

Appendix D: Included studies: Non pharmacological Risk Factor studies

<i>Study details</i>	<i>Patient details</i>	<i>Factors adjusted for</i>	<i>Anaesthesia/surgery</i>	<i>Further details</i>
Andersson 2001; prospective cohort study; country Sweden; total number of patients: 457	Age: 77 years (65-96) Cognitive impairment: patients with mental disease or confused excluded Sensory impairment: 31% visual and 39% hearing impairment Polypharmacy: not stated Comorbidities: other diseases counted (0,1,2,3,4 or more); preoperative medical treatment (yes/no); no further info	MV: marital status, cohabitation, housing, need for help before admission, mobility, hearing, vision, reason for admission, number of other diseases, postoperative complications, preoperative medication, method and length of anaesthesia, blood loss, time admission to surgery, OBS score on admission, type of fracture, antibiotics, catheter, traction, hour of admission, surgery time, age, gender	Ward: Surgical Type of anaesthesia: mixed general/regional groups; type of surgery: fracture neck of femur	Inclusion/exclusion: 65yr or more; admitted for surgery (emergency hip fracture or elective for coxarthros or gonarthros); mental disease, confusion, difficulty communicating or prolonged postoperative treatment in ICU excluded. 53% living alone; 11% in sheltered accomodation. Patients characteristics not significant in MV analysis included gender, mobility, hearing, catheter in the bladder and anaesthesia method (no data reported for NS variables)
Bohner 2003; prospective cohort study; country Germany; total number of patients: 153	Age: not stated Cognitive impairment: MMSE measured but number of patients with cognitive impairment not stated Sensory impairment: visual 61% and hearing 24% impairment; assessment method not stated Polypharmacy: not stated Comorbidities: hypercholesterolaemia 31%; prior vascular surgery 24%; major amputation 5%; prior fractured femur 4%	MV: Supra-aortic occlusive disease; major amputation; hypercholesterolaemia; age; body length; depression; cognitive impairment (MMSE); colloid infusion; minimal potassium level	Ward: Surgical Type of anaesthesia: not stated; type of surgery: cardiac	Inclusion/exclusion: Patients with elective aortic procedures, carotid operations or peripheral bypass surgery; operation time expected to be above 90 minutes; excluded if mechanical ventilation more than 24 hours.

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Bucerius 2004; prospective cohort study; country Germany; total number of patients: 16184	Age: not stated Cognitive impairment: not stated Sensory impairment: not stated Polypharmacy: not stated Comorbidities: Many: syncope; embolism; cardiogenic shock; diabetes; hyperlipidaemia; arterial hypertension, renal disease; cerebrovascular disease; heart failure; angina; peripheral vascular disease; pulmonary disease	MV: Cerebrovascular disease; atrial fibrillation; diabetes; peripheral vascular disease; left ventricular ejection fraction 30% or less; shock; urgent operation; operating time over 3 hours; haemofiltration; transfusion above 2L; beating heart surgery; age (35 variables in total - all not reported)	Ward: Surgical Type of anaesthesia: not stated; type of surgery: cardiac	Inclusion/exclusion: Patients undergoing cardiac operations with or without cardiopulmonary bypass.
Caeiro 2004; prospective cohort study; country Portugal; total number of patients: 218	Age: 57 years (24-86) Cognitive impairment: Diagnosis of dementia or mild cognitive impairment and memory and another cognitive impairment with problems in activities of daily living, from proxy Sensory impairment: not stated Polypharmacy: not stated Comorbidities: prior stroke, alcohol abuse, diabetes, mood disorder	MV: Medical complications, neglect (clinical sign in stroke), stroke type (intracerebral haemorrhage/subarachnoid haemorrhage/cerebral infarct), age	Ward: Stroke unit	Inclusion/exclusion: Patients with stroke and psychiatric/psychological assessment within 4 days; Glasgow coma score below 5 excluded. Patients with acute myocardial infarction or unstable angina as 'controls'.

