

1 **Development and psychometric testing of the OCEAN-ICU instrument to optimise sedation use in**
2 **intensive care**

3 Authors:

4 Leanne M Aitken PhD, Professor of Critical Care, School of Health & Medical Sciences, City St
5 George's, University of London

6 Ana Castro-Avila PhD, School of Health and Medical Sciences, City St George's, University of London

7 Judith Dyson PhD, Professor in Implementation Science, School of Health Sciences, Birmingham City
8 University

9 Kalliopi Kydonaki PhD, Faculty of Nursing, National and Kapodistrian, University of Athens, Greece
10 ckydonaki@nurs.uoa.gr

11 Bronagh Blackwood PhD, Professor in Critical Care, Wellcome-Wolfson Institute for Experimental
12 Medicine, Queen's University Belfast,

13 Katerina Iliopoulou PhD, School of Health and Medical Sciences, City St George's, University of
14 London

15 Cathrine McKenzie PhD, Honorary Associate Professor, NIHR Biomedical Research Centre,
16 Southampton, Perioperative and Critical Care theme, School of Clinical and Experimental Medicine,
17 Faculty of Medicine, University of Southampton, Southampton SO166YD

18 Timothy S Walsh MD, Department of Anaesthesia, Critical Care & Pain Medicine and Usher Institute,
19 University of Edinburgh

20

21 **Corresponding author:**

22 Leanne M Aitken, leanne.aitken.1@citystgeorges.ac.uk ; ORCID: 0000-0001-5722-9090

23

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25

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27

28 **Conflicts of interests:**

29 Leanne M Aitken: has been in receipt of funding from National Institute of Health and Care
30 Technology Assessment Programme, UK (HTA 16/93/01) (2018 – 2024) comparing
31 Dexmedetomidine, Clonidine and usual sedation; Elsevier Australia – royalties related to Critical Care
32 Nursing (multiple editions).

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43 Illness (www.medicinescomplete.com) and has an NIHR Senior Clinical Practitioner Award (NIHR
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49 Dexmedetomidine, Clonidine and usual sedation

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51 **280 character summary:** OCEAN-ICU instrument can inform strategy development to optimise
52 management of patients' discomfort, anxiety and pain in intensive care.

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56 **Abstract**

57 **Objective:** Sedation and pain management are core strategies used to manage discomfort, anxiety
58 and pain in intensive care, however strategies to improve this practice are inconsistently
59 implemented with differential effect. We describe the development and psychometric testing of the
60 Optimising ContExt in Assessing sedation in ICU (OCEAN-ICU) instrument intended for use in
61 intensive care to guide development of change strategies to optimise sedation. We also provide
62 descriptive results.

63 **Design:** A prospective instrument development study.

64 **Setting:** United Kingdom.

65 **Participants:** Clinical staff who self-identified as responsible for prescribing, administering and/or
66 advising on sedation to invasively mechanically ventilated intensive care patients participated.

67 **Interventions:** Not applicable

68 **Measurements & Main Results:** Developed from previous interviews and refined during pilot testing,
69 the draft instrument incorporated 68 statements aligned with the Theoretical Domains Framework.
70 Interested clinicians completed an online survey. Item responses were summed descriptively.
71 Congruence between rankings of agreement and importance were assessed descriptively. Construct
72 validity was assessed using confirmatory factor analysis. 252 usable responses were received from
73 UK based critical care clinicians (53 medical doctors, 149 nurses, 25 pharmacists, 16 physiotherapists
74 and 9 other healthcare professionals). After refining, 39 items were retained with an overall internal
75 consistency of 0.81 and construct validity of $\chi^2/df=1.86$; Comparative Fit Index=0.73; Root Mean
76 Square Error of Approximation=0.058. Areas of practice with high levels of agreement and perceived
77 importance focused on the value of light sedation and lack of progress in sedation minimisation.
78 Conflict between importance and agreement was reported in the effective assessment and
79 management of pain, delirium, and agitation.

80 **Conclusion:** The OCEAN-ICU instrument has been developed to determine barriers and facilitators to
81 improving sedation practice in local intensive care contexts. Further validation is required prior to
82 testing whether development of change strategies based on identified barriers and facilitators are
83 effective in optimising sedation practice.

84

85 **Key Points:**

86 **Question:** What is the factor structure and construct validity of the OCEAN-ICU instrument and what
87 is the level of agreement and perceived importance of the barriers and facilitators to sedation
88 optimisation.

89 **Findings:** 39 items with an overall internal consistency of 0.81 and construct validity of $\chi^2/df=1.86$;
90 Comparative Fit Index=0.73; Root Mean Square Error of Approximation=0.058. Areas of practice with
91 high levels of agreement and perceived importance focused on the value of light sedation and lack of
92 progress in sedation minimisation.

93 **Meanings:** Although further validation is required, OCEAN-ICU may be useful in informing change
94 strategies to optimise sedation practice.

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96

97 This section should be no more than 100 words.

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99 For details, please visit the author instructions

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101

102 **Background**

103 Mechanically ventilated patients in intensive care receive sedatives and analgesics to manage
104 discomfort, pain and anxiety. Patients rate comfort and avoidance of delirium as a priority in their
105 care and for research (1). Most practice guidelines include recommendations for optimising sedation
106 and analgesic use. However, inconsistent definitions of optimal sedation make interpreting this
107 literature challenging.

108 Guidelines generally suggest that lighter sedation is optimal for most patients and is likely to improve
109 outcomes (2, 3). Lighter sedation during the first 48 hours of mechanical ventilation in the
110 Emergency Department and Intensive Care Unit (ICU) is associated with reduced mortality,
111 mechanical ventilation and ICU days (4). The Pain, Agitation, Delirium, Immobility and Sleep (PADIS)
112 guidelines included meta-analysis of studies where sedation depth was defined *a priori*, and also
113 found associations between lighter sedation and improved outcomes (3). In contrast, a systematic
114 review of wider literature reported inconsistent evidence regarding the benefits of lighter sedation,
115 but reported no harm and suggested potential advantages across a range of outcomes including
116 mortality, mechanical ventilation duration, and length of ICU and hospital stays (5).

117 Despite evidence suggesting benefits of lighter sedation, recent reports indicate that many ICU
118 patients worldwide continue to be deeply sedated (6-9). Reasons for continuing deep sedation are
119 multi-dimensional and include issues of uncertainty in decision making, lack of support between
120 colleagues, and tensions between evidence-based targets and perceived optimal care (10, 11).

121 Furthermore, implementing practice change in clinical settings is notoriously challenging, especially
122 when those responsible for implementation are not involved in its development.

123 Understanding the multiple factors influencing sedation practice within individual ICUs and clinician
124 and other barriers and facilitators to changing practice is essential to inform development of
125 interventions designed to optimise sedation for ICU patients. There are currently no validated tools
126 that ICUs can use to comprehensively measure and describe their sedation culture and practice. Our

127 aim was to develop and psychometrically test a tool to support sedation practice improvement
128 within ICUs, the Optimising ContExt in Assessing sedation in ICU (OCEAN-ICU) instrument. Our
129 specific objectives were to determine the factor structure and construct validity of the OCEAN-ICU
130 instrument and to describe the level of agreement and perceived importance of the barriers and
131 facilitators to sedation optimisation.

132 **Methods**

133 **Study Design**

134 A prospective instrument development study was conducted in three stages: a qualitative interview
135 study to identify the barriers and facilitators for sedation optimisation, a development stage where
136 items were developed and refined for inclusion in the instrument and a pilot study to ensure the
137 instrument was understandable. These were followed by the instrument testing phase.

138 Ethics approval was granted by City, University of London (Minimising Sedation in Intensive Care
139 patients (MisSion-ICu) overall project 30/03/2020; this phase 28/11/2022). The study was conducted
140 in accordance with the ethical standards of the responsible ethics committee and with the Helsinki
141 Declaration of 1975. Participants confirmed their willingness to participate in the study prior to
142 progressing from the online participant information to the survey. Participants were able to
143 discontinue involvement at any stage up until they submitted their survey responses. Data were
144 collected and managed using Qualtrics XM (USA).

145 **Phase 1: Qualitative interview study**

146 Forty-four ICU clinicians participated in semi-structured interviews between July 27th and December
147 15th, 2021. Registered nurses, medical doctors, pharmacists, physiotherapists, and other clinicians
148 responsible for prescribing, administering and/or advising on sedation to invasively mechanically
149 ventilated ICU patients in the United Kingdom (UK) were invited to participate via advertising
150 through relevant professional organisations and social media (Twitter, LinkedIn).

151 Semi-structured interviews with participants followed a topic guide incorporating 39 questions
152 informed by the Theoretical Domains Framework (TDF)(12) with at least 1 question addressing each
153 domain. Interviews explored factors perceived by clinicians to be barriers or facilitators to achieving
154 optimal sedation practice, and also explored strategies considered potentially effective in achieving
155 optimal sedation practice. The topic guide was developed by a group of researchers, behavioural
156 psychologist and ICU clinicians based on initial work undertaken in Scotland (10, 11) as well as the
157 TDF domains. Interviews were conducted by a researcher trained in interview techniques and we
158 held remotely, using tele/video conferencing facilities as preferred by the interviewee.

159 **Phase 2: Development of the instrument**

160 Barriers and facilitators for sedation optimisation identified from the interviews were transformed
161 into beliefs statements and coded using the TDF (12). The TDF is an 11-domain framework used to
162 assess barriers and facilitators to behaviour change and guides design of change interventions. Seven
163 critical care and psychology experts assessed how well each statement fitted the domain they were
164 initially coded to.

165 **Phase 3: Pilot study - content and face validity**

166 A convenience sample of 10 ICU clinicians completed the instrument and commented on clarity of
167 statements, flow of the instrument, and any important aspects of sedation optimisation that were
168 missing.

169 **Phase 4: Instrument Testing**

170 The instrument consisted of belief statements aligned with each of the 11 TDF domains (Table S1).
171 Items were both positively and negatively phrased to mitigate response bias; participants rated their
172 level of agreement and importance with each statement on a five-point Likert scale. Demographic
173 questions related to role, experience and gender were also included. Instrument testing took place

174 between January 13 and March 24, 2023. Internal consistency within domains and construct validity
175 was initially tested followed by test-retest assessment.

176 **Participants & recruitment**

177 Any registered nurses, medical doctors, pharmacists, physiotherapists, and other clinicians
178 responsible for prescribing, administering and/or advising on sedation to invasively mechanically
179 ventilated ICU patients in the United Kingdom (UK) were invited to participate. Participants self-
180 determined if they met the criteria for inclusion prior to completing the survey.

181 A link to an online survey was provided to interested clinicians via emails, advertising and social
182 media (Twitter, LinkedIn) via known contacts and critical care professional groups (UK Critical Care
183 Research Forum, British Association of Critical Care Nurses, Intensive Care Society, UK Clinical
184 Pharmacy Association).

185 When accessing the survey site, clinicians were provided with participant information; agreement
186 was required for survey progression. On completion participants were asked if they would complete
187 the OCEAN-ICU survey again in 2 weeks for test-retest reliability assessment.

188 **Patient and Public Involvement**

189 Three former ICU patients met with the study team at multiple points throughout the study to
190 provide guidance in relation to topic importance and focus areas to be covered in the interviews that
191 led to the development of the initial version of OCEAN-ICU.

192 **Sample size and data analysis**

193 Target sample size for this instrument testing study was 200 – 300 respondents (13). Responses were
194 included if the participant answered 90% or more of items to minimise the risk of bias. Descriptive
195 statistics were used to describe participants' demographic data (e.g., age, gender), information about
196 their role (e.g., profession, years working in critical care) and the clinical centre where they worked
197 (e.g., UK region, hospital type).

198 Frequency of responses to each OCEAN-ICU item was summed descriptively. Responses to barriers
199 were reversed so that strongly agree/agree for facilitators and strongly disagree/disagree for barriers
200 could be combined to enable item ranking. Median responses of scores for each item were
201 calculated and examined for similarities and differences between professions. Analyses were
202 conducted using SPSS v28 (IBM Corp., IBM SPSS Statistics (including AMOS) for Windows, Version
203 28.0., Armonk, NY, USA).

204 ***Construct validity analysis***

205 Construct validity was assessed using confirmatory factor analysis in AMOS v28. Missing answers
206 were imputed using the mean for each question and testing was conducted to determine whether
207 items fitted in the TDF domains to which they were initially categorised. Items were deleted if they
208 did not meet the model assumption of a skew<3 and a kurtosis index <10 (14). Items were also
209 deleted if they had a weighted kappa<0.2 on test-retest assessment (15).

210 We used three indices to test for goodness of fit (16):

- 211 • Absolute fit: χ^2/df of <2 (17, 18)
- 212 • Parsimony of fit: Root Mean Square Error of Approximation of close to or less than 0.06 (16)
- 213 • Comparative fit of close to 0.95 (16).

214 The model was revised and the fit re-tested until the model was judged to fit well. Two values were
215 examined in the factor loading matrix to identify areas of poor fit.

- 216 • Modification Indices (MI) of >3.84 indicates that a change will probably result in an
217 improvement in model fit.
- 218 • Standardised Residuals (SR) greater than 2.58 indicates an area of strain.

219 ***Descriptive analysis***

220 Responses were summarised according to the percentage of respondents who strongly agreed or
221 agreed with facilitators and disagreed or strongly disagreed for barriers (referred to as 'agreement')
222 and considered items as important or very important (referred to as 'importance').

223 These percentages of agreement and importance were ranked from 1 (highest level of agreement or
224 importance) to 68 (lowest level of agreement or importance). Equal percentages were given the
225 same rank. The rankings for agreement and importance were then compared to determine where
226 the highest number of respondents both agreed and considered the item important, or in contrast,
227 where there was lack of congruence between these rankings. For example, if an item was agreed
228 with by a high number of participants, but not ranked as important by most participants, this was
229 considered a lack of congruence.

230 **Results**

231 **Phase 1 – Qualitative Interview Study results**

232 Analysis of the interview data identified 250 barriers and facilitators that were used for development
233 of the instrument. These barriers and facilitators focused on skills, beliefs about consequences,
234 environmental context and resources, motivation and goals, social influences and social or
235 professional role and identity.

236 **Phase 2 Development of the instrument results and Phase 3 Pilot study results**

237 Through review by the expert panel, agreement of $\geq 70\%$ was achieved for 228 statements, with 22
238 items being relocated. Experts also judged whether items should be removed, kept or reworded for
239 clarity to avoid duplication and lack of relevance to the topic. The pilot instrument comprised 74
240 remaining items. Following the pilot study, 68 items remained; these statements aligned with the 11
241 domains of the TDF, with at least 3 statements within each domain.

242 **Phase 4 Instrument testing results**

243 **Characteristics of cohort**

244 We recorded 522 responses; after removal of incomplete responses 252 respondents completed at
245 least 90% of the survey (Figure 1). Those respondents who completed the survey differed in
246 profession, qualifications and experience from those who did not complete the survey (Table S2).
247 Respondents included 53 medical doctors, 149 nurses, 25 pharmacists, 16 physiotherapists and 9
248 other healthcare professionals who were predominantly working in tertiary (academic) or district
249 (urban or county hospital) publicly funded hospitals, were most commonly female (Table S3) and
250 mainly practised in England (Table S4). Further details of the respondents, including characteristics of
251 their practice settings, are outlined in Tables S2 – S4.

