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Research Article

Development of competencies for advanced nursing practice in intensive care units across Europe: A modified e-Delphi study

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ABSTRACT

Purpose: The aim of this study was to identify and define core competencies for advanced nursing roles in adult intensive care units across Europe.
Methods: Three round electronic Delphi conducted between September 2018 and November 2019, with an expert panel of 184 nurses from 20 countries, supplemented by consensus meetings with 16 participants from 10 countries before each round.
Results: In Round 1, participants generated 275 statements across 4 domains (knowledge skills and clinical performance; clinical leadership, teaching and supervision; personal effectiveness; safety and systems management). These were re-worded as competency statements and refined at a consensus meeting resulting in 230 statements in 30 sub-domains. The expert panel rated the 'importance' of each statement in Round 2; further refinement at the consensus meeting and the addition of descriptors for sub-domains resulted in 95 competency statements presented to the panel in Round 3. These were all retained in the final set of competency statements.
Conclusion: We have used consensus techniques to generate competencies for advanced practice in intensive care nursing that are relevant across European countries and available in eight languages. These have provided the basis for an outline curriculum from which education programmes can be developed within countries.

Background

Across Europe, the Bologna agreement has sought to move all undergraduate nursing programmes from hospital-based diploma to Bachelor's degree (Collins and Hewer, 2014). There is, however, wide variation in specialist postgraduate intensive care nursing education programmes, with duration of programmes ranging from 30 days to 24 months, variation in eligibility and assessment requirements and lack of access to educational resources in some European countries (Endacott et al., 2015). Competencies have been developed for intensive care unit (ICU) nursing specialist practice (Hadjibalassi et al., 2012; European federation of Critical Care Nursing associations (EfCCNa), 2013) but not for ICU nursing advanced practice. It is evident from a recent scoping review that there is much variation in how these terms are used and the corresponding level of practice expected of ICU nurses (Egerod et al., 2021).

Changes in the critically ill patient profile (Jones et al., 2020a), coupled with the move towards personalised medicine in the clinical and trial setting (Shankar-Hari et al., 2018), point towards the need for ICU nurses to operate in advanced practice roles, as reflected in the competencies developed in this study. It is suggested that variation in care is a key factor in the differences in outcomes for patients with similar disease profiles (Dongelmans et al., 2020). Findings of a systematic review demonstrate that the involvement of advanced practice ICU nurses in the patient's care reduced ICU length of stay, time to

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Implications for clinical practice

- Adult intensive care nurses, working on advanced practice level, should adopt the newly developed competencies to assess the standards against their clinical practice.
- The adult intensive care nursing competencies provide clear definitions and standards for professional advanced nursing practice and can be used to provide standardised and consistent education across Europe.
- Hospitals implementing the competencies are encouraged to analyse the wider impact of advanced practice roles on adverse events, workforce resilience and patient outcomes.

treatment, costs, and ICU mortality, and increased patient satisfaction (Woo et al., 2017). However, there is no internationally agreed set of competencies for ICU nurses to practice at this advanced level. Hence, as part of the broader International Nursing Advanced Competency-based Training for Intensive Care (INACTIC) project, the aim of this study was to identify and define core competencies for advanced nursing roles in intensive care across Europe. The overall aim of the INACTIC project was to develop competencies, associated curriculum materials and a list of online resources mapped to the curriculum (European Society Intensive Care Medicine, 2017). A scoping review paper has been published (Egerod et al., 2021) and feedback on the competencies, from patients and family members, has been presented at a conference (Jones et al., 2020b).

The objectives were 1) to use consensus methods to develop a set of competencies required of an advanced level ICU nurse within Europe and 2) to seek the views of other professionals and stakeholders on the final competency statements. This study is based on the definition of Advanced Practice provided by Health Education England: '*a practice with high degree of* autonomy *underpinned by master's level education encompassing the four pillars of clinical practice, leadership and management, education and research and a specific clinical competence'* (Health Education England (HEE), 2019). We use the definition of competency provided by the International Council of Nurses: '*the effective application of a combination of knowledge, skill and judgement demonstrated by an individual in daily practice or job performance*' (ICN, 2009).

Design and methods

The aim and objectives were addressed using a three-round modified e-Delphi study, conducted on the Survey Monkey platform, followed by consultation with members of the multi-disciplinary team in five countries. Variability in language skills amongst nurses across Europe makes e-Delphi, with appropriate translation, the consensus mode of choice (Gill et al., 2013). Methods and results are reported in line with the "Guidance on Conducting and Reporting Delphi Studies" (CREDES) (Jünger et al., 2017), which promotes consistency and quality in conducting Delphi studies. The consensus process was undertaken in three phases: agreeing scope, generating competencies and achieving consensus (Fig. 1) and was conducted between September 2018 and November 2019.