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Edlund 2001; prospective cohort study; country Sweden; total number of patients: 101	Age: 79.5 years (65-102) Cognitive impairment: Dementia diagnosed with DSM-IV criteria; prefracture mental state also assessed from interviews with relatives/ carers and medical records Sensory impairment: visual (23%) or hearing (30%) impairment; assessment method not stated Polypharmacy: Diuretics, benzodiazepines, analgesics, neuroleptics Comorbidities: Heart disease, prior stroke, hypertension, prior delirium, prior hip fracture, depression	MV: (preop analysis): male gender, dementia, Parkinson's disease, constipation, previous delirium, drugs with anticholinergic effect, neuroleptics, fractures; MV (post-op analysis): male gender, creatinine, perioperative bp falls (3 variables), depressed mood postop, pneumonia postop.	Ward: Surgical Type of anaesthesia: spinal; type of surgery: fracture neck of femur	Inclusion/exclusion: Patients aged 65 and older operated on for fractured neck of femur. In the preoperative logistic regression analysis, male gender, Parkinson's disease, constipation, previous delirium, drugs with anticholinergic effect, neuroleptics, fractures, and depressed mood were not significant (no data provided). UV: (preoperative analysis): age, male gender, dementia, Parkinson's disease, constipation, previous delirium, drugs with anticholinergic effect, neuroleptics, fractures, depressed mood; UV (post-operative analysis): age, male gender, depression on admission, creatinine (mean), perioperative blood pressure falls, depressed mood postoperatively, pneumonia postoperatively, urinary infection and orthopaedic hospitalisation days;
Ely 2007; prospective cohort study; country USA; total number of patients: 53	Age: 31-79 years Cognitive impairment: Baseline dementia reported in 16% (7/44) patients; assessment using Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) Sensory impairment: not stated Polypharmacy: Lorazepam Comorbidities: Sepsis and/or ARDS, pneumonia, chronic obstructive pulmonary disease, malignancy, renal and 'other'	MV: APOE4 allele (present/absent); age in years, Acute Physiology and Chronic Health Evaluation II score (continuous), coma days (continuous), sepsis/acute respiratory distress syndrome/pneumonia (dichotomous), lorazepam total dose (continuous)	Ward: ICU Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Mechanically ventilated patients age 18 years or older admitted for more than 24 hrs to the ICU from Apr 2004 to Dec 2004; patients with any cognitive status included. Outcome measured: duration of delirium; all patients were managed with standardised sedation and ventilator weaning protocols as part of an ongoing clinical trial; Primary author had received honoraria and grants from Pfizer, Lilly, and Hospira;

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Furlaneto 2006; prospective cohort study; country Brazil; total number of patients: 103	Age: 71-90 years Cognitive impairment: MMSE (mean scores 12.07 (9.04) in delirium group and 17.74 (8.78) in control group); 10-item clock drawing test (mean scores 3 (2.34) and 4.73 (3.10)) Sensory impairment: not stated Polypharmacy: Antidepressants, benzodiazepines, antiparkinsons Comorbidities: Infectious diseases, hydroelectrolytic disorders	MV: dementia and ADL	Ward: Medical Type of anaesthesia: not stated; type of surgery: fracture neck of femur	Inclusion/exclusion: Patients aged 65 years or older with hip fractures between Jan 2001 and Jun 2002. UV: age, sex, education, visual and auditory deficiencies, ADL, mental state, number of diseases, number of drugs, surgical risk, creatinine clearance, haemoglobin, albumin, type and duration of anesthesia; Overall, 30/103 (29%) patients had delirium; 99 of the patients had surgery; a number of relevant variables were considered in this study, but no data were presented
Goldenberg 2006; prospective cohort study; country USA; total number of patients: 77	Age: 81.9 years (66 to 98) Cognitive impairment: MMSE and Set Test (poss high score 30 on both); 43 pts- mild dementia MMSE score >16. Mean MMSE= 21.6 (range 2-30); Mean ST score= 20.2 (1-30) Sensory impairment: not stated Polypharmacy: Not stated Comorbidities: Hypertension, diabetes, ischemic heart disease, depression	MV: multiple medications, low scores on cognitive tests (ST score<20; MMSE score <24), decreased albumin level (<3.5 g/dL), decreased hematocrit level (<33%), age >81 years	Ward: Surgical Type of anaesthesia: not stated; type of surgery: hip fracture	Inclusion/exclusion: Patients older than 65 years admitted (either from community (79%) or skilled nursing facilities) with fractures of proximal femur were included. Presence of delirium before surgery and refusal to participate were the exclusion criteria. UV: older age, greater morbidity indec, lower Hct, lower Alb, lower MMSE & STscore, dementia, SNF residence, use of multiple medications, CNS medications & presence of abnormal laboratory values