252 **Confirmatory factor analysis of survey**

253 Construct validity, using the 68-item instrument, was assessed using responses from 252 completers.
254 All items were retained after testing for skew because they fell within defined parameters (maximum
255 2.8). Seven items were deleted because of low internal consistency with the rest of the scale.
256 Weighted kappa, a measure of inter-rater agreement, ranged between -0.18 to 0.7. We deleted five
257 items because of low test-retest reliability (weighted kappa<0.2) (Table S5).
258 The overall internal consistency of the instrument with 56-items was 0.83. We excluded items with
259 an alpha <0.1, had overlapping content, were considered ambiguous or contributed to low internal
260 consistency within each domain (aiming for as close to 0.7 as possible for each domain) (Table S5).
261 By the end of this process, an eight-factor 39-item instrument (Table S6) that measured barriers and
262 facilitators for optimising sedation in the ICU context was created (Figure 2 and Figure S1). The
263 instrument tested well for internal consistency (alpha=0.81) and construct validity ($\chi^2/df=1.86$;
264 Comparative Fit Index=0.73; Root Mean Square Error of Approximation=0.058). The internal
265 consistency for individual domains ranged from 0.37 for “environmental context” and 0.75 for
266 “Skills”.

267 **Descriptive summary**

268 Descriptive analysis for each item is presented (Figure S2). Strongest areas of agreement included
269 recognition that optimal sedation and pain management is not the same for all, confidence that staff
270 are competent to discuss the sedation-analgesia needs with the team and the importance of
271 teamwork, recognition that light sedation facilitates patients' orientation and engagement and that
272 optimised sedation reduces ventilation time and improves recovery.

273 Differences between professional groups were identified for multiple statements (Tables S7, S8 & S9).
274 Differences generally reflected the specific role of each profession and the subsequent perceived
275 importance of the statement. Although most professions felt they had the skills and were confident
276 to deliver several elements of sedation, analgesia and delirium practice, some professional groups
277 considered that training was insufficient for their needs.

278 When considering the responses from the total cohort (Table S8), there was agreement that optimal
279 sedation varied between patients and enabled reduced ventilatory time. Further, light sedation was
280 considered to facilitate orientation and engagement, while teamwork was viewed as positively
281 contributing to practice in this area. Additional areas that were rated as important (Table S9)
282 included clinical staff having the necessary skills to deliver care in this area and feeling confident to
283 distinguish between pain and delirium.

284 Congruence between rankings of agreement and importance for every item in OCEAN-ICU is
285 displayed in Table S10 in the same order they appeared in the participant survey, with rankings
286 provided for the total sample and for each professional sub-group. Items are shaded green where
287 there were less than 10 positions of difference between agreement and importance rankings.

288 Areas of practice with high levels of both agreement and perceived importance in the total cohort
289 and most professional sub-groups included the belief that light sedation facilitates orientation and
290 engagement, and physical and cognitive recovery and reduces ventilation time. Survey respondents

291 considered they had the necessary skills including those required for delirium screening, have
292 managed the sedation-analgesia-delirium needs of challenging patients and are competent to
293 discuss the sedation-analgesia needs of patients with the multi-disciplinary team. Importantly,
294 sedation optimisation was recognised as not being the same for all patients. Respondents strongly
295 agreed on feeling frustration when sedation minimisation is not progressed for deeply sedated
296 patients and felt unsupported when they were reducing sedation levels.

297 In contrast, areas of practice that were rated high for perceived importance, but low for agreement
298 including being confident to distinguish between pain and delirium in patients, work out why a
299 patient is agitated and to keep the agitated or delirious patients safe.

300 **Discussion**

301 In this instrument development study performed across the UK, we developed the 39-item OCEAN-
302 ICU instrument to comprehensively describe elements considered to influence practice relevant to
303 sedation optimisation in intensive care. We provide initial reliability and validity testing of the
304 OCEAN-ICU instrument that is intended for use in any ICU setting. To our knowledge this is the first
305 instrument to identify and enable measurement of practice and potentially inform practice change in
306 local settings. It is intended that individual ICUs use this instrument to determine specific barriers
307 and enablers that are important when designing a practice change initiative to optimise sedation and
308 pain management practice in the local setting.

309 Based on the structure of the TDF the items related to staffing were initially within the
310 Environmental context and resources domain, however given the poor fit these items were shifted to
311 a separate staffing resources domain. This suggests respondents viewed staffing as distinct from
312 other environmental elements such as sedative availability, patient characteristics and family
313 involvement. Staffing has been linked to patient outcome in ICU, with nurse numbers having the
314 greatest impact on patient survival (19). This may also link with perceptions of better patient safety
315 with higher levels and qualifications of staffing in ICU (20).

316 The wording used in a small number of items meant that it was difficult to determine if they were a
317 barrier or facilitator. For example, 'Peer presence from the MDT [multi-disciplinary team] affects my
318 sedation practice' and 'Colleagues are willing to listen to my opinion about sedation holds' could
319 each be viewed as a positive or negative social influence. Although the influences are vital to
320 optimising practice in this area, further refinement of wording may be necessary. If these items are
321 scored highly in a specific context additional exploration of the meaning of high scores, and therefore
322 what strategies are required to change practice, is needed.

323 We also summarise both the agreement with, and perceived importance of, each of these elements
324 in a UK wide cohort. Practice related to sedation and pain management optimisation is recognised as
325 needing improvement (21) yet we continue to see reports of heavily, or poorly, sedated patients (6-
326 8). This is despite multiple different strategies being developed and tested to improve sedation
327 management for ICU patients (22). The importance of considering the role of context when
328 addressing barriers and facilitators to changing clinical practice has been recognised (23, 24), yet
329 there is rarely any recommendation for how to adapt sedation improvement strategies to address
330 these contextual considerations. A mechanism to enable consideration of local barriers and
331 facilitators to changing practice, and inform development of tailored strategies for change, is
332 therefore required. OCEAN-ICU is designed to provide this mechanism in relation to ICU sedation
333 practices.

334 The continued practice of heavily, or poorly, sedated patients appears in contrast to the high ratings
335 of the need to individualise sedation reported in this study. The difference between work-as-
336 imagined (practice outlined in practice guidelines etc) and work-as-done has been recognised in the
337 patient safety literature (25). Practice change strategies clearly need to be based on work-as-done
338 rather than work-as-imagined. For this reason, development of change strategies should include
339 measurement of current practice and identification of perceived barriers and facilitators to achieving
340 optimal practice (26).

341 Potential areas for future practice change include those areas that respondents considered
342 important, but did not agree with, or alternatively, where agreement was inconsistent across
343 professional groups. Our results suggest areas to improve sedation include building skills and
344 confidence in a range of areas and building a common understanding of care across all professional
345 groups within the ICU. Other potentially useful strategies include mechanisms to improve
346 communication and planning with the entire healthcare team regarding the approach to sedation
347 and related care during the coming shift period, as well as strategies to support each other if the
348 patient becomes agitated, in pain or distressed. While multi-component nonpharmacologic
349 interventions are recommended to improve practice in this area (3), no guidelines have addressed
350 the important areas of teamwork, communication or having a plan in place for what interventions
351 should be implemented should a patient becomes agitated.

352 **Strengths and limitations**

353 This instrument has been developed with responses from a range of healthcare professionals
354 responsible for the clinical care of ICU patients across the UK. As such, it represents care in multiple
355 different settings. Despite this, we recognise that this sample represents a very small proportion of
356 the critical care clinicians who practice in UK critical care. Further, we did not collect a description of
357 sedation and related aspects of care in the ICUs where participants were practicing; we acknowledge
358 that those who volunteered to participate may have had a specific interest in this area of practice. In
359 addition, the initial interviews that informed item development in OCEAN-ICU began in 2021 when
360 the impact of the COVID-19 pandemic was significant; this may have impacted on the practice and
361 perceptions of sedation and related aspects of care.

362 A further limitation is that OCEAN-ICU has not been validated in a second cohort, including outside
363 the UK or in ICU settings where different practices are the norm; this includes ICUs in low resource
364 settings. Validation in other cohorts, with revision as required, is essential as the next step in
365 development of OCEAN-ICU. A further limitation is that, although 522 surveys were submitted, many

366 were incomplete and only 252 participants completed more than 90% of the survey. There may have
367 been a systematic bias in those who did, or did not, complete the survey. Additionally, there has not
368 been testing to determine if interventions based on areas identified as important using OCEAN-ICU
369 are effective in improving sedation and related care – this is required to determine the merit of using
370 an instrument such as OCEAN-ICU when planning practice change interventions.

371 **Conclusion**

372 Achieving optimal practice in sedation and pain management for ICU patients remains a challenge.
373 Use of this 39-item instrument to identify relevant barriers and enablers may lead to development of
374 context specific strategies that are more effective than generic guidance in improving this practice.
375 Although OCEAN-ICU showed good levels of validity and reliability in the UK setting, testing in
376 different settings is required. Additional testing is also required to determine if strategies developed
377 based on OCEAN-ICU are effective in improving practice.

378

379 **Declarations**

380 **Funding:** This work was funded by Barts Charity, Grant No. G-001806

381 **Ethics approval and consent to participate:** Ethics approval was granted by City, University of London
382 (overall project 30/03/2020; this phase 28/11/2022).

383 **Availability of data and materials:** The datasets used in this study are not available.

384 **Competing interests:**

385 Leanne M Aitken: has been in receipt of funding from National Institute of Health and Care
386 Technology Assessment Programme, UK (HTA 16/93/01) (2018 – 2024) comparing
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406 **Author contributions:**

407 Leanne M Aitken: conception and design of study, analysis and interpretation of data, drafting of
408 article, final approval of submitted version of publication

409 Ana Castro-Avila: acquisition of data, analysis and interpretation of data, critical review of article,
410 final approval of submitted version of publication

411 Judith Dyson: conception and design of study, analysis and interpretation of data, critical review of
412 article, final approval of submitted version of publication

413 Kalliopi (Claire) Kydonaki: conception and design of study, analysis and interpretation of data, critical
414 review of article, final approval of submitted version of publication

415 Bronagh Blackwood: conception and design of study, analysis and interpretation of data, critical
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- 419 Cathrine McKenzie: conception and design of study, analysis and interpretation of data, critical
420 review of article, final approval of submitted version of publication
- 421 Timothy S Walsh: conception and design of study, analysis and interpretation of data, critical review
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Figure Legends

Figure 1 Flow diagram of survey responses

Figure 2. 39-item scale obtained through confirmatory factor analysis with items mapped to relevant domains of the TDF

REFERENCES

1. Reay H, Arulkumaran N, Brett SJ. Priorities for Future Intensive Care Research in the UK: Results of a James Lind Alliance Priority Setting Partnership. *Journal of the Intensive Care Society*. 2014;15(4):288-96.
2. Lewis K, Balas MC, Stollings JL, McNett M, Girard TD, Chanques G, et al. A Focused Update to the Clinical Practice Guidelines for the Prevention and Management of Pain, Anxiety, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. *Crit Care Med*. 2025;53(3):e711-e27.
3. Devlin JW, Skrobik Y, Gelinas C, Needham DM, Slooter AJC, Pandharipande PP, et al. Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. *Crit Care Med*. 2018;46(9):e825-e73.
4. Stephens RJ, Dettmer MR, Roberts BW, Ablordeppey E, Fowler SA, Kollef MH, et al. Practice Patterns and Outcomes Associated With Early Sedation Depth in Mechanically Ventilated Patients: A Systematic Review and Meta-Analysis. *Crit Care Med*. 2018;46(3):471-9.
5. Aitken LM, Kydonaki K, Blackwood B, Trahair LG, Pursell E, Sekhon M, et al. Inconsistent relationship between depth of sedation and intensive care outcome: systematic review and meta-analysis. *Thorax*. 2021;76(11):1089.
6. Page VJ, Ely EW, Gates S, Zhao XB, Alce T, Shintani A, et al. Effect of intravenous haloperidol on the duration of delirium and coma in critically ill patients (Hope-ICU): a randomised, double-blind, placebo-controlled trial. *The Lancet Respiratory medicine*. 2013;1(7):515-23.
7. Hodgson C, Bellomo R, Berney S, Bailey M, Buhr H, Denehy L, et al. Early mobilization and recovery in mechanically ventilated patients in the ICU: a bi-national, multi-centre, prospective cohort study. *Crit Care*. 2015;19:81.
8. Shehabi Y, Howe BD, Bellomo R, Arabi YM, Bailey M, Bass FE, et al. Early Sedation with Dexmedetomidine in Critically Ill Patients. *N Engl J Med*. 2019;380(26):2506-17.
9. Richards-Belle A, Canter RR, Power GS, Robinson EJ, Reschreiter H, Wunsch H, et al. National survey and point prevalence study of sedation practice in UK critical care. *Crit Care*. 2016;20(1):355.
10. Everingham K, Fawcett T, Walsh T. 'Targeting' sedation: the lived experience of the intensive care nurse. *J Clin Nurs*. 2014;23(5-6):694-703.
11. Kydonaki K, Hanley J, Huby G, Antonelli J, Walsh TS. Challenges and barriers to optimising sedation in intensive care: a qualitative study in eight Scottish intensive care units. *BMJ open*. 2019;9(5):e024549.
12. Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care*. 2005;14(1):26-33.
13. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. *Front Public Health*. 2018;6:149.
14. Kline P. *A Handbook of Test Construction; Introduction to psychometric design*. London: Routledge; 1986.
15. Sim J, Wright CC. The kappa statistic in reliability studies: use, interpretation, and sample size requirements. *Phys Ther*. 2005;85(3):257-68.
16. Brown TA. *Confirmatory factor analysis for applied research*, 2nd ed. New York, NY, US: The Guilford Press; 2015. xvii, 462-xvii, p.
17. Byrne BM. *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. New York: Routledge; 2012.
18. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. 6th ed. ed. New York: Pearson; 2013.
19. West E, Barron DN, Harrison D, Rafferty AM, Rowan K, Sanderson C. Nurse staffing, medical staffing and mortality in Intensive Care: An observational study. *Int J Nurs Stud*. 2014;51(5):781-94.

20. Leon-Villapalos C, Wells M, Brett S. Exploratory study of staff perceptions of shift safety in the critical care unit and routinely available data on workforce, patient and organisational factors. *BMJ open*. 2020;10(6):e034101.
21. Eikermann M, Needham DM, Devlin JW. Multimodal, patient-centred symptom control: a strategy to replace sedation in the ICU. *The Lancet Respiratory Medicine*. 2023;11(6):506-9.
22. Stollings JL, Balas MC, Chanques G. Evolution of sedation management in the intensive care unit (ICU). *Intensive Care Med*. 2022;48(11):1625-8.
23. Davis R, Campbell R, Hildon Z, Hobbs L, Michie S. Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review. *Health Psychol Rev*. 2015;9(3):323-44.
24. Mather M, Pettigrew LM, Navaratnam S. Barriers and facilitators to clinical behaviour change by primary care practitioners: a theory-informed systematic review of reviews using the Theoretical Domains Framework and Behaviour Change Wheel. *Syst Rev*. 2022;11(1):180.
25. Braithwaite J, Wears RL, Hollnagel E. Resilient health care: turning patient safety on its head. *International journal for quality in health care : journal of the International Society for Quality in Health Care*. 2015;27(5):418-20.
26. Michie S, Johnston M, Francis J, Hardeman W, Eccles M. From theory to intervention: Mapping theoretically derived behavioural determinants to behaviour change techniques. *Applied Psychology: An International Review*. 2008;57(4):660-80.

