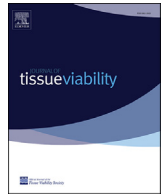




Contents lists available at ScienceDirect

Journal of Tissue Viability

journal homepage: www.elsevier.com/locate/jtv

Developing the tissue viability seating guidelines

Melanie Stephens^{a,*}, Carol Bartley^b, Ria Betteridge^c, Ray Samuriwo^{d,e,f}^a School of Health and Society, University of Salford, UK^b School of Health Sciences, University of Salford, UK^c Oxford University Hospitals NHS Foundation Trust, UK^d School of Healthcare Sciences, Cardiff University, UK^e Wales Centre for Evidence Based Care, Cardiff University, UK^f Cardiff Institute for Tissue Engineering and Repair (CITER), Cardiff University, UK

ARTICLE INFO

Article history:

Received 23 August 2017

Accepted 1 September 2017

Keywords:

Seating
Pressure ulcer
Guidelines
Adults

ABSTRACT

Background: Costs for the prevention and management of pressure ulcers have increased significantly with limited published advice from health and social care organisations on seating and preventing pressure ulcers. At the request of the UK Tissue Viability Society the aim of the publication was to develop a practical guide for people, carers and health and social care professionals on how the research and evidence base on pressure ulcer prevention and management can be applied to those who remain seated for extended periods of time.

Methods and findings: The evidence base informing the guidelines was obtained by applying a triangulation of methods: a literature review, listening event and stakeholder group consultation. The purpose was to engage users and carers, academics, clinicians, inspectorate and charities, with an interest in seating, positioning and pressure management to: gather views, feedback, stories, and evidence of the current practices in the field to create a greater awareness of the issue.

Conclusion: The new guidelines are inclusive of all people with short and long-term mobility issues to include all population groups. The document includes evidence on where pressure ulcers develop when seated, risk factors, best possible seated position and what seat adjustments are required, the ideal seating assessment, interventions, self-help suggestions and key seating outcomes. The updated TVS CPGs have been informed by the best available evidence, the insights and wisdom of experts, stakeholders and people who spend extended periods of time sitting.

© 2017 Published by Elsevier Ltd on behalf of Tissue Viability Society.

1. Introduction

Sitting is a customary, universal activity of daily living with many people spending a high proportion of the day seated. Harvey, Chastin and Skelton's [1] systematic review found that older adults aged over 60 spend on average 9.5 hours a day sitting. The consequences of prolonged sitting in relation to cardiovascular disease, diabetes and deep vein thrombosis which have been well documented [2]. However, the link between sitting and the development of pressure ulcers is less well established in contemporary literature even though people with decreased mobility being more susceptible to pressure ulcer formation [3,4].

Organisations in England who submit data to the NHS Safety Thermometer [5] reported that there were 130,917 (old and new) pressure ulcers during 2016/17, but it was not stated how many of these were associated with sitting. Current literature [6] suggests that when a person is seated the bones of the pelvis and the seated surface compress the soft tissue in the gluteal region resulting in tissue distortion and deformation. Tissue distortion and deformation occurs when seated, because the body weight is distributed over a smaller surface area resulting in higher pressures which can occur after a period of 1–2 hours [7]. Despite the long established awareness of the impact of being seated on tissue distortion and deformation, NICE [8] have highlighted the lack of robust evidence to inform clinical decision making with regards to the provision, supply and use of seating equipment.

In 2008, the Tissue Viability Society (TVS) commissioned the development of clinical practice guidelines for seating and pressure ulcers to assist health care professionals in identifying and

* Corresponding author. School of Health and Society, University of Salford, Fredrick Road Campus, Salford, Greater Manchester, M6 6PU, UK.

