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REVIEW ARTICLE

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A critical appraisal and recommendation synthesis of delirium clinical practice guidelines relevant to the care of older adults in the emergency department: An umbrella review

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Abstract

Rationale: Older adults are at high risk of developing delirium in the emergency department (ED); however, it is often missed or undertreated. Improving ED delirium care is challenging in part due to a lack of standards to guide best practice. Clinical practice guidelines (CPGs) translate evidence into recommendations to improve practice.

Aim: To critically appraise and synthesize CPG recommendations for delirium care relevant to older ED patients.

Methods: We conducted an umbrella review to retrieve relevant CPGs. Quality of the CPGs and their recommendations were critically appraised using the Appraisal of Guidelines, Research, and Evaluation (AGREE)-II; and Appraisal of Guidelines Research and Evaluation—Recommendations Excellence (AGREE-REX) instruments. A threshold of 70% or greater in the AGREE-II Rigour of Development domain was used to define high-quality CPGs. Delirium recommendations from CPGs meeting this threshold were included in the synthesis and narrative analysis.

Results: AGREE-II Rigour of Development scores ranged from 37% to 83%, with 5 of 10 CPGs meeting the predefined threshold. AGREE-REX overall calculated scores ranged from 44% to 80%. Recommendations were grouped into screening, diagnosis, risk reduction, and management. Although none of the included CPGs were ED-specific, many recommendations incorporated evidence from this setting. There was agreement that screening for nonmodifiable risk factors is important to define high-risk populations, and those at risk should be screened for delirium. The '4A's Test' was the recommended tool to use in the ED specifically. Multicomponent strategies were recommended for delirium risk reduction, and for its management if it occurs. The only area of disagreement was for the short-term use of antipsychotic medication in urgent situations.

Conclusion: This is the first known review of delirium CPGs including a critical appraisal and synthesis of recommendations. Researchers and policymakers can use this synthesis to inform future improvement efforts and research in the ED.
Registration: This study has been registered in the Open Science Framework registries: https://doi.org/10.17605/OSF.IO/TG7S6OSF.IO/TG7S6.

KEYWORDS
aged, AGREE, delirium, emergency services (hospital), practice guideline, systematic review

1 | INTRODUCTION

Delirium is a reversible 'syndrome of abrupt onset, fluctuating course, with prominent cognitive symptoms including decreased attention and awareness, additional deficits such as memory, or disorientation and evidence of an underlying physiologic cause'.[1] Older adults (i.e., people 65 years of age and older) are a high-risk population for developing delirium.[2–4] Between 7% and 35% of older adults who present to the emergency department (ED), arrive with or develop delirium during their stay.[5,6] Despite its frequent occurrence in the ED, delirium is often underrecognized in routine clinical care.[6,7] Delirium is independently linked to poorer outcomes for older ED patients such as loss of independence, increased length of hospital stay, and mortality.[8–14] Strategies to improve delirium care for older ED patients are hindered by the underlying knowledge gaps and lack of practice standards for assessing, diagnosing, preventing, and managing delirium.[15,16]

Clinical practice guidelines (CPGs) are 'statements that include recommendations intended to optimize patient care. They are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options'.[17] High-quality CPGs have the potential to reduce unwarranted practice variation, translate the complexity of scientific evidence into standards for practice, and improve healthcare quality and safety.[18] It is important to critically appraise CPG quality due to potential variations in the methodological rigour of development and differing recommendations on the same topic.[17–22] The purpose of this review was to identify and synthesize recommendations from high-quality delirium CPGs relevant to the care of older ED patients. Because both the quality of current CPGs and their relevance to EDs were unknown, our review included CPGs addressing delirium generically, then recommendations were examined to define those that may be relevant to older ED patients.

1.1 | Research question

What is the range, type, and consistency of CPG recommendations for delirium care in older adults found in high-quality practice guidelines?

2 | METHODS

A protocol for this study was registered in the Open Science Framework (https://doi.org/10.17605/OSF.IO/TG7S6) and published by Filiatreault et al.[23] The design of this study was informed by Johnston et al.'s recommendations for conducting a systematic review of CPGs.[20]

2.1 | Eligibility criteria

Eligibility criteria were applied during each phase of the review (Table 1). As recommended by Johnston et al., we used the 'PICAR' criteria[20] to define our eligibility criteria. The first four criteria were applied during evidence selection, while the last criterion was applied after critical appraisal to identify recommendations eligible to include in the synthesis and narrative analysis.

2.2 | Search and screening strategies

The search strategy was developed iteratively by all authors and refined through consultation with a health sciences librarian (J. L.). We searched Scopus (includes Medline and Embase), EBSCOhost (CINAHL, AgeLine, and Academic Search Complete), the Guidelines International Network (G-I-N) Library, and the ECRI Guidelines Trust® databases to locate and retrieve delirium CPGs that were published in English (or with English translation available). Supplemental searches using Google Advanced and snowball searching techniques were conducted to retrieve any potential original full-text CPGs. When multiple versions of the same CPG were retrieved (e.g., older versions, summaries, etc.) only the latest full-text version was retained for screening. Specific search terms used for each source can be found in an online supplement (Supporting Information: Additional File 1). Last searches were executed on 10 March 2022, however, as high-quality CPGs periodically conduct updates,[17,19] CPGs that met inclusion criteria were monitored during the study to ensure we included the most up-to-date version. Retrieved citations were merged into a reference manager (Zotero) and uploaded to the 'Covidence' online collaboration platform for conducting evidence syntheses,[24] then duplicate citations were removed. Evidence

TABLE 1 Eligibility criteria.

PICAR component	Study criteria
P: Population, clinical indication(s), and condition(s)	Older Adults[a] Delirium
I: Intervention(s)	Any intervention (due to unknown relevance)
C: Comparator(s), comparison(s), (key) content	Any comparator/comparison (due to unknown relevance)
A: Attributes of the CPG	Original full-text CPG published/updated in past 10 years English language (or translation available) Evidence-based development process presented Relevant to the general care of delirium (i.e., not setting or condition specific), or relevant to the acute care setting
R: Recommendation characteristics and other considerations	Recommendations only extracted from CPGs attaining a quality score ≥70% in the AGREE-II rigour of development domain

Abbreviation: CPG, clinical practice guideline.