Figure 1

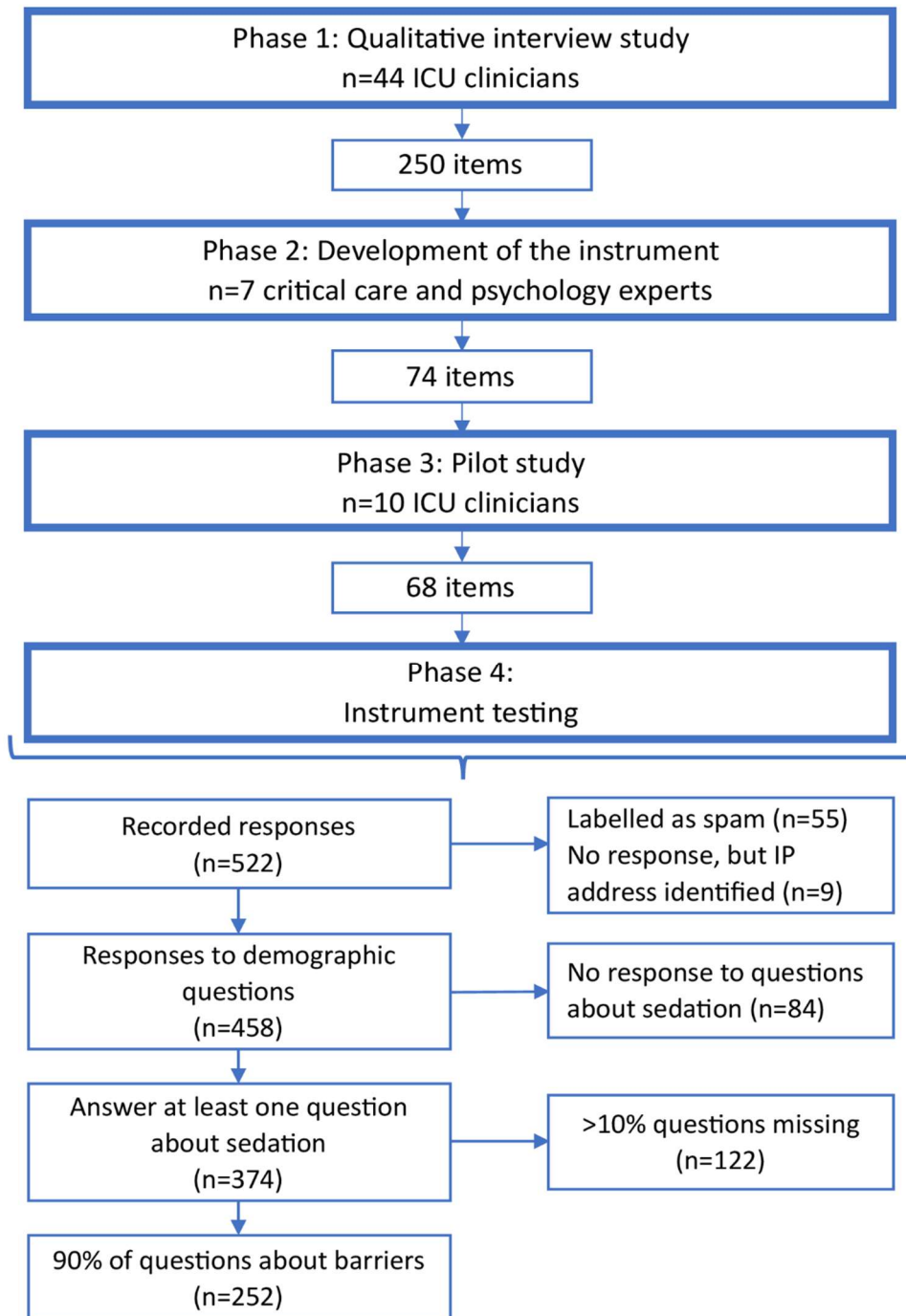
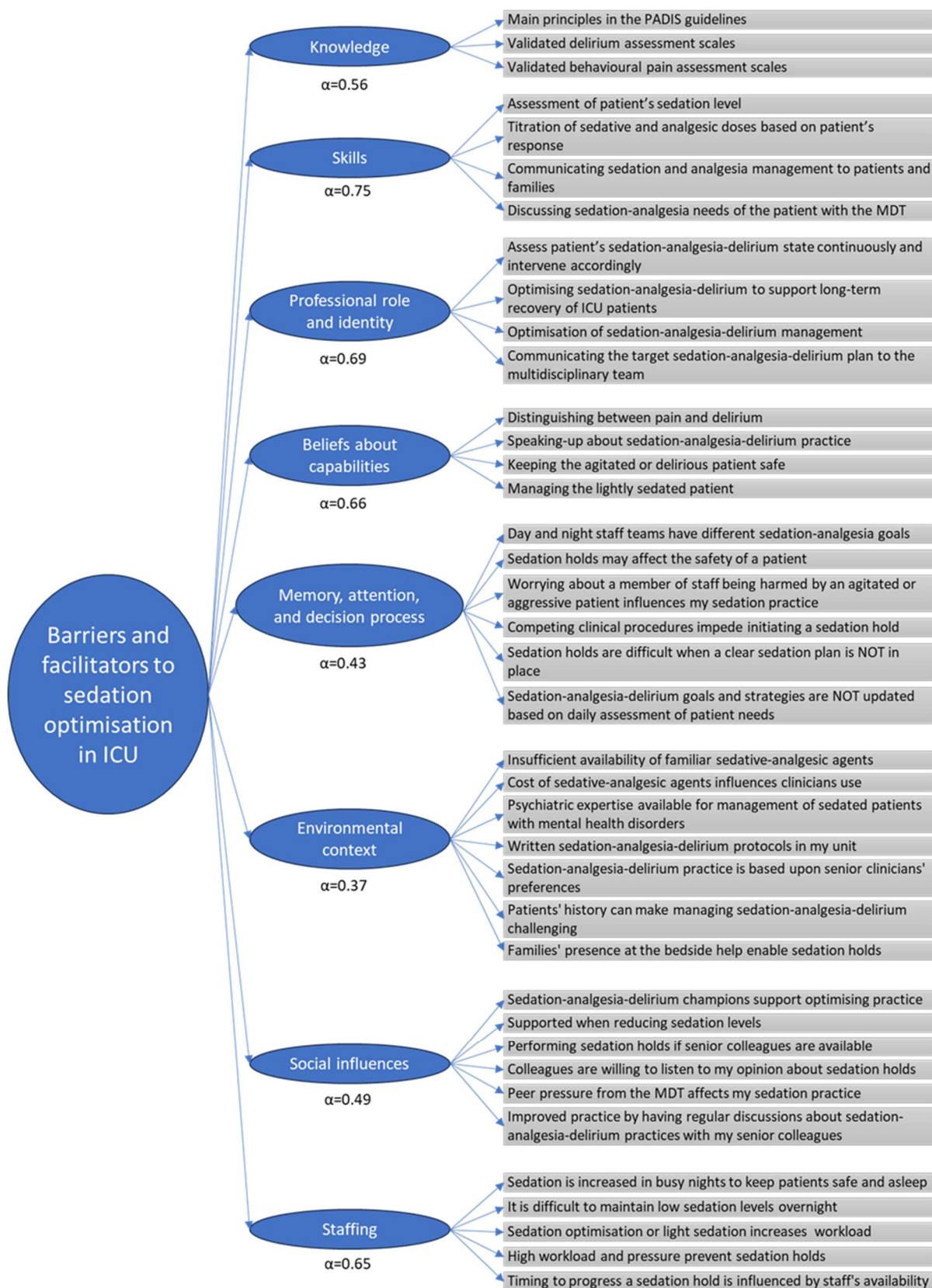


Figure 2



Development and psychometric testing of the OCEAN-ICU instrument to optimise sedation use in intensive care

Supplementary files

Table S1 Distribution of statements according to TDF domains

Domain	Number of statements
Knowledge	7
Skills	8
Professional role and identify	5
Beliefs about capabilities	7
Beliefs about consequences	8
Motivation, goals, and intention	6
Memory, attention, and decision processes	3
Environment, context	10
Social influences	7
Emotions	4
Action planning	3

Table S2 Demographic and clinical characteristics of completers versus non-completers

	Non-completers n=206	Completers n=252	p-value
Profession			<0.001
Medical doctor	36 (17.5%)	53 (21.0%)	
Nurse	105 (51.0%)	149 (59.1%)	
Other	8 (3.9%)	9 (3.6%)	
Pharmacist	15 (7.3%)	25 (9.9%)	
Physiotherapist	42 (20.4%)	16 (6.3%)	
Highest degree			0.95
Bachelor or Diploma	133 (64.6%)	162 (64.3%)	
Postgraduate degree	73 (35.4%)	90 (35.7%)	
Post specialty certifications			0.047
No	100 (48.5%)	99 (39.3%)	
Yes	106 (51.5%)	153 (60.7%)	
Years working in critical care, median (IQR)	8 (4, 15)	10 (5, 19)	0.005
Years working in critical care			0.058
0-4 years	59 (28.8%)	59 (23.4%)	
5-9 years	53 (25.9%)	63 (25.0%)	
10-14 years	40 (19.5%)	36 (14.3%)	
15-19 years	25 (12.2%)	35 (13.9%)	
20-24 years	22 (10.7%)	37 (14.7%)	
25-29 years	2 (1.0%)	14 (5.6%)	
>30 years	4 (2.0%)	8 (3.2%)	
>10 years in critical care	93 (45.4%)	130 (51.6%)	0.19
Type of facility			0.13
Tertiary referral hospital	85 (41.3%)	118 (46.8%)	
District hospital	69 (33.5%)	92 (36.5%)	
Specialty hospital	44 (21.4%)	33 (13.1%)	
Other [‡]	8 (3.9%)	9 (3.6%)	
Location of hospital			0.85
Other	80 (38.8%)	100 (39.7%)	
Major city	126 (61.2%)	152 (60.3%)	
Country in the UK			0.55
England	147 (71.4%)	186 (73.8%)	
Northern Ireland	13 (6.3%)	13 (5.2%)	
Scotland	38 (18.4%)	38 (15.1%)	
Wales	8 (3.9%)	15 (6.0%)	
Number of ICU beds			0.96
<15 beds	65 (31.6%)	79 (31.3%)	
> 15 beds	141 (68.4%)	173 (68.7%)	
Type of ICU			0.012
Mixed ICU	151 (73.3%)	213 (84.5%)	
Cardiothoracic ICU	30 (14.6%)	22 (8.7%)	
Surgical	25 (12.1%)	17 (6.7%)	
Gender			0.76
Female	140 (68.0%)	163 (64.7%)	
Male	61 (29.6%)	82 (32.5%)	
LGBTQ+/prefer not to say	5 (2.4%)	7 (2.8%)	

Table S3 Sample characteristics by profession

	Medical doctor n=53	Nurse n=149	Pharmacist n=25	Physiotherapist n=16	Other n=9	p-value
Highest degree						<0.001
Bachelor or Diploma	27 (50.9%)	117 (78.5%)	1 (4.0%)	12 (75.0%)	5 (55.6%)	
Postgraduate degree	26 (49.1%)	32 (21.5%)	24 (96.0%)	4 (25.0%)	4 (44.4%)	
Post specialty certifications						<0.001
No	9 (17.0%)	62 (41.6%)	16 (64.0%)	10 (62.5%)	2 (22.2%)	
Yes	44 (83.0%)	87 (58.4%)	9 (36.0%)	6 (37.5%)	7 (77.8%)	
Years working in critical care, median (IQR)	15 (10, 20)	7 (4, 16)	12 (5, 20)	10 (6.25, 17.5)	10 (7, 20)	<0.001
Years working critical care						0.068
0-4 years	6 (11.3%)	44 (29.5%)	4 (16.0%)	3 (18.8%)	2 (22.2%)	
5-9 years	5 (9.4%)	44 (29.5%)	7 (28.0%)	5 (31.3%)	2 (22.2%)	
10-14 years	13 (24.5%)	17 (11.4%)	4 (16.0%)	1 (6.3%)	1 (11.1%)	
15-19 years	8 (15.1%)	20 (13.4%)	2 (8.0%)	4 (25.0%)	1 (11.1%)	
20-24 years	12 (22.6%)	16 (10.7%)	5 (20.0%)	2 (12.5%)	2 (22.2%)	
25-29 years	6 (11.3%)	5 (3.4%)	1 (4.0%)	1 (6.3%)	1 (11.1%)	
>30 years	3 (5.7%)	3 (2.0%)	2 (8.0%)	0 (0.0%)	0 (0.0%)	
>10 years working in critical care	42 (79.2%)	61 (40.9%)	14 (56.0%)	8 (50.0%)	5 (55.6%)	<0.001
Type of facility						0.012
Tertiary referral hospital	25 (47.2%)	71 (47.7%)	12 (48.0%)	4 (25.0%)	6 (66.7%)	
District hospital	27 (50.9%)	44 (29.5%)	11 (44.0%)	8 (50.0%)	2 (22.2%)	
Specialty hospital	1 (1.9%)	28 (18.8%)	0 (0.0%)	3 (18.8%)	1 (11.1%)	
Other	0 (0.0%)	6 (4.0%)	2 (8.0%)	1 (6.3%)	0 (0.0%)	
Location of hospital						0.89
Other	22 (41.5%)	57 (38.3%)	12 (48.0%)	6 (37.5%)	3 (33.3%)	
Major city	31 (58.5%)	92 (61.7%)	13 (52.0%)	10 (62.5%)	6 (66.7%)	
Country of the UK						0.026
England	33 (62.3%)	118 (79.2%)	18 (72.0%)	13 (81.3%)	4 (44.4%)	
Northern Ireland	2 (3.8%)	5 (3.4%)	4 (16.0%)	1 (6.3%)	1 (11.1%)	
Scotland	14 (26.4%)	17 (11.4%)	3 (12.0%)	2 (12.5%)	2 (22.2%)	
Wales	4 (7.5%)	9 (6.0%)	0 (0.0%)	0 (0.0%)	2 (22.2%)	
Number of ICU beds						0.69
<15 beds	17 (32.1%)	46 (30.9%)	9 (36.0%)	6 (37.5%)	1 (11.1%)	
more than 15 beds	36 (67.9%)	103 (69.1%)	16 (64.0%)	10 (62.5%)	8 (88.9%)	
Type of ICU						0.40
Mixed ICU	46 (86.8%)	124 (83.2%)	23 (92.0%)	13 (81.3%)	7 (77.8%)	
Cardiothoracic ICU	3 (5.7%)	16 (10.7%)	2 (8.0%)	1 (6.3%)	0 (0.0%)	
Surgical	4 (7.5%)	9 (6.0%)	0 (0.0%)	2 (12.5%)	2 (22.2%)	
Gender						<0.001
Female	11 (20.8%)	121 (81.2%)	13 (52.0%)	12 (75.0%)	6 (66.7%)	
Male	38 (71.7%)	25 (16.8%)	12 (48.0%)	4 (25.0%)	3 (33.3%)	
LGBTQ+/ prefer not to say	4 (7.5%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	

