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Original Study

Detecting Cognitive Impairment and Dementia in the Emergency Department: A Scoping Review

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A B S T R A C T

Objectives: To identify research and practice gaps to establish future research priorities to advance the detection of cognitive impairment and dementia in the emergency department (ED).
Design: Literature review and consensus-based rankings by a transdisciplinary, stakeholder task force of experts, persons living with dementia, and care partners.
Setting and Participants: Scoping reviews focused on adult ED patients.
Methods: Two systematic scoping reviews of 7 medical research databases focusing on best tools and approaches for detecting cognitive impairment and dementia in the ED in terms of (1) *most accurate* and (2) *most pragmatic* to implement. The results were screened, reviewed, and abstracted for relevant information and presented at the stakeholder consensus conference for discussion and ranked prioritization.
Results: We identified a total of 1464 publications and included 45 to review for accurate tools and approaches for detecting cognitive impairment and dementia. Twenty-seven different assessments and instruments have been studied in the ED setting to evaluate cognitive impairment and dementia, with many focusing on sensitivity and specificity of instruments to screen for cognitive impairment. For pragmatic tools, we identified a total of 2166 publications and included 66 in the review. Most extensively studied tools included the Ottawa 3DY and Six-Item Screener (SIS). The SIS was the shortest to administer (1 minute). Instruments with the highest negative predictive value were the SIS (vs MMSE) and the 4 A's Test (vs expert diagnosis). The GEAR 2.0 Advancing Dementia Care Consensus conference ranked research priorities that included the need for more approaches to recognize more effectively and

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efficiently persons who may be at risk for cognitive impairment and dementia, while balancing the importance of equitable screening, purpose, and consequences of differentiating various forms of cognitive impairment.
Conclusions and Implications: The scoping review and consensus process identified gaps in clinical care that should be prioritized for research efforts to detect cognitive impairment and dementia in the ED setting. These gaps will be addressed as future GEAR 2.0 research funding priorities.

Emergency care of older people with cognitive impairment and persons living with dementia (PLWD) is suboptimal despite rates of emergency department (ED) use up to 50% greater than those without dementia.[1,2] In fact, PLWD are poorly identified in the ED,[3,4] are 1.5 times more likely to have an avoidable ED visit,[2] and are twice as likely to be admitted to the hospital or return after an ED visit.[5] Remarkably, it has been suggested that more than a quarter of older adults who visit the ED have some form of impaired mental status, and yet 62% of those individuals have no prior history of cognitive impairment documented in their medical record.[6]

The Geriatric Emergency care Applied Research 2.0 Network–Advancing Dementia Care (GEAR 2.0 ADC), a National Institute of Aging (NIA)–funded effort, was created to support research to fill these gaps in emergency care for PLWD and their care partners. Detection of those in the ED with cognitive impairment or dementia was prioritized as one of the 4 critical domains for further investigation by stakeholders and task force members of the GEAR 2.0 Network. GEAR identifies research gaps and proposes research priorities for the detection of cognitive impairment and dementia in the ED with a scoping review process and a stakeholder consensus approach. The goal is to support research focused on these priorities, thus generating evidence to inform and advance better patient care. This article details the scoping review process, its results, and the research priorities of the subsequent GEAR 2.0 ADC Consensus Conference.

Methods

The GEAR 2.0 ADC task force was recruited from a pool of cognitive impairment, dementia, geriatrics, and emergency medicine experts identified through prior collaborations, geriatric emergency medicine focus groups, and partner organizations. The workgroup included ED-based and non-ED-based clinicians, individuals living with dementia, care partners, and advocacy organizations. GEAR 2.0 ADC members were selected based on membership in national geriatric emergency medicine interest groups and through relevant publications in the GEAR 2.0 ADC domains. The task force members were assigned to one of 4 workgroups representing research and practice priority domains: ED Care Practices, ED Care Transitions, Communication and Decision Making, and Detection and Identification (Detection). A list of task force members can be found in the Acknowledgments section.

The GEAR 2.0 Detection workgroup consisted of 20 individuals: 6 emergency medicine physicians, 2 neuropsychologists, 2 geriatricians, 2 staff researchers, 1 geriatric psychiatrist, 1 preventive medicine physician, 1 librarian, 1 social worker, 1 nurse practitioner, 1 biostatistician, 1 PLWD, and 1 care partner. The workgroup, over the course of 6 months, convened videoconference meetings to discuss the scoping review aims, propose the research questions, review the search criteria, and examine the scoping review results, and abstraction of final papers.[7]

The Detection workgroup conducted a scoping review adhering to the Preferred Reporting Items for Systematic Review and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) reporting guidelines[8] used by all 4 workgroups. The Detection workgroup developed key priority questions that were voted on by the entire GEAR 2.0 task force. The top 2 questions were converted to the Population, Intervention, Comparison, and Outcome (PICO) format to guide the systematic scoping reviews.[9] The GEAR 2.0 Detection workgroup focused on the best tools and approaches for detecting cognitive impairment and dementia in the ED in terms of *most accurate* (PICO 1) and *most pragmatic* (PICO 2) outcomes.

The scoping review is registered on Open Science Framework (see Box 1).[10]

Search Strategy

Published literature was searched using strategies developed by the 4 participating medical librarians. They established common search terms and key words across the workgroups. The medical librarian (AB) used the Detection workgroup PICO questions and their corresponding exemplar articles to guide, refine, and develop search strings specific to the domain of cognitive impairment. PICO 1 focused on measures of diagnostic accuracy including sensitivity and specificity, models, and reproducibility of results to detect and assess cognitive impairment and dementias. PICO 2 focused on the approach, practicality, and usability of the assessment as part of emergency clinical care. We searched Ovid Medline, Embase, CINAHL, CENTRAL, APA PsycINFO, Web of Science, and PubMed Central (see Supplementary Material 1) We deduplicated in 2 sequential automated steps: first, a deduplication system developed at the Cushing/Whitney Medical Library at Yale University was used. The remaining articles were then uploaded to Covidence (Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia), a web-based article review screening and extraction tool for scoping reviews. One additional deduplication step was performed through Covidence. Full search strategies are provided in the supplement.

Study Selection and Abstraction

The scoping review literature search was completed in May 2021. Two independent reviewers (U.H., A.N.) screened titles and abstracts for inclusion and exclusion criteria. Inclusion criteria for PICO 1 and PICO 2 were studies of assessments or tools that assessed for cognitive function focusing on dementia and occurred in the ED setting. Exclusion criteria for both PICO questions were studies that took place in children, did not include patients greater than 65 years in age, exclusively focused on delirium, or exclusively focused on traumatic brain injury. Articles that did not explicitly mention patients with cognitive impairment were retained in the full-text review if they met all other inclusion criteria. Additionally, systematic reviews pertinent to our objectives were kept and their reference lists were examined for relevance to the PICOs. Studies were retained if they met inclusion criteria and were not already identified in the initial search. The full texts of the articles that met these criteria were then reviewed. In cases of disagreement between the reviewers adjudication occurred via consensus between the 2 reviewers, or by a third workgroup member (C.C.).

Box 1. PICO Questions

The GEAR 2.0 ADC Detection workgroup generated the following PICO questions:

Detection PICO-1:

How can the ED best identify cognitive impairment? (Best in terms of sensitivity, reliability, practicality, ease, and speed of completion, etc.) Are there differences by race or ethnicity?

Population: All ED patients (no children, no studies that excluded patients older than 65).

Intervention: ANY assessment available during the ED visit to identify cognitive impairment, cognitive frailty, or confusion.

Comparison: Gold/Reference standard assessments.

Outcomes: Measures of diagnostic accuracy including sensitivity, specificity, likelihood ratios, etc. against gold standards.

Detection PICO-2:

Are there pragmatic cognitive impairment screening tools that can identify patients at risk of dementia? (Pragmatic in terms of ease of use, training, quickness to complete, etc.)

Population: All ED patients (no children, no studies that excluded patients older than 65).

Intervention: ANY assessment available during the ED visit to identify cognitive impairment, cognitive frailty, or confusion.

Comparison: Gold/Reference standard assessments.

Outcomes: Time on task for assessment, clinician acceptability of assessment, training time for assessment, completion rates of assessment, patient harms from assessment.

Three authors (J.D., W.H., A.N.) abstracted the following data from the final articles based on a template that included standardized elements across the 4 workgroups such as study setting, participant demographics, race or ethnicity, and inclusion or exclusion criteria, among other information.

The PICO 1 abstractions included the screening instrument or tool studied, the gold standard used for dementia or cognitive impairment, and measures of accuracy, reliability, sensitivity, specificity, likelihood ratios, correlation coefficients, etc. For PICO 2, objective measures of feasibility, pragmatic nature, timing, or efficiency of a tool were abstracted. If no objective measures were reported, then authors' remarks on a tool's feasibility were abstracted. These included ease of use, speed, setting, integration into routine care, the outcome effect and size, feasibility, acceptability, safety, and other measures of success or failure of the interventions.

Research and Practice Gap Assessment

The results of the scoping reviews, including the abstraction tables and publications, were discussed by the Detection workgroup. The group also discussed how to present the available research and practice gaps to the GEAR 2.0 ADC Consensus Conference.

The scoping review results were presented at the GEAR 2.0 ADC Consensus Conference meeting from September 10 to 11, 2021. The goal of the meeting was to have stakeholders analyze the current evidence and identify the research and practice gaps for future research. Members discussed and voted on the research priorities in the detection of cognitive impairment in the ED. To effectively discuss the topic, participants were split into 4 groups. The groups then reconvened and discussed the perceived research and practice gaps needing attention. This discussion was then synthesized by the Detection workgroup to form the final research priorities. All Consensus Conference attendees voted to prioritize the research and practice gaps to provide guidance for future GEAR 2.0 pilot funding opportunities. Those absent from the conference were asked to vote asynchronously, for 100% participation by all 4 workgroups and Health Equity Advisory Board members.

Results

Abstraction Process

We identified 1464 citations for PICO 1; we removed 1271 citations as they did not meet inclusion criteria. The interrater reliability between both screeners was modest ($\kappa = 0.67$). Ninety-three underwent full-text review, from which an additional 50 were excluded (19 had no measures of diagnostic accuracy, 15 were not in the ED, 5 did not detect dementia, 5 were duplicates, 3 were abstracts of existing full papers, 1 focused only on traumatic brain injury, 1 focused only on delirium, 1 was a letter to the editor), leaving a total of 43 manuscripts for PICO 1 abstractions. Two additional manuscripts were identified from references listed in the abstracted manuscripts bringing the total number of manuscripts to 45. See Supplementary Figure 1, PRISMA-ScR flow diagram PICO 1.

We identified 2166 citations for PICO 2; we removed 2030 as they did not meet inclusion criteria. The interrater reliability between both screeners was low ($\kappa = 0.37$). One hundred thirty-six underwent full-text review, from which an additional 70 were excluded (33 had no measure or mention of feasibility or pragmatic nature, 25 were not in the ED, 5 did not detect dementia, 3 were abstracts of full-text papers, 3 were duplicates, 1 was not available in English), leaving 66 papers for PICO 2 abstractions. During the abstraction process, 1 manuscript was removed as it was a duplicate and 1 additional manuscript was identified by reference review. See Supplementary Figure 2, PRISMA-ScR flow diagram PICO 2.

There were 21 articles that were included in both PICO 1 and PICO 2 literature abstractions. See supplement for full abstraction tables (Supplementary Tables 1 and 2).

Abstraction Results

PICO 1

Of the 45 manuscripts, 9 only had abstracts with 3 from the same study, and 5 were review papers or editorials. Patient race or ethnicity or language spoken were reported 33% and 31% of the time in abstracted manuscripts, respectively. All those reported were English-speaking except for 2 studies that enrolled French-speaking patients. No manuscript captured sexual orientation or religious faith of the participants. Age for inclusion varied, ranging from >18 years to >75 years. The majority of manuscripts included people aged ≥65 years. The number of studies and age criteria were as follows: ≥18 years (1), ≥45 years (1), ≥55 years (1), ≥60 years (1), ≥65 years (24), ≥70 years (4), and ≥75 years (7).

Twenty-seven different assessments or instruments were evaluated or mentioned in the 45 abstracted manuscripts for PICO 1 (Table 1). The Mini-Mental Status Exam (MMSE) was the most commonly used measure as the gold standard in 23 of these 45 studies. Other measures that were used were the modified Telephone Interview for Cognitive Status—modified (TICS-m); the Montreal Cognitive Assessment (MoCA); the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE); previously documented history; patient or kin report; the Orientation, Memory, Concentration Test (OMCT); the Eight-item Interview to Differentiate Aging and

Table 1
PICO 1 and PICO 2 ED Cognitive Impairment Assessment Instruments Evaluated for Diagnostic Accuracy and Time to Complete

Gold Standard	Gold Standard Cutoff Score	Comparison	Sensitivity, %	Specificity, %	PPV, %	NPV, %	PLR	NLR	AUC	Time to Complete, min	Other Measures	Reference
MMSE	<24	Six-Item Screener	94	86	68	98				<1		Wilber[11,*]
	<24	Six-Item Screener	63	81	60	83			0.77			Wilber[12,*]
	<24	Six-Item Screener	74	77			3.3	0.33	0.83			Carpenter[3,*]
	<24	Mini-Cog	75	85	57	93				1.5		Wilber[11,*]
		Quick Confusion Scale								2.35	Correlation: $r = 0.783$	Huff[13,*]
	<24	Quick Confusion Scale	64	85							Correlation: $r = 0.61$	Stair[14,*]
	<24	AMT10	Score 8: 92	75	74	92						Schofield[15]
	<24	AMT4	Score 3: 80	88	84	85						
	<25	Ottawa 3DY—English	Nurses 90.1	60								Eagles[16,*]
			Physicians 72.7	50								
	<24	Ottawa 3DY—English	71.4	56.3								Barbic[17]
	<25	Ottawa 3DY—English	93.8	72.8			3.5	0.08				Wilding[18,*]
	<25	Ottawa 3DY—English	Nurses 84.6	54								Eagles[19,*]
			Physicians 78.9	70								
	<24	Ottawa 3DY—English	95	51			2	0.1				Carpenter[20,21,*]
	<25	Short Blessed Test	85.7	58.3								Barbic[17]
	<24	Short Blessed Test	95	68			2.7	0.08	0.89			Carpenter[20,21,*]
	<25	Animal Fluency Test	90.6	39.3			1.5	0.24				Wilding[18,*]
	<24	Patient AD8	37	82			2	0.77	0.67			Carpenter[3,*]
	<24	Caregiver AD8	66	67			2.2	0.27	0.825			Carpenter[20,21,*]
	<24	Caregiver AD8	63	79			3	0.44	0.74			Carpenter[3,*]
	<24	Brief Alzheimer's Screen	100	53					0.945			Carpenter[20]
	<24	Physical Assessment									Handgrip strength, 0.67; TNF, −0.34; IL-6, −0.36; visfatin, −0.01	Huang[22]
	<24	Documentation in notes									Percentage of undocumented cognitive impairment in patients with abnormal MMSE score in past medical history, ED physician note, inpatient physician note, and emergency nurse note: PMH: 86%, emergency physician: 72%, emergency nurse: 84%, inpatient physician: 60%	Heidt[23]
	<24	Physician's Assessment									% agreement: 67%	Dziedzic[24,*]
	N/A	Serious Game									Correlation of game response time, −0.558; and accuracy, −0.104 (nonsignificant) with MMSE score	Tong[25]
MoCA	<26	Caregiver AD8	54	78			2.4	0.59				Turner[26]
	<26	Short Blessed Test	47	89			4.1	0.6				Turner[26]
	<26	Brief Alzheimer's Screen	61	83			3.6	0.47				Turner[26]
	N/A	Serious Game									Correlation of game response time, −0.339; and accuracy, −0.042 (nonsignificant) with MoCA score	Tong[25]
CAM		Ottawa 3DY—French	Delirium detection 85	57.7								Bedard[27]
		4 A's Test (4-AT)	84	74	19	98						Gagne[28]
TICS-m	<27	4 A's Test (4-AT)	49	87	48	88						Gagne[28]
	<27	Ottawa 3DY—French	Delirium detection 84.2	60			2.0	0.3				Bedard[29]
	<27	Ottawa 3DY—French	Cognitive impairment 76.7	70								Bedard[27]
	<27	Ottawa 3DY—French	Cognitive impairment 76.2	70			2.4	0.4				Bedard[29]
	<27	Bergman-Paris Question	86.5	30	30	90						Lague[30,*]

Combined CAM-ICU, AD8, sMMSE	Positive screen on any tests	AMT4	53.0	96	94.6	73.3	14.7	0.5	0.75	Dyer[31]
Expert diagnosis[†]	N/A	4AT[‡]	84	63	39	94			0.83	O'Sullivan[32]
		6-CIT[‡]	81	76	46	94				
		APOP							1.5	Blomaard[33]
		Caregiver AD8							<6	Dyer[55]
		OMC							~2	Gerson[34]
		MoCA							~10	Han[35]
		Ottawa 3DY—English							<2	
		Short Blessed Test							<5	
		6-CIT							2-3	Lucke[36]
		4AT							2.6	Myrstad[37]
		Emergency Geriatric Screen							<5	Schoenengerger[38]
		Short-term memory recall test							2-5	Yamamoto[39]

4AT, 4 A's Test; AD8, Ascertain Dementia 8; AMT, Abbreviated Mental Test; APOP, acutely presenting older patient; AUC, area under the curve; CAM, Confusion Assessment Method; CAM-ICU, Confusion Assessment Method—Intensive Care Unit; IL-6, interleukin 6; MoCA, Montreal Cognitive Assessment; MMSE, Mini-Mental State Examination; N/A, not applicable; NLR, negative likelihood ratio; NPV, negative predictive value; PLR, positive likelihood ratio; OMC, Orientation-Memory-Concentration; PMH, past medical history; PPV, positive predictive value; 6-CIT, Six-Item Cognitive Impairment Test; TICS-m, Telephone Interview for Cognitive Status—modified; TNF, tumor necrosis factor.

[*]Article included for PICO 1 and PICO 2.

[†]Expert (geriatrician with special interest in delirium/dementia) delirium and dementia diagnosis using *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-V*) criteria, using researcher-collected Standardized Mini Mental State Examination (sMMSE), Delirium Rating Scale—Revised 98 (DRS-R98), Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) data, and demographic data, presenting complaint, and information from the general physician referral letter or hospital notes about dementia diagnosis.

[‡]Multiple cutoffs were reported and diagnostic accuracy was measured. Only 1 cutoff is presented.

Table 2
Consensus Conference Ranking of Detection and Identification Question Priority Comparing ED Providers, Non-ED Providers, and PLWD/Care Partners

Detection and Identification Research Priorities	Rankings			
	All Participants	ED Providers	Non-ED Providers	PLWD and Care Partners
What is the best approach* in the ED to screening cognitive impairment? (*Includes population definitions, using data sources, screening tests effectiveness, efficacy, referral, etc)	1st	1st	1st	1st
What are the most accurate and feasible tools and data to identify cognitive impairment in the absence of delirium or known dementia?	2nd	2nd	2nd	2nd
What is the value and potential unintended consequences of screening for cognitive impairment in the ED?	3rd	3rd	4th	3rd
How can EDs feasibly take into account culture, language, ED environment, and communities of the population served when screening cognitive impairment in the ED? (eg, does English as a second language impact screening of dementia?)	4th	4th	3rd	4th
What information is needed to differentiate delirium vs undiagnosed cognitive impairment vs known dementia vs mental health conditions?	5th	5th	5th	5th

Dementia (AD8); the Short Blessed Test (SBT); Bergman-Paris Question; Brief Risk Identification for Geriatric Health Tool (BRIGHT); and the ED Mini-Cog in declining order of use. Table 1 includes citations from PICO 1 and PICO 2 (see below) and is titled PICO 1 and PICO 2 ED Cognitive Impairment Assessment Instruments Evaluated For Diagnostic Accuracy and Time to Complete.

PICO 2

Of the 66 manuscripts abstracted, 5 were not in English but had English abstracts, 4 reported on race or ethnicity, and 5 reported on language. None reported sexual orientation or religious faith, and 20 reported measures of feasibility.

Studies evaluating feasibility focused on (1) the length of time needed to administer the assessments and (2) barriers and acceptability of screens. Time was the most commonly studied measure of feasibility. The time needed to complete an assessment was a concern of clinicians, with an ideal time of <5 minutes reported in the survey by Zun et al[40] administered to emergency physicians. Kennelly et al[41] reported that 29% of emergency physicians reported lacking the expertise to screen for cognitive impairment and dementia. A study of emergency physicians and nurses[19] reported that more than 95% of them found the Ottawa 3DY screening tool to be easy to learn and use in the clinical setting. Acceptance of different screen tools or screening methods by patients and ED staff was assessed in 3 manuscripts. Boucher et al[42] assessed the acceptance of completing screening tools on a tablet computer compared to paper or orally with a research assistant by older patients in the ED. They found that patients aged <85 years were accepting of tablets whereas those older were less accepting. The Clock Draw Test was easily accepted by patients and family members in the emergency setting.[43] Carpenter et al[4] found ED clinicians accepting of geriatric technicians screening patients for cognitive issues. Table 1 presents PICO 2 findings on the length of time different assessment methods take to complete.

