

# Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline

## Search Strategy



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## SEARCH STRATEGY

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### Purpose

The overall purpose of this international collaboration is to develop a third edition of *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline* (first published 2009, second edition published 2014). The first and second editions of the Guideline contain evidence-based recommendations for the prevention and treatment of pressure injuries<sup>1</sup> that could be used to guide decision making by health professionals and individuals throughout the world. These recommendations will be updated to reflect the current state of the science.

The methodology for this edition of the guideline is revised from 2014 to ensure current international standards in guideline development are addressed and the rigorous guideline development is maintained.

### Literature Search

A broad search strategy is conducted to identify all papers associated with pressure-injuries. This includes commentaries, qualitative research and quantitative research. The broad strategy identifies significant papers that do not include their research design in the methodology, key words or MESH classification, and includes important commentary that SWGs use for background information.

A sensitive search strategy was developed for the 2009 guideline and the same search is used for update editions. The search is made available on the guideline website alongside the methodology prior to each update when consultation commences.

The SWGs will be permitted to conduct additional focused searches to ensure the full depth and breadth of their topic area has been covered. Additional literature searches will be documented in full by the SWG members. SWG members are also permitted to identify additional literature that is important to the topic and meets inclusion criteria.

Full inclusion/exclusion criteria are reported in the *Guideline Methodology*.

### Databases

The GGG identified clinical questions to guide literature searches. The *Guideline Methodology*, available at the guideline website, outlines these questions in detail. To identify the scientific literature on pressure injury prevention and treatment, several electronic databases were consulted, including:

- AMED
- MEDLINE
- EMBASE
- Scopus
- The Cochrane Database of Systematic Reviews
- The Cochrane Central Register of Controlled Trials
- Health Technology Assessment

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<sup>1</sup> The term pressure injury is synonymous with the terms pressure ulcer and decubitous ulcer. Terminology varies in different geographic regions.

## Search Strategy 1: Pressure Injury Treatment

pressure ulcer OR pressure injury OR pressure injuries OR pressure ulcers OR pressure injury OR bed sore OR bed sores OR bedsore OR bedsores OR pressure sore OR pressure sores OR decubitus ulcer OR decubitus ulcers OR decubital ulcer OR decubital ulcers OR pressure ulcer[mesh]

AND

((((( (((((((("Randomized Controlled Trials as Topic"[Mesh] OR "Randomized Controlled Trial "[Publication Type])) OR ("Controlled Clinical Trials as Topic"[Mesh] OR "Controlled Clinical Trial "[Publication Type])) OR "Double-Blind Method"[Mesh]) ) OR "Cohort Studies"[Mesh]) OR ("Meta-Analysis "[Publication Type] OR "Meta-Analysis as Topic"[Mesh])) OR "Cross-Sectional Studies"[Mesh]) OR ("Practice Guidelines as Topic"[Mesh] OR "Practice Guideline "[Publication Type] OR "Guidelines as Topic"[Mesh])) OR "Guideline "[Publication Type] OR ("Consensus Development Conferences as Topic"[Mesh] OR "Consensus Development Conferences, NIH as Topic"[Mesh] OR "Consensus Development Conference, NIH "[Publication Type] OR "Consensus Development Conference "[Publication Type])) OR ("Multicenter Studies as Topic"[Mesh] OR "Multicenter Study "[Publication Type])) OR ("Evaluation Studies "[Publication Type] OR "Evaluation Studies as Topic"[Mesh])) OR "Follow-Up Studies"[Mesh] OR rct OR randomized controlled trial OR randomized controlled trials OR randomised controlled trial OR randomised controlled trials OR double blind OR double-blind OR random allocation OR cohort study OR cohort studies OR systematic review OR systematic reviews OR meta-analysis OR meta-analyses OR meta analysis OR meta analyses OR practice guideline OR practice guidelines OR guideline OR guidelines OR multicenter study OR multicenter studies OR multi-center study OR multi-center studies OR multi center study OR multi center studies OR evaluation study OR evaluation studies OR follow-up study OR follow-up studies OR follow up study OR follow up studies OR cochrane OR consensus development conference OR consensus development conferences OR case series OR controlled clinical trial OR controlled clinical trials OR systematic[sb]

NOT

((((( (((((((("Editorial "[Publication Type] OR "Addresses "[Publication Type] OR ("Bibliography "[Publication Type] OR "Bibliography as Topic"[Mesh])) OR "Biography "[Publication Type] OR "Dictionary "[Publication Type] OR ("Interviews as Topic"[Mesh] OR "Interview "[Publication Type])) OR "In Vitro "[Publication Type] OR "Lectures "[Publication Type] OR "Legal Cases "[Publication Type] OR ("Legislation "[Publication Type] OR "Legislation as Topic"[Mesh])) OR "News "[Publication Type] OR "Newspaper Article "[Publication Type] OR "Patient Education Handout "[Publication Type]

