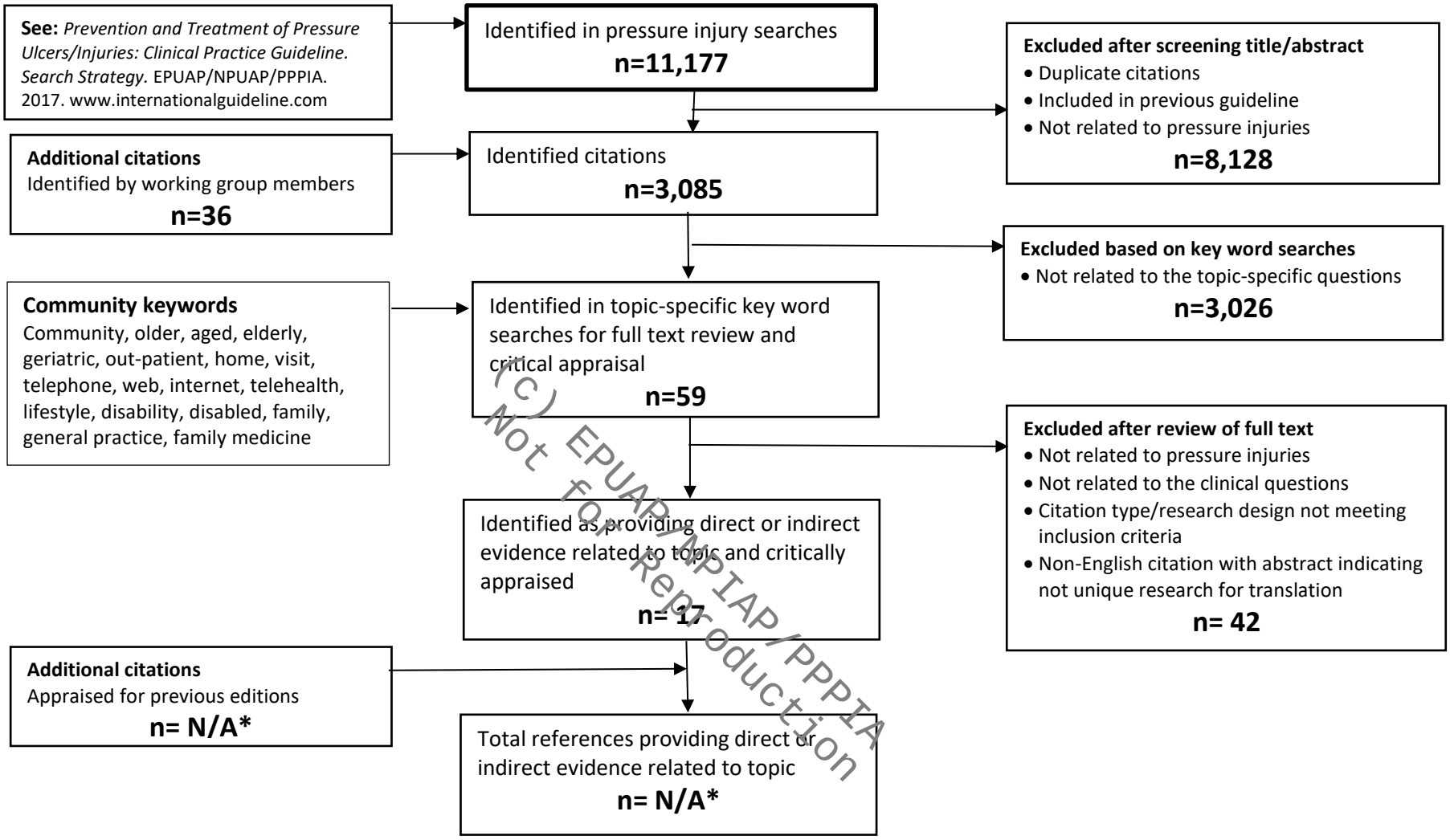
Search results for 2019 International Pressure Injury Guideline: Individuals in Community Settings



* Recommendations related to all special populations are included in the topics to which the recommendation relates (e.g. support surfaces), and the references supporting these recommendations are included in the search reports for those topics.

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA; 2019

Articles Reviewed for International Pressure Injury Guideline

The research has been reviewed across three editions of the guideline. The terms pressure ulcer and pressure injury are used interchangeably in this document and abbreviated to PU/PI. Tables have not been professionally edited. Tables include papers with relevant direct and indirect evidence that were considered for inclusion in the guideline. The tables are provided as a background resources and are not for reproduction.