PICO 1 and PICO 2

Twenty-one articles overlapped in the PICO 1 and 2 searches. Key papers to highlight are 2 recent systematic reviews of ED cognitive impairment assessment instruments. Calf et al[44] identified the O3DY as having the highest pooled sensitivity of 0.90 (95% CI 0.71-0.97), and the Six-item Screener (SIS) had the highest pooled specificity of 0.79 (95% CI 0.75-0.83). These findings were similar to another meta-analysis of ED dementia screening instruments by Carpenter et al.[45] The most commonly used gold standard evaluation was the MMSE, used in 10 of these papers.

The SIS was found to take a median of 1 minute to administer to patients in Alzheimer's clinic and have 94% and 86% sensitivity and specificity, respectively, and a negative predictive value of 98% and a positive predictive value of 68%. The area under the ROC curve for the SIS was 0.96.[11]

Table 1 includes studies from PICO 1 and PICO 2 that reported diagnostic accuracy measures with time to complete each assessment where available. With regard to the practicality of administering these assessments in the ED environment, Hirschman et al[46] found the SIS and the clock-draw test had no association with time of day, total patient hours, being screening in a private room, and number of people in the waiting room (crowding).

Many of these instruments are publicly available on the Geriatric Research Instrument Library (https://www.peppercenter.org/public/gril.cfm) under the Cognitive/Dementia Domain Category.[47]

Consensus Conference Ranked Priorities

Ranked research priorities focused on (1) best approach in the ED with regards to screening for cognitive impairment, (2) the joint evaluation of accuracy and feasibility, (3) consideration of the impact of screening of cognitive impairment in the ED, (4) consideration of patient characteristics and the settings and populations serviced, and (5) differentiating dementia from other conditions that may impair cognition (eg, delirium, mental health conditions). The list of research priorities, ranked by all members and those by clinicians vs PLWD and care partners, are presented in Table 2.

Discussion

Over the last 2 decades, there have been multiple studies evaluating ED detection of cognitive impairment specifically focused on dementia. Our scoping review identified more than 45 manuscripts addressing accuracy of detection of cognitive impairment or dementia, 66 addressing pragmatic and practical ways for this detection, and 21 manuscripts overlapping in both. Most commonly studied instruments found to have high sensitivity and negative predictive value included the SIS,[11] O3DY,[18,20,21] and 4AT[28,32] and could be considered for use in clinical care. These instruments also take a short time to administer, ranging from <1 minute for the SIS,[11] <2 minutes for the O3DY,[35] to <3 minutes for 4AT.[37]

Although these limited data support their use to screen for dementia in the ED, there was consensus that the findings were heterogeneous and more evidence was needed to inform best practices. The GEAR 2.0 task force determined that although it is widely accepted that detection of cognitive impairment in the ED is beneficial and critical to providing good care, to accomplish this efficiently and

effectively remains an undermet need. Many of these tools have existed for decades, but continue not to be implemented into practice. Research is needed to address concerns about feasibility, demonstrate their applicability, and find ways to increase their integration into clinical care. Determining the best approach in the ED for screening cognitive impairment was the top research priority from this transdisciplinary group of stakeholders that also included PLWD and their care partners. The approaches should encompass pragmatic screening processes, interventions that include referral for subsequent evaluation, and even use of patient and population risk factors or electronic health record data to improve detection of cognitive impairment and dementia in the ED setting. Such evidence could change and improve practice.

The need for more research to develop accurate *and feasible* tools to identify cognitive impairment in the absence of delirium or known dementia was the next priority focus ranked by the GEAR 2.0 Consensus Conference. In the ED setting, when patients often present with changes in cognition, it is important to determine if the impairment is new and originates from a treatable medical condition such as delirium, or from a slower decline in cognition in the setting of chronic cognitive impairment (dementia) not previously recognized. Delirium is a medical emergency and requires prompt assessment and treatment.[48] Dementia is a risk factor for delirium, and not recognizing it can impact clinical decision making, patient care transitions, and safety. Developing instruments to differentiate the two are critical for the ED setting. The importance of understanding what information is needed to differentiate delirium vs undiagnosed cognitive impairment vs known dementia and other mental health etiologies was thus another important research priority ranked by the GEAR 2.0 task force.

The next Detection research priority ranked by the Consensus Conference focused on understanding the value and potential unintended consequences of screening for cognitive impairment in the ED. Priorities expressed by PLWD on the task force emphasized the importance of clear communication of purpose, potential risks, benefits, and value of cognitive screening. Efforts in the ED should be made to ensure the patient and care partners have an understanding of the screening results and potential follow-up steps.[49] Older adults may consider screening to be strenuous or stressful, which may be due to a perceived pressure to perform well on the test.[50] There may be misunderstandings around both the reasons for a screen and the implications of test results. Therefore, clear communication should be made that the screening does not constitute diagnosis, but rather may lead to additional evaluation and management after the ED visit by appropriate clinicians. Moreover, consideration to whether a care partner is to be informed and involved in the decision making is also important. The individual being screened may have preferences about whether they would want to know if cognitive impairment is present and if the results should be communicated to care partners and to whom.[51,52]

Another research priority ranked by the task force was how to account for culture, language, the ED environment, and communities of the population served when screening for cognitive impairment in the ED. Although the scoping review searches identified 101 articles, most of these articles focused on the detection of dementia or cognitive impairment in limited languages, most in English, some in French, and 1 in Spanish. Some studies even excluded patients if they were non-English speaking. The GEAR 2.0 Consensus Conference emphasized the importance of cognitive impairment detection to define the characteristics of patients that present to the ED, including aspects like language, ethnicity, and social determinants of health that may predispose patients to inequitable differences in health and medical care.

Finally, the GEAR 2.0 Consensus Conference emphasized that the ED's role is not to assign a definitive diagnosis of dementia. It is important to acknowledge the US Preventative Services Task Force statement that there is no trial evidence to support screening older adults for cognitive impairment. They also state that early diagnosis of cognitive impairment does not improve patient, caregiver, family, clinician decision making, or other important outcomes, nor does it cause harm.[53] For the GEAR 2.0 Consensus Conference, however, the presence of an older person in the ED with signs, symptoms, or complaints of cognitive change does, in fact, warrant evaluation to ensure appropriate care in the ED and referral at discharge. A review of practice guidelines for dementia detection indicates that cognitive evaluation should occur "when a caregiver" such as a family member, friend, or other informant describes cognitive decline.[54] The 3 most common aspects of the evaluation that are the minimum requirement for diagnosis are (1) cognitive assessment with a standardized tool, (2) evaluation of comorbid conditions with medication review and laboratory tests, and (3) a history and physical examination. All steps are required, although they may be difficult to achieve in the ED setting.

Conclusion and Implications

We report the results of 2 systematic scoping reviews evaluating diagnostic accuracy and feasibility to detect cognitive impairment and dementia in the ED setting. The GEAR 2.0 Advancing Dementia Care task force, using these results, developed consensus research priorities practice gaps to advance the detection of cognitive impairment and dementia in the ED setting. They include the need for more effective and efficient approaches to recognize persons at risk for cognitive impairment and dementia. These approaches should balance the importance of equitable screening and the goal and the consequences identifying cognitive impairment. These research priorities will be the basis of future GEAR 2.0 research funding opportunities.

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Supplementary Material 1

Database Searched	Date Searched	PICO 1	PICO 2
MEDLINE (Ovid)	03/25/2021	560	890
Cochrane Central Register of Controlled Trials	03/25/2021	75	100
Embase (Ovid)	03/25/2021	834	1296
CINAHL (Ebsco)	03/25/2021	239	323
APA PsycINFO (Ovid)	03/25/2021	85	107
PubMed Central	03/25/2021	127	182
Web of Science	03/25/2021	259	361
Total		2160	3259
After deduplication: Yale De-duplicator		1464	2173
After deduplication: Covidence De-duplicator		1456	2166

Working Search Methods

The review team collaborated with a research librarian (A.L.B.) to develop and execute a comprehensive search of the literature. The search was created in partnership with several librarians and project team members from the larger GEAR 2.0 effort to conduct several scoping reviews on various topics related to dementia care in the field of emergency medicine. This search combined controlled vocabulary and title/abstract terms related to the accuracy and feasibility of dementia screening tools in the emergency department. The search was adapted from a GEAR 2.0 baseline search to fit the needs of the specific project question and translated for the following databases: MEDLINE (Ovid), Cochrane Central Register of Controlled Trials (CENTRAL), Embase (Ovid), CINAHL (Ebsco), APA PsycINFO (Ovid), PubMed Central, and Web of Science (Clarivate). All searches were performed on March 25, 2021. An exclusion filter from McGill University was used to focus on adult patient populations. No other publication type, language, or date filters were applied. Results were downloaded to a citation management software (EndNote) and underwent automated deduplication using a system at the Cushing/Whitney Medical Library at Yale University. Unique records were uploaded to a screening platform (Covidence) for independent review by several project team members using predetermined inclusion and exclusion criteria.

Used age filter from: https://libraryguides.mcgill.ca/knowledge-syntheses/search-tools

Ovid MEDLINE(R) ALL <1946 to March 24, 2021>

1 exp Emergency Medical Services/ 146955

2 Emergency Medicine/ 13903

3 (emergicenter* or triage* or unscheduled-acute-care).ti,ab. 20523

4 ((ED or EMS or ER) adj1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*)).ti,ab. 12310

5 (trauma adj1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*)).ti,ab. 23093

6 ((Emergency or emergencies) adj2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*)).ti,ab. 169983

7 or/1-6 273992

8 exp Dementia/ 172364

9 (dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or Huntington* or Lewy-Bod*).ti,ab. 248697

10 Cognitive Dysfunction/ 20913

11 Cognition Disorders/ 64841

12 ((cognit* or neurocognit* or frontotemporal) adj2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*)).ti,ab. 138648

13 or/8-12 389398

14 exp "Diagnostic Techniques and Procedures"/ 7441551

15 di.fs. 2635879

16 exp "Mental Status and Dementia Tests"/ 8157

17 exp Geriatric Assessment/ 28853

18 exp Neuropsychological Tests/ 181403

19 ((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) adj3 (assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*)).ti,ab. 190997

20 Montreal cognitive assessment.ti,ab. 3256

21 MOCA.ti,ab. 2881

22 Mini-Mental Status Examination.ti,ab. 1037

23 MMSE.ti,ab. 11543

24 Saint Louis University Mental Status.ti,ab. 37

25 SLUMS.ti,ab. 1701

26 "AD8".ti,ab. 228

27 Quick Dementia Rating System.ti,ab. 7

28 QDRS.ti,ab. 7

29 or/14-28 8937325

30 7 and 13 and 29 1041

31 [Accuracy Outcome Concept–For PICO 1] 0

32 exp "Sensitivity and Specificity"/ 601726

33 exp "Models, Theoretical"/ 1818464

34 exp "Reproducibility of Results"/ 414121

35 (accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or true-negative* or concept* or theoretical*).ti,ab. 9626627

36 or/32-35 10701541

37 [Pragmatic Concept–For PICO 2] 0

38 (pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance*).ti,ab. 598307

39 ease-of-use.ti,ab. 10062

40 (organization* or organisation* or administration* or method* or standard* or instrument* or tool*).ti,ab. 8787459

41 exp "Organization and Administration"/ 1530624

42 og.fs. 492823

43 exp Methods/ 692757

44 mt.fs. 3938387

45 st.fs. 742607

46 is.fs. 673805

47 (education* or training* or learn* or simulation*).ti,ab. 1587309

48 exp Education/ 828249

49 ed.fs. 285229

50 exp "Task Performance and Analysis"/ 36465

51 time/ or time factors/ 1216614

52 (time* or timing*).ti,ab. 3964012

53 Automation/ 18746

54 (automated* or automation*).ti,ab. 132404

55 or/38-54 15388882

56 [PICO 1: Combined & filtered] 0

57 30 and 36 579

58 (exp infant/ or exp child/ or adolescent/) not exp adult/ 1920361

59 57 not 58 560

60 [PICO 2: Combined & filtered] 0

61 30 and 55 936

62 (exp infant/ or exp child/ or adolescent/) not exp adult/ 1920361

63 61 not 62 890

Embase <1974 to 2021 March 24>

1 exp Emergency Health Service/ 108608

2 Emergency Medicine/ 42258

3 exp Emergency Ward/ 160076

4 exp emergency physician/ 13158

5 exp Emergency Nurse Practitioner/ 337
6 exp Emergency Nursing/ 6697
7 exp Emergency Patient/ 3803
8 (emergicenter* or Triage* or unscheduled-acute-care).ti,ab. 32081
9 ((ED or EMS or ER) adj1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*)).ti,ab. 25141
10 (trauma adj1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*)).ti,ab. 29792
11 ((Emergency or emergencies) adj2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*)).ti,ab. 258392
12 or/1-11 404652
13 exp Dementia/ 377840
14 (dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or Huntington* or Lewy-Bod*).ti,ab. 347273
15 exp Cognitive Defect/ 516020
16 ((cognit* or neurocognit* or frontotemporal) adj2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*)).ti,ab. 213817
17 or/13-16 617546
18 clinical assessment/ 171905
19 exp dementia assessment/ 50912
20 di.fs. 3232060
21 exp geriatric assessment/ 17751
22 ((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) adj3 (assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*)).ti,ab. 266911
23 montreal cognitive assessment/ 7784
24 Montreal cognitive assessment.ti,ab. 6548
25 MOCA.ti,ab. 7287
26 exp Mini Mental State Examination/ 42152
27 Mini-Mental Status Examination.ti,ab. 1807
28 MMSE.ti,ab. 24764
29 Saint Louis University Mental Status.ti,ab. 70
30 SLUMS.ti,ab. 1925
31 "AD8".ti,ab. 353
32 Quick Dementia Rating System.ti,ab. 7
33 QDRS.ti,ab. 10
34 or/18-33 3642188
35 [Accuracy Outcome Concept–For PICO 1] 0
36 exp diagnostic test accuracy study/ or exp diagnostic accuracy/ or exp accuracy/ 528272
37 exp "sensitivity and specificity"/ 388710
38 exp statistical analysis/ 2597960
39 exp conceptual framework/ 29130
40 (accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or true-negative* or concept* or theoretical*).ti,ab. 12457155
41 or/36-40 13240261
42 [Pragmatic Concept–For PICO 2] 0
43 (pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance*).ti,ab. 767362
44 ease-of-use.ti,ab. 14290
45 (organization* or organisation* or administration* or method* or standard* or instrument* or tool*).ti,ab. 12490561
46 exp "organization and management"/ 2101767
47 (education* or training* or learn* or simulation*).ti,ab. 1980963
48 exp education/ 1482404
49 task performance/ 145790
50 exp time/ 635316
51 (time* or timing*).ti,ab. 5368545
52 automation/ or exp autoanalysis/ 66802
53 (automated* or automation*).ti,ab. 188393
54 or/43-53 17314801
55 [PICO 1 Combined & filtered] 0
56 12 and 17 and 34 and 41 834
57 56 not (exp juvenile/ not exp adult/) 815
58 [PICO 2 Combined & filtered] 0
59 12 and 17 and 34 and 54 1337
60 59 not (exp juvenile/ not exp adult/) 1296

APA PsycInfo <1806 to March Week 3 2021>
1 exp Emergency Medicine/ 357
2 exp Emergency Personnel/ 11799
3 (emergicenter* or Triage* or unscheduled-acute-care).ti,ab. 1651
4 ((ED or EMS or ER) adj1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*)).ti,ab. 1667
5 (trauma adj1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*)).ti,ab. 1510
6 ((Emergency or emergencies) adj2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*)).ti,ab. 17905
7 or/1-6 32107
8 exp Dementia/ 80210
9 (dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or Huntington* or Lewy-Bod*).ti,ab. 106861
10 ((cognit* or neurocognit* or frontotemporal) adj2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*)).ti,ab. 80069
11 or/8-10 161116
12 exp Diagnostic Criteria/ 3425
13 exp Geriatric Assessment/ 1063
14 neuropsychological assessment/ 15227
15 ((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) adj3 (assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*)).ti,ab. 126181
16 Montreal cognitive assessment.ti,ab. 1263
17 MOCA.ti,ab. 1034
18 mini mental state examination/ 777
19 Mini-Mental Status Examination.ti,ab. 536
20 MMSE.ti,ab. 6091
21 Saint Louis University Mental Status.ti,ab. 16
22 SLUMS.ti,ab. 472
23 "AD8".ti,ab. 44
24 or/12-23 141849
25 7 and 11 and 24 146
26 [Accuracy Outcome Concept–For PICO 1] 0
27 test sensitivity/ 308
28 models/ 70462
29 test validity/ or clinical validity/ 80831
30 (accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or true-negative* or concept* or theoretical*).ti,ab. 2064410
31 or/27-30 2122572
32 [Pragmatic Concept–For PICO 2] 0
33 pragmatics/ 5210

34 (pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance*).ti,ab. 229448
35 ease-of-use.ti,ab. 2901
36 test administration/ 3277
37 (organization* or organisation* or administration* or method* or standard* or instrument* or tool*).ti,ab. 1528305
38 exp Testing Methods/ 14401
39 exp training/ 78601
40 exp Time/ 20131
41 (time* or timing*).ti,ab. 737235
42 exp Automation/ 2457
43 (automated* or automation*).ti,ab. 14229
44 or/33-43 2160738
45 [PICO 1: Combined only] 0
46 25 and 31 85
47 [PICO 2: Combined only] 0
48 25 and 44 107

Web of Science
PICO 1
13
259
#12
Indexes=SCI-EXPANDED, CPCI-S, ESCI Timespan=All years
# 12
264
#11 AND #10 AND #7 AND #4
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 11
21,509,659
TS=(accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or
ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or
true-negative* or concept* or theoretical*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 10
324,054
#9 OR #8
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 9
35,680
TS=(Montreal cognitive assessment OR MOCA OR Mini-Mental Status Examination OR MMSE OR Saint Louis University Mental Status OR SLUMS OR "AD8" OR Quick Dementia
Rating System OR QDR)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 8
303,271
TS=((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) NEAR/3
(assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 7
490,311
#6 OR #5
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 6
194,671
TS=((cognit* or neurocognit* or frontotemporal) NEAR/2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 5
381,017
TS=(dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or
Huntington* or Lewy-Bod*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 4
206,166
#3 OR #2 OR #1
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 3
183,526
TS=((Emergency or emergencies) NEAR/2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 2
25,620
TS=(trauma NEAR/1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 1
14,077
TS=((ED or EMS or ER) NEAR/1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
Web of Science
PICO 2
13
361
#12
Indexes=SCI-EXPANDED, CPCI-S, ESCI Timespan=All years
# 12
375
#11 AND #10 AND #7 AND #4
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 11
24,214,287
TS=(pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance* or ease-of-use or organization* or organisation* or administration* or method* or standard* or instrument*
or tool* or education* or training* or learn* or simulation* or time* or timing* or automated* or automation*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
# 10
324,054

#9 OR #8

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

9

35,680

TS=(Montreal cognitive assessment OR MOCA OR Mini-Mental Status Examination OR MMSE OR Saint Louis University Mental Status OR SLUMS OR "AD8" OR Quick Dementia

Rating System OR QDR)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

8

303,271

TS=((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) NEAR/3

(assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*))

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

7

490,311

#6 OR #5

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

6

194,671

TS=((cognit* or neurocognit* or frontotemporal) NEAR/2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*))

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

5

381,017

TS=(dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or

Huntington* or Lewy-Bod*)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

4

206,166

#3 OR #2 OR #1

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

3

183,526

TS=((Emergency or emergencies) NEAR/2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*))

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

2

25,620

TS=(trauma NEAR/1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*))

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

1

14,077

TS=((ED or EMS or ER) NEAR/1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*))

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

PubMed CENTRAL (PUuMed, Medline NOT Medline)