E-mail address: m.stephens@salford.ac.uk (M. Stephens).

providing suitable interventions to address this issue [9]. Since then there have been an increasing number of publications on the prevention and management of pressure ulcers in people who sit for extended periods of time. However, most of these publications did not have any end user collaboration in their development [3,10,11]. In 2016 The TVS commissioned an update of the clinical practice guidelines for seating and pressure ulcers to include the most up to date evidence and practice. The review of these guidelines was undertaken in line with the NICE [12] key principles for developing guidelines in order to ensure methodological rigour, with a specific focus on the inclusion of lay members and consultation. The review of the guidelines also complied with the international standards for guideline development by respecting the views, rights and unique contribution that ordinary people can make to the creation of healthcare related policy and decision making as they are the end users of care. This was accomplished by involving people who remain seated for extended periods of time in every step of the update of the clinical practice guidelines for seating and pressure ulcers [13]. This paper discusses the method and process which underpinned the update of the TVS clinical practice guidelines for seating and pressure ulcers.

2. Need for the review

Since the publication of the original TVS clinical practice guidelines for seating and pressure ulcers (CPGs) [9], a number of important developments have occurred that have underscored the need for these guidelines to be updated. Pressure ulcers have become the focus of considerable quality improvement efforts across the world as pressure ulcers are widely perceived to be an adverse healthcare related patient outcome [14–16]. In many countries, pressure ulcer related quality improvement efforts have entailed the implementation of measures such as skin care bundles [17–19] which provide little guidance on the care of patients who are seated for extended periods of time.

Over the last 10 years, the important contribution that patients and members of the public can make to research and clinical practice has been highlighted in a number of studies [20–22], papers [23–25] and reports [26–29] on different elements of healthcare. There has also been a global shift in healthcare with a greater emphasis on a prudent approach to population healthcare in which patients and the public are active participants in the co-production of care alongside healthcare professions in order to minimise unwarranted variations in care and to ensure the consistent delivery of safe high quality patient centred care [30–33]. Recent studies and reviews [34–38] have shown that making the correct judgements and decisions about pressure ulcers or any other aspect of wound care requires an ability to gather relevant information, an appropriate standard of clinical expertise an appropriate mental focus and state of mind as well as the due consideration of the preferences and wishes of the person receiving care. Up to date clinical practice guidelines based on the best available evidence are integral to ensuring that patients and their families consistently receive safe high quality care because they enhance healthcare professionals' judgement and decision making and reduces unnecessary variation in care [35,36,39].

The majority of contemporary of national and international guidelines [8,40] on pressure ulcer prevention and treatment do not provide detailed clinically focused guidance on how the care of people who are seated for extended periods of time especially with regards to the use of chairs and wheelchairs which incorporate preference s and views of the end users. For example, the NICE guidelines [8] refer to the need to give due consideration to the needs of people who are seated for long periods of time and are at risk of developing pressure ulcers. In order to ensure that people

who spend extended periods of time sitting consistently receive safe high quality care underpinned by evidence based decision making by healthcare professionals; it was imperative that the TVS CPGs were updated to with due consideration of the most up to date evidence and views of end users. The revised TVS CPGs set out specific guidance on seating and pressure ulcers which can be used to improve the quality of skin care that patients receive and to reduce the incidence of pressure ulcers especially in people who are seated for extended periods of time.

3. Stages of the process

3.1. Literature review

A scoping exercise was completed to map key concepts within seating since the original guidelines were developed [41]. This enabled the authors to set the parameters for a search of the literature in order to provide a framework within which to identify recent developments in the evidence base and provision of healthcare. A literature search was conducted in May 2016 and repeated in September 2016 using a PICO framework (See Fig. 1). Inclusion criteria comprised of articles published between 2008 and 2016, written in English and involved adult participants only. The search included the use of databases (CINAHL, PubMed, the Cochrane Library and Google Scholar), grey literature and hand searching using the terms in Fig. 1. From the initial search 554 citations were abstract screened by the authors and of these twenty-two were used to inform the cushion and chair selection content of the guidelines.

