

# Perioperative Neurocognitive Disorders

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# Why it matters

- 12% previously well develop symptoms post procedure.
- Highest in >65 years
- 37% US procedures on >65years



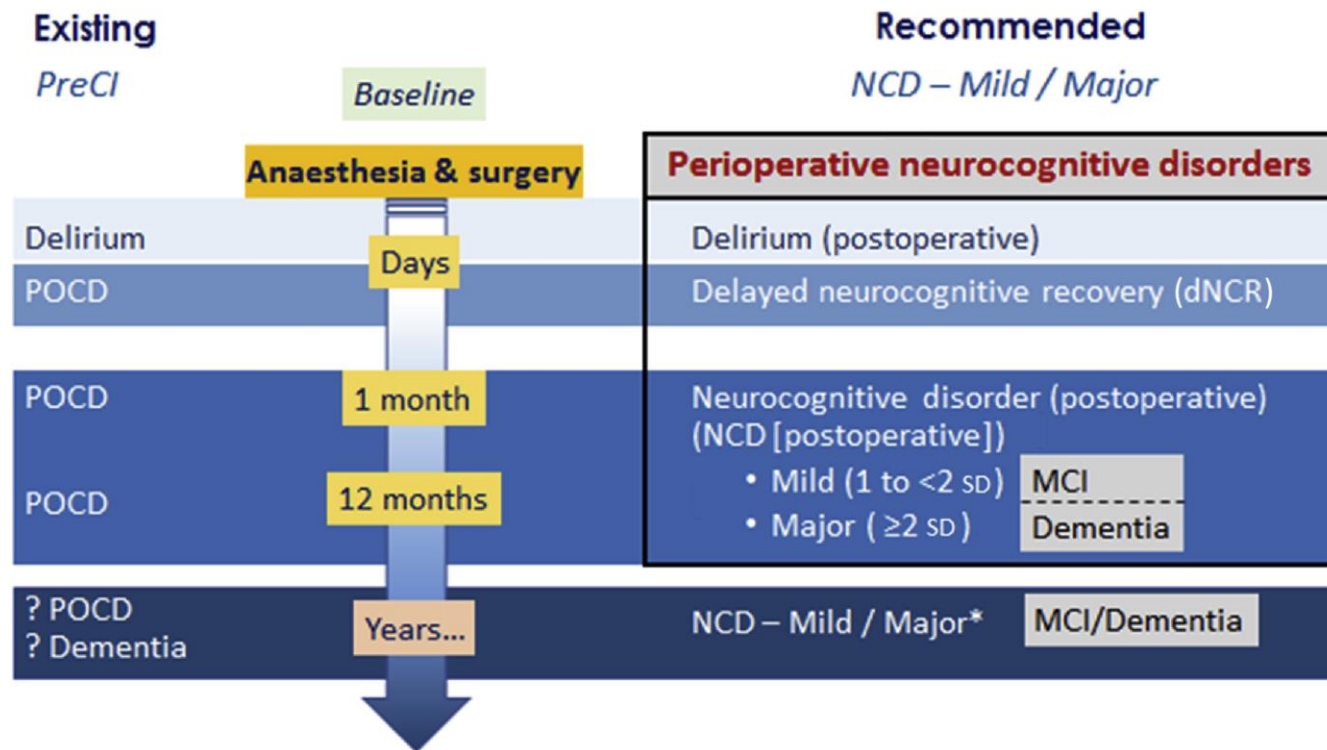
# Aims

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- Explore issues around cognitive disorder in the perioperative period
- Outline possible interventions and highlight potential areas to review practice