PICO 1, 127 results

(("emergency care*"[Title/Abstract] OR "emergency treatment*"[Title/Abstract] OR "emergency service*"[Title/Abstract] OR "emergency dispatch*"[Title/Abstract] OR "emergency department*"[Title/Abstract] OR "emergency unit*"[Title/Abstract] OR "emergency ward*"[Title/Abstract] OR "emergency room*"[Title/Abstract] OR "emergency center*"[Title/Abstract] OR "emergency centre*"[Title/Abstract] OR "emergency system*"[Title/Abstract] OR "emergency-personnel"[Title/Abstract] OR "emergency physician*"[Title/Abstract] OR "emergency provider*"[Title/Abstract] OR "emergency doctor*"[Title/Abstract] OR "emergency nurs*"[Title/Abstract] OR "emergency patient*"[Title/Abstract] OR "emergency admission*"[Title/Abstract] OR "emergency admit*"[Title/Abstract] OR "trauma care*"[Title/Abstract] OR "trauma treatment*"[Title/Abstract] OR "trauma service*"[Title/Abstract] OR "trauma dispatch*"[Title/Abstract] OR "trauma department*"[Title/Abstract] OR "trauma unit*"[Title/Abstract] OR "trauma ward*"[Title/Abstract] OR "trauma room*"[Title/Abstract] OR "trauma center*"[Title/Abstract] OR "trauma centre*"[Title/Abstract] OR "trauma system*"[Title/Abstract] OR "trauma service*"[Title/Abstract] OR "trauma-personnel"[Title/Abstract] OR "trauma physician*"[Title/Abstract] OR "trauma provider*"[Title/Abstract] OR "trauma doctor*"[Title/Abstract] OR "trauma nurs*"[Title/Abstract] OR "trauma patient*"[Title/Abstract] OR "emergicenter"[Title/Abstract] OR "unscheduled-acute-care"[Title/Abstract] OR "ED-care"[Title/Abstract] OR "ed visit*"[Title/Abstract] OR "ed stay*"[Title/Abstract] OR "ed admit*"[Title/Abstract] OR "ed admission*"[Title/Abstract] OR "ed evaluation*"[Title/Abstract] OR "ed assess*"[Title/Abstract] OR "ER-care"[Title/Abstract] OR "er visit*"[Title/Abstract] OR "er stay*"[Title/Abstract] OR "er admission*"[Title/Abstract] OR "er evaluation*"[Title/Abstract] OR "er assess*"[Title/Abstract] OR "EMS-care"[Title/Abstract] OR "ems evaluation*"[Title/Abstract] OR "ems assess*"[Title/Abstract]) AND ("dementia*"[Title/Abstract] OR "amentia*"[Title/Abstract] OR "demention*"[Title/Abstract] OR "CADASIL"[Title/Abstract] OR "alzheimer*"[Title/Abstract] OR "Creutzfeldt-Jakob"[Title/Abstract] OR "huntington*"[Title/Abstract] OR "lewy bod*"[Title/Abstract] OR "cognitive disorder*"[Title/Abstract] OR "cognitive defect*"[Title/Abstract] OR "cognitive deficit*"[Title/Abstract] OR "cognitive decline*"[Title/Abstract] OR "cognitive deteriorat*"[Title/Abstract] OR "cognitive disabilit*"[Title/Abstract] OR "cognitive dysfunction*"[Title/Abstract] OR "cognitive disfunction*"[Title/Abstract] OR "cognitive-impaired"[Title/Abstract] OR "cognitive impairment*"[Title/Abstract] OR "cognitive interference*"[Title/Abstract] OR "neurocognitive disorder*"[Title/Abstract] OR "neurocognitive defect*"[Title/Abstract] OR "neurocognitive deficit*"[Title/Abstract] OR "neurocognitive decline*"[Title/Abstract] OR "neurocognitive deteriorat*"[Title/Abstract] OR "neurocognitive disabilit*"[Title/Abstract] OR "neurocognitive dysfunction*"[Title/Abstract] OR "neurocognitive impairment*"[Title/Abstract] OR "frontotemporal disorder*"[Title/Abstract] OR "frontotemporal defect*"[Title/Abstract] OR "frontotemporal dysfunction*"[Title/Abstract] OR "frontotemporal impairment*"[Title/Abstract] OR "impaired cognit*"[Title/Abstract] OR "impaired neurocogn*"[Title/Abstract]) AND ((("mental*"[Title/Abstract] OR "cognitive*"[Title/Abstract] OR "cognition*"[Title/Abstract] OR "orientation*"[Title/Abstract] OR "agitation*"[Title/Abstract] OR "memory*"[Title/Abstract] OR "concentration*"[Title/Abstract] OR "dementia*"[Title/Abstract] OR "mini cog*"[Title/Abstract] OR "mini mental*"[Title/Abstract] OR "neurocognit*"[Title/Abstract]) AND ("assess*"[Title/Abstract] OR "test*"[Title/Abstract] OR "eval*"[Title/Abstract] OR "screen*"[Title/

Abstract] OR "question*"[Title/Abstract] OR "exam*"[Title/Abstract] OR "scale*"[Title/Abstract] OR "calculator*"[Title/Abstract])) OR ("montreal cognitive assessment"[Title/Abstract] OR "MOCA"[Title/Abstract] OR "mini mental status examination"[Title/Abstract] OR "MMSE"[Title/Abstract] OR "saint louis university mental status"[Title/Abstract] OR "SLUMS"[Title/Abstract] OR "AD8"[Title/Abstract] OR "quick dementia rating system"[Title/Abstract] OR "QDR"[Title/Abstract])) AND ("accurac*"[Title/Abstract] OR "accurate*"[Title/Abstract] OR "reproducib*"[Title/Abstract] OR "specificit*"[Title/Abstract] OR "sensitivity*"[Title/Abstract] OR "likelihood*"[Title/Abstract] OR "like lihood*"[Title/Abstract] OR "statistic*"[Title/Abstract] OR "analysis*"[Title/Abstract] OR "analyses*"[Title/Abstract] OR "analyze*"[Title/Abstract] OR "mathematic*"[Title/Abstract] OR "calculation*"[Title/Abstract] OR "ratio*"[Title/Abstract] OR "probabilit*"[Title/Abstract] OR "estimat*"[Title/Abstract] OR "false positive*"[Title/Abstract] OR "false negative*"[Title/Abstract] OR "true positive*"[Title/Abstract] OR "true negative*"[Title/Abstract] OR "concept*"[Title/Abstract] OR "theoretical*"[Title/Abstract])) NOT (("emergency care*"[Title/Abstract] OR "emergency treatment*"[Title/Abstract] OR "emergency service*"[Title/Abstract] OR "emergency dispatch*"[Title/Abstract] OR "emergency department*"[Title/Abstract] OR "emergency unit*"[Title/Abstract] OR "emergency ward*"[Title/Abstract] OR "emergency room*"[Title/Abstract] OR "emergency center*"[Title/Abstract] OR "emergency centre*"[Title/Abstract] OR "emergency system*"[Title/Abstract] OR "emergency-personnel"[Title/Abstract] OR "emergency physician*"[Title/Abstract] OR "emergency provider*"[Title/Abstract] OR "emergency doctor*"[Title/Abstract] OR "emergency nurs*"[Title/Abstract] OR "emergency patient*"[Title/Abstract] OR "emergency admission*"[Title/Abstract] OR "emergency admit*"[Title/Abstract] OR "trauma care*"[Title/Abstract] OR "trauma treatment*"[Title/Abstract] OR "trauma service*"[Title/Abstract] OR "trauma dispatch*"[Title/Abstract] OR "trauma department*"[Title/Abstract] OR "trauma unit*"[Title/Abstract] OR "trauma ward*"[Title/Abstract] OR "trauma room*"[Title/Abstract] OR "trauma center*"[Title/Abstract] OR "trauma centre*"[Title/Abstract] OR "trauma system*"[Title/Abstract] OR "trauma service*"[Title/Abstract] OR "trauma-personnel"[Title/Abstract] OR "trauma physician*"[Title/Abstract] OR "trauma provider*"[Title/Abstract] OR "trauma doctor*"[Title/Abstract] OR "trauma nurs*"[Title/Abstract] OR "trauma patient*"[Title/Abstract] OR "emergicenter"[Title/Abstract] OR "unscheduled-acute-care"[Title/Abstract] OR "ED-care"[Title/Abstract] OR "ed visit*"[Title/Abstract] OR "ed stay*"[Title/Abstract] OR "ed admit*"[Title/Abstract] OR "ed admission*"[Title/Abstract] OR "ed evaluation*"[Title/Abstract] OR "ed assess*"[Title/Abstract] OR "ER-care"[Title/Abstract] OR "er visit*"[Title/Abstract] OR "er stay*"[Title/Abstract] OR "er admission*"[Title/Abstract] OR "er evaluation*"[Title/Abstract] OR "er assess*"[Title/Abstract] OR "EMS-care"[Title/Abstract] OR "ems evaluation*"[Title/Abstract] OR "ems assess*"[Title/Abstract]) AND ("dementia*"[Title/Abstract] OR "amentia*"[Title/Abstract] OR "demention*"[Title/Abstract] OR "CADASIL"[Title/Abstract] OR "alzheimer*"[Title/Abstract] OR "Creutzfeldt-Jakob"[Title/Abstract] OR "huntington*"[Title/Abstract] OR "lewy bod*"[Title/Abstract] OR "cognitive disorder*"[Title/Abstract] OR "cognitive defect*"[Title/Abstract] OR "cognitive deficit*"[Title/Abstract] OR "cognitive decline*"[Title/Abstract] OR "cognitive deteriorat*"[Title/Abstract] OR "cognitive disabilit*"[Title/Abstract] OR "cognitive dysfunction*"[Title/Abstract] OR "cognitive disfunction*"[Title/Abstract] OR "cognitive-impaired"[Title/Abstract] OR "cognitive impairment*"[Title/Abstract] OR "cognitive interference*"[Title/Abstract] OR "neurocognitive disorder*"[Title/Abstract] OR "neurocognitive defect*"[Title/Abstract] OR "neurocognitive deficit*"[Title/Abstract] OR "neurocognitive decline*"[Title/Abstract] OR "neurocognitive deteriorat*"[Title/Abstract] OR "neurocognitive disabilit*"[Title/Abstract] OR "neurocognitive dysfunction*"[Title/Abstract] OR "neurocognitive impairment*"[Title/Abstract] OR "frontotemporal disorder*"[Title/Abstract] OR "frontotemporal defect*"[Title/Abstract] OR "frontotemporal dysfunction*"[Title/Abstract] OR "frontotemporal impairment*"[Title/Abstract] OR "impaired cognit*"[Title/Abstract] OR "impaired neurocogn*"[Title/Abstract]) AND ((("mental*"[Title/Abstract] OR "cognitive*"[Title/Abstract] OR "cognition*"[Title/Abstract] OR "orientation*"[Title/Abstract] OR "agitation*"[Title/Abstract] OR "memory*"[Title/Abstract] OR "concentration*"[Title/Abstract] OR "dementia*"[Title/Abstract] OR "mini cog*"[Title/Abstract] OR "mini mental*"[Title/Abstract] OR "neurocognit*"[Title/Abstract]) AND ("assess*"[Title/Abstract] OR "test*"[Title/Abstract] OR "eval*"[Title/Abstract] OR "screen*"[Title/Abstract] OR "question*"[Title/Abstract] OR "exam*"[Title/Abstract] OR "scale*"[Title/Abstract] OR "calculator*"[Title/Abstract])) OR ("montreal cognitive assessment"[Title/Abstract] OR "MOCA"[Title/Abstract] OR "mini mental status examination"[Title/Abstract] OR "MMSE"[Title/Abstract] OR "saint louis university mental status"[Title/Abstract] OR "SLUMS"[Title/Abstract] OR "AD8"[Title/Abstract] OR "quick dementia rating system"[Title/Abstract] OR "QDR"[Title/Abstract])) AND ("accurac*"[Title/Abstract] OR "accurate*"[Title/Abstract] OR "reproducib*"[Title/Abstract] OR "specificit*"[Title/Abstract] OR "sensitivity*"[Title/Abstract] OR "likelihood*"[Title/Abstract] OR "like lihood*"[Title/Abstract] OR "statistic*"[Title/Abstract] OR "analysis*"[Title/Abstract] OR "analyses*"[Title/Abstract] OR "analyze*"[Title/Abstract] OR "mathematic*"[Title/Abstract] OR "calculation*"[Title/Abstract] OR "ratio*"[Title/Abstract] OR "probabilit*"[Title/Abstract] OR "estimat*"[Title/Abstract] OR "false positive*"[Title/Abstract] OR "false negative*"[Title/Abstract] OR "true positive*"[Title/Abstract] OR "true negative*"[Title/Abstract] OR "concept*"[Title/Abstract] OR "theoretical*"[Title/Abstract]) AND "medline"[Filter])

PubMed CENTRAL (PUuMed, Medline NOT Medline)

PICO 2, 182 results

((((emergency-care*[tiab] OR emergency-treatment*[tiab] OR emergency-service*[tiab] OR emergency-dispatch*[tiab] OR emergency-department*[tiab] OR emergency-unit*[tiab] OR emergency-ward*[tiab] OR emergency-room*[tiab] OR emergency-center*[tiab] OR emergency-centre*[tiab] OR emergency-system*[tiab] OR emergency-personnel[tiab] OR emergency-physician*[tiab] OR emergency-provider*[tiab] OR emergency-doctor*[tiab] OR emergency-nurs*[tiab] OR emergency-patient*[tiab] OR emergency-admission*[tiab] OR emergency-admit*[tiab] OR trauma-care*[tiab] OR trauma-treatment*[tiab] OR trauma-service*[tiab] OR trauma-dispatch*[tiab] OR trauma-department*[tiab] OR trauma-unit*[tiab] OR trauma-ward*[tiab] OR trauma-room*[tiab] OR trauma-center*[tiab] OR trauma-centre*[tiab] OR trauma-system*[tiab] OR trauma-service*[tiab] OR trauma-personnel[tiab] OR trauma-physician*[tiab] OR trauma-provider*[tiab] OR trauma-doctor*[tiab] OR trauma-nurs*[tiab] OR trauma-patient*[tiab] OR emergicenter[tiab] OR unscheduled-acute-care[tiab] OR ED-care[tiab] OR ED-visit*[tiab] OR ED-stay*[tiab] OR ED-admit*[tiab] OR ED-admission*[tiab] OR ED-evaluation*[tiab] OR ED-assess*[tiab] OR ER-care[tiab] OR ER-visit*[tiab] OR ER-stay*[tiab] OR ER-admission*[tiab] OR ER-evaluation*[tiab] OR ER-assess*[tiab] OR EMS-care[tiab] OR EMS-evaluation*[tiab] OR EMS-assess*[tiab]) AND (dementia*[tiab] OR amentia*[tiab] OR demention*[tiab] OR CADASIL[tiab] OR Alzheimer*[tiab] OR Creutzfeldt-Jakob[tiab] OR Huntington*[tiab] OR Lewy-Bod*[tiab] OR cognitive-disorder*[tiab] OR cognitive-defect*[tiab] OR cognitive-deficit*[tiab] OR cognitive-decline*[tiab] OR cognitive-deteriorat**[tiab] OR cognitive-disabilit*[tiab] OR cognitive-dysfunction*[tiab] OR cognitive-disfunction*[tiab] OR cognitive-impaired[tiab] OR cognitive-impairment*[tiab] OR cognitive-interference*[tiab] OR neurocognitive-disorder*[tiab] OR neurocognitive-defect*[tiab] OR neurocognitive-deficit*[tiab] OR neurocognitive-decline*[tiab] OR neurocognitive-deteriorat**[tiab] OR neurocognitive-disabilit*[tiab] OR neurocognitive-dysfunction*[tiab] OR neurocognitive-

impairment*[tiab] OR frontotemporal-disorder*[tiab] OR frontotemporal-defect*[tiab] OR frontotemporal-dysfunction*[tiab] OR frontotemporal-impairment*[tiab] OR impaired-cognit*[tiab] OR impaired-neurocogn*[tiab])) AND (((mental*[Title/Abstract] OR cognitive*[Title/Abstract] OR cognition*[Title/Abstract] OR orientation*[Title/Abstract] OR agitation*[Title/Abstract] OR memory*[Title/Abstract] OR concentration*[Title/Abstract] OR dementia*[Title/Abstract] OR mini-cog*[Title/Abstract] OR mini-mental*[Title/Abstract] OR neurocognit*[Title/Abstract]) AND (assess*[Title/Abstract] OR test*[Title/Abstract] OR eval*[Title/Abstract] OR screen*[Title/Abstract] OR question*[Title/Abstract] OR exam*[Title/Abstract] OR scale*[Title/Abstract] OR calculator*[Title/Abstract])) OR (Montreal cognitive assessment[Title/Abstract] OR MOCA[Title/Abstract] OR Mini-Mental Status Examination[Title/Abstract] OR MMSE[Title/Abstract] OR Saint Louis University Mental Status[Title/Abstract] OR SLUMS[Title/Abstract] OR "AD8"[Title/Abstract] OR Quick Dementia Rating System [Title/Abstract] OR QDR[Title/Abstract]))) AND (pragmati*[Title/Abstract] OR practical*[Title/Abstract] OR feasibilit*[Title/Abstract] OR usabilit*[Title/Abstract] OR acceptabilit*[Title/Abstract] OR acceptance*[Title/Abstract] OR ease-of-use[Title/Abstract] OR organization*[Title/Abstract] OR organisation*[Title/Abstract] OR administration*[Title/Abstract] OR method*[Title/Abstract] OR standard*[Title/Abstract] OR instrument* [Title/Abstract] OR tool*[Title/Abstract] OR education*[Title/Abstract] OR training*[Title/Abstract] OR learn*[Title/Abstract] OR simulation*[Title/Abstract] OR time*[Title/Abstract] OR timing*[Title/Abstract] OR automated*[Title/Abstract] OR automation*[Title/Abstract])) NOT ((((emergency-care*[tiab] OR emergency-treatment*[tiab] OR emergency-service*[tiab] OR emergency-dispatch*[tiab] OR emergency-department*[tiab] OR emergency-unit*[tiab] OR emergency-ward*[tiab] OR emergency-room*[tiab] OR emergency-center*[tiab] OR emergency-centre*[tiab] OR emergency-system*[tiab] OR emergency-personnel[tiab] OR emergency-physician*[tiab] OR emergency-provider*[tiab] OR emergency-doctor*[tiab] OR emergency-nurs*[tiab] OR emergency-patient*[tiab] OR emergency-admission*[tiab] OR emergency-admit*[tiab] OR trauma-care*[tiab] OR trauma-treatment*[tiab] OR trauma-service*[tiab] OR trauma-dispatch*[tiab] OR trauma-department*[tiab] OR trauma-unit*[tiab] OR trauma-ward*[tiab] OR trauma-room*[tiab] OR trauma-center*[tiab] OR trauma-centre*[tiab] OR trauma-system*[tiab] OR trauma-service*[tiab] OR trauma-personnel[tiab] OR trauma-physician*[tiab] OR trauma-provider*[tiab] OR trauma-doctor*[tiab] OR trauma-nurs*[tiab] OR trauma-patient*[tiab] OR emergicenter[tiab] OR unscheduled-acute-care[tiab] OR ED-care[tiab] OR ED-visit*[tiab] OR ED-stay*[tiab] OR ED-admit*[tiab] OR ED-admission*[tiab] OR ED-evaluation*[tiab] OR ED-assess*[tiab] OR ER-care[tiab] OR ER-visit*[tiab] OR ER-stay*[tiab] OR ER-admission*[tiab] OR ER-evaluation*[tiab] OR ER-assess*[tiab] OR EMS-care[tiab] OR EMS-evaluation*[tiab] OR EMS-assess*[tiab]) AND (dementia*[tiab] OR amentia*[tiab] OR demention*[tiab] OR CADASIL[tiab] OR Alzheimer*[tiab] OR Creutzfeldt-Jakob[tiab] OR Huntington*[tiab] OR Lewy-Bod*[tiab] OR cognitive-disorder*[tiab] OR cognitive-defect*[tiab] OR cognitive-deficit*[tiab] OR cognitive-decline*[tiab] OR cognitive-deteriorat**[tiab] OR cognitive-disabilit*[tiab] OR cognitive-dysfunction*[tiab] OR cognitive-disfunction*[tiab] OR cognitive-impaired[tiab] OR cognitive-impairment*[tiab] OR cognitive-interference*[tiab] OR neurocognitive-disorder*[tiab] OR neurocognitive-defect*[tiab] OR neurocognitive-deficit*[tiab] OR neurocognitive-decline*[tiab] OR neurocognitive-deteriorat**[tiab] OR neurocognitive-disabilit*[tiab] OR neurocognitive-dysfunction*[tiab] OR neurocognitive-impairment*[tiab] OR frontotemporal-disorder*[tiab] OR frontotemporal-defect*[tiab] OR frontotemporal-dysfunction*[tiab] OR frontotemporal-impairment*[tiab] OR impaired-cognit*[tiab] OR impaired-neurocogn*[tiab])) AND (((mental*[Title/Abstract] OR cognitive*[Title/Abstract] OR cognition*[Title/Abstract] OR orientation*[Title/Abstract] OR agitation*[Title/Abstract] OR memory*[Title/Abstract] OR concentration*[Title/Abstract] OR dementia*[Title/Abstract] OR mini-cog*[Title/Abstract] OR mini-mental*[Title/Abstract] OR neurocognit*[Title/Abstract]) AND (assess*[Title/Abstract] OR test*[Title/Abstract] OR eval*[Title/Abstract] OR screen*[Title/Abstract] OR question*[Title/Abstract] OR exam*[Title/Abstract] OR scale*[Title/Abstract] OR calculator*[Title/Abstract])) OR (Montreal cognitive assessment[Title/Abstract] OR MOCA[Title/Abstract] OR Mini-Mental Status Examination[Title/Abstract] OR MMSE[Title/Abstract] OR Saint Louis University Mental Status[Title/Abstract] OR SLUMS[Title/Abstract] OR "AD8"[Title/Abstract] OR Quick Dementia Rating System[Title/Abstract] OR QDR[Title/Abstract]))) AND (pragmati*[Title/Abstract] OR practical*[Title/Abstract] OR feasibilit*[Title/Abstract] OR usabilit*[Title/Abstract] OR acceptabilit*[Title/Abstract] OR acceptance*[Title/Abstract] OR ease-of-use[Title/Abstract] OR organization*[Title/Abstract] OR organisation*[Title/Abstract] OR administration*[Title/Abstract] OR method*[Title/Abstract] OR standard*[Title/Abstract] OR instrument* [Title/Abstract] OR tool*[Title/Abstract] OR education*[Title/Abstract] OR training*[Title/Abstract] OR learn*[Title/Abstract] OR simulation*[Title/Abstract] OR time*[Title/Abstract] OR timing*[Title/Abstract] OR automated*[Title/Abstract] OR automation*[Title/Abstract]) AND (medline[Filter]))

