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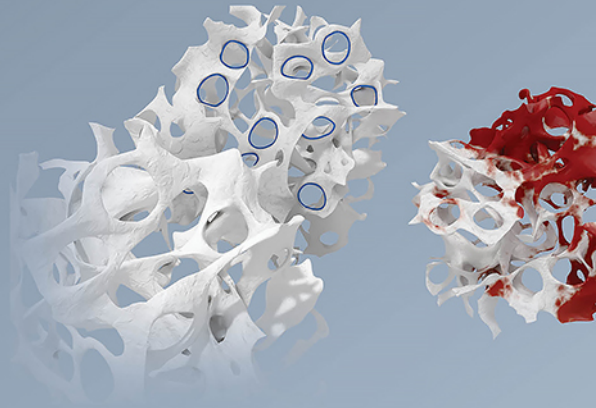
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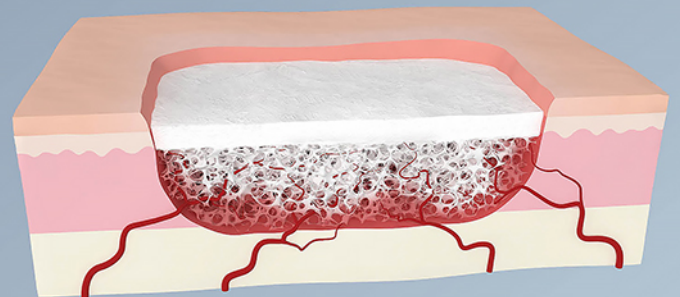
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ORIGINAL ARTICLE

Competencies of specialised wound care nurses: a European Delphi study

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Key words

CanMEDS; Competencies; Consensus; Delphi study; Wound care nurses

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Abstract

Health care professionals responsible for patients with complex wounds need a particular level of expertise and education to ensure optimum wound care. However, uniform education for those working as wound care nurses is lacking. We aimed to reach consensus among experts from six European countries as to the competencies for specialised wound care nurses that meet international professional expectations and educational systems. Wound care experts including doctors, wound care nurses, lecturers, managers and head nurses were invited to contribute to an e-Delphi study. They completed online questionnaires based on the Canadian Medical Education Directives for Specialists framework. Suggested competencies were rated on a 9-point Likert scale. Consensus was defined as an agreement of at least 75% for each competence. Response rates ranged from 62% (round 1) to 86% (rounds 2 and 3). The experts reached consensus on 77 (80%) competencies. Most competencies chosen belonged to the domain 'scholar' ($n = 19$), whereas few addressed those associated with being a 'health advocate' ($n = 7$). Competencies related to professional knowledge and expertise, ethical integrity and patient commitment were considered most important. This consensus on core competencies for specialised wound care nurses may help achieve a more uniform definition and education for specialised wound care nurses.

Introduction

Many patients with wounds require expert help from health care professionals (1). A mix of skills and experience of these professionals can improve the quality of care (2). A minimum level of education among professionals caring for (complex) wounds is a prerequisite to provide optimum wound care (3). This is particularly important for specialised wound care nurses, as they provide most of the direct care for such patients.

Key Messages

- consensus reached amongst experts about a set of core competencies specialised wound care nurses should have to ensure optimum wound care
- the consensus may lead to a more uniform definition and education of specialised wound care nurses
- the set of competencies may help make a proper distinction between general and specialist nurses

Table 1 Examples of different educational opportunities and degrees in Europe

Wound consultant education at the Erasmus Medical Centre, the Netherlands
Akademie für zertifiziertes Wundmanagement (ZWM) [®] , Germany
Bachelor of Science module in the Principles of Wound Care Management, University of Glamorgan, UK
Master of Science in Wound Healing and Tissue Repair, Cardiff University, UK
Master of Science in Wound and Tissue Viability, Catholic University, Portugal

In Western Europe, a range of educational opportunities are available to become a wound care nurse at the postgraduate level. These include degree-level courses (see Table 1). However, confusion still abounds regarding the scope of practice and expectations of graduates from such courses. Different titles are used to describe such individuals, for example, 'advanced wound care nurses', 'tissue viability nurses', 'wound consultants' or 'wound experts', which increases the confusion. Substantial curricular decisions are taken, and these are often based on informal consensus or local efforts and may depend on the context of the health care organisation. It is an educational challenge to determine what the content and level of wound care curricula should be (3).