Participants

The expert panel was comprised of ICU nurses recruited through the European Society of Intensive Care Medicine (ESICM) and country representatives of the European federation of Critical Care Nursing associations (EfCCNa). We over-recruited to allow for attrition between rounds, an acknowledged limitation of the e-Delphi method (Gargon et al., 2019). We aimed to recruit 8–10 people from 20 countries (total 160–200 for Round 1); the overall goal was to keep at least two people per country (20%) engaged throughout the three round process. We achieved 23% (42/184) retention. We included nurses who were registered according to local country regulations with a minimum of five years' experience working in an ICU and currently working at least 0.2 Full Time Equivalent in a clinical ICU role.. Given that there are differences in ICU education opportunities between countries (Endacott et al., 2015), we took an inclusive approach. We particularly sought out participants from countries where nursing is perceived as a low status profession (Marcinowicz et al., 2016). We identified countries in which initial preparation to register as a nurse does not solely take place in Higher Education institutions, such as Croatia and Portugal (Lahtinen et al., 2014), as this is sometimes used as a proxy for the status of a profession. As the focus for the competencies is adult, general ICU, nurses working predominantly in cardiothoracic, neurological, paediatric or neonatal intensive care were excluded. Eligible participants were identified by the country representatives and could also self-select via adverts on professional society websites.

e-Delphi surveys

Prior to the modified e-Delphi, an extensive literature search of research studies and policy documents was undertaken to identify concepts relevant to advanced level ICU nursing. Content analysis was undertaken of existing nursing role descriptions for advanced ICU nursing. Four domains were identified from these sources: knowledge skills and clinical performance; clinical leadership, teaching and supervision; personal effectiveness; safety and systems management. A consensus meeting was held with 16 ICU nurses, with experience of advanced practice in ICU, from 10 countries to agree: parameters for 'advanced practice', eligibility for the expert panel and structure for the first e-Delphi round. The consensus process is outlined in Fig. 1.

The first e-Delphi round comprised an open-ended question ('*what would you expect an advanced level intensive care nurse to be able to do?*') designed to generate ideas for competencies in the four domains. Responses to Round 1 within each domain were re-worded as competencies and grouped into sub-domains and discussed at a further consensus meeting. In Round 2 of the e-Delphi, participants rated the importance of each competency statement using a 5-point Likert scale (1 *unimportant* to 5 *very important*). In Round 3, participants were presented with a refined list of competencies with descriptors, ensuring any redundant or repetitive statements were removed. Each statement had an 'agree/disagree' response option and a request option for explanation if 'disagree' was ticked.

To maximise opportunity for participation, the questionnaires of all three e-Delphi rounds were translated from English into seven languages (Croatian, French, German, Greek, Polish, Spanish, and Turkish). Participants in a number of countries also preferred to complete the survey in English. The competencies were designed for use by ICU nurses, assessors, educators and wider stakeholders hence it was essential that there was congruence for the clinical (technical) wording. We, therefore, undertook two levels of translation: i) primary translation, with back translation to ensure accuracy and ii) review of the translation by clinical experts. This second level of translation was essential to ensure that the competency statements were interpreted in the same way by participants in different countries. The translation followed the processes outlined by Wild and colleagues (Wild et al., 2005). It was undertaken