Cochrane CENTRAL (trials)

ID Search Hits

#1 (emergicenter* or Triage* or unscheduled-acute-care):ti,ab,kw 1755

#2 ((ED or EMS or ER) near/1 (care* OR visit* or stay* or admit* or admission* or evaluation* OR assess*)):ti,ab,kw 1914

#3 ((trauma) near/1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*)):ti,ab,kw 1400

#4 ((Emergency or emergencies) near/2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel or physician* or provider* or doctor* or nurs* or patient*)):ti,ab,kw 19318

#5 #1 OR #2 OR #3 OR #4 21387

#6 (dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or Huntington* or Lewy-Bod*):ti,ab,kw 20470

#7 ((cognit* or neurocognit* or frontotemporal) near/2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*)):ti,ab,kw 20493

#8 #6 OR #7 35214

#9 (mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) NEAR/3

(assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*):ti,ab,kw 35794

#10 (Montreal cognitive assessment OR MOCA OR Mini-Mental Status Examination OR MMSE OR Saint Louis University Mental Status OR SLUMS OR AD8 OR Quick Dementia Rating System OR QDR):ti,ab,kw 6749

#11 #9 OR #10 37101

#12 #5 AND #8 AND #11 106

#13 (accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or true-negative* or concept* or theoretical*):ti,ab,kw 752666

#14 #12 AND #13 76

#15 (pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance* or ease-of-use or organization* or organisation* or administration* or method* or standard* or instrument* or tool* or education* or training* or learn* or simulation* or time* or timing* or automated* or automation*):ti,ab,kw 1215948

#16 #12 AND #15 101
#17 MeSH descriptor: [Infant] explode all trees 32413
#18 MeSH descriptor: [Child] explode all trees 56688
#19 MeSH descriptor: [Adolescent] explode all trees 104818
#20 #17 or #18 or #19 149861
#21 MeSH descriptor: [Adult] explode all trees 467867
#22 #20 NOT #21 58997
#23 #14 NOT #22 in Trials 75
#24 #16 NOT #22 in Trials 100
CINAHL Complete
S1 MH "Emergency Medical Services+" Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 107,911
S2 MH "Emergency Medicine" Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 12,809
S3 MH "Physicians, Emergency" Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 4,445
S4 MH "Emergency Nurse Practitioners" Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 662
S5 MH "Emergency Nursing+" Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 15,518
S6 MH "Emergency Patients" Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 8,329
S7 TI (emergicenter* or Triage* or unscheduled-acute-care) OR AB (emergicenter* or Triage* or unscheduled-acute-care) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 11,300
S8 TI ((“ED” or “EMS” or “ER”) N1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*)) OR AB ((“ED” or “EMS” or “ER”) N1 (care* or visit* or stay* or admit* or admission* or evaluation* or assess*)) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 9,224
S9 TI (trauma N1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*)) OR AB (trauma N1 (care* or support* or center* or centre* or department* or unit* or room* or ward* or service*)) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 14,368
S10 TI ((Emergency or emergencies) N2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*)) OR AB ((Emergency or emergencies) N2 (admit* or admission* or care* or treatment* or service* or dispatch* or department* or unit* or ward* or room* or center* or centre* or system* or personnel* or physician* or provider* or doctor* or nurs* or patient*)) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 95,158
S11 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 185,675
S12 (MH “Dementia+”) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 76,007
S13 TI (dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or Huntington* or Lewy-Bod*) OR AB (dementia* or amentia* or demention* or CADASIL or Alzheimer* or Creutzfeldt-Jakob or Huntington* or Lewy-Bod*) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 81,565
S14 (MH "Cognition Disorders") OR (MH "Mild Cognitive Impairment") Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 31,167
S15 TI ((cognit* or neurocognit* or frontotemporal) N2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*)) OR AB ((cognit* or neurocognit* or frontotemporal) N2 (disorder* or defect* or deficit* or decline* or deteriorat* or disabilit* or dysfunction* or disfunction* or impaired or impairment* or interference*)) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 48,748
S16 S12 OR S13 OR S14 OR S15 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 141,321
S17 (MH "Clinical Assessment Tools") Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search

Database - CINAHL Complete 169,223

S18 (MH "Mental Status/EV") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 615

S19 (MH "Diagnostic Tests, Routine") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 4,591

S20 (MH "Geriatric Assessment+") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 17,266

S21 (MH "Neuropsychological Tests+") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 36,416

S22 TI ((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) N3 (assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*)) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 9,268

S23 AB ((mental* or cognitive* or cognition* or orientation* or agitation* or memory* or concentration* or dementia* or mini-cog* or mini-mental* or neurocognit*) N3 (assess* or test* or eval* or screen* or question* or exam* or scale* or calculator*)) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 61,663

S24 TI (Montreal cognitive assessment OR MOCA OR Mini-Mental Status Examination OR MMSE OR Saint Louis University Mental Status OR SLUMS OR "AD8" OR Quick Dementia Rating System OR QDR) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 865

S25 AB (Montreal cognitive assessment OR MOCA OR Mini-Mental Status Examination OR MMSE OR Saint Louis University Mental Status OR SLUMS OR "AD8" OR Quick Dementia Rating System OR QDR) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 6,756

S26 S17 OR S18 OR S19 OR S20 OR S22 OR S23 OR S24 OR S25 Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search.

Database - CINAHL Complete 247,110

S27 S11 AND S16 AND S26 Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 440

S28 (MH "Reliability and Validity+") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 258,799

S29 TI (accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or true-negative* or concept* or theoretical*) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 326,037

S30 AB (accurac* or accurate* or reproducib* or specificit* or sensitivity* or likelihood* or like-lihood* or statistic* or analysis* or analyses* or analyze* or mathematic* or calculation* or ratio* or probabilit* or estimat* or false-positive* or false-negative* or true-positive* or true-negative* or concept* or theoretical*) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 1,596,933

S31 S29 OR S30 Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 1,735,631

S32 MH "Task Performance and Analysis+") OR (MH "Time Management") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 22,887

S33 (MH "Time+") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 197,095

S34 (MH "Education+") Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 951,735

S35 TI ((pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance* or ease-of-use or organization* or organisation* or administration* or method* or standard* or instrument* or tool* or education* or training* or learn* or simulation* or time* or timing* or automated* or automation*) Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CINAHL Complete 578,579

S36 AB ((pragmati* or practical* or feasibilit* or usabilit* or acceptabilit* or acceptance* or ease-of-use or organization* or organisation* or administration* or method* or standard* or instrument*

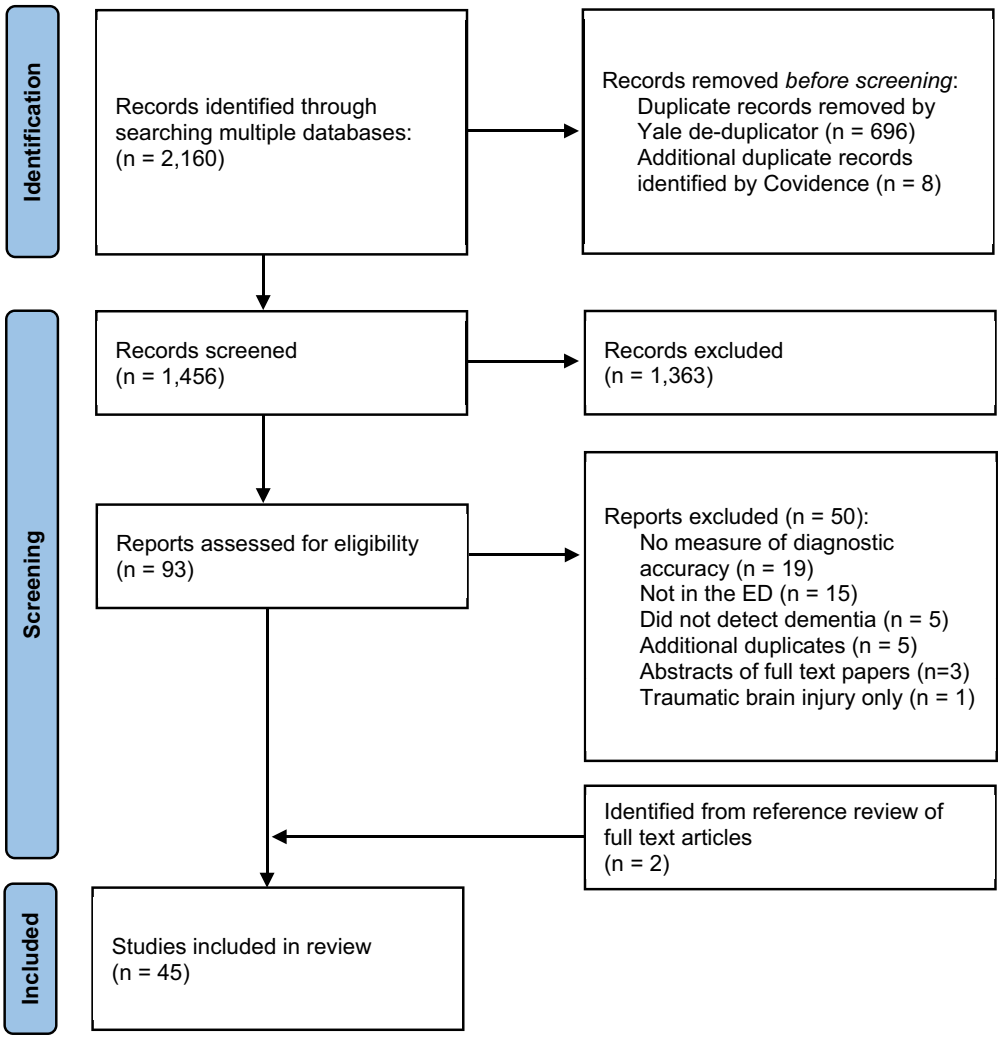
or tool* or education* or training* or learn* or simulation* or time* or timing* or automated* or automation*) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 2,116,284
S37 S32 OR S33 OR S34 OR S35 OR S36 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 2,991,525
S38 S27 AND S31 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 244
S39 NOT ((MH "Child+") or (MH "Adolescence")) NOT (MH "Adult+") Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 623,765
S40 S38 NOT S39 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 239
S41 S27 AND S37 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 330
S42 NOT ((MH "Child+") or (MH "Adolescence")) NOT (MH "Adult+") Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 623,765
S43 S41 NOT S42 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Complete 323
DEDUPLICATION

PICO 1

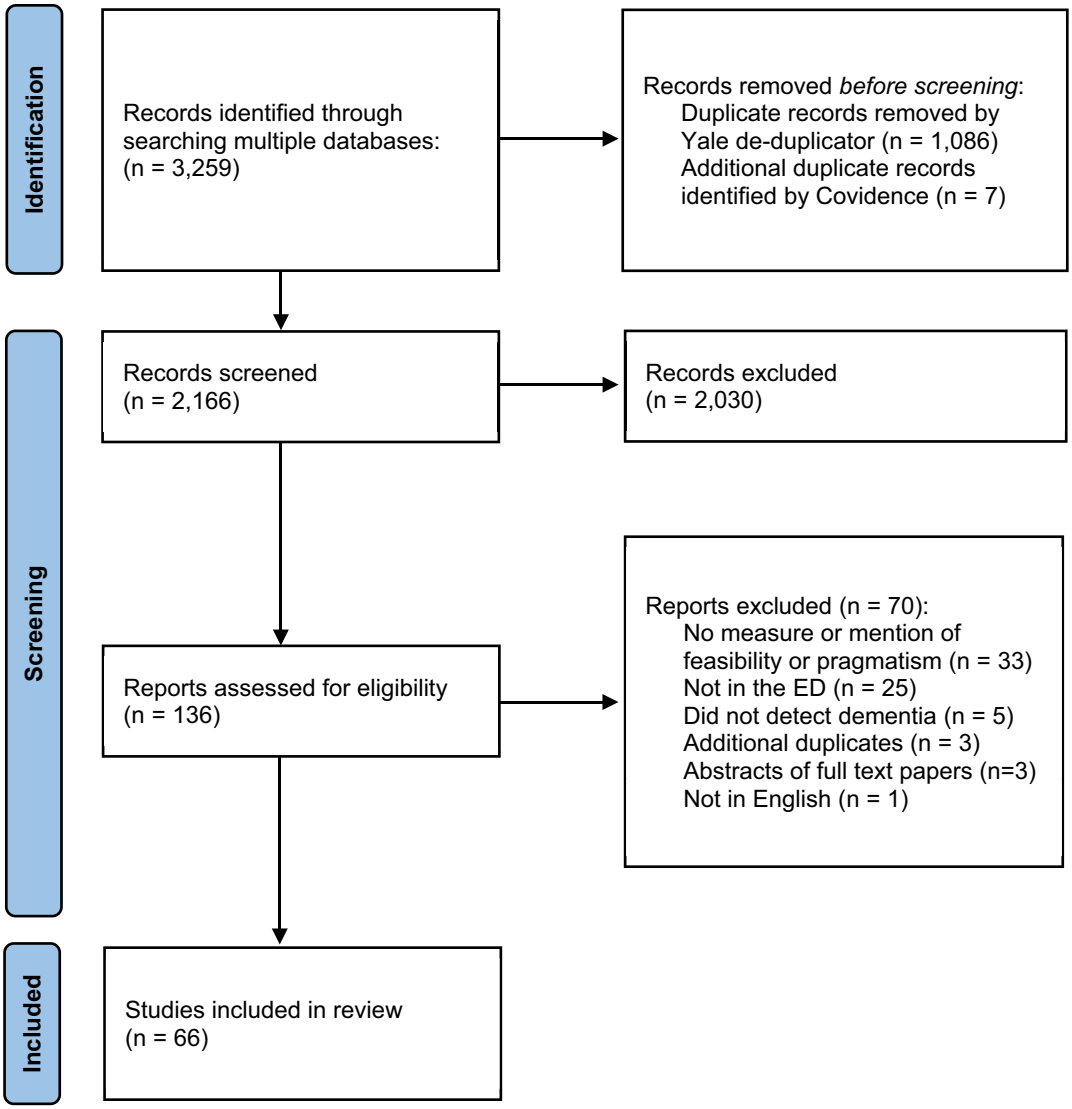
Summary:
RIS data file: PICO 1_GEAR2.txt (2160 references)
Total references considered: 2160
Sensitivity level: medium
Total references removed: 696
Remaining references: 1464
Duration: 27 seconds (Uploading: 19 seconds|Processing: 8 seconds)
Start time: March 25, 2021, 1651-0400 h
Code version: 1e70a5 (January 25, 2021)

PICO 2

Summary:
RIS data file: PICO 2_GEAR2.txt (3259 references)
Total references considered: 3259
Sensitivity level: medium
Total references removed: 1086
Remaining references: 2173
Duration: 40 seconds (Uploading: 28 seconds|Processing: 12 seconds)
Start time: March 25, 2021, 1658-0400 h
Code version: 1e70a5 (January 25, 2021)



Supplementary Fig. 1. PRISMA-ScR flow diagram PICO 1.



Supplementary Fig. 2. PRISMA-ScR flow diagram PICO 2.

Supplementary Table 1
PICO 1 Abstraction Table

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Hirschman*, 2011, Hospital of the University of Pennsylvania, PA, USA; ED; September 2007 and May 2008	N = 829; 65 y or older; mean age 75.7 ± 7.1 y (65-105)	Spoke English, were 65 y or older, lived within a 30-mile radius of the ED in the state of Pennsylvania, and lived independently (ie, not in a nursing home)	End-stage disease with prognosis of 6 mo or less, cancer diagnosis with active treatment, known alcohol or drug abuse, history of neurologic disease (eg, cerebral vascular accident with residual effects, multiple sclerosis, etc), a previous medical history of dementia or delirium, or resided in a nursing home	A cross-sectional, observational study of older adults admitted to the ED of a large, urban, tertiary academic health center was conducted to identify rates of impairment among older adults; and identify relationships, if any, between ED environmental factors and presence of cognitive impairment	Six-Item Screen (SIS) and clock-drawing task (CLOX1)	N/A	No measure of diagnostic accuracy but identified factors associated with positive cognitive screen tests: Patients were more likely to screen positive for cognitive impairment using the SIS if they were 85 y or older (RR 1.63, $P < .001$), Black (RR 1.85, $P < .001$), and male (RR 1.42, $P < .001$). Interestingly, only age was significantly associated with screening positive for cognitive impairment in the ED using the CLOX1 (75-84 y: RR 1.35, $P < .001$; ≥85 y: RR 1.69, $P < .001$)
Carpenter*, 2008							Clinicians should select one population-appropriate primary screening tool and consider others for specific situations. For example, if one has very little time available, the Clock Drawing Test may be the most useful screening tool, whereas the Hopkins Verbal Learning Test may be superior in mildly impaired or highly educated patients. The MMSE has been evaluated most extensively, but current copyright restrictions limit its use, and diagnostic inaccuracy is a problem in relationship to educational levels. High-functioning, educated populations can be tested with instruments demonstrating less ceiling effect, but so far these tools are more time consuming.
Turner, 2012, Washington University in St Louis, St Louis, MO, USA; ED; time frame not specified	N = 170; mean age 74 y; 79% had cognitive impairment by MoCA	English-speaking community-dwelling patients aged ≥65 y		Randomized, single-center, cross sectional, consecutive sampling trial	Brief Alzheimer's Screen (BAS), Short Blessed Test (SBT), caregiver-AD8 (cAD8)	MoCA	BAS: sensitivity 61%, specificity 83%, LR+ 3.6, LR− 0.47, AUC 0.797 cAD8: sensitivity 54%, specificity 78%, LR+ 2.4, LR− 0.59, AUC 0.590 SBT: sensitivity 47%, specificity 89%, LR+ 4.1, LR− 0.60, AUC 0.746
Heidt, 2009, Washington University in St Louis, St Louis, MO, USA; ED; time frame not specified but was done in 5 mo	N = 251; mean age 76 y; 53% had cognitive impairment (MMSE score ≤23)	English-speaking patients over age 65 y who had not received potentially sedating medications including anti-emetics, sedative-hypnotics, or narcotic-analgesia prior to criterion standard testing.		Prospective, cross-sectional convenience sampling	PMH, emergency physician note, nurse note, inpatient physician note documentation of cognitive impairment	MMSE	Did not document cognitive impairment in patients with abnormal MMSE: PMH: 86%, emergency physician: 72%, emergency nurse: 84%, inpatient physician: 60%

(*continued on next page*)

Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Eagles*, 2014, Civic Campus of the Ottawa Hospital; ED; June 17 −August 16, 2013	N = 260; age ≥ 75 y; mean age 83.7 (5.9) y; 38.4% had altered mental status	75 y or older who presented to the ED Monday to Friday between 0800 and 1600 h.	(1) Patients who have been previously enrolled on a prior visit within 30 d; (2) patients with known history of cognitive impairment or obviously altered or delirious; (3) patients with communication barriers, including non-English or French speaking, auditory, verbal, or visual impairment severe enough to affect cognitive testing; patients who have a decreased level of consciousness such that they are not able to respond to verbal questioning; (4) patients triaged as Canadian Triage and Acuity Scale level 1 or judged by their attending ED nurse or physician to be too critically ill; and (5) patients from long-term care/nursing homes and transfers from other hospitals.	Monday to Friday between 0800 and 1600 h	O3DY	Folstein Mini-Mental State Exam	O3DY by nurses had a sensitivity of 84.6% (95% CI 64.3-95.0) and specificity of 54.2% (95% CI 39.3-68.3). O3DY by physicians had a sensitivity of 78.9% (95% CI 53.9-93.0) and specificity of 39.4% (95% CI 23.4-57.8)
Carpenter, 2010, urban medical center; ED; 2 mo	N = 111; age > 65 y; mean age 77 y; 35% had cognitive impairment based on MMSE score	English-speaking patients aged ≥65 y who had not received potentially sedating medications		Cross-sectional convenience sampling	Caregiver-administered AD8, BAS, SBT, and the O3DYO3DY	MMSE score ≤24	BAS: sensitivity 100%, specificity 53%, and AUC 0.945 (95% CI 0.905-0.985) SBT: sensitivity 95%, specificity 68%, and AUC 0.890 (95% CI 0.816-0.964) O3DY: sensitivity 95% and specificity 51% Caregiver AD8: sensitivity 87%, specificity 67%, and AUC 0.825 (95% CI 0.733-0.917)
Rodriguez-Molinero, 2010, 4 tertiary university teaching hospitals; ED; July through November 2003	N = 101; undefined mean age or age criteria			Cross-sectional; older adult patients selected at random	(1) Physician recognition of cognitive impairment, (2) cognitive data shown in the patient's medical records	S-IQCODE (Short Form of the Informant Questionnaire on Cognitive Decline in the Elderly)	1. Concordance between the physicians' impression on the presence of cognitive impairment, and the S-IQCODE obtained from family member-carer was 0.26 (95% CI 0.06-0.45). 2. Concordance between information on cognitive decline from medical records and the results of the S-IQCODE was 0.47 (95% CI 0.05-0.88)

Huff*, 2001, University of Virginia; ED; 7 wk	N = 444; age > 55 y; no mean age reported; % cognitive impairment not reported; care partners not reported	Aged ≥55 y	Head trauma or multisystem trauma, inability to speak English, educational level of ≤7 y, acute medical illness, or contact or droplet isolation, patients that the research assistants felt might be harmed by mental distress or other discomfort by test administration	Prospective comparison of the QCS and the MMSE in a convenience sample; 16 h per day for a total of roughly 80 h per week for a 7-wk period	QCS	MMSE score	QCS scores were significantly correlated ($r = 0.783$) with MMSE scores
Gerson*, 1994, Community teaching hospital; ED; 3 mo (March 1, 1991–May 31, 1992)	N = 547; age > 65 y; mean age 76.7 y (±7.7 SD); 33.5% had cognitive impairment based on OMCT		Refusal to participate, physical condition prevented participation, known dementia, unable to communicate in English	ED social worker enrolled 7 AM to 3 PM Monday to Friday. Medical students enrolled in 3 different blocks: evenings 3 PM–7 PM, weekend days 7 AM –3 PM, nights 11 PM–7 AM. Five shifts per week were randomly selected in a 3:2:1 ratio to approximate patient flow and medical student availability.	Logistic regression model to predict cognitive impairment	6-item OMCT	Predictors of cognitive impairment were age >80 y (adjusted OR 3.68, 95% CI 2.21-6.14) and living in nursing home (adjusted OR 13.8, 95% CI 3.79-50.2)
Zaffarana, 2013, Florence, Italy; ED; January 1, 2010, to December 31, 2010	N = 169; age > 75 y; mean age 83 ± 5.3 y; 18.9% had dementia		Subjects triaged as very low severity ("white" code) or with communication disorders	Retrospective analysis		Reported by a patient's kin or when specific indication and/or therapy were recorded in medical chart	
Gagne, 2018, CHU de Quebec –Hôpital de l'Enfant-Jésus (Quebec City), the CHU de Quebec –CHUL (Quebec City), the Hôpital de Trois-Rivières (Trois-Rivières), and the Centre Hospitalier de Lanaudière (Lanaudière); ED; 6-8 wk at each participating center (between February and May 2016)	N = 320; age > 65 y; mean age 76.8 (7.4) y	Patients aged ≥65 y who were independent or semiindependent (able to perform at least 5 activities of daily living), had an 8-h exposure to the ED environment from the time of registration (because of the high frequency of delirium with prolonged periods of stay in the ED), and were admitted (or waiting to be admitted) to a hospital ward	Lived in a nursing home or long-term care facility, had an unstable medical state that could lead to intensive care, could not communicate in French, or were unable to provide consent. Finally, patients with a history of a psychiatric disorder were also excluded.	Prospective comparison of 4AT-F and TICS-m	French version of the 4 A's Test (4AT-F)	Telephone Interview for Cognitive Status (TICS-m)	Sensitivity 49% (34, 64). specificity 87% (82, 92), PPV 48% (33, 63), NPV 88% (74, 85), positive LR 3.77, negative LR 0.59
Marlow, 2010, Data from National Hospital Ambulatory Medical Care Survey (NHAMCS); ED; 2005-2006	None reported				Orientation to person, place, and time	Patient self-reported reason for visit	Sensitivity: 50.15% (SE = 4.27)

(*continued on next page*)

Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Carpenter, 2010, Washington University in St Louis; ED	N = 105; age > 65 y; mean age 77 y; 31% with cognitive impairment; N/A for care partners	Adults aged ≥65 y		Convenience sampling	MMSE administered at home after 3 wk follow-up	MMSE score <24 in ED	Cognitive dysfunction (MMSE < 24) was present in 31% in the ED, including 5% with delirium. At follow-up, 26% had cognitive dysfunction and none had delirium.
Dziedzic*, 1998, University of Virginia School of Medicine, Charlottesville, VA; ED; 2½ wk	N = 31; age ≥ 65 y; mean/median age not reported; 61% cognitive impairment; N/A for care partners	65 y or older, absence of recent head or multisystem trauma; able to speak English as a primary language; not be acutely experiencing alcohol or substance intoxication; score of 15 on the Glasgow Coma Scale; and educational level equivalent to 9 y or more		Patient sample was collected in a time period of 2½ wk, during shifts randomly distributed among 3 attending emergency medicine physicians. Shifts during daytime hours were maximized.	Physician perception of cognitive impairment	MMSE score	MMSE findings agreed with the treating physicians' assessments in 21 (67%) cases
Shah, 2009, Monroe County, NY; EMS and ED; June-December 2007	N = 187; age ≥ 60 y; mean age 75.6 ± 9.2 y; 8.6% had a medical history of dementia	Community-dwelling patients aged ≥60 y who requested emergency assistance	Did not speak English or refused transport	Cross-sectional	EMS SIS	ED Mini-Cog, ED CLOX1, ED CLOX2	Compared to Mini-Cog: sensitivity 29% (20%-39%), specificity 96% (88%-99%) Compared to CLOX1: sensitivity 21% (13%-31%), specificity 93% (82%-98%) Compared to CLOX2: sensitivity 23% (14%-35%), specificity 92% (83%-97%)
Schofield, 2010, Glasgow, UK; accident and emergency (A&E); February-August 2007	N = 601; age ≥ 65 y; mean age 77 y; 37.6% with cognitive impairment (MMSE score ≤23); N/A for care partners	Adults aged ≥ 65 y	Verbal communication categorized as none, or sounds only according to the Glasgow Coma Scale, learning disability, severe hearing disability, unable to speak English and lack of interpreter	Convenience sampling, focusing on periods of high attendance by older patients	AMT10 (different cutoffs), AMT4 (different cutoffs), receiving nurse's judgment	MMSE score ≤24	Nurse's judgment: sensitivity 50.5% (44%-57%), specificity 98.6% (96%-100%), PPV 97% (92%-99%), NPV 69% (65%-73%) AMT4 cutoff 3/4: sensitivity 80% (75-85), specificity 88% (84-91), PPV 84% (78%-88%), NPV 85% (81%-89%) AMT10 cutoff 7/10: sensitivity 76% (69%-81%), specificity 93% (90%-96%), PPV 90% (84%-93%), NPV 83% (79%-87%)
Carpenter*, 2011, Barnes Jewish Hospital, St Louis, MO; ED; July 1, 2008–April 20, 2009	N = 319; age ≥65 y; mean age 76 y; 35.4% (31%-41%)	All ED patients aged ≥65 y	Patients who received medications that may have affected their mental status during the testing period (narcotics, benzodiazepines, antiemetics), were too critically ill to participate, as judged by the attending emergency physician, were unable to consent or cooperate with data acquisition, did not speak English, or refused to complete the questioning	Prospective, cross-sectional, convenience sampling. Enrollment occurred weekdays and weekends during equally distributed day, evening, and overnight shifts	SIS, AD8 (caregiver and patient), combined SIS and caregiver AD8 (cAD8; abnormal SIS or abnormal cAD8 result)	Mini-Mental State Examination score ≤24	SIS: sensitivity 74% (68%-80%), specificity 77% (74%-80%), positive LR 3.3 (2.5-4.1), negative LR 0.33 (0.25-0.44), AUC 0.83 (0.78-0.87) cAD8: sensitivity 63% (53%-72%), specificity 79% (73%-85%), positive LR 3.0 (1.9-4.6), negative LR 0.44 (0.31-0.62), AUC 0.74 (0.65-0.81) pAD8: sensitivity 37% (28%-46%), specificity 82% (77%-86%), positive LR 2.0 (1.1-3.3), negative LR 0.77 (0.63-0.93), AUC 0.67 (0.60-0.74) SIS or cAD8: sensitivity 89% (80%-95%), specificity 70% (63%-73%), positive LR 3.0 (2.3-3.6), negative LR 0.16 (0.07-0.30)

Carpenter*, 2011, Barnes Jewish Hospital, St Louis, MO; ED; June 10, 2009–March 9, 2010	N = 169; age ≥65 y; mean age 78 ± 8 y; 37% (29%-45%); n = 91 (56%) had care partners available	All ED patients aged ≥65 y	Patients receiving mental status–altering medications (antiemetics, benzodiazepines, or narcotics) prior to or during the testing period, emergency physician judgment of critical illness precluding informed consent or safe data collection, subject inability to consent or comply with data acquisition, non-English speaking, or refusal to complete the questioning	Prospective, cross-sectional, convenience sampling	O3DY, BAS, SBT, and cAD8	MMSE score ≤23	SBT: sensitivity 95% (88%-98%), specificity 65% (61%-67%), positive LR 2.7 (2.2-3.0), negative LR 0.08 (0.03-0.2), AUC 0.930 (0.862-0.971) BAS: sensitivity 95% (88%-98%), specificity 52% (48%-54%), positive LR 2.0 (1.7-2.2), negative LR 0.10 (0.03-0.3), AUC 0.934 (0.867-0.974) O3DY: sensitivity 95% (85%-99%), specificity 51% (46%-53%), positive LR 2.0 (1.6-2.1), negative LR 0.10 (0.03-0.3) cAD8: sensitivity 83% (71%-91%), specificity 63% (55%-68%), positive LR 2.2 (1.6-2.8), negative LR 0.27 (0.1-0.5), AUC 0.816 (0.727-0.886) SBT or cAD8: sensitivity 91% (81%-97%), specificity 27% (20%-30%), positive LR 1.2 (1.0-1.4), negative LR 0.32 (0.1-0.9) BAS or cAD8: sensitivity 97% (90%-99%), specificity 11% (6%-12%), positive LR 1.1 (0.9-1.1), negative LR 0.27 (0.04-1.6) O3DY or cAD8: sensitivity 100%, specificity 0%

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Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Huang, 2020, Taipei Veterans General Hospital, Taiwan; ED; August 2018 to February 2019	N = 106; age ≥ 75 y; mean age 87.3 ± 5.2 y; 58.5%	Admission in the observation room of the ED, age of ≥75 y, and willingness to provide written informed consent	(1) Unstable clinical conditions, eg, using high-flow oxygen supplement, inotropic agents with pump, or emergent diseases, eg, acute myocardial infarction, cerebrovascular accident, surgical indication, sepsis; (2) diagnosed with malignant tumors within 3 y who were not in a stable disease state, including the need to receive tumor-related treatment or to receive unacceptable conditions for palliative care; (3) with autoimmune diseases who were not in a stable disease state requiring immunosuppressive agents to reach therapeutic targets; (4) unable to cooperate with blood evaluation or routine physiology test (eg, old stroke with bed-ridden status, aphasia, confusion, or unconsciousness, hemiplegia); (5) unwilling to participate in the trial; (6) unwilling to provide informed consent; (7) unable to cooperate with long-term follow-up assessment; and (8) subjects who had been enrolled in this study	Prospective, cross-sectional	Demographics, handgrip strength, and blood markers as predictors of cognitive impairment	Chinese MMSE score <23	The independent predictor of cognitive impairment was handgrip strength (OR 0.86, 95% CI 0.80-0.94; $P < .001$) and age (OR 1.15, 95% CI 1.02-1.29; $P < .05$). TNF-α, IL-6, and visfantin were higher in the cognitive impairment group compared to controls, albumin was lower. IL-6 was higher in the dementia group compared with those in the cognitive impairment −no dementia group.

Calf*, 2021, various locations; ED; various time frames	Mean or median age of the study population included in the studies ranged from 75.4 to 81.9 y	Studies were considered eligible for review when they met the following criteria: Cohort study or case-control study Study population consisted of patients with a mean or median age ≥65 y, visiting an ED. The target condition was cognitive impairment irrespective of the etiology. The diagnosis was based on the *DSM* criteria (version III, IV, IV-R, V) made by a specialist in geriatric care. CAM and MMSE were accepted as a substitute gold standard because of their wide use in clinical practice. The index test was an instrument to assess cognition in the ED. The study provided sufficient data to construct a 2-by-2 table.	Studies conducted in a different environment than the ED	Systematic review and meta-analysis for diagnostic accuracy of tests detecting cognitive impairment (including delirium)	Ten different tests: 4AT, 6-CIT/SBT, AFT, AMT, AMT4, BAS, Mini-Cog, O3DY, SIS, cAD8	Eight studies used the MMSE as reference standard with cutoff values varying from ≤26 to <24 points, and 1 study used the *DSM* criteria for dementia.	O3DY: no. of studies: 3, no. of patients: 518, pooled sensitivity 0.90 (95% CI 0.71-0.97), pooled specificity 0.61 (95% CI 0.47-0.73) 6-CIT/SBT: no. of studies: 3, no. of patients: 685, pooled sensitivity 0.89 (95% CI 0.78-0.95), pooled specificity 0.67 (95% CI 0.56-0.77) cAD8: no. of studies: 2, no. of patients: 482, pooled sensitivity 0.75 (95% CI 0.52-0.89), pooled specificity 0.71 (95% CI 0.52-0.85) SIS: no. of studies: 3, no. of patients: 746, pooled sensitivity 0.72 (95% CI 0.59-0.82), pooled specificity 0.79 (95% CI 0.75-0.83)

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Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Barbic, 2018, Vancouver, Canada (not specifically mentioned); ED; June-November 2016	N = 117; age ≥ 75 y; median age 81.9 y (IQR 77-85); 12.0% (95% CI 6.1%-17.9%); N/A for caregiver	Aged ≥75 y and presented to the ED	Patients triaged as Canadian Emergency Department Triage and Acuity Scale level 1 (resuscitation); if their condition was deemed too critical for evaluation; patients requiring emergent ED administration of medications that might negatively affect their neurologic and/or executive function (eg, opioids, benzodiazepines); patients with significant communication barriers affecting evaluation (eg, visual, verbal, or auditory impairments); patients with overt hallucinations, agitation, or confusion; patients who did not speak English; patients from nursing homes or long-term care facilities; patients with a previous diagnosis of cognitive impairment (eg, patients with dementia); patients already enrolled in the study and patients unable to provide full, written, informed consent in English.	Prospective, cross-sectional, convenience sampling. Recruitment was Monday to Friday between 9 AM and 4 PM	O3DY and SBT	MMSE score ≤24	O3DY: Sensitivity: 71.4% (95% CI 47.8-95.1), specificity: 56.3% (46.7%-65.9%), AUC: 0.51 (95% CI 0.42-0.61), positive LR: 1.63 (1.10-2.43), negative LR: 0.51 (0.22-1.18). The O3DY and MMSE scores agreed in 58.1% of cases. SBT: sensitivity: 85.7% (67.4%-99.9%), specificity: 58.3% (48.7%-67.8%), AUC: 0.52 (95% CI 0.43-0.61), positive LR: 2.05 (1.50-2.81), negative LR: 0.25 (0.07-0.89). The SBT score agreed with the MMSE score in 61.5% of cases.
Roth, 2015, Pittsburgh, PA, USA; ED	N = 806; age ≥65 y; 58.2% with cognitive impairment	Aged ≥65 y and presented to the ED		Prospective observational study. Convenience sampling.	Multiple logistic regression model identifying factors predicting cognitive impairment.	SBT score ≥ 4	A model of age >85 y (AOR 2.04, 95% CI 1.22-3.13), Black race (AOR 1.8, 95% CI 1.3-2.5), less than high school education (AOR 2.1, 95% CI 1.6-2.9), any fall in past year (AOR 1.8, 95% CI 1.2-2.4), any potentially inappropriate medication (AOR 1.4, 95% CI 1.1-1.94) had moderate predictive accuracy for cognitive impairment (AUC = 0.66). A score of 2 would produce a sensitivity of 72.0%, specificity of 51.6%, positive LR of 1.49, negative LR of 0.54.

Eagles*, 2020, Ottawa, Canada; ED; June-August 2013	N = 260; age ≥75 y; mean age 83.7 y	Aged ≥75 y and presented to the ED	Patients who had a known history of cognitive impairment or were obviously cognitively impaired; were non −English- or French-speaking patients; had auditory, verbal, or visual impairments severe enough to affect cognitive testing; were critically ill; resided in a long-term care home or were transferred from other hospitals.	Prospective cohort. Monday to Friday between 0800 and 1600 h	O3DY	MMSE score <25	When completed by nurses: (WORLD reversal) Agreement O3DY score and MMSE = 64.9% Sensitivity: 84.6% (95% CI 64.3-95.0) Specificity (95% CI): 54.2% (95% CI 39.3-68.4) When completed by nurses: (Serial 7s) Agreement O3DY score and MMSE = 67.7%. Sensitivity: 81.5% (95% CI 61.3-93.0). Specificity: 57.1% (95% CI 39.5-73.2). When completed by physicians: (WORLD reversal) Agreement O3DY score and MMSE = 53.8% Sensitivity: 78.9% (95% CI 53.9-93.0) Specificity: 39.4% (95% CI 23.4-57.8) When completed by physicians: (Serial 7s) Agreement O3DY score and MMSE = 51.2%. Sensitivity: 70.0% (95% CI 45.7-87.2). Specificity: 34.8% (95% CI 17.2-57.1).
Wilber, 2005, Akron, OH, USA; ED; fall of 2003	N = 150; age ≥ 65 y; mean age 75 (±7) y; 23% with cognitive impairment	All patients aged ≥65 y who were able to communicate in English	Unable or unwilling to perform testing, those who were medically unstable, and those who received medications during the study that could affect their mental status	Prospective, randomized, cross-sectional study. Convenience sampling	SIS, Mini-Cog	MMSE score ≤23	SIS: sensitivity 94% (95% CI 73-100), specificity 86% (95% CI 74-94), PPV 68% (95% CI 46-85), NPV 98% (95% CI 89-100), AUC 0.96 (95% CI 0.92-1.0) Mini-Cog: sensitivity 75% (95% CI 48-93), specificity 85% (95% CI 73-93), PPV 57% (95% CI 34-78), NPV 93% (95% CI 82-98)
Stair*, 2007, Boston, MA, USA; ED; June 2002 −October 2003	N = 684 (666 completed both MMSE and QCS); age > 18 y; mean age 48 ± 18 y	Age >18 y, ability to speak English or Spanish, and ability to answer questions		Prospective study	QCS	MMSE score ≤23	Sensitivity 64%, specificity 85% For patients aged >55 y, the sensitivity was 64% and specificity 82%; for those with >8 y of education, the sensitivity was 59% and specificity 86%
Lague*, 2018, Quebec, Canada; ED; March-July 2015	N = 171; age ≥65 y; mean age 76.9 (8.3) y; 22% with cognitive impairment based on TICS-m ≤27	(1) Were aged ≥65 y; (2) were independent or semiindependent (can perform 5 of the 7 activities of daily living without any help); (3) spent ≥8 h in the ED; and (4) were admitted to any hospital ward.	(1) Were living in a long-term care facility; (2) were unable to consent; (3) were unable to communicate in French or English; (4) were experiencing an unstable medical condition leading to their admission to the intensive care unit (ICU); (5) had a previous diagnosis of severe dementia or any other psychiatric condition; or (6) had delirium during their 8-h ED stay.	Prospective observational cohort	Bergman-Paris Question (BPQ)	TICS-m score ≤27	Sensitivity 86.5% (95% CI 71.2-95.5), specificity 27.8% (95% CI 20.4-36.3), PPV 25.0% (95% CI 17.8-33.4), NPV 88.1% (95% CI 74.4-96.0), AUC 0.57 (95% CI 0.50-0.64), adjusted AUC for age and sex 0.71 (95% CI 0.62-0.80)