Despite a lack of uniform education for those working as wound care nurses, the term 'specialised' or 'advanced' appears unequivocal to describe their role and position (4). The term 'specialised' nurse leads, in some instances, to disharmony between general and specialist nurses (5). In general, 'advanced' nurses are defined as nurses who are employed in a clinical area with direct patient contact, are able to set the pace for changes in practice and are innovators. These attributes are underpinned by educational experiences beyond the level required for initial registration (4). However, it remains unclear whether this is commensurate with the ideal profile of specialised wound care nurses.

A recently published Delphi study among 360 caregivers prioritised inclusion of wound education in all professional undergraduate and postgraduate nursing programs (6). This supports the need for all caregivers involved in wound care to achieve a uniform standard of education. However, the specific competencies required for a 'specialised wound care nurse' remain unclear. Therefore, the aim of this study was to reach a consensus within Western Europe on a core set of desired competencies for specialised wound care nurses compatible with international expectations and educational systems.

Methods

Design

The Delphi technique is considered as an effective way to measure and obtain group consensus (7). We used a modified three-round e-Delphi technique using an internet-based questionnaire to reach consensus among experts from six Western European countries on the desired competencies

of specialised wound care nurses. This approach differed from the Delphi technique in that closed- and open-ended questions were posed and respondents were invited to suggest additional competencies to be judged.

Characteristics of 'specialised wound care nurses' and definition of 'core competencies'

The purpose of this study was to define a 'specialised wound care' as a qualified nurse who had successfully completed any additional wound-oriented education (including different levels of degree courses). In daily practice, these individuals would take care of patients with complex wounds, undertake consultations, decide on treatments appropriate for wounds and provide professional support for colleagues. Furthermore, they may also have responsibility for updating the protocols, and take evidence-based decisions regarding wound dressings and devices. This definition was provided to clarify terminology for the experts taking part in the survey.

A 'core competence' was defined as the functional adequacy and capacity to integrate knowledge and skills with attitudes and values into the specific context of practice (8). This principle should underpin the ideal competencies to be chosen for specialised wound care nurses.

Competency framework: CanMEDS domains

We searched in literatures to identify the current use of competency frameworks in clinical practice and to detect specific frameworks currently in use. Furthermore, we gathered information on current curricula and examples of course content from different educational institutions in Europe. Some curricula used the current or an adapted version of the Canadian Medical Education Directives for Specialists (CanMEDS) 2005 Physician Competence framework. Although there is no universally accepted framework, it was decided to use the CanMEDS as a structure for the development of the survey (9). This comprehensive framework comprises seven domains, each characterised by several attributes. Originally, this framework was designed to set out the core competencies for physicians, but has also been adopted by nurses to evaluate competencies. Currently, several countries in Europe (e.g. UK, the Netherlands and Denmark) are gradually adopting the CanMEDS framework in specialist education (10–12). This acceptance appears to indicate the applicability of such a framework in Europe. However, there is a lack of evidence to support the validity of this approach (13).

The purpose of this study was to convert the CanMEDS domain 'medical expert' into 'nursing expert'. Other CanMEDS domains include 'communicator', 'collaborator', 'manager', 'health advocate', 'scholar' and 'professional'. The descriptions of the different domains are found in Table 2.

Preparation of questionnaire

Before the commencement of the first Delphi round, we gathered relevant competencies by sending open-ended questions to ten Dutch caregivers (one doctor and nine specialised wound care nurses). This questionnaire was divided into seven

Table 2 CanMEDS domains

Domain	Description
Nursing expert	Competencies that focus on knowledge, skills and attitudes
Communicator	Competencies that allow an effective patient relationship and include dynamic exchanges in care
Collaborator	Competencies related to working effectively within a health care team
Manager	Competencies that focus on decision making about allocation of resources and organising practices within health care organisations
Health advocate	Competencies that focus on using expertise to promote health and well-being of patients, communities and populations
Scholar	Competencies that focus on lifelong commitment to learning, as well as on the creation, dissemination, application and translation of knowledge
Professional	Competencies that focus on commitment to ethical practice, professional regulation and high standards of behaviour

domain of the CanMEDS, based on the definitions given in the CanMEDS Framework 2005. The caregivers indicated which competencies they believed specialised wound care nurses should ideally possess. Additionally, we undertook telephone interviews with all respondents to identify and resolve any issues with the questionnaire, for example, problems with the formulation and clarity of the questions. No particular issues were identified. We collected many additional competencies ($n = 157$) from this pilot. We categorised and restructured these competencies being careful to avoid duplication, which resulted in a list of 80 competencies. This was used as a starting point for the first questionnaire.