Table S4 Demographic characteristics by country

	England n=186	Northern Ireland n=13	Scotland n=38	Wales n=15	p- value
Profession					0.026
Medical doctor	33 (17.7%)	2 (15.4%)	14 (36.8%)	4 (26.7%)	
Nurse	118 (63.4%)	5 (38.5%)	17 (44.7%)	9 (60.0%)	
Other	4 (2.2%)	1 (7.7%)	2 (5.3%)	2 (13.3%)	
Pharmacist	18 (9.7%)	4 (30.8%)	3 (7.9%)	0 (0.0%)	
Physiotherapist	13 (7.0%)	1 (7.7%)	2 (5.3%)	0 (0.0%)	
Highest degree					0.28
Bachelor or Diploma	118 (63.4%)	7 (53.8%)	29 (76.3%)	8 (53.3%)	
Postgraduate degree	68 (36.6%)	6 (46.2%)	9 (23.7%)	7 (46.7%)	
Post specialty certification					0.005
No	63 (33.9%)	9 (69.2%)	22 (57.9%)	5 (33.3%)	
Yes	123 (66.1%)	4 (30.8%)	16 (42.1%)	10 (66.7%)	
Years working in critical care, median (IQR)	8.75 (4, 17)	7 (4, 9)	15.5 (10, 22)	10 (6, 20)	0.003
Years working in critical care					0.024
0-4 years	47 (25.3%)	4 (30.8%)	5 (13.2%)	3 (20.0%)	
5-9 years	50 (26.9%)	6 (46.2%)	4 (10.5%)	3 (20.0%)	
10-14 years	25 (13.4%)	0 (0.0%)	8 (21.1%)	3 (20.0%)	
15-19 years	29 (15.6%)	2 (15.4%)	3 (7.9%)	1 (6.7%)	
20-24 years	22 (11.8%)	1 (7.7%)	11 (28.9%)	3 (20.0%)	
25-29 years	9 (4.8%)	0 (0.0%)	3 (7.9%)	2 (13.3%)	
>30 years	4 (2.2%)	0 (0.0%)	4 (10.5%)	0 (0.0%)	
>10 years working in critical care	89 (47.8%)	3 (23.1%)	29 (76.3%)	9 (60.0%)	0.002
Type of facility					0.020
Tertiary referral hospital	94 (50.5%)	6 (46.2%)	14 (36.8%)	4 (26.7%)	
District hospital	66 (35.5%)	2 (15.4%)	18 (47.4%)	6 (40.0%)	
Specialty hospital	19 (10.2%)	3 (23.1%)	6 (15.8%)	5 (33.3%)	
Other	7 (3.8%)	2 (15.4%)	0 (0.0%)	0 (0.0%)	
Location of hospital					0.19
Other	67 (36.0%)	6 (46.2%)	18 (47.4%)	9 (60.0%)	
Major city	119 (64.0%)	7 (53.8%)	20 (52.6%)	6 (40.0%)	
Number of ICU beds					<0.001
<15 beds	51 (27.4%)	6 (46.2%)	21 (55.3%)	1 (6.7%)	
More than 15 beds	135 (72.6%)	7 (53.8%)	17 (44.7%)	14 (93.3%)	
Type of ICU					0.44
Mixed ICU	155 (83.3%)	11 (84.6%)	32 (84.2%)	15 (100.0%)	
Cardiothoracic ICU	18 (9.7%)	0 (0.0%)	4 (10.5%)	0 (0.0%)	
Surgical	13 (7.0%)	2 (15.4%)	2 (5.3%)	0 (0.0%)	
Gender					0.083
Female	124 (66.7%)	9 (69.2%)	20 (52.6%)	10 (66.7%)	
Male	59 (31.7%)	4 (30.8%)	14 (36.8%)	5 (33.3%)	
LGTBQ+/ prefer not to say	3 (1.6%)	0 (0.0%)	4 (10.5%)	0 (0.0%)	

Table S5. Items eliminated from final survey

Q	Item	Initial Domain	Barrier / Facilitator	Weighted kappa
1	I have adequate knowledge to use validated sedation assessment scales, e.g. Richmond Agitation-Sedation Scale (RASS), Riker Sedation Agitation Scale (SAS)	KNOWLEDGE	F	0.19
9	Sedation-analgesia-delirium practice should be based on evidence and NOT on clinicians' personal beliefs	KNOWLEDGE	F	0.39
13	The patient's underlying condition influences my sedation-analgesia-delirium management decisions	MEMORY, ATTENTION, DECISION PROCESS	F	0.47
14	My sedation-analgesia-delirium management is influenced by whether the patient has cardiovascular instability	BELIEFS ABOUT CONSEQUENCES	F	0.49
15	I have experience of managing the sedation-analgesia-delirium needs of challenging patients	BELIEFS ABOUT CAPABILITIES	F	0.62
17	I find sedation-analgesia-delirium management challenging	SKILLS	B	0.48
19	I prioritise sedation-analgesia-delirium optimisation over other aspects of patient care	MOTIVATION, GOALS, INTENTIONS	B	0.19
26	Training to assess and manage sedation-analgesia-delirium is insufficient for my needs	SKILLS	B	0.33
29	I feel stressed by managing an agitated or combative patient	EMOTIONS	B	0.53
30	I am confident working out why a patient is agitated	BELIEFS ABOUT CAPABILITIES	F	0.49
33	I do NOT know when I should use a behavioural pain scale rather than non-behavioural pain scale such as the Visual Analogue Scale (VAS)	KNOWLEDGE	B	0.16
36	Light sedation facilitates patients' orientation and engagement	BELIEFS ABOUT CONSEQUENCES	F	0.26
37	I am anxious about reducing sedation if my workload is too high	EMOTIONS	B	0.34
38	It is easier to lighten sedation when the patient is pain free	BELIEFS ABOUT CONSEQUENCES	F	0.60
39	I feel frustrated when sedation minimisation is NOT progressed for deeply sedated patients	EMOTIONS	B	0.52
41	It is part of my role to support the patients who are awake to deal with their fears and anxiety	PROFESSIONAL ROLE & IDENTITY	F	0.62
42	There are conflicts between staff in my unit when clinicians wean off sedation either very quickly or stop abruptly	ENVIROMENT, CONTEXT	B	0.30

Q	Item	Initial Domain	Barrier / Facilitator	Weighted kappa
48	In my unit there are insufficient numbers of clinical staff to perform sedation holds	STAFFING	B	0.43
50	I have the necessary decision-making skills to initiate a sedation hold	SKILLS	F	0.26
52	A low proportion of experienced ICU staff creates a barrier to initiating or progressing sedation holds in my unit	STAFFING	B	0.43
54	Optimising sedation reduces the time a patient needs to stay on the ventilator	BELIEFS ABOUT CONSEQUENCES	F	0.26
56	Day and night staff teams have different sedation-analgesia goals	MOTIVATION, GOALS, INTENTIONS	B	0.49
57	Sedation optimisation facilitates patients' physical and cognitive recovery	BELIEFS ABOUT CONSEQUENCES	F	0.10
58	Optimal sedation and analgesia is NOT the same for every patient	KNOWLEDGE	B	-0.17
60	I work towards a target sedation score to achieve sedation-analgesia-delirium optimisation	MOTIVATION, GOALS, INTENTIONS	F	0.32
61	I am able to coordinate the clinical team to manage sedation-analgesia-delirium practices	SKILLS	F	0.57
63	Teamwork contributes positively to my sedation-analgesia-delirium practice	SOCIAL INFLUENCES	F	0.61
64	Agreeing the sedation-analgesia-delirium plan is a shared decision-making process within the multidisciplinary team	MEMORY, ATTENTION, DECISION PROCESS	F	0.01
67	I feel less concerned when implementing a sedation-analgesia-delirium plan that has been decided after a multi-disciplinary team discussion	EMOTIONS	F	0.58

B: barrier; F: facilitator.

Table S6 Remaining items in the scale, test-retest reliability, and internal consistency for each domain.

Q	Item	Current Domain	Barrier / Facilitator	Weighted Kappa	Domain's Cronbach
2	I have the necessary skills to assess patient's sedation, analgesia and delirium level	Skills	F	0.39	0.74
3	It is part of my role to assess patient's sedation-analgesia-delirium state continuously and intervene accordingly	Professional Role & Identity	F	0.53	0.69
4	I do NOT feel I have the necessary skills to titrate sedative and analgesic doses considering the patient's response	Skills	B	0.57	0.74
5	There are times in my unit when there is insufficient availability of sedative-analgesic agents that I am familiar with	Environment, Context	B	0.47	0.37
6	The cost of sedative-analgesic agents influences which agents clinicians use	Environment, Context	B	0.33	0.37
7	In my unit psychiatric expertise is NOT available to guide optimal medication management in sedated patients with mental health disorders	Environment, Context	B	0.69	0.37
8	I am aware of the main principles in the sedation, agitation, delirium (PADIS) guidelines	Knowledge	F	0.54	0.59
10	Written sedation-analgesia-delirium protocols are NOT in place in my unit	Environment, Context	B	0.46	0.37
11	Sedation is increased in my unit when the unit is busy at night to keep patients safe and asleep	Staffing	B	0.46	0.65
12	Day and night staff teams have different sedation-analgesia goals	Memory, Attention, Decision Process	B	0.58	0.43
16	Sedation-analgesia-delirium goals and strategies are NOT updated based on daily assessment of patient needs	Memory, Attention, Decision Process	B	0.36	0.43
18	I am confident to distinguish between pain and delirium	Beliefs about Capabilities	F	0.60	0.65
20	It is difficult to maintain low sedation levels overnight	Staffing	B	0.32	0.65

21	Sedation-analgesia-delirium champions support staff in optimising practice	Social Influences	F	0.39	0.49
22	Sedation-analgesia-delirium practice is based upon senior clinicians' preferences in my unit	Environment, Context	B	0.38	0.37
23	I am confident to speak-up about sedation-analgesia-delirium practice	Beliefs about Capabilities	F	0.41	0.65
24	Patients' history such as age, chronic pain, substance abuse and mental health disorders can be challenging factors for me when managing sedation-analgesia-delirium	Environment, Context	B	0.30	0.37
25	I am competent to communicate with patients and families about sedation and analgesia management	Skills	F	0.57	0.74
27	I have adequate knowledge to use validated delirium assessment scales, e.g. Confusion Assessment Method (CAM)-ICU, Intensive Care Delirium Screening Checklist (ICDSC)	Knowledge	F	0.45	0.59
28	I am confident to keep the agitated or delirious patient safe	Beliefs about Capabilities	F	0.55	0.65
31	Worrying about a member of staff being harmed by an agitated or aggressive patient influences my sedation practice	Memory, Attention, Decision Process	B	0.32	0.43
32	I have adequate knowledge to use validated behavioural pain assessment scales, e.g. Critical-care Pain Observation Tool (CPOT), Behavioural Pain Scale (BPS)	Knowledge	F	0.61	0.59
34	Sedation optimisation or light sedation increases workload	Staffing	B	0.56	0.65
35	I am confident to manage the lightly sedated patient	Beliefs about Capabilities	F	0.38	0.65
40	I do NOT feel adequately supported when I am reducing sedation levels	Social Influences	B	0.43	0.49
43	Sedation holds may affect the safety of a patient	Memory, Attention, Decision Process	B	0.65	0.43

44	High workload and pressure prevent ICU staff from performing sedation holds	Staffing	B	0.48	0.65
45	Competing clinical procedures (eg theatre, diagnostics etc) impede initiating a sedation hold	Memory, Attention, Decision Process	B	0.20	0.43
46	In my unit, timing to progress a sedation hold is influenced by staff's availability	Staffing	B	0.34	0.65
47	I am more likely to perform sedation holds if senior colleagues are available at the bedside	Social Influences	B	0.40	0.49
49	Sedation holds are difficult for me to accomplish when a clear sedation plan is NOT in place	Memory, Attention, Decision Process	B	0.35	0.43
51	My colleagues are willing to listen to my opinion about sedation holds	Social Influences	F	0.59	0.49
53	Families' presence at the bedside help enable sedation holds	Environment, Context	F	0.60	0.37
55	Optimising sedation-analgesia-delirium to support long-term recovery of ICU patients is NOT part of my role	Professional Role & Identity	B	0.62	0.69
59	Optimisation of sedation-analgesia-delirium management is NOT within the scope of my practice	Professional Role & Identity	B	0.60	0.69
62	I am competent to discuss with the multidisciplinary team the sedation-analgesia needs of the patient	Skills	F	0.64	0.74
65	Peer pressure from the multidisciplinary team affects my sedation-analgesia-delirium practice	Social Influences	B	0.51	0.49
66	I improve my practice by having regular discussions about sedation-analgesia-delirium practices with my senior colleagues	Social Influences	F	0.52	0.49
68	Communicating the target sedation-analgesia-delirium plan to the multidisciplinary team is part of my role	Professional Role & Identity	F	0.43	0.69

B: barrier; F: facilitator

Table S7 Barriers and facilitators – responses by profession

Responses have been recoded where necessary so “1” always represent a barrier.

Knowledge		MD n=53	Nurse n=149	Pharmacist n=25	Physiotherapist n=16	Other 9	p-value
Q1	I have adequate knowledge to use validated sedation assessment scales, e.g. Richmond Agitation-Sedation Scale (RASS), Riker Sedation Agitation Scale (SAS), median (IQR)	5 (4, 5)	5 (4, 5)	4 (4, 5)	4.5 (4, 5)	4 (2, 5)	0.25
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (4, 5)	4 (4, 5)	4 (4, 5)	4 (4, 5)	4 (3, 5)	0.29
Q8	I am aware of the main principles in the sedation, agitation, delirium (PADIS) guidelines, median (IQR)	4 (2, 5)	4 (3, 5)	5 (4, 5)	4 (3, 4)	4 (4, 4)	0.062
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	3 (3, 4)	4 (4, 5)	4 (4, 5)	4 (4, 5)	4 (4, 4)	<0.001
Q9	Sedation-analgesia-delirium practice should be based on evidence and NOT on clinicians’ personal beliefs, median (IQR)	4 (4, 5)	5 (4, 5)	4 (4, 5)	4 (4, 5)	5 (4, 5)	0.13
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 4)	4 (4, 5)	4 (4, 5)	4 (3.5, 5)	4 (4, 4)	<0.001
Q27	I have adequate knowledge to use validated delirium assessment scales, e.g. Confusion Assessment Method (CAM)-ICU, Intensive Care Delirium Screening Checklist (ICDSC), median (IQR)	5 (4, 5)	4 (4, 5)	4 (4, 4)	4 (4, 5)	5 (2, 5)	0.045
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 5)	5 (4, 5)	4 (4, 5)	4 (4, 5)	4 (4, 5)	0.003
Q32	I have adequate knowledge to use validated behavioural pain assessment scales, e.g. Critical-care Pain Observation Tool (CPOT), Behavioural Pain Scale (BPS), median (IQR)	3 (2, 4)	4 (3, 5)	3 (3, 4)	3 (2, 3.5)	4 (4, 4)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	3 (3, 4)	4 (4, 5)	4 (3, 4)	4 (3, 4)	4 (3, 4)	<0.001
Q33	I do NOT know when I should use a behavioural pain scale rather than non-behavioural pain scale such as the Visual Analogue Scale (VAS), median (IQR)	3 (2, 4)	3 (2, 5)	4 (3, 5)	2 (2, 4)	3 (2, 4)	0.21
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	3 (2, 4)	4 (3.5, 5)	3 (3, 4)	4 (3, 4.5)	4 (3, 4)	<0.001
Q58	Optimal sedation and analgesia is not the same for every patient, median (IQR)	5 (5, 5)	5 (5, 5)	5 (5, 5)	5 (5, 5)	5 (5, 5)	0.20
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	5 (4, 5)	5 (4, 5)	5 (4, 5)	5 (4.5, 5)	5 (5, 5)	0.012

