# Epidemiologia e fattori di rischio di delirium

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**Gruppo di Ricerca Geriatrica di Brescia**

**Gruppo di studio delirium (Associazione Italiana di Psicogeriatria)**

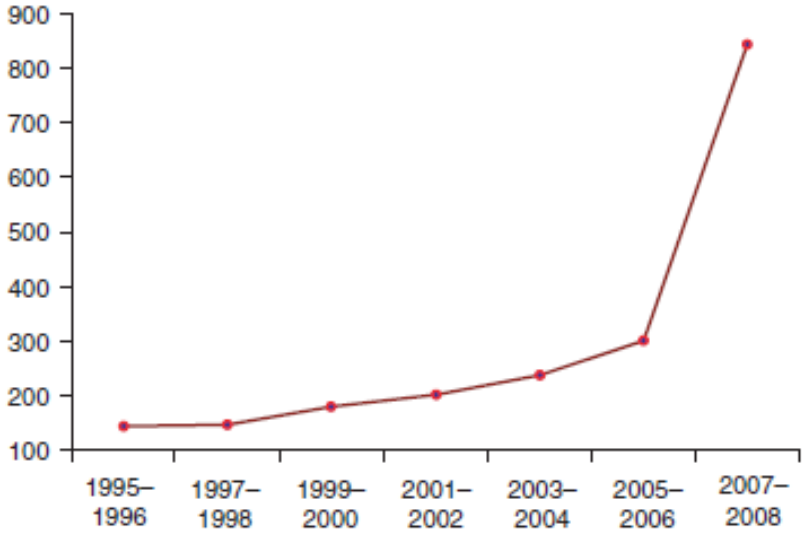
Fondazione Teresa Camplani
Casa di Cura Ancelle

***Torino, venerdi 29 Novembre 2013***

Gruppo di ricerca geriatrica

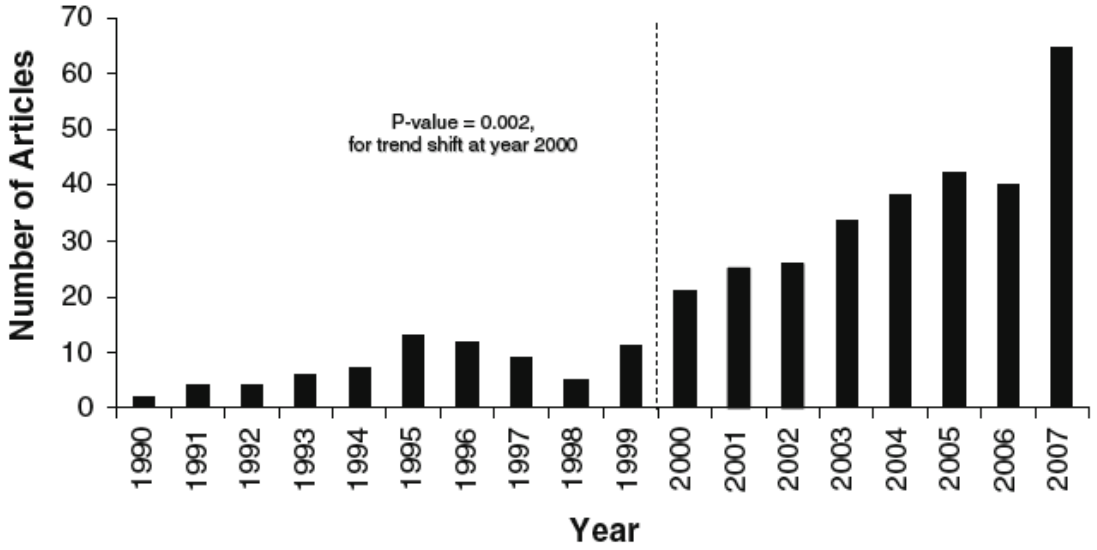
AIP Associazione Italiana Psicogeriatria

# Trend della ricerca sul delirium




Meagher D Int Rev Psych 2009;21:1-3

Morandi et al ICM 2008;34:1907-1915



# Outline

- **Epidemiologia del delirium**
  - **Prevalenza**
  - **Prognosi**
- **Fattori di rischio**

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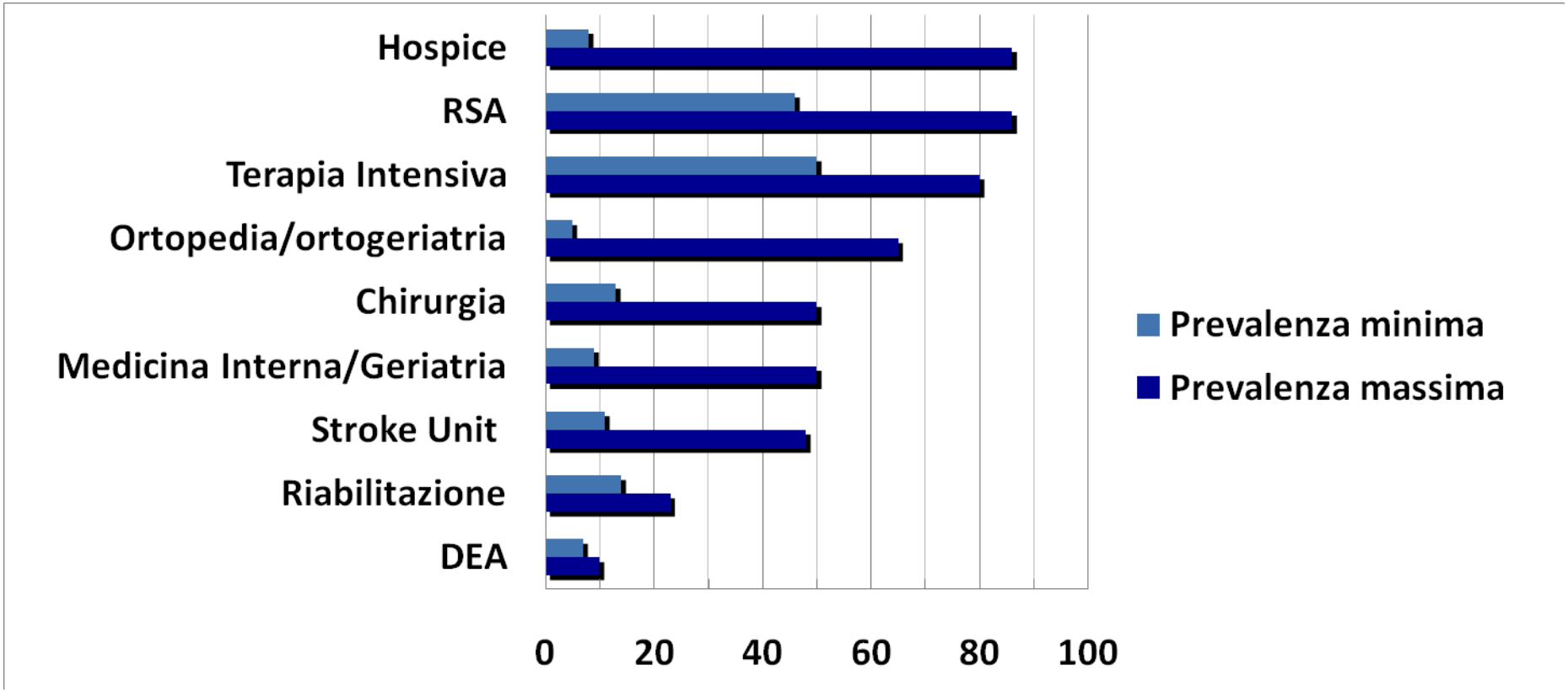
# Epidemiologia del delirium: Prevalenza

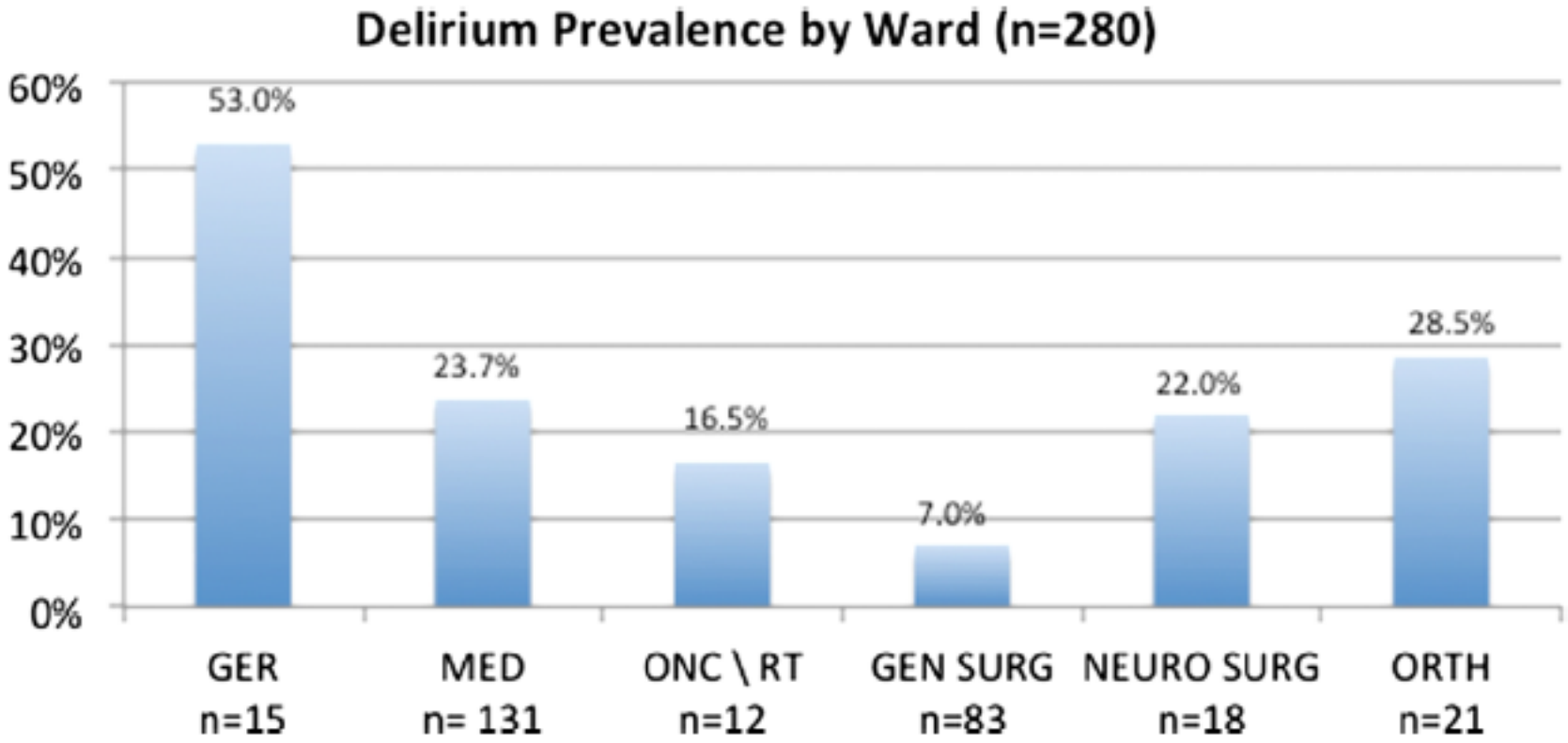



Morandi A, Ely EW, Trabucchi M. "Il delirium" Vita e Pensiero 2012

BMJ open accessible medical research

# Delirium in an adult acute hospital population: predictors, prevalence and detection

Daniel James Ryan,[1] Niamh Annmarie O'Regan,[1] Ronán Ó Caoimh,[1] Josie Clare,[2] Marie O'Connor,[3] Maeve Leonard,[4] John McFarland,[5] Sheila Tighe,[6] Kathleen O'Sullivan,[7] Paula T Trzepacz,[8,9] David Meagher,[4] Suzanne Timmons[1]