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Hofste 1997; prospective cohort study; country The Netherlands; total number of patients: 321	Age: 62 years (29-83) Cognitive impairment: Mini Mental State Examination (MMSE) below 24 (out of 30) Sensory impairment: not stated Polypharmacy: not stated Comorbidities: Heart failure, atrial fibrillation, hypertension, diabetes, stroke/transient ischaemic attack	MV: Age, gender, lowest preoperative haemoglobin, abnormalities on electroencephalogram, mechanical ventilation on day 1	Ward: Surgical Type of anaesthesia: general; type of surgery: cardiac	Inclusion/exclusion: Patients requiring cardiac surgery with bypass; patients undergoing deep hypothermic circulatory arrest or cardiac plus carotid surgery, or unable to undergo testing due to deafness, blindness or inability to speak were excluded.
Inouye 1993; prospective cohort study; country USA; total number of patients: 107	Age: 79.3 years (SD 6.6) Cognitive impairment: MMSE; mean score 24.2 (5.0); 36% with a score below 24 Sensory impairment: 6% vision impairment; 54% hearing. Jaeger & Snellen tests (vision); Welch-Allyn audioscope; screening questions (hearing). Polypharmacy: not stated Comorbidities: not stated	MV: age, sex, needs assistance with one or more ADLs, needs assistance with two or more ADLs, vision impairment, hearing impairment, MMSE score below 24, history of confusion, illness severity, APACHE score greater than 16, and a composite measure), blood urea nitrogen/creatinine ratio of 18 or more, depressive symptoms, six or fewer social supports, fewer support types	Ward: Medical	Inclusion/exclusion: Consecutive admissions (from the emergency services to general medicine) from June 1988 to March 1989; 70 years or more, no evidence of delirium at admission, no history of severe dementia (patients with mild or moderate cognitive impairment were included). development cohort; 3% of sample were living in a nursing home; UV: age, sex, needs assistance with one or more ADLs, needs assistance with two or more ADLs, vision impairment, hearing impairment, MMSE score below 24, history of confusion, three measures of illness severity (nurse rating of 'severe', APACHE score greater than 16, and a composite measure), blood urea nitrogen/creatinine ratio of 18 or more, depressive symptoms, six or fewer social supports, fewer support types, ethnicity, education, marital status, living alone, religion, BMI, number and type of admission diagnoses, medications, electrolyte abnormalities, leukocytosis, anaemia, acid imbalance, and abnormalities in glucose, calcium or liver function

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Inouye 2007; prospective cohort study; country USA; total number of patients: 491	Age: 79.1 years (SD 6.1) Cognitive impairment: MMSE; mean score 23.1 (6.3); 39% with a score below 24 Sensory impairment: 38% vision impairment; hearing impairment not reported (whisper test) Polypharmacy: 273/491 (56%) had >3 hospital medications added in 1 day; 142/491 (29%) had >3 psychoactive medications in 1 day Comorbidities: Charlston comorbidity index 2.7 (SD 2.1) 29% was ≥ 4	MV: ADL impairment >1, vision impairment, dementia (diagnosis or mBDRS ≥ 4), Charlston ≥ 4 , restraint use during delirium	Ward: Medical	Inclusion/exclusion: Control arm of delirium prevention trial; 70 years or more, consecutive admissions, no evidence of delirium at admission, intermediate or high baseline risk. development cohort: 3% of sample were living in a nursing home; UV: age, sex, needs assistance with one or more ADLs, needs assistance with two or more ADLs, vision impairment, hearing impairment, MMSE score below 24, history of confusion, three measures of illness severity (nurse rating of 'severe', APACHE score greater than 16, and a composite measure), blood urea nitrogen/creatinine ratio of 18 or more, depressive symptoms, six or fewer social supports, fewer support types, ethnicity, education, marital status, living alone, religion, BMI, number and type of admission diagnoses, medications, electrolyte abnormalities, leukocytosis, anaemia, acid imbalance, and abnormalities in glucose, calcium or liver function
Kazmierski 2006; prospective cohort study; country Poland; total number of patients: 260	Age: 62 years (25-81) Cognitive impairment: MMSE score equal to or less than 24; 53% in group with delirium and 16% in non-delirious group (preoperatively). Dementia excluded Sensory impairment: not stated Polypharmacy: Not stated Comorbidities: Major depression, diabetes mellitus	UV and MV: age, gender (male), cognitive impairment (MMSE equal to or less than 24), major depression, atrial fibrillation, peripheral vascular disease, history of cerebrovascular disease, serum urea (greater than 50 mg/dl), serum creatinine (greater than 1.2 mg/dl), use of heart pacemaker, ventricular arrhythmia, arterial hypertension, diabetes mellitus, prior myocardial infarction, NYHA greater than II, alcohol abuse	Ward: Surgical Type of anaesthesia: not stated; type of surgery: cardiac	Inclusion/exclusion: Consecutively admitted patients undergoing cardiac surgery between Nov 2004 and March 2005; patients with preoperative delirium and dementia were excluded.

