

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: DSM III-R

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Cole 2003 case control study; study held in Canada.</p> <p>Setting: Hospital. Patients admitted from the emergency department to the medical services.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients aged 65 years and over who were admitted from the emergency department to the medical services.</p> <p>Exclusion criteria: Patients with a primary diagnosis of stroke, those admitted to the oncology unit, ICU or cardiac monitoring unit [unless they were transferred to medical ward within 48h of admission], & those who did not speak English or French.</p> <p>Patient characteristics: age: 83 years (72 to 91); sex: 37% male; Patients who did not speak English or French excluded</p> <p>Comorbidities: Not reported. Other details: 9.6% were living in nursing home prior to admission, 19% in senior residence or foster home, and 71% were living at home alone or at home with others;</p> <p>Other study comments: oStudy was a secondary analysis of data collected in 2 concurrent studies on delirium: RCT of mgmt of delirium & prospective study of the prognosis of delirium that incl non delirious pts; oResults for whole sample, patients w/dementia, patients without dementia; oPts transferred to LTC, language barrier, previously enrolled in study, communication problems, refused screening, residing outside geographic area, not sampled or missed, died were excluded following enrollment.oReference standard was DSM III R and Index test was DSM IV but both used same symptoms, so we turned this round.</p>	<p>Index test: DSM III-R:the study gave CAM to patients with SPMSQ score ≥ 3 or delirium symptoms in notes; then 10 CAM symptoms of delirium appeared to be used to determine DSM III R; time: not stated (n=322)</p> <p>Reference standard: DSM IV; the study gave CAM to patients with SPMSQ score ≥ 3 or delirium symptoms in notes; then 10 CAM symptoms of delirium appeared to be used to determine the reference standard; time not stated (n=322)</p> <p>For Target Condition/Outcome: Cases: of the 1552 screened, 187 met DSMIII-R criteria for delirium; 19 pts excl because data on dementia status were missing; Controls: selected from patients screened for delirium who were free of condition (part matched to cases)</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: DSM III

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Cole 2003 cross sectional study; study held in Canada.</p> <p>Setting: Hospital. Patients admitted from the emergency department to the medical services.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients aged 65 years and over who were admitted from the emergency department to the medical services.</p> <p>Exclusion criteria: Patients with a primary diagnosis of stroke, those admitted to the oncology unit, ICU or cardiac monitoring unit [unless they were transferred to medical ward within 48h of admission], & those who did not speak English or French.</p> <p>Patient characteristics: age: 83 years (72 to 91); sex: 37% male; Patients who did not speak English or French excluded</p> <p>Comorbidities: Not reported. Other details: 9.6% were living in nursing home prior to admission, 19% in senior residence or foster home, and 71% were living at home alone or at home with others;</p> <p>Other study comments: oStudy was a secondary analysis of data collected in 2 concurrent studies on delirium: RCT of mgmt of delirium & prospective study of the prognosis of delirium that incl non delirious pts; oPts transferred to LTC, those with a language barrier, previously enrolled in study, communication problems, refused screening, residing outside geographic area, not sampled or missed, died were excluded following enrollment.</p>	<p>Index test: DSM III:the study gave CAM to patients with SPMSQ score ≥ 3 or delirium symptoms in notes; then 10 CAM symptoms of delirium appeared to be used to determine DSM III R; time: (n=322)</p> <p>Reference standard: DSM IV;the study gave CAM to patients with SPMSQ score ≥ 3 or delirium symptoms in notes; then 10 CAM symptoms of delirium appeared to be used to determine the reference standard; time (n=322)</p> <p>For Target Condition/Outcome: Cases: of the 1552 screened, 187 met DSMIII-R critieria for delirium; 19 pts excl because data on dementia status were missing; Controls: selected from patients screened for delirium who were free of condition (part matched to cases)</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: ICD 10

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Cole 2003 case control study; study held in Canada.</p> <p>Setting: Hospital. Patients admitted from the emergency department to the medical services.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients aged 65 years and over who were admitted from the emergency department to the medical services.</p> <p>Exclusion criteria: Patients with a primary diagnosis of stroke, those admitted to the oncology unit, ICU or cardiac monitoring unit [unless they were transferred to medical ward within 48h of admission], & those who did not speak English or French.</p> <p>Patient characteristics: age: 83 years (72 to 91); sex: 37% male; Patients who did not speak English or French excluded</p> <p>Comorbidities: Not reported. Other details: 9.6% were living in nursing home prior to admission, 19% in senior residence or foster home, and 71% were living at home alone or at home with others;</p> <p>Other study comments: oStudy was a secondary analysis of data collected in 2 concurrent studies on delirium: RCT of mgmt of delirium & prospective study of the prognosis of delirium that incl non delirious pts; oResults for whole sample, patients w/dementia, patients without dementia; oPts transferred to LTC, language barrier, previously enrolled in study, communication problems, refused screening, residing outside geographic area, not sampled or missed, died were excluded following enrollment.</p>	<p>Index test: ICD 10:the study gave CAM to patients with SPMSQ score ≥ 3 or delirium symptoms in notes; then 10 CAM symptoms of delirium appeared to be used to determine ICD 10; time: not stated (n=322)</p> <p>Reference standard: DSM-III-R; the study gave CAM to patients with SPMSQ score ≥ 3 or delirium symptoms in notes; then 10 CAM symptoms of delirium appeared to be used to determine the reference standard; time not stated (n=322)</p> <p>For Target Condition/Outcome: Cases: of the 1552 screened, 187 met DSMIII-R critieria for delirium; 19 pts excl because data on dementia status were missing; Controls: selected from patients screened for delirium who were free of condition (part matched to cases)</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: CAM short version

