

PICO SEARCH ASSIGNMENT WORKSHEET

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Brief description of patient problem/setting (summarize the case very briefly)

A 70 yo Caucasian male veteran residing in a VA long-term care facility with significant PMHx of Parkinson's disease, presented after a fall from his wheelchair. He reported that "the world was spinning" prior to the fall and was found face down by nursing staff. He also endorses new urinary symptoms, including dysuria and cloudy urine, raising concern for possible UTI. Given his acute change in mental status and risk factors for delirium, the clinical team must determine whether use of a standardized delirium screening tool such as Confusion Assessment Method (CAM) would improve early detection compared to routine clinical assessment alone.

Search Question: Clearly state the question (including outcomes or criteria to be tracked)

In elderly patients who specifically reside in long-term care facilities, does the use of the Confusion Assessment Method (CAM), compared to non-standardized clinical assessment, reduce missed delirium diagnoses and improve clinical outcomes such as hospitalization or mortality?

Question Type: What kind of question is this? (boxes now checkable in Word)

☐ Prevalence

☒ **Screening**

☐ Diagnosis

☐ Prognosis

☐ Treatment

☐ Harms

Assuming that the highest level of evidence to answer your question will be meta-analysis or systematic review, what other types of study might you include if these are not available (or if there is a much more current study of another type)?

Please explain your choices

If meta-analysis or systematic review is not available, I would include:

- **Randomized Controlled Trials (RCTs)**- evaluating the implementation of CAM in long-term care settings compared to routine assessment, as these studies can show effectiveness and improved outcomes.
- **Prospective cohort studies**- examining delirium detection rates and subsequent clinical outcomes like hospitalization, mortality, and length of stay, in facilities that routinely use CAM vs. those who do not. Its especially helpful in geriatrics compared to RCTs may be limited due to ethical or logistical challenges.
- **Retrospective cohort studies or database studies**- using VA or Medicare data would be important to assess real-world outcomes such as missed delirium diagnoses, hospital admissions and mortality rates. These studies can capture large elderly populations and provide clinical practice patterns

PICO search terms:

P	I	C	O
Elderly LTC residents	Confusion Assessment Method (CAM)	Usual clinical assessment	Delirium detection
Age 65 and older in nursing homes	CAM screening	No screening tool	Missed delirium diagnoses
LTC residents	Delirium screening tool	Non-standardized assessment	Hospitalization
Geriatric patients		Routine evaluation	Mortality

Search tools and strategy used:

Please indicate what databases/tools you used, provide a list of the terms you searched together in each tool, and how many articles were returned using those terms and filters.

Explain how you narrowed your choices to the few selected articles. For example, if your search returned 25 articles among the several databases used, what was the process used to determine which four articles to use?

Database	Search Term Used	# of Results	Filters/Limiters Applied	Notes/Observers
PubMed	("delirium") AND ("long-term care" OR "nursing home" OR "LTC facility") AND ("Confusion Assessment Method" OR CAM) AND ("mortality" OR "falls" OR "cognitive decline" OR "hospitalization" OR "ADL")	18 results	Last 5 years, Free full text, English, Human studies, Aged: 65+ years, Systematic reviews, scoping review, Meta-analyse, Observational studies	I focused on long-term care settings and negative outcomes of delirium. Selected a 2025 scoping review examining mortality, cognitive decline, falls, and functional decline in LTC residents. The article emphasizes differences in assessment tools, with CAM being the most common diagnostic method in LTC settings.
Science Direct	("delirium") AND ("Confusion Assessment Method" OR CAM) AND ("long-term care" OR "nursing home" OR "skilled nursing facility") AND ("elderly" OR "aged 65 and over") AND ("diagnostic accuracy" OR "sensitivity and specificity" OR "screening")	36 results	2020, 2021, 2022, 2023, 2024, 2025, 2026, review articles, English, Research articles, Clinical studies, Observational studies	Most studies focused on accuracy of diagnosis in hospitalized older adults rather than exclusively to long-term care residents. I reviewed systematic reviews and cohort studies evaluating sensitivity, specificity and missed delirium diagnoses when CAM is compared to usual clinical assessment.
Cochrane Library	("delirium") AND ("Confusion Assessment Method" OR CAM-ICU) AND ("diagnostic accuracy")	104 results	Systematic reviews only	This Cochrane review evaluates the diagnostic accuracy of CAM-ICU when compared to standard clinical assessment. Although conducted in critical care settings, it shows that structured CAM tools have high specificity and good sensitivity for detecting delirium.