[a]CPG can be for the All Adult population, but must be inclusive of Older Adult population.

selection was conducted independently by two reviewers (S. F., R. C.) who first screened all titles and abstracts, followed by full-text screening for potentially eligible CPGs.

2.3 | Critical appraisals of CPGs and recommendations

Critical appraisals of CPGs and recommendations were conducted independently by three reviewers (S. F., R. C., R. A.) using the Appraisal of Guidelines, Research, and Evaluation (AGREE-II)[19,25] and Appraisal of Guidelines Research and Evaluation—Recommendations Excellence (AGREE-REX) instruments,[26,27] respectively. The AGREE-II instrument is endorsed by the EQUATOR Network[28] and has been used internationally to appraise CPG quality for over 10 years.[20,25] The AGREE-II is a 23-item instrument that assesses the quality of CPGs according to their scope and purpose (3 items), stakeholder involvement (3 items), rigour of development (8 items), clarity of presentation (3 items), applicability (4 items), and editorial independence (2 items).[19,25] A final item assesses the overall quality of the CPG. Each item is rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). The AGREE-REX instrument was recently developed to complement the AGREE-II, recognizing the need to ensure that CPG content and recommendations have also been rigorously developed.[22,26,27,29] The AGREE-REX is a nine-item instrument that assesses the quality of CPG recommendations according to their clinical applicability (i.e., quality of evidence assessment and applicability to target users and patients; three items), values and preferences (i.e., quality of consideration/incorporation of relevant stakeholder groups' values and preferences; four items), and implementability (i.e., quality of implementation considerations; two items).[26] Each item is rated on a 7-point scale from 1 (lowest quality) to 7 (highest quality).

We used the 'My AGREE Plus' online platform to appraise the CPGs using the AGREE-II instrument.[25] Once the independent appraisals were complete, appraisers met to discuss scores and compare items with large discrepancies (i.e., point difference ≥3).[20,25] Appraisers then had the opportunity to modify their scores based on the discussion. As per the updated AGREE-II manual, we used a threshold of 70% or greater in the rigour of development domain to define high quality CPGs in our study.[25] Only CPGs that scored at or above the established threshold, and met all other eligibility criteria, were included for further analyses and synthesis.

We read the full texts of the CPGs meeting the quality threshold to identify recommendations that met our eligibility criteria. These recommendations were critically appraised using the AGREE-REX instrument.[26,27] Scores were entered into the Covidence quality assessment template to facilitate the appraisal and consensus process. In accordance with the AGREE-REX manual, independent appraisals were completed first, then appraisers met to reach consensus on final scores. Consensus scores for each item and calculated overall quality scores were used to describe the quality of the recommendations. Since thresholds to quantify high or low quality recommendations do not yet exist, we described the range of AGREE-REX scores by item and overall.

2.4 | Data abstraction

Data were extracted independently by two reviewers (S. F., R. C.). First, the general characteristics of the included CPGs were extracted. Next, data abstraction matrices were created for each CPG to facilitate the extraction and categorization of recommendations according to: aspects of delirium care addressed (i.e., screening, diagnosis, risk reduction, and management), the reported level of evidence, the reported strength of the recommendation, whether the recommendation was identified as a priority for implementation by the CPG development group, and whether the ED setting was explicitly included in the evidence base supporting the recommendation (i.e., the ED setting was included in the summary of the evidence). Eligible recommendations were extracted as direct quotes from the CPGs. Descriptive analysis was used to facilitate the

organization, characterization, and interpretation of data extracted on CPG and recommendation characteristics.[20]

2.5 | Data analysis

Data from each phase were analysed using Microsoft Excel™ for Mac. During the screening phase, a Cohen's κ of 0.60 was used to define an acceptable level of interrater reliability.[30,31] During the critical appraisal phase, an intraclass correlation coefficient (ICC) based on a two-way random effect was calculated across the included CPGs for the AGREE-II appraisals. An ICC above 0.50 was used to define an acceptable level of interrater reliability.[32] AGREE-II quality scores were calculated by summing the item scores in each domain and scaling the summative score as a percentage of the maximum possible score for that domain.[25] AGREE-REX overall quality scores were calculated by summing scores for all items and scaling the summative score as a percentage of the maximum possible overall score. Data are presented using median and interquartile range (IQR) for AGREE-II and AGREE-REX scores.

2.6 | Data synthesis

The data synthesis of recommendations was conducted iteratively to merge the data matrices for each CPG, including the number explicitly including the ED setting and the number identifying the recommendation as a priority for implementation for each aspect of care. Synthesized information was then examined to identify areas of similarity and discrepancy. We decided to include the reported strength of the recommendations instead of the level of evidence because the strength of the recommendations takes into consideration the balance of benefits versus harms of alternative care strategies, values and preferences of various stakeholder groups (including clinicians and patients), resource implications, as well as the level of the evidence.[33,34] Determining the strength of recommendations using a rigorous process such as the Grading of Recommendations Assessment Development and Evaluation (GRADE), which incorporates an evaluation of the level of evidence in the process,[35] is considered the gold standard in CPG development.[36] Definitions for the strength of recommendations are presented Box 1.

BOX 1. Definitions for the assigned strength of recommendations using GRADE approach

Legend	Rating	Definition
☆☆☆☆	Strong (for or against)	CPG group members assessed there to be high-quality evidence to base the recommendation, as well as that the benefits of an intervention significantly outweigh the risks (or vice versa), the majority of clinicians should pursue this course of action (or not), and all or most patients would want the recommended action.
☆☆☆	Conditional (for or against)	CPG group members assessed that the implied benefits of the intervention outweigh the disadvantages (or vice versa), but there is a lack of confidence as to the quality of the evidence or the trade-offs between risk and benefits were closely balanced. Patients preferences may also be varied.
☆☆	Good practice	Strong but ungraded recommendations, in which there is an unequivocal belief by CPG group members that the benefit of the intervention outweighs the risk but there is no available direct evidence that could be summarized or evaluated.
☆	Descriptive statement	Nonactionable evidence-based statements, in which CPG group members believe awareness of the information is important to help inform decision-making and should be used to augment actionable recommendations.

