Defloor and Grypdonck (2005)
25/42 Variables (60%)	<u>Moderate RoB</u> Aloweni (2019) Halfens (2000) Osis and Diccini (2020) Shaw (2014) Tsaras (2016)	<u>Moderate RoB</u> Bergstrom and Braden (1992) Vanderwee (2009)	<u>Moderate RoB</u> Chan (2005) González-Méndez (2018) Miller (2020) Tourtual (1997)	<u>Moderate RoB</u> Allman (1995) Baumgarten (2004) - ≥ 85y Bergquist and Frantz (1999) Compton (2008) De Laat (2007) Yatabe (2013)
	<u>High RoB</u> Chen (2018) Lannering (2016) Serpa (2020) Zarei (2019)	<u>High RoB</u>	<u>High RoB</u> Dukes (2018) Goodridge (1998) Magny (2017) Popow (2019)	<u>High RoB</u>
Sex	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>
25 Studies	Cox (2020) – male Han (2018) – female Kim (2019) – male Rondinelli (2018) – male	Brandeis (1994) – males in low incidence homes	Artico (2020) – male Bergstrom (1996) – female	
11/25 Variables (44%)	<u>Moderate RoB</u> Aloweni (2019) – female Forni (2018) – male	<u>Moderate RoB</u> Bergquist and Frantz (1999) – male Compton (2008) – male Okuwa (2006) – male Yatabe (2013) – male	<u>Moderate RoB</u> Chan (2005) González-Méndez (2018) – male Miller (2020) – male Shaw (2014) – male	<u>Moderate RoB</u> Baumgarten (2004) – male Manzano (2014)
	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u> Chen (2018) - female Dukes (2018) – male Goodridge (1998) Lannering (2016) – gender Magny (2017) Serpa (2020) – male	<u>High RoB</u>
Ethnic group	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>
	Bergstrom (1996) – white			Brandeis (1994) – white

6 Studies	<u>Moderate RoB</u>	<u>Moderate RoB</u> Baumgarten (2004) – black	<u>Moderate RoB</u> Aloweni (2019) – Chinese Chan (2005) Miller (2020) – white	<u>Moderate RoB</u>
2/6 Variables (33%)	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u>
Laboratory values	<u>Low RoB</u> Galivanche (2020) – high preoperative platelet count (>417) Rondinelli (2018) – LAPS 2 score	<u>Low RoB</u> Reed (2003) – low albumin level (<3 g/dl)	<u>Low RoB</u>	<u>Low RoB</u> Nixon (2006) – hemoglobin on admission or preoperatively (g/l)
21 Studies				
17/36 Variables (47%)	<u>Moderate RoB</u> Aloweni (2019) – anemia Miller (2020) – Hba1c (>7%), mean hemoglobin Tsaras (2016) – hematocrit	<u>Moderate RoB</u> Allman (1995) – lymphopenia Bergquist and Frantz (1999) – anemia	<u>Moderate RoB</u> Bergstrom and Braden (1992) – albumin Gao (2018) – preoperative hemoglobin Miller (2020) – mean albumin	<u>Moderate RoB</u> Bergstrom and Braden (1992) – albumin Compton (2008) – max. creatinine, max. blood glucose, max. c-reactive protein, min. thromboplastin time, max. serum bilirubin Manzano (2014) – albumin, anemia Okuwa (2006) – sodium level, hemoglobin level
	<u>High RoB</u> Bourdel Marchasson (2000) – 1 g/L albumin decrease Ek (1991) – Albumin Magny (2017) – 1 g/L albumin decrease Popow (2019) – low protein concentration Salzberg (1999) – serum creatinine Sternal (2016) – lowest recorded sodium concentration, haemoglobin at admission, lowest recorded haemoglobin level	<u>High RoB</u>	<u>High RoB</u> Chen (2018) – hyperlipidemia Magny (2017) – creatinine, hemoglobin Popow (2019) – high hemoglobin concentration Salzberg (1999) – Albumin	<u>High RoB</u>