# Recommendations for the Nomenclature of Cognitive Change Associated with Anaesthesia and Surgery—2018



# Delirium

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65% patients

LOS, mortality ↑

At risk

Severe illness

Infection

Poor vision/hearing

Cognitive impairment,

Age >65y

Treat NICE CG103



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# Types of Delirium

Br J Anaesth. 2014;114(2):194-203. doi:10.1093/bja/aeu296

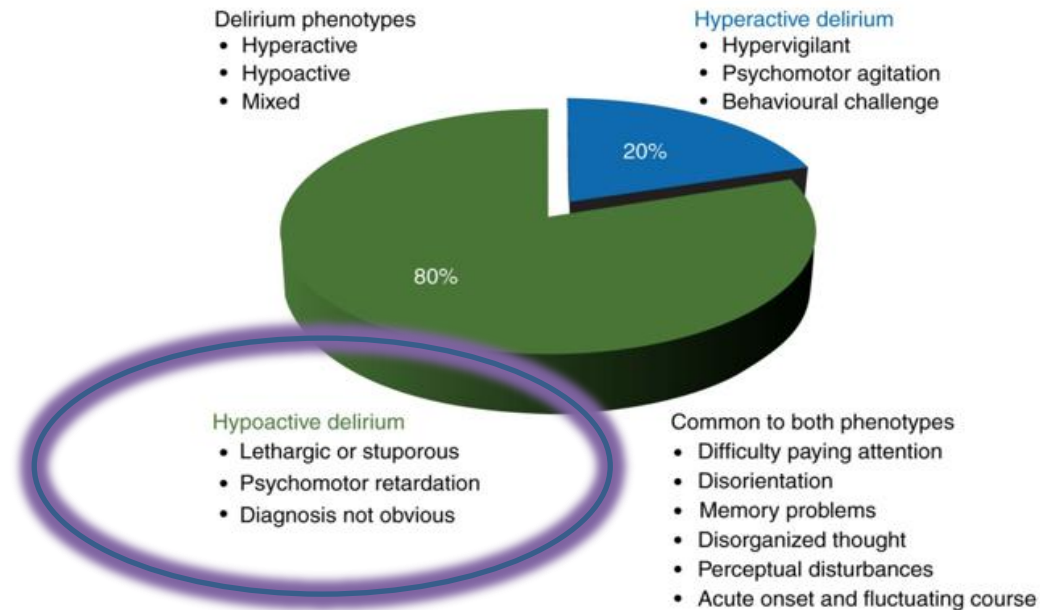


Figure Legend:  
Signs and subtypes of postoperative delirium.



# Delirium-Multicomponent Intervention Studies

- Orientation
- Cognitive stimulation
- Early mobilisation
- Non-pharmacological sleep programme
- Visual & hearing aids
- Avoid dehydration
- Staff education
  - Identification of delirium
  - Treatment of delirium
- Minimise drug triggers