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Gonzalez 2004 cross sectional study; study held in Spain.</p> <p>Setting: Hospital. .</p> <p>Funding :Grant from the Ministry of Foreign Affairs of Spain.</p>	<p>Inclusion criteria: Inpatients over 65 years of age with a length of stay over 24 hours. Exclusion criteria: Patients in psychiatric ward.</p> <p>Patient characteristics: age: 77.73 years (65 to 94); sex: 38% male; Spanish adaptation of CAM. Assume English is not the first language Comorbidities: Medical: respiratory, electrolytic, metabolic, infectious, intracranial expansive process; some patients had more than one diagnosis. Other details: Ethnicity not reported</p> <p>Other study comments: Over a 6 mo. period, one bed was randomly selected every day, from inpatients of >65years with LoS over 24h;.</p>	<p>Index test: CAM short version:translated & adapted version of CAM; time: study reported that 'detection of symptoms required a few minutes' (n=123)</p> <p>Reference standard: DSM IV;assessed by either a general physician or psychiatrist; also used patient's medical record, validated Spanish MMSE and the Delirium Rating Scale; time (n=123)</p> <p>For Target Condition/Outcome: 30/123 [24%] diagnosed with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Hestermann 2009 cross sectional study; study held in Germany.</p> <p>Setting: Hospital. acute medical geriatric wards.</p> <p>Funding :Author received a 1-year grant from the Women's Support Program of the University of Heidelberg.</p>	<p>Inclusion criteria: Patients admitted to acute medical geriatric wards over a 3 month period, screened w/ SPMQ; First 2 pts admitted on Fridays & Mondays ≥3 points on SPMQ recruited.</p> <p>Exclusion criteria: Discharge within 3 days after admission, severe aphasia, terminal illness, refusal of enrollment.</p> <p>Patient characteristics: age: 82.8 years (71 to 95); sex: 28% male; German adaptation of CAM. Assume English is not the first language.</p> <p>Comorbidities: Number of comorbid conditions: 2.77 (SD 1.3). Other details: Details on ethnicity not reported.</p> <p>Other study comments: In addition to CAM, a standardized interview [based on the 30 items of the MMSE], a standardized question to assess for disorganised thinking, & 3-item questionnaire to a family member/caregiver about acute changes in mental status, fluctuations & sleep.</p>	<p>Index test: CAM short version:German adaptation of the CAM (IRR k=0.95 CI 0.74 to 1.0); translated and back translated; time: On day 3 after admission; Between 10 am and 4 pm, patient assessed 3 times (n=39)</p> <p>Reference standard: DSM IV;Assessed by a geriatric neuropsychiatricist incl pt interviews, clinical mental status exams, family or nurse interviews, as well as medical histories and record reviews. In addition, a trained resident in geriatric medicine administered a geriatric assessment [completed by patient] incl: questions on memory; orientation to date, place and person; alertness; concentration & disorganised thinking. Consensus diagnosis based on the geriatric neuropsychiatrist and geriatrician; time on day 3 after admission; examinations were performed less than 3h apart (n=39)</p> <p>For Target Condition/Outcome: 26/39 (67%) had delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2002 cross sectional study; study held in Finland.</p> <p>Setting: Hospital. 2 acute geriatric hospitals.</p> <p>Funding :Study supported by La Carita Foundation, The Academy of Finland (Grant) and Helsinki University Central hospital.</p>	<p>Inclusion criteria: Consecutively enrolled elderly patients (> 70 years). Exclusion criteria: Age less than 70 or coma.</p> <p>Patient characteristics: age: 27% were age over 85; sex: 24.7% male; Finnish adaptation of CAM. Assume English is not the first language. Comorbidities: not reported. Other details: 42% had education level of primary school or less; 79% were living at home, In addition to 43.2% with dementia, 14.8% had depression, 3.7% psychosis</p>	<p>Index test: CAM short version:CAM translated into Finnish ; translation backed up by the Finnish translation of the DSM-criteria; Instrument not back translated; Final version developed by consensus; time: performed within a 6 h time period between 8am and 5 pm on weekdays (n=81)</p> <p>Reference standard: DSM-III-R;Reference standard assessed by geriatrician according to fully operationalised criteria of the DSM-III, DSM-III-R, DSM-IV, and ICD-10; time (n=81)</p> <p>For Target Condition/Outcome: 32/81 (39.5%) had delirium according to the DSM-IV;</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Monette 2001 cross sectional study; study held in Canada.</p> <p>Setting: Hospital. Emergency room.</p> <p>Funding :Partially funded by National Health Research & Development Program (NHRDP), Health Canada.</p>	<p>Inclusion criteria: Patients \geq 66 years.</p> <p>Exclusion criteria: Patients who were blind, deaf, mute, aphasic, hospitalised in the week prior to the interview, too sick to be interviewed or did not speak French or English were excluded.</p> <p>Patient characteristics: age: Not reported; patients \geq 66 years eligible for enrollment; sex: Not reported; Patients who did not speak English or French were excluded</p> <p>Comorbidities: Not reported. Other details:</p>	<p>Index test: CAM short version:Three lay interviewers (nurse; nurse with some experience of research interviewer; research assistant [without nursing degree] with considerable experience interviewing elderly); time: Patients were initially interviewed within 3 hours of arrival into ER; and within 6 h for those who arrived early a.m.; CAM checklist completed once geriatrician conducted interview was observed (n=110)</p> <p>Reference standard: CAM;assessed by one of the three geriatricians ; within 3 hours of interviewer assessment; time (n=110)</p> <p>For Target Condition/Outcome: 19% met the CAM criteria, 24% met DSMIII-R criteria, 20% met DSM-IV criteria, 21% according to clinical impression</p>