3.2. Stakeholder involvement

Within research there is a growing body of evidence to support the use of stakeholders in the development of clinical guidelines [8,12]. Stakeholders are defined as people or organisations who will have a specific interest in the subject or are affected by the outcomes [12]. This group of people should include supporters and critics in order to provide a balanced view [12]. Stakeholders were identified from the Tissue Viability Society trustees, service users, clinicians, policy makers, inspectorates, academics and charities. Patient engagement was seen as a key element of the process of developing the revised guidelines to ensure 'face validity and meaningfulness' (p.8) for the people for whom the guidelines were intended [13]. This meant that consideration was given to the definitions and language used and key elements of the guidelines, to empower the voice of the end user. The final group of stakeholders included: seven TVS trustees, two service users and three academics.

3.3. Listening event

Following the initial stakeholders meeting questions emerged related to equipment and measurement that required further clarification. A Listening event was arranged to gather the views and opinions of the wider community in relation to the findings. Listening events are used extensively in the healthcare arena to ensure that different perspectives are heard and explored [42]. They assist in strengthening the guidelines by acknowledging individual opinion and ensuring any resulting guidelines are developed to represent the identified end users and current evidence base [42].

A keynote speaker was invited to set the context of the event and give specific background in relation to product design, industry, healthcare and ultimately the end user. Academics, clinicians (all professions), inspectorate, charities, users, and carers with

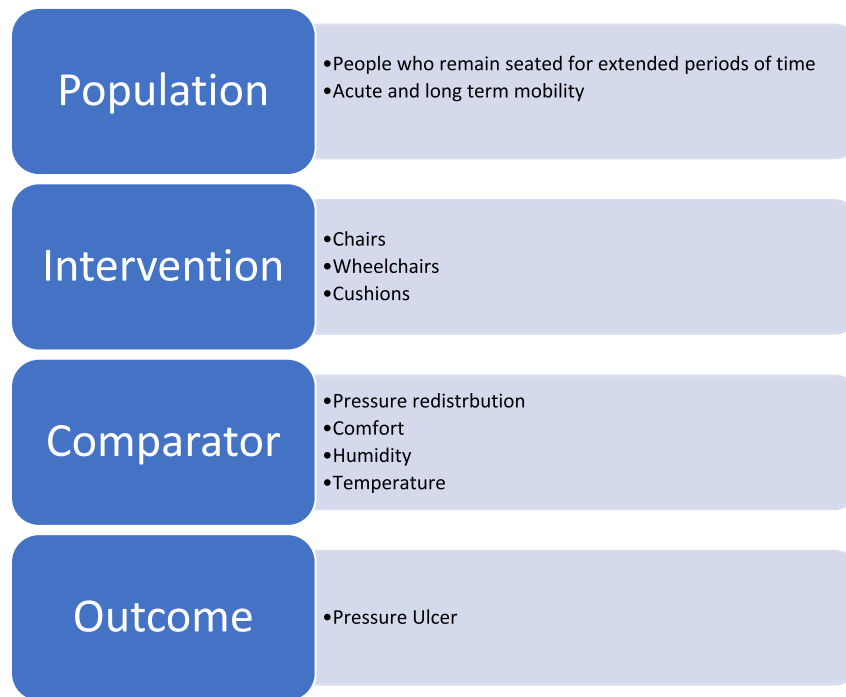


Fig. 1. PICO Framework.

an interest in seating, positioning and pressure management were invited to attend. The intention of the event was to gather views and feedback on the first draft of the document, gather further evidence of current practices in the field and to create greater awareness of the complexities of the issue using a nominal group technique [42]. The presence of users and their carers was essential for collecting opinions of the effectiveness of current commercially available seating products for service users who remain seated for extended periods of time, short term or long term.