Participants in the main study

We invited experts in the field of wound care or education from six Western European countries (i.e. Belgium, Denmark, the Netherlands, Portugal, Switzerland and UK). The convenience sample of six countries has similar health care systems, in particular the reimbursement system of health care. We aimed to include four groups of experts to obtain a broad spectrum of relevant professionals: 6 doctors, 12 specialised wound care nurses, 6 university teachers and 6 managers or head nurses of wound centres or departments, totalling 36 experts. The numbers of specialised wound care nurses were double those of the other groups as the opinions of these individuals were fundamental to the aim of this study. This resulted in a group of experts that was homogenous as to the field of investigation, but heterogeneous in terms of professional background. All experts were selected purposefully to ensure that they could give a valuable contribution to the discussion from their specialist background. Inclusion criteria were as follows: (i) at least 3 years postqualification experience; (ii) involvement in wound care or wound care education and (iii) ability to proficiently communicate and write in English. To increase response rates, we used personalised

letters, and contacted non-responders by email (14). If individuals did not respond to our initial invitation prior to the start of the study, and if they did not complete the first questionnaire, no further mailings or invitations were sent. More experts were invited than planned beforehand to ensure that none of the expert groups would be underrepresented after finishing the study.

Data collection

All wound care experts received the link for the URL of the online questionnaire by email, using a commercially available online survey tool (<http://www.surveymonkey.com>). The experts were asked to complete each Delphi round within 2 weeks. The three questionnaires were sent out monthly between January and March 2012. The questionnaires included instructions for completion. Up to two reminders were sent per round if necessary. Furthermore, within 2 weeks of receipt of all questionnaires, the experts received feedback on the previous round and the invitation for the next round.

Likert scale and consensus

In all rounds, experts expressed their opinion about which competencies they thought the ideal specialised wound care nurse should have on a 9-point Likert scale, ranging from 1 – highly irrelevant – to 9 – highly relevant. We grouped these scores into five categories: a score of 1 represented ‘strongly irrelevant’; scores of 2–3, ‘irrelevant’; scores of 4–5, ‘moderately relevant’; scores of 6–7, ‘relevant’; and scores of 8–9, ‘highly relevant’. This strikes a compromise between offering enough choice and the interpretability of the overall group response.

No standard threshold for consensus exists (15). Therefore, through a process of group discussion by the authors, we defined consensus if at least 75% of the experts agreed that the competence was ‘highly relevant’, and thus a ‘core competence’ of specialised wound care nurses. If more than 25% of the experts scored the competence in one of the other categories, we defined these competencies as ‘not a core competence’ of specialised wound care nurses.

Round 1

The questionnaire in the first Delphi round consisted of three parts. The first part posed questions about baseline characteristics of the experts. The second part contained 80 competencies, compiled from the pilot and structured according to the CanMEDS categories. The third part contained open-ended questions to identify issues that might have been omitted, such as ideas for additional content and further competencies. When adding a competence, we advised experts that they should consider two points: (i) there is no right or wrong competency and (ii) the profile should not be about the current situation or local practices, but rather what they thought should be included in a European set of competencies.

We used the results of the first round to select competencies to be considered as core competencies. Competencies reaching at least 75% consensus in round 1 were retained as agreed

competencies for the final consensus, and not discussed again in round 2.

Round 2

The second questionnaire consisted of two parts. The first part contained the remaining competencies from round 1 on which no consensus had been reached. We provided the experts with the overall group response from the first round. Experts could reconsider their original response or leave it unchanged. In the second part of the questionnaire, we presented the experts with the additional competencies as suggested by the experts in round 1.

If the results showed no consensus, after the experts had rated the same competencies twice, we rejected these competencies as core competencies for specialised wound care nurses. This decision was made after group discussion. No straightforward statements are available when to stop. The competencies that reached consensus in the second part of this questionnaire were retained. Thus, only the competencies that were added after round 1 that had not reached consensus here were presented again in round 3.

Round 3

The third questionnaire consisted of the competencies based on the suggestions made in round 1 on which no consensus had been reached after round 2. Again, we provided the experts with the overall group response of each competence.

If the results showed no consensus, the items were also rejected as core competence.

Ethical considerations

The local medical ethics committee waived the need for approval for this study. Willingness to participate was implied when the experts had given written consent before the start of the study or by response to the first questionnaire.

Data analysis

Data analysis was carried out using SPSS software (PASW statistics version 18.0, IBM, Armonk, NY). Summary descriptive statistics were calculated to determine the number of competencies that reached consensus after each round.

We conducted content analysis of all qualitative data from the pilot questionnaire as well as the first Delphi Round. All similar competencies were grouped into CanMEDS categories by the first author. This process was reviewed by three other authors who independently examined each category for similar competencies that could be collapsed into one.