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<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Pompei 1995 cross sectional study; study held in USA.</p> <p>Setting: Hospital. two general medicine wards and two surgical wards [primarily orthopaedic, general surgical, urologic or vascular surgical problems].</p> <p>Funding :Funded by a grant.</p>	<p>Inclusion criteria: Patients who are 65 years or older and admitted to medical or surgical wards.</p> <p>Exclusion criteria: Patients unable to provide consent because of cognitive impairment, coma , aphasia, or inability to speak English.</p> <p>Patient characteristics: age: 74.5 years (range 67.5 to 81.9); sex: 75% male; Patients unable to speak English were excluded</p> <p>Comorbidities: not reported. Other details: 29% African-American; Ethnicity of remaining patients not reported; Education beyond 11th grade: 11%;</p> <p>Other study comments: Of the 1168 admitted, 278 not eligible [cognitive impairment: 109; discharge w/in 48h: 114; not communicate in English: 47; protective isolation:8]; Of the 890 eligible patients: 306 refused, 107 unavailable, 45 too ill.</p>	<p>Index test: CAM short version:Details not reported; time: (n=432)</p> <p>Reference standard: DSM-IIIIR;clinical investigators [four geriatricians and one geriatric nurse specialist]; time assessment made within 24h of referral (n=432)</p> <p>For Target Condition/Outcome: 64/432 [15%] met the DSM-IIIIR criteria for delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Radtke 2008 cross sectional study; study held in Germany.</p> <p>Setting: Hospital. 'recovery room'; patients ready for discharge.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients over age of 18 years admitted to recovery room after general anaesthesia during 9am to 5pm.</p> <p>Exclusion criteria: Past medical history of psychiatric or neurological illness, previous cerebral insult, history of drug,alcohol or opioid abuse, unable to speak the local language.</p> <p>Patient characteristics: age: 54.5 years (25.4 to 80.8); sex: 40% male; Patients not speaking local language excluded</p> <p>Comorbidities: not reported. Other details: Details on ethnicity not reported.</p> <p>Other study comments: LoS in the recovery room: 79 min (22 to 144): 72 min (28 to 147), for the delirious and non delirious groups, respectively.</p>	<p>Index test: CAM short version:patients assessed only once in the recovery room; time: unclear/not reported (n=154)</p> <p>Reference standard: DSM IV;unclear who assessed patients against DSM-IV criteria; time unclear/not reported (n=154)</p> <p>For Target Condition/Outcome: 14% (21/154) diagnosed with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: CAM long version