The listening event took the form of five rotational workshops designed to elicit the views and opinions of the participants. Each workshop was facilitated by a specialist in the field. The topics of the workshops were:

- Risk and skin assessment tools
- Choosing a cushion
- Choosing a chair
- Choosing a Wheelchair
- Pressure mapping and anthropometric measurements

The findings of these round table discussions were aggregated and checked with the participants to ensure the views were representative and had been reported accurately. The benefits of working together included the sharing of information and understanding individual needs to ensure the guidelines were applicable to all.

3.4. Drafts

The drafted guidelines underwent several rounds of peer review to ensure that the content and tone was appropriate and focused. The peer review process is well defined in the literature on guideline development as a method to enhance the quality in the end product [42].

TVS Trustees, clinical experts, academic and Independent practitioners from different disciplines and communities and end

users were consulted to ensure that the guidelines were relevant and applicable for different settings and populations. The first draft was discussed at the Listening Event previously mentioned. Each subsequent version of the document was sent to specified individuals who represented key stakeholders for comment and review then modified and resent to check validity. The final draft was reviewed by a wider group again for final comments. By this stage, few amendments were put forward, suggesting that the guidelines were in a stable form. In total four drafts of the document were reviewed.

4. Content: variations from 2009

4.1. Terminology

It was imperative that the language used within the document was easily readable for all and this was founded upon conclusions from stakeholder meetings, a listening event and best practice [43]. From this the term 'people' was expressed by the service users as their preferred term and was then incorporated throughout the guidelines. Further terminology changes were included in a glossary providing both professional and lay terms which can be accessed from the full document.

4.2. Where do pressure ulcers develop when seated?

Common sites for pressure ulcer development when seated were documented in the original guidelines. However, the authors added elbows, back of the head and between the knees as these are common sites where pressure ulcers may develop due to the armrests, headrest and inappropriate positioning in the chair.

4.3. What is the best possible seated position and what seat adjustments are required?

There was a consensus agreement from the stakeholders and

listening event attendees that the term 'best possible seated position' was a more accurate representation of an individual's holistic requirements. The term 'correct' infers flawless and error free, however achieving it is virtually impossible for anyone. Addendums to the seated position included: headrest, backrest, seat to back angle, leg rest and footplate to ensure credence is given to the full body and not just the pelvis and trunk.

4.4. What makes an ideal seating assessment?

A four-dimensional approach to assessment was taken utilising the person, chair and cushion, carer and other factors such as the environment. In doing this the authors demonstrate that a person-centred approach to assessment should be used in order to avoid equipment abandonment [10].

4.5. Who might be involved in the seating assessment?

In order to respond to the changing landscape of seating provision the importance of interprofessional collaboration with other professionals has been highlighted.

4.6. What interventions can I expect after a seating assessment?

A person-centred approach is demonstrated throughout the document in particular in this section exploring the differences of opinion between end user and professionals in priority of necessary features in chairs and cushions. This evidence was obtained at the listening event.

4.7. Cushion and static chair selection

In order to accommodate the most recent research and product developments WaterCell technology was added to the cushion selection [3].

4.8. Tilt in space wheelchairs and chairs

Static armchairs with tilt in space facilities have been added to the document to reflect current best practice in the twenty-four hour management of pressure and posture care. More up to date research has been added on the advantages and disadvantages of tilt in space wheelchair positioning.

4.9. What self-help suggestions are there to assist in the prevention of pressure ulcer?

In line with current government initiatives regarding the importance of patient engagement [44,45] the term self-help has been used to encourage the individual to be an active participant in their care. In light of recent evidence, the action of wheelchair push ups has been excluded [46] and an addition to the SSKIN bundle 'sickness' has been added as this increases susceptibility to pressure ulcer development thereby rendering the acronym to SSKINS in this document [47].

4.10. Key seating outcomes for the long-term seated individual

In response to requests from commissioners of healthcare, patient reported outcome measures and include additional factors such as communication, comfort, stability, pressure redistribution and physiological abilities have been considered ⁽⁴⁸⁾.