Inouye SK *et al.*  
N Engl J Med 1999; 340: 699-76

Lundstrom M *et al.*  
J Am Geriatr Soc 2005; 53: 62-8

Naughton BJ *et al.*  
J Am Geriatr Soc 2005; 53: 18-23

Tabet N *et al.*  
Age Aging 2005; 34: 152-6



# Hospital Elder Life Program (HELP) for Prevention of Delirium

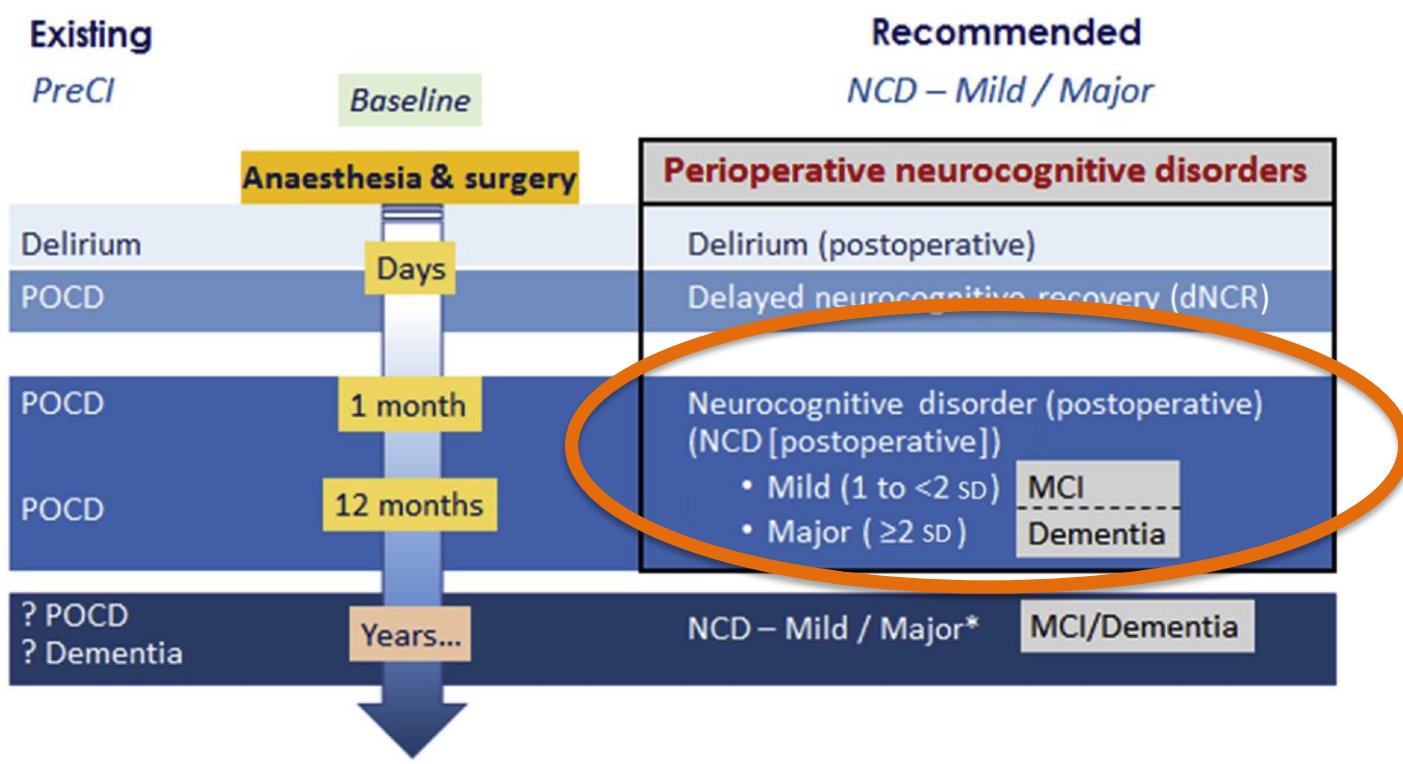
A comprehensive patient-care program that ensures optimal care for older adults in the hospital. HELP prevents delirium (a sudden state of confusion or change in mental state) and loss of functioning.



Enter Keywords

GO

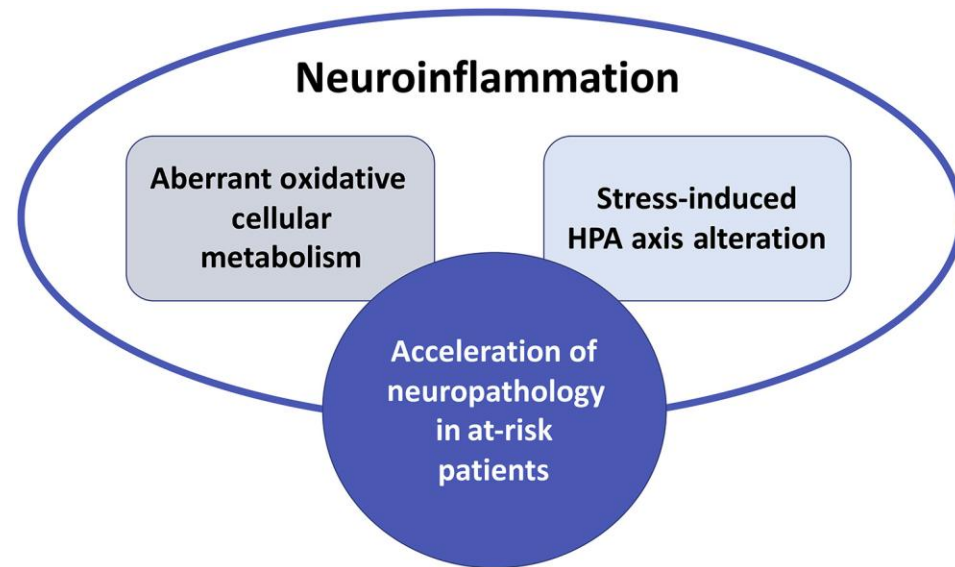




# Biological Mechanisms of NCD

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1. Neurotransmitter abnormalities
2. Proinflammatory cytokines
3. Neuroinflammation
4. 'Unmasking' existing dementia