*BMJ Open* 2013;**3**:e001772. doi:10.1136/bmjopen-2012-001772

BMJ open accessible medical research

# Delirium in an adult acute hospital population: predictors, prevalence and detection

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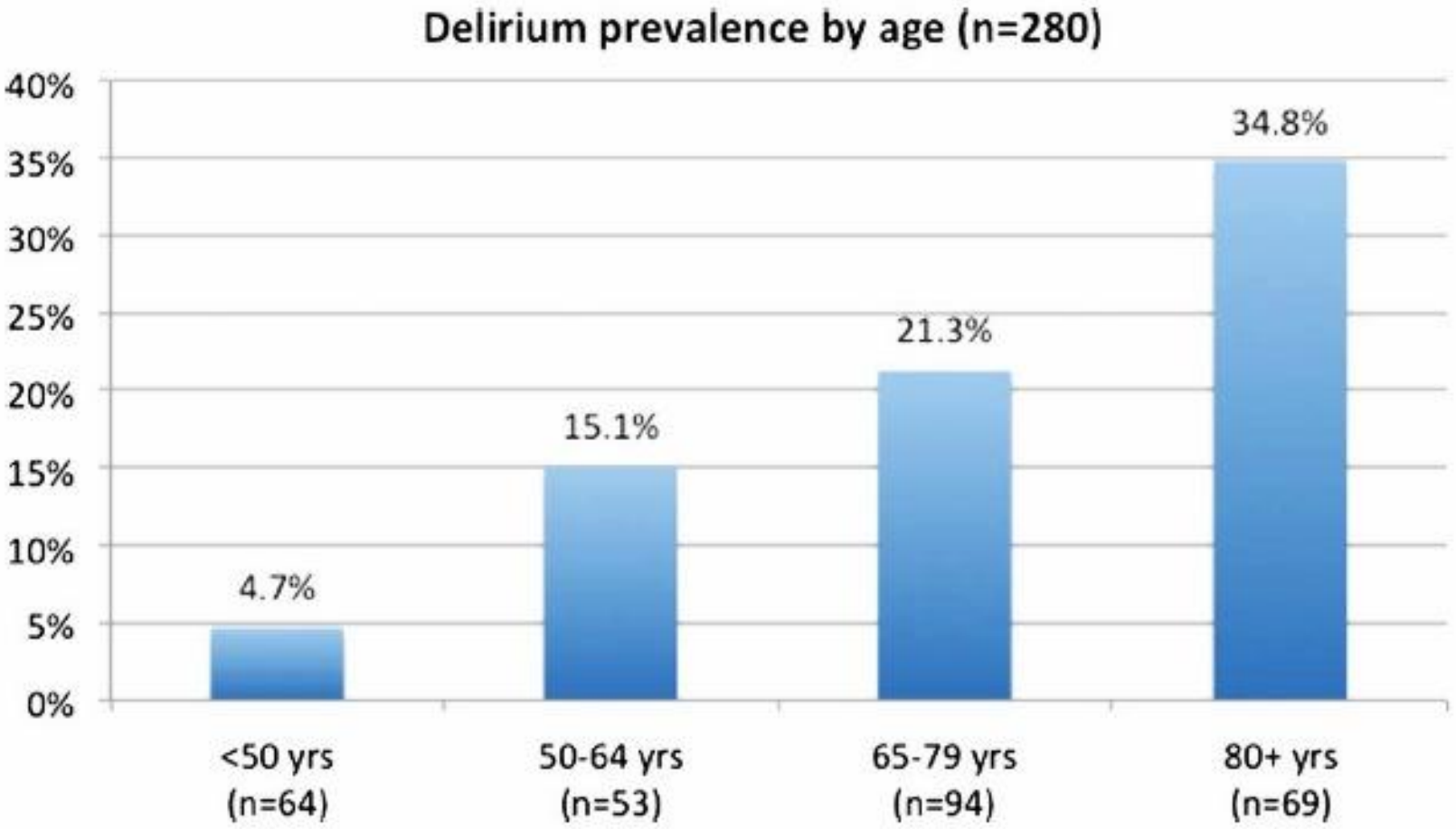



*BMJ Open* 2013;**3**:e001772. doi:10.1136/bmjopen-2012-001772

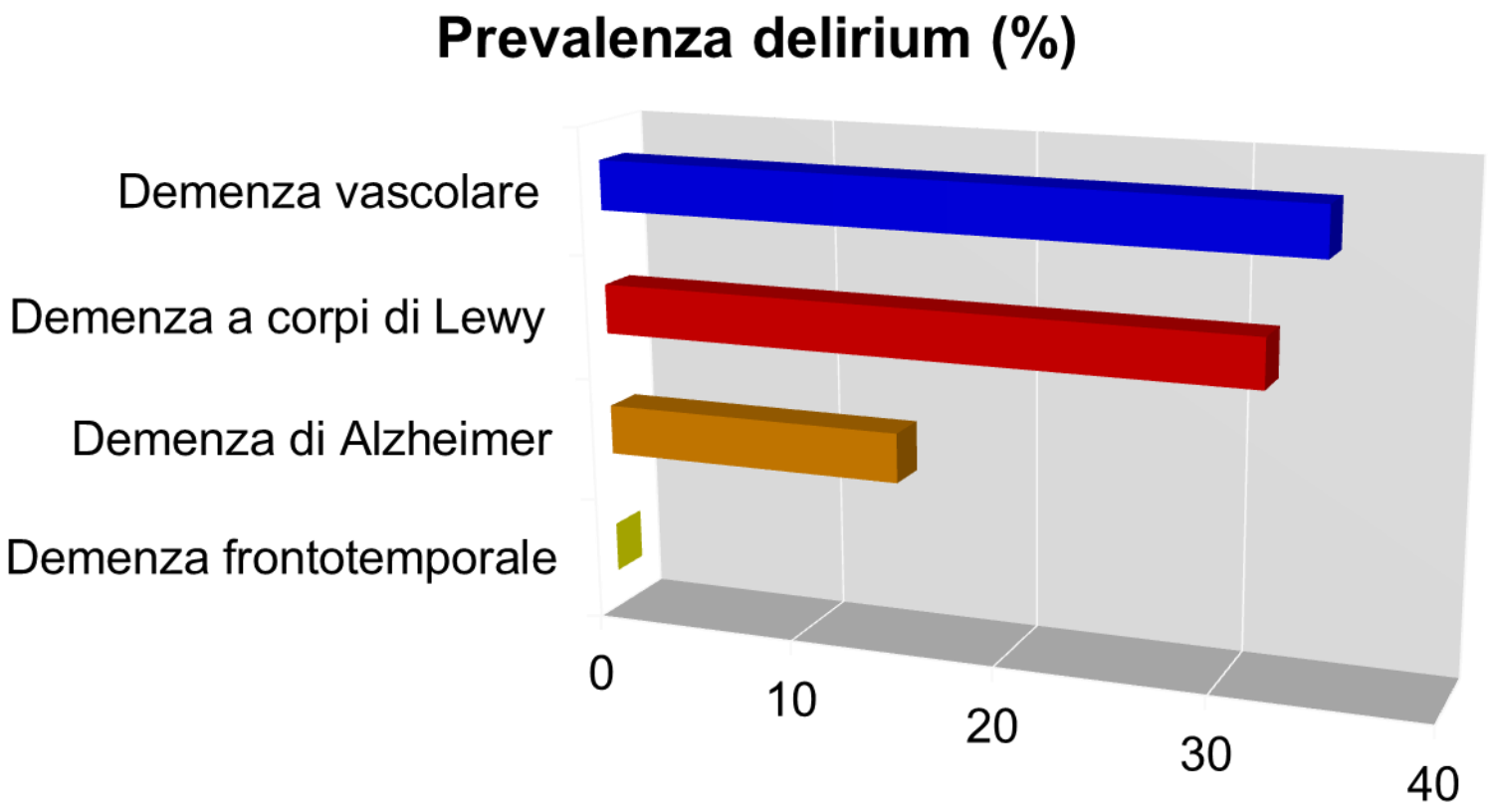
# Epidemiologia:
# delirium sovrapposto a demenza (DSD)

**La prevalenza varia a seconda degli studi *dal 22% all'89%*.**


- *Fick DM, et al. J Am Geriatr Soc. 2002;50:1723–32*
- Bellelli G, et al. J Gerontol A BiolSciMedSci 2007;62:1306-1309
- Fick DM, et al. JHospMed 2013;8: 500-5
- *Morandi A, et al. JAMDA 2013 under submission*

# Prevalence of delirium among outpatients with dementia

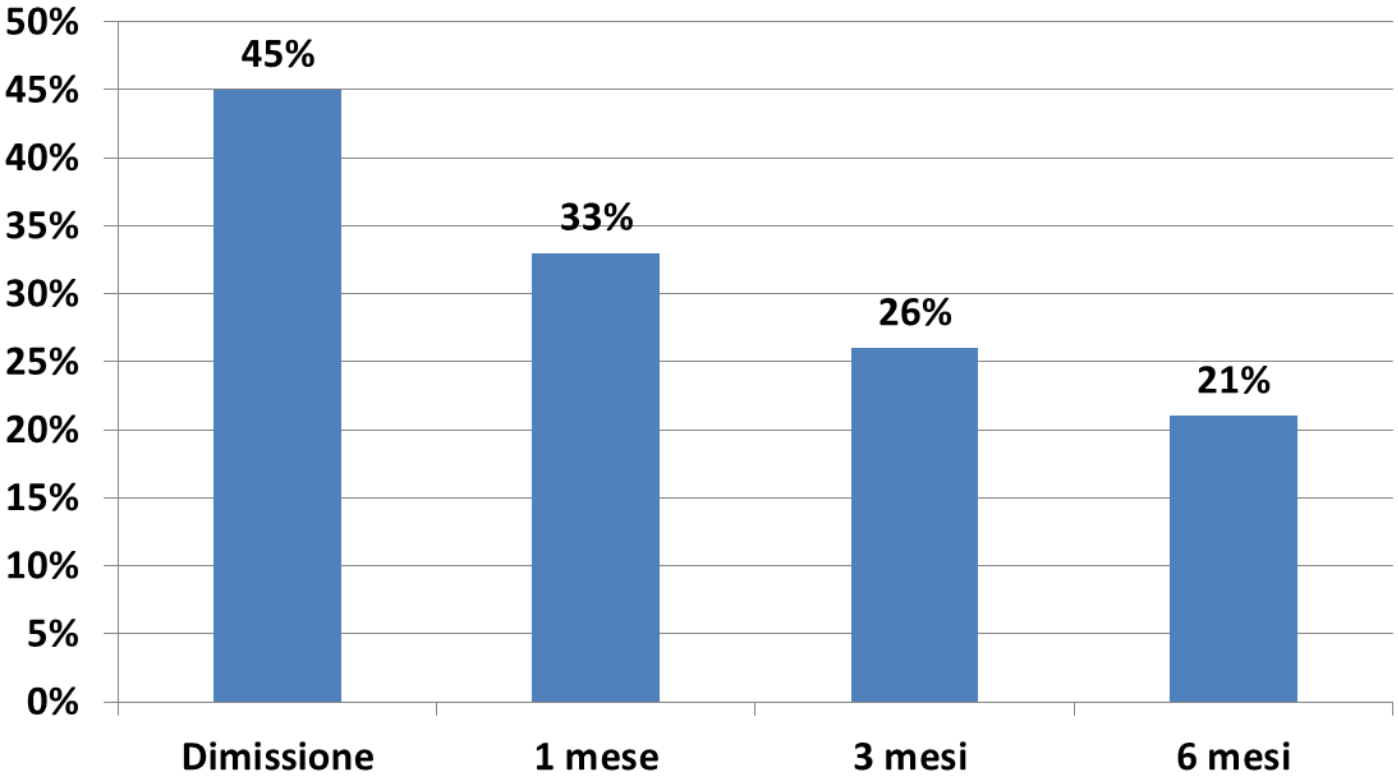
Hasegawa N, Hashimoto M, Yuuki S, Honda K, Yatabe Y, Araki K, Ikeda M




Int Psychogeriatr. 2013 Jul 22:1-7

# Epidemiologia: delirium persistente

**Prevalenza delirium persistente**




*Cole, M.G. et al. Age Ageing 2009; 38: 19-26*

# Outline

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  - Prevalenza
  - **Prognosi**
- Fattori di rischio

JAMA®

Online article and related content current as of July 27, 2010.