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA; 2019

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
Clinical question 1: What are the unique pressure injury risk factors to consider for individuals in community settings?							
Street, Noonan, Cheung, Fisher, & Dvorak, 2015	Retrospective cohort study with logistic regression analysis exploring **factors associated with adverse events in emergency admissions**	All adults with acute traumatic spinal cord injury (TSCI) treated in a 2 year period at an acute spinal unit in Canada. Retrospective review of data records for acute admissions (n=171) Inclusion criteria: • TSCI • Admission to an acute spinal unit across Canada that participated in the national-level database Participant characteristics: • 81.3% male • 22.8% of participants had no adverse events • Mean length stay in acute care 40.8±40.9 days • Mean physical component summary 31 • Mean mental component summary 52.2 73% adverse events were pre/post operative	• Exploratory analysis conducted to determine unadjusted effects of patient characteristics on number and type of adverse events Independent variables found to be collinear with the outcome variable were excluded from final models	• 14 intraoperative and 22 pre- or postoperative adverse events common in patients undergoing spinal surgery that are included in the Spine Adverse Events Severity System (SAVES) • Health related quality of life (HRQOL) determined by SF-36 and Functional Index Measure (FIM)	**Most common adverse events for TSCI patients** • UTI 19.4%, pneumonia 13.7%, neuropathic pain 5.8%, PU 5.8%, delirium 8.2% **Binary logistic regression model to determine the patient factors that affect pressure injury occurrence** • Independent variables used in model age at injury, initial motor score, and gender. • Motor score was the only factor strongly predictive of occurrence of PU ($p<0.05$). One point decrease in motor score increased PU risk by factor of 0.04		**Level of evidence: 3** **Quality: low**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
Morita, Yamada, Watanabe, & Nagahori, 2015	Case control study investigating **lifestyle factors that influence risk of pressure injuries in individuals with SCI in community**	Cases: people with SCI admitted to a Japanese rehabilitation hospital from 01/11 to 12/11 for treatment of PU (n=31) Controls: outpatients of the same facility who had lived in the community without PU for the preceding 12 months No exclusion criteria Cases and controls were matched for gender, level of injury, severity of paralysis Characteristics: • Mean age: 55.4yrs for cases versus 45.3yrs for controls (p=0.005) • Mean time since injury 24yrs for cases versus 14.6 for controls, (p=0.007) • significantly more previous history of pressure injuries for cases (p=0.031)	Structured questionnaire interview Diary of habits maintained by controls for 1 week (only for controls)	• Daily living factors including: ○ Wheelchair and cushion factors ○ Protective activities ○ Urination/defecation ○ Social participation • Risk assessment using Braden scale and SCI pressure ulcer scale (SCIPUS) • Interface pressure (IP) measurement of wheelchair surface •	**Pressure injury risk** • Braden scale: 15.7±1.4 cases vs 16.3±1.4 controls (p=0.068) • SCIPUS: 6.2±2.1 cases vs 3.9±1.5 controls (p<0.001) **Life-style factors (interview data): case vs control** • Number seat cushions owned:1.8±0.7 vs 2.3±0.7, p=0.005 • Average hrs/day in chair: 12.2±4.6 vs 15.2±2.4, p=0.002 • Number baths per week: 3.5±2.3 vs 5.1±2.2, p=0.012 • Independent driving: significantly more controls (p=0.004) • Knowledge of pressure relief methods: 1.3±0.6 vs 2.4±1.4, p=0.000 • Number pressure relief maneuvers/hr: 2.2±3.3 vs 1.8±1.6, p=0.664 • At least week skin monitoring: no significant difference • Number wheelchairs in possession: 1.8±0.7 vs 2.2±0.8, p=0.64 **Pressure measurement** Max IP, contact area and average IP not significantly different between cases and controls **Multivariate analysis** • Number of seat cushions in possession: odds ratio (OR) for pressure injury 8.110 (95% CI 1.799 to 36.571) • Average time spent in wheelchair: OR for pressure injury 1.581 (95% CI 1.154 to 2.166) • SCIPUS score: OR for pressure injury 0.395 (95% CI 0.233 to 0.667)	• Low generalizability • Relied on self-reported preventive health data and relied on recall for case group • Case-control matching led to significant difference in age, time since injury and previous history of PU • Wide confidence interval for seat cushions in possession	**Level of evidence: 3 (prognostic)** **Quality: high**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
					Author conclusions: Number of cushions in possession, time spent in chair and SCIPUS score were associated with risk of pressure injuries.		
Gould et al., 2014	Retrospective survey from SCI patients **predicting risk of pressure injuries in people with SCI living in community**	Random sample of records from 1400 SCI outpatients in the US (n=120) Inclusion criteria: • had a documented annual exam within a 12 month period Exclusion criteria: • SCI due to multiple sclerosis, terminal disease or amyotrophic lateral sclerosis Characteristics: • Primarily male participants • Mean age approximately 60-63 years • Approx 55-58% were Caucasian • Approx 46% were married • 44-59% had service connected at least 50% • 42-50% had a caregiver	N/A	• Record review by trained nurses • Uncertain how PU was identified and classified **Bivariate analysis** • Significant factors: • contractures more often in PU group (p=0.008) • bed mobility lower in PU group (p=0.025) • length of stay in past 12 months longer in pressure injury group (p=0.018) • length of stay in rehabilitation longer in pressure injury group (p=0.001) • albumin lower in pressure injury group (p=0.001) • prealbumin lower in pressure injury group (p=0.01) • BMI lower in pressure injury group (p=0.007) • ASIA higher in pressure injury group (p=0.015) • Functional independence measure lower in pressure injury group (p=0.001)	**PU rate** 72/120 (60%) had experienced at least 1 PU 47/120 (40%) had no PU **Multivariate regression model for prediction of pressure injuries** • ASIA A (yes/no), OR 4.02 (95% CI 1.74 to 9.27, p<0.001) • overweight (BMI > 25, based on WHO criteria), OR 0.32 (95% CI 0.914 to 0.77, p=0.01) • prior hospitalization within previous year, OR 1.79 (95% CI 0.71 to 4.51, p=0.215) • anemia (hemoglobin < 13), OR 3.08 (95% CI 1.06 to 8.94, p=0.075) • percent service-connected status, OR 0.99 (95% CI 0.99 to 1.00, p=0.069) • Functional Independence Measure score, OR 0.97 (95% CI 0.96 to 0.99, p=0.001) • Good Nutrition (albumin > 3.5 or prealbumin > 17), OR 0.64 (95% CI 0.18 to 2.20, p=0.475) • caregiver support (yes/no), OR 1.99 (95% CI 0.92 to 4.33, p=0.082) current smoker (yes/no), OR 1.71 (95% CI 0.76 to 3.79, p=0.184)	• Not entirely clear whether the risk factor preceded the PU in this study • Unclear how PU was identified or categorized • Community participants who made not have used same preventive care strategies • Unclear why some statistically significant factors were not retained in final model •	**Level of evidence: 3 (prognostic)** **Quality: high**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
				• Factors with no significant difference: mechanism of SCI accident, level of SCI injury, hemoglobin, tobacco use, chronic obstructive pulmonary disease, diabetes mellitus, years since injury, spasticity, pain, history depression or alcohol use			
H. J. Lee, Ju, Park, Kim, & Lee, 2017	Retrospective study to examine the **relationship between hospitalisation and receipt of home nursing services amongst individuals with a pressure injury who had long care health insurance**	This was a retrospective audit using a national data base in South Korea (including urban and rural regions) (full data base n=558,147; random sample of n=4,807) Inclusion criteria: • Pressure injury • Living at home • receiving home care services for a pressure injury at least once from 2008 to 2013 • Beneficiary of long term care insurance program • Aged ≥ 60 years Exclusion criteria: None stated Participant characteristics: • Receiving home nursing through insurance n=384 • no home nursing through insurance n=4423 • Mean age = 81 ± 7.3 SD • Urban n=2847, rural n=1960	Not applicable	• Number of persons who required hospitalization related to pressure injuries during the study period • Secondary outcomes included analysis of variables that potentially influenced hospitalization rate including: ○ gender, age, income ○ residence ○ use of home visit nursing services ○ living location (urban vs rural) ○ other nursing needs ○ Charlson comorbidity index ○ ADL score • rehabilitation function score	**Care use for pressure injury** • 17.9% admitted to hospital during the study period • 8% of insurance beneficiaries with a pressure injury used home care more than once **Factors associated with admissions** • Use of home nursing services had lower risk of hospitalization (odds ration [OR] 0.99, 95% CI 0.98 to 1.00) • Living in a rural area had higher risk of hospitalization (OR 1.24, 95% CI 1.04 to 1.44) • Having other nursing needs had a higher risk of hospitalization for pressure injury (OR 1.37, 95% CI 1.15 to 1.62) • Higher Charlson comorbidity Index score were more likely to be hospitalized (CCI 1 OR 1.23, 95% CI 1.02 to 1.48; CCI 2 OR 1.32, 95% CI 1.10 to 1.58) • Greater ADL dependency were more likely to be hospitalized (OR 1.03, 95% CI 1.02 to 1.05) • Greater physical limitations were more likely to be hospitalized (OR 1.03, 95% CI 1.01 to 1.05)	• No ethics clearance due to anonymous nature of data • Relied on database records • Limited to one country • No reporting of outcomes after admission to hospital • It is not explained how persons with a pressure ulcer who do not use home nursing services manage their wound • There is no report nor analysis of the stage or location of the pressure injuries	**Level of evidence: 4** **Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
		74% of the sample did not require any care in addition to their pressure injury			**Author conclusion: Home nursing is associated with lower rates of hospitalization for a pressure injury**		
De Paula Chaves Freitas & Alberti, 2013	To investigate the ability of the Braden Scale to predict pressure injury/ulcer development in a home-care setting.	• Participants n=183 • Clinical setting: A home-care monitoring program • City and country: Belo Horizonte in South Eastern Brazil • Inclusion criteria: a classification of 'level III or IV' in the homecare monitoring program; no prior PI; had been in treatment for at least one month • Exclusion criteria: died; discharged from hospital; excluded from the treatment Participant characteristics not reported/analysed: n/a	Monthly pressure injury risk assessment for 6 months using the Braden Scale and the incidence of new PI that developed during that period.	• Incidence of pressure injuries • Correlation between Braden Scale score and development of pressure injury • Correlation between other characteristics and development of pressure injury (i.e. age, skin colour, medications, functional ability (ability to perform ADLs)	• n=56 pressure injuries developed during the study (incidence) • Home care monitoring program classification level: 64.9% of those who developed a PI were grade IV and 61.6% of patients who did not develop a PI were grade III • 81% of persons who developed PI had moderate or severe cognitive impairment • 97.3% were impaired in performing activities of daily living • Alzheimer's disease, stroke and Parkinson's disease were predisposing factors to development of PI • A decrease in the Braden scale score during the study period was associated with PI development The authors concluded that the Braden scale was effective for predicting persons with an increased risk of developing pressure injury in the home-care setting.	This was a very poorly designed study in a number of aspects: • No explanation of how participants were selected and recruited • Who collected the study data (including performing the risk assessments and scoring, and PI staging) was not identified – there was no discussion regarding ensuring inter-rater reliability • No discussion if there was any incomplete or missing data, nor if there were any dropouts and how their data was managed • There was no discussion regarding important potential variables such as availability and use of equipment and availability and assistance of carers	**Level of evidence: 3 (prognostic)** **Quality: Low**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
						• For a community based study it is extremely unusual that not 1 PI over the ischial tuberosity developed	
Bergquist-Beringer & Gajewski, 2011	Retrospective cohort study investigating predictors of pressure injuries development in older home health patients	Participants recruited from home healthcare between Sept 30, 2007 to Jan 30, 2009 (non-hospice) (n=5395 non-surgical patients); n=5116 PU free at baseline Inclusion: • Nonhospice patient • Aged ≥60 • Admitted for intermittent skilled home healthcare • Only first admission considered for patients admitted more than once Characteristics: • n=2072 males; n=3323 females • mean age 78.2 yrs; range 60 – 103 yrs • n=0 lost to follow-up • N=279 with baseline PUs - no grade provided.	Not reported	• Outcome definition: Development of new ≥ Stage 1 PU according to OASIS Skin and Wound Status M0 Items (uses NPUAP classification). • PU definition for regression: development of new PU • OASIS data are gathered on admission, every 60 days while on the active caseload, following an inpatient facility stay of ≥24 hrs with return for more home, after significant change in condition, and discharge. • mean length of follow-up 35.1 days (range unknown) Statistical methods: Multiple logistic regression Model 1 N=71/5395 (1.3% incidence) developed 92 PUs; • n=31 stage 1 PU; n=43 stage 2 PU; n=10 stage III PU; n=5 stage	<u>Model 1</u> *(n=71/5393; includes those with PUs on admission)* Bowel incontinence 0.042; 2.84; 1.04-7.72 Physical aggressive behaviour 0.046; 4.57; 1.03-20.37 Grooming 0.032; 1.97; 1.06-3.66 Ability to dress the upper body (someone must help) 0.052; 1.97; 0.99-3.92 Ability to dress the upper body (depends entirely on another) 0.303; 1.78; 0.60-5.29 Ability to dress the lower body (depends entirely on another) 0.016; 2.97; 1.23-7.19 Toileting (unable to get to/from) 0.013; 5.30; 1.42-19.77 Toileting (totally dependent) 0.125; 2.23; 0.80-6.24 Transferring (unable to transfer self/can weight bear and pivot <0.001; 5.20; 2.27-11.89 Transferring (unable to transfer self/weight bear/pivot when transferred by another person 0.017; 4.22; 1.30-13.73 Transferring (bedfast) 0.130; 3.01; 0.72-12.53 Ambulation (chairfast: unable to ambulate/able to wheel self) 0.009; 5.52; 1.52-20.05	• Only 3 FU points at long intervals but community setting Insufficient number of events	**Level of evidence: 3 (prognostic)** **Quality: low**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
				IV PU; n=3 nonobservable Model 2 N=49/5116 (0.96%) No in final: 5% of overall sample lost; 2nd model 30% of PU sample excluded N=21 risk factors entered into MV analysis: • Indwelling or suprapubic catheter; enteral nutrition; live with paid help; PU on admission; urinary incontinence; bowel incontinence; frequency of confusion; cognitive functioning; depressed mood; memory deficit; impaired decision making; verbal disruptive behavior; physical aggressive behavior; frequency of behavior problems; grooming; ability to dress the upper body; ability to dress the lower body; bathing; toileting; transferring; ambulation N=9 risk factors from final model	Ambulation (chairfast: unable to ambulate or wheel self) 0.009; 5.70; 1.53-21.24 Ambulation (bedfast) 0.175; 3.52; 0.571-21.74 PU on admission <0.001; 4.47; 2.44-8.21 <u>Model 2</u> *(n=49/5116; excludes those with PUs on admission)* Bowel incontinence 0.005; 4.81; 1.61-14.34 Ability to dress lower body (depends entirely on another) 0.026; 3.26; 1.15-9.21 Transferring (unable to transfer self/can weight bear and pivot) 0.001; 5.12; 1.89-13.87 Transferring (unable to transfer self/weight bear/pivot when transferred by another person 0.010; 6.40; 1.55-26.50 Ambulation (chairfast: unable to ambulate/able to wheel self) 0.019; 6.18; 1.35-28.36 Ambulation (chairfast: unable to ambulate or wheel self) • 0.007; 7.91; 1.74-35.96		