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Cole 2003 case control study; study held in Canada.</p> <p>Setting: Hospital. Patients admitted from the emergency department to the medical services.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients aged 65 years and over who were admitted from the emergency department to the medical services.</p> <p>Exclusion criteria: Patients with a primary diagnosis of stroke, those admitted to the oncology unit, ICU or cardiac monitoring unit [unless they were transferred to medical ward within 48h of admission], & those who did not speak English or French.</p> <p>Patient characteristics: age: 83 years (72 to 91); sex: 37% male; Patients who did not speak English or French excluded</p> <p>Comorbidities: Not reported. Other details: 9.6% were living in nursing home prior to admission, 19% in senior residence or foster home, and 71% were living at home alone or at home with others;</p> <p>Other study comments: oResults for whole sample, patients w/dementia, patients without dementia;o Pts w/ SPSMQ score <3 were rescreenedand CAM readministered if score increased or evidence of delirium in nursing notes;o Non delirious pts selected by age and prior cognitive impairmenttoStudy was a secondary analysis of data collected in 2 concurrent studies on delirium: RCT of mgmt of delirium & prospective study of the prognosis of delirium that incl non deliriuos pts; o oPts transferred to LTC, language barrier, previously enrolled in study, communciation problems, refused screening, residing outside geographic area, not sampled or missed, died were excluded following enrollment..</p>	<p>Index test: CAM long version:same data used for CAM and reference standard; time: not stated (n=322)</p> <p>Reference standard: DSM-IIIIR,no further details; time not stated (n=322)</p> <p>For Target Condition/Outcome: Of the 1552 screened, 187 met DSMIII-R critieria for delirium; 19 pts excl because data on dementia status were missing; 52% patients with delirium (n=168/322); 40% (128/322)with delirium & dementia; 29% (94/322) with dementia only</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Fabbri 2001 cross sectional study; study held in Brazil.</p> <p>Setting: Hospital. Emergency service.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Older adults (aged 60 years or over) admitted to a teaching hospital. Exclusion criteria: Pts 'in mutism', those who scored 11 or more in the Glasgow scale;.</p> <p>Patient characteristics: age: 73.8 years (72.12 to 75.48); sex: 52% male; Portugese adaptation of CAM. Assume English is not the first language. Comorbidities: Mean number of discharge diagnoses: 6.4 (SD 2.3) to 4.2 (SD 2.2) for the delirious and non delirious groups respectively.. Other details: 84% were of European descent; 32% [32/100] patients were unable to read or write fluently; 15% [15/100] patients had more than 8 years of formal education</p> <p>Other study comments: Clinical state of patient prevented assessment (n=61); time period between assessment with CAM & DSMIV was >2h [n=41]; patient was discharged from the ER in <24h [n=194].</p>	<p>Index test: CAM long version:Portugese version of CAM; translated and back translated into English by an independent translator; time: within 24h of admission to ER (n=100)</p> <p>Reference standard: DSM IV;Assessed by psychiatrist; time interval between CAM and DSMIV assessment were no longer than 24h (n=100)</p> <p>For Target Condition/Outcome: 17/100 patients with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Yates 2009 cross sectional study; study held in UK.</p> <p>Setting: Hospital. elderly ward and a mixed general medical ward in a teaching hospital.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Every acute older people admission to a care of the elderly ward and mixed general medical ward over a 6-week period.</p> <p>Exclusion criteria: Not reported.</p> <p>Patient characteristics: age: 82.2 years; sex: not reported; Details on language not reported</p> <p>Comorbidities: . Other details: Ethnicity or writing ability not reported</p> <p>Other study comments: Study reported that 15 pts were unable to be assessed w/MMSE because of level of consciousness, inability to communicate or rapidly deteriorating medical condition..</p>	<p>Index test: CAM long version:CAM with 10 items, administered by 1 of 2 medical SHOs; time: not reported (n=62)</p> <p>Reference standard: DSM IV;administered by 1 of 2 medical SHOs; time not reported (n=62)</p> <p>Other comparator tests: b)Delirium Symptom interview [DSI]- not included in review.</p> <p>For Target Condition/Outcome: 11/62 [18%] diagnosed with delirium with DSM-IV</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Zou 1998 cross sectional study; study held in Canada.</p> <p>Setting: Hospital .</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients admitted consecutively from the emergency department to the medical wards of a primary acute care hospital and who scored 3 or more on the SPMSQ. Exclusion criteria: Not stated.</p> <p>Patient characteristics: age: 84.9 years (SD 6.97) range estimated: 77.9 to 91.87; sex: 32% male; Details on language not reported Comorbidities: not reported. Other details: Details on ethnicity not reported.</p>	<p>Index test: CAM long version:nurse clinician trained by psychiatrist gathered demographic info, reviewed the cart, assessed the patient before completing CAM and the chart would be rereviewed; time: all assessments done between 8am to 6pm; (n=87)</p> <p>Reference standard: Consensus diagnosis (incl DSM IV and CAM);Consensus diagnosis [2 geriatric psychiatrists, research fellow & nurse clinician] based on the nurses results [from CAM, SPMSQ, chart review], psychiatrists findings from chart review & clinical examination, & each participant independently indicated delirium based on the five DSMIV criteria; time between assessments varied btw 30 min to 8h (n=87)</p> <p>For Target Condition/Outcome: 56/87 [64%] diagnosed with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: CAM

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Rockwood 1994 cross sectional study; study held in USA.</p> <p>Setting: Hospital. general medicine clinical teaching units.</p> <p>Funding :supported by non-pharamaceutical funding;</p>	<p>Inclusion criteria: Consecutive admissions of elderly patients (65 years and over). Exclusion criteria: Not stated.</p> <p>Patient characteristics: age: before: 78.6 years (estimated range 71.1 to 86.1); after: 78.8 years(estimated range 71.3 to 86.3);; sex: before: 60% male; after: 55%; It was unclear if English was the first language. Comorbidities: Not stated. Other details: before: 78% from the community;after: 72%; Details on ethnicity not reported</p> <p>Other study comments: Data on patietns recorded 4 months before and 6 months after the intervention. before: 187 patients; After: 247.</p>	<p>Index test: CAM:Details on type of CAM not reported; time: not reported (n=187)</p> <p>Reference standard: DSM-IIIR;DSM III-R mentioned only in the abstract; study also reported that study physician completed the CAM, and used the DSR scale; time not reported (n=187)</p> <p>Other comparator tests: Staff were part of an education intervention programme.</p> <p>For Target Condition/Outcome: Delirium: before: 3% ; after 9%</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Rolfson 1999 cross sectional study; study held in Canada.</p> <p>Setting: Hospital. Centre providing cardiac surgery.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients undergoing elective CABG.</p> <p>Exclusion criteria: Patients who were blind, deaf, or unable to speak English. Death or coma before the 4th postoperative day.</p> <p>Patient characteristics: age: 71 years; sex: 80% male; All patients who were unable to speak English excluded</p> <p>Comorbidities: . Other details: Details on ethnicity not reported</p>	<p>Index test: CAM:type of version unclear; based on an interview that included the MMSE; administered by geriatrician for the first 41 cases and by nurses by subsequent 30 cases; time: administered prior to the surgery & on the 4th postoperative day (n=71)</p> <p>Reference standard: DSM-III-R;unclear when reference standard was done;administered by physician (who also administered the CAM; time (n=71)</p> <p>Other comparator tests: b) MMSE c) Clock drawing Test- administered by physicians/nurses on day prior to surgery and on 4th postoperative day ; score of 6 or less considered to be abnormal.</p> <p>For Target Condition/Outcome: 32% [23/71] patients diagnosed with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: DRS-R- 98