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Korevaar 2005; prospective cohort study; country The Netherlands; total number of patients: 126	Age: 79.1 years (SD 7.8) Cognitive impairment: MMSE (score less than 24 indicating cognitive impairment); 69/126 (53%) Sensory impairment: not stated Polypharmacy: Benzodiazepines, narcotic analgetics, corticosteroids, antihistaminics, and cholinergics (less high-risk drugs also reported) Comorbidities: Infectious disease, malignancy, gastrointestinal bleeding, water and electrolyte disturbances	MV: age, cognitive impairment, Katz ADL: 5-6, Katz ADL: 7 or greater, malignancy, gastrointestinal bleeding, electrolytes, urea, leucocytes, narcotic analgetics	Ward: Medical	Inclusion/exclusion: Patients 65 years and older admitted to the Dept of Internal Medicine between Jan 2003 and Feb 2004; patients unable to speak Dutch or English were excluded, or if they were transferred to another ward, or left the ward within 48 hrs. UV: age, sex (male), comorbidity (mild/md/severe), cognitive impairment, Katz ADL (0-4, 5-6, 7 or greater), admission reason, urea, creatinine, leucocytes, CRP, various medications
Leung 2007; prospective cohort study; country USA; total number of patients: 203	Age: 72.5 years (SD 5.9) Cognitive impairment: Telephone Interview of Cognitive Status instrument (adapted from MMSE); measured preoperatively (mean score 33.0 +/- 3.2) Sensory impairment: not stated Polypharmacy: Benzodiazepines, opioids Comorbidities: Some patients with history of CNS disorders, stroke, vascular disease	MV: allele, age, pain, education, 5 ADLs, 7 ADLs, a history of CNS disorders, alcohol intake, cognitive status, GDS score (0-2).	Ward: Surgical Type of anaesthesia: mixed general/regional groups; type of surgery: likely to be mixed	Inclusion/exclusion: Consecutive English-speaking patients, aged 65 years or older who were scheduled to undergo a major noncardiac surgery requiring anaesthesia, and in hospital more than 48 hrs. UV: age, education (highschool or less vs highschool grad and greater), alcohol intake, (more than or less than 2 drinks per day) history of nervous system disorders (yes/no), preoperative depressive symptoms (GDS score 0-2, 3-5, 6+), functional status (independent in 7 IADLs), pain levels, apolipoprotein E e4 allele (with/without)

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Levkoff 1988; retrospective cohort study; country USA; total number of patients: 1285	Age: not reported Cognitive impairment: not stated Sensory impairment: not stated Polypharmacy: not stated Comorbidities: Cancer, COPD, diabetes mellitus, heart failure, ischaemic heart disease, mental disorders, pneumonia, stroke, renal disease (acute and chronic), urinary tract infection	MV: sex, emergency or elective admission, age (80+), chronic renal disease, urinary tract infection, sodium, anion gap, creatinine, AST, albumin, calcium, TIBC, haematocrit, WBC, PT, urine, and proteinuria	Ward: Mixed: Medical/Surgical	Inclusion/exclusion: Patients 60 years or older in hospital for more than 2 days. UV: sex, emergency or elective admission, age (80+), cancer, COPD, diabetes mellitus, heart failure, ischaemic heart disease, mental disorders, pneumonia, stroke, renal disease (acute and chronic), urinary tract infection, sodium, blood sugar, anion gap, creatinine, AST, albumin, calcium, phosphate, TIBC, digoxin, haematocrit, WBC +, urine
Levkoff 1992; prospective cohort study; country USA; total number of patients: 325	Age: 81.4 years (SD7.7) Cognitive impairment: 24% with preexisting cognitive impairment; assessment methods not reported (relied on medical chart review) Sensory impairment: Patients with severe sensory impairment excluded Polypharmacy: not stated Comorbidities: Circulatory, digestive respiratory or genitourinary system diseases, fracture, cancer, endocrine	UV and MV: age, sex, preexisting cognitive impairment (presence/absence), and illness severity	Ward: Mixed: Medical/Surgical Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Patients 65 years or older from both long-term care and the community admitted to hospital from Jul 1987 to June 1989; patients were excluded if admitted from an ICU or psychiatric unit; or had severe language or hearing problems, or active tuberculosis. Patients also admitted with nutritional and metabolic diseases, diseases of the skin and 'other'; data also provided separately for those patients who were admitted from long-term care versus the community

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Levkoff 1992 community; prospective cohort study; country USA; total number of patients: 211	Age: 78.1 years (SD 6.8) Cognitive impairment: 14% with preexisting cognitive impairment; assessment methods not reported (relied on medical chart review) Sensory impairment: Patients with severe sensory impairment excluded Polypharmacy: not stated Comorbidities: Circulatory, digestive respiratory or genitourinary system diseases, fracture, cancer, endocrine...	UV and MV: age, sex, preexisting cognitive impairment (presence/absence), and illness severity	Ward: Mixed: Medical/Surgical Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Patients 65 years or older from the community admitted to hospital from Jul 1987 to June 1989; patients were excluded if admitted from an ICU or psychiatric unit; or had severe language or hearing problems, or active tuberculosis.. Patients also admitted with nutritional and metabolic diseases, diseases of the skin and 'other'; data also provided separately for those patients who were admitted from long-term care versus the community
Levkoff 1992 institution; prospective cohort study; country USA; total number of patients: 114	Age: 87.4 years (SD 7.7) Cognitive impairment: 42% with preexisting cognitive impairment; assessment methods not reported (relied on medical chart review) Sensory impairment: Patients with severe sensory impairment excluded Polypharmacy: not stated Comorbidities: Circulatory, digestive respiratory or genitourinary system diseases, fracture, cancer, endocrine...	UV and MV: age, sex, preexisting cognitive impairment (presence/absence), and illness severity	Ward: Mixed: Medical/Surgical Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Patients 65 years or older from long-term care admitted to hospital from Jul 1987 to June 1989; patients were excluded if admitted from an ICU or psychiatric unit; or had severe language or hearing problems, or active tuberculosis.. Patients also admitted with nutritional and metabolic diseases, diseases of the skin and 'other'; data also provided separately for those patients who were admitted from long-term care versus the community