Validation

Five external experts (one doctor from Denmark, two specialised wound care nurses from UK and two lecturers from Ireland) reviewed the final list of core competencies needed for specialised wound care nurses. None of them participated in the study and was recommended by experts in the field

based on their reputation. We asked the reviewers to provide a brief narrative commentary on the face validity of the final list. Face validity was assessed by judging the relevance and comprehensiveness of items (16). This was considered essential to make sure that the competencies adequately reflect those of specialised wound care nurses in daily practice.

Results

Initially, 26 experts consented to participate. Of these, 20 responded in the first round (77%). To increase our number of experts, we sent out an additional invitation to 32 further experts; of these, 16 (50%) responded. In total, 36 participants (36/58 = 62%) completed round 1. Two experts only completed the baseline characteristics, so we excluded their data from the analysis. Only those experts who participated in the first round or gave permission before the start of the study received the second and third questionnaires. Response rates in these last two rounds were 86% (37/43).

The characteristics of the international expert panel are presented in Table 3. This panel appeared as the representative of the field of investigation.

Round 1

In the first round, we were able to reach consensus regarding 70 of the 80 competencies, whereas ten remained open for a further consensus discussion in the subsequent rounds. From the open-ended questions in round 1, we identified 16 additional competencies to be judged. Thus, 26 competencies were to be rated in round 2 (see Figure 1).

Round 2

In round 2, consensus was reached about 7 of the 26 competencies. Eight competencies that were open for further discussion after round 1 did not reach consensus in round 2, and were considered as 'not a core competence' of specialised wound care nurses.

Round 3

Eleven competencies remained open for further discussion in round 3. None of these reached the level of consensus and was also considered as 'not a core competence' of specialised wound care nurses.

Final list

A total of 96 competencies were considered by the experts during all the three rounds. The experts reached consensus regarding 77 of the 96 (80%) for inclusion in the final list of 'core competencies' (Table 4). The distribution of competencies included in each CANMEDS domain is presented in Table 2. In Table 5, we give an overview of the competencies that did not reach consensus.

Overall, experts rated 'The application of a high level of wound care knowledge with regards to factors such as wound aetiology, underlying causes of problem wounds, and treatment options in patient care' (rank 1; mean, 8.86 on the

Table 3 Baseline characteristics of experts

Baseline characteristics	Round 1 N (%)	Round 2 N (%)	Round 3 N (%)
Number of participants per round	36	37	37
Country			
Belgium	5 (14)	4 (11)	5 (14)
Denmark	4 (11)	4 (11)	4 (11)
The Netherlands	8 (22)	10 (27)	9 (24)
Portugal	5 (14)	6 (16)	5 (13)
Switzerland	4 (11)	3 (8)	3 (8)
UK	10 (28)	10 (27)	11 (30)
Gender distribution			
Male	16 (44)	15 (40)	17 (46)
Profession (participants were asked to indicate all categories that apply)			
Doctor	8 (22)	8 (22)	9 (24)
Wound care nurse	23 (64)	23 (62)	23 (62)
Lecturer	10 (28)	10 (27)	10 (27)
Manager or head nurse	8 (22)	8 (22)	8 (22)
No. of years postgraduate experience in wound care			
3–5 years	5 (14)	3 (8)	3 (8)
5–10 years	3 (8)	3 (8)	3 (8)
10–15 years	9 (25)	9 (24)	9 (24)
>15 years	19 (53)	22 (60)	22 (60)
Highest level of education			
Some college but no degree	2 (5)	2 (5)	1 (3)
Associate degree	0 (0)	0 (0)	0 (0)
Bachelor degree	13 (36)	13 (35)	13 (35)
Master degree	10 (28)	10 (27)	11 (30)
Post-master degree	10 (28)	11 (30)	11 (30)
Missing	1 (3)	1 (3)	1 (3)
Practice mix			
Mainly acute wounds	0 (0)	0 (0)	0 (0)
Mainly chronic wounds	13 (36)	13 (35)	12 (32)
A mix of both chronic and acute wounds	20 (56)	20 (54)	22 (60)
Not applicable	3 (8)	4 (11)	3 (8)

9-point Likert scale) as most important followed by ‘the ability to protect information provided by or about patients, keeping it in confidence, and divulging it only with the patient’s permission except when otherwise required by law’ (rank 2; mean, 8.83) and ‘honesty and integrity in patient care’ and ‘commitment to their patients, profession, and society through ethical practice’ (both rank 3; mean, 8.72) as the top three most important. These competencies belong to the domains ‘nursing expert’ and ‘professional’.