4.11. Useful resources

These updated guidelines were developed for inclusivity with a resource page added for further reading enabling easy access to websites, apps and current guidance. Alongside the full document there is a shortened abridged 'at a glance version' which can be downloaded for free from the Tissue Viability Society website for use as an information leaflet.

5. Alerts

The original TVS CPG were widely acknowledged to be first to provide clear guidance on best practice on seating and pressure ulcer prevention and treatment. The original CPG were also widely used in the UK and beyond to inform and underpin the care of people who are seated for extended periods of time. The updated TVS CPGs also have a number of innovative and novel features (alerts) which in our view make them uniquely suited to inform and improve skin care of people who are seated for extended periods of time in the prevention and treatment of pressure ulcers. The alerts highlight areas such as: assessment of dark pigmented skin, assessment of specific areas of risk pertinent to people who sit for extended periods of time, contraindications of the use of footstools, selection of cushion, use of recline function, standing frames and devices and finally consideration of non-verbal cues.

6. Conclusion

This paper has set out the methods and process which underpinned the update of the TVS CPGs in line with best practice with regards to evidence synthesis, guidelines development and patient and public engagement. The update of the TVS CPGs was undertaken in an iterative process with a number of stages each of which generated novel insight, knowledge and concepts that were integrated into the final guidelines. The updated TVS CPGs have been informed by the best available evidence, the insights and wisdom of experts, stakeholders and people who spend extended periods of time sitting. The updated TVS CPGs have advanced what is known about how to deliver the best possible care to prevent and treat pressure ulcers with regards to people who are seated for extended periods of time. Therefore, the updated TVS CPGs address a gap in current knowledge and set out a clear set of standards for best practice. As with any guidelines, the TVS CPGs are based on the best available evidence at the time of publication so future pressure ulcer research and quality improvement initiatives must have a greater focus on the needs of the people who are seated for extended periods of time in order to ensure that they receive the best possible health care in the rapidly evolving healthcare context.

The updated TVS CPGs are written in easy to understand English and are designed to be used by healthcare professionals, carers and people who are seated for extended periods of time to make appropriate decisions to prevent pressure ulcers and promote comfortable seating. Therefore, it is vital that these guidelines are interpreted and utilised appropriately to ensure the consistent delivery of safe high care to people who are seated for extended periods of time which delivers the best possible pressure ulcer related outcomes.

Funding

This work was undertaken as part of a project to update the Tissue Viability Society Guidelines funded by the Tissue Viability Society. However, the views and opinions expressed therein are those of the authors and do not necessarily reflect those of the Tissue Viability Society. No funding bodies had any role in study

design, data collection and analysis, decision to publish, or preparation of the manuscript.

Conflict of interest

The authors have no conflict of interest Ria Betteridge is a former Trustee of the Tissue Viability Society and Ray Samuriwo is the current Chair of Trustees of the Tissue Viability Society.

Acknowledgements

We would like to thank the following for their contribution to the rewriting of the guidelines.

Dan Bader - Professor of Bio-engineering and Tissue Health, Health Sciences, University of Southampton.

Ria Betteridge* - Consultant Nurse Tissue Viability, Oxford University Hospitals NHS Trust.

Nicola Burke* - Service User and Member of Service User Group, School of Health Sciences, University Salford.

Chris Cammis* - Service User and Member of Service User Group, School of Health Sciences, University Salford.

Tina Chambers* - Tissue Viability Consultant, Educator and Advisor Ringwood, Hampshire.

Linda Primmer - Community Tissue Viability Nurse Specialist, NHS Lothian.

Ray Samuriwo - Lecturer in Adult Nursing, School of Healthcare Sciences, Cardiff University.

Julie Sturges* - Tissue Viability Nurse, Buckinghamshire Healthcare NHS Trust.

Roy. Vickers - Academic Librarian, University of Salford.