**No benefit from modulation**



# Risk Factors for Post Op NCD

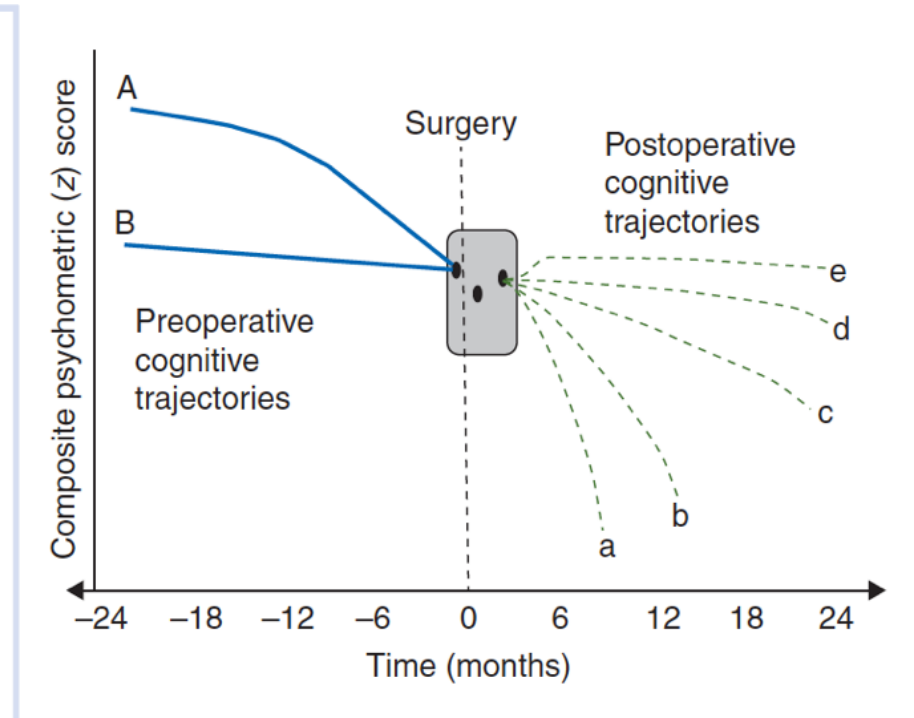
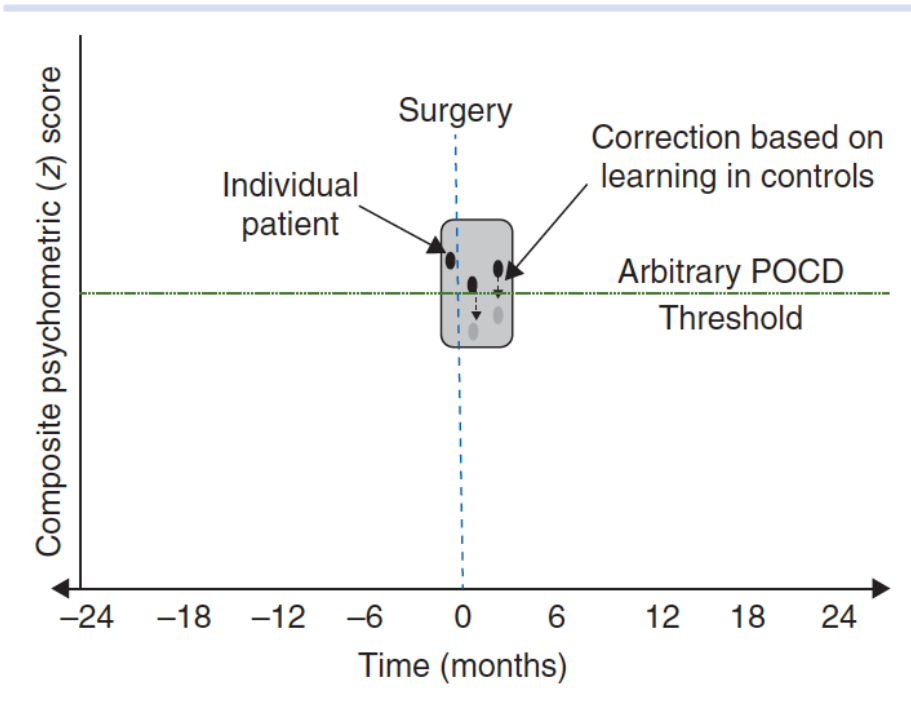
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Increasing age  
Poor education (shorter time in school education)  
History of cerebrovascular disease with no residual impairment  
Duration and Type of Surgery (Cardiac, Orthopaedics and Vascular)  
Pre-existing Cognitive Impairment  
Poor functional status  
Postoperative respiratory complications  
Postoperative infections