Excluded from final list

Conversely, they rated ‘the ability to design a randomised clinical trial in wound care’ (rank 96; mean, 4.97), ‘the ability to write scientific articles for peer reviewed journals’ (rank 95; mean, 5.67) and ‘to communicate in English (oral as well as written), where English is not the native language’ (rank 94; mean, 6.51) as the three least important competencies.

External review

The elected list of 77 competencies was presented to an external review panel to judge face validity. The following quotes

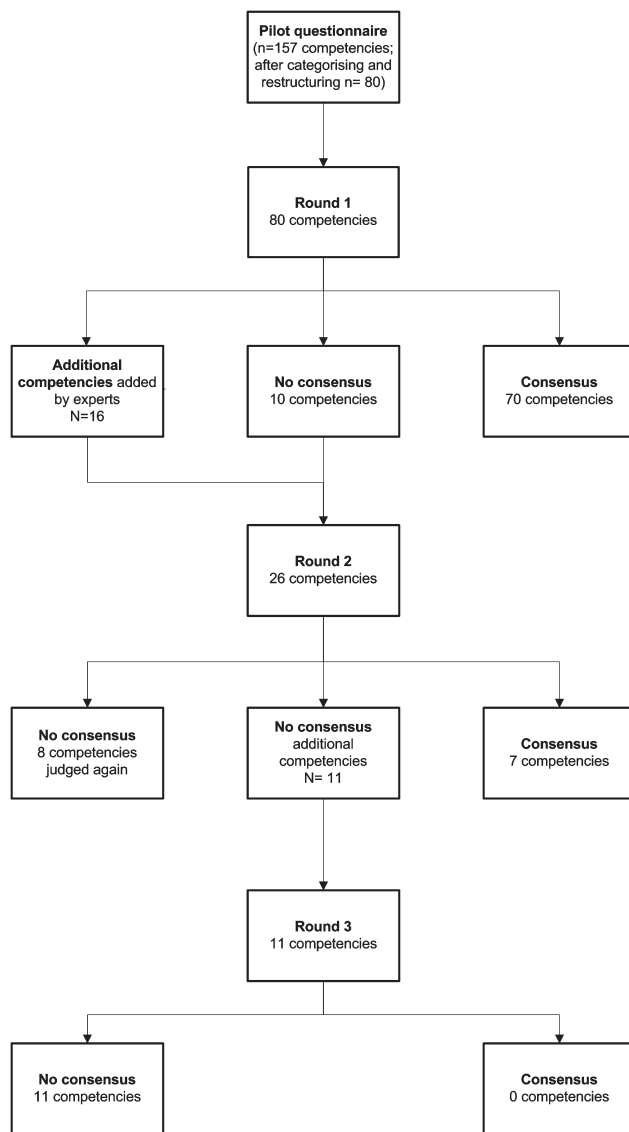


Figure 1 Flowchart of competencies per round.

were received: ‘I think this list is useful and important and in line with international expectations and educational systems’, ‘In my opinion the list of core competencies for wound care nurses demonstrates good face validity and appears to reflect the essential competencies for an ideal wound care nurse’, ‘I absolutely agree with all the elements of the competencies which are well thought out. I would like to order 5 new nurses like these please!’, ‘Basically all of them are relevant’ and the fifth reviewer answered ‘the listed competencies are good, however, some could be listed as essential and others as desirable’. Some additional suggestions concerned adding competencies related to patients and staff’s attitudes and basic knowledge about health economics. Finally, an advice was given to think about a numbering system for each within its subsection as this type of document will be useful for appraisals, teaching, etc. These points should be considered in future research.