# Delirium in Elderly Patients and the Risk of Postdischarge Mortality, Institutionalization, and Dementia: A Meta-analysis

Joost Witlox; Lisa S. M. Eurelings; Jos F. M. de Jonghe; et al.

*JAMA*. 2010;304(4):443-451 (doi:10.1001/jama.2010.1013)

- **Aumentato rischio di sviluppare demenza**
  **HR 12.52, (95% CI: 1.86-84.21)**

- **Aumentato rischio di istituzionalizzazione**
  **HR 2.41, (95% CI: 1.77-3.29)**

- **Aumentato rischio di mortalità**
  **HR 1.95, (95% CI: 1.51-2.52)**

ORIGINAL RESEARCH | Annals of Internal Medicine

# Adverse Outcomes After Hospitalization and Delirium in Persons With Alzheimer Disease

Tamara G. Fong, MD, PhD; Richard N. Jones, ScD; Edward R. Marcantonio, MD, SM; Douglas Tommet, MS; Alden L. Gross, PhD, MHS; Daniel Habtemariam, BA; Eva Schmitt, PhD; Liang Yap, PhD; and Sharon K. Inouye, MD, MPH

*Table 3.* Adjusted and Unadjusted Relative Risks for Death, Institutionalization, Cognitive Decline, and Any Adverse Outcome*

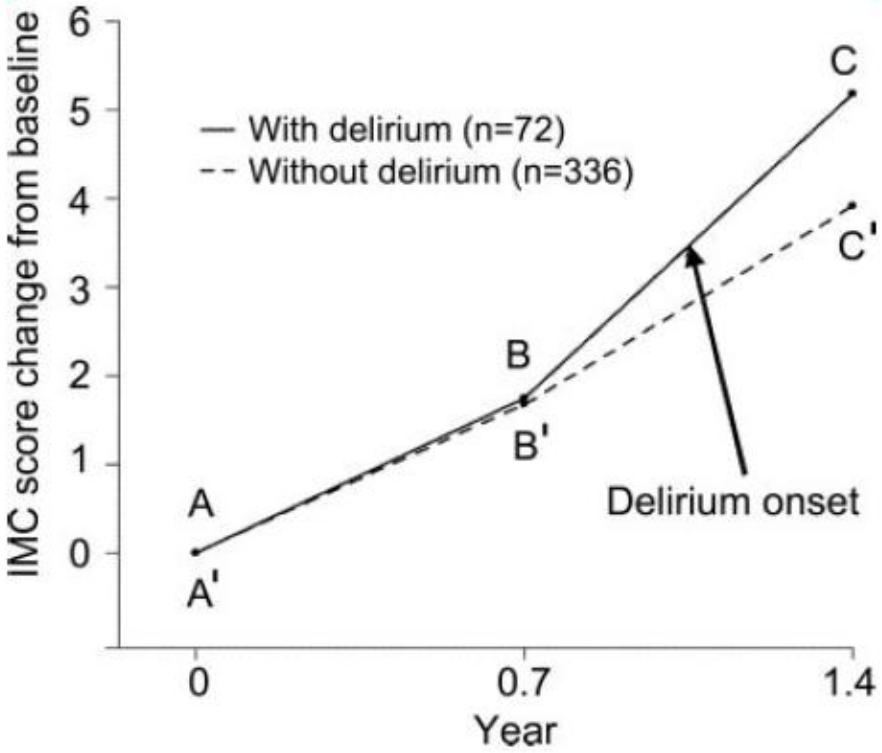
| Variable | Relative Risk (95% CI) | |
|---|---|---|
| | Hospitalized Patients Without Delirium† | Hospitalized Patients With Delirium† |
| **Death (*n* = 771)** | | |
| Unadjusted | 5.3 (2.2–12.8) | 8.9 (4.0–20.0) |
| Adjusted‡ | 4.7 (1.9–11.6) | 5.4 (2.3–12.5) |
| **Institutionalization (*n* = 771)** | | |
| Unadjusted | 7.3 (4.3–12.5) | 10.8 (6.5–18.0) |
| Adjusted‡ | 6.9 (4.0–11.7) | 9.3 (5.5–15.7) |
| **Cognitive decline (*n* = 480)** | | |
| Unadjusted | 0.9 (0.6–1.3) | 1.6 (1.2–2.2) |
| Adjusted‡ | 0.9 (0.6–1.4) | 1.6 (1.2–2.3) |
| **Any adverse outcome (*n* = 590)** | | |
| Unadjusted | 1.8 (1.4–2.2) | 2.5 (2.0–3.0) |
| Adjusted‡ | 1.7 (1.4–2.2) | 2.2 (1.8–2.7) |

*Ann Intern Med.* 2012;156:848-856.

# Delirium e decadimento cognitivo

Delirium accelerates cognitive decline in Alzheimer disease

Figure Cognitive trajectories of patients with Alzheimer disease with and without delirium



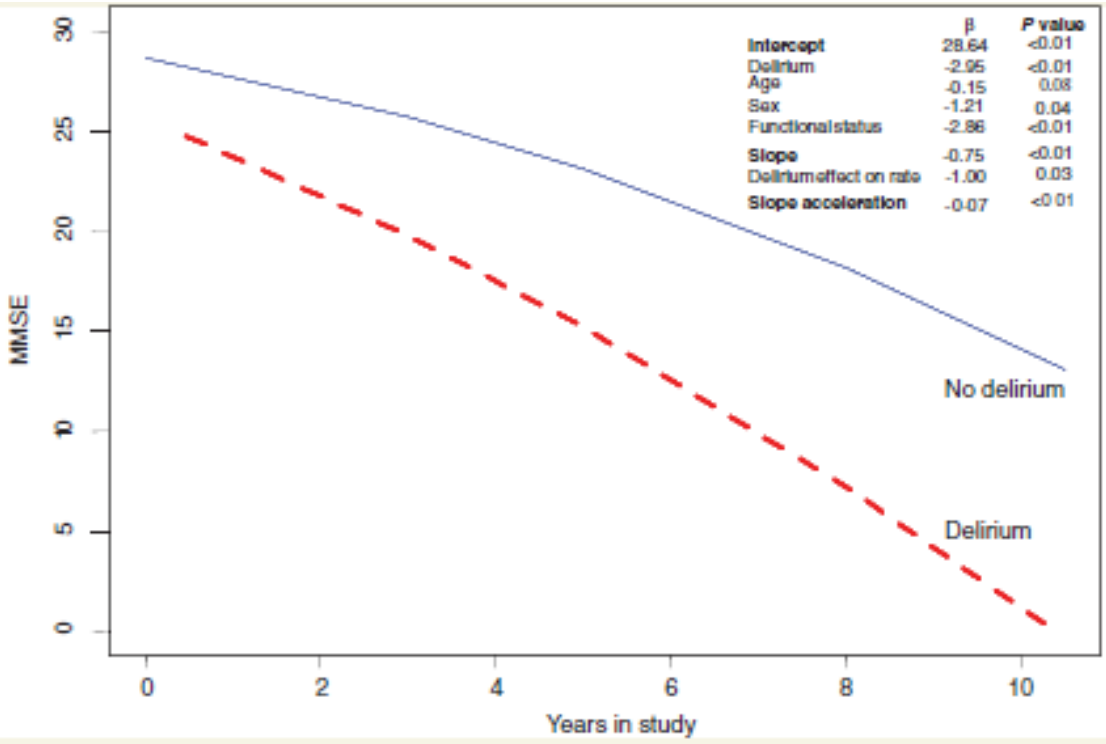

T.G. Fong et al. Neurology 2009

doi:10.1093/brain/aws190


BRAIN
A JOURNAL OF NEUROLOGY

# Delirium is a strong risk factor for dementia in the oldest-old: a population-based cohort study

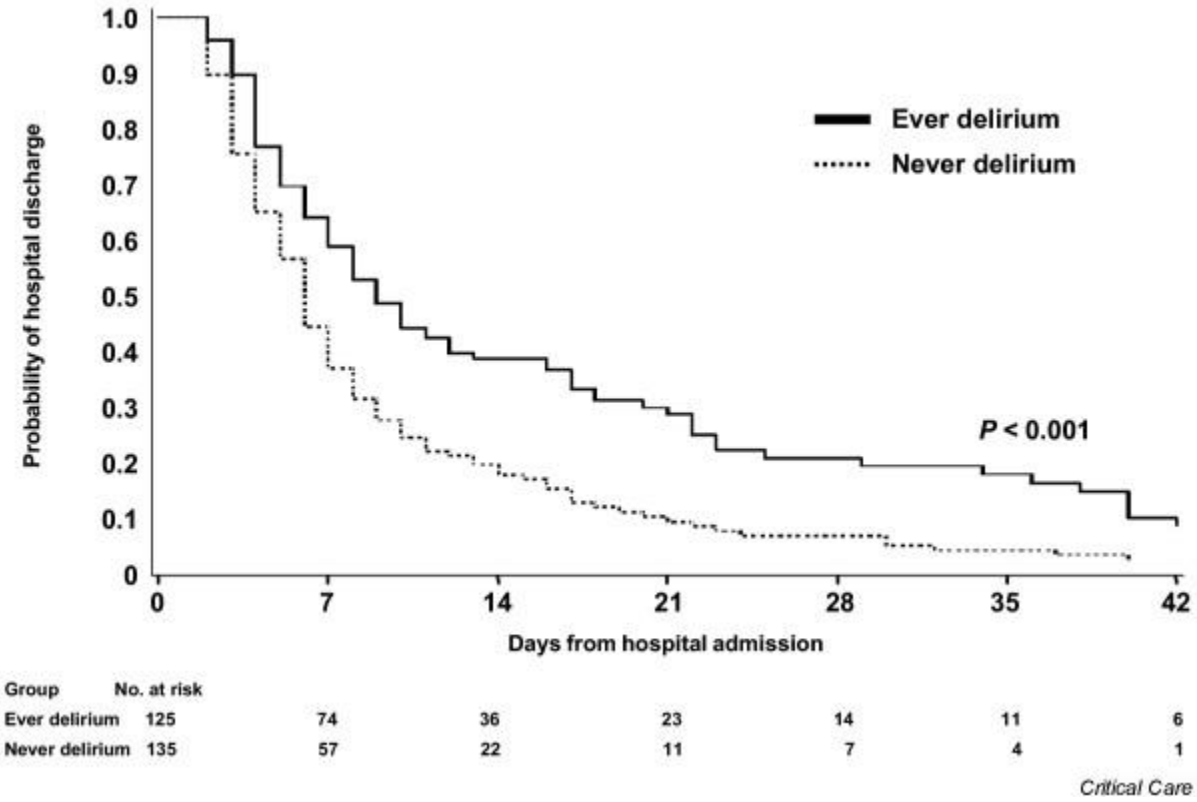
Daniel H. J. Davis,[1,2] Graciela Muniz Terrera,[3] Hannah Keage,[1,4] Terhi Rahkonen,[5] Minna Oinas,[6,7] Fiona E. Matthews,[3] Colm Cunningham,[8] Tuomo Polvikoski,[9] Raimo Sulkava,[10] Alasdair M. J. MacLullich[2,11] and Carol Brayne[2]



# Delirium e durata di degenza

**Intensive care unit delirium is an independent predictor of longer hospital stay: a prospective analysis of 261 non-ventilated patients**

Jason WW Thomason[1], Ayumi Shintani[2], Josh F Peterson[3], Brenda T Pun[4], James C Jackson[5] and E Wesley Ely[6]