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
Clinical question 3: What are the unique pressure injury treatment strategies for individuals in community settings?							
Support surfaces							
Stephen-Haynes & Callaghan, 2017	To examine the effect of using **the alternating pressure air mattress for home-care patients at a high risk or with pressure injuries**	Participants were recruited in a home care setting in the UK (n=100) Inclusion criteria • Aged over 18 years • -Lived in own home • High risk of pressure injuries (Waterlow scale), or existing deep pressure injury • Required alternating pressure mattress using the NHS trust selection algorithm Participant characteristics: • Mean age 78.4 years • 64% female • At the start of the study, 5% had a Category/Stage I pressure injury, 22% had Category/Stage II pressure injury, 21% had a Category/Stage III pressure injury and 5% had a Category/Stage IV pressure injury, 44% had intact skin, 3% were unrecorded	• Care based on guidance from NICE (2014) and EPUAP et al (2014), local guidelines and staff who are trained to provide care based upon the structured approach outlined in the SSKIN bundle. • Patients were allocated the Dual Professional (IQ Medical) APAM using an NHS trust equipment selection algorithm based upon the NICE (2014)	• EPAUAP/NPUAP staging system • The mattress was used for a total of 5809 days (829 weeks) during the evaluation.The average time using mattress 83 days (range 1-295) Unclear how skin evaluation was conducted	**Pressure injury outcomes** Pressure injury improved in 53%, stayed the same for 20% and deteriorated for 5% Al deteriorating pressure injuries were in people at end-of-life **Skin condition** Skin remained the same in 50%, improved in 39% of patient and deteriorated in 7%. 4% did not have an assessment completed. **Informal care giver evaluation** 77% said the experience with moving and handling remained the same, 14% said it improved. Staff evaluation 77% said the experience with moving and handling remained the same, 14% said it improved. **Patient comfort evaluation** 43% said it was more comfortable, 28% said it was the same and 5% said it was less comfortable. In 17%, they could not compare as this was the first time they had used an alternating pressure air mattress. **Author conclusions: Selection of appropriate alternating pressure mattresses should take account of risk factors for the development of pressure ulcers and clinical outcomes**	• long periods of time when no clinical staff are delivering care • The support surface is only one of several interventions that could influence the primary outcome • Only one model of mattress was reviewed • Low pressure feature was not reviewed •	**Level of evidence: 4** **Quality: Low**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
D. Jackson et al., 2017a	Mixed methods study exploring perspective of community-based people **living with a pressure injuries, with focus on their use and pressure redistributing devices**	Participants were recruited in the UK in community settings (n=90 for quantitative component, n=12 patients and n=5 family for interviews) Inclusion criteria: • Aged ≥18 years • Pressure injury • Have been prescribed a device Exclusion criteria: • Receiving end of life care Interview participant characteristics: • participants had pressure injuries primarily of feet/heels • Pressure injury duration ranged from 2 months to 20 years • Most participants were older people	N/A	Quantitative: retrospective case reviews over 12 month period recording devices used Qualitative: interviews and EQ-5D questionnaire)	**Equipment use (e.g. overlays, cushions, heel offloading devices)** • 31% of participants used equipment as recommended • 40% had partial equipment use • 22% had no details recorded of equipment needs **Qualitative findings** • Poor uptake of equipment was due to discomfort or unsuitability of devices for home settings • Participants worried about continuity of care, service staff interrupting their care plans, and highlighted importance of building trust relationships • Participants worried that clinicians not familiar with their care might not have enough knowledge • Transitioning between hospital and home care was associated with feeling vulnerable and lacking control • Home care services had structures that hinder patient ability to contact carers	• Patients validated transcripts • Patient expert reviewed themes • Small study that does not consider the different management strategies used in the communities of the participants • 16-minute interview may not capture rich thick data about how it feels to live with a pressure injury • Findings might not be generalizable to other home care services •	**Level of evidence: 5 (qualitative)** **Quality: High**
Tele/video health interventions							
Arora et al., 2017	RCT determine the **effectiveness of telephone-based management of pressure injuries in people with spinal cord injury (SCI) in low- and**	• Participants were recruited in the community in India and Bangladesh (n=120) Inclusion criteria: • >18 years • SCI >3 months • ≥1 pressure injury on sacrum, ischial tuberosity or greater trochanter • unlikely to be in hospital within 12 weeks	Participants were randomized to either: • Intervention group receiving: (n=60) ○ pressure injury management pamphlet ○ weekly phone calls from a health professional (nurse or physiotherapist) for 12 weeks focused on	• Three independent, trained, blinded assessors • Time of healing collected by unblinded assessor 2 weekly by telephone • Primary outcome: size of pressure injury at 12 weeks (length and width in cm^2)	**Pressure injury size and healing** • The mean between-group difference at 12 weeks, adjusted by baseline size was 2.3cm^2 favoring the intervention group (95% CI -0.3 to 4.9; p=0.008) • Kaplan-Meier estimates for time to healing in favor for intervention (hazard ratio [HR] 2.0, 95% CI 1.0 to 3.9, p=0.04) **Secondary outcomes** 7- 8 out of 13 secondary outcomes were statistically significant (PUSH score, Braden	• Unblinded assessor collected data in PU healing by phone (self reported data) • Multicenter, assessor-blinded RCT • Possibly biased recruitment • The minimally worthwhile treatment effect	**Level of evidence: 1** **Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
	middle-income countries	• speak Hindi or Bengali • access to a phone • potential to benefit from telephone advice • Exclusion criteria: • Cognitive or verbal impairments • Clinically significant medical condition that would compromise participation • unlikely to be assessed at 12 weeks Participant characteristics: The groups were similar at baseline • Mean age 35 years • Time since injury 7 yrs • Mix of complete and incomplete SCI • Category/Stage II pressure injures (n=35), Category/Stage III pressure injures (n=83), Category/Stage IV pressure injures (n=2)	reinforcing self-help strategies, minimizing psychological stress and enhancing engagement with life ○ education about appropriate seating, bed overlays, cushions, equipment, diet, nutrition and wound dressings, pressure relieving strategies, when to seek help, continence management ○ Each week goals were negotiated and reviewed at the next phone cal. ○ free to seek any help or medical assistant that they deemed appropriate • Control group (n=60) received pressure injury management pamphlet and were free to seek any help or medical assistant that they deemed appropriate	• Secondary outcomes: PUSH, pressure injury depth, undermining, Braden scale, HADS, participation items (WHODAS), Utility score (EQ-5D-5L), Self-rated health (EQ-5D-VAS), participant impression of pressure injury, participant confidence to mange pressure injury, clinician impression of pressure injury, participant satisfaction, self-reported time for pressure injury resolution	score, Participation items, Utility score, Participants´ impression of pressure injury status, Participants´ confidence in healing, Participants´ satisfaction) **Author conclusions: Results of primary outcome do not provide conclusive evidence that people with SCI can be supported at home to manage their pressure injury through regular telephone-based advice. Secondary outcomes show positive indication that telephone support might provide some assistance.**	was set a priori as equivalent to 10% of the mean initial size of pressure injury at baseline	
Hill, Cronkite, Ota, Yao, & Kiratli, 2009	Observational study **determining the reliability of telephone and video wound assessment**	Patient participants were recruited from a spinal cord injury (SCI) treatment center in the US (n= 42 with n = 67 PUs) Assessors were physical therapists (n=3) Exclusion:	• All participants were assessed in a home-like environment • Pilot study to assess interrater reliability found kappa ≥ 0.80 could not be achieved between the three	Skin was assessed using a 0 to 4 staging scale from AHCPR where 0 = no PU and 4 = stage IV PU. • Other aspects (tunnelling, pain, erythema, types of exudate etc) were	**Telephone consultation reliability** • There was moderate correlation (κ=0.47) for PU stage between telephone and in person assessment. • Correlation was poor for assessment of exudate eschar and surrounding tissue (κ<0.20); good for assessment of pain	• The three assessors could not achieve a very good correlation in their in person assessments in the pilot study despite training	**Level of evidence: 3 (diagnostic)** **Quality: low**