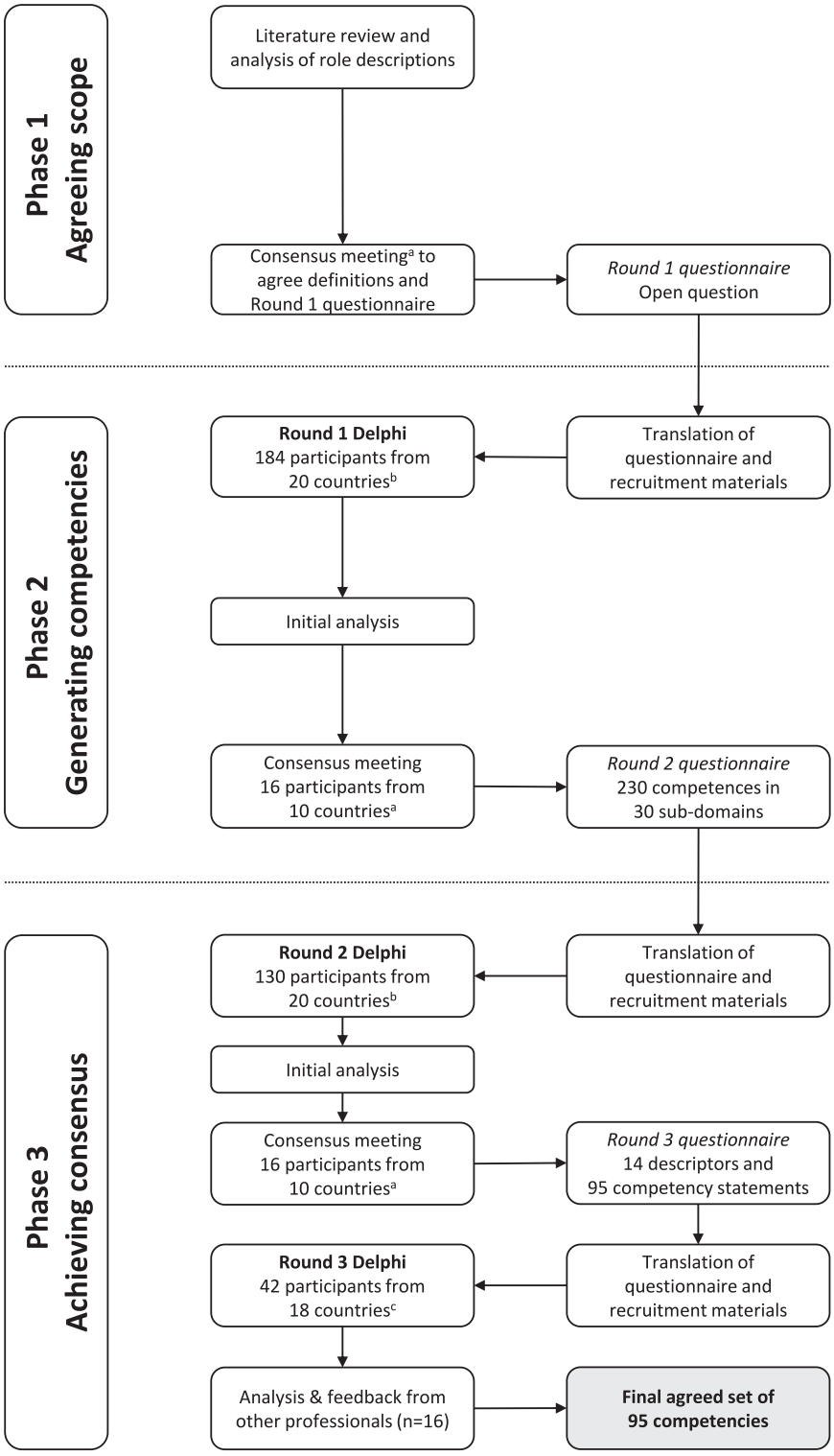

Fig. 1. Consensus process. KEY: a: Registered Nurses from Belgium, Denmark, England, France, Greece, Israel, Netherlands, Norway, Spain and Switzerland. b: Registered Nurses from Austria, Belgium, Croatia, Cyprus, Denmark, England, France, Germany, Greece, Iceland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and Turkey. c: Registered Nurses from Austria, Belgium, Croatia, Cyprus, Denmark, England, France, Germany, Greece, Iceland, Israel, Italy, Netherlands, Poland, Portugal, Spain, Sweden, and Turkey.

KEY: a: Registered Nurses from Belgium, Denmark, England, France, Greece, Israel, Netherlands, Norway, Spain and Switzerland
b: Registered Nurses from Austria, Belgium, Croatia, Cyprus, Denmark, England, France, Germany, Greece, Iceland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and Turkey
c: Registered Nurses from Austria, Belgium, Croatia, Cyprus, Denmark, England, France, Germany, Greece, Iceland, Israel, Italy, Netherlands, Poland, Portugal, Spain, Sweden, and Turkey

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Table 1
Domains, descriptors and competency statements.