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Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Bedard*, 2017, Quebec, Canada; ED; February-May 2016	N = 313; age ≥65 y; mean age 76.8 (7.5) y; 27.2% with cognitive impairment, TICS-m score ≤27	(1) Age ≥ 65 y; (2) an ED length of stay ≥8 h; (3) awaiting admission to a care unit; and (4) independent or semiindependent for activities of daily living	(1) Had an unstable medical condition that could lead to intensive care; (2) inability to communicate in French; (3) unable to consent; (4) history of a severe psychiatric condition (eg, schizophrenia, severe depression, or bipolar disorder); and (5) were living in a nursing home or another long-term care center	Prospective study	O3DY-F (French) score < 4	TICS-m score <27	Sensitivity 76.2% (66.7%-84.8%), specificity 67.6% (61.0%-73.6%), PPV 46.7% (38.1%-55.4%), NPV 88.4% (82.6%-92.8%), positive LR 2.4, negative LR 0.4
Rodriguez-Molinero, 2010, Madrid, Spain; ED; July-November 2003	N = 98; age ≥ 65 y; mean age 81.7 ± 7.3 y; 48% positive on cognitive impairment with Pfeiffer test; 66% were women and mean age was 56.1 y (±12.6 y); 64.4% were children of patients, 18.8% were spouses, and 15.8% other family members; 1% of informants had no family relationship with the patients.	Patients older than 80 y, and patients between 65 and 79 y, provided that the latter had at least 2 comorbid chronic conditions	Those who had no available informant, who failed to sign the informed consent, who had no clinical history of emergencies, or whose physician failed to meet the criteria outlined below: Once a patient had been selected, one of the physicians declaring themselves responsible for the patient was required to participate. The highest ranking physician was selected, with those who had less than 1 year of experience or had already participated in the study in connection with another patient being excluded.	Cross-sectional; weekdays and weekends based on researcher availability	Physician perception of cognitive impairment	IQCODE	Concordance (κ) between IQCODE obtained from the relatives and physicians' perceptions of cognitive impairment was 0.26 (95% CI 0.06-0.45; power of the comparison, 95%)

Schnitker*, 2015, Australia; ED; May 2012-February 2013	N = 580; age ≥ 70 y; mean age 80.3 ± 6.7 y	All ED patients aged ≥70 y	Patients who (1) stayed >2 h in ED before the research nurse was available to approach them; (2) were severely ill, which prevented consent; (3) had consented for the study during a previous ED visit; (4) required an interpreter and where no suitable interpreter could be found in a timely manner (2 h); or (5) who were not able to participate in the planned phone follow-up (7 and 28 d post ED visit).	Prospective (?). Weekdays from 8 AM to 5 PM	Physician perception of cognitive impairment	OMCT score ≥ 9	Sensitivity 24% (95% CI 17-31; PPV of 88%) and specificity 96% (95% CI 92-99; NPV of 54%)
Ouellet*, 2016, Quebec, Canada; ED; May 2009 −March 2011	N = 306; age ≥65 y; mean age 77.0 ± 7.2 y; 62.4% with cognitive impairment based on MoCA < 26, 22.9% for MoCA < 21	(1) Be 65 y or older, (2) be presenting to the ED specifically for a minor traumatic injury (ie, soft tissue/osseous lesions such as lacerations, contusions, sprains, simple extremity fractures, minor thoracic injuries, or minor head injury), (3) be discharged home within 48 h of the ED visit, and (4) be independent in basic activities of daily living in the month prior to the ED visit	(1) Injuries leading to admission to any ward, (2) living in long-term care, (3) diagnosis of dementia, (4) delirium or confusion at the ED visit, and (5) inability to give a verbal consent, to communicate in French or English, or to attend follow-up assessments	Prospective cohort. Any day or time; 24/7 recruitment schedule	Model predicting cognitive impairment	MoCA score < 26	Male sex, age 85 y, higher depression scores, slower walking speed, and self-reported memory problems were predictive of cognitive impairment

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Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Carpenter, 2019, 4 studies occurred in the United States, 2 in Canada, 2 in Ireland, and 1 in Scotland; ED; Studies were conducted between 2003 and 2016	N = 2423 patients, N = 9 studies; age ≥ 65 y; a weighted average for dementia prevalence of 31% (range, 12%-43%)	Studies that described adults aged ≥65 y, evaluated in the ED setting with an index test for dementia and compared with an acceptable reference standard for dementia. A priori determinants of acceptable reference standards included the MMSE or more formal neuropsychological evaluation by qualified individuals (psychiatrist, neurologist, geriatrician) using *DSM-5* criteria. Studies had to provide sufficient detail on the dementia screening test and reference standard to construct 2-by-2 tables.		Systematic review and meta-analysis	AMT-4, cAD8, O3DY, SBT, and the SIS	MMSE, formal neuropsychologic evaluation by qualified individuals (psychiatrist, neurologist, geriatrician) using *DSM-V* criteria	AMT4: pooled sensitivity 0.74 (0.69-0.79), pooled specificity 0.88 (0.85-0.91), pooled positive LR 7.69 (3.46-17.10), pooled negative LR 0.31 (0.10-0.90) cAD8: pooled sensitivity 0.72 (0.62-0.81), pooled specificity 0.72 (0.64-0.79), pooled positive LR 2.53 (1.82-3.51), pooled negative LR 0.39 (0.26-0.59) O3DY: pooled sensitivity 0.92 (0.84-0.96), pooled specificity 0.63 (0.58-0.68), pooled positive LR 2.26 (1.45-3.52), pooled negative LR 0.17 (0.05-0.66) SBT: pooled sensitivity 0.87 (0.80-0.92), pooled specificity 0.70 (0.66-0.74), pooled positive LR 2.71 (2.03-3.61), pooled negative LR 0.18 (0.09-0.39) SIS: pooled sensitivity 0.69 (0.62-0.74), pooled specificity 0.81 (0.77-0.84), pooled positive LR 3.53 (2.36-5.29), pooled negative LR 0.39 (0.31-0.50)
Bissig*, 2019, California, USA; ED; second half of 2016	N = 100; age ≥ 45 y; mean age 68 ± 12 y; 6% with previous cognitive impairment	Patients ≥45 y old, who communicated in spoken English, and had been in the hospital for less than 24 h		Cross-sectional observational study	SIS	Previously documented cognitive impairment	Sensitivity 86%, specificity 77%

Wilding*, 2016, Ontario, Canada; ED; January –August 2010	N = 238; age ≥ 75 y; mean age 81.9 y; 13.4% with cognitive impairment based on MMSE score <25	Patients ≥75 y old	Patients who (1) were medically unstable (abnormal vital signs, required use of opioids, or those in obvious distress, as determined by initial ED staff or geriatric emergency management nurse assessment); (2) had a preexisting diagnosis of cognitive impairment or were obviously impaired (overtly confused, agitated, or hallucinating); (3) did not live in the city of Ottawa; (4) lived in long-term care; (5) had a primary language other than English or French; or (6) had hearing or visual impairment severe enough to effect cognitive testing	Prospective cohort; convenience sampling; 7 d per week from 8 AM to 4 PM	O3DY and AFT	MMSE score < 25	O3DY/MMSE: agreement 75.6% (95% CI 69.8%-80.7), sensitivity 93.8% (95% CI 77.8%-98.9%), specificity 72.8% (95% CI 66.1%-78.7%), positive LE 3.5, and negative LR 0.08. AFT, cutoff score < 15: AFT/MMSE: agreement 46.2% (95% CI 40.0%-52.6%), sensitivity 90.6% (95% CI 73.8%-97.5%), specificity 39.3% (95% CI 32.7%-46.4%), positive LR 1.5, and negative LR 0.24. AFT cutoff score < 10: AFT/MMSE: agreement 76.1% (95% CI 70.2%-81.0%), sensitivity 62.5% (95% CI 43.7%-78.3%), specificity 78.2% (95% CI 71.8%-83.5%), positive LR 2.9, and negative LR 0.48
Carpenter, 2011, USA; ED	N = 142; age ≥65 y; mean age 77 y; 34% with cognitive impairment based on MMSE score <24	Consenting English-speaking patients aged ≥65 y who had not received potentially sedating medications		Prospective, cross-sectional, convenience sampling	BAS, SBT, cAD8 stratified by education level	MMSE score <24	In order of total, less than ninth-grade reading level, more than ninth-grade reading level, not graduating high school, and graduating high school BAS: sensitivity 90, 93, 75, 96, 77; specificity 43, 29, 48, 28, 57; positive LR 1.6, 1.3, 1.5, 1.3, 1.8; negative LR 0.24, 0.25, 0.52, 0.16, 0.41 SBT: sensitivity 90, 93, 67, 87, 71; specificity 47, 38, 53, 44, 50; positive LR 1.7, 1.5, 1.4, 1.6, 1.4; negative LR 0.22, 0.20, 0.62, 0.29, 0.59 cAD8: sensitivity 83, 70, 100, 75, 100; specificity 65, 46, 77, 64, 67; positive LR 2.4, 1.3, 4.4, 2.1, 3; negative LR 0.26, 0.65, 0, 0.39, 0
Boyd*, 2008, New Zealand; ED; December 2005 –March 2006	N = 139; age: ≥75 y (65 y for Maori and Pasifika elders); mean age 82.5 y; 35% with cognitive impairment (BRIGHT)	All those aged ≥75 y (65 y for Maori and Pasifika elders) who presented to the ED with a nonurgent complaint (triage level 3-5)	Patients who were sleeping, undergoing medical procedures, or in distress. Cognitively impaired patients were only enrolled if their family was available to assist in completing the BRIGHT.	Cross-sectional convenience sampling; 4-h time blocks (Monday-Friday, 8 AM–8 PM) over a 12-wk period	BRIGHT	Cognitive performance scales (different cutoffs reported)	BRIGHT cutoff ≥2: sensitivity 0.81 (0.66, 0.91), specificity 0.34 (0.24, 0.46), positive LR 1.2, negative LR 0.6 BRIGHT cutoff ≥3: sensitivity 0.78 (0.63, 0.89), specificity 0.54 (0.43, 0.66), positive LR 1.7, negative LR 0.4 BRIGHT cutoff ≥4: sensitivity 0.70 (0.54, 0.83), specificity 0.74 (0.62, 0.83), positive LR 2.7, negative LR 0.4

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Supplementary Table 1 (*continued*)

Study, Location, Time Frame (* in PICO 1 & PICO 2)	No. of Patients (median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design; Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Gold Standard for Dementia or Cognitive Impairment	Measures of Accuracy, Reliability, Sensitivity, Specificity, Negative LR, Positive LR, Correlation Coefficients, etc
Wilber*, 2008, Summa Health System's Akron City Hospital and Washington University, Barnes-Jewish Hospital and Cleveland clinic; ED; January 12, 2006–January 14, 2007	N = 352; age ≥ 65 y; mean age 77 (±8) y; 32% with cognitive impairment based on MMSE	ED patients aged ≥65 y who were able to communicate in English	Patients who received medications that may have affected their mental status during the testing period (such as narcotics, antiemetics, or benzodiazepines), were critically ill, were unable to consent or cooperate with data acquisition, were previously enrolled, or refused to complete the questioning	Prospective, cross-sectional, convenience sampling	SIS	MMSE score <23	Sensitivity 63% (53, 72), specificity 81% (75, 85), PPV 60% (50, 69), NPV 83% (77, 87), positive LR 3.2 (2.4, 4.3), 0.5 (0.4, 0.6), AUC 0.77 (95% CI 0.72-0.83)
O'Sullivan, 2018, Cork, Ireland; ED; June-November 2015	N = 419; age ≥70 y; median age 77 y; 21.5% with dementia	All ED patients aged ≥70 y	Refusal, inability to consent and no family member to give assent, being actively drunk, severe intellectual disability, requiring medical isolation, poor English, medically unstable (resuscitation room or 1:1 nursing care) and prior study recruitment	Prospective, nonconsecutive sample. Monday-Friday, 8 AM –6 PM	4AT, 6-CIT (multiple cutoffs reported)	Standardized MMSE, IQCODE, *DSM-5* criteria	4AT (cutoff 0/1): sensitivity 0.84 (0.74-0.91), specificity 0.63 (0.57-0.69), PPV 0.39 (0.32-0.46), NPV 0.94 (0.89-0.96), AUC 0.83 6-CIT (cutoff 9/10): sensitivity 0.81 (0.70-0.89), specificity 0.76 (0.71-0.81), PPV 0.46 (0.37-0.55), NPV 0.94 (0.90-0.97)
Dyer, 2017, Dublin, Ireland; ED; June-August 2014	N = 196; age ≥ 70 y; mean age 78.5 ± 5.9 y; 50.1% had cognitive impairment (delirium, MCI, or dementia)	All ED patients aged ≥70 y	Patients who were too unwell, unable to consent, or who declined assessment	Prospective, cross-sectional, convenience sampling. 7 d per week both during and outside of working hours (outside of 0900 and 1700 h and on weekends)	AMT4	CAM-ICU + AD8 + sMMSE (either positive)	Sensitivity 0.53 (0.42-0.63), specificity 0.96 (0.89-0.99), PPV 94.6% (84.9%-98.8%), NPV 73.33% (65.9%-79.9%), AUC 0.75 (0.68-0.82), positive LR 14.7 (4.7-45.4), negative LR 0.5 (0.4-0.6)
Bedard, 2019, Quebec, Canada; ED; February-May 2016	N = 313; age ≥ 65 y; mean age 76.8 (7.5) y; 27.2% with cognitive impairment, TICS-m score ≤ 27	(1) age ≥ 65 y; (2) an ED length of stay ≥8 h; (3) awaiting admission to a care unit; and (4) independent or semiindependent for activities of daily living	(1) had an unstable medical condition that could lead to intensive care; (2) inability to communicate in French; (3) unable to consent; (4) history of a severe psychiatric condition (eg, schizophrenia, severe depression, or bipolar disorder); and (5) were living in a nursing home or another long-term care center	Prospective study	O3DY-F (French) < 4	TICS-m score <27	Sensitivity 76.2% (66.7%-84.8%), specificity 67.6% (61.0%-73.6%), PPV 46.7% (38.1%-55.4%), NPV 88.4% (82.6%-92.8%), positive LR 2.4, negative LR 0.4

Carpenter, 2011, USA; ED	N = 142; age ≥65 y; mean age 77 y; 34% with cognitive impairment based on MMSE score <24	Consenting English-speaking patients aged ≥65 y who had not received potentially sedating medications		Prospective, cross-sectional, convenience sampling	BAS, SBT, cAD8 stratified by whether MMSE was administered first or last	MMSE score <24	In order of total cohort, MMSE first, and MMSE last: BAS: sensitivity (%) 90, 91, 88; specificity (%) 43, 46, 41; positive LR 1.57, 1.67, 1.49; negative LR 0.24, 0.19, 0.30 SBT: sensitivity (%) 90, 86, 94; specificity (%) 47, 48, 48; positive LR 1.70, 1.65, 1.80; negative LR 0.22, 0.29, 0.12 cAD8: sensitivity (%) 83, 89, 78; specificity (%) 65, 68, 64; positive LR 2.37, 2.78, 2.18; negative LR 0.26, 0.16, 0.35
Carpenter, 2011, USA; ED;	N = 142; age ≥65; mean age 77; 34% with cognitive impairment based on MMSE score <24	Consenting English-speaking patients aged ≥65 y who had not received potentially sedating medications		Prospective, cross-sectional, convenience sampling	BAS, SBT, cAD8 in detecting MCI	Detection of MCI defined as normal MMSE score (≥24) but abnormal MoCA score (<26)	BAS: sensitivity (%) 62 (57-66), specificity (%) 65 (44-82), positive LR 1.76 (1.01-3.62), negative LR 0.59 (0.42-0.99), AUC 0.742 (0.614-0.871) cAD8: sensitivity (%) 40 (34-41), specificity (%) 89 (60-98), positive LR 3.56 (0.84-20.59), negative LR 0.68 (0.60-1.11), AUC 0.506 (0.345-0.666) SBT: sensitivity (%) 63 (59-65), specificity (%) 63 (59-65), positive LR 5.39 (1.84-19.51), negative LR 0.41 (0.36-0.61), AUC 0.799 (0.692-0.906)
Han, 2018							Review of delirium and dementia, including the description of different tests used in detecting dementia in the ED
Tong, 2016, Toronto, Ontario, Canada	N = 146; age ≥ 70 y; mean age 80.6 (6.0) y	Participants who were aged ≥70 y and who were present in the ED for a minimum of 4 h	Patients who were (1) critically ill (defined by the Canadian Triage Acuity Scale score of 1), (2) in acute pain (measured using the Numeric Rating Scale with a score ≥2 of 10), (3) receiving psychoactive medications, (4) judged to have a psychiatric primary presenting complaint, (5) previously enrolled, (6) blind, or (7) unable to speak English, follow commands, or communicate verbally	Feasibility study, prospective enrollment	Tablet-based serious game (whack-a-mole)	MMSE, MoCA	Correlation of game response time (RT) and game accuracy: Game RT with MMSE score −0.558, with MoCA −0.339 Game accuracy with MMSE score −0.104 (nonsignificant), with MoCA −0.042 (nonsignificant)

4AT, 4 A's Test; AFT, Animal Fluency Test; AMT, Abbreviated Mental Test; AUC, area under the curve; BAS, Brief Alzheimer's Screen; BRIGHT, Brief Risk Identification for Geriatric Health Tool; cAD8, caregiver-completed Alzheimer's Disease-8; CAM, Confusion Assessment Method; CLOX1, clock-drawing task; *DSM*, *Diagnostic Statistical Manual of Mental Disorders*; EMS, Emergency Medical Services; LR, likelihood ratio; MCI, mild cognitive impairment; Mini-Cog, mini cognitive; MMSE, Mini-Mental State Examination; MoCA, Montreal Cognitive Assessment; N/A, not applicable; NPV, negative predictive value; O3DY, Ottawa 3DY; OMCT, Orientation, Memory, Concentration Test; PMH, past medical history; PPV, positive predictive value; QCS, Quick Confusion Scale; RR, risk ratio; SBT, Short Blessed Test; 6-CIT, Six-Item Cognitive Impairment Test; SIS, Six-Item Screener; sMMSE, standardized MMSE; TICS-m, Telephone Interview for Cognitive Status—modified.