I used three databases, PubMed, Science Direct, and the Cochrane Library to find articles that addressed my PICO question on whether use of the Confusion Assessment Method (CAM), compared to routine evaluation, improves delirium diagnoses, detection, and clinical consequences in geriatric patients. I searched terms like "delirium" "Confusion Assessment Method" "CAM" "diagnostic accuracy" "long-term care" "hospitalization" and "mortality", applying filters for English, human studies, recent publications, along with study type. The Cochrane review provided high-level evidence on CAM diagnostic accuracy and the ScienceDirect and PubMed articles also supported structured screening over routine assessment. I excluded studies that focused on treatment rather than delirium detection or outcomes.

Results found:

Identify at least 3 articles (or other appropriate reputable sources) that answer your specific question

with the highest available level of evidence (you will probably need to look at more than 3 articles to get the 3 most focused and highest-level articles to address your question). Please make sure that they are Medline indexed.

In addition to providing the hyperlinks, the full-length articles (PDFs) must also be attached in Brightspace.

Please post the citation and abstract for each article (to include the journal and authors' names and date) and say why you chose it.

Please also note what kind of article it is (e.g. meta-analysis, cohort study, or independent blind comparison with gold standard of diagnosis, etc.).

At the bottom of each abstract, please comment on what your key points are from this article (including any points or concepts included in the article, but not present in the abstract – i.e. make the concepts understandable to the reader)

Please note that if the evidence is not in the abstract, you must clearly summarize the evidence in your posting.

1. Chia-Jou Lin, I.-Chang Su, Sheng-Wen Huang, Pin-Yuan Chen, Victoria Traynor, Hui-Chen (Rita) Chang, I.-Hsing Liu, Yun-Shuan Lai, Hsin-Chien Lee, Kaye Rolls, Hsiao-Yean Chiu, Delirium assessment tools among hospitalized older adults: A systematic review and metaanalysis of diagnostic accuracy, *Ageing Research Reviews*, Volume 90, 2023, 102025, ISSN 1568-1637, <https://doi.org/10.1016/j.arr.2023.102025>.

Type: Systematic review and Meta-analysis

A B S T R A C T

Delirium is a common neuropsychiatric syndrome that is often overlooked in clinical settings. The most accurate instrument for screening delirium has not been established. This study aimed to compare the diagnostic accuracy of the 4 'A's Test (4AT), Nursing Delirium Screening Scale (Nu-DESC), and Confusion Assessment Method (CAM) in detecting delirium among older adults in clinical settings. These assessment tools feature concise item sets and straightforward administration procedures. Five electronic databases were systematically searched from their inception to September 7, 2022. Studies evaluating the sensitivity and specificity of the 4AT, Nu-DESC, and CAM against the *Diagnostic and Statistical Manual of Mental Disorders* or *International Classification of Diseases* as the reference standard were included. Bivariate random effects model was used to summarize the sensitivity and specificity results. A total of 38 studies involving 7378 patients were included. The 4AT, Nu-DESC, and CAM had comparable sensitivity in detecting delirium (0.76, 0.78, and 0.80, respectively). However, the specificity of the CAM was higher than that of the 4AT (0.98 vs 0.89, $P = .01$) and Nu-DESC 0.99 vs 0.90, $P = .003$). Diagnostic accuracy was moderated by the percentage of women, acute care setting, sample size, and assessors. The three tools exhibit comparable sensitivity, and the CAM has the highest specificity. Based on the feasibility of the tools, nurses and clinical staffs could employ the Nu-DESC and the 4AT on screening out positive delirium cases and integrate these tools into daily practice. Further investigations are warranted to verify our findings.

I chose this article because it is a more recent systematic review/meta-analysis that focuses on diagnostic accuracy of delirium assessment tools in geriatric patients who are hospitalized. Since my PICO question focuses on whether CAM improves detection compared to routine clinical assessment, this study directly tackles that by analyzing sensitivity and specificity across multiple different tools. It also provides high-level evidence by collecting data from several studies, increasing its reliability. Additionally, the focus on elderly patients makes it clinically relevant to long-term care populations, where delirium is often underdiagnosed. Although the study doesn't directly measure hospitalization or mortality, its results show that structured tools such as CAM, CAM-ICU, 4AT, Nu-DESC, Delirium Rating Scale and Memorial Delirium Assessment Scale significantly improve diagnostic accuracy in older adults, which then reduces missed delirium cases and supports earlier clinical intervention.

2. Takeya Y, Arai H. Delirium in the long-term care: a challenge for clinicians and researchers-the negative outcomes related to delirium: a scoping review. *Eur Geriatr Med*. 2025 Dec;16(6):1961-1970. doi: 10.1007/s41999-025-01274-0. Epub 2025 Oct 12. PMID: 41076610; PMCID: PMC12743706.