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Lin 2008; prospective cohort study; country Taiwan; total number of patients: 151	Age: 76 years (64-86) Cognitive impairment: Blessed Dementia Rating Scale of 3 or higher. Patients with dementia excluded. Sensory impairment: not stated Polypharmacy: Tranquilizers, narcotics, benzodiazepines, steroids Comorbidities: Pneumonia, chronic lung disease, cerebrovascular disease, cancer, congestive heart failure, ischaemic heart disease, gastrointestitinal disease, diabetes mellitus, drug intoxication, other	MV: diabetes mellitus, hypoalbuminemia, and sepsis	Ward: ICU	Inclusion/exclusion: Mechanically ventilated adult ICU patients admitted from October 2002 to May 2003; patients were excluded if they had a history of chronic dementia, psychosis, mental retardation, or other neurologic disease, patients receiving antipsychotics. UV:diabetes mellitus, hypertension, alcohol abuse, history of stroke, chronic airway disease, chronic heart disease, sepsis, shock, hyoxemia, hypercarpnia, hypoalbuminemia, elevated creatinine, elevated urea nitrogen, elevated bilirubin, tranquilizers, narcotics, benzodiazepines, steroids
McCusker 2001; prospective cohort study; country Canada; total number of patients: 444	Age: 83.3 years (SD 7.0) Cognitive impairment: Assessed with IQCODE with cut off score of 3.5 or more for dementia Sensory impairment: 20% with visual/hearing impairment Polypharmacy: Comorbidities: Charlston comorbidity index mean 2.7 (SD 2.0). 71% in own home, 11% nursing home pre-admission; 18% foster home/senior residence	baseline delirium severity; age, dementia (present, missing), comorbidity, study group (x2), prevalent delirium, visual or hearing impairment, cumulative number of room changes, isolation, hospital unit (x5), length of follow up, stimulation level (x2), not in same room, single room, physical restraint, medical restraint, surroundings not well lit, noise/quiet, radio/TV on, no clock/watch, no calendar, no personal possessions, not wearing glasses, not using hearing aid, family absent	Ward: Medical	Inclusion/exclusion: 65 y & older admitted from the emergency dept to medical services. Excluded: stroke as primary diagnosis, admission to oncology unit; ICU or cardiac monitoring unit unless in ward within 48h; non English/French speakers. For RCT: max cog impairment score. Values of DI score updated at each time measurement, which were soon after enrollment, every 2-3 days in 1st week then weekly while patient in hospital => repeated measures analysis

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Quimet 2007; prospective cohort study; country Canada; total number of patients: 764	Age: 48-78 years Cognitive impairment: Not stated Sensory impairment: not stated Polypharmacy: Opiates, benzodiazepine, propofol, indomethacin Comorbidities: All reasons for admission not stated	UV & MV (only significant variables reported): age, hypertension, active tobacco consumption, alcohol consumption, APACHE II score, epidural catheter use, opiate dose, benzodiazepine dose, propofol dose, indomethacin dose, coma, anxiety, pain	Ward: ICU Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Consecutive patients 18 years or older admitted for more than 24 hrs to a medical-surgical ICU between Dec 2003 and Aug 2004. No data reported for UV analysis (only p values)