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
Andrew 2009 cross sectional study; study held in Canada. Setting: Hospital. . Funding :Scholarship.	Inclusion criteria: Geriatric medicine patients admitted to a tertiary care teaching hospital. Exclusion criteria: Not reported. Patient characteristics: age: 81.2 years; sex: 34% men; Details on language not reported Comorbidities: Mean comoridities 7.1 (SD 2.7). Other details: Details on ethnicity not reported	Index test: DRS-R- 98:score range 0 to 44; pair of raters assessed on DRS-R-98 [one geriatrician, one resident) no extensive training in instrument; unclear which assessor measure used to calc sens & spec; time: not reported (n=145) Reference standard: DSM IV;unclear who administered the reference standard.; time not reported (n=145) For Target Condition/Outcome: 23/145 [16%]; with dementia & delirium 22/145; with cognitive impairment & delirium : 10/145; Total: 55/145 [38%]

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: MMSE

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
Rolfson 1999 cross sectional study; study held in Canada. Setting: Hospital. Centre providing cardiac surgery. Funding :Not reported.	Inclusion criteria: Patients undergoing elective CABG. Exclusion criteria: Patients who were blind, deaf, or unable to speak English. Death or coma before the 4th postoperative day. Patient characteristics: age: 71 years; sex: 80% male; All patients who were unable to speak English excluded Comorbidities: . Other details: Details on ethnicity not reported	Index test: MMSE:score of ≤ 23 was indicative of cognitive impairment; unclear whether a physician or nurse carried out the assessment; time: administered prior to the surgery & on the 4th postoperative day (n=71) Reference standard: DSM-III-R;unclear when reference standard was done;administered by physician (who also administered the CAM; time (n=71) Other comparator tests: postoperative day ; score of 6 or less considered to be abnormal. For Target Condition/Outcome: 32% [23/71] patients diagnosed with delirium

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: AMT

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Ni Chonchubhair 1995 cross sectional study; study held in UK.</p> <p>Setting: Hospital. Surgical setting;.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients aged more than 65 years undergoing surgery. Exclusion criteria: Patients expected to remain in hospital less than 48h after surgery and those with aphasia or deafness were excluded.</p> <p>Patient characteristics: age: 74 years; sex: 37% male; Details on language not reported Comorbidities: Not reported. Other details: Details on ethnicity not reported</p>	<p>Index test: AMT:AMT - 10 questions with each correct answer scoring one point.; decline in AMT scores of 3 or more; time: Assessed third postoperative day; assessed before and third day after surgery- unclear who did the preop/postop assessment (n=100)</p> <p>Reference standard: DSM-III;Delirium Assessment Scale used to determine delirium according to DSM-III; time unclear (n=100)</p> <p>Comparator test: Delirium Assessment Scale used to determine delirium according to DSM-III; time: (n=100).</p> <p>For Target Condition/Outcome: 15% (15/100) were diagnosed with delirium on the third postoperative day; 25% (4/16) patients with a preoperative AMT score less than 8 and 13% (11/84) patients with a preoperative AMT score of 8 or more developed delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: Clock Drawing Test

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
Rolfson 1999 cross sectional study; study held in Canada. Setting: Hospital. Centre providing cardiac surgery. Funding :Not reported.	Inclusion criteria: Patients undergoing elective CABG. Exclusion criteria: Patients who were blind, deaf, or unable to speak English. Death or coma before the 4th postoperative day. Patient characteristics: age: 71 years; sex: 80% male; All patients who were unable to speak English excluded Comorbidities: Not reported. Other details: Details on ethnicity not reported	Index test: Clock Drawing Test:administered by physicians/nurses on day prior to surgery and on 4th postoperative day ; score of 6 or less considered to be abnormal; time: administered prior to the surgery & on the 4th postoperative day (n=71) Reference standard: DSM-III-R;administered by physician; time unclear when this was done (n=71) For Target Condition/Outcome: 32% [23/71] patients diagnosed with delirium

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: MMSE (serial change)