Crit Care. 2005 Aug;9(4):R375-81

# Delirium e riospedalizzazione

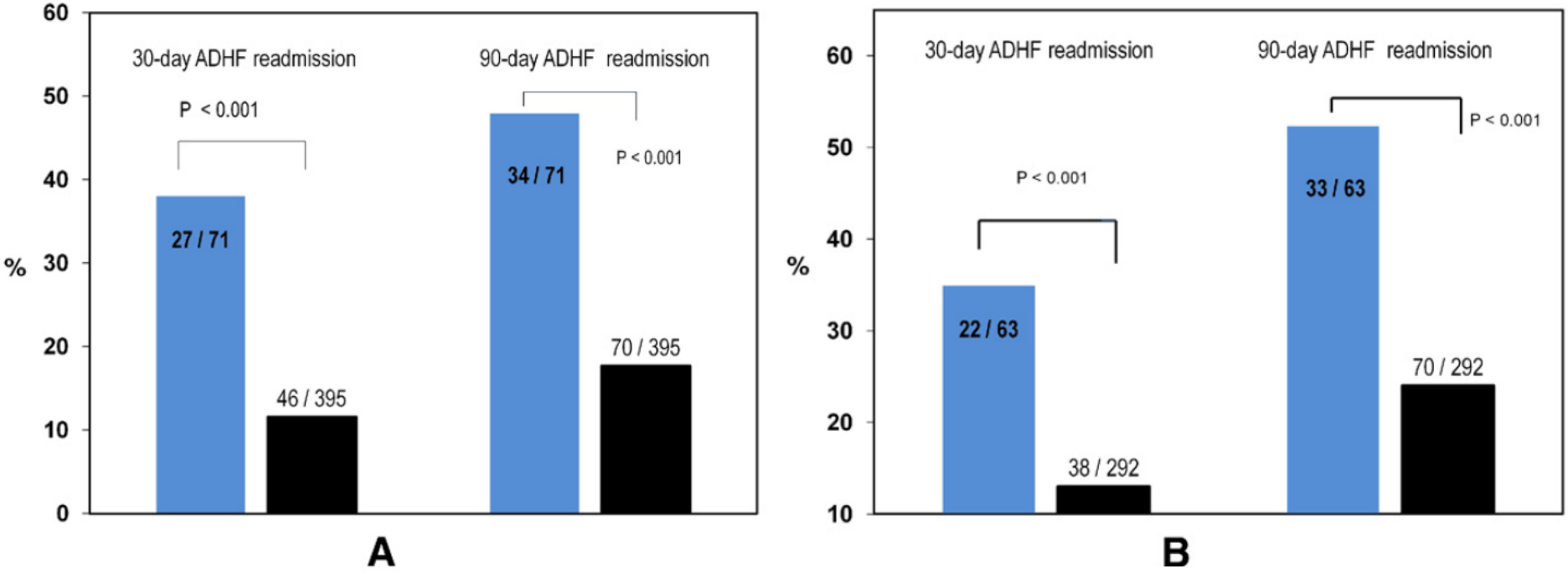



Figure 3. Acute decompensated heart failure readmission risk at 30 and 90 days in patients with left ventricular ejection fractions ≤40% *(A)* and >40% *(B)* stratified by presence *(gray bars)* or absence *(black bars)* of delirium.

**Uthamalingam S et al. Am J Cardiol 2011**

# Delirium e stato funzionale

**Table 5. Logistic regression analysis for functional decline one year after admission in acutely hospitalized older patients.**

| | Functional decline | | | |
|---|---|---|---|---|
| **Variables** | **Univariable OR (95% CI)** | **p-value** | **Multivariable OR (95% CI)** | **p-value** |
| Male sex | 0.69 (0.44 to 1.08) | 0.10 | - | - |
| Age (per year) | 1.07 (1.04 to 1.11) | <0.001 | 1.05 (1.02 to 1.09) | 0.01 |
| Charlson comorbidity score (per point) | 1.04 (0.93 to 1.16) | 0.52 | | |
| **Geriatric conditions** | | | | |
| **Somatic domain** | | | | |
| Polypharmacy | 1.43 (0.92 to 2.24) | 0.12 | - | - |
| Malnutrition | 0.84 (0.54 to 1.31) | 0.45 | | |
| Obesity | 1.55 (0.85 to 2.81) | 0.16 | - | - |
| Fall risk | 1.68 (0.94 to 2.98) | 0.08 | - | - |
| Presence of a pressure ulcer | 1.80 (0.14 to 24.13) | 0.65 | | |
| Indwelling urinary catheter | 2.97 (1.74 to 4.92) | <0.001 | 2.15 (1.24 to 3.72) | 0.01 |
| Incontinence | 1.15 (0.66 to 2.00) | 0.62 | | |
| Constipation | 0.92 (0.52 to 1.65) | 0.79 | | |
| **Psychological domain** | | | | |
| Cognitive impairment (per MMSE point) | 0.94 (0.90 to 0.97) | <0.001 | - | - |
| Prevalent delirium | 2.47 (1.34 to 4.54) | 0.01 | - | - |
| **Functional domain** | | | | |
| ADL impairment (per point) | 1.04 (0.88 to 1.22) | 0.66 | | |
| IADL impairment (per point) | 1.26 (1.14 to 1.39) | <0.001 | 1.17 (1.05 to 1.30) | 0.01 |
| Vision impairment | 1.46 (0.87 to 2.45) | 0.16 | - | - |
| Hearing impairment | 1.48 (0.83 to 2.64) | 0.19 | - | - |
| Mobility difficulty | 2.67 (1.69 to 4.23) | <0.001 | - | - |

Bianca M. Buurman et al, Plos One 2011

# Postoperative Delirium and Functional Decline After Noncardiac Surgery

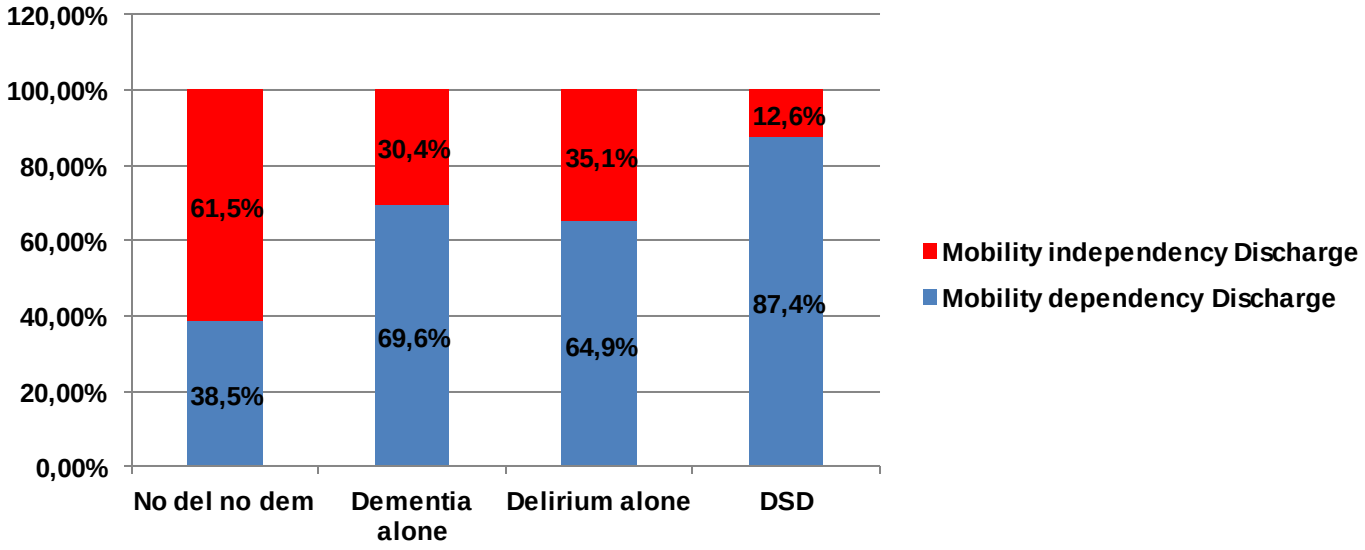
*Nicky Quinlan, MB, MRCPI,*[*†] *and James L. Rudolph, MD, SM*[*†‡]

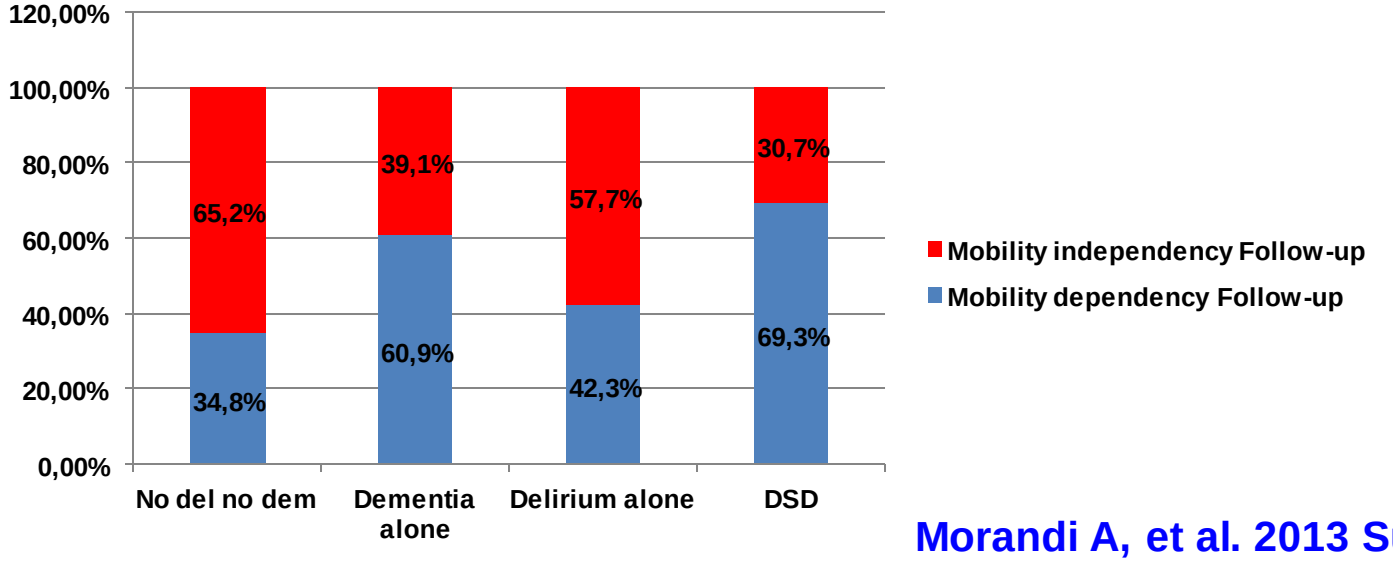
***STUDY POPOLATION*: older adults undergoing major abdominal, noncardiac thoracic, and orthopedic surgery with general anesthesia**

***RESULTS:*** Of the 948 participants who completed functional assessment ***at 3 months***, 20% (n = 189) had a decline in function. In unadjusted analysis, postoperative delirium increased the odds of functional decline odds ratio (OR) = 2.4, 95% confidence interval (CI) = 1.4–4.2). After adjustment for age, sex, education, cognition, and surgery duration, **delirium remained associated with functional decline** (OR = 2.1, 95% CI = 1.2– .8).