Limits: human only

## Search Strategy 2: Pressure Injury Prevention

("pressure ulcer"[MeSH Terms] OR pressure ulcer[Text Word] OR Pressure Ulcers[Text Word] OR "Ulcer Pressure"[Text Word] OR "Ulcers Pressure"[Text Word] OR Pressure Injury[Text Word] OR Bed Sores[Text Word] OR Bed Sore[Text Word] OR "Sore Bed"[Text Word] OR "Sores Bed"[Text Word] OR Bedsore[Text Word] OR Bedsores[Text Word] OR Decubitus Ulcer[Text Word] OR Decubitus Ulcers[Text Word] OR "Ulcer Decubitus"[Text Word] OR "Ulcers Decubitus"[Text Word] OR Pressure Sore[Text Word] OR Pressure Sores[Text Word] OR "Sore Pressure"[Text Word] OR "Sores Pressure"[Text Word] OR decubitus[Text Word]) AND (("risk"[MeSH Terms] OR risk[Text Word]) AND score[All Fields] OR ("skin"[MeSH Terms] OR skin[Text Word]) AND assessment[All Fields] AND ("weights and measures"[All Fields] OR "weights and measures"[MeSH Terms] OR scale[Text Word]) OR (("risk"[MeSH Terms] OR risk[Text Word]) AND calculator[All Fields]) OR "Risk Assessment"[MeSH] OR Risk assessment[Text Word] OR "Risk Assessments"[Text Word] OR Risk Assessments[Text Word] OR "Risk Assessment"[Text Word] OR Benefit-Risk Assessment[Text Word] OR "Benefit-Risk Assessment"[Text Word] OR "Benefit-Risk Assessments"[Text Word] OR Benefit Risk Assessment[Text Word] OR Benefit-Risk Assessments[Text Word] OR Risk-Benefit Assessment[Text Word] OR "Risk-Benefit Assessment"[Text Word] OR "Risk-Benefit Assessments"[Text Word] OR Risk-Benefit Assessments[Text Word] OR Risk Benefit Assessment[Text Word] OR Risk-Benefit Assessments [Text Word] OR Risks and Benefits[Text Word] OR Benefits and Risks[Text Word] OR (("risk"[MeSH