Supplementary Table 2
PICO 2 Abstraction Table

Study, Location, Time Frame (* in PICO 1 and 2)	No. of Patients (Median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design- Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Measured for Feasibility, Pragmatic Nature, Timing, Efficiency, etc (Yes/No)	If Y: Measures Cited for Feasibility, Preferences, Duration of Instrument, Efficiency	If N: Points Made by Study About Ease of Use, Speed (Quick, Fast, etc), Setting, Integration Into Routine Care, etc
Adler 2019, University Hospital SUNY Downstate (urban tertiary hospital)	No data for ED	Birth year 1978 or earlier (40 y), use of upper extremities, lack of vision or hearing impairments, and English speaking	None	Pilot in ED: Patients in ED were triaged into "fast" and "slow" tracks depending on acuteness; patients in the slow track were approached	Computerized cognitive assessment tool used (the Cognigram)	No		As per text description of study team experience: most adults declined participation, citing that they "had not been seen by a doctor" and "did not feel up to it." Another common reason for refusal was that they would soon be called and not have time to complete the Cognigram. Other observations in the ED included suspicion or nervousness about the Cognigram. Adults were not comfortable with the idea of cognitive testing, even when assured anonymity. They did not accept [the] purpose of evaluating Cognigram implementation, and mentioning that the Cognigram was used to study dementia or ADRD did not help"
Andrews 2009					4-item screen: How old are you? What is your date of birth? What is this place? What year is it?			Brevity of the test likely to be practical as per the report.
Bedard 2017*, between February and May 2016 in 4 hospitals across the province of Québec	N = 305, age mean 76 y (SD 10.8)	Patients aged ≥65 y, with an 8-h ED stay, admitted on a care unit, independent or semiindependent in their ADL	Patient living in a long-term nursing facility, with an unstable medical condition, preexisting psychiatric condition or severe dementia, a delirium within the 8-h exposure to the ED	Comparison against reference tests	Administration of O3DY	No		None
Bissig 2019*, University of California–Davis Neurology consultation service	N = 100; age 68 y (SD 12); 5 with dementia, 1 MCI	Patient living in a long-term nursing facility, with an unstable medical condition, preexisting psychiatric condition or severe dementia, a delirium within the 8-h exposure to the ED	None	Integrating screener into ED neurology consultations; administered within 24 h of hospital arrival	SIS	No		None

Blomaard 2021, Leiden University Medical Center, tertiary hospital in the Netherlands; 4 December 2017 until 2 February 2018	N = 953; age 77 y (IQR 73-82)	All patients aged ≥70 y are eligible for screening after routine ED triage	Excluded patients who bypassed triage and patients who were triaged to the immediate urgency level	Before and after implementation of screening program: Implementation: recurring PDSA cycles for implementation, facilitation of program in electronic health record and standard operating procedures	APOP screener (which includes 3 questions on dementia and cognition) followed by interventions: screening older patients for risk of functional decline or mortality and signs of impaired cognition; second, targeted interventions for high-risk patients in the ED; and third, interventions for high-risk patients who are hospitalized or discharged home	Yes	Comparison of ED LOS before and after implementation of screener: ED LOS 202 min (IQR 133-290 min) before vs 196 min (IQR 133-265 min) after; $P = .152$; hospital admission rate 40% before and 39% after; $P = .642$	
Boucher 2019, Hôpital de l'Enfant-Jésus (CHU de Québec—Université Laval) between May and July 2018	N = 67; age 75.5 ± 8 y; mild dementia 7/67	Patients aged ≥65 y presenting to the ED of the Hôpital de l'Enfant-Jésus (CHU de Québec—Université Laval) for any medical reason; caregiver, relative, or close friend of a study participant who was present at the time of enrolment	Required resuscitation (CTAS 1); were unable to speak French; were unable to consent; had a physical condition preventing them from using the electronic tablet	RCT with crossover comparing tablet assessment vs RA assessment	Functional, frailty and cognitive assessment using electronic tablet; compared to RA collected O3DY, MoCA, OARS, CFS	Yes	Patient-reported acceptability measure: TAP questionnaire; mean adjusted TAP scores showed no difference: 2.36 for standard RA assessments vs 2.20 for self-assessment using a tablet ($P = .08$); subgroup analysis with age > 85 y showed worse acceptability for tablet or self-assessment	Additional open-ended questions: that assess acceptability and preference of the 2 modes of assessments; comments include liked being able to concentrate and take their time answering the questions on the tablet; the main reason for refusal was fear or dislike of technology
Boyd 2008*, New Zealand ED in Auckland; a 12-wk period between December 2005 and March 2006	N = 139; age 82.5 (±5.4) y	Aged ≥75 y (65 y for Maori and Pasifika elders) who presented to the ED with a nonurgent complaint (triage level 3-5) during a convenience sample of 4-h time blocks (Monday—Friday, 8 AM—8 PM) during the study period; cognitively impaired patient only enrolled if family was available to complete assessment		Cross-sectional study	Comparison of 11-item BRIGHT case-finding tool administered in ED against comprehensive geriatric assessment within 10 d	No		75% of participants had assistance from a visitor or the RA to complete the BRIGHT assessment
Calf 2021*, Systematic review of cognitive screening instruments in ED				Systematic review of diagnostic accuracy of instruments		No		

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Supplementary Table 2 (*continued*)

Study, Location, Time Frame (* in PICO 1 and 2)	No. of Patients (Median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design- Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Measured for Feasibility, Pragmatic Nature, Timing, Efficiency, etc (Yes/No)	If Y: Measures Cited for Feasibility, Preferences, Duration of Instrument, Efficiency	If N: Points Made by Study About Ease of Use, Speed (Quick, Fast, etc), Setting, Integration Into Routine Care, etc
Carpenter 2011, level 1 trauma center ED; July 2008–February 2009	21 physicians and 34 nurses (response rate 42%)	Physicians and nurses at a level 1 trauma ED	None	Cross-sectional survey of staff	8-item survey on ED management of geriatric patients; for the previous 8 mo, older adults were screened by a geriatric technician for cognitive dysfunction (MMSE), falls and function (OARS scale)	Yes	8-item survey regarding geriatric technician role (acceptability and feasibility); 71% of physicians and 85% of nurses found geriatric technician screening as an overall benefit to older patients; 0% of physicians and 18% of nurses thought that geriatric technician screening prolonged the ED length of stay	
Carpenter 2008*, systematic review abstract concerning the practicality and accuracy of brief cognitive screening instruments in primary care		Studies enrolling subjects older than 60 y and which used an acceptable criterion standard to diagnose dementia	Non–English language articles, inpatient or nursing home isolated populations, memory disorder clinic populations without an adequately characterized outside control group, or populations with less than 6 y of median education	Systematic review		Yes	Time needed to administer; reproduction limited to copyright	
Carpenter 2011*, tertiary medical center ED; from July 1, 2008, to April 20, 2009	N = 371; mean age 76 y	All ED patients aged ≥65 y	Patients who received medications that may have affected their mental status; too critically ill to participate, as judged by the attending emergency physician, were unable to consent or cooperate with data acquisition, did not speak English, or refused to complete the questioning	Observational cross-sectional cohort study	SIS, AD8, and MMSE	No		Using both instruments requires more time and training, with the additional need to find consenting caregivers to complete the AD8

Carpenter 2011*, urban academic university–affiliated medical center between June 2009 and March 2010	N = 169; age = 78 ± 8 y	All ED patients aged ≥65 y	Patients receiving mental status–altering medications (antiemetics, benzodiazepines, or narcotics) prior to or during the testing period, emergency physician judgment of critical illness precluding informed consent or safe data collection, subject inability to consent or comply with data acquisition, non–English speaking, or refusal to complete the questioning	Prospective, cross-sectional, convenience sampling	O3DY, BAS, SBT, cAD8 compared against MMSE	No	
Clevenger 2012, systematic review or scoping review?	Includes 209 articles pertaining to care for PWD in ED			Systematic review or scoping review??	Clinical care for PWD in ED (includes assessment)	No	
de Gelder 2018, EDs in 4 hospitals in the Netherlands; from 2014 to 2017	N = 2629; mean age 79 y (IQR 74-84); 20.5% with impaired cognition	All patients aged ≥70 y	Red triage category (highest acuity) according to the Manchester Triage System (MTS), an unstable medical condition, no permission of nurse or physician to approach the patient, a language barrier and impossibility to obtain informed consent	Multicenter cohort study	APOP screener (which includes 3 questions on dementia/cognition)	Yes	Mean time to complete the screener was 93 s (SD 29); overall rating of clinical usability was positive, with a mean Likert score of 3.79 (out of 5; SD 0.63)
Dyer 2017, Irish tertiary urban referral university teaching hospital; June-August 2014	N = 220; 78.8 (±6.16) y	Patients aged ≥70 y who presented to the ED	Patients who were too unwell to take part were excluded, as were patients who refused assessment.	Convenience sample; cross-sectional	Informant history; cognitive screeners for delirium (CAM-ICU) and dementia (sMMSE and AD8)	Yes	The length of time to contact informants was 3.1 (±5.8) min. In 9.1% (6/66), it took 10 min or longer to contact the informant; brief informant interviewing (mean duration, 6 min); rating of privacy (8.4 ± 1.6/10) and accessibility (8.5 ± 1.47/10)

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Supplementary Table 2 (*continued*)

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Dziedzic 1998*, academic ED of a university-based hospital	N = 31	Age ≥65 y, absence of recent head or multisystem trauma; able to speak English as a primary language; not be acutely experiencing alcohol or substance intoxication; score of 15 on the GCS; and educational level equivalent to ≥9 y		Cross-sectional	MMSE compared against constructed interview for physician	No		
Eagles 2020*, academic tertiary care hospital ED between June and August 2013	N = 260; mean age 83.7 y (SD 5.9)	Age ≥75 y	A known history of cognitive impairment or were obviously cognitively impaired; were non-English or French speaking patients; had auditory, verbal, or visual impairments severe enough to affect cognitive testing; were critically ill; resided in a long-term care home or were transferred from other hospitals.	Prospective cohort	O3DY	Yes	Postimplementation survey of nurses and physicians: 98%, 95%, and 88% of physician respondents judged the O3DY tool to be easy to learn, to use, and to remember, respectively; 97% agreeing that the O3DY tool is easy to learn and use and 94% reporting that it is easy to remember (nurses)	
Eagles 2014, a tertiary-care ED	N = 198; mean age 84.2 y; 31% with evidence of impaired mental status	≥75 y of age		Prospective cohort	O3DY	No		Mentioned that it is a feasible tool for ED
Fox 2018, ED (not specified)	N = 785; 81.4 (SD 6.4) y; 9% with dementia diagnosis	Aged ≥70 y		Prospective randomized double-blind diagnostic accuracy study	4AT	No		Rapid delirium assessment instrument, feasible in routine care
Gerson 1994*, midwestern community teaching hospital; March-May 1992	N = 547; mean age 76.7 y (7.7 SD)	Age ≥65 y treated in the ED	Refused to participate, physical condition prevented participation, had known dementia, unable to communicate in English	Cross-sectional study	Six-item OMCT	Yes	Mean time of 1.9 min (+0.91 SD) was required to complete the test	
Graf 2010, Letter to the editor; commentary, and evidence synthesis				Evidence synthesis	QCS described for cognition assessment			QCS, which can be completed more quickly (~2 min) than the MMSE

Graf, 2012						No	In ED, screening tools developed to detect these geriatric problems have to be quick, easy to use, and to present a high sensibility.
Groening, 2020						No	Though some emergency physician might consider "the old patient" as not exciting, there is a broad consensus that pragmatic geriatric screening tools are required. More practical tools will have to be developed in the future.
Hadbavna 2013, in ED between October 15, 2012, and October 30, 2012	N = 117; mean age 76.4 (±8) y	Aged ≥65 y		Convenience sample; cross-sectional	Nurse-administered 6-CIT	No	Noted considerable variation in applicability and successful implementation of the screening instrument between nurses despite training
Han 2018					Table listing screening tests (p. 344 Table 5); AD8, BAS, Mini-Cog, O3DY, SIS, SBT		Mentioned time required for certain tests (Mini-Cog, 10 min; SBT, <5 min; O3DY, <2 min)
Hare 2008, ED in hospital in Western Australia; April 2007	N = 28; mean age 79.2 y; 18% with dementia	Aged ≥65 y	Did not speak English, unable to speak because of medical condition, critically ill at the time	Quality improvement	AMT, CAM	No	AMT takes up to 5 min to administer
Hirschman 2011*, ED of a large, urban, tertiary academic health center; between September 6, 2007, and May 1, 2008	N = 829; age 75.7 ± 7.1 y	Age ≥65 y, lived within a 30-mile radius of the ED in the state of Pennsylvania, and lived independently	Had an end-stage disease with prognosis of 6 mo or less, cancer diagnosis with active treatment, known alcohol or drug abuse, history of neurologic disease (eg, cerebral vascular accident with residual effects, multiple sclerosis, etc), a previous medical history of dementia or delirium, or resided in a nursing home		2 validated screening tools: the SIS and CLOX1	No	Study measures and analyses controlled for no ED-specific environmental variables (eg, crowding, time of triage, triage class, location of screening, wait time, etc) in relation to screening cognitive impairment

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Supplementary Table 2 (*continued*)

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Huff 2001*, University hospital ED	N = 205	Aged 55 y or older	Head trauma or multisystem trauma, inability to speak English, educational level of ≤7 y, acute medical illness, or contact or droplet isolation. Additionally, patients that the research assistants felt might be harmed by mental distress or other discomfort by test administration were excluded	Cross-sectional, convenience sample	Comparison of QCS against MMSE	Yes	MMSE took significantly longer to administer (311 s mean) than did the QCS (141 s mean; $P < .01$)	
Irons 2002, University hospital ED; June-August 2000	N = 731; age 18-25 y (16%); 26-40 y (30%); 41-60 y (30%); 61-75 y (13%); >75 y (8%)	Age ≥18 y	Sustained multisystem trauma resulting in GCS score <15, unable to speak English, required acute medical intervention, require contact or respiratory isolation, patients who RA thought might experience emotional distress or other discomfort, chronic cognitive deficits (previously diagnosed as having moderate to severe mental retardation, Down syndrome, advanced dementia, etc)	Prospective, cross-sectional	Validation of QCS against MMSE	No		Average administration and scoring time for the QCS is slightly less than 2½ min; QCS requires no written response from the patient
Keles 2001						No		Standardized tests applied briefly and easily are available and these are beneficial in order to identify and treat cognitive disorders of older adults
Kennelly 2012, ED in urban teaching hospital in Ireland	N = 76	All medical, surgical, and ED physicians involved in the acute care of older patients in the hospital		Cross-sectional	14-item questionnaire administered to assess knowledge skills and attitudes of physicians toward screening of older patients in ED for cognitive deficits	Yes	29% felt they lacked expertise to perform screening; 78% thought screening was important	Clinicians reported several limiting factors that restricted their efforts to do this: lack of a rapid screening tool; lack of privacy; too much noise; and time constraints. There was no consensus on who should perform screening in this setting.

Kennelly 2013, urban teaching hospital, ED, January-March 2012	All medical, surgical, and ED physicians, 76 of 97 completed survey						
Koita 2010	N/A	N/A	N/A	Article discusses the process for conducting a mental status examination on a patient in the ED. It mentions SIS, clock drawing, Mini-Cog, Memory Impairment Screen, Brief Alzheimer Screen, 7-min screen, and MMSE as tests for neurologic mental status examinations	No	N/A	The 7-10 min needed to perform the MMSE and the copyright laws pose further barriers for easy ED use. The 1996 US Preventative Services Task Force literature review found the MMSE, Short Test of Mental Status, the Blessed Orientation Memory Concentration Test, and Functional Activities Questionnaire were all equivalent as a screening tool for detecting dementia. These cognitive tests have not been studied in the ED setting, however, and do not have a defined role in the ED at this time. Wilber and colleagues performed a study in the ED setting comparing the MMSE, SIS, and Mini-Cog. The Mini-Cog consists of 3-item recall and clock drawing; SIS consists of 3-item recall and 3-item temporal orientation (ie, day of week, month, and year). When using a cutoff score of $\leq$4 in SIS, the SIS proved to be better than the Mini-Cog. In comparison to the MMSE, the SIS had a sensitivity and specificity of 94% and 86%, respectively, whereas the Mini-Cog had a sensitivity and specificity of 75% and 85%, respectively. Initially, Callahan and colleagues found SIS to perform as well as MMSE, but repeat studies have shown that SIS only had a sensitivity of 63% and specificity of 81%. Cognitive assessment in the ED continues to be an area in need of research.

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Supplementary Table 2 (*continued*)

Study, Location, Time Frame (* in PICO 1 and 2)	No. of Patients (Median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design- Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Measured for Feasibility, Pragmatic Nature, Timing, Efficiency, etc (Yes/No)	If Y: Measures Cited for Feasibility, Preferences, Duration of Instrument, Efficiency	If N: Points Made by Study About Ease of Use, Speed (Quick, Fast, etc), Setting, Integration Into Routine Care, etc
Krupp 2018, Germany; acute geriatric department	N = 165			Patients in an acute geriatric department performed the SIS (4 times), the MMSE (2 times), CDT according to Shulman (2 times), the Regensburg verbal fluency test (2 times), and the Montgomery-Åsberg depression rating scale within a period of 16 d. The overall judgment of a physician blinded to the test results served as the reference standard.	SIS, MMSE, clock drawing, Regensburg verbal fluency, Montgomery-Asberg depression scale	No		The SIS closely correlated with the medical judgment (−0.729). The SIS is a valid, reliable short cognitive test. Using a threshold of 5 points, the SIS detects cognitive deficits relevant to daily living with a higher sensitivity than the MMSE with a threshold of 25. The brevity and simple application of the SIS also enable its application outside geriatric wards.
Lague 2018*, Canada; ED; March-July 2015	N = 171; age ≥ 65 y; 76.9 y (SD 8.3); 2%; 0	Age ≥65 y, independent or semiindependent (can perform 5 of the 7 activities of daily living without any help), spent ≥8 h in the ED, were admitted to any hospital ward	Were living in a long-term care facility, were unable to consent, were unable to communicate in French or English, were experiencing an unstable medical condition leading to their admission to the intensive care unit, had a previous diagnosis of severe dementia or any other psychiatric condition, had delirium during their 8-h ED stay	Participants recruited after being in the ED for at least 8 h	Bergman-Paris Question (BPQ). Asked of patient's close relative "Would you be comfortable leaving your family member home alone for three months if you had to go on a trip to Paris and no other family member or close friend was available?" The purpose of the study was help assess if further geriatric assessments were needed of the patient.	Yes	The BPQ had good sensitivity but a low specificity for detecting the 3 geriatric syndromes, cognitive impairment, functional impairment, and frailty. The BPQ could be used to flag patients who would benefit from further screening.	

Laguna 1997, ED	N = 536; age ≥ 60 y	Patients aged ≥60 y seen in ED	No exclusion criteria		To check the reliability of the usual medical assessment to detect the cognitive deterioration in older adults attended at HED, compared with that performed systematically by means of an evaluation test of cognitive functions	No	Cognitive deterioration was not detected in 111 patients (31.5%); it was mild in 147 (41.8%), moderate in 71 (20.2%), and severe in 23 (6.5%). In patients with moderate-severe deterioration according to the OMCT, such a deterioration was detected by the usual medical evaluation in 7% of cases. The mean time in completing the test was 2.6 ± 0.9 min. An age ≥80 y was associated with an increased relative risk for detecting moderate-severe cognitive deterioration (1.98; 95% CI, 1.42-2.78; $P < .001$), whereas the discharge diagnosis of respiratory disease was associated with a decrease of the relative risk (0.41, 95% CI 0.19-0.89; $P < .05$)
Lanata 2014, Rhode Island Hospital	N = 23 resident physicians	For chart review: admitted to medicine or neurology ward		Authors reviewed charts for 100 adult patients admitted to medicine and neurology wards; 23 resident physicians were questioned about their use of cognitive screening tools.		No	Authors found 67% and 63% of patients evaluated by attendings in the emergency and medicine departments, respectively, did not receive any form of cognitive testing. In addition, 62% of patients evaluated by neurology attendings received cognitive testing. No physician preformed hierarchical, systematic mental status examinations. The most common reason cited by resident physicians for not using standardized cognitive screening tools was lack of time.
Lucke 2017, Leiden University MedicalCenter (LUMC) and Alrijne Hospital in the Netherlands; ED; N/R	N = 1632; age ≥ 70 y	Patients aged ≥70 y visiting ED	N/R	The aim was to investigate if the 6-CIT is an independent predictor of functional decline and mortality. They compared the 6-CIT score with the Katz ADL and assessed mortality and functional decline 3 mo and 1 y post-ED visit.	6-CIT, Katz ADL	No	Cognitive impairment, measured with the 2-3-min 6-CIT, is independently associated with adverse health outcomes in older ED patients.

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Supplementary Table 2 (*continued*)

Study, Location, Time Frame (* in PICO 1 and 2)	No. of Patients (Median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design- Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Measured for Feasibility, Pragmatic Nature, Timing, Efficiency, etc (Yes/No)	If Y: Measures Cited for Feasibility, Preferences, Duration of Instrument, Efficiency	If N: Points Made by Study About Ease of Use, Speed (Quick, Fast, etc), Setting, Integration Into Routine Care, etc
Lucke 2015, Leiden University Medical Center (LUMC) and Alrijne Hospital in the Netherlands; ED; N/R	N = 757; age ≥ 70 y; 78.7 y mean	Patients aged ≥70 y visiting ED		A prospective follow-up study among all patients aged ≥70 y presenting to the ED of a university teaching hospital in the Netherlands. Descriptive data including cognition, measured by the 6-CIT was obtained. Follow-up data consisted of 90-d mortality and 90-d functional decline, defined by 1-point increase in Katz ADL score and/or new institutionalization	6-CIT, Katz ADL	No		6-CIT is administered in 2-3 min and measures cognitive impairment. Impaired cognition (6-CIT score > 9) was significantly associated with both mortality (OR 3.51, 95% CI 1.96-6.27, *P* value < .001) and functional decline (OR 1.75, 95% CI 1.08-2.82, *P* value .023) after adjustment for age, gender, level of education, dementia, number of different medications used at home, and time of arrival.
Maxwell 2013, 2 acute care community hospitals	N = 80; 78.7 y mean; 44%; 27	Patients aged ≥65 y visiting ED with a primary injury		The Mini-Cog or Informant Questionnaire on Cognitive Decline in the Elderly (IQCDE) and Vulnerable Elder Survey (VES-13) were administered to patients or surrogates.				Cognitive impairment was present in 36 (44%) of patients (abnormal Mini-Cog: 22%; IQCDE > 3.44: 22%). Injured older adults had higher cognitive and preinjury functional impairment than has been reported in other older populations. A combination of brief screening instruments for use with hospitalized injured older adults or surrogates is useful for risk assessment and clinical management.
Melady 2018	N/A	N/A	N/A	Not a study				This article discusses best practices in the ED for care of geriatric patients. Mentions screening for cognitive defects and mentions O3DY and bCAM screening tools. Caregiver history is an essential component of ED evaluation of older adults with functional dependence and/or cognitive impairment.