Skills		MD n=53	Nurse n=149	Pharmacist n=25	Physiotherapist n=16	Other n=9	p-value
Q2	I have the necessary skills to assess patient's sedation, analgesia and delirium level, median (IQR)	5 (5, 5)	5 (4, 5)	4 (3, 5)	4 (4, 4)	4 (3, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	5 (4, 5)	5 (4, 5)	4 (4, 5)	4.5 (4, 5)	5 (4, 5)	1.00
Q4	I do NOT feel I have the necessary skills to titrate sedative and analgesic doses considering the patient's response, median (IQR)	5 (5, 5)	5 (4, 5)	4 (3, 4)	1.5 (1, 3)	5 (5, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 5)	4 (4, 5)	4 (3, 4)	4 (3, 5)	5 (4, 5)	0.004
Q17	I find sedation-analgesia-delirium management challenging, median (IQR)	2 (2, 3)	2 (2, 3)	2 (2, 3)	2 (2, 3)	3 (2, 4)	0.15
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 4)	4 (4, 5)	4 (3, 5)	4 (3, 4)	4 (4, 4)	<0.001
Q25	I am competent to communicate with patients and families about sedation and analgesia management, median (IQR)	5 (4, 5)	5 (4, 5)	4 (3, 4)	4 (3, 4)	4 (4, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 4)	4 (4, 5)	3 (3, 4)	4 (4, 4)	4 (4, 5)	<0.001
Q26	Training to assess and manage sedation-analgesia-delirium is insufficient for my needs, median (IQR)	4 (3, 5)	3 (2, 4)	3 (2, 4)	2 (1.5, 3)	5 (3, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	3 (2, 4)	4 (4, 5)	3 (3, 4)	4 (4, 5)	4 (4, 5)	<0.001
Q50	I have the necessary decision-making skills to initiate a sedation hold, median (IQR)	5 (5, 5)	4 (4, 5)	3 (2, 4)	3 (1, 3.5)	5 (4, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 5)	4 (4, 5)	3 (3, 4)	4.5 (3, 5)	4 (4, 4)	0.005
Q61	I am able to coordinate the clinical team to manage sedation-analgesia-delirium practices, median (IQR)	4 (4, 5)	4 (3, 4)	3 (3, 4)	3 (3, 4)	4 (4, 4)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (4, 5)	4 (4, 5)	4 (3, 5)	4 (4, 5)	4 (4, 4)	0.57
Q62	I am competent to discuss with the multidisciplinary team the sedation-analgesia needs of the patient, median (IQR)	5 (5, 5)	5 (4, 5)	5 (4, 5)	4.5 (4, 5)	4 (4, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (4, 5)	4 (4, 5)	4 (4, 5)	4 (4, 5)	5 (4, 5)	0.13

Social / professional role and identity		MD n=53	Nurse n=149	Pharmacist n=25	Physiotherapist n=16	Other n=9	p-value
Q3	It is part of my role to assess patient's sedation-analgesia-delirium state continuously and intervene accordingly, median (IQR)	4 (4, 5)	5 (5, 5)	4 (2, 5)	4 (4, 4)	5 (1, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (4, 5)	5 (4, 5)	4 (3, 5)	4 (4, 5)	5 (4, 5)	<0.001
Q41	It is part of my role to support the patients who are awake to deal with their fears and anxiety, median (IQR)	5 (4, 5)	5 (5, 5)	4 (2, 4)	5 (4, 5)	5 (4, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (4, 5)	5 (4, 5)	4 (3, 5)	5 (5, 5)	4 (4, 5)	<0.001
Q55	Optimising sedation-analgesia-delirium to support long-term recovery of ICU patients is NOT part of my role, median (IQR)	5 (5, 5)	5 (5, 5)	5 (4, 5)	5 (2.5, 5)	5 (5, 5)	0.035
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 5)	5 (4, 5)	4 (3, 5)	5 (4.5, 5)	5 (4, 5)	0.002
Q59	Optimisation of sedation-analgesia-delirium management is NOT within the scope of my practice, median (IQR)	5 (5, 5)	5 (4, 5)	5 (4, 5)	3.5 (2, 4)	5 (4, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (3, 5)	4 (4, 5)	4 (3, 5)	5 (4, 5)	4 (4, 5)	0.004
Q68	Communicating the target sedation-analgesia-delirium plan to the multidisciplinary team is part of my role, median (IQR)	5 (5, 5)	4 (4, 5)	4 (2, 5)	3.5 (3, 4)	5 (4, 5)	<0.001
	How important is the above issue to you achieving optimal sedation, analgesia and delirium, median (IQR)	4 (4, 5)	4 (4, 5)	4 (3, 5)	4 (3, 5)	5 (4, 5)	0.071

Table S8. Level of agreement by profession (green shading represents top 10 ranked items in each group)

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking
1	I have adequate knowledge to use validated sedation assessment scales, e.g. RASS, SAS	90%	14	92%	23	91%	17	88%	15	100%	1	55%	41
2	I have the necessary skills to assess patient's sedation, analgesia and delirium level	92%	8	98%	6	95%	6	72%	27	81%	16	66%	38
3	It is part of my role to assess patient's sedation-analgesia-delirium state continuously and intervene accordingly	87%	20	81%	30	97%	2	52%	40	81%	16	67%	33
4	I do NOT feel I have the necessary skills to titrate sedative and analgesic doses considering the patient's response (Reversed)	84%	24	98%	6	93%	12	52%	40	12%	53	78%	23
5	There are times in my unit when there is insufficient availability of sedative-analgesic agents that I am familiar with (Reversed)	89%	18	94%	20	88%	22	96%	6	69%	22	89%	10
6	The cost of sedative-analgesic agents influences which agents clinicians use (Reversed)	45%	47	53%	42	42%	47	64%	31	12%	53	44%	46
7	In my unit psychiatric expertise is NOT available to guide optimal medication management in sedated patients with mental health disorders (Reversed)	23%	57	29%	54	19%	57	20%	61	24%	50	55%	41
8	I am aware of the main principles in the sedation, agitation, delirium (PADIS) guidelines	70%	35	62%	37	69%	38	88%	15	69%	22	89%	10
9	Sedation-analgesia-delirium practice should be based on evidence and NOT on clinicians' personal beliefs	90%	14	83%	29	93%	12	92%	9	82%	12	89%	10
10	Written sedation-analgesia-delirium protocols are NOT in place in my unit (Reversed)	63%	39	68%	35	64%	39	56%	35	44%	40	67%	33
11	Sedation is increased in my unit when the unit is busy at night to keep patients safe and asleep (Reversed)	28%	53	14%	62	32%	52	36%	51	25%	45	33%	50
12	Day and night staff teams have different sedation-analgesia goals (Reversed)	29%	51	17%	58	34%	48	40%	49	6%	65	33%	50

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking
13	The patient's underlying condition influences my sedation-analgesia-delirium management decisions	91%	10	98%	6	90%	20	100%	1	69%	22	89%	10
14	My sedation-analgesia-delirium management is influenced by whether the patient has cardiovascular instability	84%	24	76%	32	89%	21	80%	24	75%	18	78%	23
15	I have experience of managing the sedation-analgesia-delirium needs of challenging patients	93%	7	100%	1	97%	2	84%	19	50%	33	89%	10
16	Sedation-analgesia-delirium goals and strategies are NOT updated based on daily assessment of patient needs (Reversed)	79%	30	89%	27	75%	34	88%	15	69%	22	89%	10
17	I find sedation-analgesia-delirium management challenging (Reversed)	18%	61	23%	55	17%	60	8%	63	18%	52	33%	50
18	I am confident to distinguish between pain and delirium	80%	29	70%	34	87%	24	56%	35	87%	11	88%	21
19	I prioritise sedation-analgesia-delirium optimisation over other aspects of patient care	27%	54	11%	63	33%	51	28%	55	25%	45	22%	59
20	It is difficult to maintain low sedation levels overnight (Reversed)	22%	58	17%	58	22%	56	28%	55	12%	53	44%	46
21	Sedation-analgesia-delirium champions support staff in optimising practice	37%	48	34%	52	34%	49	48%	43	69%	22	33%	50
22	Sedation-analgesia-delirium practice is based upon senior clinicians' preferences in my unit (Reversed)	24%	56	17%	58	26%	53	32%	53	12%	53	33%	50
23	I am confident to speak-up about sedation-analgesia-delirium practice	85%	22	96%	16	80%	30	92%	9	82%	12	89%	10
24	Patients' history such as age, chronic pain, substance abuse and mental health disorders can be challenging factors for me when managing sedation-analgesia-delirium (Reversed)	6%	68	4%	68	6%	68	8%	63	12%	53	11%	63
25	I am competent to communicate with patients and families about sedation and analgesia management	90%	14	98%	6	96%	5	56%	35	62%	32	88%	21

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking
26	Training to assess and manage sedation-analgesia-delirium is insufficient for my needs (Reversed)	46%	46	64%	36	44%	46	32%	53	12%	53	67%	33
27	I have adequate knowledge to use validated delirium assessment scales, e.g. Confusion Assessment Method (CAM)-ICU, Intensive Care Delirium Screening Checklist (ICDSC)	91%	10	97%	15	91%	17	80%	24	94%	5	67%	33
28	I am confident to keep the agitated or delirious patient safe	84%	24	96%	16	85%	25	56%	35	75%	18	100%	1
29	I feel stressed by managing an agitated or combative patient (Reversed)	17%	62	38%	49	10%	65	8%	63	12%	53	44%	46
30	I am confident working out why a patient is agitated	79%	30	75%	33	80%	30	72%	27	75%	18	100%	1
31	Worrying about a member of staff being harmed by an agitated or aggressive patient influences my sedation practice (Reversed)	7%	67	6%	67	8%	66	0%	68	6%	65	11%	63
32	I have adequate knowledge to use validated behavioural pain assessment scales, e.g. Critical-care Pain Observation Tool (CPOT), Behavioural Pain Scale (BPS)	62%	40	49%	45	73%	36	48%	43	25%	45	78%	23
33	I do NOT know when I should use a behavioural pain scale rather than non-behavioural pain scale such as the Visual Analogue Scale (VAS) (Reversed)	46%	45	46%	46	46%	45	60%	33	38%	42	33%	50
34	Sedation optimisation or light sedation increases workload (Reversed)	22%	59	17%	58	19%	57	28%	55	50%	33	11%	63
35	I am confident to manage the lightly sedated patient	89%	18	91%	24	93%	12	68%	30	82%	12	89%	10
36	Light sedation facilitates patients' orientation and engagement	96%	2	98%	6	95%	6	100%	1	94%	5	100%	1
37	I am anxious about reducing sedation if my workload is too high (Reversed)	32%	50	36%	51	25%	55	56%	35	25%	45	66%	38

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking
38	It is easier to lighten sedation when the patient is pain free	91%	10	96%	16	93%	12	92%	9	63%	30	89%	10
39	I feel frustrated when sedation minimisation is NOT progressed for deeply sedated patients	85%	22	98%	6	77%	33	92%	9	94%	5	100%	1
40	I do NOT feel adequately supported when I am reducing sedation levels (Reversed)	50%	43	57%	40	55%	41	40%	50	12%	53	33%	50
41	It is part of my role to support the patients who are awake to deal with their fears and anxiety	92%	8	89%	27	98%	1	52%	40	100%	1	100%	1
42	There are conflicts between staff in my unit when clinicians wean off sedation either very quickly or stop abruptly (Reversed)	15%	63	21%	56	13%	64	28%	55	6%	65	0%	68
43	Sedation holds may affect the safety of a patient (Reversed)	26%	55	31%	53	17%	60	48%	43	50%	33	44%	46
44	High workload and pressure prevent ICU staff from performing sedation holds (Reversed)	14%	64	8%	65	15%	63	28%	55	12%	53	11%	63
45	Competing clinical procedures (eg theatre, diagnostics etc) impede initiating a sedation hold (Reversed)	8%	66	8%	65	7%	67	4%	67	12%	53	22%	59
46	In my unit, timing to progress a sedation hold is influenced by staff's availability (Reversed)	14%	64	9%	64	16%	62	16%	62	12%	53	22%	59
47	I am more likely to perform sedation holds if senior colleagues are available at the bedside	47%	44	44%	48	50%	43	48%	43	37%	43	22%	59
48	In my unit there are insufficient numbers of clinical staff to perform sedation holds (Reversed)	53%	42	52%	43	48%	44	64%	31	75%	18	66%	38
49	Sedation holds are difficult for me to accomplish when a clear sedation plan is NOT in place (Reversed)	29%	52	51%	44	26%	53	8%	63	25%	45	33%	50
50	I have the necessary decision-making skills to initiate a sedation hold	79%	30	100%	1	83%	27	44%	48	24%	51	78%	23
51	My colleagues are willing to listen to my opinion about sedation holds	82%	27	94%	20	80%	30	84%	19	69%	22	67%	33

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking
52	A low proportion of experienced ICU staff creates a barrier to initiating or progressing sedation holds in my unit (Reversed)	18%	60	19%	57	19%	57	24%	60	0%	68	11%	63
53	Families' presence at the bedside help enable sedation holds	58%	41	62%	37	54%	42	72%	27	63%	30	55%	41
54	Optimising sedation reduces the time a patient needs to stay on the ventilator	96%	2	98%	6	94%	9	100%	1	94%	5	100%	1
55	Optimising sedation-analgesia-delirium to support long-term recovery of ICU patients is NOT part of my role (Reversed)	90%	14	100%	1	91%	17	80%	24	68%	29	78%	23
56	It is easier for me to optimise sedation when a clear sedation-analgesia-delirium plan is in place	78%	33	60%	39	84%	26	88%	15	69%	22	77%	31
57	Sedation optimisation facilitates patients' physical and cognitive recovery	95%	5	94%	20	94%	9	100%	1	100%	1	100%	1
58	Optimal sedation and analgesia is NOT the same for every patient	97%	1	100%	1	95%	6	100%	1	100%	1	100%	1
59	Optimisation of sedation-analgesia-delirium management is NOT within the scope of my practice (Reversed)	87%	20	100%	1	88%	22	84%	19	50%	33	78%	23
60	I work towards a target sedation score to achieve sedation-analgesia-delirium optimisation	78%	33	81%	30	82%	28	84%	19	31%	44	55%	41
61	I am able to coordinate the clinical team to manage sedation-analgesia-delirium practices	67%	38	91%	24	64%	39	48%	43	44%	40	78%	23
62	I am competent to discuss with the multidisciplinary team the sedation-analgesia needs of the patient	94%	6	98%	6	94%	9	96%	6	88%	9	77%	31
63	Teamwork contributes positively to my sedation-analgesia-delirium practice	96%	2	98%	6	97%	2	92%	9	88%	9	100%	1
64	Agreeing the sedation-analgesia-delirium plan is a shared decision-making process within the multidisciplinary team	91%	10	91%	24	93%	12	92%	9	82%	12	89%	10