Terms] OR risk[Text Word]) AND prediction[All Fields]) OR "Risk Factors"[MeSH] OR "Risk Factor" [Text Word] OR "Risk Factors" [Text Word] OR Risk Factor[Text Word] OR (clinical[All Fields] AND assessment[All Fields]) OR "Risk Management"[MeSH] OR "Risk Management"[Text Word] OR Management Risk[Text Word] OR Management Risks[Text Word] OR "Management Risk"[Text Word] OR "Management Risks"[Text Word] OR "Hospital Risk Reportings"[Text Word] OR Hospital Risk Reporting[Text Word] OR Hospital Risk Reportings [Text Word] OR "Hospital Risk Reporting"[Text Word] OR "Risks Management"[Text Word] OR "risks Managements"[Text Word] OR Risks Management[Text Word] OR Risks Managements[Text Word] OR "Hospital Incident Reporting"[Text Word] OR "Hospital Incident Reportings"[Text Word] OR Hospital Incident Reporting[Text Word] OR Hospital Incident Reportings[Text Word] OR "Nursing Assessment"[MeSH] OR "Nursing Assessment"[Text Word] OR "Risk Assessments"[Text Word] OR Nursing Assessments[Text Word] OR "Nursing Protocols" [Text Word] OR Nursing Protocol[Text Word] OR "Nursing Protocol"[Text Word] OR Nursing Protocols[Text Word] OR "Beds"[MeSH] OR beds[Text Word] OR Bed[Text Word] OR Mattresses[Text Word] OR Mattress[Text Word] OR "Bedding and Linens"[MeSH] OR Linens and Bedding[Text Word] OR Bedding[Text Word] OR Beddings[Text Word] OR Linens[Text Word] OR Linen[Text Word] OR cushion[All Fields] OR cushions[All Fields] OR "Wheelchairs"[MeSH] OR Wheelchairs[Text Word] OR Wheelchair[Text Word] OR Wheel Chairs[Text Word] OR "Wheel Chair"[Text Word] OR "Wheel Chairs"[Text Word] OR Wheel Chair[Text Word] OR "Wheel Chair"[Text Word] OR "Wheel Chairs"[Text Word] OR (("pressure"[MeSH Terms] OR pressure[Text Word]) AND relief[All Fields]) OR (("pressure"[MeSH Terms] OR pressure[Text Word]) AND relieving[All Fields]) OR alternating[All Fields] OR "Protective Devices"[MeSH] OR protective devices[Text Word] OR "Protective Device"[Text Word] OR "Protective Devices"[Text Word] OR Protective Device[Text Word] OR Safety Devices[Text Word] OR "Safety device"[Text Word] OR "Safety devices"[Text Word] OR Safety Device[Text Word] OR "Equipment and Supplies, Hospital"[MeSH] OR Hospital Equipment and Supplies[Text Word] OR Hospital Equipment[Text Word] OR "Hospital Equipment"[Text Word] OR Hospital Supplies[Text Word] OR Hospital Supply[Text Word] OR "Hospital Supplies"[Text Word] OR Hospital Supply[Text Word] OR "Equipment and Supplies"[MeSH] OR Equipment and Supplies[Text Word] OR Supplies and Equipment[Text Word] OR Apparatus and Instruments[Text Word] OR Instruments and Apparatus[Text Word] OR Devices[Text Word] OR Device[Text Word] OR Equipment[Text Word] OR Inventories[Text Word] OR Inventory[Text Word] OR Medical Devices[Text Word] OR "Medical Devices"[Text Word] OR "Medical Device"[Text Word] OR Medical Device[Text Word] OR Supplies[Text Word] OR Repositioning[All Fields] OR Reposition [All Fields] OR turning[All Fields] OR turn[All Fields] OR position[All Fields] OR positioning[All Fields] OR mobilization[Text Word] OR mobilisation[Text Word] OR "Posture"[MeSH] OR Posture[Text Word] OR Postures[Text Word] OR "Supine Position"[MeSH] OR "Supine Position"[Text Word] OR "Supine positions"[Text Word] OR Supine Positions[Text Word] OR Dorsal Position[Text Word] OR Dorsal Positions[Text Word] OR "Dorsal position"[Text Word] OR "Dorsal positions"[Text Word] OR "Prone Position"[MeSH] OR prone position[Text Word] OR "Prone position" [Text Word] OR "Prone Positions" [Text Word] OR Prone Positions[Text Word] OR "Classification"[MeSH] OR "classification"[Subheading] OR Classification[Text Word] OR Classifications[Text Word] OR Systematics[Text Word] OR Taxonomy[Text Word] OR Taxonomies[Text Word] OR hierarchies[Text Word] OR hierarchy[Text Word] OR (("pressure"[MeSH Terms] OR pressure[Text Word]) AND ("physiology"[Subheading] OR "physiology"[MeSH Terms] OR physiology[Text Word])) OR "Nutritional Sciences"[MeSH] OR "Nutritional Science"[Text Word] OR "Nutritional Sciences"[Text Word] OR Nutrition Science[Text Word] OR "Nutrition Science"[Text Word] OR "Nutrition Sciences"[Text Word] OR Nutrition Sciences[Text Word] OR Nutritional Science[Text Word] OR "Nutrition Disorders"[MeSH] OR Nutrition Disorder[Text Word] OR Nutritional Disorders[Text Word] OR Nutritional Disorder[Text Word] OR "Nutritional Requirements"[MeSH] OR Nutritional Requirement[Text Word] OR "Nutritional Requirement"[Text Word] OR "Nutritional Requirements"[Text Word] OR Nutrition Requirements[Text Word] OR Nutrition Requirement[Text Word] OR "Nutrition Requirement"[Text Word] OR "Nutrition Requirements"[Text Word] OR Dietary Requirements[Text Word] OR Dietary Requirement[Text Word] OR "Dietary Requirement"[Text Word] OR "Dietary Requirements"[Text Word] OR "Nutritional Status"[MeSH] OR "Nutritional Status"[Text Word] OR "Nutrition Status"[Text Word] OR "Nutrition Status"[Text Word] OR "Nutrition Assessment"[MeSH] OR "Nutrition Assessments"[Text Word] OR "Nutrition Assessment"[MeSH] OR "Nutrition Assessments"[Text Word] OR "Nutrition Assessment"[Text Word] OR Nutritional Assessment[Text Word] OR "Nutritional Assessment"[Text Word] OR "Nutritional Assessments"[Text Word] OR Nutritional Assessments[Text Word] OR Nutrition Assessments[Text Word] OR Nutrition Indexes[Text Word] OR "Nutrition Indexes"[Text Word] OR Nutrition Index[Text Word] OR "Nutrition Index"[Text Word] OR "Nutrition Indices"[Text Word] OR