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		Primary physician would not approve travel to study site Patient participant characteristics • Mean age 58 years • 95% sample male • 77% sample white skin • 62% paraplegia • 74% facility inpatient	assessors and a SCI clinician despite additional training. • Assessors were randomized to perform one of three assessments on each patient • Assessment via: • In person evaluation • Telephone consultation • Low bandwidth video conference Measuring guide was placed beside wound for the video consult	assessed as present, absent, cannot assess or N/A	(κ=0.70); moderate for assessment of sinus tract (κ=0.48). **Video consultation reliability** • There was moderate correlation (κ=0.54) for PU stage between video conference and in person assessment. • Correlation ranged from poor to moderate for assessment of different exudate types (κ=0.20 to 0.56); fair for eschar (κ=0.32); and fair for surrounding tissue (κ<0.42); good for assessment of pain (κ=0.75); good for assessment of sinus tract (κ=0.61). • Wound sizes and volumes tended to be measured as larger in telephone and video consultation than in person assessments. • Study conclusions: Correlation for assessment of presence of a PU was lower in video and telephone assessments than an in person assessment.	• Only three assessors used, no intrarater reliability assessment • Research assistant told assessors the area of skin they should assess • Insufficient stage I PUs in study to assess reliability in their identification	
Dietary interventions							
Brewer et al., 2010	Historical control study investigating **the effect of arginine supplementation in promoting healing of PU in community SCI patients**	Participants were recruited from through a SCI community support group in Australia (n=18) and database from spinal nurse of same group was used to attain control group (n=17) Inclusion: • SCI • Aged ≥ 18 years • Category II, III or IV PU Exclusion: • Phenylketonuria • Sepsis	Intervention group (n=18): Consumed x2 sachets daily of supplement containing 4.5g arginine, 4g carbohydrate, 155mg vitamin C, 50mg vitamin E. Sachets consumed in 200 to 250 ml water. All other care was according to recommended guidelines.	• PU size and severity assessed using PUSH tool • Nutritional status assessed on Subjective Global Assessment	• The intervention group showed superior healing with respect to time to complete healing compared to the control group (10.5±1.3 wks versus21.1±3.7 wks, p=0.006) • There was no significant difference in healing rates between participants with and without diabetes in the intervention group (p=0.894) or between participants with and without diabetes in the historical control group (p=0.994) • All participants n intervention group consumed at least 85% of supplement doses until full healing was achieved.	• Relied on database information for control group • Nutritional status of control group was unavailable • Small sample size	Level of evidence: 4 Quality: low

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		• Chronic renal failure • Metabolic disease • Diabetic foot ulcer • Suspected osteomyelitis • Receiving hydroxyurea or >10mg daily prednisolone or 1.5mg daily dexamethasone Characteristics: • Participants were matched for age, gender, level of SCI injury, baseline PUSH, baseline PU area • Baseline PU area was 4.5 to 6.7 cm2 • Mean age was 49.9 to 52.2			• Conclusions: arginine supplementation of 9g daily may be associated with faster PU healing in patients with SCI with and without diabetes		
Other topics: Impact of pressure injuries on lifestyle of community-dwellers							

D. Jackson et al., 2017b	Qualitative study **exploring the experiences of patients with pressure injuries living at home**	A convenience sample of participants was recruited through the National Health Service in a small district in the UK (n=12, 38% response rate from invited population)
		
		Inclusion criteria:
		• Aged ≥18 years
		• Community based and not receiving 24-hour care
		• Pressure injury that was not acquired in a facility
		• Able to communicate
		
		Exclusion criteria:
		• End-of-life care
		• Inability to consent
		
		Participant characteristics:
			Not relevant	• Interviewed by an experienced researcher
				• Open-ended questions focused on experience of pain that were validated by clinical nurses
				• Thematic analysis by 3 researchers and 1 patient
					Prevalence of pressure injury pain
					91.7% (11/12) participants experienced pressure injury related pain, with the final participant having paraplegia leading to lack of sensation
					
					Themes associated with pain
					• Poorly controlled pain: 'I just want the pain to go away'
					  ○ Pain is dominant and unrelenting
					  ○ Powerlessness
					  ○ Normal movement worsens pain, reducing mobility
					  ○ Sitting and lying worsens pain
					  ○ Pain management unachievable
					  ○ Dressings worsen pain
					  ○ Pain impacts ability to sleep
					• Uncertainty for the future: 'it almost seems insurmountable'
						• Patients validated transcripts
						• Patient expert reviewed themes
						• Small study that does not consider the different management strategies used in the communities of the participants
						• 16-minute interview may not capture rich thick data about how it feels to live with a pressure injury
						• Findings might not be generalizable to
							Level of evidence: 5 (qualitative)
							