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking	%agree	ranking
65	Peer pressure from the multidisciplinary team affects my sedation-analgesia-delirium practice (Reversed)	33%	49	37%	50	34%	50	36%	52	18%	52	33%	50
66	I improve my practice by having regular discussions about sedation-analgesia-delirium practices with my senior colleagues	68%	36	55%	41	71%	37	84%	19	50%	33	78%	23
67	I feel less concerned when implementing a sedation-analgesia-delirium plan that has been decided after a multi-disciplinary team discussion	68%	36	45%	47	74%	35	96%	6	50%	33	55%	41
68	Communicating the target sedation-analgesia-delirium plan to the multidisciplinary team is part of my role	81%	28	96%	16	82%	28	60%	34	50%	33	89%	10

Table S9. Items deemed as most important by profession (green shading indicates top 10 ranked items in each group)

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking
1	I have adequate knowledge to use validated sedation assessment scales, e.g.RASS, SAS	86%	16	83%	10	89%	21	88%	4	82%	20	66%	52
2	I have the necessary skills to assess patient's sedation, analgesia and delirium level	94%	1	95%	1	93%	9	96%	1	94%	1	89%	13
3	It is part of my role to assess patient's sedation-analgesia-delirium state continuously and intervene accordingly	89%	8	82%	13	97%	1	52%	41	88%	9	100%	1
4	I do NOT feel I have the necessary skills to titrate sedative and analgesic doses considering the patient's response	79%	25	72%	23	87%	25	52%	41	63%	63	100%	1
5	There are times in my unit when there is insufficient availability of sedative-analgesic agents that I am familiar with	69%	55	36%	60	83%	38	60%	30	69%	51	66%	52
6	The cost of sedative-analgesic agents influences which agents clinicians use	38%	68	12%	68	52%	68	8%	68	43%	67	33%	68
7	In my unit psychiatric expertise is NOT available to guide optimal medication management in sedated patients with mental health disorders	61%	60	24%	67	77%	55	32%	65	82%	20	55%	58
8	I am aware of the main principles in the sedation, agitation, delirium (PADIS) guidelines	72%	47	45%	53	79%	51	76%	16	87%	12	78%	32
9	Sedation-analgesia-delirium practice should be based on evidence and NOT on clinicians' personal beliefs	82%	20	61%	35	90%	18	80%	9	75%	40	89%	13
10	Written sedation-analgesia-delirium protocols are NOT in place in my unit	74%	39	49%	46	80%	48	76%	16	87%	12	88%	27
11	Sedation is increased in my unit when the unit is busy at night to keep patients safe and asleep	71%	49	64%	30	73%	60	64%	26	81%	27	89%	13

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking
12	Day and night staff teams have different sedation-analgesia goals	73%	42	59%	37	81%	44	56%	35	68%	62	89%	13
13	The patient's underlying condition influences my sedation-analgesia-delirium management decisions	81%	23	73%	21	84%	33	84%	6	69%	51	78%	32
14	My sedation-analgesia-delirium management is influenced by whether the patient has cardiovascular instability	73%	42	49%	46	84%	33	56%	35	75%	40	77%	44
15	I have experience of managing the sedation-analgesia-delirium needs of challenging patients	89%	8	87%	4	91%	13	84%	6	75%	40	100%	1
16	Sedation-analgesia-delirium goals and strategies are NOT updated based on daily assessment of patient needs	87%	15	81%	14	87%	25	96%	1	88%	9	100%	1
17	I find sedation-analgesia-delirium management challenging	77%	31	54%	42	85%	32	72%	20	75%	40	89%	13
18	I am confident to distinguish between pain and delirium	91%	3	85%	6	96%	4	72%	20	88%	9	89%	13
19	I prioritise sedation-analgesia-delirium optimisation over other aspects of patient care	59%	65	27%	65	73%	60	44%	53	69%	51	44%	65
20	It is difficult to maintain low sedation levels overnight	72%	47	59%	36	79%	51	44%	53	87%	12	89%	13
21	Sedation-analgesia-delirium champions support staff in optimising practice	51%	67	25%	66	58%	67	48%	48	69%	51	55%	58
22	Sedation-analgesia-delirium practice is based upon senior clinicians' preferences in my unit	52%	66	32%	63	59%	66	52%	41	56%	66	44%	65
23	I am confident to speak-up about sedation-analgesia-delirium practice	78%	30	59%	37	84%	33	76%	16	82%	20	89%	13

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking
24	Patients' history such as age, chronic pain, substance abuse and mental health disorders can be challenging factors for me when managing sedation-analgesia-delirium	83%	19	64%	30	90%	18	84%	6	81%	27	77%	44
25	I am competent to communicate with patients and families about sedation and analgesia management	76%	35	59%	37	86%	29	44%	53	87%	12	89%	13
26	Training to assess and manage sedation-analgesia-delirium is insufficient for my needs	70%	52	42%	57	81%	44	48%	48	82%	20	77%	44
27	I have adequate knowledge to use validated delirium assessment scales, e.g. Confusion Assessment Method (CAM)-ICU, Intensive Care Delirium Screening Checklist (ICDSC)	88%	13	73%	21	93%	9	80%	9	94%	1	100%	1
28	I am confident to keep the agitated or delirious patient safe	90%	6	85%	7	96%	4	64%	26	81%	27	100%	1
29	I feel stressed by managing an agitated or combative patient	77%	31	54%	42	91%	13	32%	65	82%	20	88%	27
30	I am confident working out why a patient is agitated	89%	8	83%	10	95%	6	68%	24	94%	1	88%	27
31	Worrying about a member of staff being harmed by an agitated or aggressive patient influences my sedation practice	79%	25	59%	37	91%	13	52%	41	0%	68	77%	44
32	I have adequate knowledge to use validated behavioural pain assessment scales, e.g. Critical-care Pain Observation Tool (CPOT), Behavioural Pain Scale (BPS)	74%	39	44%	54	90%	18	52%	41	69%	51	66%	52
33	I do NOT know when I should use a behavioural pain scale rather than non-behavioural pain scale such as the Visual Analogue Scale (VAS)	62%	59	34%	62	75%	56	44%	53	63%	63	55%	58
34	Sedation optimisation or light sedation increases workload	71%	49	68%	26	75%	56	56%	35	69%	51	78%	32

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking
35	I am confident to manage the lightly sedated patient	79%	25	66%	29	89%	21	56%	35	75%	40	78%	32
36	Light sedation facilitates patients' orientation and engagement	91%	3	85%	7	95%	6	80%	9	94%	1	88%	27
37	I am anxious about reducing sedation if my workload is too high	71%	49	49%	46	83%	38	36%	64	81%	27	78%	32
38	It is easier to lighten sedation when the patient is pain free	82%	20	71%	24	91%	13	60%	30	62%	65	100%	1
39	I feel frustrated when sedation minimisation is NOT progressed for deeply sedated patients	85%	17	87%	4	84%	33	80%	9	93%	7	100%	1
40	I do NOT feel adequately supported when I am reducing sedation levels	73%	42	49%	46	86%	29	48%	48	69%	51	89%	13
41	It is part of my role to support the patients who are awake to deal with their fears and anxiety	89%	8	79%	16	97%	1	60%	30	87%	12	100%	1
42	There are conflicts between staff in my unit when clinicians wean off sedation either very quickly or stop abruptly	67%	56	43%	55	79%	51	40%	59	75%	40	67%	51
43	Sedation holds may affect the safety of a patient	73%	42	53%	45	87%	25	40%	59	75%	40	55%	58
44	High workload and pressure prevent ICU staff from performing sedation holds	82%	20	74%	20	87%	25	64%	26	81%	27	100%	1
45	Competing clinical procedures (eg theatre, diagnostics etc) impede initiating a sedation hold	70%	52	57%	41	79%	51	40%	59	76%	38	77%	44
46	In my unit, timing to progress a sedation hold is influenced by staff's availability	76%	35	68%	26	83%	38	44%	53	94%	1	55%	58
47	I am more likely to perform sedation holds if senior colleagues are available at the bedside	61%	60	46%	52	72%	62	28%	67	69%	51	44%	65
48	In my unit there are insufficient numbers of clinical staff to perform sedation holds	70%	52	48%	50	80%	48	44%	53	81%	27	78%	32

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking
49	Sedation holds are difficult for me to accomplish when a clear sedation plan is NOT in place	61%	60	28%	64	72%	62	52%	41	75%	40	78%	32
50	I have the necessary decision-making skills to initiate a sedation hold	77%	31	68%	26	86%	29	48%	48	69%	51	78%	32
51	My colleagues are willing to listen to my opinion about sedation holds	77%	31	70%	25	82%	42	56%	35	82%	20	78%	32
52	A low proportion of experienced ICU staff creates a barrier to initiating or progressing sedation holds in my unit	75%	37	64%	30	84%	33	48%	48	82%	20	66%	52
53	Families' presence at the bedside help enable sedation holds	60%	64	42%	57	68%	65	40%	59	69%	51	55%	58
54	Optimising sedation reduces the time a patient needs to stay on the ventilator	91%	3	92%	2	93%	9	80%	9	87%	12	89%	13
55	Optimising sedation-analgesia-delirium to support long-term recovery of ICU patients is NOT part of my role	80%	24	62%	33	88%	24	68%	24	81%	27	89%	13
56	It is easier for me to optimise sedation when a clear sedation-analgesia-delirium plan is in place	73%	42	47%	51	81%	44	76%	16	87%	12	66%	52
57	Sedation optimisation facilitates patients' physical and cognitive recovery	90%	6	78%	18	93%	9	88%	4	93%	7	100%	1
58	Optimal sedation and analgesia is NOT the same for every patient	93%	2	79%	16	97%	1	92%	3	94%	1	100%	1
59	Optimisation of sedation-analgesia-delirium management is NOT within the scope of my practice	74%	39	54%	42	82%	42	60%	30	81%	27	77%	44
60	I work towards a target sedation score to achieve sedation-analgesia-delirium optimisation	75%	37	62%	33	81%	44	72%	20	75%	40	66%	52
61	I am able to coordinate the clinical team to manage sedation-analgesia-delirium practices	79%	25	83%	10	80%	48	64%	26	81%	27	78%	32

Q	Statement	Total (n=252)		Medical (n=53)		Nurses (n=149)		Pharmacists (n=25)		Physiotherapists (n=16)		Other (n=9)	
		%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking	%Important	ranking
62	I am competent to discuss with the multidisciplinary team the sedation-analgesia needs of the patient	89%	8	80%	15	94%	8	80%	9	87%	12	89%	13
63	Teamwork contributes positively to my sedation-analgesia-delirium practice	88%	13	89%	3	91%	13	72%	20	75%	40	89%	13
64	Agreeing the sedation-analgesia-delirium plan is a shared decision-making process within the multidisciplinary team	85%	17	78%	18	89%	21	80%	9	81%	27	88%	27
65	Peer pressure from the multidisciplinary team affects my sedation-analgesia-delirium practice	61%	60	41%	59	70%	64	40%	59	75%	40	55%	58
66	I improve my practice by having regular discussions about sedation-analgesia-delirium practices with my senior colleagues	66%	58	39%	60	75%	56	56%	35	76%	38	77%	44
67	I feel less concerned when implementing a sedation-analgesia-delirium plan that has been decided after a multi-disciplinary team discussion	67%	56	43%	55	75%	56	60%	30	81%	27	78%	32
68	Communicating the target sedation-analgesia-delirium plan to the multidisciplinary team is part of my role	79%	25	85%	7	83%	38	52%	41	69%	51	78%	32

Table S10 Congruence in ranking of strength of agreement and perceived importance (Numbers represent ranks of agreement and importance)

Q	Statement	Total		MD		Nurses		Pharmacists		Physiotherapists		Other	
		Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance
1	I have adequate knowledge to use validated sedation assessment scales, e.g. Richmond Agitation-Sedation Scale (RASS), Riker Sedation Agitation Scale (SAS)	14	16	23	10	17	21	15	4	1	20	41	52
2	I have the necessary skills to assess patient's sedation, analgesia and delirium level	8	1	6	1	6	9	27	1	16	1	38	13
3	It is part of my role to assess patient's sedation-analgesia-delirium state continuously and intervene accordingly	20	8	30	13	2	1	40	41	16	9	33	1
4	I do NOT feel I have the necessary skills to titrate sedative and analgesic doses considering the patient's response (Reversed)	24	25	6	23	12	25	40	41	53	63	23	1
5	There are times in my unit when there is insufficient availability of sedative-analgesic agents that I am familiar with (Reversed)	18	55	20	60	22	38	6	30	22	51	10	52
6	The cost of sedative-analgesic agents influences which agents clinicians use (Reversed)	47	68	42	68	47	68	31	68	53	67	46	68
7	In my unit psychiatric expertise is NOT available to guide optimal medication management in sedated patients with mental health disorders (Reversed)	57	60	54	67	57	55	61	65	50	20	41	58
8	I am aware of the main principles in the sedation, agitation, delirium (PADIS) guidelines	35	47	37	53	38	51	15	16	22	12	10	32
9	Sedation-analgesia-delirium practice should be based on evidence and NOT on clinicians' personal beliefs	14	20	29	35	12	18	9	9	12	40	10	13
10	Written sedation-analgesia-delirium protocols are NOT in place in my unit (Reversed)	39	39	35	46	39	48	35	16	40	12	33	27
11	Sedation is increased in my unit when the unit is busy at night to keep patients safe and asleep (Reversed)	53	49	62	30	52	60	51	26	45	27	50	13
12	Day and night staff teams have different sedation-analgesia goals (Reversed)	51	42	58	37	48	44	49	35	65	62	50	13
13	The patient's underlying condition influences my sedation-analgesia-delirium management decisions	10	23	6	21	20	33	1	6	22	51	10	32

Q	Statement	Total		MD		Nurses		Pharmacists		Physiotherapists		Other	
		Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance
14	My sedation-analgesia-delirium management is influenced by whether the patient has cardiovascular instability	24	42	32	46	21	33	24	35	18	40	23	44
15	I have experience of managing the sedation-analgesia-delirium needs of challenging patients	7	8	1	4	2	13	19	6	33	40	10	1
16	Sedation-analgesia-delirium goals and strategies are NOT updated based on daily assessment of patient needs (Reversed)	30	15	27	14	34	25	15	1	22	9	10	1
17	I find sedation-analgesia-delirium management challenging (Reversed)	61	31	55	42	60	32	63	20	52	40	50	13
18	I am confident to distinguish between pain and delirium	29	3	34	6	24	4	35	20	11	9	21	13
19	I prioritise sedation-analgesia-delirium optimisation over other aspects of patient care	54	65	63	65	51	60	55	53	45	61	59	65
20	It is difficult to maintain low sedation levels overnight (Reversed)	58	47	58	36	56	51	55	53	53	12	46	13
21	Sedation-analgesia-delirium champions support staff in optimising practice	48	67	52	66	49	67	43	48	22	51	50	58
22	Sedation-analgesia-delirium practice is based upon senior clinicians' preferences in my unit (Reversed)	56	66	58	63	53	66	53	41	53	66	50	65
23	I am confident to speak-up about sedation-analgesia-delirium practice	22	30	16	37	30	33	9	16	12	20	10	13
24	Patients' history such as age, chronic pain, substance abuse and mental health disorders can be challenging factors for me when managing sedation-analgesia-delirium (Reversed)	68	19	68	30	68	18	63	6	53	27	63	44
25	I am competent to communicate with patients and families about sedation and analgesia management	14	35	6	37	5	29	35	53	32	12	21	13
26	Training to assess and manage sedation-analgesia-delirium is insufficient for my needs (Reversed)	46	52	36	57	46	44	53	48	53	20	33	44
27	I have adequate knowledge to use validated delirium assessment scales, e.g. Confusion Assessment Method (CAM)-ICU, Intensive Care Delirium Screening Checklist (ICDSC)	10	13	15	21	17	9	24	9	5	1	33	1