Jo Webb - Senior Lecturer Occupational Therapy, School of Health Sciences, University of Salford.

Dr. Anna Akinshina Lecturer in Physical Chemistry School of Environment & Life Sciences - University of Salford.

Karen Birch Community Occupational Therapist - Oldham Community Health Services.

Kymberly Chillely Student Nurse Mental Health - School of Health and Society, University of Salford.

Denisse DaSilva Operations Manager Disability Services (Occupational Therapist) - Bury Council.

Brian Donnelly Executive Director - CECOPS CIC.

Michelle Eachus Clinical Nurse Specialist Tissue Viability - Pennine Acute NHS Foundation Trust.

Suzanne Grierson Intern Lecturer - School of Health and Society, University of Salford.

Vince Hession Service User and Member of School of Health Sciences User and Carer Group - University of Salford.

Jennifer Kearns Student Nurse Mental Health - School of Health and Society, University of Salford.

Anthony McDonald Occupational Therapist - Halton Borough Council.

Paul Murtough Service User and Member of School of Health Sciences User and Carer Group - University of Salford.

Janette Navesey Community Staff Nurse - Pennine Acute NHS Foundation Trust.

Samantha Prince Student Nurse Mental Health - School of Health and Society, University of Salford.

Judith Ruddel Wheelchair/Occupational Therapist - North Tees and Hartlepool Foundation Trust.

Catherine Sainter Community Staff Nurse - Pennine Acute NHS Foundation Trust.

Wendy Smith Occupational Therapist - Community Neurology Team, Salford Royal Foundation NHS Trust.

Delphine Wise Student Occupational Therapist, School of Health Sciences, University of Salford.

Lucy Woodall Occupational Therapist - Salford Royal Foundation NHS Trust.