Type: Narrative Review

Abstract

Background Most previous studies on the outcomes of delirium have focused on acute care hospital settings. However, the number of residents in long-term care (LTC) facilities is increasing, and these individuals are at risk of experiencing adverse outcomes related to delirium. Recent studies suggest that delirium in LTC settings is associated with serious consequences—such as increased mortality, cognitive decline, and reduced physical function—similar to those reported in acute care. However, high-quality studies specific to this population remain limited.

Purpose This scoping review aimed to identify adverse outcomes associated with delirium in long-term care settings and to explore appropriate outcome measures for future research.

Methods This scoping review was conducted in accordance with the Joanna Briggs Institute methodology and adhered to the PRISMA-ScR checklist to identify studies examining adverse outcomes of delirium in LTC settings. MEDLINE, EMBASE, and Web of Science were searched on May 2025.

Results A total of 14 studies met the inclusion criteria. Delirium was defined and evaluated using a variety of assessment tools, including DSM-IV-based algorithms, the Confusion Assessment Method (CAM), and the Short-CAM (S-CAM). Follow-up durations ranged from 1 week to 2 years. Despite substantial heterogeneity in study designs and outcome measures, multiple studies identified associations between delirium and adverse outcomes, such as increased mortality, cognitive decline, falls, and deterioration in activities of daily living (ADL).

Conclusions This scoping review provides insight into adverse outcomes of delirium in LTC settings and the inherent heterogeneity across LTC settings.

Keywords Delirium · Outcome · Older adults · Long-term care · Nursing home

I chose this article because it focuses on delirium specifically in long-term care or residential settings, which aligns with my PICO population. The article is a comprehensive review that synthesizes evidence regarding the prevalence, outcomes, and clinical significance of delirium amongst elderly in institutional care. It explains that delirium is a common illness in patients aged 65 and over and can lead to serious consequences of increased mortality, cognitive and functional decline, falls and hospital transfers. The review discusses how often delirium can be misdiagnosed or missed altogether because of the setting of care, which reinforces the need for structured screening tools such as CAM. While it doesn't directly compare CAM to non-standardized assessments, the article shows that these tools are necessary for

early detection and are more reliable in non-acute settings. This supports the rationale behind my PICO question, as improved detection is a necessary step towards reducing missed diagnoses and ultimately clinical outcomes in this high-risk population.

3. Miranda F, Gonzalez F, Plana MN, Zamora J, Quinn TJ, Seron P. Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) for the diagnosis of delirium in adults in critical care settings. Cochrane Database of Systematic Reviews 2023, Issue 11. Art. No.: CD013126. DOI: 10.1002/14651858.CD013126.pub2. Accessed 20 February 2026.

Type: Systematic review

ABSTRACT

Background

Delirium is an underdiagnosed clinical syndrome typified by an acute alteration of mental state. It is an important problem in critical care and intensive care units (ICU) due to its high prevalence and its association with adverse outcomes. Delirium is a very distressing condition for patients, with a huge impact on their well-being. Diagnosis of delirium in the critical care setting is challenging. This is especially true for patients who are mechanically ventilated and are therefore unable to engage in a verbal interview.

The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) is a tool specifically designed to assess for delirium in the context of ICU patients, including those on mechanical ventilation. CAM-ICU can be administered by non-specialists to give a dichotomous delirium present/absent result.

Objectives

To determine the diagnostic accuracy of the CAM-ICU for the diagnosis of delirium in adult patients in critical care units.

Search methods

We searched MEDLINE (Ovid SP, 1946 to 8 July 2022), Embase (Ovid SP, 1982 to 8 July 2022), Web of Science Core Collection (ISI Web of Knowledge, 1945 to 8 July 2022), PsycINFO (Ovid SP, 1806 to 8 July 2022), and LILACS (BIREME, 1982 to 8 July 2022). We checked the reference lists of included studies and other resources for additional potentially relevant studies. We also searched the Health Technology Assessment database, the Cochrane Library, Aggressive Research Intelligence Facility database, WHO ICTRP, ClinicalTrials.gov, and websites of scientific associations to access any annual meetings and abstracts of conference proceedings in the field.

Selection criteria

We included diagnostic studies enrolling adult ICU patients assessed using the CAM-ICU tool, regardless of language or publication status and reporting sufficient data on delirium diagnosis for the construction of 2 x 2 tables. Eligible studies evaluated the diagnostic performance of the CAM-ICU versus a clinical reference standard based on any iteration of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* criteria applied by a clinical expert.

Data collection and analysis

Two review authors independently selected and collated study data. We assessed the methodological quality of studies using the QUADAS-2 tool. We used two univariate fixed-effect or random-effects models to determine summary estimates of sensitivity and specificity. We performed sensitivity analyses that excluded studies considered to be at high risk of bias and high concerns in applicability, due mainly to the target population included (e.g. patients with traumatic brain injury). We also investigated potential sources of heterogeneity, assessing the effect of reference standard diagnosis and proportion of patients ventilated.