Q	Statement	Total		MD		Nurses		Pharmacists		Physiotherapists		Other	
		Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance
28	I am confident to keep the agitated or delirious patient safe	24	6	16	7	25	4	35	26	18	27	1	1
29	I feel stressed by managing an agitated or combative patient (Reversed)	62	31	49	42	65	13	63	65	53	20	46	27
30	I am confident working out why a patient is agitated Worrying about a member of staff being harmed by an agitated or aggressive patient influences my sedation practice (Reversed)	30	8	33	10	30	6	27	24	18	1	1	27
31	I have adequate knowledge to use validated behavioural pain assessment scales, e.g. Critical-care Pain Observation Tool (CPOT), Behavioural Pain Scale (BPS)	67	25	67	37	66	13	68	41	65	68	63	44
32	I do NOT know when I should use a behavioural pain scale rather than non-behavioural pain scale such as the Visual Analogue Scale (VAS) (Reversed)	40	39	45	54	36	18	43	41	45	51	23	52
33	Sedation optimisation or light sedation increases workload (Reversed)	45	59	46	62	45	56	33	53	42	63	50	58
34	I am confident to manage the lightly sedated patient Light sedation facilitates patients' orientation and engagement	59	49	58	26	57	56	55	35	33	51	63	32
35	I am confident to reduce sedation if my workload is too high (Reversed)	18	25	24	29	12	21	30	35	12	40	10	32
36	It is easier to lighten sedation when the patient is pain free	2	3	6	7	6	6	1	9	5	1	1	27
37	I feel frustrated when sedation minimisation is NOT progressed for deeply sedated patients	50	49	51	46	55	38	35	64	45	27	38	32
38	I do NOT feel adequately supported when I am reducing sedation levels (Reversed)	10	20	16	24	12	13	9	30	30	65	10	1
39	It is part of my role to support the patients who are awake to deal with their fears and anxiety	22	17	6	4	33	33	9	9	5	7	1	1
40	There are conflicts between staff in my unit when clinicians wean off sedation either very quickly or stop abruptly (Reversed)	43	42	40	46	41	29	50	48	53	51	50	13
41		8	8	27	16	1	1	40	30	1	12	1	1
42		63	56	56	55	64	51	55	59	65	40	68	51

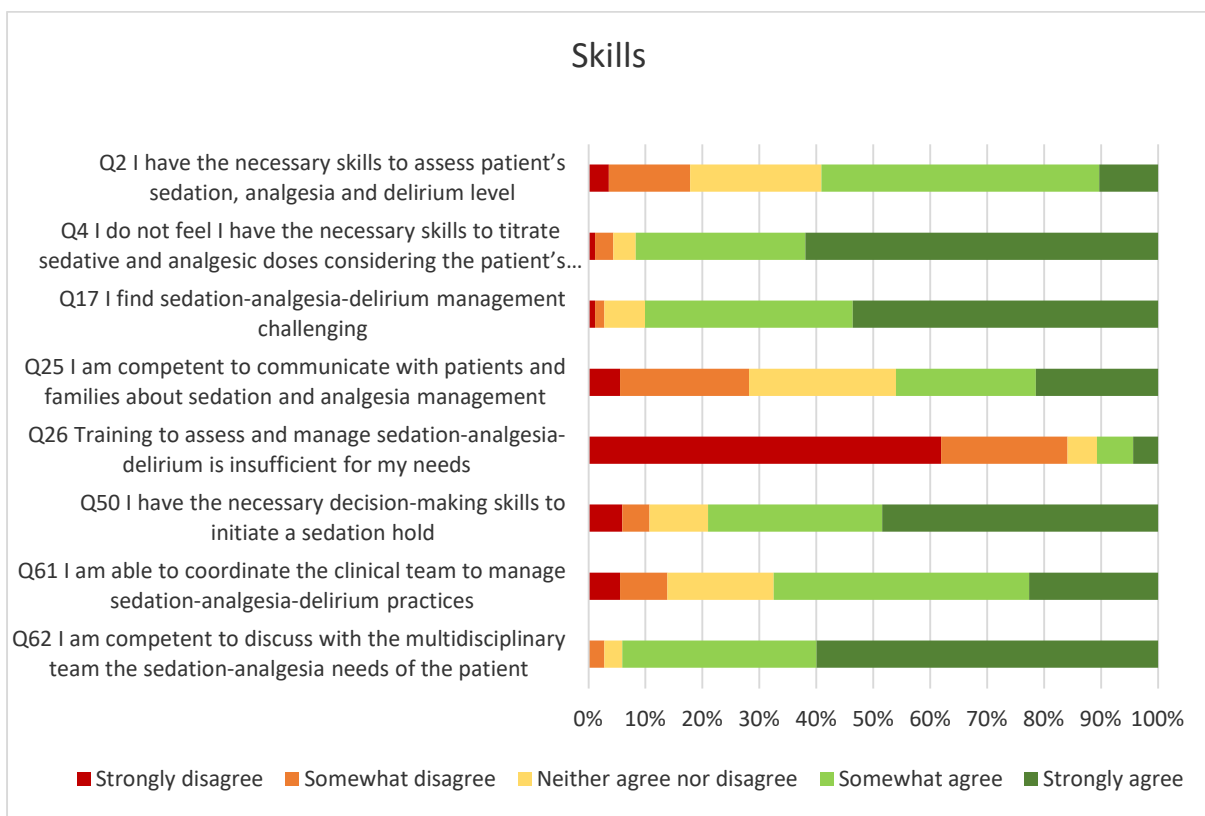
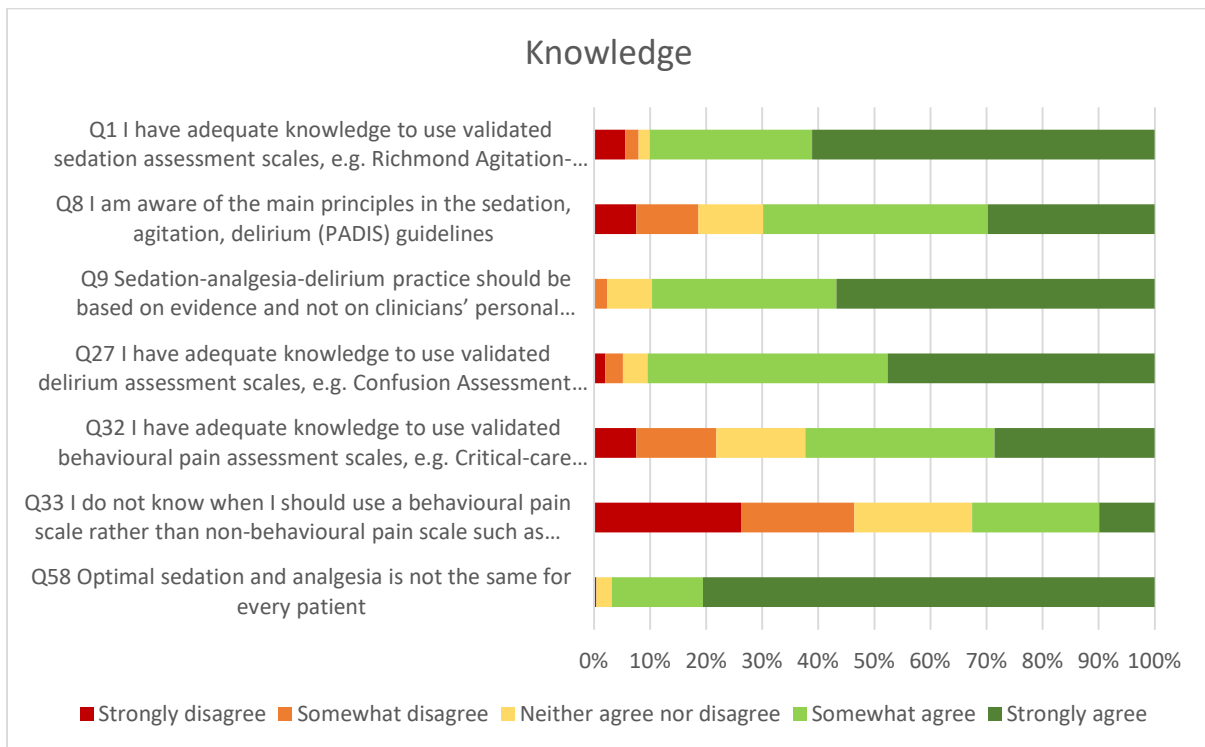
Q	Statement	Total		MD		Nurses		Pharmacists		Physiotherapists		Other	
		Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance
43	Sedation holds may affect the safety of a patient (Reversed)	55	42	53	45	60	25	43	59	33	40	46	58
44	High workload and pressure prevent ICU staff from performing sedation holds (Reversed)	64	20	65	20	63	25	55	26	53	27	63	1
45	Competing clinical procedures (eg theatre, diagnostics etc) impede initiating a sedation hold (Reversed)	66	52	65	41	67	51	67	59	53	38	59	44
46	In my unit, timing to progress a sedation hold is influenced by staff's availability (Reversed)	64	35	64	26	62	38	62	53	53	1	59	58
47	I am more likely to perform sedation holds if senior colleagues are available at the bedside	44	60	48	52	43	62	43	67	43	51	59	65
48	In my unit there are insufficient numbers of clinical staff to perform sedation holds (Reversed)	42	52	43	50	44	48	31	53	18	27	38	32
49	Sedation holds are difficult for me to accomplish when a clear sedation plan is NOT in place (Reversed)	52	60	44	64	53	62	63	41	45	40	50	32
50	I have the necessary decision-making skills to initiate a sedation hold	30	31	1	26	27	29	48	48	51	51	23	32
51	My colleagues are willing to listen to my opinion about sedation holds	27	31	20	25	30	42	19	35	22	20	33	32
52	A low proportion of experienced ICU staff creates a barrier to initiating or progressing sedation holds in my unit (Reversed)	60	37	57	30	57	33	60	48	68	20	63	52
53	Families' presence at the bedside help enable sedation holds	41	64	37	57	42	65	27	59	30	51	41	58
54	Optimising sedation reduces the time a patient needs to stay on the ventilator	2	3	6	2	9	9	1	9	5	12	1	13
55	Optimising sedation-analgesia-delirium to support long-term recovery of ICU patients is NOT part of my role (Reversed)	14	24	1	33	17	24	24	24	29	27	23	13
56	It is easier for me to optimise sedation when a clear sedation-analgesia-delirium plan is in place	33	42	39	51	26	44	15	16	22	12	31	52
57	Sedation optimisation facilitates patients' physical and cognitive recovery	5	6	20	18	9	9	1	4	1	7	1	1

Q	Statement	Total		MD		Nurses		Pharmacists		Physiotherapists		Other	
		Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance	Agreement	Importance
58	Optimal sedation and analgesia is NOT the same for every patient	1	2	1	16	6	1	1	3	1	1	1	1
59	Optimisation of sedation-analgesia-delirium management is NOT within the scope of my practice (Reversed)	20	39	1	42	22	42	19	30	33	27	23	44
60	I work towards a target sedation score to achieve sedation-analgesia-delirium optimisation	33	37	30	33	28	44	19	20	44	40	41	52
61	I am able to coordinate the clinical team to manage sedation-analgesia-delirium practices	38	25	24	10	39	48	43	26	40	27	23	32
62	I am competent to discuss with the multidisciplinary team the sedation-analgesia needs of the patient	6	8	6	15	9	8	6	9	9	12	31	13
63	Teamwork contributes positively to my sedation-analgesia-delirium practice	2	13	6	3	2	13	9	20	9	40	1	13
64	Agreeing the sedation-analgesia-delirium plan is a shared decision-making process within the multidisciplinary team	10	17	24	18	12	21	9	9	12	27	10	27
65	Peer pressure from the multidisciplinary team affects my sedation-analgesia-delirium practice (Reversed)	49	60	50	59	50	64	52	59	52	40	50	58
66	I improve my practice by having regular discussions about sedation-analgesia-delirium practices with my senior colleagues	36	58	41	60	37	56	19	35	33	38	23	44
67	I feel less concerned when implementing a sedation-analgesia-delirium plan that has been decided after a multi-disciplinary team discussion	36	56	47	55	35	56	6	30	33	27	41	32
68	Communicating the target sedation-analgesia-delirium plan to the multidisciplinary team is part of my role	28	25	16	7	28	38	34	41	33	51	10	32

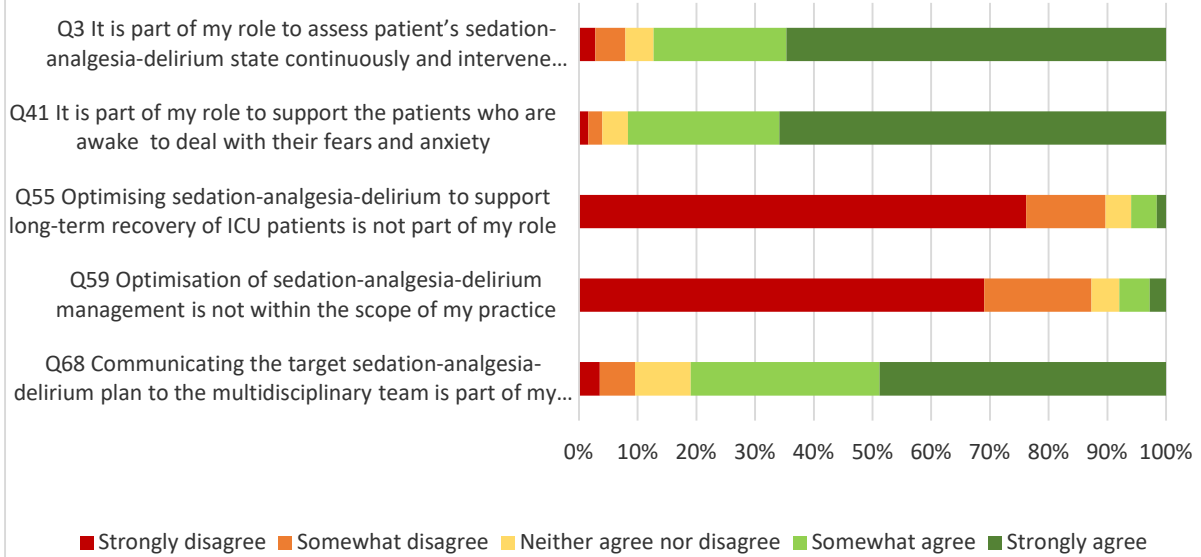
'Other' category included advanced clinical practitioners, psychologists, Numbers represent ranked sums of each of agreement and importance

	Difference between agreeing this issue affected sedation, analgesia and delirium practice compared to how important they considered the issue
	Agreement: <10 positions in ranking
	Partial agreement: 10 - 19 difference positions in ranking
	Disagreement: ≥20 difference positions in ranking