Descriptor	Competency
Domain 1 Knowledge, skills and clinical performance	
Assessment skills The Advanced Practitioner will have the following competencies that distinguish advanced practice from threshold competent performance of the Advanced Practitioner: • apply theoretical knowledge to clinical practice, • demonstrate 'critical decision making' in 'complex and rapidly changing circumstances • demonstrate comprehensive knowledge and skills in these areas.	Undertakes comprehensive and systematic assessment of the patient's *Respiratory status* *Cardiovascular status* *Neurological status* *Renal Function* *Temperature control* *Acid Base Balance* *Skin Integrity* *Wound Care needs* *Comfort and Dignity*
Decision making based on evidence The Advanced Practitioner demonstrates decision making that involves data interpretation following physical assessment and the collation of data from monitoring devices and invasive equipment. Decisions are made in the context of the patient's wellbeing, comfort and safety and involve consultation with family members wherever possible including using the latest evidence.	Uses the latest evidence to inform decision making in relation to phases of *ventilation* *Weaning* *Dialysis* *Sedation Practice* *Delirium / agitation management* *Pain management* *Patient Nutrition* *Rehabilitation* *Invasive monitoring* *Inotropes and catecholamines titration*
Decision making in changing or complex circumstances The Advanced Practitioner is able to make decisions in uncertainty and rapidly changing circumstances of patients that requires constant vigilance, attention to detail and forward planning. Decisions are made in compliance with resuscitation algorithms, protocols and clinical guidelines. Decisions are taken independently but also in collaboration with colleagues from all disciplines and involve specialists where necessary. Referral to others is a decision. In this context, decisions are made in the patient's best interest, with respect for the patient's cultural and religious preferences and wherever possible involving the family.	Demonstrates decision making in complex and rapidly changing circumstances: *Emergencies* *Patient deterioration* *Altered consciousness* *Sepsis* *Multi system failure* *Withdrawal of active treatment* *End of Life care* *Organ donation* *Rehabilitation*
Procedural skills The Advanced Practitioner follows practical procedures underpinning patient care performed at a level of competence to teach, demonstrate to colleagues, incorporating the latest evidence to inform best practice.	Demonstrates competence to undertake *PEG Feeding* *Enteral Nutrition* *Catheter Care* *Understanding ABG results* *Dialysis* *Intravascular temperature control* *Haemodynamic monitoring* *Ventilation* *Weaning* *Preventing ICU complications* *Suctioning* *Tracheostomy Care* *Fundamental Care*
Leadership of Care The Advanced Practitioner demonstrates capability to lead care in collaboration with other members of the multi-disciplinary team (MDT) within and outside the critical care unit when serving on an outreach, or rapid response team. Their interventions are timely, accurate, compliant with policy, protocol and guidelines and show expertise in managing medical devices and technical equipment in support of patient need in the following circumstances. The Advanced Practitioner has a key role in advocacy and promoting the patient's best interests at all times.	Demonstrates contemporaneous knowledge and shares this with others in the following situations: *Advanced Life Support* *Patient Transfer* *Patient Rehabilitation* *Preventing error/complications* *Monitoring complex treatment modalities*
Domain 2: Clinical leadership, teaching and supervision	
Professional leadership The Advanced Practitioner demonstrates leadership through role modelling best practice, advocating for patient and	2.1 Demonstrates leadership in professional relationships with patients and their families

(*continued on next page*)

Table 1 (*continued*)