							Quality: High

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
		• Age range 31 to 92 years • 75% female • Pressure injuries ranged from 2 month to 20 year duration • Comorbidities included arthritis, diabetes, obesity, respiratory disease and heart failure.			○ Strong understanding of difficulty in healing pressure injuries ○ Doubt and uncertainty about getting better ○ Fear that pressure injury won't heal ○ Frustration with slow healing **Author conclusions: Pain is a serious problem that impacts quality of life, social and emotional well-being**	other home care services •	
D. E. Jackson et al., 2017	Qualitative study exploring perspective of community based people **living with a pressure injuries, with a focus on experience of loss**	A convenience sample of participants was recruited through the National Health Service in a small district in the UK (n=12, 38% response rate from invited population) Inclusion criteria: • Aged ≥18 years • Community based and not receiving 24-hour care • Pressure injury that was not acquired in a facility • Able to communicate Participant characteristics: • Age range 31 to 92 years • 75% female • Pressure injuries ranged from 2 month to 20 year duration Comorbidities included arthritis, diabetes, obesity, respiratory disease and heart failure	Not relevant	• Interviewed by an experienced researcher • Open-ended questions focused on experience of pain that were validated by clinical nurses • Thematic analysis by 3 researchers and 1 patient	**Themes** • Loss of mobility and independence: these were significantly impeded by having a pressure injury, work life was often impeded, reduced mobility increased reliance on family and others, increased feelings of being a burden • Loss of privacy and dignity: requiring care assistance reduced privacy, requiring help with intimate care reduced dignity, odor contributed to threats to dignity • Loss of social and activity engagement: restrictions on engaging in preferred activities, risk of social isolation, unable to enjoy outdoors • Loss of control and autonomy: restrictions on work, clothing, home furnishing, bedding **Author conclusions: The patient voice should be a focus of care planning and delivery**	• Patients validated transcripts • Patient expert reviewed themes • Small study that does not consider the different management strategies used in the communities of the participants • 16-minute interview may not capture rich thick data about how it feels to live with a pressure injury • Findings might not be generalizable to other home care services	**Level of evidence: 5 (qualitative)** **Quality: High**
Ghaisas, Pyatak, Blanche, Blanchard	Retrospective analysis of outcomes of one cohort in	Retrospective secondary analysis of outcomes for the treatment group in a previously conducted trial. All participants who	Participants were classified as having achieved lifestyle changes vs no changes	• Treatment note review to categorize participants based on	Four patterns identified: • Positive lifestyle change and positive pressure injury status change (n=19)	• Analysis was limited to a treatment arm of a	**Level of evidence: 3** **Quality: low**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
, & Clark, 2015	trial **to identify associations between pressure injury status and lifestyle change**	completed 12 months of the intervention were eligible for inclusion (n=47 eligible, n=17 included) Inclusion criteria: • Completed 12 months of the intervention with sufficient participation • Experienced PU during intervention period Exclusion criteria: • Experience no PU • Poor adherence to lifestyle changes	Participants were classified as having improved or worsening PU status	making lifestyle changes • 1,922 notes were reviewed (mean 40.9/participant) ○	• Positive lifestyle change and no change or worsening in pressure injury status (n=3) • Minor or no lifestyle change and positive pressure injury change (n=1) • Minor or no lifestyle change and no change or worsening in pressure injury status (n=2) Discussion of factors: • People with positive lifestyle change were motivated, had identifiable goals and had support • People with no lifestyle change lacked a sense of urgency, had knowledge gaps regarding skin health, prioritized other issues	trial (i.e. potential bias sample) • Participants not adhering to lifestyle changes were excluded for unclear reasons (some other participants were described as making minor/no lifestyle change) • Unclear how pressure injury status assessed and whether recurrence was considered • Subjective outcome measures	
Dunn, Carlson, Jackson, & Clark, 2009	Qualitative cross-case, secondary analysis, investigating experience of living with pressure injuries in community dwelling individuals with SCI undergoing rehabilitation	Case profiles from a previous qualitative study conducted in a US rehabilitation center were analyzed (n=19) Inclusion: • Included in the parent study (n=20) • Community dwelling adults with SCI • Personal profiles selected with adequate information about one or more responses to a low-grade ulcer Exclusion: • Did not develop a PU (n=1) Characteristics:	• Re-analysis of previous original research to establish differences and similarities in experiences of people with PU Initial data collected through participant observation and interviews.	• Researchers analyzed previous data and identified responses to stage I or II PUs • Responses were categorized according to types and confirmed by 2 researchers • One randomly selected PU event for each participant was analyzed in-depth to enhance vigor	Eight themes of response to pressure injuries Category/Stages I to II identified within the 46 events • Lacking adequate knowledge: overlooking a PU or underestimating danger • Procrastinating: delaying action on the basis of emotion, negating consciously • Experiencing cognitive dysfunction • Diverting attention: attending to comorbidities, desiring activity, attending to external exigencies • Avoiding social discomfort • Being thwarted from receiving adequate medical help • Relying on self or caregiver help • Adhering to medical recommendations	• Ethnically diverse group whose demographics may have skewed results (but demographics not reported) • Based on self-report and recall of events, memory lapses or misrepresentation of history may limit findings • Methodology could have allowed researchers to categorize differently	**Indirect evidence (qualitative)** **Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
		• There were 46 PU events reported by 19 participants. • 19 participants had SCI and 1 had transverse myelitis • Described as "ethnically diverse" • No demographic characteristics e.g. age, gender, co-morbidities, duration of disease, duration of PU was reported			**Study conclusions: rehabilitation professionals need to provide education about early PU detection and recognition, potential severity of PU and the importance of early treatment. Patients with PU need to support to effectively self-advocate for proper medical care and to balance preventative measures with lifestyle concerns. Wound care clinics and consumer support groups can serve as valuable ongoing community-based resources.**	• No opportunity to pursue follow-up for more complete responses	
Galhardo, Magalhaes, Blanes, Juliano, & Ferreira, 2010	Cross-sectional study **to evaluate HRQOL and depression of older community dwelling individuals with PU**	Participants were outpatients at health centers in Brazil from 2005 to 2006 (n=42) Inclusion: • Aged ≥ 60 years • No cognitive impairment • Living in the community Characteristics: • Study and control groups similar for age, co-morbidities, income and BMI. • Mean age of participants was 76 to 79 years • Approx. 31% of study group had immobility related to CVA and approx. 24% related to femoral fracture. • 21 participants in study group had total 36 PUs . 50% were stage II PUs, most commonly of the sacrum Most common comorbidity was diabetes	Participants were visited in their home and interviewed. Analyzed in two groups: • PU present (n=21) • No PU present (n=21) •	PU measurement: • PU presence confirmed by examination • PU classification according to NPUAP staging system HRQOL measurement: • SF-36 includes 8 dimensions – physical functioning, social functioning, role limitations (physical), role limitations (emotional), mental health, vitality and pain. • Geriatric Depression Scale (GDS-15) cut off point of ≥ 6 to identify possible case of depression •	• Participants with PU had significantly lower HRQOL scores than those without PU in all SF-36 domains (p ranged from <0.0001 to 0.014) • Participants with PU had the lowest SF-36 scores for physical functioning physical role limitations and emotional role limitation (p<0.0001 versus those without PU for all). • 71.4% of participants with PU rated their current health status as slightly worse or much worse that 12 months before, versus 38% of those without PU. • 80.9% of participants with PU had light or severe depression versus 19.1% of those without PU. • There was no direct relationship between degree of depression on GDS-15 and number or severity of PU **Study conclusions: Older adults with PUs living in the community have high rates of depression and lower scores on measurements of HRQOL than those who do not have PU, despite having similar co-morbidities.**	• Small sample size • People with cognitive impairments were excluded • Participants were described as having low educational and income levels •	**Level of evidence: 4** **Quality: moderate**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
Other topics: Pressure injury prevalence in community settings							
Hopkins & Worboys, 2015	Prevalence study conducted in community settings in the UK	Point prevalence study in one UK borough in 2012 Borough population: • Population 254,000 • mean age 59 years • 49% residents >64 years Inclusion criteria: • All participants (all ages) known to nursing homes, GP practices, walk-in clinics, community nursing teams and self-caring patients • Identified through dressing scheme in the region	• N/A	• Data collected over a one week period • All wounds were identified and the worst wound per patient were recorded •	**Wound prevalence** • 272 residents had one or more wounds (total of 325 wounds • mean of 1.19 wounds/person • Community prevalence of wounds 1.07 wounds per 1,000 residents **Pressure injury prevalence** • Pressure injuries accounted for 13% of wounds (n=34 persons with n=42 PUs) • Category/Stage 3 and 4 PUs (n=16)	• Calculation of pressure injuries included moisture lesions • Unclear how representative sample is of overall community • Unclear how pressure injuries were identified Relied on documentation	**Level of evidence: 4** **Quality: Low**
Bogaisky & Dezieck, 2015	Cross sectional survey to **compare rates and risk factors for early hospital readmission for residents in nursing homes and older adults in the community**	Inpatient chart audit for admissions to a geriatric facility over 12-month period (n=1,706 hospital admissions for n=1,038 people) Inclusion criteria: • Adults aged >65 years • Admitted to geriatric inpatient services in audit timeframe Exclusion criteria: • Aged under 65 years Participant characteristics: • n= 625 nursing home residents n=413 community dwellers	• N/A	• Medical records review • Univariate analysis	**Risk Factors for readmission** • Having a pressure injury was associated with readmission to hospital for community dwellers (odds ratio [OR] 2.9, 95% confidence interval [CI] 1.5 to 5.7. • Having a pressure injury was associated with readmission to hospital for people discharged to a nursing home (OR 1.6, 95% CI 1.2 to 2.1)	• Relied on medical record data • Single hospital • Does not account for people who may have been readmitted to different hospitals • Minimal relevance to pressure injuries	**Indirect evidence**
Corbett, Funk, Fortunato,	Retrospective prevalence review **to**	Participants were in one facility in the US over a 12 month period (n=44,202 total admissions, of	• Not relevant	• Mean number of PI per patient	**Pressure injury prevalence/incidence** • Pressure injury on admission n=1022	• Data was taken from only one hospital	**Level of evidence: 4**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