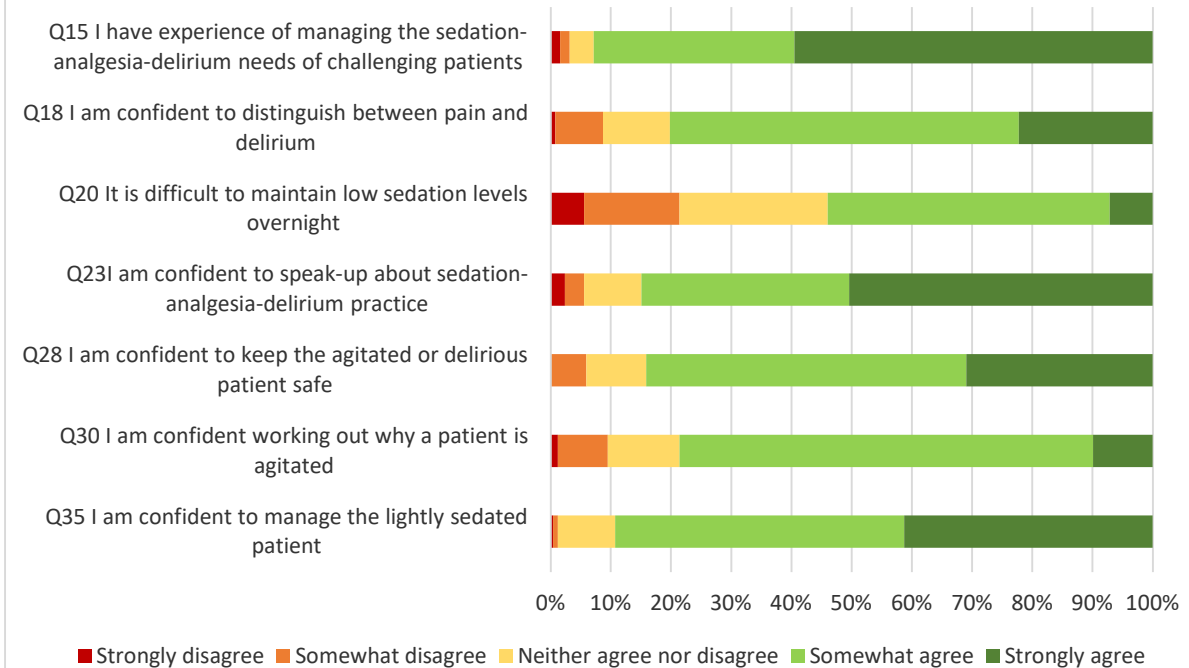
Figure S1



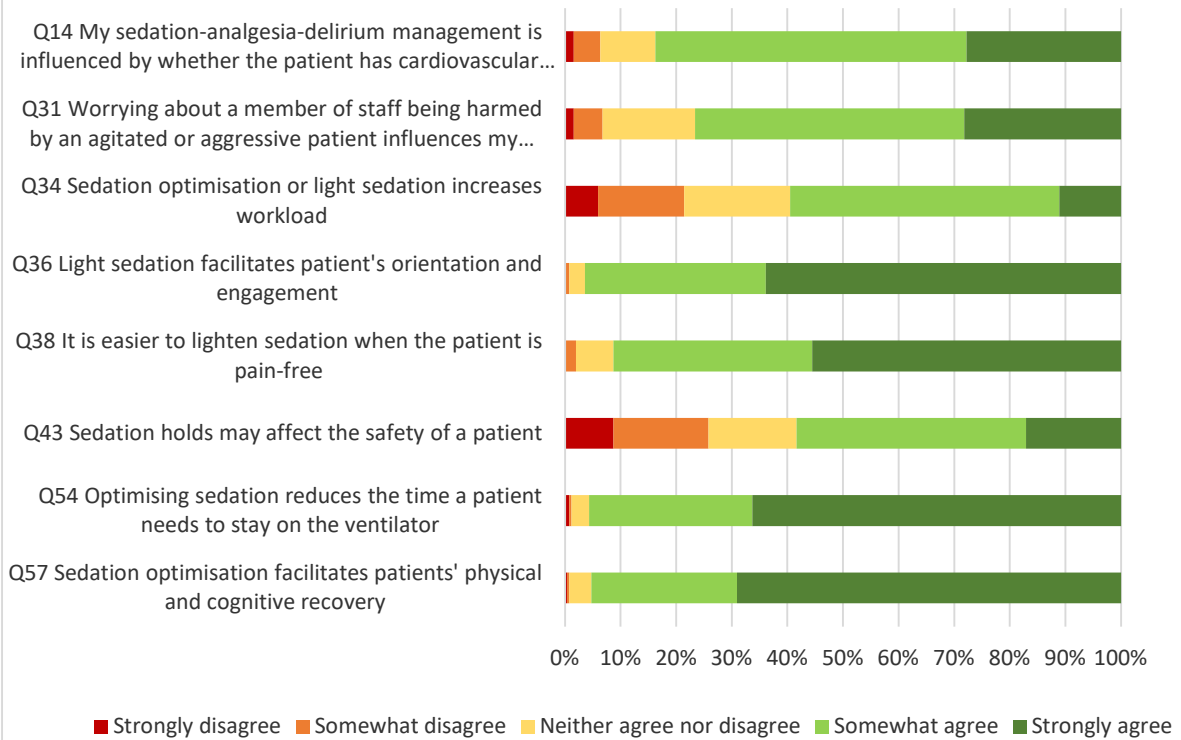
Professional role and identity



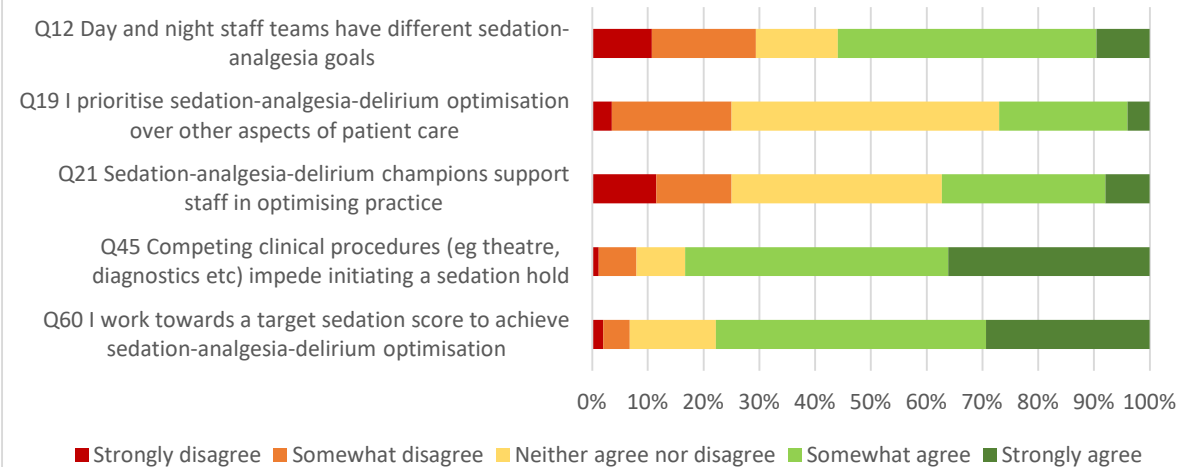
Beliefs about capabilities



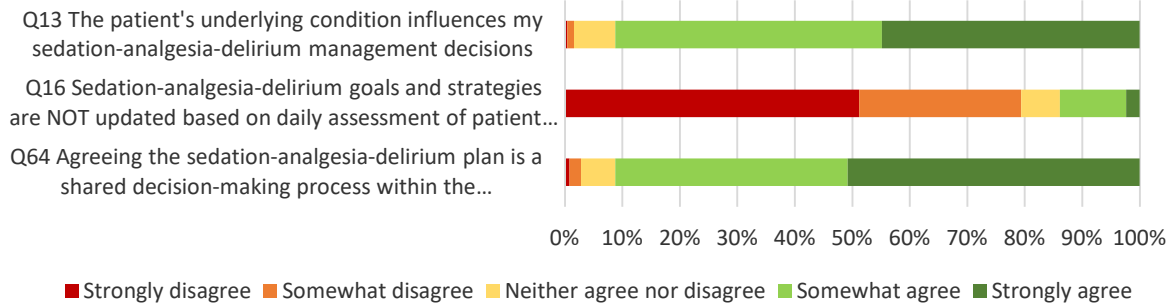
Beliefs about consequences



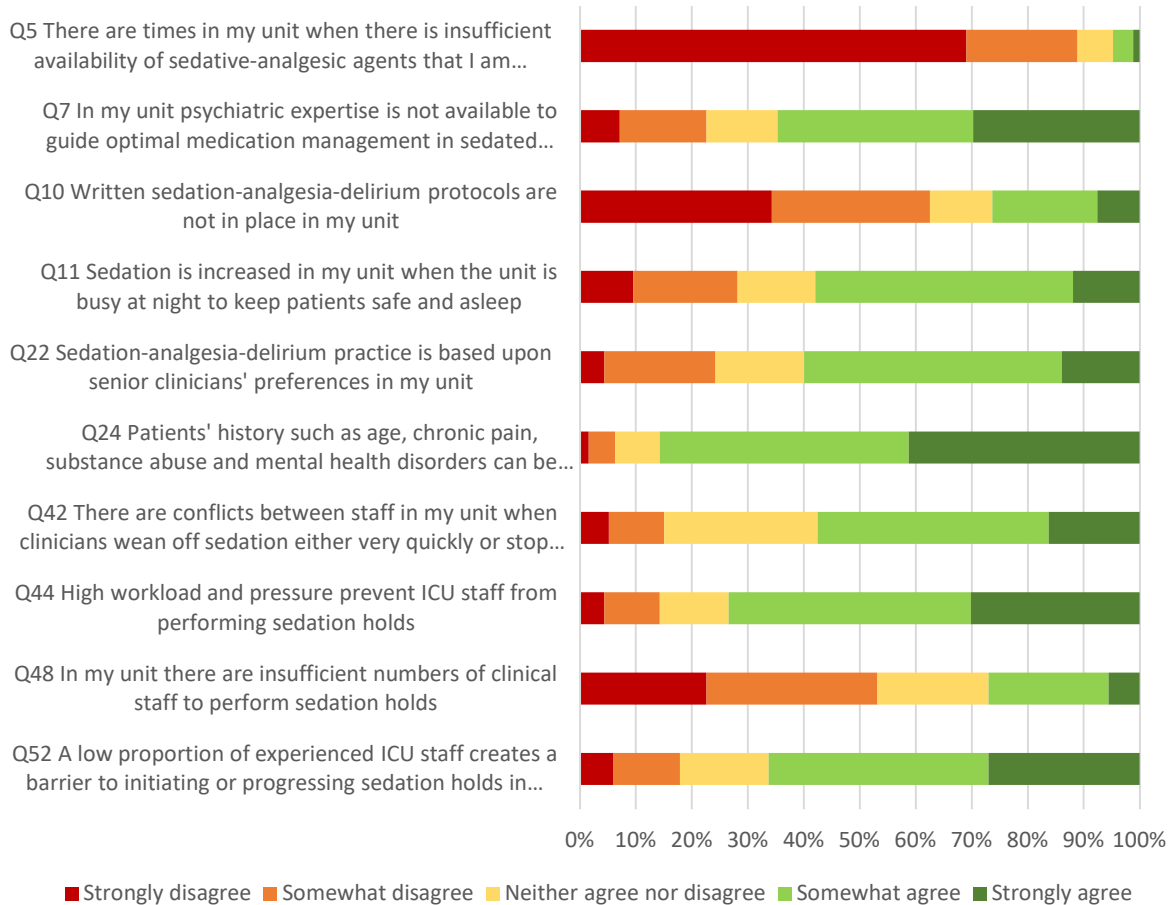
Motivation, goals, and intentions



Memory/attention and decision processes



Environmental context and resources



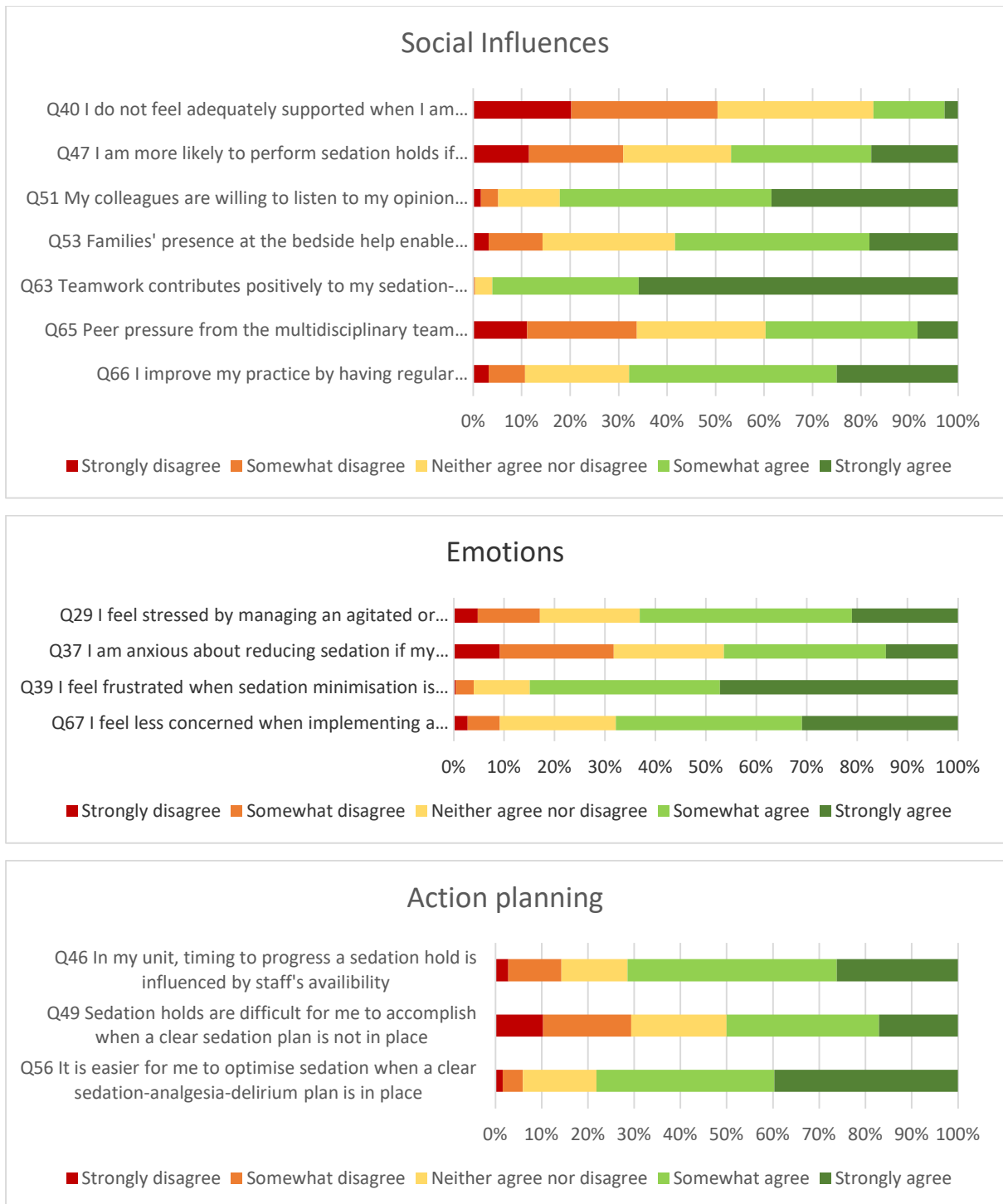


Figure S1. Responses to each OCEAN-ICU item (n = 252)

Questions are phrased in the same format as the instrument, i.e. with the desirable response sometimes being 'agree' and sometimes being 'disagree'. The questions have been grouped following the Theoretical Domains Framework.