Meldon 2020, academic ED; October 2019 −May 2020	Initial program N = 7718; age ≥ 65 y; 74.9 y mean; Enhanced program N = 1836; age ≥ 65 y; 75.6 y mean	Patients aged ≥65 y visiting ED	N/R	Implantation of an EMR best practices alert for patients aged ≥65 y. Created an EMR alert for patients aged ≥80 y, fall complaint, history of dementia, polypharmacy (≥10 medications recorded), or high ED utilization (>5 visits in 1 y) in addition to a positive delirium screen. For the first part of the study, ED clinicians educated about these risks and about the EMR alert for comprehensive care assessment. Compared the change in comprehensive geriatric assessment pre- or posttraining.	No	The proportion of geriatric evaluations increased a relative 21% (4.3%-5.2%, P = .09). Authors note that the enhanced period occurred during the beginning of the COVID pandemic.
Morley 2013, Ireland; hospital	N = 35 HIV clinic and ED clinicians	Clinician in HIV clinic or ED		Surveyed clinicians about cognitive screening tools used and factors limiting cognitive assessments in the clinical setting	No	Participants were asked if an assessment of Orientation in Person, Place and Time (OPPT) was an adequate screening tool for detecting HIV dementias. They were presented with the names of other cognitive screening tools and were asked which they had used previously with HIV-positive patients. MMSE, MoCA screen, the Abbreviated Mental Test (AMT) score, the International HIV Dementia Scale (HIVDS), and the Brief Neurocognitive Screen (BNCS). Thirty-four percent (n = 12) of respondents felt that OPPT was a sufficient screening tool for cognitive assessment. Respondents found lack of time, exposed environment, and lack of privacy the most limiting factors when performing cognitive assessment on patients who present acutely to the ED.

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Supplementary Table 2 (*continued*)

Study, Location, Time Frame (* in PICO 1 and 2)	No. of Patients (Median or Mean Age)	Inclusion Criteria	Exclusion Criteria	Study Design- Timing of Recruitment	Intervention: Screening Instrument or Tool Studied	Measured for Feasibility, Pragmatic Nature, Timing, Efficiency, etc (Yes/No)	If Y: Measures Cited for Feasibility, Preferences, Duration of Instrument, Efficiency	If N: Points Made by Study About Ease of Use, Speed (Quick, Fast, etc), Setting, Integration Into Routine Care, etc
Myrstad 2018, Norway; ED; October 2017 −May 2018	N = 111; age ≥65 y, 81 y mean	Patient seen in ED with suspect infection and admitted		ED nurses screened patients with qSOFA and 4AT (rapid screening of alertness, cognition, attention and fluctuation of symptoms). Time spent on 4AT was recorded	qSOFA and 4AT.	Yes	Median time spent on the assessment with 4AT was 2 min (mean 2.6 min). Among 39 patients with a qSOFA point given for altered mental state, 4AT revealed signs of cognitive impairment in 37 (95%). 4AT revealed signs of cognitive impairment in 26 of 72 patients (36%) where qSOFA did not reveal an altered mental state. 4AT is a rapid assessment of cognitive impairment feasible for use in the ER. 4AT improved the assessment of cognitive impairment in patients aged ≥65 y with suspected infection.	
Ngian 2008, Australia; teaching hospital; January 2004-April 2006	N = 103; age ≥70 y; 83 y mean (±6.5)	Patient meeting ASET referral criteria: age ≥70 y, and 2 of the following 5 criteria required to trigger referral: (1) multiple health problems or >3 regular medications, (2) history of falls or fall-related injury, (3) >3 presentations to ED in the last 6 mo, (4) problems with memory, or (5) patient or caregiver reports recent functional or behavioral change.	N/R	Study objectives were to review discordant cases (using EMR)— older adult patients deemed for discharge by ED but subsequently admitted following ASET review. These cases were examined with regard to clinical outcomes. ASET contribution was also reviewed with respect to assessment of cognitive, functional, and mobility status.		No		Assessment of older adult patients by ASET yielded additional information on functional, mobility and cognitive issues that were overlooked by ED.

O'Sullivan 2016*	This is a review article citing the use of the 6-CIT screen in primary care, outpatient care, and EDs	Yes	The 6-CIT has been shown to be a fast, feasible method for screening for cognitive impairment in older adults in the ED, with a mean completion time of 1.9 min. In a US-based study involving 163 ED patients (mean age 78 y), the 6-CIT demonstrated excellent sensitivity at 95% and specificity at 65% (AUC = 0.930) for cognitive dysfunction based on MMSE scores of ≤23. However, this result was achieved using a lower 6-CIT cutoff of 4/5, and there was no randomization between criterion standard testing and screening. Another US research group used the 6-CIT to screen for cognitive impairment in 271 older patients in an urban teaching hospital ED. The psychometric properties of the instrument were not analyzed; however, the researchers claimed to have discovered 46 from a total of 55 cases of cognitive impairment, where no previous history of cognitive impairment existed.

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Ouellet 2016*, Canada; teaching EDs; May 2009 −March 2011	N = 306; age ≥65 y; mean 77.0 ± 7.2 y; 85.3%	Age ≥65 y, be presenting to the ED specifically for a minor traumatic injury (ie, soft tissue/ osseous lesions such as lacerations, contusions, sprains, simple extremity fractures, minor thoracic injuries, or minor head injury), be discharged home within 48 h of the ED visit, be independent in basic activities of daily living in the month prior to the ED visit.	Injuries leading to admission, living in long-term care, diagnosis of dementia, delirium, or confusion at the ED visit, inability to give a verbal consent, to communicate in French or English, to attend follow-up assessments	This study aimed at exploring correlates of global cognitive functioning in older adults being evaluated in the context of a consultation in the ED following a minor traumatic injury.	The MoCA was used to assess cognitive function.	No		Results of multivariate analyses indicate that the variables most strongly associated with lower MoCA scores are being a man, being 85 y or older, having a lower education, being more depressed, being slower in terms of mobility, and reporting serious memory problems.
Salen 2009, US; ED; N/R	N = 100; age ≥65 y; 9%	Age ≥65 y, English-speaking community-dwelling people seen in a community hospital ED	Presenting for altered mentation, evidence of critical illness as reflected by abnormal vital signs (systolic blood pressure 100 mm Hg, pulse 100 beats/min, temperature 37.8 °C (100 °F), pulse-oximetry 95% on room air), lived in a nursing home or in an assisted-living situation, history of dementia or delirium, or if they refused to participate.	Primary objective of this study was to assess the prevalence of cognitive impairment as reflected by an inability to correctly perform a CDT in older adult patients presenting to the ED for reasons other than altered mental status. Also sought to assess whether an ED cognitive impairment screening program as reflected by an abnormal CDT prompted further evaluation of mental functioning by primary care physicians.	CDT	Yes	The CDT seems to be a feasible means for identifying older adult ED patients at risk for cognitive disorders. Routine cognitive screening of older adults with the CDT seems to be well accepted by patients and families, but the sporadic follow-up by PCPs suggests a role for more aggressive ED interventions to delineate the causes of abnormal cognitive screening examinations.	
Samaras 2010				This is a review article of older adult patients in the ED.	CAM and SIS	No		Mentions the need to identify dementia and delirium
Sanders 1995				This is an editorial regarding a Naughton et al article published in the same issue. The editorial mentions the CAM, a standard OMCT MMSE				
Sanders 2007				The article is a commentary.				

Schnitker 2015*, Australia; ED; 2012-2013	N = 580; age ≥ 70 y; 80.3 ± 6.7 y; 33%	Age ≥70 y, seen at one of 4 hospitals in Australia	(1) Stayed >2 h in ED before the research nurse was available to approach them; (2) were severely ill; (3) had consented for the study during a previous ED visit; (4) required an interpreter and where no suitable interpreter could be found in a timely manner (2 h); or (5) who were not able to participate in the planned phone follow-up (7 and 28 d post ED visit)	The study team assessed 11 process quality indicators	OMCT	No		As it is considered currently, the OMCT is a cognitive screening tool with the most optimal psychometric properties tested (ie, MMSE was used as the reference standard) in the older ED population
Schoenenberger 2014			The article discusses geriatric screening/ assessment tools: Short blessed test, CAM, Timed up and go, ADL, EGS (discussed in article below)		No		
Schoenenberger 2014, Switzerland; University hospital ED; June 2012−February 2013	N = 1547 (752 control, 795 screening); age ≥75 y; 82.8 ± 5.1 y (control), 82.7 ± 5 y (screening); N/R; N/R	Age ≥75 y, ED patient	None	Authors developed a novel multidimensional EGS tool (has 15 questions). ED physicians were trained in its use during the control period, June-October 2012. October 2012−June 2013 was the screening period.	The tool met the following prerequisites: (1) EGS is multidimensional and covers relevant domains of geriatric problems; (2) EGS uses validated instruments; and (3) EGS must be feasible in an ED. The domains were relevant for older ED patients: cognition, falls, mobility, and ADL	Yes	EGS took <5 min to perform in most (85.8%) cases. Of the 70 invited ED physicians, 41 (64.1%) returned the questionnaire that asked about their experience with the EGS. Most responders agreed or partially agreed that EGS domains are suited to detect geriatric problems: 73.0% agreed or partially agreed for cognition; 77.8%, for falls; 75.0%, for mobility; and 72.2%, for ADL	

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Shenkin 2019, UK; ED and inpatient; not stated	N = 785; age ≥70 y; mean age 81.4 y (SD 6.4); 9% with known dementia; 0	Patients aged ≥70 y in ED or inpatient		Participants assessed within 12 h of coming to ED or 96 h as an inpatient	Delirium Rating Scale −Revised-98, CAM, 4AT (www.the4AT.com) 4AT takes <2 min to complete	Yes	Compared the diagnostic accuracy of the 4AT to the other screens for delirium. The 4AT had an AUC of 0.90. The 4AT had specificity of 95% (95% CI 92-97) and sensitivity of 76% (95% CI 61-87). The CAM had specificity of 100% (95% CI 98-100) and sensitivity of 40% (95% CI 26-57). Patients with positive 4AT had longer lengths of stay (median 5 d, IQR 2.0-14.0) than negative 4AT (median 2 d, IQR 1.0-6.0) and higher mortality. Cognitive test items of the 4AT were highly specific (AMT4 score 2:97% 94%-98%); attention score of 2: 98% (96%-99%); but showed lower sensitivity (AMT4 score 2: 47% 32%-62%); attention score of 2: 62% (36%-83%) in detecting existing dementia. Conclusions: The 4AT is a rapid delirium assessment instrument that is feasible in routine care, including with patients with dementia, which has good diagnostic accuracy for delirium for acutely unwell older patients	

Singh 2013	The objective was to review published evidence on the Rapid Assessment Interface and Discharge (RAID) service model, examining the strengths and weaknesses of the service design, outcome, and effectiveness. The RAID service has shown quality improvement in the care of older people by reducing their length of stay, avoiding their admission to acute hospital beds, and discharging them in increased numbers back to their original place of residence, rather than an institution or care home. In addition, the RAID model has been shown to reduce the readmission rate after discharge by 65% in comparison with a pre-RAID group. The psychiatric liaison service can support the management of behavioral and psychological symptoms in patients with dementia; an audit of antipsychotic prescriptions for people with dementia has showed a 52% reduction in antipsychotic prescriptions for people with dementia between 2008 and 2011. The RAID service could have contributed to reduced antipsychotic prescriptions, but this was not actually studied as part of the evaluation.	No	The RAID service has shown quality improvement in the care of older people by reducing their length of stay, avoiding their admission to acute hospital beds, and discharging them in increased numbers back to their original place of residence, rather than an institution or care home. In addition, the RAID model has been shown to reduce the readmission rate after discharge by 65% in comparison with a pre-RAID group. The psychiatric liaison service can support the management of behavioral and psychological symptoms in patients with dementia; an audit of antipsychotic prescriptions for people with dementia has showed a 52% reduction in antipsychotic prescriptions for people with dementia between 2008 and 2011. The RAID service could have contributed to reduced antipsychotic prescriptions, but this was not actually studied as part of the evaluation.

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Stair 2007*, Urban teaching hospital, ED, June 2002 −October 2003	N = 684, age ≥18 y, mean 48 ± 18 y, N/R, 0	Age ≥18 y, speak English or Spanish, ability to answer questions		Research assistants would ask the participants, "How many years of school have you completed?" then would flip a coin to determine if MMSE or QCS would be asked first. Time to complete both tests was recorded	MMSE or QCS	Yes	Researchers found that the QCS required less time to complete than the MMSE (2.7 ± 1.3 vs 5.1 ± 1.9 mean; $P <$ .001). Correlation of QCS and MMSE scores was fair, with Pearson $r = 0.61$ (95% CI 0.56-0.66). Conclusions: The QCS can be administered more quickly than the MMSE and is easier to administer in the ED	
Sunkara 2019, NY; ED; March 1−July 1, 2018	N = 418, age ≥ 75 y, 41.15% screened positive, 80	ED patients aged ≥75 y likely to be discharged home, English or Spanish speaking		Not reported	Mini-Cog (if participant could answer), IQCODE if participant could not respond	No		Cognitive impairment screening is feasible in the ED and many individuals screen positive. Use of a volunteer workforce may be a feasible interim step to implementing a sustainable program while increasing learners' exposure to positive geriatric care experiences.

Taylor 2018		Older adults aged ≥65 y presenting to the ED Administration of a functional and/or cognition assessment instrument whilst the patient is in any part of the ED setting •Clinical assessment tools addressing any aspect of functional ability, and/or cognition assessment •The study must include an intervention of any description resulting from the outcome of the instrument administration•There must be a measured outcome as a result of the ED-based intervention	Evaluation of an assessment instrument as the primary outcome •Studies that target an intervention of 1 primary diagnostic criterion eg stroke •Assessments or interventions not performed in the ED environment •Studies only targeting residents of residential aged care facilities (RACFs)		Scoping review identified 6 measures used for cognitive and delirium screening instruments: AMT, CAM, Blessed Orientation-memory Concentration (BOMC), MMSE, Mini-Cog, Short Portable Status Questionnaire (SPMSQ)			Only 2 of the screens, Mini-Cog and MMSE, have been tested for use in ED. Mini-Cog has a drawing section that is a limitation for use in ED. There was no standard time to administer one of the screens. Authors note that doing them early in a patient's visit would help provide needed information that could impact patient disposition.
Wilber 2006				Not a study. Article described mental status screening tests		No		MMSE not useful in ED as difficult to preform, patients may have vision, hearing or writing limitation, takes a median of 6 min to do. Article mentioned screens studied for ED use including the OMCT, CDT, Mini-Cog, and SIS
Wilber 2005, Summa Health System's; ED; fall 2003	149; age ≥65 y; mean age 75 y; 23%, 0	Age ≥65 y, English speaking	Unable or unwilling to perform testing, those who were medically unstable, and those who received medications during the study that could affect their mental status.	Treating physician conducted SIS or Mini-Cog as directed, ≥30 min later an investigator conducted MMSE	SIS, Mini-Cog, MMSE	Yes	SIS agreed with MMSE 88%, and Mini-Cog agreed 83%. Previous study showed patients completed the SIS in <1 min (range, 0.5-3.5 min) and Mini-Cog took 1.5 min (0.5-5 min). MMSE takes a median of 5.5 min (range, 3.5-14 min) to complete.	

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Wilber 2008*, Summa Health System's Akron City Hospital, Washington University, Barnes-Jewish Hospital, The Cleveland Clinic; ED; January 2006—January 2007	352 participants, age ≥65 y, mean age 77 ± 8; 32%; 0 care partner	Age 65 y; English speaking	Receiving medications that may have affected their mental status (narcotics, antiemetics, or benzodiazepines), were critically ill, were unable to consent or cooperate with data acquisition, were previously enrolled, or refused to complete the questioning	At Sites 1 and 3, the SIS was administered first, and the MMSE was administered a minimum of 30 min later. At Site 2, the MMSE was administered first, and the SIS was administered a minimum of 30 min later.	MMSE, SIS	No		Compared sensitivity and specificity of SIS to MMSE. Overall, the SIS was 63% sensitive and 81% specific; the NPV was 83% and the PPV was 60% (Table 1). The overall agreement between the 2 tests was 75%. However, we believe that the SIS, testing temporal orientation and recall, is quick and easy for EPs to incorporate into their physical examination. It provides an objective measure of cognition, as opposed to the unstructured evaluation of cognition by clinical gestalt (often expressed as A&Ox3).

Wilding 2016*, Ontario Canada; ED; January 1, 2010, to August 31, 2010	N = 238; age ≥75 y; mean age 81.9 y; 13.4%; 0	Patients aged ≥75 y with no history of cognitive impairment	Medically unstable; cognitively impaired; not living in Ottawa; reside in nursing home; non-English or French speaking; hearing/visual impairment	MMSE, O3DY, and AFT. MMSE and O3DY were administered followed by AFT	MMSE, O3DY, and AFT	No		The O3DY Scale demonstrated a sensitivity of 93.8% (95% CI 77.8-98.9) and a specificity of 72.8% (95% CI 66.1-78.7). The MMSE and O3DY scale showed agreement in 75.6% of cases. An AFT score <15 demonstrated a sensitivity of 90.6% (95% CI 73.8-97.5) and specificity of 39.3% (95% CI 32.7-46.4). Using a cutoff of <10 for the AFT resulted in a lower sensitivity of 62.5% (95% CI 43.7-78.3) but greater specificity of 78.2% (95% CI 71.8-83.5). The MMSE and the AFT showed agreement in 46.2% and 76.1% of cases with cutoffs of <15 and <10, respectively. The O3DY scale is a feasible screening tool for cognitive impairment in older adult patients presenting to the ED. It is highly practical for use in the time-pressured ED environment, and it does not require paper, pen, or stopwatch. It showed high sensitivity and moderate specificity compared with the MMSE. The AFT did not perform as well, with a much diminished specificity.
Wilkinson 2018, Canada; ED	N = 147; age 70-94 y			A "Whack-a-mole" style computer game was created to discern inhibition ability in a geriatric population in the ED. The results of the game were then compared to MMSE, MoCA, and CAM evaluations.	The developed game had a correlation to MMSE, MOCA, or CAM, determined as, respectively, −0.558, −0.339, and 0.565 (all with $P < .001$)	No	No	No
Yamamoto 2019, Japan; hospital ED; October 1, 2014, to September 30, 2015	N = 885; age >50 y; mean age 78.9 y; 10% history of dementia (n = 89, mean age 85.0 ± 6.53 y); 0 care partner	Non−critically ill patients aged >50 y admitted to the ED	Admitted with critical diseases, receiving sedative medication, unable to consent, or who refused to participate, and those with more than 1 wk of hospitalization	Participants approached in ED	Short-term memory recall test (STMT-R) a revised version of the STMT	Yes	Short-term memory recall test (STMT-R), The test is normally completed within 2 min, but some participants were unable to complete the questionnaire within 5 min	

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Zun 1986, mailed survey	N = 170 Board-certified ED physicians	ED Board-certified physician	N/R	Random sample of 120 of 1174 American Board of Emergency Medicine—certified emergency physicians and a validation group of 50 Board-certified ED physicians were surveyed by questionnaire.	Authors developed a questionnaire to determine the indications, the amount of time necessary to evaluate mental status, the content of the mental status examination (MSE) used, and the ideal characteristics of a short, standardized MSE. The Strub and Black's Composite Mental Status Examination (CMSE) was used as the standard example for answering the questionnaire	Yes	72% of respondents said they take <5 min on the MSE	No
Zun 1988						No	N	Some physicians view the mental status evaluation as a series of odd maneuvers and questions that appear time-consuming and of questionable clinical significance. "Emergency departments are places where physicians have limited time to examine patients. Texts in emergency medicine have advocated the need to perform formal mental status examinations. However, many physicians find the formal mental status examination time-consuming and cumbersome." An extensive test is rarely necessary in the ED; rather a short test of cognitive function, such as the Cognitive Capacity Screening Examination or MMSE, may be more appropriate.

4AT, 4 A's Test; AD8, Alzheimer's Disease-8; ADL, activities of daily living; ADRD, Alzheimer's disease and related dementias; AFT, Animal Fluency Test; AMT, Abbreviated Mental Test; APOP, acutely presenting older patient; ASET, Aged Care Service Emergency Teams; AUC, area under the curve; BAS, Brief Alzheimer's Screen; BRIGHT, Brief Risk Identification for Geriatric Health Tool; cAD8, caregiver-completed Alzheimer's Disease-8; CAM-ICU, Confusion Assessment Method—Intensive Care Unit; CDT, Clock-Drawing Test; CFS, clinical frailty scale; ED, emergency department; EGS, Emergency Geriatric Screening; GCS, Glasgow Coma Scale; IQCODE, Informant Questionnaire for Cognitive Decline; LOS, length of stay; MMSE, Mini-Mental State Examination; MoCA, Montreal Cognitive Assessment; N/A, not applicable; NPV, negative predictive value; N/R, not reported; OARS, Older American Resources and Services scale; O3DY, Ottawa 3DY; OMCT, Orientation Memory Concentration Test; PDSA, plan-do-study-act; PPV, positive predictive value; QCS, Quick Confusion Scale; qSOFA, Quick Sequential Organ Failure Assessment; RA, research assistant; SBT, Short Blessed Test; 6-CIT; Six-Item Cognitive Impairment Test; SIS, Six Item Screener; sMMSE, standardized MMSE; TAP, Treatment Acceptability and Preferences.