Descriptor	Competency
family centred care, introducing and steering innovative approaches to critical care nursing. Leadership is also demonstrated through managing the staffing resource, workload allocation and contributing to the quality of care provided within the intensive care unit and the organisation by ensuring compliance with policy and guidelines. They are recognised by others for their contribution and often sought to lead practice and participate in organisational development. The Advanced Practitioner promotes wellbeing among staff, recognising when colleagues require facilitation, provides constructive feedback to remediate error, demonstrates and encourages others to be reflective and is recognised to demonstrate professional resolve to ensure the best for patients and their families. These distinguishing attributes and behaviours are made evident through professional relationships within and across health care teams, personal governance (mindful attention, noticing, personal insight into continuing professional development needs) and excellent communication skills.	*Supporting transition to end of life care* *Involves families in best interest meetings* *Supervises and encourages families' participation in care* 2.2 Demonstrates leadership in professional relationships with colleagues *Supporting colleagues* *Managing critically ill patients outside the intensive care unit* *Undertaking research and research appraisal* *Presenting at conferences and publishing* *Undertaking continuing professional development* 2.3 Demonstrates leadership in managing *The staffing resource* *Intensive care resources* *Emergency situations* *Medical Emergency and Outreach Teams*
Teaching The Advanced Practitioner facilitates others through teaching and supervision and in providing motivation, inspiration and encouragement. They participate in teaching programmes that benefit the multi professional team. They demonstrate the highest standard of ethical deportment and can clearly articulate their reasoning, decision making and rationale while teaching at the bedside or in the classroom.	2.4 Teaching others through *Monitoring performance of colleagues* *Providing mentorship* *Assessing the competence of others through direct observation of performance* *Assessing others' written accounts to demonstrate competence* *Demonstration of competence and skills to others* *Teaching patients and families* *Facilitating continuing professional development* *Medical equipment training* *Patient Follow up*
Supervision The Advanced Practitioner participates in the supervision of all staff including clinical and non-clinical colleagues to enable them to practice effectively and efficiently in the critical care setting. Supervision includes the critical evaluation of performance, contribution of others as well as facilitation of others to enable them to achieve their potential.	2.5 Supervises and guides others in the implementation of: *Protocols and guidelines* *Evidence Based Practice* *Safety and Improvement Initiatives (care bundles, error reporting systems)* *Tools to measure aspects of care and patient outcomes* *Prevention strategies*
Domain 3 Personal effectiveness	
Communication skills The Advanced Practitioner has specialist expertise and from that the privilege of influence. The following seeks to express the way in which the empathic professional communicates in a clear and precise manner (in writing and verbally), ensures that they are understood and conveys in manner and deed their compassion, thoughtfulness and commitment to critical care nursing practice, their colleagues, their patients and the relatives. This means they are able to exercise personal governance, ethical deportment and self-control in all circumstances and with all colleagues, staff, patients and relatives.	3.1 Demonstrates excellent communication skills: *Communicates in a verbally clear, precise manner* *Communicates well through all written media* *Communicates effectively with all staff (clinical and non-clinical, senior and junior colleagues))* *Facilitates difficult conversations with families* *Facilitates difficult conversations with staff*
Personal attributes The Advanced Practitioner demonstrates the following professional and personal qualities that enables others to model their behaviour, be inspired and motivated.	3.2 Demonstrates the following Personal Attributes *Remains calm under pressure* *Positive and encouraging* *Resourcefulness* *Dedication to lifelong learning* *Enacts the values of patient and family centred care* *Self-aware i.e. reflective of personal bias*
Personal and professional influence The Advanced Practitioner is influential. Influence is recognised by others within and outside the critical care unit. The following seeks to describe how the Advanced Practitioner ensures their contribution is respected, valued and sought.	3.3 Recognised by others for the following qualities *Inspirational* *Demonstrates practice that is consistent and effective* *Serves as a resource of experiential wisdom* *Acts in a timely and efficient manner*

(*continued on next page*)

Table 1 (*continued*)

Descriptor	Competency
Domain 4 Safety and systems management	
Quality and safety	4.1 Undertakes Quality Improvement Projects
The Advanced Practitioner demonstrates competence in quality and safety management. Quality systems are in place to redress error. Systems to improve quality are constantly evolving, developing, under revision and evaluation. The Advanced Practitioner has a significant role to play in leading, critiquing, contributing to processes, undertaking, evaluating (by linking initiatives to patient safety and satisfaction data) to reduce error and enhance performance.	4.2 Reviews Evidence Based Practice for protocols and guidelines 4.3 Contributes to the production of Care Bundles
Workload management	4.4 Assesses, implements and evaluates workload allocation
The Advanced Practitioner assesses the capabilities of staff and then allocates work accordingly. The Advanced Practitioner can plan ahead, organise and prioritise workload and reallocate workload as issues arise.	4.5 Uses IT systems to facilitate workload allocation 4.6 Assesses Staffing Capabilities to deliver care
Service development	4.7 Evaluates future service demand
The Advanced Practitioner recognises opportunity for development to improve care and the range of services available to patients and their families. Working in teams and drawing on expertise from other disciplines, they recognise opportunity, build practice and expand services.	4.8 Demonstrates business and management capability

by ICU nurses with more than 5 years' experience who had the translation language as their primary language and English as a fluent second language. These experts were selected by members of the Project Team who could verify their English language fluency.

Data analysis

Content analysis was used to code and categorise, conflate and merge the responses from Round 1 (Vaismoradi et al., 2016). This process enabled contributions to be determined as descriptors of how a competence might be performed as well as help to granulate the competence statements. These data were found in comments as well as potential competencies nominated by the expert panel. Descriptors qualified how the competencies might be recognised and helped to situate advanced practice. Labelling decisions were cross checked by three authors [*author initials*] and reviewed by the wider research team prior to circulation in Round 2 and 3. Descriptive statistics were used to analyse the quantitative data from Round 2 and 3 using SPSS version 24 (IBM Corp., 2016). Means and standard deviation were used to compare responses for the different language versions. A cut-off mean score of ≥ 4 was applied. Outlying competencies were conflated and merged and some were used to further render descriptors where country-based respondents emphasised the significance.