Nutrition	<u>Low RoB</u> Cox (2020) – moderate to severe malnutrition (ICD 9 code)	<u>Low RoB</u> Brandeis (1994) – difficulty feeding itself in high incidence homes Reed (2003) – malnourished	<u>Low RoB</u> Artico (2020) – ESASr score lack of appetite, artificial nutritio Cox (2011) – Braden nutrition Defloor and Grypdonck (2005) – Braden nutrition, extra nutrients (protein supplements), fluid intake Nixon (2006) – Braden nutrition	<u>Low RoB</u> Cox (2011) – Braden nutrition Defloor and Grypdonck (2005) – Braden nutrition, extra nutrients (protein supplements), fluid intake
24 Studies				
15/37 Variables (41%)				

				Perneger (2002) – Braden dietary intake	
	<u>Moderate RoB</u> Bergstrom and Braden (1992) – protein (%RDA), iron (%RDA) Miller (2020) – Minimum Braden nutrition Tsaousi (2015) – MUST score, artificial diet	<u>Moderate RoB</u> Yatabe (2013) – MNA scale	<u>Moderate RoB</u> Miller (2020) – mean Braden nutrition, nothing by mouth, malnutrition status	<u>Moderate RoB</u> Anrys (2018) – Braden nutrition Bergquist and Frantz (1999) – ADL dependent feed Compton (2008) – parenteral nutrition De Laat (2007) – inadequate food intake Schoonhoven (2002) - malnutrition Vanderwee (2009) – Braden nutrition	
	<u>High RoB</u> Bourdel Marchasson (2000) – control vs. nutritional intervention Ek (1991) – Norton food intake Park and Park (2017) – nutrition consultation, gastrointestinal tube Serpa (2020) – moderate/high vs. without risk NRS 2002, severe malnutrition vs. low risk SGANS	<u>High RoB</u>	<u>High RoB</u> Lannering (2016) – MNA-SF reduced food intake Park and Park (2017) – nothing by mouth, malnutrition Serpa (2020) – low vs. without risk NRS 2002, moderate malnutrition vs. low risk SGANS, adequate/probably inadequate/ completely inadequate vs. excellent Braden nutrition Zarei (2019) – malnutrition	<u>High RoB</u> Compton (2008) – parenteral nutrition De Laat (2007) – inadequate food intake Schoonhoven (2002) - malnutrition Vanderwee (2009) – Braden nutrition	
Body temperature	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u>	
7 Studies	<u>Moderate RoB</u> Bergstrom and Braden (1992) – °F Suriadi (2008) – S.S. scale body temperature (≥ 37.4°C)	<u>Moderate RoB</u>	<u>Moderate RoB</u>	<u>Moderate RoB</u>	<u>Moderate RoB</u> Compton (2008) Vanderwee (2009)
3/7 Variables (43%)	<u>High RoB</u> Sternal (2016) – mean evening body temperature during hospitalization	<u>High RoB</u>	<u>High RoB</u> Ek (1987) – Norton body temperature Popow (2019) – higher temperature	<u>High RoB</u>	
Health status	<u>Low RoB</u> Artico (2020) – ESASr score pain Kim (2019) – previous falls Latimer (2019) – no. of comorbidities Strazzieri-Pulido (2018) – in palliative care Rondinelli (2018) – COPS 2 score	<u>Low RoB</u> Nixon (2006) – baseline wound O'Brien et al. (2014) – ASA class 4/5 Rademakers (2007) – ASA class 3/4	<u>Low RoB</u> Artico (2020) – KPS status >30 vs <30, ESASr score nausea/feeling sad/feeling nervous/lack of energy/overall wellbeing Cox (2011) – APACHE Defloor and Grypdonck (2005) – pain Galivanche (2020) – preoperative SIRS/ bleeding disorder	<u>Low RoB</u> Cox (2011) – APACHE Defloor and Grypdonck (2005) – pain Manzano (2013) – APACHE, SOFA score Nixon (2006) – vascular patients vs acute care patients	
29 Studies					
15/52 Variables (29%)					

				Han (2018) – pain Strazzieri-Pulido (2018) – exit condition death	