Pisani 2007; prospective cohort study; country USA; total number of patients: 304	Age: 66-83 years Cognitive impairment: baseline dementia assessed using IQCODE Sensory impairment: 11% with vision impairment and 17% with hearing impairment; proxy reported Polypharmacy: Benzodiazepine, narcotics Comorbidities: Respiratory, gastrointestinal haemorrhage, sepsis, neurologic or other;	MV: nonwhite race, medicaid status, alcohol, a history of depression, dementia (score greater than 3.3), APACHE II score (mean) (scale), any impairment of ADL, medication use, admitting diagnosis, admitting physiologic variables, admitting laboratory data	Ward: ICU	Inclusion/exclusion: Consecutive patients 60 years or older admitted to a medical ICU from Sept 2002 to Sept 2004; patients were excluded if proxy was unavailable to provide info, they transferred from another ICU, admission less than 24 hrs, or they were non-English speaking. 18% from a nursing home. UV: age (yrs), male sex, nonwhite race*, medicaid status*, marital status, education (yrs), admitted from nursing home, vision and hearing impairment, alcohol* and tobacco use, history of depression*, dementia* (score greater than 3.3), Charlson Comorbidity Index, APACHE II score (mean)* (scale)*, any impairment of ADL*, any impairment in instrumental ADL, full code status on ICU admission, medication use*, admitting diagnosis*, admitting physiologic variables*, admitting laboratory data*; A number of relevant variables were included in the MV, but not presented in the final model = not significant (also no univariate ORs data presented)
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Pompei 1994_Chicago; prospective cohort study; country USA; total number of patients: 432	Age: 68-83 years Cognitive impairment: MMSE; for patients with less than high school education, the cut-off was 21, with HS cut-off was 23, college edu cut-off 24 points); 158/432 (37%) Sensory impairment: not stated Polypharmacy: not stated Comorbidities: not stated	MV: cognitive impairment, number of major diagnostic categories, depression, alcoholism (total scores greater than or equal to 2 using the short form of the Michigan Alcoholism Screening test)	Ward: Mixed: Medical/Surgical Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Patients 65 years or older admitted to hospital between Nov 1989 and Jun 1991; patients were excluded if they were unable to provide consent because of cognitive impairment, coma, aphasia, inability to speak English, discharged within 48 hrs of admission. 31% patients living alone. UV: age, women, Black, widowed, living alone, education beyond 12th grade, impaired cognitive status on admission, full function in ADL's prior to admission, depression, alcoholism, admission to surgical service, number of Major Diagnostic Categories; Chicago hospital data
Pompei 1994_Yale; prospective cohort study; country USA; total number of patients: 323	Age: mean 79.2 (6) years Cognitive impairment: MMSE; for patients with less than high school education, the cut-off was 21, with HS cut-off was 23, college edu cut-off 24 points); 39% with impaired Sensory impairment: not stated Polypharmacy: not stated Comorbidities: not stated	MV: cognitive impairment, number of MDCs, depression, alcoholism (total scores greater than or equal to 2 using the short form of the Michigan Alcoholism Screening test)	Ward: Mixed: Medical/Surgical Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Patients 70 years or older admitted to hospital between Nov 1989 and Jun 1990; patients were excluded if they were unable to interview because of intubation, coma, aphasia, or terminal condition; discharged within 48 hrs of admission. 41% patients living alone. UV: age, women, Black, widowed, living alone, education beyond 12th grade, impaired cognitive status on admission, full function in ADL's prior to admission, depression, alcoholism, number of Major Diagnostic Categories; Yale-New Haven hospital data

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Ranhoff 2006; prospective cohort study; country Italy; total number of patients: 401	Age: 78.1years (60-94) Cognitive impairment: MMSE; mean score two weeks prior to admission to SICU was 19.1 (SD 11.0) Sensory impairment: 116/401 (29%) with vision impairment; patient/close relative asked if vision problems affecting daily activity Polypharmacy: not stated Comorbidities: Respiratory failure, cardiac diseases, stroke, gastrointestinal bleeding, cancer, renal failure	MV: age, dementia, vision impairment, history of heavy alcohol use, number of drugs taken, s-albumin, APS score, fitted bladder catheter	Ward: ICU	Inclusion/exclusion: Patients admitted to the SICU from Jan 2003 to Apr 2004; patients were excluded if they were less than 60 years of age and/or with an APACHE II score less than 5, or Acute Physiology Score (APS) less than 3. 25% patients were living alone. UV: age*, female, MMSE score, Barthel Index, dementia*, vision impairment*, history of heavy alcohol use*, number of drugs taken*, s-albumin*, s-cholesterol, s- urea/s-creatinine ratio, Charlson Comorbidity Index, APS score*, fitted bladder catheter*, non-invasive mechanical ventilation: Study conducted in a sub-intensive care unit (SICU)
Redelmeier 2008; retrospective cohort study; country Canada; total number of patients: 284158	Age: 67-80 years Cognitive impairment: not stated Sensory impairment: not stated Polypharmacy: Statins, non-statin lipid lowering medications, antihypertensives, diuretics, misc. cardiovascular agents, antiplatelet agents, orally administered anticoagulants, other vascular agents, and others Comorbidities: Cardiac, thoracic, neurosurgical, vascular, abdominal, musculoskeletal, retroperitoneal, urogenital, breast and skin, external head and neck, ophthalmologic	MV: age, sex, neuropsychiatric drug (4 different drugs), type of surgery (cardiac, thoracic, neurosurgical, vascular, musculoskeletal, lower urologic and gynaecologic, breast and skin, external head and neck, ophthalmologic), duration of surgery (per 30-min increase)	Ward: Surgical Type of anaesthesia: not stated; type of surgery: likely to be mixed	Inclusion/exclusion: patients ages 65 years or older admitted to hospital between April 1992 and April 2002 for for elective surgery. The aim of this study was to determine associations between statin use and postoperative delirium; Canadian Institutes for Health Information database