Note: Assigned strength of the recommendation takes into consideration, the balance of benefits versus harms of alternative care strategies, values and preferences of various stakeholder groups (including clinicians and patients), resource implications, as well as the level of the evidence.[33,34]

3 | RESULTS

3.1 | Search outcome

The screening process, including reasons for exclusion, are presented in a modified PRISMA flowchart (see Figure 1).[20,37] After duplicates were removed, the titles and abstracts of 1534 citations were screened, identifying 31 for full-text screening, with substantial interrater reliability ($k = 0.79$). After full-text screening, 10 documents met the eligibility criteria for inclusion, with near perfect interrater reliability ($k = 1.00$). The top three reasons for exclusion were: summaries, audits or quick guides of CPGs ($n = 6$); CPGs that did not use an evidence-based process and/or rate the strength of recommendation ($n = 5$); and CPGs with newer version available as a replacement ($n = 4$). During the screening process two CPGs were

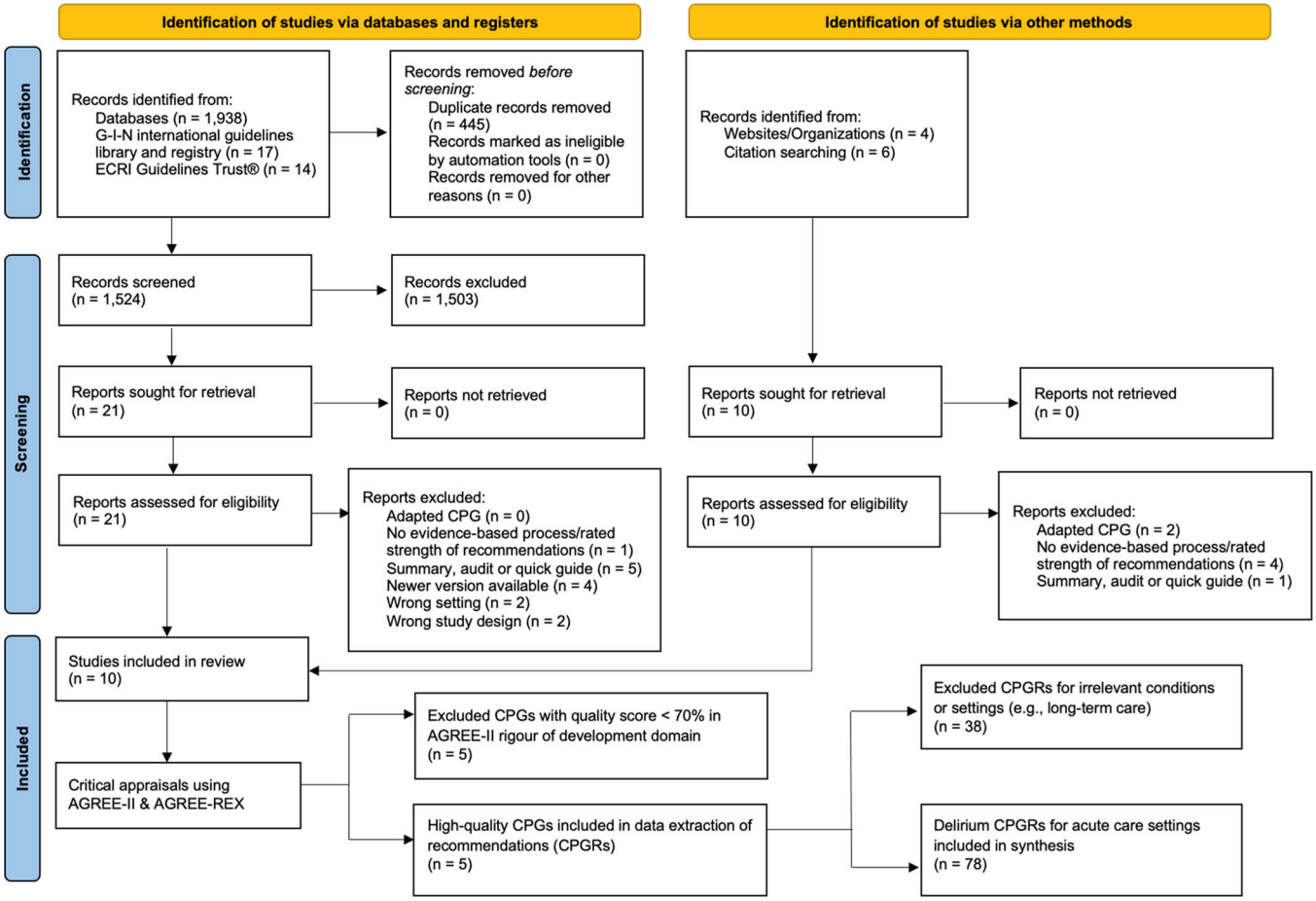

FIGURE 1 PRISMA flowchart of literature search.

identified that were relevant to older adults in the ED specifically,[38,39] however, neither CPG used an evidence-based process or rated the strength of their recommendations so were excluded from our review.

3.2 | CPG characteristics

Ten original full-text CPGs were included in our review. A summary of CPG characteristics is presented in Table 2. Seven CPGs addressed delirium specifically,[40–46] while three addressed multiple conditions.[47–49] Older adults were the target population in five CPGs,[42–45,48] and none were specific to the ED setting. The year of publication or latest update for included CPGs ranged from 2014 to 2023, with three being the first published version of the CPG,[41,44,46] and seven being reviewed and/or updated at least once.[40,42,43,45,47–49] The included CPGs were developed by teams from various countries, with six author groups originating from one country,[40–43,45,48] and four multinational author groups.[44,46,47,49] Eight CPGs were originally published in English,[40,41,43–48] while two were originally published in other languages with English translations available.[42,49] Seven CPGs report using the GRADE approach as their evidence-based process for developing and reporting the strength of recommendations.[40–44,47,49] The number of delirium recommendations in each CPG ranged from 9 to 196. Details of all CPG characteristics extracted are presented in an online supplement (Supporting Information: Additional File 2).