	<u>Moderate RoB</u> Aloweni (2019) – ASA grade ≥ 3 González-Méndez (2018) – Complications during stay, SAPS 3 severity Miličević (2012) – FIM score Miller (2020) – Charlson score	<u>Moderate RoB</u> Anrys (2018) – pressure area related pain	<u>Moderate RoB</u> Chan (2005) – secondary diagnosis, comorbidities Gao (2018) – intraoperative blood loss Miličević (2012) – ASIA scale completeness of lesion/level of injury, mode of trauma	<u>Moderate RoB</u> Bergquist and Frantz (1999) – unable to cough, abnormal breath sounds Compton (2008) – ICU mortality Manzano (2013) – diarrhea Manzano (2014) – APACHE	
	<u>High RoB</u> Park and Park (2017) – diarrhea	<u>High RoB</u>	<u>High RoB</u> Dukes (2018) – injury type, injury cause Lannering (2016) – no. of diagnoses Magny (2017) – Charlson score, CIRS score Park and Park (2017) – pain, hygiene management, weakness	<u>High RoB</u>	
Diagnosis	<u>Low RoB</u> Artico (2020) – cancer diagnosis vs other disease Cox (2020) – influenza Galivanche (2020) – urinary tract infection	<u>Low RoB</u> O'Brien et al. (2014) – history of renal failure	<u>Low RoB</u> Cox (2011) – infection Galivanche (2020) – renal failure, ascites, cachexia (>10% weight loss in 6 mo. before surgery), preoperative wound infection, postoperative superficial infection, postoperative deep infection Rondinelli (2018) – stroke	<u>Low RoB</u> Cox (2011) – infection O'Brien et al. (2014) – history of liver disease	
13 Studies					
8/24 Variables (33%)					
	<u>Moderate RoB</u> Osis and Diccini (2020) – moderate/severe TBI (GCS score)	<u>Moderate RoB</u>	<u>Moderate RoB</u> Aloweni (2019) – renal disease	<u>Moderate RoB</u>	
	<u>High RoB</u> Chen (2018) – SCI, ALS, Stroke Park and Park (2017) – renal failure	<u>High RoB</u>	<u>High RoB</u> Magny (2017) – cancer, stroke Park and Park (2017) – cancer Popow (2019) – oncological diagnosis Zarei (2019) – kidney failure	<u>High RoB</u>	
<u>Subdomain Skin/PI status</u>					
PI stage 1	<u>Low RoB</u>	<u>Low RoB</u> Nixon (2006) – baseline PI grade 1b Reed (2003) – PI stage 1	<u>Low RoB</u>	<u>Low RoB</u>	
4 Studies					
4/4 Variables (100%)	<u>Moderate RoB</u>	<u>Moderate RoB</u>	<u>Moderate RoB</u>	<u>Moderate RoB</u>	

			Allman (1995) – non-blanchable erythema of intact sacral skin Anrys (2018) – non-blanchable erythema at baseline			
		<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u>	
Existing/previous PI	<u>Low RoB</u> Defloor and Grypdonck (2005) – existing PI Galivanche (2020) – preoperative PI	<u>Low RoB</u> Defloor and Grypdonck (2005) – existing PI	<u>Low RoB</u> Defloor and Grypdonck (2005) – existing PI	<u>Low RoB</u>	<u>Low RoB</u> Nixon (2006) – existing PI	
8 Studies						
5/9 Variables (56%)						
	<u>Moderate RoB</u> Milićević (2012) – existing PI	<u>Moderate RoB</u> Baumgarten (2004) – PI on admission	<u>Moderate RoB</u> Tourtual (1997) – admitted with PI	<u>Moderate RoB</u> Allman (1995) – previous PI Anrys (2018) – previous PI		
	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u>		
General skin status	<u>Low RoB</u> Defloor and Grypdonck (2005) – skin condition (dry, macerated)	<u>Low RoB</u> Defloor and Grypdonck (2005) – skin condition (dry, macerated) Nixon (2006) – baseline skin trauma	<u>Low RoB</u>	<u>Low RoB</u>		
7 Studies						
11/17 Variables (68%)						
	<u>Moderate RoB</u>	<u>Moderate RoB</u> Allman (1995) – dry sacral skin Compton (2008) – edematous, mottled, reddened skin, centralized circulation	<u>Moderate RoB</u>	<u>Moderate RoB</u> Anrys (2018) – Dryness Bergquist and Frantz (1999) – Edema Compton (2008) – livid, hyperemic skin, cyanosis		