Main results

We included 25 studies (2817 participants). The mean age of participants ranged from 48 to 69 years; 15 of the studies included critical care units admitting mixed populations (e.g. medical, trauma, surgery patients). The percentage of patients receiving mechanical ventilation ranged from 11.8% to 100%. The prevalence of delirium in the studies included ranged from 12.5% to 83.9%. Presence of delirium was determined by the application of *DSM-IV* criteria in 13 out of 25 included studies. We assessed 13 studies as at low risk of bias and low applicability concerns for all QUADAS-2 domains. The most common issue of concern was flow and timing of the tests, followed by patient selection.

Overall, we estimated a pooled sensitivity of 0.78 (95% confidence interval (CI) 0.72 to 0.83) and a pooled specificity of 0.95 (95% CI 0.92 to 0.97).

Sensitivity analysis restricted to studies at low risk of bias and without any applicability concerns (n = 13 studies) gave similar summary accuracy indices (sensitivity 0.80 (95% CI 0.72 to 0.86), specificity 0.95 (95% CI 0.93 to 0.97)).

Subgroup analyses based on diagnostic assessment found summary estimates of sensitivity and specificity for studies using *DSM-IV* of 0.79 (95% CI 0.72 to 0.85) and 0.94 (95% CI 0.90 to 0.96). For studies that used *DSM-5* criteria, summary estimates of sensitivity and specificity were 0.75 (95% CI 0.67 to 0.82) and 0.98 (95% CI 0.95 to 0.99). *DSM* criteria had no significant effect on sensitivity ($P = 0.421$), but the specificity for detection of delirium was higher when *DSM-5* criteria were used ($P = 0.024$). The relative specificity comparing *DSM-5* versus *DSM-IV* criteria was 1.05 (95% CI 1.02 to 1.08).

Summary estimates of sensitivity and specificity for studies recruiting < 100% of patients with mechanical ventilation were 0.81 (95% CI 0.75 to 0.85) and 0.95 (95% CI 0.91 to 0.98). For studies that exclusively recruited patients with mechanical ventilation, summary estimates of sensitivity and specificity were 0.91 (95% CI 0.76 to 0.97) and 0.98 (95% CI 0.92 to 0.99). Although there was a suggestion of differential performance of CAM-ICU in ventilated patients, the differences were not significant in sensitivity ($P = 0.316$) or in specificity ($P = 0.493$).

Authors' conclusions

The CAM-ICU tool may have a role in the early identification of delirium, in adult patients hospitalized in intensive care units, including those on mechanical ventilation, when non-specialized, properly trained clinical personnel apply the CAM-ICU. The test is most useful for exclusion of delirium. The test may miss a proportion of patients with incident delirium, therefore in situations where detection of all delirium cases is desirable, it may be best to repeat the test or combine CAM-ICU with another assessment. Future studies should compare different screening tests proposed for bedside assessment of delirium, as this approach will reveal which tool yields superior accuracy. In addition, future studies should consider and report the flow and timing of the tests and clearly report key characteristics related to patient selection. Finally, future research should focus on the impact of CAM-ICU screening on patient outcomes.

I selected this article because it is a high-level Cochrane systematic review that evaluates the diagnostic accuracy of the CAM-ICU for detecting delirium. Cochrane reviews are considered strong source of evidence because they use extensive search methods, carefully define inclusion criteria, and ensures bias reduction and improved reliability by critically appraising study quality, assessing risk of bias, and synthesizing data using transparent and standardized methods. Since my PICO question focuses on whether structured screening tools can improve delirium detection compared to routine check up, this review directly supports that by collecting sensitivity and specificity across multiple studies. Although the population studied was in a critical setting, the evidence supports the broader principle that standardized delirium assessment tools improve detection and reduce missed diagnoses in older adults.

What is the clinical “bottom line” derived from these articles in answer to your question?

Based on all the articles I have reviewed, the clinical bottom line is that structured delirium screening tools such as CAM, improve detection of delirium in elderly patients compared to relying solely on routine clinical assessment. Evidence has consistently shown that standardized tools have measurable sensitivity and specificity, meaning they are more reliable at defining true cases of delirium and reduce missed diagnoses. Although not all studies measure outcomes like hospitalization or mortality, earlier and more accurate recognition of delirium allows for faster intervention and identifying underlying causes like infection, and prevention of complications. Delirium is often subtle or misdiagnosed as

baseline dementia, especially in settings of long-term care and nursing home residency. It is important, especially in these high-risk populations to do routine CAM testing in addition to standard clinical assessment to provide the best and earliest treatment as well as avoid fatal complications.