3.3 | AGREE-II critical appraisals

The calculated domain and overall scores for the AGREE-II appraisals are presented in Table 3 and Figure 2. There was good overall reliability in AGREE-II scoring across all appraisers (ICC = 0.76). The median overall appraisal score was 64% (IQR, 18%). The National Institute for Health and Care Excellence (NICE)[40] received the highest score of 83%, while Celis-Rodriguez et al.[49] and Aldecoa et al.46 received the lowest scores of 39%. The median for the Rigour of Development domain (i.e., Domain 3) was 68% (IQR, 14%) with NICE[40] receiving the highest score of 83%, and Celis-Rodirguez et al.[49] receiving the lowest score of 37%. Five CPGs achieved our defined threshold for a high-quality CPG, including: Sundhedsstyrelsen (NKR),[42] American Geriatrics Society (AGS),[43] Scottish Intercollegiate Guideline Network (SIGN),[41] Devlin et al.,[47] as well as NICE.[40]

TABLE 2 Summary of characteristics for delirium CPGs included in this study ($N = 10$).

Guideline	Year[a]	Condition(s)	Population	Country	Language[b]	LoE tool[c]	Num[d]
National Institute for Health and Care Excellence (NICE)	2010, 2023	Delirium	All adults	United Kingdom	English	GRADE	30
Sundhedsstyrelsen (NKR)	2016, 2021	Delirium	Older adults	Denmark	Danish	GRADE	11
American Geriatrics Society (AGS)	2014, 2021	Delirium	Older adults	United States	English	GRADE	12
Celis-Rodriguez et al. (C-R)	2013, 2020	Delirium, sedation, analgesia	Critically ill adults	Multicountry	Spanish	GRADE	19
Scottish Intercollegiate Guideline Network (SIGN)	2019	Delirium	All adults	Scotland	English	GRADE	25
Devlin et al.	2013, 2018	Delirium, pain, agitation/sedation, immobility, sleep disruption	Critically ill adults	Multicountry	English	GRADE	7
Aldecoa et al.	2017	Delirium	All at risk	Multicountry	English	Oxford criteria	25
Abraha et al.	2016	Delirium	Older adults	Multicountry	English	GRADE	12
Registered Nurses Association of Ontario (RNAO)	2010, 2016	Delirium, dementia, depression	Older adults	Canada	English	Adapted SIGN criteria[e]	9
Canadian Coalition for Seniors' Mental Health (CCSMH)	2006, 2014	Delirium	Older adults	Canada	English	Shekelle et al. (1999) criteria	196

Abbreviation: CPG, clinical practice guideline.

[a]Year first published and latest update/review; Older adults = ≥65 years of age, All adults = ≥18 years of age, All at risk = all populations at risk of delirium including all adults and pediatrics.

[b]Original published language.

[c]Level of Evidence tool used to appraise the quality of evidence and grade recommendations.

[d]Number of delirium recommendations/good practice statements published.

[e]Before SIGN implementing GRADE approach in 2010.

TABLE 3 Domain and overall quality scores assessed using the AGREE-II instrument (%) ($N = 10$).

CPG group[a]	Domain score						Overall score	Quality threshold[b]
	Scope and purpose	Stakeholder involvement	Rigour of development	Clarity of presentation	Applicability	Editorial independence		
NICE	98	81	83	89	71	64	83	Yes
NKR	81	80	71	63	43	39	67	Yes
AGS	76	81	70	63	24	83	67	Yes
C-R	41	46	37	48	14	72	39	No
SIGN	81	76	78	91	58	97	72	Yes
Devlin	57	87	71	63	74	50	72	Yes
Aldecoa	59	41	47	69	18	61	39	No
Abraha	74	35	65	67	14	56	61	No
RNAO	72	81	62	74	60	97	61	No
CCSMH	63	81	56	80	44	44	50	No
Median (IQR)	73 (20)	81 (28)	68 (14)	68 (16)	44 (40)	63 (29)	64 (18)	

[a]Abbreviation or first author.

[b]A priori quality threshold defined as CPG scoring ≥70% in Rigour of Development.