- 32% arthroplasty patients had unidentified cognitive impairment
- “Best practice” consensus is routine assessment



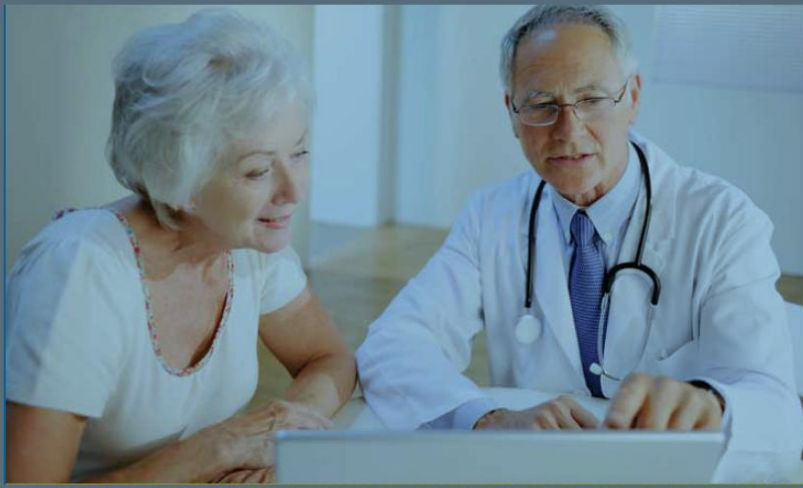
# Cognitive Trajectory



MJ Needham, CE Webb, DC Bryden, British Journal of Anaesthesia, 119 (S1): i115–i125 (2017)



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# Pre-operative Optimisation?

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- Little direct evidence
- Team based approach
- COE consultation
- Effect may be secondary
- PREHAB/SPRINT studies



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# Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study

*Thomas Gilbert\*, Jenny Neuburger\*, Joshua Kraindler\*, Elis Keeble, Paul Smith, Cono Ariti, Sandeepa Arora, Andrew Street, Stuart Parker, Helen C Roberts, Martin Bardsley, Simon Conroy*

JAMA Surgery | **Original Investigation**

## Association of a Frailty Screening Initiative With Postoperative Survival at 30, 180, and 365 Days

Daniel E. Hall, MD, MDiv, MHSc; Shipra Arya, MD, SM; Kendra K. Schmid, PhD; Mark A. Carlson, MD; Pierre Lavedan, MD; Travis L. Bailey, BS; Georgia Purviance, RN; Tammy Bockman, RN, MHA; Thomas G. Lynch, MD, MHCM; Jason M. Johanning, MD, MS



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# High Risk Medications & Anticholinergic burden



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For healthcare professionals

7 Steps

## Anticholinergics

Print

Why are anticholinergics problematic?





# Medication Changes & Acute Care

	Pre-admission	Critical Care Discharge	Hospital Discharge	p-value
Total medicines	9 [6.75; 14.0]	10 [8.0; 14.0]	9.5 [8.0; 15.0]	0.477
High-risk medicines	4 [2.0; 5.0]	5 [3.75; 7.0]	4 [2.75; 6.25]	0.207
Anticholinergic burden	2 [1.0; 3.0]	1 [0.0; 2.25]	1.5 [0.75; 3.0]	0.735

	Critical Care Discharge	Hospital Discharge	p-value
Number of new medicines	4 [2.0; 5.25]	3 [2.0; 5.25]	0.370
Number of medicines not continued	2 [1.0; 5.0]	2 [1.0; 4.0]	0.426
Number of dose or route changes	0 [0;1.0]	0 [0;1.0]	0.422
Number of medication changes*	9 [5.0; 10.25]	6 [4.0; 9.25]	0.106

# Chronic Disease Management

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# Intra-operative Care

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- BIS target 40-60
- No evidence for TIVA
- No strong evidence for RA
- Avoid known delirium precipitants