Table 4 Competencies for specialised wound care nurses

Competencies	Percentage of experts rated these items as core competence
Domain: Nursing expert	
Which competencies should your ideal specialised wound care nurse have in terms of knowledge, skills and attitudes to deliver patient-centred care?	
Demonstrate the application of a high level of wound care knowledge with regard to factors such as wound aetiology, underlying causes of problem wounds and treatment options in patient care	100
Demonstrate the ability to use preventive and therapeutic interventions effectively	90
Demonstrate the ability to stimulate patient empowerment and patient self-management	86
Demonstrate the ability to perform a multifocal assessment of the whole patient, to include comorbidities, environmental hazards and patient barriers (e.g. lack of knowledge)	87
Demonstrate the ability to apply evidence-based wound care in clinical practice	84
Demonstrate the ability to master and initiate treatment of complex wounds	82
Demonstrate the ability to be ready to respond quickly if the patients' conditions change	82
Demonstrate the ability to perform specialised skills such as sharp debridement	79
Demonstrate the ability to examine current practices and evaluate traditional methods of the management of wounds, based on theoretical knowledge	79
Demonstrate the ability to use procedural, diagnostic and therapeutic skills proficiently and appropriately	75
Domain: Communicator	
Which competencies should your ideal specialised wound care nurse have to effectively facilitate the nurse–patient relationship and the dynamic exchanges that occur before, during and after the medical encounter?	
Demonstrate the ability to use appropriate terminology taking into account the intended recipient	97
Demonstrate the ability to accurately communicate relevant information and explanation to patients, colleagues and other professionals	94
Demonstrate the ability to provide clear instructions for patients and ensure appropriate follow-up care	94
Demonstrate the ability to obtain and synthesise relevant information and perspectives of patients and families, colleagues and other professionals accurately	92
Demonstrate the ability to communicate effectively and empathetically with patients and their families	92
Demonstrate the ability to maintain thorough, clear and concise documentation	92
Demonstrate the ability to be calm, provide clear information, be aware of patient expectations, formulate own expectations, appropriate attitude (polite, correct and interested behaviour)	91
Demonstrate the ability to develop a common understanding of issues, problems and plans with patients, families and other professionals to develop a shared plan of care	89
Demonstrate the ability to develop trusting, ethical and therapeutic relationships with patients and families	89
Demonstrate the ability to transform theory into practice that is understandable to the patient	89
Demonstrate the ability to provide an equal partnership between patient and wound care nurse	89
Demonstrate the ability to present a patient case in a clear, concise and complete manner	86
Demonstrate the ability to use a holistic approach to the patient, in which quality of life is essential	86
Demonstrate the ability to communicate the evidence to support a treatment option to the patient	77
Domain: Collaborator	
Which competencies should your ideal specialised wound care nurse have to work effectively within a health care team to achieve optimal patient care?	
Demonstrate the ability to establish and maintain effective workplace relationships with colleagues and other health care professionals	95
Demonstrate the ability to appreciate the benefit of inter-professional teamwork through learning alongside others from different professions	95
Demonstrate the ability to be open to other opinions and ideas and to reach a consensus	92
Demonstrate the ability to share knowledge and information to other colleagues on a specialist level	92
Demonstrate the ability to communicate (oral as well as written communications) about patients in a clear, concise and complete manner	89
Demonstrate the ability to work effectively with other health professionals to discuss, prevent and resolve inter-professional conflicts	86
Demonstrate the ability to participate effectively and appropriately in an inter-professional health care team	83
Demonstrate the ability to share knowledge of wound management with colleagues who are less informed about wound management	83
Demonstrate the ability to explain when, why and how choices are made, and describe the risk of treatments used to patients and other health care professionals	78
Demonstrate the ability to be reliable, have critical independence and are socially minded	75
Domain: Manager	
Which competencies should your ideal specialised wound care nurse have to act as an integral participant in health care organisations, able to organise sustainable practices, make decisions about allocation resources and contribute to the effectiveness of the health care system?	