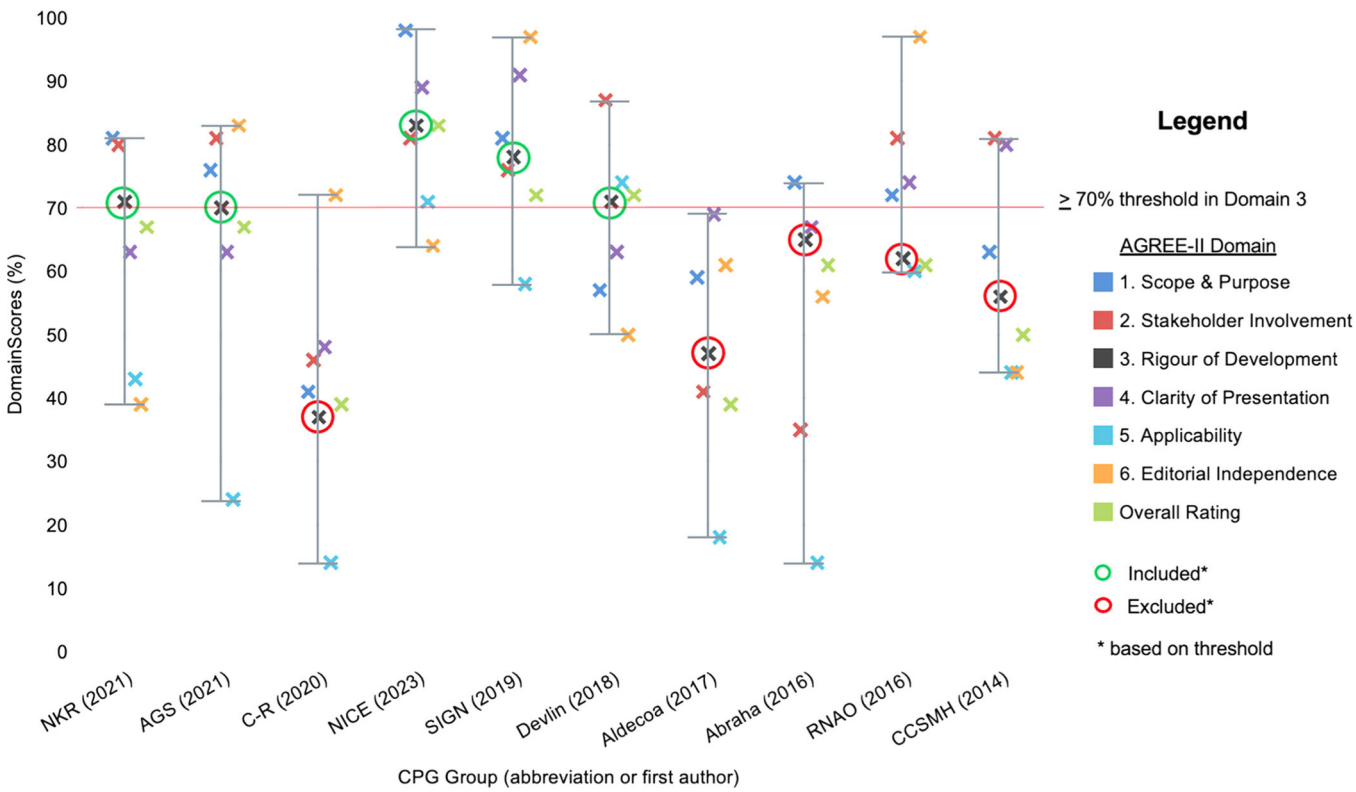

FIGURE 2 AGREE-II domain and overall scores by CPG, including quality threshold ($N = 10$). CPG, clinical practice guideline.

3.4 | AGREE-REX critical appraisals

The final AGREE-REX item scores and overall calculated scores for the five included CPGs are presented in Table 4. The highest median scores were for Item 1 'Evidence' (median, 6; IQR, 2) and Item 2 'Applicability to Target Users' (median, 6; IQR, 0), which both fall under the 'Clinical Applicability' domain. High scores for these items reflect that CPG authors thoroughly reviewed the quality and results of available evidence (Item 1), and that recommendations address a relevant clinical problem and are applicable to target users (Item 2).[26]

TABLE 4 Item and calculated overall quality scores assessed using the AGREE-REX instrument ($n = 5$).

CPG group[a]	Item score[b] 1	2	3	4	5	6	7	8	9	Overall score (%)
NICE	7	5	5	6	6	6	5	5	5	76
NKR	7	7	6	5	5	5	4	5	3	70
AGS	5	6	3	5	2	3	2	5	2	44
SIGN	5	6	5	5	5	5	4	5	5	67
Devlin	6	6	6	7	7	4	6	6	5	80
Median (IQR)	6 (2)	6 (0)	5 (1)	5 (1)	5 (1)	5 (1)	4 (1)	5 (0)	5 (2)	70 (9)
Domain	Clinical applicability			Values and preferences				Implementability		

[a]Abbreviation or first author.

[b]Item score on a scale of 1 to 7; Item 1 = *Evidence*, 2 = *Applicability to Target Users*, 3 = *Applicability to Patients/Populations*, 4 = *Values and Preferences of Target Users*, 5 = *Values and Preferences of Patients/Populations*, 6 = *Values and Preferences of Policy/Decision Makers*, 7 = *Values and Preferences of CPG Developers*, 8 = *Purpose*, 9 = *Local Application and Adoption*.

The lowest median score was for Item 7 'Values and Preferences of CPG Developers' (median, 4; IQR, 1). Lower scores for this item reflect that CPG authors did not clearly describe the values and preferences they brought to the development process or how these may have influenced their interpretation of the evidence for their recommendations.[26] Overall AGREE-REX scores were high for 4 of 5 CPGs (67%–80%), apart from the AGS[43] CPG (44%). Despite this low score, the AGS[43] scored high for how well the evidence was considered in the development of their recommendations (Item 1), as well as for the consideration of the values/preferences and applicability to target users (Items 2 and 4).

3.5 | Synthesis of recommendations and narrative analysis

From the five high-quality CPGs we included, 67% of recommendations ($n = 78$) met our PICAR eligibility criteria for synthesis. We grouped these into four categories: screening, diagnosis, risk reduction, and management. Table 5 summarizes the aspects of care addressed by the recommendations and indicates their strength as reported in each CPG. All included author groups used the GRADE approach for evaluating the level of evidence and grading the strength of the recommendations.

3.5.1 | Screening

NICE and NKR provided recommendations about screening for nonmodifiable risk factors,[40,42] while a descriptive ungraded statement was provided by Devlin et al.[47] Two of three CPGs explicitly included the ED setting in the evidence base, and all three identified risk factor assessment as a priority for implementation. SIGN and AGS detailed potential risk factors in the introductory chapters.[41,43] Older age (≥65 years of age), cognitive impairment (past or present), current fragility fracture (e.g., hip fracture), and severe illness (with risk for deterioration) were identified as risk factors across all CPGs. There was agreement across recommendations that people with these risk factors should be identified as high-risk, and subsequently screened for delirium.[40,42,47]

NICE, NKR, SIGN, and Devlin et al. provided recommendations for delirium screening.[40–42,47] All four CPGs identified delirium screening as a priority for implementation but only three explicitly included the ED setting in the evidence base. However, the specific tool or approach for conducting the delirium screening differs across CPGs. NICE and SIGN both recommend the use of the '4As Test' (4AT) tool for formal delirium screening outside the ICU setting,[40,41] and SIGN contains a specific recommendation for its use in the ED setting.[41]

3.5.2 | Diagnosis

NICE and SIGN provided recommendations pertaining to diagnosis of delirium. Both CPGs explicitly included the ED setting in the evidence base and have identified two recommendations as priorities for implementation.[40,41] Further, they both highlighted the importance of an accurate delirium diagnosis recorded in the person's health record to ensure continuity of care, as well as to get a clearer understanding of the true epidemiology of delirium.[40,41]

3.5.3 | Risk reduction

To reduce modifiable (i.e., clinical) risk factors for delirium, all five CPGs provided multiple recommendations to reduce the risk of delirium. All CPGs recommended the provision of a tailored multicomponent intervention for those at risk of delirium,[40–43,47] with four identifying this as a priority for implementation. NKR, AGS, and SIGN included a separate recommendation for conducting a medication review,[41–43] while this was stated as a component of the multicomponent intervention by NICE.[40] AGS and NICE also included

TABLE 5 Synthesis and comparison of delirium recommendations and their reported strength (n = 5).