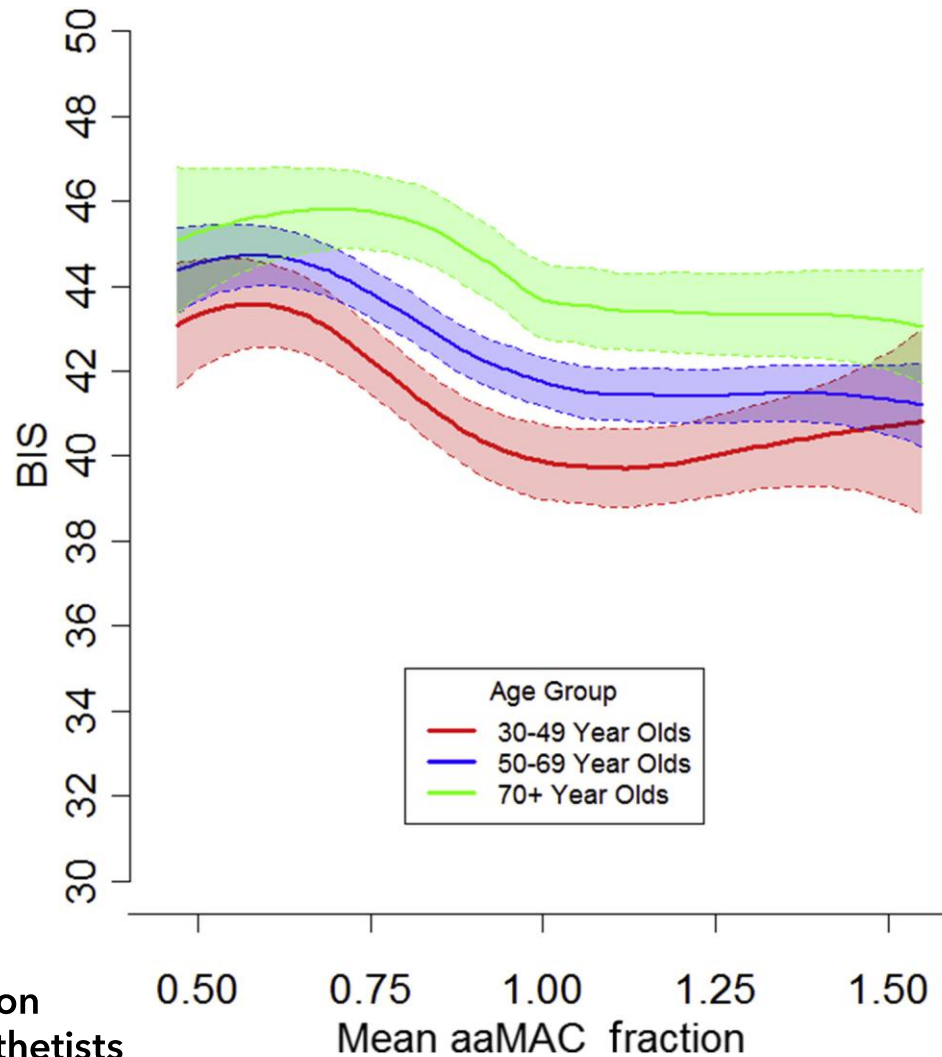


J Neurosurg Anesthesiol 2013; 25: 33–42



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# A Caveat regarding BIS....