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>O'Keeffe 2005 cross sectional study; study held in Ireland.</p> <p>Setting: Hospital. acute geriatric services.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Patients aged 65 years or older admitted from the A&E to an acute geriatric service.</p> <p>Exclusion criteria: Patients with severe aphasia, deafness, expected to die before sixth hospital day, those expected to die or those unwilling to participate.</p> <p>Patient characteristics: age: 79 years (SD 8); sex: 44% male; Language details not reported</p> <p>Comorbidities: 4.1 (SD 1.9) comorbid conditions. Other details: 96% White;</p> <p>Other study comments: Admitting diagnoses were: respiratory (34%), cardiovascular (18%), gastrointestinal (10%), and cerebrovascular (9.5%); Of 200 pts included, 18% (35/200) did not have a second assessment on day 6 because of death (n=6), discharge (n=14), or error (n=15).</p>	<p>Index test: MMSE (serial change):MMSE [adapted & validated version for use in an Irish population] administered by registrars in geriatric and general internal medicine; time: administered first full day of hospitalisation and on hospital day 6 (n=200)</p> <p>Reference standard: CAM + interview by experienced clinician;Diagnosis with CAM required presence of acute onset and fluctuating course, inattention and disorganised thinking or altered level of consciousness. Assessed by experienced consultant geriatrician.; time administered on the same hospital days (n=200)</p> <p>For Target Condition/Outcome: Day 1: 27 delirious; Day 6: 5 prevalent + 14 incident</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: CAM ICU

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Ely 2001 cross sectional study; study held in USA.</p> <p>Setting: ICU. medical and coronary ICU patients.</p> <p>Funding :Author recipient of the Pharmacology in Aging Grant, NIH grant; Co-author (S.Inouye) recipient of research grants.</p>	<p>Inclusion criteria: Mechanically ventilated adult medical and coronary ICU patients; study interval from Feb 2000 to July 2000.</p> <p>Exclusion criteria: History of psychosis or neurologic disease that would confound the diagnosis of delirium, inability to communicate with assessors (not English speaking or deaf), extubated before study nurses' assessments, previously enrolled in the study, no consent.</p> <p>Patient characteristics: age: 55.3 years (18 to 92); sex: 47.9% male; Patients who did not speak or understand English were excluded</p> <p>Comorbidities: Severity: APACHE II 22.9 (SD 7.2). Other details: 79.2% White; 19.8% Black; 1% Hispanic; 61.5% with vision or hearing deficits</p> <p>Other study comments: Patients also assessed with Richmond Agitation Sedation Scale (RASS); Admission diagnoses: acute respiratory distress syndrome, MI or arrhythmia, CHF, hepatic or renal failure, chronic obstructive pulmonary disease, GI tract bleeding, malignancy, drug overdose.</p>	<p>Index test: CAM ICU:acute onset and inattention; AND disorganised thinking or altered level of consciousness assessed by 2 critical care nurses; Assessment includes the RASS and ASE; time: 2min assessment; possibly no more than 3 h between ratings (n=91)</p> <p>Reference standard: DSM IV;based on evaluation with family members, patient's nurse and chart review; Completed by geriatrician, delirium carer, geriatric consult liaison psychiatrist or neuropsychologist; patients assessed as either normal,delirious,stupor or comatose using DSM-IV or standardised definition of stupor & coma; time 30-45min duration of assessment; (n=91)</p> <p>For Target Condition/Outcome: 86% [80/96] diagnosed with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Ely 2001b cross sectional study; study held in USA.</p> <p>Setting: ICU. .</p> <p>Funding :Author recipient of the Pharmacology in Aging Grant, NIH grant; Co-author (S.Inouye) recipient of a research grant.</p>	<p>Inclusion criteria: Mechanically ventilated adult medical and coronary ICU patients.</p> <p>Exclusion criteria: History of severe dementia/ psychosis/neurologic disease that would confound the diagnosis of delirium, inability to communicate with assessors (not English speaking or deaf), extubated before assessments, previously enrolled in the study, no consent.</p> <p>Patient characteristics: age: 60 years (SD19) estimated range: 41 to 79 years; sex: 60% male; Patients who did not speak or understand English were excluded</p> <p>Comorbidities: Severity: APACHE II 17.1 (SD 8.7). Other details: 84% White; 14% Black; 2% Hispanic; 71% with vision or hearing deficits</p> <p>Other study comments: Admission diagnoses: acute respiratory distress syndrome, MI or arrhythmia, CHF, hepatic or renal failure, chronic obstructive pulmonary disease, GI tract bleeding, malignancy, drug OD.</p>	<p>Index test: CAM ICU:acute onset and inattention; AND disorganised thinking or altered level of consciousness assessed by 2 critical care nurses; first alert or lethargic evaluation for each pt; time: 2 minute assessment; mean time between index & reference standard 1.4h (SD 0.8) (n=38)</p> <p>Reference standard: DSM IV;based on evaluation w/family members, patient's nurse chart review, & nursing notes; Completed by geriatrician delirium expert and geriatric consult liaison psychiatrist with >20 y experience; patients assessed as either normal, delirious, stupor or comatose using DSM-IV or standardised definition of stupor & coma; time 30 to 45 minutes; exact duration of reference standard evaluation not recorded;≤4 hours inbetween index and reference standard assessments (n=38)</p> <p>Comparator test: Assessed by intensivists; time: (n=26).</p> <p>For Target Condition/Outcome: 86.68% (33/38) patients were diagnosed with delirium with Reference standard.</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Lin 2004 cross sectional study; study held in Taiwan.</p> <p>Setting: ICU. Medical ICU.</p> <p>Funding :Not reported.</p>	<p>Inclusion criteria: Mechanically ventilated adult ICU patients admitted to university affiliated medical centre medical ICU.</p> <p>Exclusion criteria: Pts w/Hx of chronic dementia, psychosis, mental retardation or other neurologic disease; antipsychotics, high doses of morphine [$>50\text{mg/day}$] or midazolam [$>0.09\text{mg/kg/hr}$]; pts under GA recovering from surgery or heavily sedated w/neuromuscular agent.</p> <p>Patient characteristics: age: 73.6 years (estimated range: 70.4 to 77.4); sex: 53% male; Chinese translation of CAM. Assume English not the first language Comorbidities: Not reported. Other details: Ethnicity details not reported.</p> <p>Other study comments: Patients or families who refused to participate were excluded. Patients who remained comatose [7/109] were excluded from analysis..</p>	<p>Index test: CAM ICU:Chinese version of the CAM-ICU; validated with DSM IV prestudy[evaluated by psychiatrist] kappa=0.96;; time: assessment conducted within the first 5 days of their ICU stay. (n=102)</p> <p>Reference standard: DSM IV;Evaluated by senior psychiatrists; time (n=102)</p> <p>For Target Condition/Outcome: 22/102 [22%] diagnosed with delirium</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: DSM III-R