Aspects of care	NKR[42]	AGS[43]	NICE[40]	SIGN[41]	Devlin[47]	Included ED[a]	Priority[b]	Similar[c] (yes/no)	Agree[d] (yes/no)
Screening:									
For risk factors on presentation	☆☆		☆☆☆☆		☆	2/3	3/3	Yes	Yes
For delirium									
1st clinical assessment[e]			☆☆☆☆			1/1	1/1	No	Yes
Use psychometric tool	☆☆		☆☆☆☆	☆☆☆☆	☆☆	3/4	4/4	No	Yes
Repeat assess and document									
Changes in risk factors			☆☆☆☆			1/2	1/2	Yes	Yes
Delirium									
At least daily			☆☆☆☆			1/1	0/1	Yes	Yes
Within hours or days	☆☆					0/1	1/1	Yes	Yes
Diagnosis:									
Formal diagnosis by a trained healthcare professional			☆☆☆☆	☆☆		1/2	1/2	Yes	Yes
Ensure the diagnosis is documented and written in a discharge letter for follow-up			☆☆☆☆	☆☆		2/2	2/2	Yes	Yes
Inform family/carers of diagnosis				☆☆		1/1	0/1		
Brain CT should not be used routinely but considered for specific patients				☆☆☆		0/1	0/1		
EEG if suspected epileptic activity causing delirium				☆☆☆		1/1	0/1		
Consider imaging if no clear cause of nonresolving delirium				☆☆		0/1	0/1		
Do not routinely perform LPs				☆☆		0/1	0/1		
Risk Reduction:									
Tailored multicomponent intervention, including	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆	☆☆☆	0/5	4/4	Yes	Yes
Orientation/reorientation	☆☆☆		☆☆☆☆	☆☆☆	☆☆☆				
Visual and hearing aids (sensory optimization)	☆☆☆		☆☆☆☆	☆☆☆	☆☆☆				
Pain control		☆☆☆☆	☆☆☆☆	☆☆☆					
Sleep hygiene	☆☆☆		☆☆☆☆	☆☆☆	☆☆☆				
Early mobilization	☆☆☆		☆☆☆☆	☆☆☆	☆☆☆				
Prevent, identify, treat post-op complications				☆☆☆					
Optimize hydration and nutrition	☆☆☆		☆☆☆☆	☆☆☆					
Regulate bladder and bowel function				☆☆☆					
Optimize oxygen saturation			☆☆☆☆	☆☆☆					
Address infection			☆☆☆☆						
Review and optimize medications			☆☆☆☆						
Medication review by experienced professional	☆☆☆	☆☆☆☆		☆☆☆☆		1/3	2/2	Yes	Yes

(Continues)

TABLE 5 (Continued)

Aspects of care	NKR[42]	AGS[43]	NICE[40]	SIGN[41]	Devlin[47]	Included ED[a]	Priority[b]	Similar[c] (yes/no)	Agree[d] (yes/no)
Tailored multicomponent intervention delivered by a multidisciplinary team		☆☆☆☆	☆☆☆☆			0/2	1/1	Yes	Yes
Avoid unnecessary transfers and moves within and between units or rooms			☆☆☆☆	☆☆		0/2	1/2	Yes	Yes
Inform and involve carers to reduce the risk of delirium			☆☆☆☆	☆☆	FR	0/2	0/2	Yes	Yes
Have protocols for patients at high risk of delirium including first-line treatments to minimize risk				☆☆		0/1	0/1		
Do not use or newly prescribe to prevent delirium:									
Cholinesterase inhibitors		☆☆☆☆	FR	FR		0/1		Yes	Yes
Haloperidol, an atypical antipsychotic, dexmedetomidine, a β-Hydroxy β-methylglutaryl-Coenzyme A reductase inhibitor, or ketamine			FR	FR	☆☆☆	0/1	1/1	Yes	Yes
Management:									
Identify and manage possible underlying cause or combination of causes (re-evaluate as necessary)		☆☆☆☆	☆☆☆☆	☆☆☆☆		1/3	2/2	Yes	Yes
Use established delirium care pathways				☆☆☆☆		0/1	1/1		
Multicomponent nonpharmacological treatment	☆☆☆	☆☆☆			☆☆☆	0/3	2/2	Yes	Yes
Reduce modifiable risk factors					☆☆☆				
Nutrition and hydration	☆☆☆								
Sleep hygiene	☆☆☆				☆☆☆				
Visual and hearing aids (sensory optimization)	☆☆☆				☆☆☆				
Mobilization	☆☆☆				☆☆☆				
Orientation/cognitive engagement	☆☆☆				☆☆☆				
Promote cognitive engagement and reorientation	☆☆		☆☆☆☆	☆☆		1/3	2/3	Yes	Yes
Promote mobilization	☆☆			☆☆		0/2	1/2	Yes	Yes
Provide a suitable care environment, avoiding unnecessary stimuli (e.g., transfers)	☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆		1/4	3/3	Yes	Yes
Communicate and provide information to patients, family/carers	☆☆☆		☆☆☆☆	☆☆☆☆	FR	0/2	1/2	Yes	Yes
Involve family/carers in management	☆☆☆		☆☆☆	☆☆☆☆	FR	1/3	3/3	Yes	Yes
Review and adjust medication	☆☆	☆☆☆☆		☆☆☆☆		0/3	2/2	Yes	Yes
Treat distressed/agitated patients									
1st nonpharmacological treatment		☆☆☆	☆☆☆☆	☆☆☆☆		1/3	2/2	Yes	Yes
2nd short-term use of haloperidol starting at lowest appropriate dose		☆☆☆	☆☆☆	☆		1/3	1/2	No	No
Do not routinely treat delirium using:									
Antipsychotics/atypical antipsychotics	☆☆☆		FR	FR	☆☆☆	0/3	2/2	No	No

TABLE 5 (Continued)

Aspects of care	NKR[42]	AGS[43]	NICE[40]	SIGN[41]	Devlin[47]	Included ED[a]	Priority[b]	Similar[c] (yes/no)	Agree[d] (yes/no)
A β-Hydroxy β-methylglutaryl-Coenzyme A reductase inhibitor			FR		☆☆☆	0/1	1/1		
Benzodiazepines (unless specifically indicated)	☆☆	☆☆☆	FR	FR		0/2	1/1	Yes	Yes
Melatonin	☆☆					0/1	1/1		
Use dexmedetomidine in mechanically ventilated patients where agitation is preventing extubation				FR	☆☆☆	0/1	1/1		
Consider conducting cognitive and functional assessments				☆☆☆		0/1	0/1		
Do not use bring light therapy to reduce delirium					☆☆☆	0/1	1/1		
Health system:									
Provide education to healthcare providers on delirium care		☆☆☆☆	FR			0/1			

Note: ☆☆☆☆ = strong, ☆☆☆ = conditional, ☆☆ = good practice, ☆ = descriptive statement.