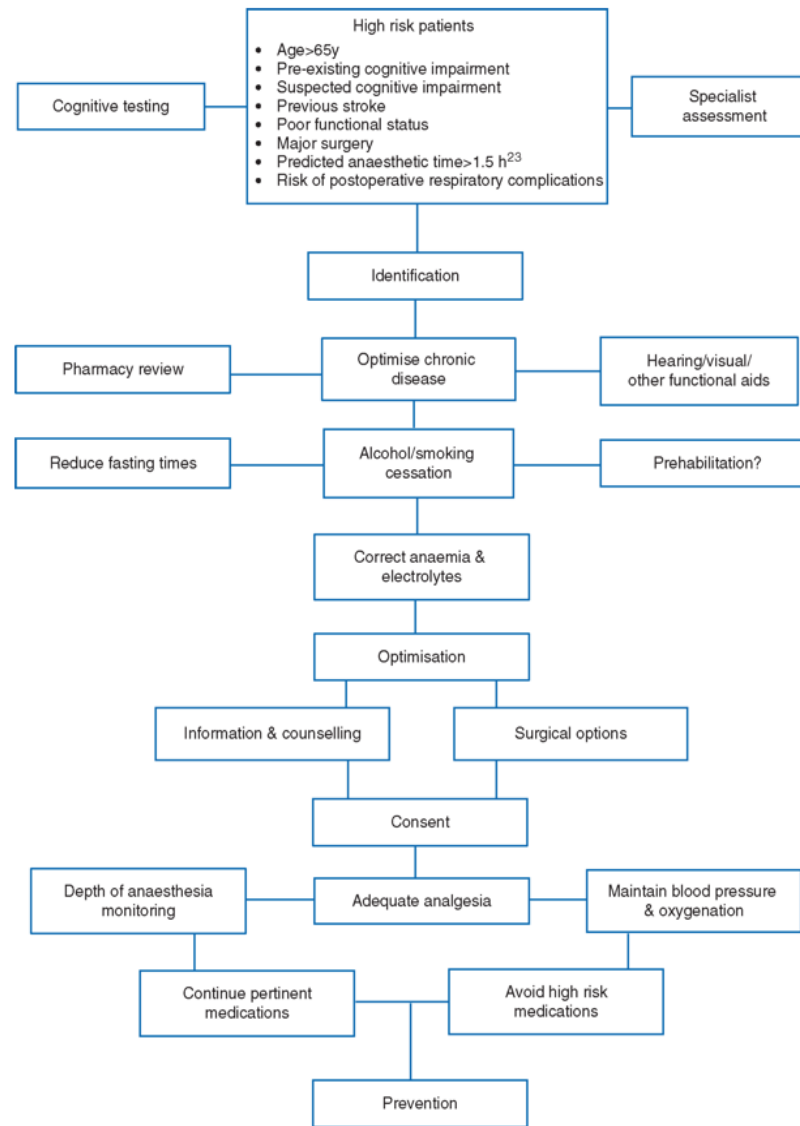


*British Journal of  
Anaesthesia*  
Volume 123,  
Issue 3, Pages  
288-297  
(September  
2019)



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MJ Needham, CE  
Webb, DC Bryden,  
British Journal of  
Anaesthesia, 119 (S1):  
i115–i125 (2017)



# Consent



## Consent checklist for Aortic Aneurysm repair

Risks Discussed with the patient (tick/insert number for all that are discussed)			
Risk of doing nothing		Risk of death after intervention %	
Graft infection		Bleeding	
Heart Attack		Wound complications	
Stroke		Chest infection	
Kidney Failure		Bowel complications	
Leg ischemia		Impotence (10% EVAR and OR)	
Paraplegia		Buttock claudication (EVAR)	
Poor functional outcome or prolonged recovery		Long term follow up after EVAR	



Risks associated with your anaesthetic

## Section 7: Becoming confused after an operation

### Summary

This leaflet explains that confusion is a common risk following anaesthesia and surgery. Behaviour and memory can be affected and there may be some deterioration in more complex mental functions such as the ability to get dressed or do the crossword.

This leaflet explains the different types of confusion. Most people can be treated and improve, though they may have to be in hospital longer than expected. However, it helps if you can be as healthy as possible before the operation, with a good diet and sensible exercise.

### Types of confusion

There are two types of confusion that can happen after surgery and an anaesthetic.

- Delirium (postoperative delirium) happens very soon after an operation. It has a number of causes that are usually treatable.
- Cognitive dysfunction (or postoperative cognitive dysfunction or POCD) can develop later. The cause of this is not well understood and there is evidence that in a few people its effects may be permanent.

Neither of these is the same as dementia. Dementia is a progressive disease of the brain. It is unrelated to having an operation and an anaesthetic. However, people with previous dementia are more likely to get both delirium and POCD. Also, it may be that mild early dementia has not been noticed by the patient or by friends and family. It may seem to have been related to the operation and anaesthetic, whereas in fact the changes were there beforehand.

Postoperative delirium and POCD are described in more detail in this article. They are different, but some elements (for example poor memory) can happen in both and also happen in dementia.



# Summary

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- Definitional development
- Plausible biological mechanisms
- Manage expectantly: educate, perioperative care bundles, consent
- Consider anaesthetic technique