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2003 cross sectional study; study held in Finland.</p> <p>Setting: Mixed. geriatric hospitals[230/425] and nursing homes[195/425].</p> <p>Funding :Supported by La Carita Foundation, the Uulo Arhio Foundation, the Academy of Finland & the Helsinki University Central Hospital.</p>	<p>Inclusion criteria: All patients in acute geriatric hospitals & residents of nursing homes. Patients with moderate cognitive impairment [MMSE score:< 20] or poor capability of judgement informed consent from closest proxy; Interviews in hosp: Nov 99- Apr 00; in NH: Nov 99-Oct00.</p> <p>Exclusion criteria: Age less than 70 years and patients in coma.</p> <p>Patient characteristics: age: 88.4 years; sex: 18% male; Language details not reported Comorbidities: Majority of the NH patients had dementia as primary diagnosis, but also had multiple diseases.. Other details: Dementia: wards: 45.2%; Nursing homes: 86.2%</p> <p>Other study comments: Patients in geriatric wards were admitted for all major diagnostic categories of somatic illness- acute infections, cardiopulmonary or endocrine problems, falls or stroke, postoperative patients and patients with terminal illness.</p>	<p>Index test: DSM III-R: operationalised in a yes/no questionnaire; time: both index & reference standard administered together (n=425)</p> <p>Reference standard: DSM IV; Criteria addressed in the DSM-IV were operationalised in one questionnaire which also addressed the criteria in other classification systems (DSM-III-R; DSM-III; ICD10); time both index & reference standard administered together (n=425)</p> <p>For Target Condition/Outcome: 25% [106/425] diagnosed with delirium (DSMIV)</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2004 cross sectional study; study held in Finland.</p> <p>Setting: Mixed. geriatric hospitals and nursing homes.</p> <p>Funding :Supported by La Carita Foundation, the Uulo Arhio Foundation, the Academy of Finland & the Helsinki University Central Hospital.</p>	<p>Inclusion criteria: All patients in acute geriatric hospitals and all residents of nursing homes. Patients with moderate cognitive impairment [MMSE score:< 20] or poor capability of judgement informed consent from closest proxy.</p> <p>Exclusion criteria: Age less than 70 years and in coma.</p> <p>Patient characteristics: age: 88.4 years; sex: 18% male; Language details not reported</p> <p>Comorbidities: Majority of the NH patients had dementia as primary diagnosis, but also had multiple diseases.. Other details: Dementia: wards: 45.2%; Nursing homes: 86.2%</p> <p>Other study comments: Patients in geriatric wards were admitted for all major diagnostic categories of somatic illness- acute infections, cardiopulmonary or endocrine problems, falls or stroke, postoperative patients and patients with terminal illness.</p>	<p>Index test: DSM III-R;; time: unclear (n=170)</p> <p>Reference standard: DSM IV;Criteria addressed in the DSM-IV were operationalised in one questionnaire which also addressed the criteria in other classification systems (DSM-III-R; DSM-III; ICD10); time unclear (n=170)</p> <p>For Target Condition/Outcome: delirium [with dementia]:66/255; delirium [no dementia]: 40/170</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: DSM III