Potential participants were provided with an Information Sheet explaining steps taken to ensure anonymity and confidentiality, and their right to withdraw at any time without prejudice. Participants were also encouraged to contact the country representative or members of the study team if they had any queries regarding the work required. Ethics approval was provided by the [*name of institution*] Health and Human Sciences Ethics Committee (study ref no: 17/18–934).

Results

Participant characteristics

We recruited 184 participants from 20 countries. Most worked in a mixed medical-surgical ICU (77%) and almost half had a Master's degree (40%) or PhD (8%) as their highest level of qualification. Two research volunteers at ICUsteps (an ICU patient support charity) provided suggestions for the four domains in Round 1 and helped to develop a lay version of the competencies after completion of the e-Delphi study. This was used in a Focus Group study with former patients and family members (reported separately). We recruited a total of 16 physicians and physiotherapists from five countries to provide feedback on the final competencies.

Round 1

The initial questionnaire completed by 184 participants from 20 countries generated 275 statements in the four domains. Using content analysis, similarly-worded statements were merged into competence stems, initially by three members of the research team (*blinded for peer review*); these were then discussed at a consensus meeting with 16 participants from 10 countries (see country detail at Fig. 1). This resulted in a total of 230 competency statements, grouped into 30 sub-domains (see Supplementary File 1).

Round 2

The Round 2 questionnaire was completed by 130 participants from 20 European countries. A mean rating of 4 or more (important or very important) was achieved for 228/230 competence stems; these 228 were presented to the consensus meeting prior to Round 3. The 5-point Likert scale responses by language version for each statement at Round 2 are presented at ESM File 1. In order to reduce repetition for Round 3, descriptors were provided for sub-domains of competency statements in

Table 2
Round 3 agreement scores for competencies by language version.

Competency Statement	Language version (% agreement)								Total (%)
	Cro	Eng	Fre	Ger	Gre	Pol	Spa	Tur	
Assessment skills	3 (100)	6 (75)	8 (100)	5 (83.3)	4 (100)	3 (100)	3 (50)	2 (100)	**34 (85.0)**
1.6 Undertakes comprehensive and systematic assessment of the patient's:									
Respiratory status									
Cardiovascular status									
Neurological status									
Renal Function									
Temperature control									
Acid Base Balance									
Skin Integrity									
Wound Care needs									
Comfort and Dignity									
Decision making based on evidence	3 (100)	8 (100)	8 (100)	6 (100)	4 (100)	3 (100)	5 (83.3)	2 (100)	**39 (97.5)**
1.7 Uses the latest evidence to inform decision making in relation to:									
ventilation									
Weaning									
Dialysis									
Sedation Practice									
Delirium / agitation management									
Pain management									
Patient Nutrition									
Rehabilitation									
Invasive monitoring									
Inotrope and catecholamine titration									
Decision making in changing or complex circumstances	3 (100)	7 (87.5)	8 (100)	5 (83.3)	4 (100)	2 (66.7)	5 (83.3)	2 (100)	**36 (90.0)**
1.8 Demonstrates decision making in complex/rapidly changing circumstances:									
Emergencies									
Patient deterioration									
Altered consciousness									
Sepsis									
Multi system failure									
Withdrawal of active treatment									
End of Life care									
Organ donation									
Rehabilitation									
Procedural skills	3	7	8	6	4	3	3	1	**35**
1.9 Demonstrates competence in advanced practical skills	(100)	(87.5)	(100)	(100)	(100)	(100)	(50)	(50)	**(87.5)**
PEG Feeding									
Enteral Nutrition									
Catheter Care									
Understanding ABG results									
Dialysis									
Intravascular temperature control									
Haemodynamic monitoring									
Ventilation									
Weaning									
Preventing ICU complications									
Suctioning									
Tracheostomy Care									
Fundamental Care									
Leadership of care	3	7	8	6	4	3	4	2	**37**
1.10 Demonstrates contemporaneous knowledge and shares this with others	(100)	(87.5)	(100)	(100)	(100)	(100)	(66.7)	(100)	**(92.5)**
Advanced Life Support									
Patient Transfer									
Patient Rehabilitation									
Preventing error/ complications									
Monitoring complex treatment modalities									
Professional leadership									
2.1 Demonstrates leadership in professional relationships with patients & families:	3	6	7	6	4	3	5	2	**36**
Supporting transition to end of life care	(100)	(75)	(87.5)	(100)	(100)	(100)	(83.3)	(100)	**(90)**
Involves families in best interest meetings									
Supervises and encourages families' participation in care									
2.2 Demonstrates leadership in professional relationships with colleagues:	3	6	7	6	4	3	5	2	**36**
Supporting colleagues	(100)	(75)	(87.5)	(100)	(100)	(100)	(83.3)	(100)	**(90)**
Managing critically ill patients outside the intensive care unit									
Undertaking research and research appraisal									
Presenting at conferences and publishing									
Undertaking continuing professional development									
2.3 Demonstrates leadership in managing complex situations:	3	6	7	6	4	3	5	2	**36**
The staffing resource	(100))	(75)	(87.5)	(100)	(100)	(100)	(83.3)	(100)	**(90)**
Intensive care resources									