Table 4 Continued

Competencies	Percentage of experts rated these items as core competence
Demonstrate the ability to use evidence-based and cost-effective investigations and treatments	92
Demonstrate the ability to be aware of the financial constraints within organisations	86
Demonstrate the ability to make timely and well-considered decisions	83
Demonstrate the ability to take control (leadership) and coordinate care for patients with wounds	81
Demonstrate the ability to lead or implement a change in health care regarding wound care	80
Demonstrate the ability to think analytically and strategically	78
Demonstrate the ability to participate in activities that contribute to the effectiveness of their health care organisation and systems	78
Demonstrate the ability to think beyond their own institution (e.g. national or international)	78
Demonstrate the ability to consult with other health care professionals and can justify these choices	75
Domain: Health advocate	
Which competencies should your ideal specialised wound care nurse have to use their expertise and influence to advance the health and well-being of individual patients, communities and populations correctly?	
Demonstrate the ability to give, in a specific situation, detailed advice to a patient	92
Demonstrate the ability to be aware of the underlying psychosocial and socioeconomic problems that may reduce adherence to the treatment	92
Demonstrate knowledge of risk factors of wound healing	89
Demonstrate the ability to counsel and educate patients to prevent complications	86
Demonstrate the ability to be creative and innovative in identifying solutions for individuals	86
Demonstrate knowledge of coping strategies of patients	81
Demonstrate the ability to identify opportunities to discuss risk factors with patients	75
Domain: Scholar	
Which competencies should your ideal specialised wound care nurse have to demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge?	
Demonstrate the ability to motivate others to use guidelines	95
Demonstrate the ability to adapt their working practices based on verified new insights	94
Demonstrate the ability to be open to feedback and actively seek feedback from patients, colleagues and other health care professionals	89
Demonstrate the ability to provide bedside teaching to patients and nurses at each consultation	89
Demonstrate the ability to provide effective feedback	89
Demonstrate the ability to keep up with the professional literature	86
Demonstrate the ability to translate knowledge into professional care	86
Demonstrate the ability to apply the concepts of evidence-based practice and best-practice guidelines and how they relate to patient care	86
Demonstrate the ability to support health care institutions to ensure that knowledge is kept up to date	86
Demonstrate the ability to search relevant scientific evidence	86
Demonstrate the ability to be self-guided in their professional development to include identification of their own learning needs	83
Demonstrate the ability to critically appraise the literature relevant to wound care	83
Demonstrate the ability to access a range of available educational resources to enhance patient care	80
Demonstrate the ability to identify wound care training needs of health professionals	80
Demonstrate the ability to combine all elements of evidence-based practice (including evidence, clinical experience, patient preferences and costs) in making decisions about care for individual patients	78
Demonstrate the ability to provide an effective lecture or presentation	78
Demonstrate the ability to select effective teaching strategies and content to facilitate the learning of others	78
Demonstrate the ability to interpret scientific research	77
Demonstrate the ability to develop standards in wound care for other professionals (i.e. assistant nurses) in wound care issues	77
Domain: Professional	
Which competencies should your ideal specialised wound care nurse have to show commitment to the health and well-being and society through ethical practice, professional regulation and high personal standards of behaviour?	
Demonstrate the ability to provide care in a responsible manner	98
Demonstrate the ability to protect information provided by or about patients, keeping it confidence and divulging it only with the patient's permission except when otherwise required by law	97
Demonstrate a commitment to their patients, profession and society through ethical practice	97
Demonstrate honesty and integrity in patient care	95
Demonstrate a commitment to their patients, profession and society through participation in profession-led regulation	95
Demonstrate the ability to strive for high-level expertise in light of evidence-based practice in wound care	95
Demonstrate a commitment to nurse health and sustainable practice	91
Demonstrate a compassionate and a non-judgmental approach to all patients	89

Table 5 Number of core competencies that did not reach consensus

Competencies	Percentage of experts rated these items as core competence
Nursing expert	
Demonstrate knowledge and application of controversial issues related to wound healing and tissue repair	61
Communicator	
Demonstrate the ability to use social media/ICT in contacting patients and colleagues	57
Demonstrate the ability to communicate in English (oral as well as written), where English is not the native language	43
Manager	
Demonstrate the ability to undertake pioneering work, implement innovations and provide access to optimal quality of patient care	74
Demonstrate the ability to understand organisational structures	54
Demonstrate the ability to manage a wound care service and budget	54
Demonstrate the ability to play a key role in the negotiation between health care institutions and industries	46
Demonstrate the ability to use contacts out of their network to improve the financial balance of national health care (e.g. stimulate outpatient care)	43
Scholar	
Demonstrate the ability to search for new knowledge using scientific electronic databases with scientific publications (e.g. Pubmed, Cinahl, Ovid Medline, Cochrane Library)	70
Demonstrate the ability to participate/assist in scientific research	66
Demonstrate the ability to take an active role in imparting scientific knowledge to colleagues	65
Demonstrate the ability to have knowledge of word processing and spreadsheet software, for example, Microsoft Office® or similar programs	64
Demonstrate the ability to interpret randomised clinical trials	62
Demonstrate the ability to write articles for popular (non-scientific) journals	46
Demonstrate the ability to perform scientific research	37
Demonstrate the ability to publish scientific research	35
Demonstrate the ability to write scientific articles for peer-reviewed journals	28
Demonstrate the ability to design a randomised clinical trial	8
Professional	
Demonstrate the ability to seek to understand other cultures and to appreciate other cultures	57

Discussion

Wound care experts from six different countries in Western Europe reached consensus regarding 77 core competencies for specialised wound nurses based on the CanMEDS framework. In general, competencies related to professional knowledge and expertise, ethical integrity and patient commitment were considered to be essential competencies. These competencies are rather generic statements that do not strongly distinguish between general and specialist practice, but are competencies all health care professionals should have. Other competencies, such as teaching ability and research utilisation, may discern specialist nurses. Conversely, research activities (e.g. performing and publishing research) were considered less relevant. This is helpful to map the educational outcomes expected of specialised wound care nurses.

This consensus may contribute to a more uniform education to and performance of specialised wound care nurses in developed countries. Moreover, it may standardise the definition and position of such specialised nurses in clinical practice. Such harmonisation is pivotal in the recognition of wound care as a large, multidisciplinary area within health care that deserves attention by highly trained professionals to ensure the quality of patient care.