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2003 cross sectional study; study held in Finland.</p> <p>Setting: Mixed. geriatric hospitals[230/425] and nursing homes[195/425].</p> <p>Funding :Supported by La Carita Foundation, the Uulo Arhio Foundation, the Academy of Finland & the Helsinki University Central Hospital.</p>	<p>Inclusion criteria: All patients in acute geriatric hospitals and all residents of nursing homes. Patients with moderate cognitive impairment [MMSE score:< 20] or poor capability of judgement informed consent from closest proxy.</p> <p>Exclusion criteria: Age less than 70 years and patients in coma.</p> <p>Patient characteristics: age: 88.4 years; sex: 18% male; Language details not reported</p> <p>Comorbidities: Majority of the NH patients had dementia as primary diagnosis, but also had multiple diseases.. Other details: Dementia: wards: 45.2%; Nursing homes: 86.2%</p> <p>Other study comments: Patients in geriatric wards were admitted for all major diagnostic categories of somatic illness- acute infections, cardiopulmonary or endocrine problems, falls or stroke, postoperative patients and patients with terminal illness.</p>	<p>Index test: DSM III:further details not reported; time: both index & reference standard administered at the same time (n=425)</p> <p>Reference standard: DSM IV;Criteria addressed in the DSM-IV were operationalised in one questionnaire which also addressed the criteria in other classification systems (DSM-III-R; DSM-III; ICD10); time both index & reference standard administered together (n=425)</p> <p>For Target Condition/Outcome: 25% [106/425] diagnosed with delirium with DSM-IV</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2004 cross sectional study; study held in Finland.</p> <p>Setting: Mixed. geriatric hospitals and nursing homes.</p> <p>Funding :Supported by La Carita Foundation, the Uulo Arhio Foundation, the Academy of Finland & the Helsinki University Central Hospital.</p>	<p>Inclusion criteria: All patients in acute geriatric hospitals and all residents of nursing homes. Patients with moderate cognitive impairment [MMSE score:< 20] or poor capability of judgement informed consent from closest proxy.</p> <p>Exclusion criteria: Age less than 70 years and in coma.</p> <p>Patient characteristics: age: 88.4 years; sex: 18% male; Language details not reported</p> <p>Comorbidities: Majority of the NH patients had dementia as primary diagnosis, but also had multiple diseases.. Other details: Dementia: wards: 45.2%; Nursing homes: 86.2%</p> <p>Other study comments: Patients in geriatric wards were admitted for all major diagnostic categories of somatic illness- acute infections, cardiopulmonary or endocrine problems, falls or stroke, postoperative patients and patients with terminal illness.</p>	<p>Index test: DSM III.; time: unclear (n=225)</p> <p>Reference standard: DSM IV;Criteria addressed in the DSM-IV were operationalised in one questionnaire which also addressed the criteria in other classification systems (DSM-III-R; DSM-III; ICD10); time unclear (n=225)</p> <p>For Target Condition/Outcome: delirium [with dementia]:66/255; delirium [no dementia]: 40/170</p>

Appendix D: Included Studies- Diagnostic test accuracy

Diagnostic Test: ICD 10

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2003 cross sectional study; study held in Finland.</p> <p>Setting: Mixed. geriatric hospitals[230/425] and nursing homes[195/425].</p> <p>Funding :Supported by La Carita Foundation, the Uulo Arhio Foundation, the Academy of Finland & the Helsinki University Central Hospital.</p>	<p>Inclusion criteria: All patients in acute geriatric hospitals and all residents of nursing homes. Patients with moderate cognitive impairment [MMSE score:< 20] or poor capability of judgement informed consent from closest proxy..</p> <p>Exclusion criteria: Age less than 70 years and in coma.</p> <p>Patient characteristics: age: 88.4 years; sex: 18% male; Language details not reported</p> <p>Comorbidities: Majority of the NH patients had dementia as primary diagnosis, but also had multiple diseases.. Other details: Dementia: wards: 45.2%; Nursing homes: 86.2%</p> <p>Other study comments: Patients in geriatric wards were admitted for all major diagnostic categories of somatic illness- acute infections, cardiopulmonary or endocrine problems, falls or stroke, postoperative patients and patients with terminal illness; Interviews in hospital took place: Nov 1999 to Apr 2000 and in nursing homes: Nov 1999 to Oct 2000;.</p>	<p>Index test: ICD 10:ICD-10 (clinical criteria) operationalised into a yes/no question; time: both index & reference standard administered together (n=425)</p> <p>Reference standard: DSM IV;Criteria addressed in the DSM-IV were operationalised in one questionnaire which also addressed the criteria in other classification systems (DSM-III-R; DSM-III; ICD10); time both index & reference standard administered together (n=425)</p> <p>For Target Condition/Outcome: 25% [106/425] diagnosed with delirium (DSMIV);</p>

Appendix D: Included Studies- Diagnostic test accuracy

<i>Study</i>	<i>Participants</i>	<i>Diagnostic tests</i>
<p>Laurila 2004 cross sectional study; study held in Finland.</p> <p>Setting: Mixed. geriatric hospitals and nursing homes.</p> <p>Funding :Supported by La Carita Foundation, the Uulo Arhio Foundation, the Academy of Finland & the Helsinki University Central Hospital.</p>	<p>Inclusion criteria: All patients in acute geriatric hospitals and all residents of nursing homes. Patients with moderate cognitive impairment [MMSE score:< 20] or poor capability of judgement informed consent from closest proxy.</p> <p>Exclusion criteria: Age less than 70 years and in coma.</p> <p>Patient characteristics: age: 88.4 years; sex: 18% male; Language details not reported</p> <p>Comorbidities: Majority of the NH patients had dementia as primary diagnosis, but also had multiple diseases.. Other details: Dementia: wards: 45.2%; Nursing homes: 86.2%</p> <p>Other study comments: Patients in geriatric wards were admitted for all major diagnostic categories of somatic illness- acute infections, cardiopulmonary or endocrine problems, falls or stroke, postoperative patients and patients with terminal illness.</p>	<p>Index test: ICD 10;; time: unclear (n=225)</p> <p>Reference standard: DSM IV;Criteria addressed in the DSM-IV were operationalised in one questionnaire which also addressed the criteria in other classification systems (DSM-III-R; DSM-III; ICD10); time unclear (n=225)</p> <p>For Target Condition/Outcome: delirium [with dementia]:66/255; delirium [no dementia]: 40/170</p>