Abbreviations: CPG, clinical practice guideline; ED, emergency department; FR, future research area.

[a]Included ED = number of CPGs that explicitly included the ED setting in the evidence-base for the recommendation.

[b]**Priority** = Number of CPGs that identified recommendation as a priority for implementation (Maximum possible number across CPGs = 4 as AGS[43] does not specifically identify any key recommendations for implementation).

[c]**Similar** = a similar action, tool, and so forth. recommended across CPGs.

[d]**Agree** = there is agreement across CPGs whether recommendations are for or against an action.

[e]NICE[40] recommends stepped approach to first identify signs of possible delirium through daily observations, then screen using psychometric tool if signs are present.

a recommendation indicating that the tailored multicomponent intervention be provided by a multidisciplinary team.[40,43] Beyond providing a multicomponent intervention and medication review, NICE and SIGN recommended avoiding unnecessary transfers and moves within and between units or rooms as part of delirium risk reduction care strategies.[40,41] The only CPG recommendation that explicitly included the ED setting was for medication review.[41]

All CPGs except NKR reported reviewing relevant literature in relation to pharmacological risk reduction.[40,41,43,47] Although the presentation of the recommendations differed (e.g., recommendations against the use of medications vs. choosing not to publish recommendations and advocating future research) there was agreement across CPGs that there is currently no recommended medication to reduce the risk of delirium.

3.5.4 | Management

A variety of recommendations were put forward in each CPG for delirium management. NICE, AGS, and SIGN included recommendations for the identification and management of possible underlying causes of delirium,[40,41,43] NICE and SIGN identified this aspect of care as a priority for implementation,[40,41] and NICE used evidence including the ED setting. SIGN provided the most detail within their recommendation and suggested a systematic assessment using a stepped approach (Step 1—considering acute life-threatening causes, 2—identifying other potential causes, and 3—optimizing physiology and managing concurrent conditions).[41]

All CPGs included recommendations for nonpharmacological management of delirium as part of a multicomponent intervention or care pathway,[41–43,47] or as separate recommendations for care.[40] Whether part of a multicomponent intervention or not, the agreed components of delirium management across all CPGs included promoting mobilization and cognitive engagement/reorientation.[40–43,47] Three CPGs also included sleep hygiene and sensory optimization,[41,42,47] as well as medication review and adjustment.[41–43] All CPGs except Devlin et al.[47] also included a recommendation to provide a suitable care environment and avoid unnecessary stimuli (e.g., placing patient in a care space with reduced noise), as part of any delirium management strategy,[40–43] with NICE explicitly including the ED setting as part of the evidence base in formulating this recommendation.[40]

Pharmacological management was the only area of disagreement across CPG recommendations. NKR and Devlin et al. contained recommendations against using antipsychotic medications to treat delirium under any circumstance.[42,47] Conversely, NICE and AGS included cautious recommendations,[40,43] and SIGN provided a descriptive ungraded statement,[41] for the short-term (i.e., ≤7 days)

use of haloperidol in situations where the patient is distressed/agitated or considered a risk to themselves or others, and where de-escalation techniques were ineffective or inappropriate. NICE explicitly included the ED setting as part of the evidence base and rationale in formulating the recommendation for the use of haloperidol.[40] NICE and SIGN also expressed a need for future research in the pharmacological management of delirium.[40,41]

Lastly, NICE, NKR, and SIGN contain recommendations for providing information about delirium to patients and their family/caregivers, as well as involving family/caregivers in aspects of delirium care, such as helping with cognitive engagement and reorientation.[40–42] Devlin et al. identifies family/carer communication and involvement as an area where future research is needed.[47] These recommendations are identified as priorities for implementation in one or more CPGs, and the ED setting is included in the evidence base by NICE.[40]

4 | DISCUSSION

In this umbrella review, we critically assessed the quality of delirium CPGs and recommendations using the AGREE-II and AGREE-REX instruments, respectively. Data were synthesized to define recommendations that may be relevant to older ED patients. Results highlight the importance of conducting this work, revealing only 5 of the 10 included CPGs could be considered of high methodological quality, and thus have their recommendations considered for synthesis. Although no high-quality ED-specific CPGs were found, many of the included recommendations incorporated the ED setting into their evidence base. Results show that there are many areas of agreement across organizations and geographical bounds. Regardless of the care setting, older adults are an uncontested high-risk group that should be prioritized for delirium screening, as well as multicomponent nonpharmacological risk reduction and management strategies, including in the ED.

Despite considerable agreement across most recommendations, two areas of discrepancy exist. First, while there is agreement that delirium screening should be conducted for high-risk groups, differences in the recommended tool or approach exist. This may partly be due to the variety of settings covered by different CPGs. For example, Devlin et al.[47] is specific to the ICU setting, whereas NICE[40] provides generic recommendations (e.g., initiate daily observations for potential signs of delirium before formal screening), some of which would be impractical in the ED setting. Although both NICE and SIGN recommend the use of the '4As Test' (4AT) tool for formal delirium screening outside the ICU setting,[40,41] SIGN is the only CPG to provide an ED-specific recommendation for its use to identify people with probable delirium at the earliest opportunity.[41] This is congruent with a recent systematic review and meta-analysis of the 4AT tool, highlighting its good diagnostic accuracy (pooled sensitivity, 0.88 [95% CI, 0.80–0.93]; pooled specificity, 0.88 [95% CI, 0.82–0.92]).[50] Further, the 4AT may be advantageous to use in EDs as it is shorter and simpler compared with other recommended tests and does not require any special training.[50] This is supported by one recent large observational study examining 4AT outcomes in the ED, which found that screening using this tool was feasible in a large 'real-world' ED setting.[51]

The second area of discrepancy pertains to pharmacological management. Two CPGs recommend against using antipsychotic medications, such as haloperidol, to treat delirium under any circumstance.[42,47] Conversely, three CPGs support the short-term use of haloperidol at the lowest possible dose in situations where a person with delirium is distressed/agitated, or when patients are still a risk to themselves or others after other de-escalation techniques have failed.[40,41,43] NICE included the ED setting in the evidence base when formulating this recommendation in recognition that the ED is a unique environment, in which care for agitated and distressed patients often requires practical guidance.[40] Conversely, in their recent syntheses, both Carpenter et al. and Lee et al. provided evidence against routinely using haloperidol for prevention or routine management of delirium in EDs, without commenting on exceptional circumstances.[15,52] Haloperidol remains widely used in clinical practice and expert opinion supports its use in specific urgent situations of distress or risk of harm.[41] Therefore, it is important to articulate parameters of best practice, as well as monitor and evaluate its use in the ED.