	<u>High RoB</u> Popow (2019) - Edema	<u>High RoB</u>	<u>High RoB</u> Park and Park (2017) – Edema	<u>High RoB</u>		
Moisture	<u>Low RoB</u>	<u>Low RoB</u>	<u>Low RoB</u> Defloor and Grypdonck (2005) – Braden moisture scale Perneger (2002) – Braden moisture scale Sardo (2018) – Braden moisture scale	<u>Low RoB</u> Defloor and Grypdonck (2005) – Braden moisture scale		
14 Studies						
8/20 Variables (40%)						
	<u>Moderate RoB</u> Halfens (2000) – moisture (urinary/fecal incontinence and sweat) Tourtual (1997) – Braden moisture scale Yoshimura (2016) – perspiration	<u>Moderate RoB</u> Bergquist and Frantz (1999) – Skin drainage Compton (2008) – moist skin Teschler (2012) – Braden moisture scale score 2 vs. 4, score 3 vs. 4	<u>Moderate RoB</u> Halfens (2000) – Braden moisture scale Miller (2020) – mean, minimum Braden moisture scale	<u>Moderate RoB</u> Anrys (2018) – Braden moisture scale Bergquist and Frantz (1999) – Braden moisture scale De Laat (2007) – constantly moist Teschler (2012) – Braden moisture scale score 1 vs. 4		

				Vanderwee (2009) – Braden moisture scale <u>High RoB</u>
	<u>High RoB</u> Salzberg (1999) – moisture	<u>High RoB</u>	<u>High RoB</u>	
Incontinence	<u>Low RoB</u>	<u>Low RoB</u> Brandeis (1994) – fecal incontinence in high incidence homes Ooi (1999) – dual incontinence	<u>Low RoB</u> Perneger (2002) – Norton incontinence	<u>Low RoB</u> Brandeis (1994) – urinary incontinence Reed (2003) – fecal incontinence
12 Studies				
4/12 Variables (33%)	<u>Moderate RoB</u>	<u>Moderate RoB</u> Bergquist and Frantz (1999) – bowel/bladder incontinence Vanderwee (2009) – urinary incontinence (decreases risk)	<u>Moderate RoB</u> Tourtual (1997) – any incontinence	<u>Moderate RoB</u> Allman (1995) – fecal incontinence Baumgarten (2004) – urinary incontinence, fecal incontinence, dual incontinence Bergquist and Frantz (1999) – urinary incontinence Vanderwee (2009) – fecal incontinence, dual incontinence
	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u> Park and Park (2017) – incontinence Popow (2019) – Norton incontinence Salzberg (1999) – urinary incontinence	<u>High RoB</u>
<u>Subdomain poor perfusion</u> Diagnosis related to oxygenation/circulation	<u>Low RoB</u> Artico (2020) – ESASr score shortness of breath Cox (2011) – cardiovascular disease Cox (2020) – cardiovascular disease, peripheral vascular disease, septic shock, pneumonia Galivanche (2020) – insulin- dependent diabetes, pre- and postoperative sepsis, postoperative pneumonia Schultz (1999) – Diabetes	<u>Low RoB</u> Brandeis (1994) – diabetes in high incidence home Cox (2011) – cardiovascular disease Nixon (2006) – Diabetes O'Brien et al. (2014) – history of congestive heart failure Ooi (1999) – Diabetes Rademakers (2007) – Diabetes	<u>Low RoB</u> Defloor and Grypdonck (2005) – skin circulation Galivanche (2020) – non-insulin dependent diabetes, congestive heart failure, low preoperative platelet count, myocardial infarction, pulmonary embolism Rondinelli (2018) – Diabetes	<u>Low RoB</u> Defloor and Grypdonck (2005) – skin circulation O'Brien et al. (2014) – history of diabetes
28 Studies				
27/59 Variables (46%)	<u>Moderate RoB</u> Aloweni (2019) – respiratory disease Boyle and Green (2001) – cardiovascular instability	<u>Moderate RoB</u> Okuwa (2006) – ABI Tescher (2012) – acute respiratory failure Vanderwee (2009) – cerebral vascular accident	<u>Moderate RoB</u> Aloweni (2019) – Diabetes, heart disease González-Méndez (2018) – Diabetes Miller (2020) – smoking history	<u>Moderate RoB</u> Compton (2008) – sepsis Vanderwee (2009) – Diabetes