**JAGS 2011**

# DSD e stato funzionale: setting riabilitativo



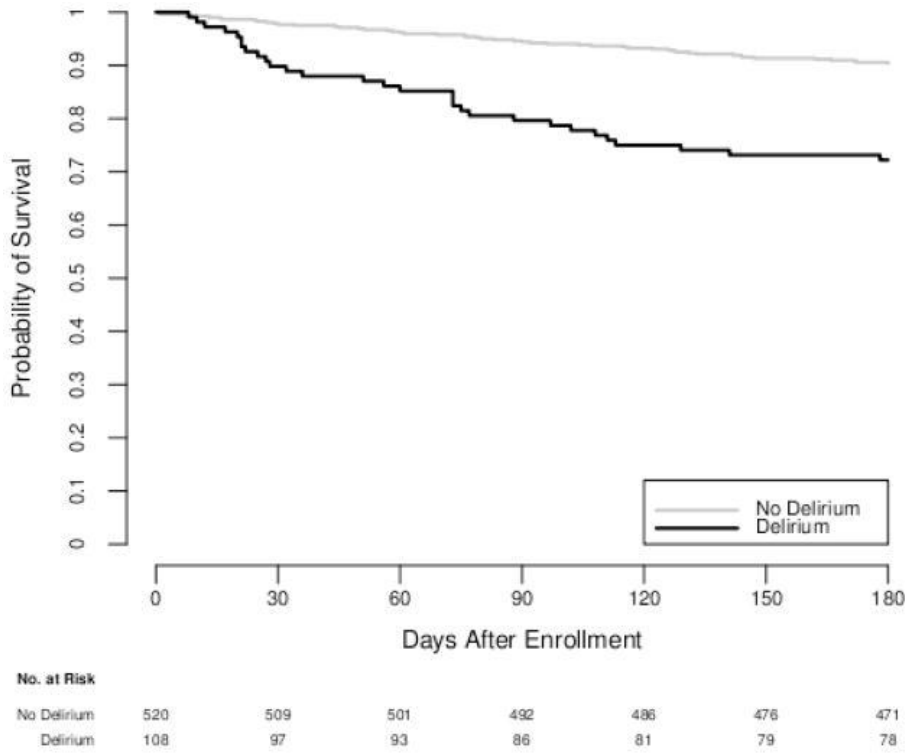




Morandi A, et al. 2013 Submitted JAMDA

# Delirium e mortalità

**Delirium in the Emergency Department: an Independent Predictor of Death Within Six Months**

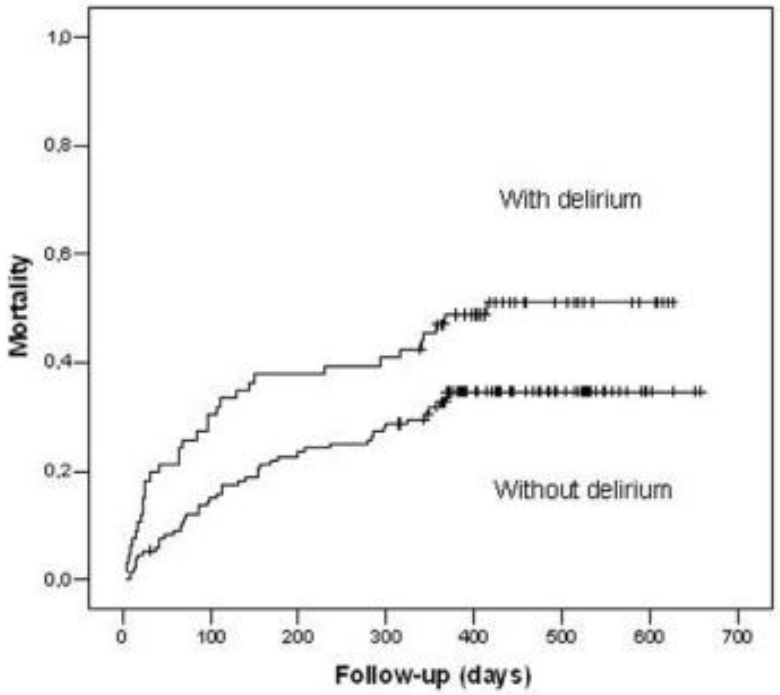
Jin H. Han, MD, MSc[1], Ayumi Shintani, PhD, MPH[2], Svetlana Eden, MS[2], Alessandro Morandi, MD[3], Laurence M. Solberg, MD[4,5], John Schnelle, PhD[4,5], Robert S. Dittus, MD, MPH[4,5], Alan B. Storrow, MD[1], and E. Wesley Ely, MD, MPH[3,5]




Ann Emerg Med. 2010 September

CLINICAL SCIENCE

**DELIRIUM IN HOSPITALIZED ELDERLY PATIENTS AND POST-DISCHARGE MORTALITY**




CLINICS 2010

# The Effect of Poststroke Delirium on Short-Term Outcomes of Elderly Patients Undergoing Rehabilitation

**Table 2.** Predictors of Institutionalization at Discharge and Inhospital Death in 176 Patients Newly and Consecutively Admitted After an Acute Stroke to a DRAC (Multiple Logistic Regression Analyses).

| | Institutionalization at Discharge | | | Death During DRAC Stay | | |
|---|---|---|---|---|---|---|
| | Adjusted Odds Ratio | 95% Confidence Intervals | *P* | Adjusted Odds Ratio | 95% Confidence Intervals | *P* |
| Delirium on admission | 7.23 | 4.79-10.91 | .0003 | 4.26 | 1.15-15.81 | .0304 |
| Malnutrition | 5.71 | 1.62-20.09 | .0066 | 6.94 | 1.85-26.0 | .00411 |
| Bladder catheter on admission | 4.56 | 1.36-15.28 | .0138 | 2.04 | 0.46-9.16 | .3508 |
| C-reactive protein serum levels | 0.96 | 0.84-1.10 | .5219 | 1.21 | 1.06-1.38 | .0052 |
| Barthel index score on admission | 0.94 | 0.91-0.97 | .0005 | 0.97 | 0.91-1.02 | .2450 |

Abbreviation: DRAC, Department of Rehabilitation and Aged Care; *P*, significance.

Turco R. et al. Journal of Geriatric Psychiatry and Neurology, 2013

# Delirium persistente: Prognosi

**Table 3.** Summary of studies of the prognosis of patients with persistent delirium

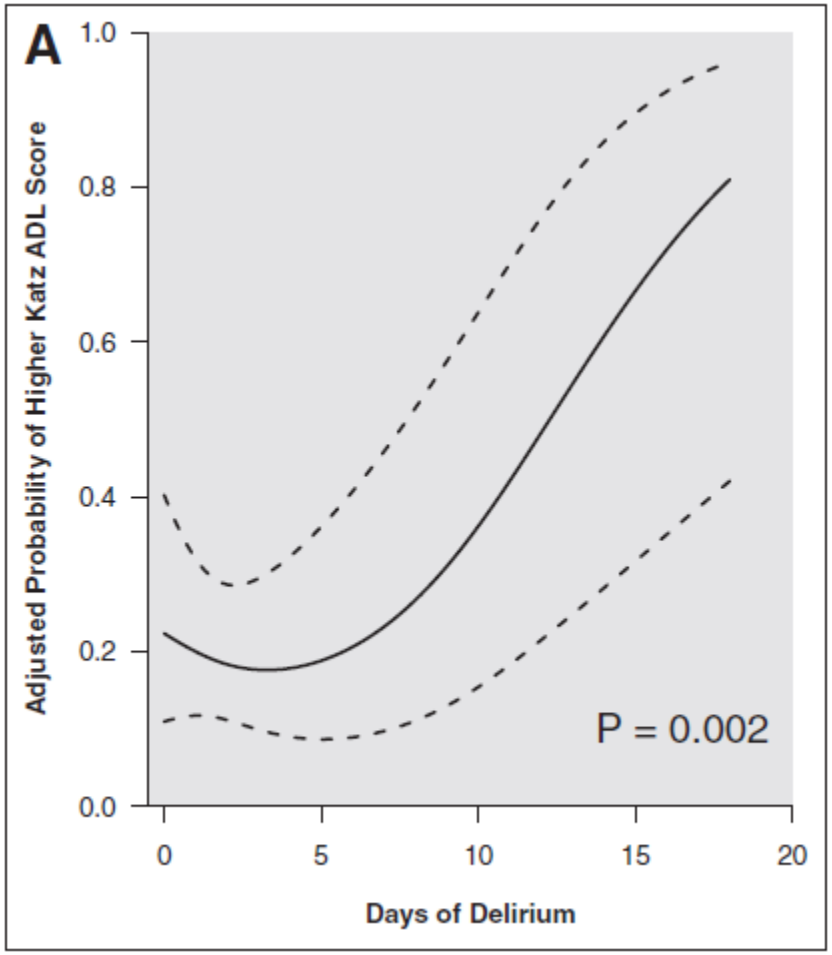
| Author/year | *N* | PerD determined at | Proportion with PerD (%) | Outcomes determined at | Outcomes [OR (95% CI)] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mortality | NH placement | ADL decline | Cognitive decline | Ambulation decline |
| Marcantonio *et al.*/2000 | 52 | 1 month | 32 | 1 month | 1.5 (0.45, 5.0)[a,e] | | 3.05 (0.74, 12.64)[a] | | 5.73 (1.51, 21.78)[a] |
| McCusker *et al.*/2003 | 181 | 24 h after enrolment | 61 | 12 months | 1.62 (0.79, 3.34)[b] | | −10.7 (−19.8, 1.6)[c] | 0.87 (−1.1, 2.8)[d] | |
| | | Discharge | 32 | 12 months | 1.63 (0.77, 3.44)[b] | | −21.9 (−31.1, −12.7)[c] | −5.3 (−7.5, −3.1)[d] | |
| McAvay *et al.*/2006 | 55 | Discharge | 44 | 12 months | 2.38 (0.64, 8.84)[a,e] | | | | |

*Cole, M.G. et al. Age Ageing 2009; 38: 19-26*

# Delirium persistente e critical illness: Stato funzionale

## Delirium in the ICU and Su Long-Term Disability Amon Mechanical Ventilation

Nathan E. Brummel, MD, MSCI[1,2,3]; James C. Jackso
Jennifer L. Thompson, MPH[9]; Ayumi K. Shintani, P
Thomas M. Gill, MD[11]; Gordon R. Bernard, MD[1]; E.
Timothy D. Girard, MD, MSCI[1,2,3,4]




*Brummel NE, et al. CCM 2013; Epub ahead of print*

***Maggiore score ADL, peggiore stato funzionale***

# Delirium and the functional recovery of older medical inpatients after acute illness: the significance of biological factors.

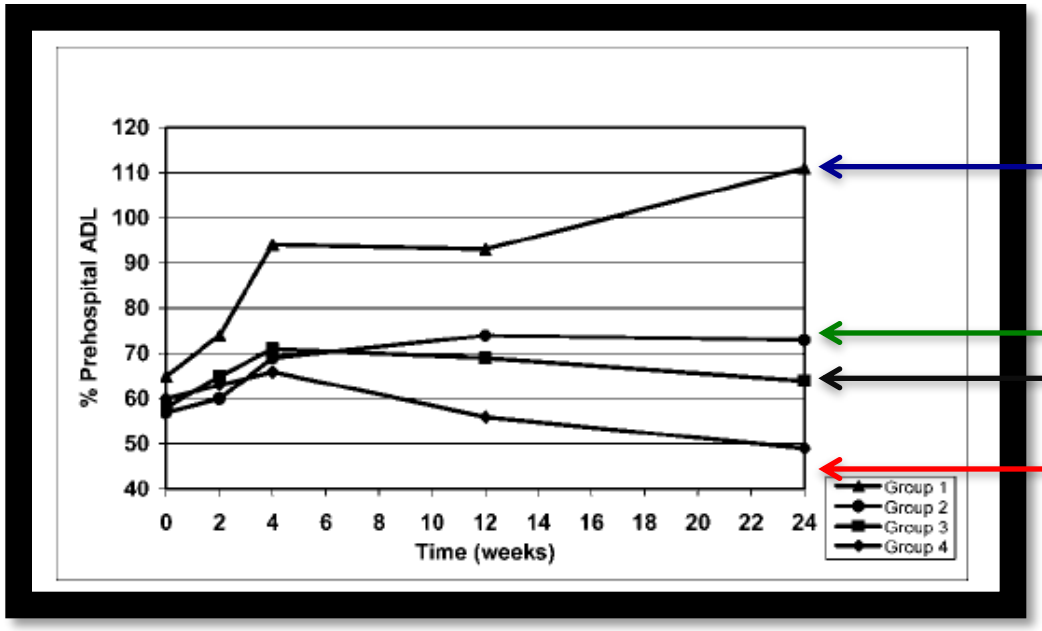
- By discharge, survivors who had ***recovered*** from prevalent delirium ***had significant improvement in BI*** (n=38, p=0.005), ***but non-recovers did not*** (n=14, p=0.512).

