Instrument	modified Confusion Assessment Method for the Emergency Department NOTE: This card is populated with information from the instrument's original validation study only.
Acronym	mCAM-ED
Primary use	Delirium screening
Area assessed (Number of questions)	Addresses 4 core features: Acute onset or fluctuating course; Inattention; Disorganized thinking; Altered level of consciousness (15 Items)
Description	The mCAM-ED is based on the original CAM algorithm, modified to screening for inattention using the months of the year in reverse order from the Bedside Confusion Scale by nurses in the emergency department. If inattention is present, then proceed to the MSQ and The Comprehension Test, a subdomain for the Cognitive Test for Delirium
Versions	1
Scoring information	To score inattention: Every omission (from months of the year in reverse order) is scored 1 point, a delay >30 seconds scored 1 additional point. Inattention was present with a score of >2. If inattention present, Mental Status Questionnaire (MSQ) is used to determine altered cognition; if >2 errors are made, then altered cognition is present. Disorganized thinking is tested with The Comprehension Test, present if >2 errors. Altered level of consciousness and fluctuating course are assessed using patient observation during the interview.
Cognitive testing	Months of year backwards, Mental Status Questionnaire (MSQ), The Comprehension Test (from Cognitive Test for Delirium)
Administer to	Patients, in person
Estimated time to rate	1 minute to score attention, 3-5 minutes to complete full assessment
Require trained rater	Yes – trained lay raters or ED nurses, physicians, or other clinicians
How to obtain	Available in https://doi.org/10.1186/1757-7241-22-19 (development) https://doi.org/10.1007/s11739-017-1781-y (validation), (Note-article may be behind paywall); mCAM-ED English version: http://demdel.hasemann.info/mCAM-ED_EnglishVersion.pdf ; mCAM-ED German version http://demdel.hasemann.info/mCAM-ED_GermanVersion.pdf MSQ available at: https://doi.org/10.1176/ajp.117.4.326 The Comprehension Test available at http://dx.doi.org/10.1016/S0033-3182(96)71517-7
Licensing Fee*	None
Languages available	English, German
Highest COSMIN** rating	3/6[†]
Test Performance Characteristics	**Hasemann W. et al. Intern Emerg Med. 2018;13:915-922** Validation study in N=283 consecutive ED patients; Reference standard: geriatrician rating using DSM-IV-TR criteria. Sensitivity: 0.90[a] (0.70; 0.97) Specificity: 0.98 (0.95; 0.99) Positive predictive value: 0.75 (0.55; 0.88) Negative predictive value: 0.99 (0.97; 1.00) Note: The sensitivity of the rule out procedure with was 0.95 (CI 0.76; 0.99) for DSM-IV-TR and the negative likelihood ratio was 0.06 (CI 0.01; 0.39)

* Fees and licensing information is effective as of 2021, but is subject to change over time

** COSMIN is used to rate a study's evaluation of a survey or test's measurement properties. COSMIN does NOT rate the instrument itself, but helps readers understand if they can have confidence in the results of studies evaluating measurement properties of surveys and tests. For example, a rigorous study evaluating a test with poor measurement properties will receive a "good" COSMIN rating, while a poorly-conducted study evaluating a test with good measurement properties will receive a "poor" COSMIN rating. Small sample size can impact all COSMIN ratings. You must consider both the COSMIN rating and the results of studies provided when forming your opinion about that test. *COSMIN ratings shown are based solely on the instrument's original validation study.*

† COSMIN breakdown of 2018 article: content validity: GOOD, effect indicators: GOOD, internal consistency: NONE, inter-rater reliability: NONE, construct validity: NONE, external validity:Good

Reference:

Hasemann, W., Grossmann, F. F., Stadler, R., Bingisser, R., Breil, D., Hafner, M., Kressig, R. W., & Nickel, C. H. (2018). Screening and detection of delirium in older ED patients: performance of the modified Confusion Assessment Method for the Emergency Department (mCAM-ED). A two-step tool. Internal and Emergency Medicine, 13(6), 915-922. https://doi.org/https://doi.org/10.1007/s11739-017-1781-y/ Validation study.

Grossmann FF, Hasemann W, Graber A, Bingisser R, Kressig RW, Nickel CH. Screening, detection and management of delirium in the emergency department–a pilot study on the feasibility of a new algorithm for use in older emergency department patients: the modified Confusion Assessment Method for the Emergency Department (mCAM-ED). Scandinavian journal of trauma, resuscitation and emergency medicine. 2014;22(1):19. Development study.