4.1 | Implications for CPG methodology

Results from our AGREE-II appraisals are similar to previous reviews of delirium CPGs.[53,54] However, this study is unique as the first review of delirium CPGs that included sequential critical appraisals using the AGREE-REX instrument. The AGREE-II instrument evaluates the methodology of CPG development, but not the quality of CPG content or recommendations. This is an important distinction because a high-quality development process does not necessarily translate to high-quality recommendations.[22,26,27,29] The AGREE-REX instrument was recently developed to address this gap.[26]

In our study, most CPGs scored well across AGREE-REX items apart from AGS,[43] which obtained many low scores. The low item scores AGS[43] received indicate the values and preferences of, and applicability to, relevant groups such as patients were not fully considered during recommendation development (Items 3 and 5). This is exemplified in the recommendation synthesis as it is the only CPG that did not include recommendations related to communicating with and involving family/caregivers. Further, AGS[43] is the only CPG that did not specify any key recommendations for implementation, which is consistent with the low AGREE-REX score for local application and adoptability (Item 9). Therefore, although AGS[43] met criteria for methodological soundness based on the AGREE-II appraisal, the AGREE-REX exposed deficits in their recommendations. These findings demonstrate the value of using AGREE-II and AGREE-REX in combination to define high quality CPGs and recommendations, which increases their credibility for implementation into practice.

4.2 | Implication for ED care

Our review did not identify any high-quality CPGs addressing delirium care for older ED patients specifically. Two lower quality ED-specific CPGs were retrieved during the screening phase but they did not meet our inclusion criteria (i.e., they did not use an evidence-based process for development).[38,39] As the ED is often the first point of entry into the healthcare system, it is important to develop tools and recommendations based on scientifically sound evidence to inform best practice and improve ED quality of care. However, developing a high-quality CPG requires significant resources, making the development of a new delirium CPG specific to the ED impractical or infeasible. Instead, researchers and policymakers can use the synthesis of recommendations from this study to adapt them to the ED context (e.g., using a process such as ADAPTE[55]) and to inform the development of context-specific care pathways to guide best practice.

4.3 | Strengths and limitations

Our study has several strengths. The methodology includes the use of a comprehensive search strategy to retrieve all possibly relevant CPGs, the use of a standardized and internationally recognized CPG appraisal instrument (AGREE-II), as well as the synthesis of recommendations. To our knowledge, this is the first review of delirium CPGs to conduct a synthesis and comparison of recommendations; it is also one of the first studies that has used the AGREE-REX instrument since it has been developed.

This review also has some limitations. First, we only included CPGs published in English or with an English translation available. Although this allowed for the inclusion of two non-English CPGs, and every attempt was made to retrieve translated versions of all supporting documentation (e.g., methodology manuals), the critical appraisals of these CPGs may not have been as accurate due to differences in language and translation. Inclusion of these CPGs was made possible by advances in technology, allowing for more international collaboration and transparency in CPG development and dissemination. For example, NKR[42] used an online platform for writing and publishing CPGs using a structured format based on GRADE methodology called the 'MAGICapp',[56] which allows for some translation of CPGs published on the platform to various languages (with improvements ongoing).

Second, there is a degree of subjectivity to the AGREE-II and AGREE-REX appraisals, and other appraisers may interpret AGREE items and domains differently.[57] As per the AGREE user manuals,[25,26] we have used multiple assessors for both the AGREE-II and AGREE-REX appraisals, held consensus meetings for each appraisal stage, and conducted reliability testing to ensure our process was rigorous. Further, although an a priori quality threshold was defined as per the AGREE-II manual,[25] there is currently a lack of empirical evidence to support this, making the quality threshold slightly arbitrary. However, a systematic review conducted by Hoffmann-Eßer et al. found Domain 3 (Rigour of Development) has a large influence on overall quality,[57] which was the domain used to define our quality threshold in this study. Similarly, there are no established quality thresholds to differentiate high or low quality recommendations for the AGREE-REX instrument. While it is beyond the scope of this paper, the data from this review will be used to conduct subsequent analyses to investigate the ability to define quality thresholds more clearly for the AGREE-II and AGREE-REX instruments.

4.4 | Conclusion

Our review shows there are numerous delirium CPGs for diverse contexts, however, there are no ED-specific CPGs developed using evidence-based processes. Further, only half of included CPGs were found to be of high methodological quality. This highlights the importance of conducting work such as ours to provide evidence to guide best practice, as well as clinical and policy decision-making. Our synthesis revealed the ED setting was included in the evidence base for many of the included recommendations, however, it remains unclear which are most important and actionable in the ED setting. Future research will use these results to gain this knowledge so it can be used to improve the quality of delirium care older adults receive in the ED.

AUTHOR CONTRIBUTIONS

Sarah Filiatreault conceived the research idea under the supervision of Malcolm B. Doupe, Jeremy M. Grimshaw, Sara A. Kreindler, and Alecs Chochinov. Sarah Filiatreault and Janice Linton developed and refined the search strategy. Sarah Filiatreault and Rashmita Chatterjee conducted screening, data abstraction and synthesis. Sarah Filiatreault, Rashmita Chatterjee, and Rilwan Azeez conducted critical appraisals. The manuscript was first drafted by Sarah Filiatreault and Malcolm B. Doupe, additional content and draft reviews were provided by Jeremy M. Grimshaw, Sara A. Kreindler, Alecs Chochinov, Janice Linton, Rashmita Chatterjee, and Rilwan Azeez. All authors reviewed and approved the final version.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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