- Delirium in acutely admitted patients is associated with functional decline only in those who do not recover.

**Adamis et al. Arch Gerontol Geriatr. 2011**

# Delirium persistente e riabilitazione: Stato funzionale

**Percentuale media di IADL pre-morbose recuperate in relazione alla risoluzione del delirium durante un ricovero in riabilitazione**




**Risoluzione delirium entro 2 settimane**

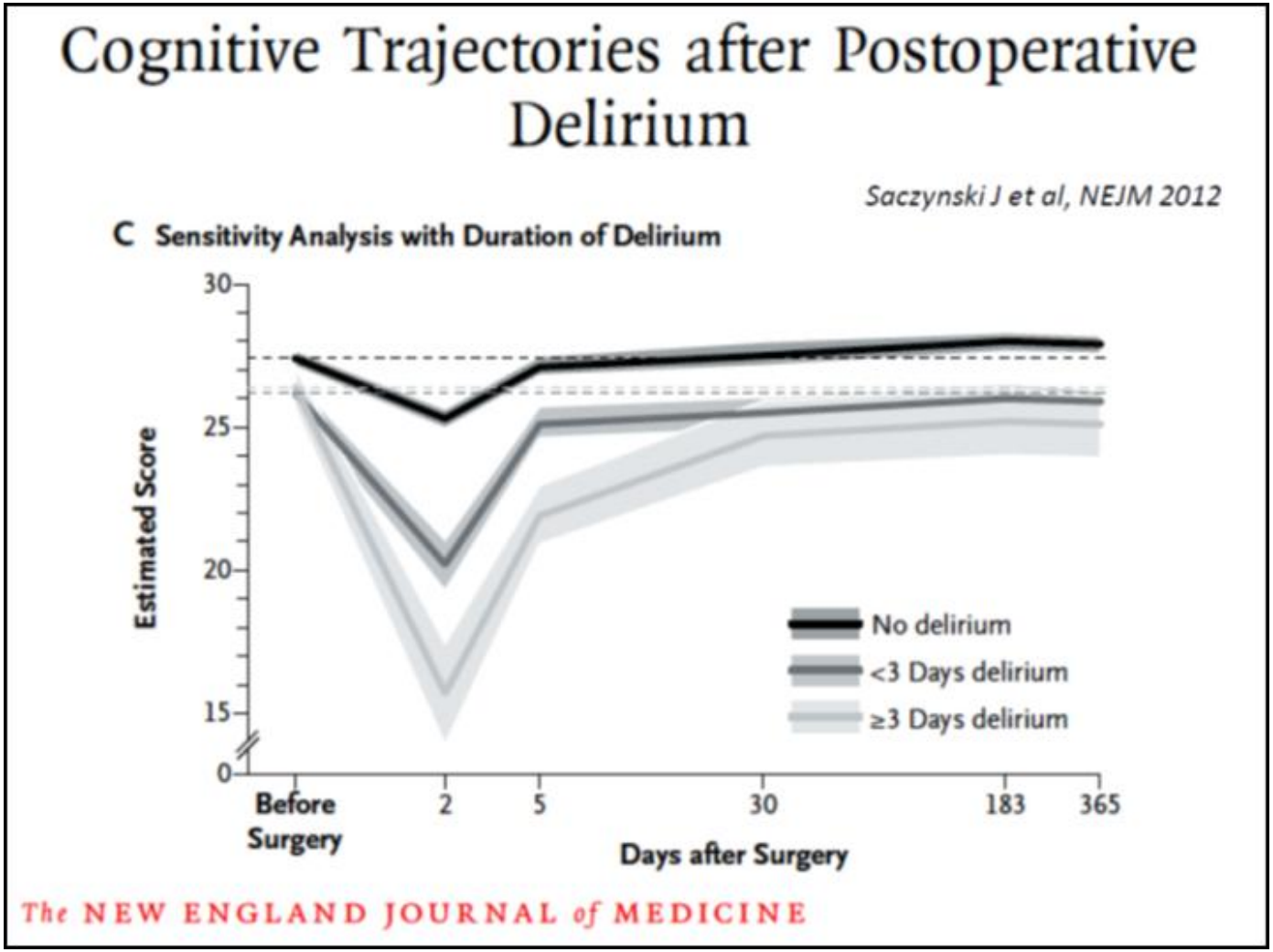
**Risoluzione delirium dopo 2 settimane**

**Risoluzione delirium con recidiva durante la degenza**

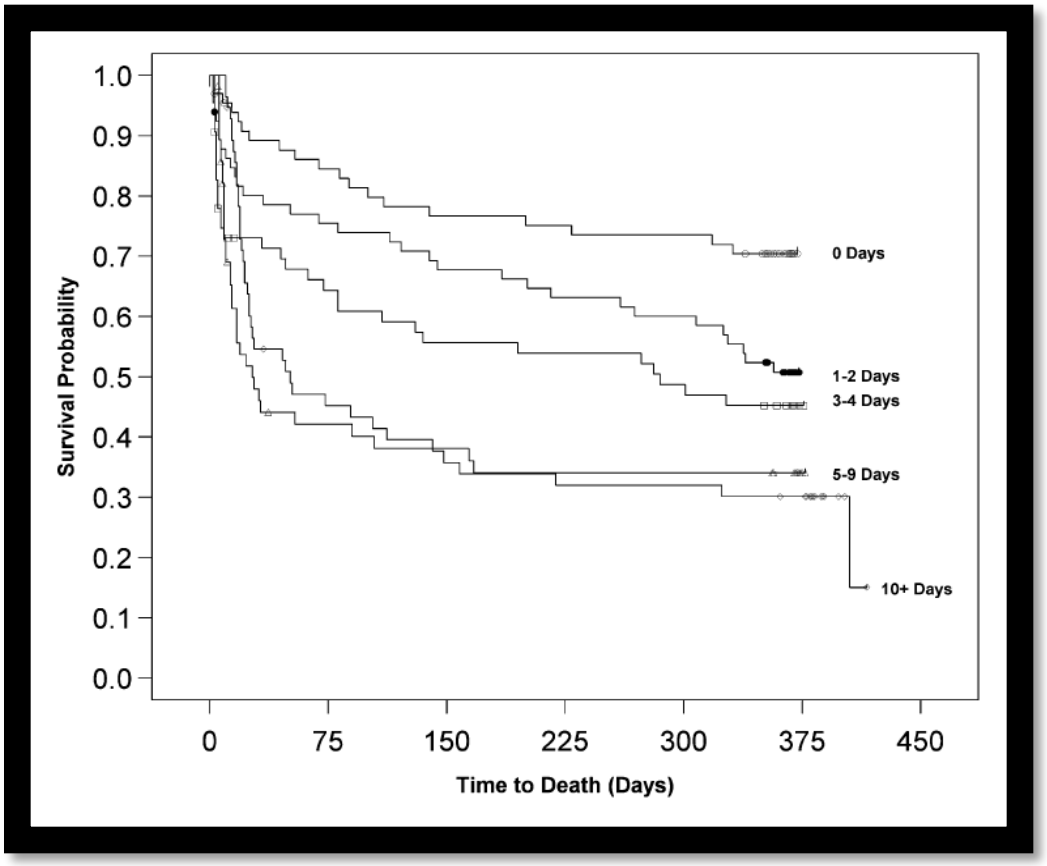
**Delirium mai risolto durante la degenza**

Kiely D.K. J Gerontology, 2006;61A:204-208

# Delirium persistente e decadimento cognitivo

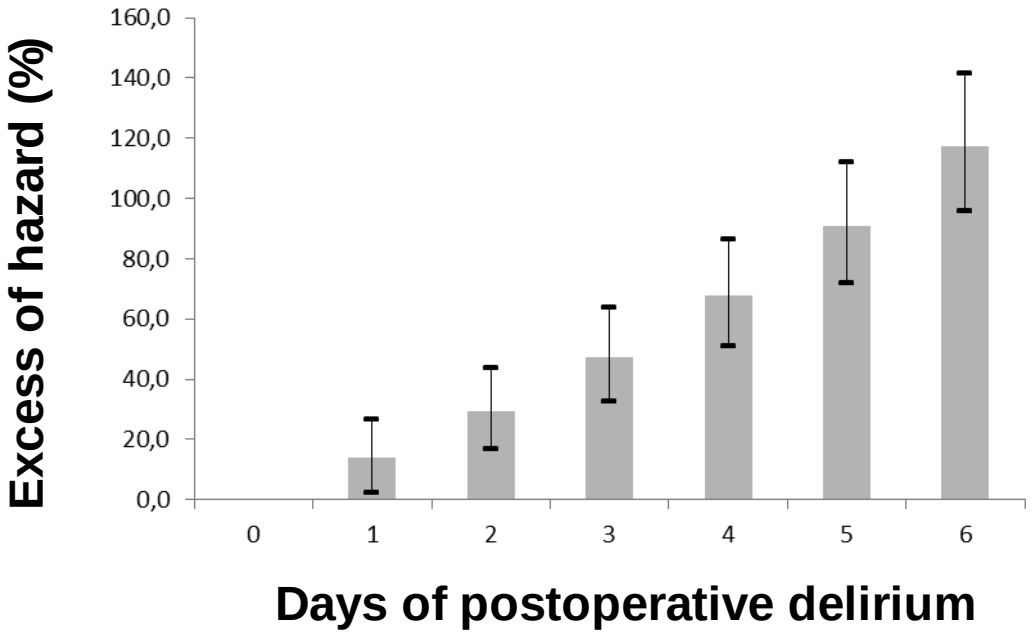


# Delirium persistente e criticall illness: Mortalità




Pisani M, et al. Am J Resp CritCareMed. 2009;180: 1097-2009

# Delirium persistente ed ortogeriatria: Mortalità




*Bellelli, et al. Unpublished data*

# Delirium persistente e mortalità

Clin Orthop Relat Res (2011) 469:2612–2620
DOI 10.1007/s11999-011-1806-1

CLINICAL RESEARCH

## Frequency, Risk Factors, and Prognosis of Prolonged Delirium in Elderly Patients After Hip Fracture Surgery

Kyung-Hag Lee MD, Yong-Chan Ha MD,
Young-Kyun Lee MD, Hyun Kang MD,
Kyung-Hoi Koo MD