& O'Sullivan, 2017	**describe the prevalence, demographic, patient and pressure injury characteristics of people admitted to a tertiary hospital with a pressure injury on admission**	which n=1,435 admitted with pressure injury, of which n=1,022 acquired in a community setting) Inclusion criteria: • First admission for to hospital in the year • Had a pressure injury on admission or sustained in institution • Complete data available Exclusion criteria: Patients with missing data (n=92) Participant characteristics: • 23% had no pressure injury risk • 15.8% had high or very high risk • About 58% had adequate or excellent nutrition • About 61% had slight or no mobility limitations • About 34% bedfast and 212% chair bound About 93% occasionally or rarely had moisture		• Category/Stage of worst injury using NPUAP definitions • Location of pressure injuries	• Pressure injury developed during admission=321 • Mean pressure injuries/person 1.46 (range 1-8) **Category/Stage of pressure injury** Category/Stage I pressure injuries 157 (15.4%) Category/Stage II pressure injuries 481 (47.1%) Category/Stage III pressure injuries 40 (3.9%) Category/Stage IV pressure injuries 33 (3.2%) Unstageable pressure injuries 146 (14.3%) Depp tissue injury 165 (16.1%)	• The characteristics of patients requiring hospital admission might not be truly representative of patients living in the community with PI • Unclear how pressure injuries were assessed • Relied on medical records	**Quality: Moderate**
Stevenson et al., 2013	Cross sectional observation **study conducted across to determine the prevalence of pressure injuries in community setting**	Study conducted in two sites in UK (site 1 n=1680 patients, Site 2 n=-) Inclusion criteria: • Aged ≥18 years • Site 1:at home in a residential home rehab palliative care or nursing home with or without a pressure ulcer	• No intervention	• Nurses collected data in both sites and were trained in using a standard form used for both sites • Risk was assessed using Braden scale and clinical judgement • Staging system used was EPUAP/NPUAP 1998	**Pressure injury prevalence** • Site 1: n=185 had a Category/Stage I or greater pressure injury, prevalence rate of 0.77 per 1000 • Site 2 n= 102 had a Category/Stage I or greater pressure injury, prevalence rate of 0.40 per 1000 • Most common sites were sacrum buttocks and heels	• Site 1 measured total population with or without pressure injury whilst site 2 only included those with pressure injuries • May also be that they had different support e.g. equipment	**Level of evidence: 4** **Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
		• Site 2: patients in the community nursing caseload known to have a pressure injury Participant characteristics: • Site 1 mean age= 78 years • Site 2 mean age was 77 years • More females than males • Mostly Caucasian • In site 1 most people were in nursing homes but site 2 most were living at home		• Study period was over a period of months	**Conclusion: study provides useful data on pressure injury prevalence in the community**	resources and patient education • Risk of double counting due to sources of data collection	
Rimmer, Yamaki, Lowry, Wang, & Vogel, 2010	Web survey investigating **prevalence of pressure injuries in overweight community-dwelling adolescents**	n=461 adolescents (aged 12 to 18 years) with cognitive (n=322) or physical (n=139) disability overweight (BMI ≥ 85th percentile): • 130/322 with cognitive disability • 28/139 with physical disability 67.5% males (mean age 14.8±1.9) 32.5% females (mean age 15.2±2.0)	N/A	• Prospective web-based survey • Clinical audit skin inspection	Pressure injury prevalence • 1.8% of overweight adolescents with cognitive disability had pressure injuryversus 0.7% of healthy weight (p=0.574) • 30.8% of overweight adolescents with physical disability had PU versus 14.3% of healthy weight (p=0.081)	• Parent-reported web-based survey • Non-representative population – primarily higher SES • Unclear how parents differentiated PU from other wounds or if only health professional diagnosis was requested	**Level of evidence: 4**
Tsai, Lin, Liu, & Wang, 2012	Cross-sectional study **investigating pressure injury prevalence in home care settings**	Home care setting (Taiwan) Matched pairs of home care patients and their caregivers (n=168) followed for 4 to 6 weeks Exclusion criteria: • Existing pressure injury • Readmission to hospital Participant characteristics: • Mean age 76 years		• Used NPUAP classification • Clinical audit and inspection	Incidence of new pressure injuries while in home care was 14.3%• **Prevalence of pressure injuries** Stage I 20.8% • Stage II 75% • Stage III 4.2%	• Participants readmitted to hospital were excluded	**Level of evidence: 4**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
Other topics: Economic analyses in community settings							
Guest, Fuller, Vowden, & Vowden, 2018	Retrospective cohort analysis evaluating impact and costs of pressure injuries treated in the community	Participants were records in a national database of general practice patients in the UK (n= Inclusion criteria: • Aged ≥ 18 years • Diagnosis of pressure injury post 2012 • Continuous 12 months medical records from presentation with a pressure injury Exclusion criteria: • Hospital-acquired pressure injury • Died within 12 months of diagnosis Participant characteristics: • Mean age 77.2 years • 44% had BMI ≥25kg/m2 • 60% had a Category/Stage III pressure injury, 10% Category/Stage IV, 11% Category/Stage I, 7% Category/Stage II, 12% unstageable • 35% pressure injuries occurred within 3 months of a hospital discharge • 9% were wheelchair users • High level of comorbidity	Audit of interventions, see results	Data base review including patient characteristics, wound-related resource use, visits with health professionals, medication use	**Pressure injury healing** • 50% pressure injuries healed within 12 months (100% of Category/Stage I, 69% of Category/Stage II, 41% of Category/Stage III, 21% of Category/Stage IV, 36% of unstageable) • Time to healing was a mean 5.4 months (1.1 months for Category/Stage I, 5 month for Category/Stage II, 7.7 month Category/Stage III and IV, 10 months for unstageable) **Pressure injury management** • 60% patients first saw a GP, 14% a practice nurse, 8% other health professional • 50% people with Category/Stage I pressure injury received no dressings • 50% of people received multiple dressings in first month • Category/Stage I pressure injuries had one nursing visit/week, Category/Stage II had three dressing changes/ two weeks, Category/Stage III pressure injuries had two dressing changes/week, Category/Stage IV had three dressing changes/ week, unstageable had two dressing changes/ week **Costs** • Mean cost over 12 months was £8720 per pressure injury (range £1382 for Category/Stage I to >£8500) • District nurse service accounted for ≥80% of costs • Dressings accounted for 15% of costs	• Relied on computer records • Only prescriptions recorded – did not follow up if these were used • Does not indicate how pressure injuries were assessed and staged • Indirect costs (e.g. lost wage) not included	**Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
					• Costs were higher when anti-infective plus antimicrobial dressing was prescribed		
Dale, Cox-Martin, Shaw, & Carolan-Rees, 2014	Retrospective chart review **to compare the cost of pressure injury healing in the community using an outreach service versus surgical repair**	Study conducted in a community setting in UK (n=93) Inclusion criteria: Category/Stage IV pressure injury with extensive damage Exclusion criteria: No Category/Stage IV pressure injury Participant characteristics: • n= 10 with multiple pressure injuries	Comparison of 2 services: • Pressure ulcer outreach service for non-surgical healing pressure injuries • Surgical closure without the outreach service	Category/Stage IV pressure injury costs and outreach staffing costs measured including daily costs, outreach staffing, surgery costs, number pressure injuries per service, recurrence rates, waiting times	Economic modelling Per patient there was a cost saving of £694.01 for the outreach service (£24954.90 with outreach vs £25648.91 with surgery) When recurrence was included, there was a cost saving of £8598 for the outreach service (£26028 with outreach vs £34626 with surgery) **Author conclusions: Non-surgical healing in the community with an outreach service is associated with cost-effective pressure injury management compared to surgery due to the lower recurrence rates**	This is a small study of only one case Using this comparative cost model the comparison of the outreach service and the surgical closure without the outreach service is hypothetical using retrospective data and based on one case	**Quality: moderate**
Chan et al., 2013	Economic analysis **to determine the cost in terms of resources of an individual with SCI living in the community**	Participants were one arm of a pilot RCT comparing an interdisciplinary pressure ulcer prevention approach to bed rest set in the community in Toronto and Ontario, Canada (n=14 consented, n=12 completed the study) Inclusion criteria: • Aged 18 years or over • SCI with quadriplegia or paraplegia • Category/Stage II to IV pressure injury present ≥3 months, likely healing in 6 months • Wheelchair user • Limiting mobility (i.e. increasing bed rest) due to concerns about skin condition	Individuals were randomized to receive interdisciplinary pressure management or bed rest for 3 months followed by a 4- month period where they had the option to continue with current treatment or switch to another treatment option. (no numbers provided) Unclear what other treatment options were	Monthly costs	**Cost for SCI person in community** Total average cost per patient in the community with an SCI is $4748 per month **Average monthly costs for pressure injuries** • Category/Stage II $683±636 • Category/Stage III $6098±10403 • Category/Stage II $823±1584 • Majority of cost (59%) attributed to nursing/allied health professional's costs, and hospital admissions	• Participants had pressure injuries for several months prior to recruitment, treatment costs not fully captured. • None of the participants healed by study end • Due to the nature of questionnaire, results may have been missing and participants may have had recall bias • Costs likely to be under estimated due to lack of relevant information about	**Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
		Exclusion criteria: • Osteomyelitis requiring surgical intervention • Medically unstable or unable to tolerate interventions • Limited life expectancy Participant characteristics: • Mean age 52.4 years (range 24 to 70) • 67% males • Average time since spinal cord injury 21 years • Current pressure injuries were of median duration 8.5 months • Category/stage pressure injuries: 25% Category/Stage IV, 67% Category/Stage III, 8% Category/Stage II				unpaid education and nursing time	
Other topics: Adherence to treatment plans in community settings							
Clark et al., 2014	Preliminary report on an RCT to assess the efficacy of a complex, preventive **intervention in reducing the incidence of, and costs associated with, the development of medically serious pressure ulcers in people with**	Participants were individuals with spinal cord injury recruited in a community facility in US (n=170) Inclusion criteria: • Non-ambulatory • Cognitively intact • English or Spanish speaking • History of traumatic spinal cord injury ≥6 months prior • ≥1 medically serious pressure ulcer within the past 5 years • No worsening Category/Stage III pressure injury • No Category/Stage IV pressure injury	Participants were assigned to either: • 12 month preventive intervention (PUPS) group consisting of preplanned weekly contact with occupational therapist in consultation with RNs who made wound care prevention and treatment recommendations, 9 home visits and 15 phone calls during intensive phase (month 1-6), then a tapered	• All health delivery by individuals blinded to study design and hypotheses. • Primary outcome is the incidence of serious PU • Secondary endpoints which include: pressure injury related surgeries, medical costs, quality of life. • Outcomes assessed at 12 and 24 months after randomization • Also studying mediating mechanisms	**Pressure injury outcomes and costs** Not reported **Adherence** • 90% treatment adherence rate and enactment of assessment plan • Difficulties with intervention delivery and fidelity changes including: life circumstances, high risk activities, translating interventions to Spanish	• Unknown if intervention is effective in treating or preventing pressure injuries • Difficulty obtaining sample size due to small SCI population • Participants had low income and education and unstable housing, high risk group • Inconsistencies in pressure injury	**Level of evidence: 1** **Quality: High**