The experts judged the competencies in the domain 'scholar', that is, performing, participating and publishing scientific research, as less relevant. The conceptual

framework of Straus *et al.* (17), regarding the levels of usage of evidence-based medicine, was designed for doctors but can be extrapolated to specialised wound care nurses. Following this framework, our study indicates that one should practice evidence-based medicine as an 'user', instead of a 'replicator' or a 'doer'. The competencies referring to 'scholar' are in accordance with the view that not all caregivers should be involved in wound care research. However, stakeholders such as specialised wound care nurses should be able to critique and apply research pertinent to their area (18,19), and in teaching activities.

Besides the educational challenge in wound care, the shift of tasks from doctors to nurses is another emerging feature. The range of duties of nurses is changing (e.g. nurses prescribing drugs). This is the case not only in Europe but also in Canada and the USA. This change of responsibilities has burgeoned because of not only the increased demands and reforms in health care, but also the increasing specialisation and advanced educational opportunities in nursing (6,20,21). Concurrently, many developed countries are seeking to shift provision from doctors to nurses, while trying to cope with an increasing pressure to constrain costs (21). The consensus reached in this Delphi study may help clarify which competencies are required and also reduce uncertainty and confusion among specialised wound care nurses regarding their responsibilities in the medical and nursing fields. In various settings, appropriately trained nurses may produce

health outcomes and quality of patient care that are equal to those achieved by doctors (21,22). Therefore, the results of our study may help doctors defer tasks and relinquish some control (e.g. coordination between care and provision of patient education) to specialised wound care nurses.

The main strength of this study was the use of a digital Delphi technique to achieve consensus in an area where empirical evidence is scarce (23). This method gives equal weight to the opinion of each expert, allows anonymous inclusion of experts across various countries and levels of expertise, and avoids the domination by one expert of the consensus process (15).

Attrition rates in questionnaire research are a recognised problem (15). Withdrawal can occur in each stage, but high dropout rates in the final round may substantially influence the results (24). In our study, the reason for withdrawal was not recorded. However, we achieved high response rates in every round. Therefore, we consider our results to be robust. A possible reason for the high response rate may be that the experts recognised the importance of the topic and considered themselves as partners in the study. Feeling involved is important to bridge the well-described gap between research and practice (25). Because of the range of specialties and countries involved in this Delphi study, this ultimate set of core competencies is likely to be generalisable to other specialised wound care nurses in other developed countries.

There are also some limitations in this study. First, we included only 6 of the 27 European countries (22%) and 5 external reviewers. However, we chose our contributors purposefully, based on their expertise in wound care. Furthermore, we included only English-speaking experts. This was done deliberately to make sure that the experts completely understood the described competencies. Second, the present consensus comprises numerous competencies. Stakeholders should organise these competencies thematically to make this framework easier to use in daily practice. However, these themes should include all competencies to reflect the full spectrum of tasks specialised wound care nurses should fulfil. Third, the level of consensus was chosen arbitrarily, because no standard threshold for consensus is available (15). If we had chosen a higher consensus level (e.g. 80%), more competencies were considered as 'not a core competence'. This may have provided a more compact, easier-to-use, but less comprehensive list of competencies. Conversely, we could have defined consensus at a lower level of agreement. In that case, competencies regarding implementing innovations and searching scientific evidence would also have been considered as core competencies. Additionally, some of the general competencies may benefit from further discussion to focus more on the specific tasks of wound care nurses. This study provides a set of competencies for specialised wound care nurses, which can serve as a basis for further polish and particularise their competencies. Finally, many studies in health care support the use of the CanMEDS framework to structure competencies (26–28). However, an officially adapted version of the CanMEDS for nurses is lacking, although we found that various curricula of nursing schools are based on the CanMEDS framework.

By means of the Delphi technique, we were able to reach an international consensus about core competencies for specialised wound care nurses. This consensus may be helpful to achieve a more uniform and better definition of specialised wound care nurses and, ultimately, a more uniform and better quality of wound care. The next step should be the acceptance and implementation of this set of competencies in education and clinical practice. Furthermore, support from European wound care organisations, such as the European Wound Management Association (EWMA), may be helpful to make these steps easier to take.

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Author contribution

AME participated in the design of the study, collected the data, corresponded with the Delphi respondents and drafted the manuscript. JMM participated in the design of the study and was involved in drafting the manuscript. SH, NvD, PA and DAL were involved in designing the study and gave intellectual input on the manuscript. DTU and HV also gave intellectual input on the manuscript, and they were the project leaders. Furthermore, they had the overall responsibility for the study. All authors have read and approved the final version of the manuscript.

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