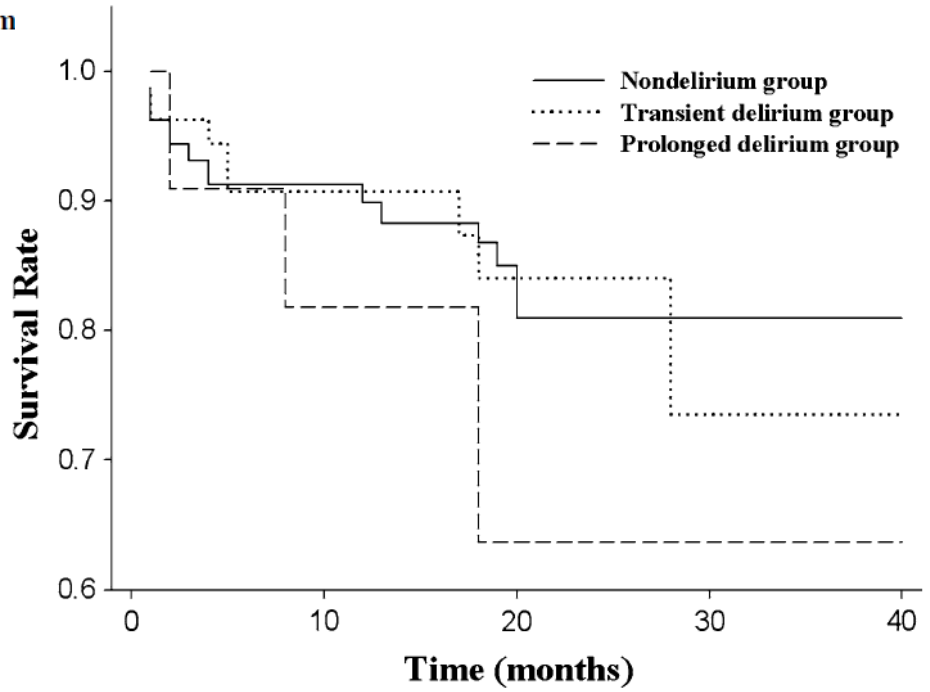
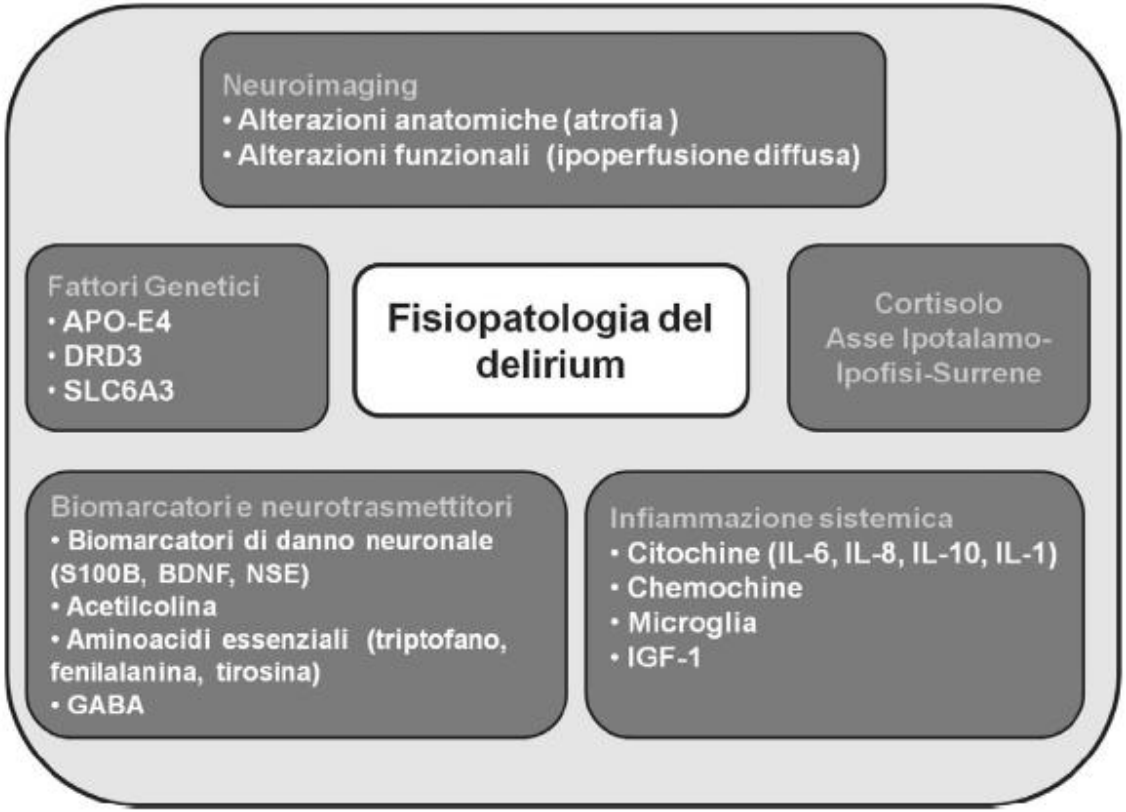



**Fig. 2** Kaplan-Meier survival curves show the survival rates at 40 months were 81.0%, 73.5%, and 63.6% for the nondelirium, transient delirium, and prolonged delirium groups, respectively.

# Outline

- Epidemiologia del delirium
  - Prevalenza
  - Prognosi
- **Fattori di rischio**

# Patogenesi del delirium: ipotesi e meccanismi





Trzepacz PT, *Psychos* 1994; 35:374-391
Inouye SK, *J Geront A Biol Sci Med Sci* 2006; 61:1277-80
Maldonado JR, Critical Care Clin 2008;24:789-756
MacLullich AM, J Psychosom Res. 2008;65:229-38
Gunther ML, Morandi A, et al. Crit Care Clin 2008;24: 45-65
Morandi A, Ely EW, Trabucchi M. "Il delirium" 2012

Cerejeira J, Acta Neuropathol 2010;119:737-54
Van Gool WA, Lancet 2010;375:773-5
Simmone MJ, CNS Neurosc Ther 2010 Epub
Morandi A, Chest 2011 Sep;140(3):580-5

# Fattori di rischio predisponenti il delirium

| Setting Medici | Terapia Intensiva | Setting Chirurgici | Dipartimenti di Emergenza | Residenze Sanitarie Assistenziali | Hospice/Cure Palliative |
|---|---|---|---|---|---|
| • Età ≥ 80 anni<br>• Demenza<br>• Deficit visivi<br>• Disidratazione<br>• Gravità della malattia acuta<br>• Abuso etilico | • Età ≥ 65 anni<br>• Demenza<br>• Abuso etilico<br>• Tabagismo<br>• Ipertensione arteriosa<br>• Fattori genetici (allele APOE4) | • Età ≥ 65 anni<br>• Demenza<br>• Depressione<br>• Fibrillazione Atriale<br>• Fragilità<br>• Pregresso ictus<br>• Diabete Mellito<br>• Artetiopatia obliterante<br>• Comorbilita'<br>• Euroscore ≥5<br>• Deficit visivi ed uditivi<br>• Leucoaraiosi | • Demenza<br>• Deficit funzionali<br>• Deficit uditivi<br>• Residenza in RSA | • Demenza<br>• Disturbi comportamentali<br>• Depressione<br>• Dolore<br>• Politrattamento farmacologico<br>• Disidratazione<br>• Perimetro brachiale | • Età<br>• Neoplasie cerebrali<br>• Metastasi Cerebrali ed ossee<br>• Neoplasie ematologiche<br>• Encefalopatia ipossica<br>• Ipoalbuminemia |

Morandi A, Ely EW, Trabucchi M. "Il delirium" Vita e Pensiero 2012

# Fattori di rischio scatenanti

| Setting Medici | Terapia Intensiva | Setting Chirurgici | Residenze Sanitarie Assistenziali | Hospice/Cure Palliative |
|---|---|---|---|---|
| • Contenzione fisica<br>• Malnutrizione<br>• Aggiunta di ≥3 farmaci durante il ricovero<br>• Catetere vescicale<br>• Assenza dei familiari o di un orologio nella stanza<br>• Mancato uso degli occhiali<br>• Uso di opioidi o benzodiazepine<br>• Coprostasi, ritenzione acuta d'urina | • APACHE score<br>• Acidosi metabolica<br>• Alterazioni idroelettrolitiche<br>• Ansietà, coma<br>• Numero di cateteri ed infusioni<br>• Contenzione fisica<br>• Uso di opioidi o benzodiazepine<br>• Fattori ambientali (assenza della luce diurna, isolamento ed assenza dei familiari)<br>• Alterazione del ciclo sonno-veglia | • Deficit funzionali<br>• Depressione<br>• Pregresso ictus/TIA<br>• Ipo/Iper albuminemia<br>• Emotrasfusioni perioperatorie<br>• Alterazioni elettolitiche<br>• Ipossiemia<br>• Frazione d'eiezione del ventricolo sinistro ≤30%<br>• Contropulsatore aortico<br>• Chirurgia ortopedica d'urgenza<br>• Chirurgia ortopedica dilazionata<br>• Chirrugia toracica e dell'aorta addominale<br>• Dolore postoperatorio<br>• Meperidina /benzodiazepine<br>• Mancata mobilizzazione postoperatoria | • Contenzione fisica<br>• Numero dei fattori di rischio precipitanti | • Farmaci psicotropici<br>• Infezioni |

Morandi A, Ely EW, Trabucchi M. "Il delirium" Vita e Pensiero 2012

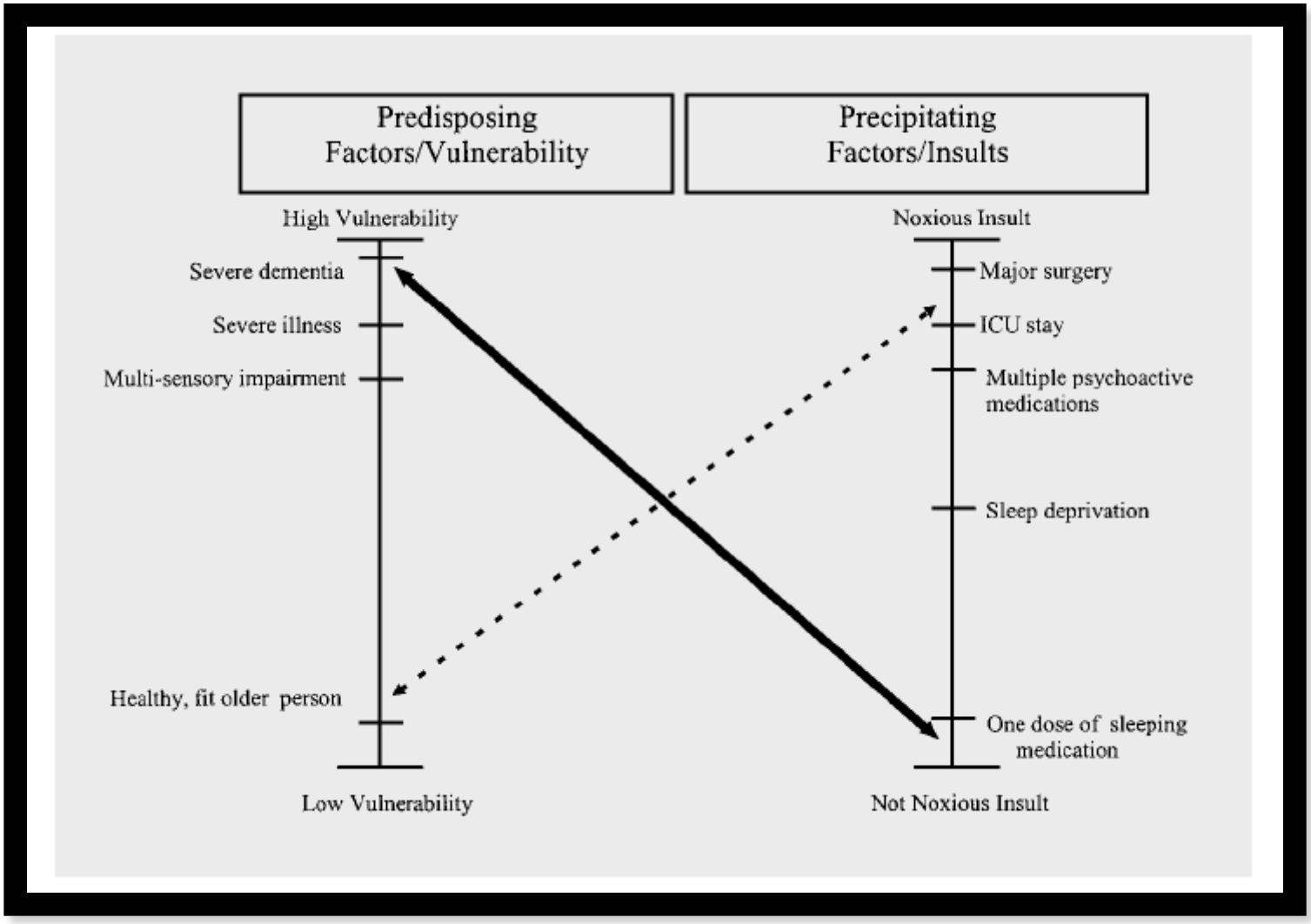
# Delirium in elderly people

*Sharon K Inouye, Rudi G J Westendorp, Jane S Saczynski*

Although a single factor can lead to delirium, usually delirium is **multifactorial** in elderly people.