Nutrition Indices[Text Word] OR Nutritional Index[Text Word] OR "Nutritional Index"[Text Word] OR "Nutritional Indices"[Text Word] OR Nutritional Indices[Text Word] OR Prognostic Nutritional Index[Text Word] OR "Prognostic Nutritional Index" [Text Word] OR "Prognostic Nutritional Indices"[Text Word] OR Prognostic Nutritional Indices[Text Word] OR (nutritional[All Fields] AND ("diagnosis"[Subheading] OR "mass screening"[MeSH Terms] OR screening[Text Word])) OR (nutritional[All Fields] AND intervention[All Fields]) OR "nutrition physiology"[MeSH Terms] OR nutrition[Text Word] OR "Nutrition Physiology" [Text Word] OR Nutritional Physiology [Text Word] OR "Nutritional Physiology" [Text Word] OR "prevention and control"[Subheading] OR "Primary Prevention"[MeSH] OR primary prevention[Text Word] OR "Accident Prevention"[MeSH] OR preventive measures[Text Word] OR preventive therapy[Text Word] OR prophylaxis[Text Word] OR control[Text Word] OR prevention[Text Word] OR "prevention primary"[Text Word] OR "Prevention Accident"[Text Word] OR Accident Preventions[Text Word] OR "Preventions Accident"[Text Word] OR "etiology"[Subheading] OR "Causality"[MeSH] OR etiology[Text Word] OR causes[Text Word] OR causality[Text Word] OR pathogenesis[Text Word] OR Causalities[Text Word] OR Enabling Factors[Text Word] OR Enabling Factor[Text Word] OR "Factor Enabling"[Text Word] OR "Factors Enabling"[Text Word] OR Multifactorial Causality[Text Word] OR "Causalities Multifactorial"[Text Word] OR "Causality Multifactorial"[Text Word] OR Multifactorial Causalities [Text Word] OR Multiple Causation [Text Word] OR "Causation Multiple"[Text Word] OR "Causations Multiple"[Text Word] OR Multiple Causations[Text Word] OR Predisposing Factors[Text Word] OR "Factor Predisposing"[Text Word] OR "Factors Predisposing"[Text Word] OR Predisposing Factor[Text Word] OR Reinforcing Factors[Text Word] OR "Factor Reinforcing"[Text Word] OR "Factors Reinforcing"[Text Word] OR Reinforcing Factor[Text Word] OR Causation[Text Word] OR Causations[Text Word] OR "Skin Care"[MeSH] OR Skin care[Text Word] OR "Care Skin"[Text Word]) AND ((case[All Fields] AND series[All Fields]) OR "Multicenter Study"[Publication Type] OR "Evaluation Studies"[Publication Type] OR "Comparative Study"[Publication Type] OR "Validation Studies"[Publication Type] OR "randomized controlled trial"[Publication Type] OR "randomized controlled trials"[MeSH Terms] OR "randomized controlled trials"[Text Word] OR "randomised controlled trials"[Text Word] OR "review"[Publication Type] OR "review literature"[MeSH Terms] OR "systematic review"[Text Word] OR "controlled clinical trial"[Publication Type] OR "controlled clinical trials"[MeSH Terms] OR "controlled clinical trials"[Text Word] OR "meta-analysis"[Publication Type] OR "meta-analysis"[MeSH Terms] OR "meta-analysis"[Text Word] OR Meta Analysis[Text Word] OR Meta-Analyses[Text Word] OR "Clinical Trial Overviews"[Text Word] OR Clinical Trial Overview[Text Word] OR "Clinical Trial Overview"[Text Word] OR Clinical Trial Overviews[Text Word] OR Data Pooling[Text Word] OR Data Poolings[Text Word] OR "cohort studies"[MeSH Terms] OR Cohort Studies[Text Word] OR Cohort Study[Text Word] OR "Cohort Studies"[Text Word] OR "Cohort study"[Text Word] OR "Concurrent studies"[Text Word] OR Concurrent Study[Text Word] OR "Concurrent study"[Text Word] OR Concurrent Studies[Text Word] OR Closed Cohort Studies[Text Word] OR "Closed Cohort Studies"[Text Word] OR Closed Cohort Study[Text Word] OR "Closed Cohort Study"[Text Word] OR Historical Cohort Studies[Text Word] OR "Historical Cohort Studies"[Text Word] OR "Historical Cohort Study"[Text Word] OR Historical Cohort Study[Text Word] OR Incidence Studies[Text Word] OR Incidence Study[Text Word] OR "Incidence studies"[Text Word] OR "Incidence study"[Text Word] OR "Cohort Analysis"[Text Word] OR "Cohort Analyses"[Text Word] OR Cohort Analyses[Text Word] OR Cohort Analysis[Text Word] OR "case-control studies"[MeSH Terms] OR casecontrol studies[Text Word] OR Case-Control Study[Text Word] OR "Case-Control Study"[Text Word] OR Case-Base Studies[Text Word] OR Case Base Studies[Text Word] OR Case-Base Study[Text Word] OR "Case Base Studies"[Text Word] OR "Case-Base Study"[Text Word] OR Case-Comparison Studies[Text Word] OR Case Comparison Studies[Text Word] OR Case-Comparison Study[Text Word] OR "Case-Comparison Studies"[Text Word] OR "Case-Comparison Study"[Text Word] OR Case-Referent Studies[Text Word] OR Case Referent Studies[Text Word] OR Case-Referent Study[Text Word] OR Case-Referent Studies[Text Word] OR Case-Referent Study[Text Word] OR Case-Referent Studies[Text Word] OR Case Referent Studies[Text Word] OR Case-Referent Study[Text Word] OR "Case-Referent Studies"[Text Word] OR "Case-Referent study"[Text Word] OR Case-Compeer Studies[Text Word] OR Case Compeer Studies[Text Word] OR Case-Compeer Study[Text Word] OR "Case-Compeer Studies"[Text Word] OR "Case-Compeer Study"[Text Word] OR Case Control Studies[Text Word] OR Case Control Study[Text Word] OR "Case Control Studies"[Text Word] OR "Case Control Study"[Text Word] OR Matched Case-Control Studies[Text Word] OR "Matched Case-Control Studies"[Text Word] OR "Matched Case-Control Study"[Text Word] OR Matched Case Control Studies[Text Word] OR Matched Case-Control Study