	Suriadi (2008) – S.S. scale smoking		Tourtual (1997) – diagnosed with CHF, pulses	
	<u>High RoB</u> Magny (2017) – Diabetes, chronic coronary heart disease Zarei (2019) – Diabetes, smoking	<u>High RoB</u>	<u>High RoB</u> Chen (2018) – Diabetes, IHD, Asthma, COPD Magny (2017) – periphal vascular disease, heart valve disease, cardiac failure, COPD Popow (2019) – Diabetes, arteriosclerosis, vessel diagnosis, COPD, Asthma Salzberg (1999) – pulmonary disease Serpa (2020) – Diabetes	<u>High RoB</u>
Oxygenation/ventilation	<u>Low RoB</u> Kim (2019) – SpO <sub>2</sub> monitoring Strazzieri-Pulido (2018) – mechanical ventilation	<u>Low RoB</u> O'Brien et al. (2014) – existing airway	<u>Low RoB</u> Rondinelli (2018) – full code designation Sala (2020) – FiO <sub>2</sub> > 50%	<u>Low RoB</u>
11 Studies	<u>Moderate RoB</u> Gao (2018) – cardiopulmonary bypass (surgical)	<u>Moderate RoB</u> Bergquist and Frantz (1999) – oxygen use	<u>Moderate RoB</u> Shaw (2014) – heart-lung machine used	<u>Moderate RoB</u> Compton (2008) – min. PaCO <sub>2</sub> , min. arterial pH, mechanical ventilation
7/17 Variables (41%)	<u>High RoB</u> Park and Park (2017) – ventilators, tracheostomy tube	<u>High RoB</u>	<u>High RoB</u> Dukes (2018) – mechanical ventilation, lowest SpO <sub>2</sub> Park and Park (2017) – endotracheal tube, oxygen therapy	<u>High RoB</u>
Vasopressor	<u>Low RoB</u> Cox (2020) – norepinephrine	<u>Low RoB</u> Cox (2011) - norepinephrine	<u>Low RoB</u> Cox (2011) – norepinephrine, vasopressin Sala (2020) – vasopressor administered Strazzieri-Pulido (2018) – vasoactive drugs	<u>Low RoB</u> Cox (2011) – vasopressin O'Brien et al. (2014) – use of corticosteroid
10 Studies	<u>Moderate RoB</u> Osis and Diccini (2020) – noradrenaline use	<u>Moderate RoB</u>	<u>Moderate RoB</u>	<u>Moderate RoB</u> Compton (2008) – vasopressor therapy Schoonhoven (2002) – method of anesthesia (with or without vasoactive medication)
3/13 Variables (23%)	<u>High RoB</u>	<u>High RoB</u>	<u>High RoB</u> Dukes (2018) – vasoactive medication Park and Park (2017) – cardiac stimulants	<u>High RoB</u>

Blood pressure	<u>Low RoB</u> Aloweni (2019) – Hypertension Cox (2020) – Hypotension Sala (2020) – mean arterial pressure < 60mmHg	<u>Low RoB</u>	<u>Low RoB</u> Galivanche (2020) – Hypertension Sala (2020) – fluid bolus volume	<u>Low RoB</u> Cox (2011) – mean arterial pressure, systolic pressure, diastolic pressure
14 Studies	<u>Moderate RoB</u> Bergstrom and Braden (1992) – diastolic blood pressure	<u>Moderate RoB</u> Bergstrom and Braden (1992) – systolic blood pressure Vanderwee (2009) - Hypotension	<u>Moderate RoB</u>	<u>Moderate RoB</u> Compton (2008) – max. heart rate, invasive monitoring Vanderwee (2009) - Hypertension
10/24 Variables (42%)	<u>High RoB</u> Magny (2017) – atrial fibrillation Serpa (2020) – Hypertension Sternal (2016) – systolic blood pressure at admission, mean systolic blood pressure during hospitalization	<u>High RoB</u>	<u>High RoB</u> Chen (2018) – Hypertension Dukes (2018) – Highest systolic blood pressure, mean arterial pressure, average heart rate Magny (2017) – Hypertension Popow (2019) – Hypertension	<u>High RoB</u>

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PI, pressure injury; RoB, risk of bias