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Rolfson 1999; prospective cohort study; country Canada; total number of patients: 75	Age: 69-74 years Cognitive impairment: MMSE less than 24; 9% in group with delirium and 12% in group without delirium Sensory impairment: not reported Polypharmacy: lorazepam, sufentanil, midazolam, morphine Comorbidities: not stated	MV: past stroke, CPB time (min), low cardiac output	Ward: Surgical Type of anaesthesia: general; type of surgery: cardiac	Inclusion/exclusion: Patients aged 65 years and older undergoing coronary artery bypass graft (CABG) surgery consecutively admitted to hospital between June and October 1995; patients were excluded if blind and/or deaf, ongoing delirium, emergency CABG or mixed surgery. UV: past stroke, a history of clinical depression, heart dysfunction, burden of comorbid illness (Charlson comorbidity index score), alcoholism, CPB time, post-operative factors: low cardiac output, electrolyte abnormalities, and selective drug exposure;
Rudolph 2007; prospective cohort study; country USA; total number of patients: 1218	Age: 68.9 years (SD 5.9) Cognitive impairment: MMSE; mean 27.8 (1.6) at baseline; various other neuropsychologic tests applied = mild cognitive impairment Sensory impairment: not stated Polypharmacy: not stated Comorbidities: Hypertension, diabetes, congestive heart failure, previous myocardial infarction, angina, stroke	MV: age, male, any tobacco exposure, diabetes, previous myocardial infarction, vascular surgery	Ward: Surgical Type of anaesthesia: general; type of surgery: likely to be mixed	Inclusion/exclusion: Patients aged 60 years or older undergoing noncardiac surgery between Nov 1994 and May 1996; patients were excluded if they had a score of 23 or less on the MMSE, dementia, Parkinson disease, previous neuropsychologic testing, illiteracy, emergency surgery. UV: age (year), male, any tobacco exposure, no alcohol use, functional impairment, hypertension, diabetes, congestive heart failure, previous myocardial infarct, angina, stroke, peripheral vascular disease, vascular surgery, neuropsychologic tests; The International Study of Postoperative Cognitive Dysfunction (13 hospitals in 8 countries); surgery type included abdominal, genitourinary, vascular, orthopaedic, thoracic, other

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Santos 2004; prospective cohort study; country Brazil; total number of patients: 220	Age: 66-78 years Cognitive impairment: MMSE (using a cut-off of 23) Sensory impairment: Severe hearing or vision impairment excluded Polypharmacy: Diuretics, calcium channel blockers, beta blockers, ACE inhibitors, nitrates, H2 blockers, diazepam, midazolam Comorbidities: Hypertension, diabetes, renal dysfunction, COPD or asthma, obesity, dyslipidemia, previous myocardia	MV: Those included in final model were age, blood urea, cardiothoracic index greater than 0.5, hypertension, smoking, blood replacement (intraoperative), atrial fibrillation, pneumonia, blood balance on 2nd day after surgery	Ward: Surgical Type of anaesthesia: general; type of surgery: cardiac	Inclusion/exclusion: Patients 60 years of age or older admitted for a nonemergency CABG between Jun 1996 and Jan 1999; patients with severe hearing or vision impairment, cognitive impairment, valvular surgery or ventriculotomy, and prior bypass surgery were excluded. UV: 37 pre-operative factors (including age, gender, education, socio-economic level, ASA physical status class, comorbidity, ECG findings, cardiothoracic index, echocardiogram, medications, biochemistry profile, depression), 24 intra-operative factors and 31 post-operative factors;
Schor 1992; prospective cohort study; country USA; total number of patients: 291	Age: 80.5 years (SD 7.6) Cognitive impairment: method not reported; 42% with prior cognitive impairment in the group with delirium and 10% in group without delirium Sensory impairment: 33% with vision loss and 21% with hearing loss Polypharmacy: Neuroleptics, narcotics, H2 blocker, digoxin, anticholinergics, benzodiazepine, steroids, nonsteroidal anti-inflammatory Comorbidities: Cardiovascular disease, gastrointestinal, cancer, pulmonary, fracture, genitourinary and other diagnoses, depression	MV: age (greater than 80), prior cognitive impairment, fracture on admission, patients from an institution, male sex, infection, pain (poorly controlled), neuroleptic use, and narcotic use	Ward: Mixed: Medical/Surgical Type of anaesthesia: not stated; type of surgery: unclear/not stated	Inclusion/exclusion: Patients 65 years or older from both institutional and community settings admitted between July 1987 and June 1989; patients admitted to ICU were excluded as well as patients with severe language and/or hearing problems. 70% of patients from the community; 30% institutionalised. 61% admitted to medicine, 21% admitted for surgery; UV: age (greater than 80 years, prior cognitive impairment, fracture on admission, patient from an institution, gender, vision loss, hearing loss, infection, cardiac disease, respiratory disease, malignant disease, renal disease, depression, hypotension, hypertension, temperature, operation, dehydration, urinary retention, hyponatraemia/hypernatraemia, hypoglycemia/hyperglycemia, WBC, serum urea nitrogen, drugs (8 variables)

