

Neurocognitive Decline

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Neurocognitive Decline

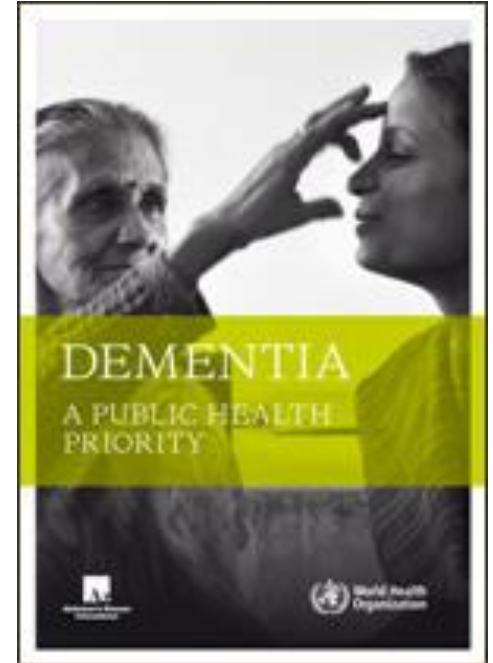
- Is there a problem?
- Definitions
- Assessment
- New nomenclature

Dementia

The report “Dementia: a public health priority” has been jointly developed by WHO and Alzheimer's Disease International.

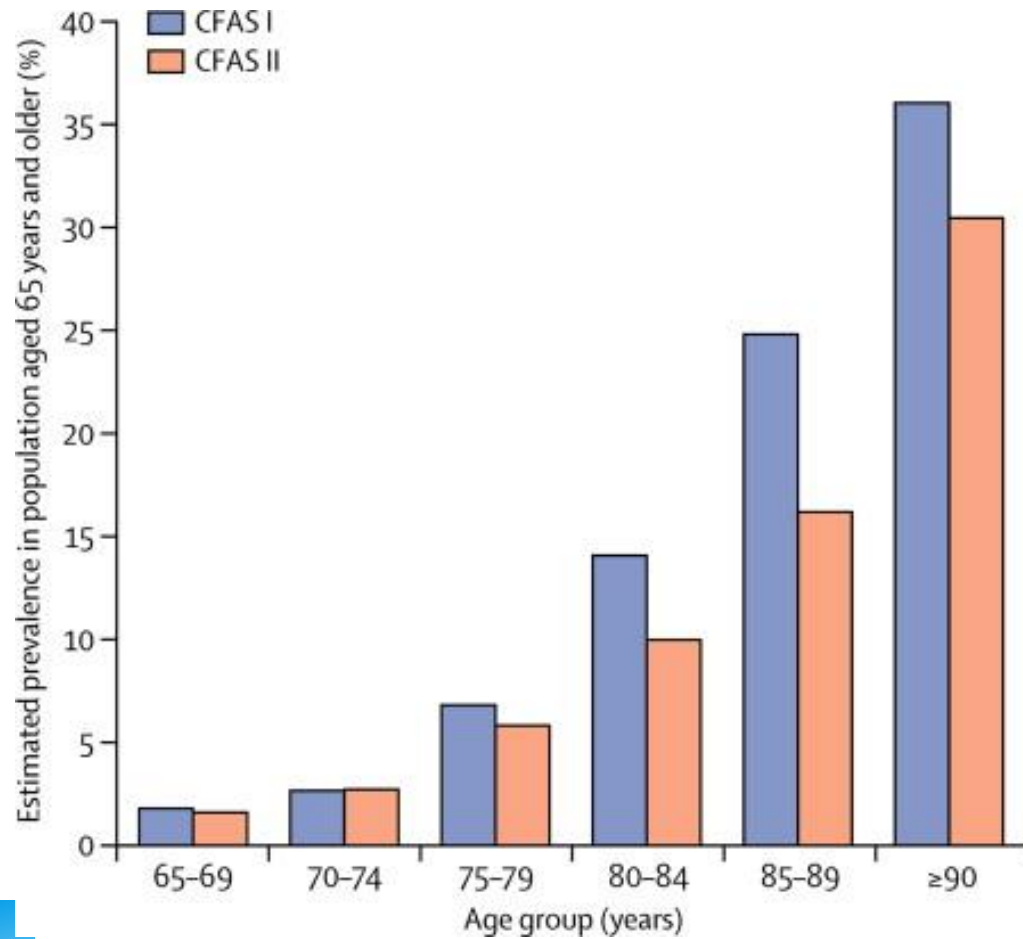
Dementia is a syndrome that affects memory, thinking, behaviour and ability to perform everyday activities.