References

- [1] Harvey JA, Sebastian FM, Skelton DA. How sedentary are older People? A systematic review of the amount of sedentary behavior. *J Aging Phys Act* 2015;23:471–87. <http://dx.doi.org/10.1123/japa.2014-0164>.
- [2] Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet* 2012;380:219–29.
- [3] Bartley C, Stephens M. Evaluating the impact of Watercell® technology on pressure redistribution and comfort/discomfort of adults with limited mobility. *J Tissue Viability* 2017;26(2):144–9.
- [4] Bhattacharya S, Mishra RK. Pressure ulcers: current understanding and newer modalities of treatment. *Indian J Plast. Surg Off Publ Assoc Plast. Surg India* 2015;48(1):4–16. <http://dx.doi.org/10.4103/0970-0358.155260>.
- [5] England January 2016-January 2017 Health and social care information centre NHS safety thermometer: patient harms and harm free care. 2017. Retrieved from, <http://www.content.digital.nhs.uk/catalogue/PUB23160/nati-safe-rep-jan-2016-jan-2017.pdf>.
- [6] Brienza D, Valley J, Karg P, Akins J, Gefen A. An MRI investigation of the effects of user anatomy and wheelchair cushion type on tissue deformation. *J Tissue Viability* 2017. <http://dx.doi.org/10.1016/j.jtv.2017.04.001>.
- [7] Kosiak M. Etiology and pathology of ischemic ulcers. *Arch Phys Med Rehabil* 1959;40(2): 62e9.
- [8] National Institute of Health and Care Excellence. Pressure ulcers: prevention and management. 2014. Retrieved 20/6/17 from, <https://www.nice.org.uk/guidance/cg179>.
- [9] Stockton L, Gebhardt KS, Clark M. Seating and pressure ulcers: clinical practice guideline. *J Tissue Viability* 2009;18(4):98–108.
- [10] Crane B, Hobson D. The importance of comfort to wheelchair users - a preliminary study. In: Paper presented at the 18th international seating symposium; March 7–9, 2002. Vancouver, BC, Canada.
- [11] Geyer MJ, Brienza DM, Karg P, Treffer E, Kelsey S. A randomized control trial to evaluate pressure-reducing seat cushions for elderly wheelchair users. *Adv Skin Wound Care* 2001;14: 1120e219.
- [12] National Institute of Health and Care Excellence. Developing NICE guidelines: the manual. 2015. Retrieved 20/06/2017 from, <https://www.nice.org.uk/media/default/about/what-we-do/our-programmes/developing-nice-guidelines-the-manual.pdf>.
- [13] Armstrong MJ, Rueda JD, Gronseth GS, Mullins CD. Framework for enhancing clinical practice guidelines through continuous patient engagement. *Health Expect* 2016;20:3–10.
- [14] Samuriwo R, Williams H, Cooper J, Carson-Stevens A. Improving skin care through data: a pitch for patient safety incident reporting. *J Wound Care* 2016;25(12):691.
- [15] Smith IL, Nixon J, Brown S, Wilson L, Coleman S. Pressure ulcer and wounds reporting in NHS hospitals in England part 1: audit of monitoring systems. *J Tissue Viability* 2016;25(1):3–15.
- [16] Coleman S, Smith IL, Nixon J, Wilson L, Brown S. Pressure ulcer and wounds reporting in NHS hospitals in England part 2: survey of monitoring systems. *J Tissue Viability* 2016;25(1):16–25.
- [17] Richardson A, Peart J, Wright SE, McCullagh IJ. Reducing the incidence of pressure ulcers in critical care units: a 4-year quality improvement. *Int J Qual Health Care* 2017;29(3):433–9.
- [18] Chaboyer W, Bucknall T, Webster J, McInnes E, Gillespie BM, Banks M, et al. The effect of a patient centred care bundle intervention on pressure ulcer incidence (INTACT): a cluster randomised trial. *Int J Nurs Stud* 2016;64: 63–71.
- [19] Hendrich A, Tersigni AR, Jeffcoat S, Barnett CJ, Brideau LP, Pryor D. The Ascension Health Journey to zero: lessons learned and leadership perspectives. *Jt Comm. J Qual Patient Saf* 2007;33(12):739–49.
- [20] Baxter S, Bartley A. Preventing pressure ulcers driver diagram and change package. *Edinb Glasg Health Improv Scotl* July 2011;2011.
- [21] Daveson BA, de Wolf-Linder S, Witt J, Newson K, Morris C, Higginson IJ, et al. Results of a transparent expert consultation on patient and public involvement in palliative care research. *Palliat Med* 2015;29(10):939–49.
- [22] Synnot A. Stakeholder priorities for research in health communication and participation. Findings from the Cochrane consumers and communication priority setting project. Melbourne, Australia: La Trobe University, Melbourne; 2016.
- [23] Wilson P, Mathie E, Keenan J, McNeilly E, Goodman C, Howe A, et al. Health services and delivery research. *ReseArch with patient and public involvement: a Realist evaluation - the RAPPORT study*. Southampton (UK): NIHR Journals Library; 2015.
- [24] Born KB, Coulter A, Han A, Ellen M, Peul W, Myres P, et al. Engaging patients and the public in choosing wisely. *BMJ Qual Saf* 2017;26(8):687–91.
- [25] Donaldson L. Expert patients usher in a new era of opportunity for the NHS. *BMJ Br Med J* 2003;326(7402):1279–80.
- [26] Martin GP. 'Ordinary people only': knowledge, representativeness, and the publics of public participation in healthcare. *Soc Health Illn* 2008;30(1): 35–54.