[Text Word] OR "Matched Case Control Studies" [Text Word] OR "Matched Case-Control Study"[Text Word] OR Nested Case-Control Studies[Text Word] OR "Nested Case-Control Studies"[Text Word] OR "Nested Case-Control Study"[Text Word] OR Nested Case Control Studies [Text Word] OR Nested Case-Control Study[Text Word] OR "Nested Case-Control Studies"[Text Word] OR "Nested Case Control Study"[Text Word]) AND "humans"[MeSH Terms]

### Search Strategy 3: Pressure Injury Broad Search

pressure ulcer/ OR pressure ulcers/ OR pressure injury/ OR pressure injuries/ OR bed sore/ OR bed sores/ OR bedsore/ OR bedsores/ OR pressure sore/ OR pressure sores/ OR decubitus ulcer/ OR decubitus ulcers/ OR decubital ulcer/ OR decubital ulcers/ OR pressure ulcer[mesh]

### Search Strategy 4: Pressure Injury Risk Factors

1. decubitus.sh.
2. skin ulcer.sh,tw.
3. exp decubitus ulcer/
4. decubitus ulcer\$.tw.
5. pressure ulcer\$.tw.
6. pressure damage\$.tw.
7. pressure sore\$.tw.
8. bed sore\$.tw.
9. or/1-8
10. exp cohort-studies/
11. exp risk/
12. (odds and ratio\$).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
13. (relative and risk\$).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
14. (case and control\$).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. or/10-14
16. incidence.tw.
17. exp mortality/
18. Follow-Up Studies/
19. prognos\$.tw.
20. predict\$.tw.
21. course.tw.
22. Survival Analysis/
23. or/16-22
24. 9 and 15
25. 9 and 23
26. 24 or 25
27. case report.sh.
28. historical article.pt.
29. review of reported cases.pt.
30. review, multicase.pt.
31. letter.pt.
32. comment.pt.
33. editorial.pt.
34. or/27-33
35. 26 not 34
36. limit 35 to humans
37. leg ulcer.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
38. varicose ulcer.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
39. pilonidal.tw.
40. surgical flaps.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]

41. skin transplantation\$.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
42. burn\$.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
43. gunshot.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
44. corneal ulcer.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
45. exp dentistry/
46. peptic ulcer.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
47. duodenal ulcer.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
48. stomach ulcer.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
49. fistula\$.mp. [mp=ab, hw, ti, it, sh, tn, ot, dm, mf, nm]
50. bite.tw.
51. or/37-50
52. 36 not 51