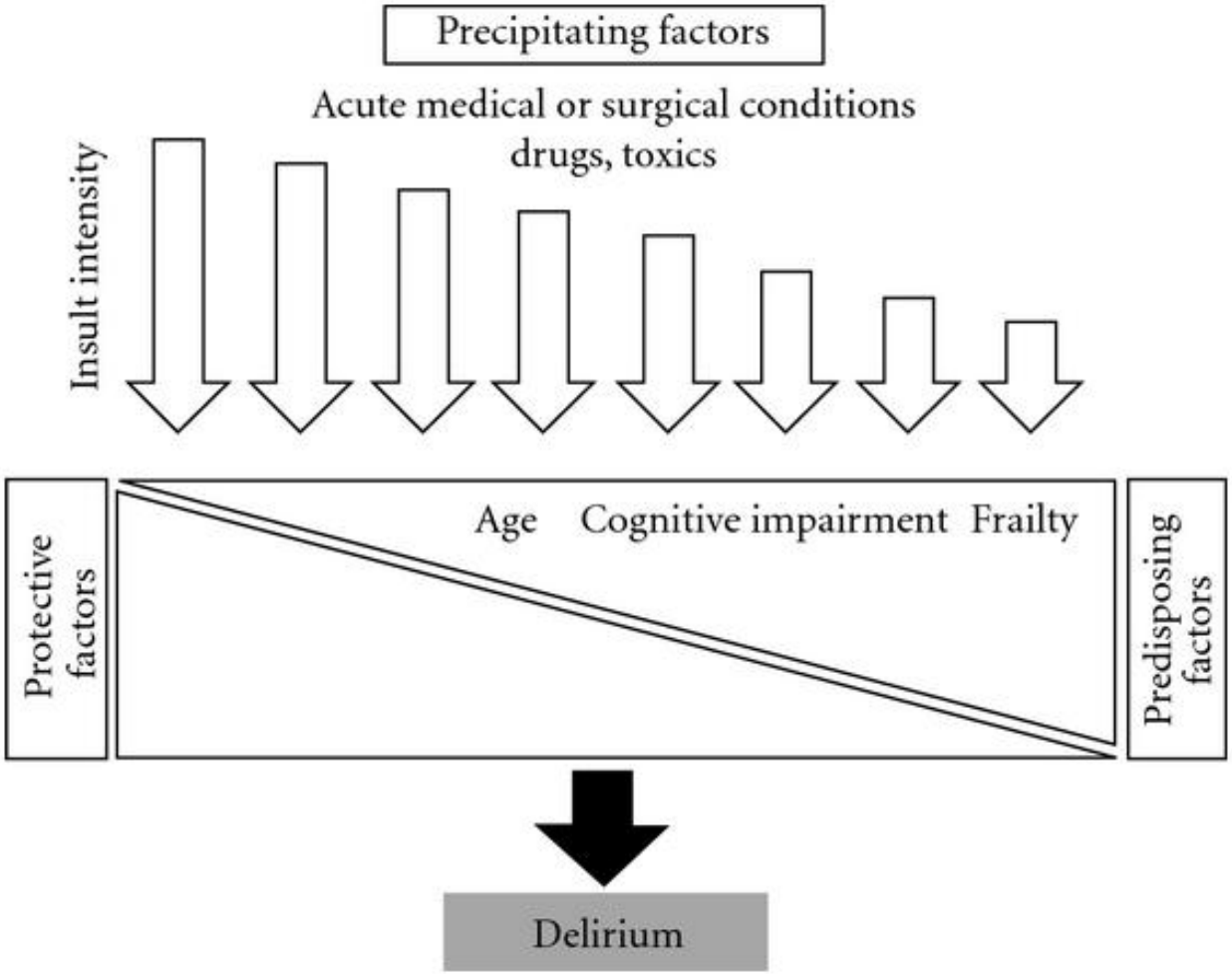
**The Lancet. August 28, 2013**

# Modello multifattoriale del delirium nella popolazione anziana




Inouye S.K., Charpentier P.A. JAMA 1996; 275: 825-57

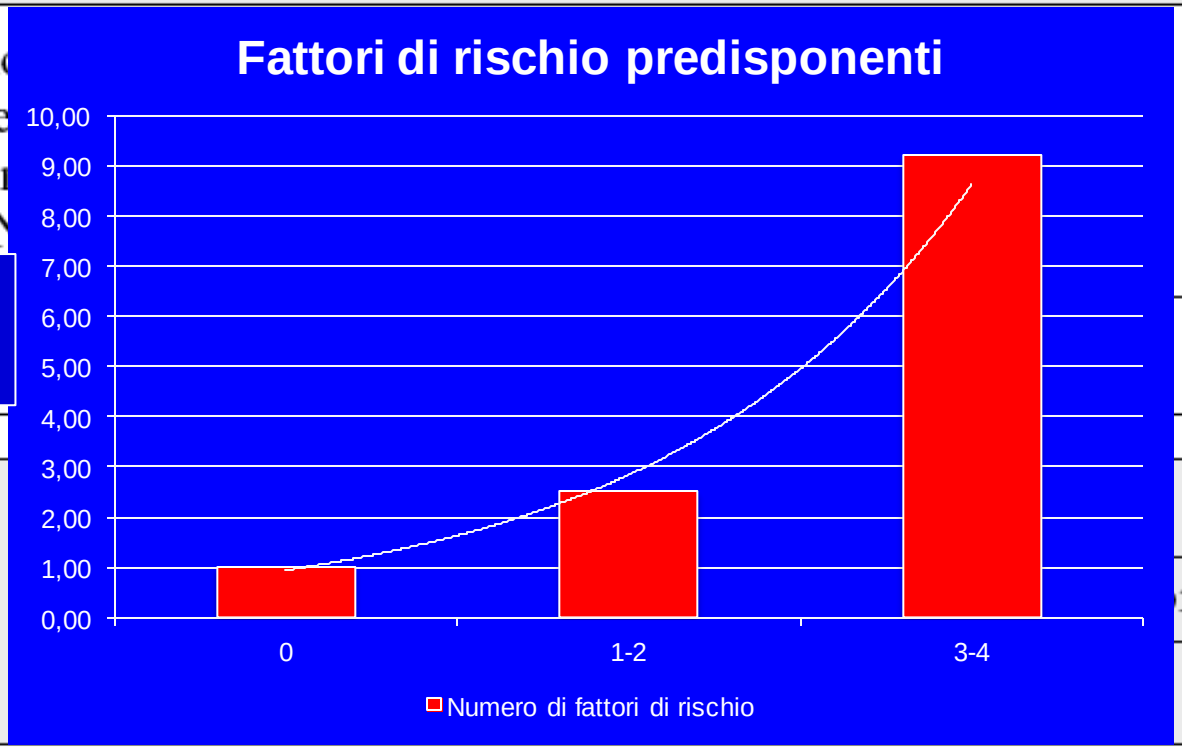
# Relazione tra fattori predisponenti, protettivi, and precipitanti nel delirium




Joaquim Cerejeira, Nurs Res Pract. 2011

# Predisposing risk factors for delirium in medical wards

| Risk factor | Adjusted relative risk |
|---|---|
| Visi | |
| Seve | |
| Cogi | |
| BUN | |




| Risk group | | | | | n cohort | | |
|---|---|---|---|---|---|---|---|
| | | | | | | % | RR |
| Low | 0 | 3/33 | 9[a] | 1.0 | 1/30 | 3[b] | 1.0 |
| Intermediate | 1–2 | 14/61 | 23[a] | 2.5 | 16/103 | 16[b] | 4.7 |
| High | 3–4 | 10/12 | 83[a] | 9.2 | 12/38 | 32[b] | 9.5 |

Inouye SK DemGeriatr CognDisord 1999;10:393-400

# Fattori di rischio scatenanti il delirium

| Precipitating factor | Adjusted relative risk |
|---|---|
| Use of | |
| Malnut | |
| >3 me | |
| Use of | |

Rischio di delirium

| Risk group | | | | ium rate/ person-days[a] | RR |
|---|---|---|---|---|---|
| Low | 0 | 5/125 (4)[b] | 1.0 | 5/1,063 (0.5)[c] | 1.0 |
| Intermediate | 1–2 | 31/156 (20)[b] | 5.0 | 31/934 (3.3)[c] | 7.1 |
| High | ≥3 | 11/31 (35)[b] | 8.9 | 11/134 (8.2)[c] | 17.5 |

Inouye SK DemGeriatr CognDisord 1999;10:393-400

# Fattori di rischio predisponenti e scatenanti il delirium in RSA

**Prevalence of Delirium According to Risk Group Categories and Results of Univariate Analyses**

| Risk Group | Number of Factors | Prevalence of Delirium (%) | Crude Odds Ratios* [95% CI] |
|---|---|---|---|
| **Predisposing Factors** | | | |
| Low | 0–2 | 32.0 (16/50) | 1.0 (referent) |
| Moderate | 3–4 | 78.4 (40/51) | 7.7 [3.16–18.88] |
| High | 5–9 | 98.1 (53/54) | 112.6 [14.27–888.7] |
| **Precipitating Factors** | | | |
| Low | 0–1 | 37.9 (11/29) | 1.0 (referent) |
| Moderate | 2 | 67.2 (39/58) | 4.4 [1.72–11.05] |
| High | 3–4 | 86.8 (59/68) | 13.9 [4.99–38.9] |

Voyer P SK et al. Geriatr Nurs 2010;31:105-114

# Fattori di rischio associati al delirium persistente

*International Psychogeriatrics* (2010), 22:3, 373–394 © International Psychogeriatric Association 2010
doi:10.1017/S1041610209991517

REVIEW

**Factors associated with prolonged delirium: a systematic review**

Monidipa Dasgupta[1,2] and Loretta M. Hillier[2]

**Persistence was associated with:**

- **Dementia**
- **Increasing numbers of medical conditions**
- **Increasing severity of delirium and hypoactive symptoms**
- **Hypoxic illnesses**

# Complications in postacute care are associated with persistent delirium

Anderson CP, Marcantonio ER. J Am Geriatr Soc. 2012 Jun

PARTICIPANTS: Three hundred fifty individuals with delirium at PAC admission.

**RESULTS:** ….***Delirium persistence at 1 month was significantly greater in participants with more geriatric syndrome complications*** (no complications, 51%; one complication 61%; ≥ 2 complications, 100%, adjusted P = .048). There was also ***a trend toward greater delirium persistence in participants with unresolved geriatric syndrome complications*** (no complications, 51%; resolved complication, 61%; unresolved complication, 68%; adjusted P = .10).

**CONCLUSION:** Geriatric syndrome complications are common in individuals admitted to PAC with delirium and are associated with persistence of delirium 1 month later. Proactively addressing risk factors for geriatric syndromes may improve outcomes of vulnerable individuals in PAC.

***Geriatric syndrome complications***

- Dehydration
- Pressure ulcers
- Poorly controlled pain
- Urinary retention
- Fecal impaction
- Malnutrition
- Aspiration
- Falls

# Conclusioni

- **Il delirium è una condizione clinica frequente in diversi setting di cura**
- **Il delirium è associato ad un incrementato rischio di outcome negativi**
- **La persistenza del delirium si associa ad una prognosi peggiore**
- **La patogenesi del delirium è multifattoriale ed i fattori di rischio (predisponenti e scatenanti) sono molteplici**

**http://www.europeandeliriumassociation.com**
**http://www.psicogeriatria.it/congressi/**