Ref	Type of Study	Sample	Intervention(s)	Outcome Measures & Length of Follow-up	Results	Limitations and comments	
	spinal cord injury.	Participant characteristics: • Primarily males • 83 Hispanic/Latinos, 54 African-Americans, 22 Whites, and 11 people of mixed or other ethnicities • 54% with household incomes less than 1/4th of the 2011 national median income	phase (months 7-12), opportunity for immediate contact if experience problems, ≤$400 for prevention equipment (n=) or • standard care control group with no personal or phone calls (n=)	that account for intervention outcomes		assessment and clinical documentation • Potential inadvertent contamination of the control group	
Other topics: Factors associated with healing							
E. Lee, 2017	Retrospective study to investigate **factors associated with healing over time in the setting of community-based home care**	Participants were recruited in home care in South Korea from 2006-2010 (n=184) Inclusion criteria: • At least one pressure injury • Treated in home care Exclusion criteria: • Requesting primary health care for issue other than pressure injury Participant characteristics: • 52.2% males • Mean age 65.1 years • 81.5% completely bedridden • 64.1% alert, 27.7% drowsy • 59.8% had one pressure injury, 23.4% had 2 pressure injuries, 9.2% had 3 pressure injuries, 7.6% had 4 or more pressure injuries • About 25% pressure injuries were >24cm^2	• Home care services provided by a nurse approx. 6.83 times/month with interval between visits of 4 days • Care included physical assessment, pressure injury assessment, dressing care, debridement Range of wound dressings used	• Pressure injury changes (location, size, depth, stage, color and odor) • Pressure injury healing • Risk factors such as level of mobility and level of consciousness-assessed with Glasgow Coma Scale • NPUAP Staging scale • Mean service duration was 6.8 months •	**Pressure injury change** • Probability of change PI status: 66.7% • Probability of Category/Stage I or II pressure injuries healing per month was 1.20%, probability of remaining the same was 94.46% and probability of deterioration was 4.33% • Probability of Category/Stage I or II pressure injuries healing per month was 5.14%, probability of remaining the same was 91.90% and probability of deterioration was 2.96% **Probability of healing in 12 months** About 10% pressure injuries completely healed in 12 months **Hazard ratio for complete pressure injury healing at 12 months (Cox regression)** • Aged <65 years, HR 1.83 (95% CI 0.64 to 5.19) • Having no mobility HR 1.46 (95% CI 0.49 to 4.39) • Having a Sage I or II pressure injury HR 1.94 (95% CI 0.42 to 9.02) • Having a Stage III pressure injury HR 2.0 (95% CI 0.45 to 9.25)	• All pressure injuries received different care plans so it is hard to determine whether this had an influence on results • Care was delivered only every 4 days • Small study with no comparator group • Unclear how outcomes were measured and if this was consistent across participants • 88% of patients discontinued services during the study period (e.g. due to hospitalization or death)	**Level of evidence: 3 (prognostic)** **Quality: Moderate**

Table 1: Level of Evidence for Intervention Studies

Level 1	**Experimental Designs** • Randomized trial
Level 2	**Quasi-experimental design** • Prospectively controlled study design • Pre-test post-test or historic/retrospective control group study
Level 3	**Observational-analytical designs** • Cohort study with or without control group • Case-controlled study
Level 4	**Observational-descriptive studies (no control)** • Observational study with no control group • Cross-sectional study • Case series (n=10+)
Level 5	**Indirect evidence**: studies in normal human subjects, human subjects with other types of chronic wounds, laboratory studies using animals, or computational models

Table 2: Levels of evidence for diagnostic studies in the EPUAP-NPUAP-PPPIA guideline update

Level 1	Individual high quality (cross sectional) studies according to the quality assessment tools with consistently applied reference standard and blinding among consecutive persons.
Level 2	Non-consecutive studies or studies without consistently applied reference standards.
Level 3	Case-control studies or poor or non-independent reference standard.
Level 4	Mechanism-based reasoning, study of diagnostic yield (no reference standard).