(*continued on next page*)

Table 2 (*continued*)

Emergency situations									
Medical Emergency and Outreach Teams									
Teaching	3	6	8	6	4	3	5	2	**37**
2.4 Teaching others through:	(100))	(75)	(100)	(100)	(100)	(100)	(83.3)	(100)	**(92.5)**
Monitoring performance of colleagues									
Providing mentorship									
Assessing the competence of others through direct observation of performance									
Assessing others' written accounts to demonstrate competence									
Demonstration of competence and skills to others									
Teaching patients and families									
Facilitating continuing professional development									
Medical equipment training									
Patient Follow up									
Supervision	3	8	8	6	4	2	4	2	**37**
2.5 Supervises and guides others in implementing best practice:	(100)	(100)	(100)	(100)	(100)	(66.7)	(66.7)	(100)	**(92.5)**
Protocols and guidelines									
Evidence Based Practice									
Safety and Improvement Initiatives (care bundles, error reporting systems)									
Tools to measure aspects of care and patient outcomes									
Prevention strategies									
Communication skills	3	8	7	5	4	3	6	2	**38**
3.1 Demonstrates excellent communication skills:	(100)	(100)	(87.5)	(83.3)	(100)	(100)	(100)	(100)	**(95)**
Communicates in a verbally clear, precise manner									
Communicates well through all written media									
Communicates effectively with all staff (clinical and non-clinical, senior and junior colleagues))									
Facilitates difficult conversations with families									
Facilitates difficult conversations with staff									
Personal attributes	3	8	8	6	4	3	5	1	**38**
3.2 Demonstrates key personal attributes:	(100)	(100)	(100)	(100)	(100)	(100)	(83.3)	(50)	**(95)**
Remains calm under pressure									
Positive and encouraging									
Resourcefulness									
Dedication to lifelong learning									
Enacts the values of patient and family centred care									
Self-aware i.e. reflective of personal bias									
Personal and professional influence	3	7	8	6	4	2	5	2	**37**
3.3 Recognised by others for key qualities:	(100)	(87.5)	(100)	(100)	(100)	(66.7)	(83.3)	(100)	**(92.5)**
Inspirational									
Demonstrates practice that is consistent and effective									
Serves as a resource of experiential wisdom									
Acts in a timely and efficient manner									
Quality and safety									
4.1 Undertakes Quality Improvement Projects	3	7	8	6	4	3	6	2	**39**
4.2 Reviews Evidence Based Practice for protocols and guidelines	(100)	(87.5)	(100)	(100)	(100)	(100)	(100)	(100)	**(97.5)**
4.3 Contributes to the production of Care Bundles									
Workload management									
4.4 Assesses, implements and evaluates workload allocation	3	8	8	6	4	3	6	1	**39**
4.5 Uses IT systems to facilitate workload allocation	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(50)	**(97.5)**
4.6 Assesses Staffing Capabilities to deliver care									
Service development									
4.7 Evaluates future service demand	3	8	8	6	4	3	5	2	**39**
4.8 Demonstrates business and management capability	(100)	(100)	(100)	(100)	(100)	(100)	(83.3)	(100)	**(97.5)**

Key: Cro = Croatian, Eng = English, Fre = French, Ger = German, Gre = Greek, Pol = Polish, Spa = Spanish, Tur = Turkish

each domain. The descriptors provide the context, or the 'how', for the competency statements and included phrases such as '*able to make decisions in uncertain and rapidly changing circumstance …*'. These were discussed, and grouping of competencies finalised, at the consensus meeting, with 16 people from 10 countries; this resulted in the Round 3 questionnaire comprising of competency statements (n = 95) and descriptors (n = 14), grouped by domain (Table 1).