- [27] Corrie C, Finch A. Expert patients. London: Reform; 2015. Faulkner A, Yiannoullou S, Kalathil J, Crepaz-Keay D, Singer F, James N, et al. Involvement for influence. London: The National Involvement Partnership (NIP); 2015.
- [28] Hibbard J, Gilbert H. Supporting people to manage their health. An introduction to patient activation. London: The Kings Fund; 2014.
- [29] Mulley A, Trimble C, Elwyn G. Patients' preferences matter. Stop the silent misdiagnosis. London: The Kings Fund; 2012.
- [30] Rix A, Marrin K. Prudent healthcare and patient activation. An appraisal prepared for the Planned Care Programme. Cardiff: Welsh Government; 2015.
- [31] Batalden M, Batalden P, Margolis P, Seid M, Armstrong G, Opiari-Arrigan L, et al. Coproduction of healthcare service. *BMJ Qual Saf* 2016;25(7):509–17.
- [32] Scotland NHS. Realising realistic medicine. Chief Medical Officer's annual report 2015–16. Edinburgh: The Scottish Government; 2017.
- [33] Bradley P, Willson A, Buss P, Harthy S, Laing H, Shortland G, et al. Achieving prudent healthcare in NHS Wales. Cardiff: Public Health Wales; 2014.
- [34] Samuriwo R, Dowding D. Nurses' pressure ulcer related judgements and decisions in clinical practice: a systematic review. *Int J Nurs Stud* 2014;51(12):1667–85.
- [35] Adderley UJ, Thompson C. Community nurses' judgement for the management of venous leg ulceration: a judgement analysis. *Int J Nurs Stud* 2015;52(1):345–54.
- [36] Adderley UJ, Thompson C. A comparison of the management of venous leg ulceration by specialist and generalist community nurses: a judgement analysis. *Int J Nurs Stud* 2016;53:134–43.
- [37] Adderley UJ, Thompson C. Confidence and clinical judgement in community nurses managing venous leg ulceration – a judgement analysis. *J Tissue Viability* 2017. Article In Press.
- [38] Shekelle P, Woolf S, Grimshaw J, Schunemann H, Eccles M. Developing clinical practice guidelines: reviewing, reporting, and publishing guidelines; updating guidelines; and the emerging issues of enhancing guideline implementability and accounting for comorbid conditions in guideline development. *Implement Sci* 2012;7(1):62.
- [39] NPUAP, EPUAP, PPPIA. Prevention and treatment of pressure ulcers: clinical practice guideline. Osborne Park, Western Australia: Cambridge Media; 2014. Report No.: 0–9807396.
- [40] Mays N, Roberts E, Popey J. Synthesising research evidence. In: Fullop N, Allen P, Clarke A, Black N, editors. *Methods for studying the delivery and organisation of health services*. London: Routledge; 2001.
- [41] National institute for health and care excellence (NICE) developing NICE guidelines: the manual. 2014. <https://www.nice.org.uk/media/default/about/what-we-do/our-programmes/developing-nice-guidelines-the-manual.pdf>. [Accessed 16 July 2017].
- [42] Tong A, Lopez-Vargas P, Howell M, Phoon R, Johnson D, Campbell D, et al. Consumer involvement in topic and outcome selection in the development of clinical practice guidelines. *Health Expect* 2012;15:410–23. <http://dx.doi.org/10.1111/j.1369-7625.2011.00676.x>.
- [43] NHS England. Liberating the NHS: No decision about me, without me' Department of Health. London: Crown Copyright; 2012.
- [44] NHS England. Five year forward view. London: Crown Copyright; 2014.
- [45] Sonenblum SE, Vonk TE, Janssen TW, Sprigle SH. Effects of wheelchair cushions and pressure relief manoeuvres on ischial interface pressure and blood flow in people with spinal cord injury. *Arch Phys Med Rehabil* 2014;95(7):1350–7. <http://dx.doi.org/10.1016/j.apmr.2014.01.007>.
- [46] Resuscitation Council (UK). Advanced Life support. sixth ed. London: Resuscitation Council (UK); 2011.
- [47] Kenny S, Gowran RJ. Outcome measures for wheelchair and seating provision: a critical appraisal. *Br J Occup Ther* 2014;77(2):67–77.