<i>Study details</i>	<i>Patient details</i>	<i>Factors adjusted for</i>	<i>Anaesthesia/surgery</i>	<i>Further details</i>
Sheng 2006; prospective cohort study; country Australia; total number of patients: 156	Age: 79.2 years (65-95) Cognitive impairment: MMSE; overall scores at one month were 23.4 +-6.0 Sensory impairment: 28/156 (18%) stroke patients with vision field loss Polypharmacy: Anticholinergics Comorbidities: Hypertension, atrial fibrillation, diabetes mellitus	MV: age, dementia prestroke, haemorrhagic stroke, metabolic factor, ability to lift both arms, Glasgow Coma Scale Score less than 15, dysphagia, neglect, impaired vision, systolic blood pressure, diastolic blood pressure, one or more metabolic factors, urinary tract infection, urinary incontinence and faecal incontinence	Ward: Medical	Inclusion/exclusion: Consecutive acute stroke patients aged 65 years and older, including patients with cerebral infarction and intracerebral hemorrhage admitted between Mar 2002 and Mar 2003; patients with transient ischemic attack, severe head trauma + were excluded. 90% patients living alone. UV: age, functional independence, gender, English/non-English speaking background, living at home, medical history (11 variables), stroke type, clinical symptoms (7 variables), blood pressure, aspiration pneumonia, urinary tract infection, temperature, urinary and faecal incontinence; Each patient was followed-up at 1, 6, and 12 months post-stroke
Veliz-Reissmuller 2007; prospective cohort study; country Sweden; total number of patients: 107	Age: 65-78 years Cognitive impairment: MMSE; the median score was 29 (17-30) in the delirium group and 30 (27-30) in the non-delirium group Sensory impairment: not stated Polypharmacy: not stated Comorbidities: Diabetes, hypertension, cerebrovascular disease, carotid artery stenosis, angina, myocardial infarction	MV: age, alcohol consumption, memory complaints, CABG- valve versus CABG, valve versus CABG, preoperative MMSE score (less than or equal to 28 versus greater than or equal to 29 points)	Ward: Surgical	Inclusion/exclusion: Patients 60 years or older undergoing elective cardiac surgery; none of the patients suffered from dementia. UV: comorbidity, smoking (within last 30 days), alcohol (more than 2 times per week), BMI mean, number of drugs (mean), memory complaints, MMSE score, type of operation, number of anastomoses, duration of surgery, CPB time (min), aortic clamp time (min), respiratory support (hrs);

<i>Study details</i>	<i>Patient details</i>	<i>Factors adjusted for</i>	<i>Anaesthesia/surgery</i>	<i>Further details</i>
Yildizeli 2005; retrospective cohort study; country Turkey; total number of patients: 432	Age: 51.7 years (18 to 86) Cognitive impairment: not stated Sensory impairment: not stated Polypharmacy: Aminophylline, antiarrhythmics, antibiotics, steroids, anihypertensives Comorbidities: Lung cancer, lung metastases, mesothelioma, mediastinal tumours, brochiectasis, hydatid disease +	UV & MV: (preoperative variables) age, sex, chronic disease, alcohol abuse, psychiatric problems, diabetes, cerebrovascular disease, chemotherapy, operation due to malignancy, urgent operation, (postoperative variables) respiratory insufficiency; abnormal serum chemistry values, operation time, LOS, length of ICU stay, sleep deprivation, hypertension, infection, blood transfusion, use of various drugs, immobilisation	Ward: Surgical	Inclusion/exclusion: Patients older than 18 years admitted to hospital between 1996 and 2003 for thoracic surgery. Only significant results reported in MV analysis
Zakriya 2002; prospective cohort study; country USA; total number of patients: 168	Age: 50-98 years Cognitive impairment: Dementia excluded. Sensory impairment: not stated Polypharmacy: not stated Comorbidities: Coronary artery disease, congestive heart failure, atrial fibrillation, stroke, diabetes, history of peripheral vascular disease, hypertension, chronic obstructive pulmonary disease, hypothyroid	MV: normal white blood cell count, abnormal serum Na+, ASA class greater than II, history of illness (3 : coronary artery disease, congestive heart failure, atrial fibrillation)	Ward: Surgical Type of anaesthesia: not stated; type of surgery: fracture neck of femur	Inclusion/exclusion: Patients undergoing hip fracture repair, consecutively admitted from Mar 1999 to Dec 2000; patients with delirium or dementia at hosptial admission were excluded. UV: gender (men), smoker, greater than 2 alcohol drinks/day, ASA class greater than II, history of illness (9 variables), age, normal white blood cell count, abnormal haemocrit, ab serum Na+, ab serum creatinine, ab blood urea nitrogen, ab serum albumin;