Round 3

Forty-two participants from 18 countries participated in Round 3. Overall agreement for the statements ranged from 85 to 97.5%. Differentiation by language version is presented at Table 2. Free text comments were mostly to clarify nomenclature, for example use of the word 'practitioner' in Spain refers to technical assistants, rather than advanced level nurses. Some Polish respondents equated advanced practitioner with advanced doctor. Some comments provided greater detail such as patient participation; this has been addressed in the outline curriculum (https://www.esicm.org/education/inactic/).

Feedback from other professionals

The 16 participants who provided feedback on the final set of 95 competencies were physicians and physiotherapists, members of the MDT who work most closely with nurses. They agreed with the competency statements, making a few suggestions which highlighted the importance and influence of the personal characteristics of the nurse, as illustrated below:.

> "*should the Descriptor, in amongst managing the technical aspects of complex care, also mention advocacy/promoting the patient's best interests at all times? In my experience, the more complex the situation, the*

easier it is to 'get carried away' and lose sight of the patient. Experienced nurse leaders are often the best placed to 'ground' the over-enthusiastic MDT and ensure the focus always comes back to: 'is this the right thing to do for this patient? " (UK Intensive Care Physician 4)

Discussion

The consensus processes resulted in 95 competency statements for advanced practice in adult ICU across Europe; the number of countries and experienced ICU nurses who engaged with this work are a testament to the perceived need to develop a common standard for advanced practice ICU nursing. The generation, refinement and rendering of the competencies required inductive and deductive cycles of reasoning, including patient and public involvement through ICUsteps, a patient support charity.

The degree of discussion needed to define concepts before developing the Round 1 instrument emphasises the importance of getting the foundations right to develop competencies that can be applied across countries. This was likely to have been an important factor in the high level of agreement between countries despite differences in ICU education (Endacott et al., 2015) and lack of advanced nursing roles in critical care, or other fields of nursing, in some countries (Heale and Rieck, 2015). At consensus meetings held on three occasions during the study, it was agreed that the competencies should be aspirational and it would not serve any useful purpose to play to the minimum standard/threshold of performance. Those who acknowledged some challenges in their own country in meeting the competencies felt that the INACTIC outputs (competencies, outline curriculum and mapping to online resources - see https://www.esicm.org/education/inactic/) would allow them to apply some leverage to change practices, for the benefits of critically ill patients, families and learners.

The impact of advanced nursing practice roles in ICU has been evidenced earlier (Woo et al., 2017). However, the central role of ICU nurses in maintaining the quality and safety of patient care has come to the fore during the COVID-19 pandemic. The future shape of critical care services (Arabi et al., 2021), with pre-planned, expandable ICU capacity and a tiered experience staffing model, to allow rapid deployment of non-ICU staff, will be well served by advanced practice ICU nurses, who have developed the competencies outlined in this paper. In particular the leadership and personal effectiveness skills are likely to be required for a greater proportion of the ICU nursing workforce (Shuman and Costa, 2020). Advanced ICU nursing practice also keeps, and extends, the contribution of experienced nurses at the bedside, whilst also offering a clinical career pathway.

Limitations

Our study has a number of limitations. As is common with the prolonged nature of the Delphi process we had attrition from 184 participants in Round 1 to 42 in Round 3 (see detail at Fig. 1), but we kept participants from 18 countries engaged throughout. The survey was available in eight languages, as advised by our country contacts; a greater number of language versions may have increased the response rate or decreased the attrition. The care of critically ill patients is undertaken by a multi-professional team hence it was important to do some 'sense checking' by those who would work alongside an advanced ICU nurse. Relatively few contributed to this process (16 respondents from five countries); this may reflect a lack of experience of advanced practice roles for nursing (Heale and Rieck, 2015).

Conclusions

This study used consensus methods to develop competencies for advanced nursing practice in intensive care. These competencies provide measurable outcomes of training for intensive care nurses. Hospitals implementing advanced ICU nursing practice roles are encouraged to use the competencies and to analyse the wider impact on adverse events, workforce resilience and patient outcomes.

Authorship statement

RE, JL, JS wrote the initial manuscript draft; all authors made a substantial contribution to the conception and analysis of the work, revised the manuscript and approved the final version.

Ethical statement

Ethics approval was provided by the University of Plymouth Health and Human Sciences Ethics Committee (study ref no: 17/18-934).

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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