Table 3: Levels of evidence for prognostic studies in the EPUAP-NPUAP-PPPIA guideline update

Level 1	A prospective cohort study.
Level 2	Analysis of prognostic factors amongst persons in a single arm of a randomized controlled trial.
Level 3	Case-series or case-control studies, or low quality prognostic cohort study, or retrospective cohort study.

APPRAISAL FOR STUDIES PROVIDING DIRECT EVIDENCE (i.e. ELIGIBLE FOR SUPPORTING AN EVIDENCE-BASED RECOMMENDATIONS

Each criteria on the critical appraisal forms was assessed as being fully met (Y), partially met or uncertain (U), not met/not reported/unclear (N), or not applicable (NA). Studies were generally described as high, moderate, or low quality using the following criteria:

- High quality studies: fully met at least 80% of applicable criteria
- Moderate quality studies: fully met at least 70% of applicable criteria
- Low quality studies: did not fully meet at least 70% of applicable criteria

CROSS SECTIONAL/SURVEY/PREVALENCE STUDIES/OBSERVATIONAL

Endnote ID	Author/year	Focussed question	Sampling method	Represent-ative sample	States number invited participants	Clear outcome measures	Valid reliable outcome measurement	Comparable results for multiple sites	Confounders identified and accounted for	Minimal bias	Reliable conclusions	Level of evidence	Quality
7965	Hopkins & Worboys, 2015	Y	U	Y	Y	Y	U	N	N	Y	U	4	low
16897	H. J. Lee et al., 2017	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	4	high
16831	Stephen-Haynes & Callaghan, 2017	Y	N	N	Y	Y	U	NA	N	Y	N	4	Low
7933	Stevenson et al., 2013	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	4	High
14500	Corbett et al., 2017	Y	Y	U	Y	Y	U	NA	N	Y	Y	4	Moderate

RCTS

Endnote ID	Author/year	Focussed question	Assignment randomised	Adequate concealment method	Subjects and investigators blinded	Groups comparable at commence-ment	Only difference btw groups was treatment	Valid, reliable outcome measure	% drop out in study arms is reported and acceptable	Intention to treat analysis	Comparable results for multiple sites	Minimal bias	Reliable conclusions	Level of evidence	Quality
7868	Clark et al., 2014	Y	Y	Y	N	Y	Y	Y	U	Y	Y	Y	Y	1	High
14241	Arora et al., 2017	Y	Y	Y	N	Y	Y	Y	Y	Y	U	Y	Y	1	High

COHORT STUDIES

	Author/year	Focussed	Comparable source	States number invited	Likelihood of outcome at enrolment	Per cent drop out in study arms is reported	Comparison btw drop outs and participants	Clear outcome measures	Assessment blinded or discuss potential bias	Valid, reliable assessment with supporting reference	More than one measure of exposure	Confounders identified and accounted for	Provides confidence intervals	Minimal bias	Reliable conclusions	Level of evidence	Quality
9533	Street et al., 2015	Y	Y	Y	N	N	NA	Y	N	N	N	N	Y	Y	U	3	low
6709	Ghaisas et al., 2015	U	Y	Y	NA	NA	NA	N	N	N	U	N	N	N	U	3	low

PROGNOSTIC STUDIES

	Author/year	Adequate description of baseline characteristics	Satisfactory study attrition	Clear outcome measures/prognostic factors	Range of prognostic factors/confounders measured and identified	Method of measuring prognostic factor is reported, valid and reliable	Same method of measure of prognostic factor for all	Continuous variables or appropriate cut offs	Percent participants with complete data acceptable	Appropriate imputation method	Confounders/prognostic factors accounted for in analysis	Selective reporting avoided	Adequate sample size (10 PIs per factor)	Level of evidence	Quality
3001	Gould et al., 2014	Y	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	3 (prognosis)	high
14500	Corbett et al., 2017	Y	NA	Y	N	N	U	Y	Y	NA	Y	Y	Y	3 (prognosis)	moderate
1324	De Paula Chaves Freitas & Alberti, 2013	Y	U	Y	Y	U	U	U	U	U	Y	U	Y	3 (prognosis)	Low
6683	Morita et al., 2015	Y	Y	Y	N	U	Y	Y	Y	NA	Y	Y	Y	3 (prognosis)	High
13997	E. Lee, 2017	Y	Y	Y	Y	U	U	Y	Y	NA	N	Y	Y	3 (prognosis)	Moderate

ECONOMIC EVALUATIONS

	Author/year	Focussed question	Economic importance of question is clear	Choice of study design is justified	All costs are included and measured and valued appropriately	Outcome measures to answer study question are relevant and measured and valued appropriately	Discounting of future costs and outcome measures is performed correctly when appropriate	Assumptions explicit and a sensitivity analysis conducted	Results provide information relevant for policy providers	Minimal bias	Reliable conclusions	Level of evidence	Quality
2939	Dale et al., 2014	N	N	N	Y	Y	N	Y	Y	Y	Y	NA	Moderate
27	Chan et al., 2013	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	High
17181	Guest et al., 2018	Y	Y	Y	Y	U	NA	Y	Y	Y	Y	NA	High

QUALITATIVE STUDIES

Endnote ID	Author/year	Focussed question	Appropriate qualitative methodology	Recruitment appropriate to research and sample justified	Setting for data collection justified	Clear, explicit methods for data collection	Saturation of data	Researchers role in data collection and analysis and potential bias addressed	Ethics clearance	In-depth description of analysis technique	Sufficient supporting data	Contradictory data considered	Findings related to original question are stated	Discusses evidence for and against the researcher's argument	Research contributes to the existing knowledge	Level of evidence	Quality
15190 14414 15738	D. Jackson et al., 2017a, 2017b; D. E. Jackson et al., 2017	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	5	High

SYSTEMATIC REVIEWS FOR DISCUSSION

RATING CRITERIA:

1 Partial yes: states review question, search strategy, in/exclusion criteria and risk of bias were a-priori; full yes: meta-analysis/synthesis plan, investigation of heterogeneity and justification for protocol deviation

2 Partial yes: At least 2 databases, provides keywords and search, justifies publication restrictions; full yes: searched reference lists of included studies, searched trial registries, consulted experts in field, searched grey literature, search within 24 months of review completion

3 At least two reviewers independently agreed on selection of studies to include or reviewers achieved 80% agreement on a sample of studies

4 Either two reviewers did data extraction and had >80% agreement, or two reviewers reached consensus on data to extract

5 Partial yes: list of all relevant studies that were read and excluded; full yes: every study that was excluded is independently justified

6 Partial yes: described populations, interventions, comparators, outcomes and research design; full yes: detailed descriptions of same plus study setting and timeframe for follow-up

7 FOR RCTS Partial yes: appraised risk of bias from unconcealed allocation and lack of blinding; full yes: appraised risk of bias on true randomisation, selection of reported result from multiple measurements/analyses

FOR non randomised studies: Partial yes: appraised confounding and selection bias; full yes: appraised methods to ascertain exposures and outcomes, selection of reported result from multiple measurements/analyses

8 Must include reporting of the source of funding of individual studies, or reports that the reviewers considered this even if individual funding sources aren't listed in review

Endnote ID	Author/year	PICO research question and inclusion criteria	Explicitly states a-priori protocol[1]	Rationale for selection of study designs	Comprehensive search[2]	Duplicate study selection[3]	Duplicate data extraction[4]	Excluded studies listed[5]	Adequate description of included studies[6]	Risk of bias assessed[7]	Source of funding reported[8]	Appropriate meta-analysis including weighting and adjustment for heterogeneity	Meta-analysis considers risk of bias of studies	Discussion consider risk of bias of studies	Assessment of publication bias if quantitative analysis is done	Potential conflicts of interest of authors reported and managed	Review Quality
14628	Cogan et al., 2017				Y			N		Y		NA		N	N		Exclude

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