The number of people living with dementia worldwide is currently estimated at 35.6 million. This number will double by 2030 and more than triple by 2050. Dementia is overwhelming not only for the people who have it, but also for their caregivers and families



Dementia

A risk factor for delirium
Commonly overlooked preoperatively



Matthews
2013

Other types of cognitive decline

- Delirium
- Mild neurocognitive disorder
- Many diagnoses and subtypes in ICD-10 and other systems



Case

After surgery his memory is not all there. He couldn't answer simple questions like his birthplace, birthdate and how many children he has. He's been in a rehab-nursing home since Jan. 29th and has been bedridden and hoping to start therapy to get him back on his feet. After his surgeries, he is not the same. I am worried that the anesthesia has done something to him

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Cognitive decline

Problems with

- memory
- planning, organising, abstracting
- attention
- speed of information processing

Postoperative Brain Dysfunction

Delirium

Acute disturbance of consciousness and attention.
Fluctuates during the day

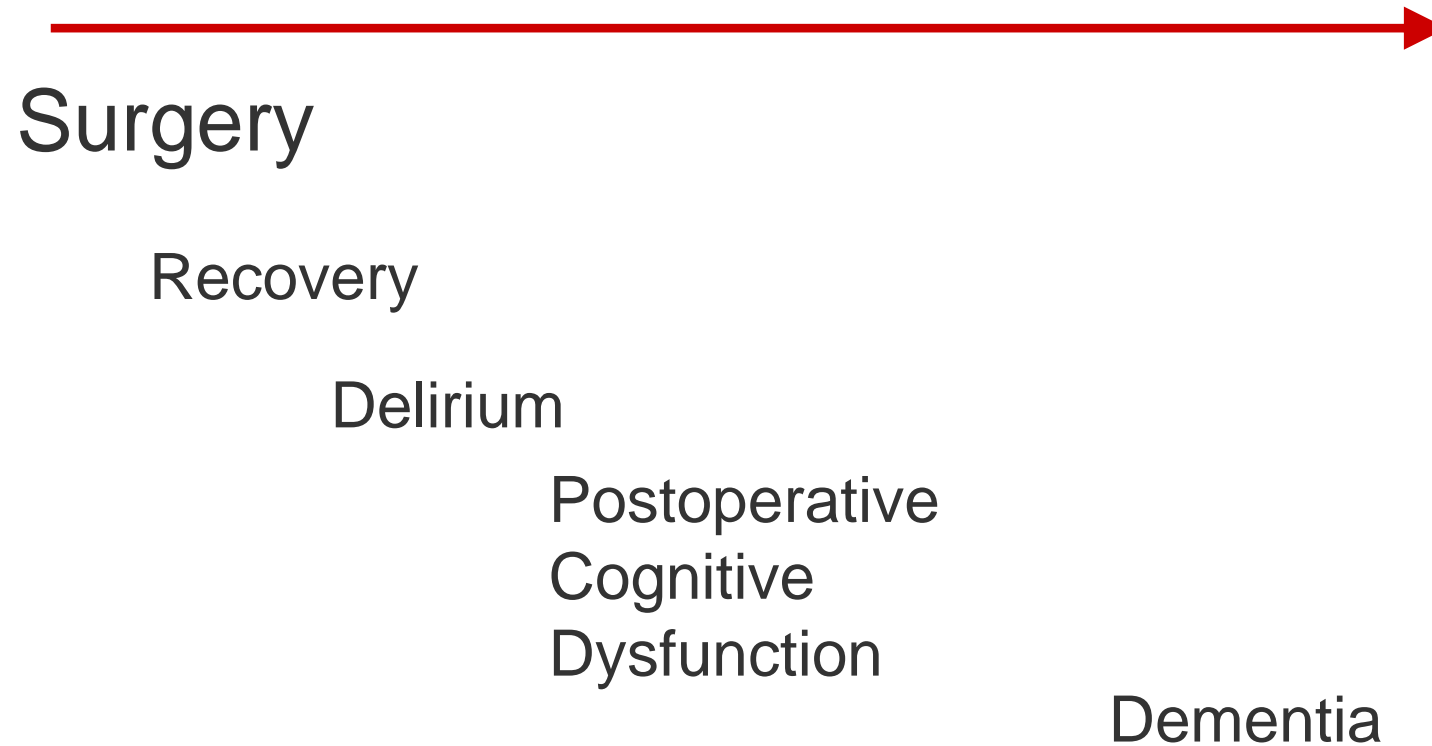
Postoperative Cognitive Dysfunction (POCD)

Subtle decline evidenced from neuropsychological testing

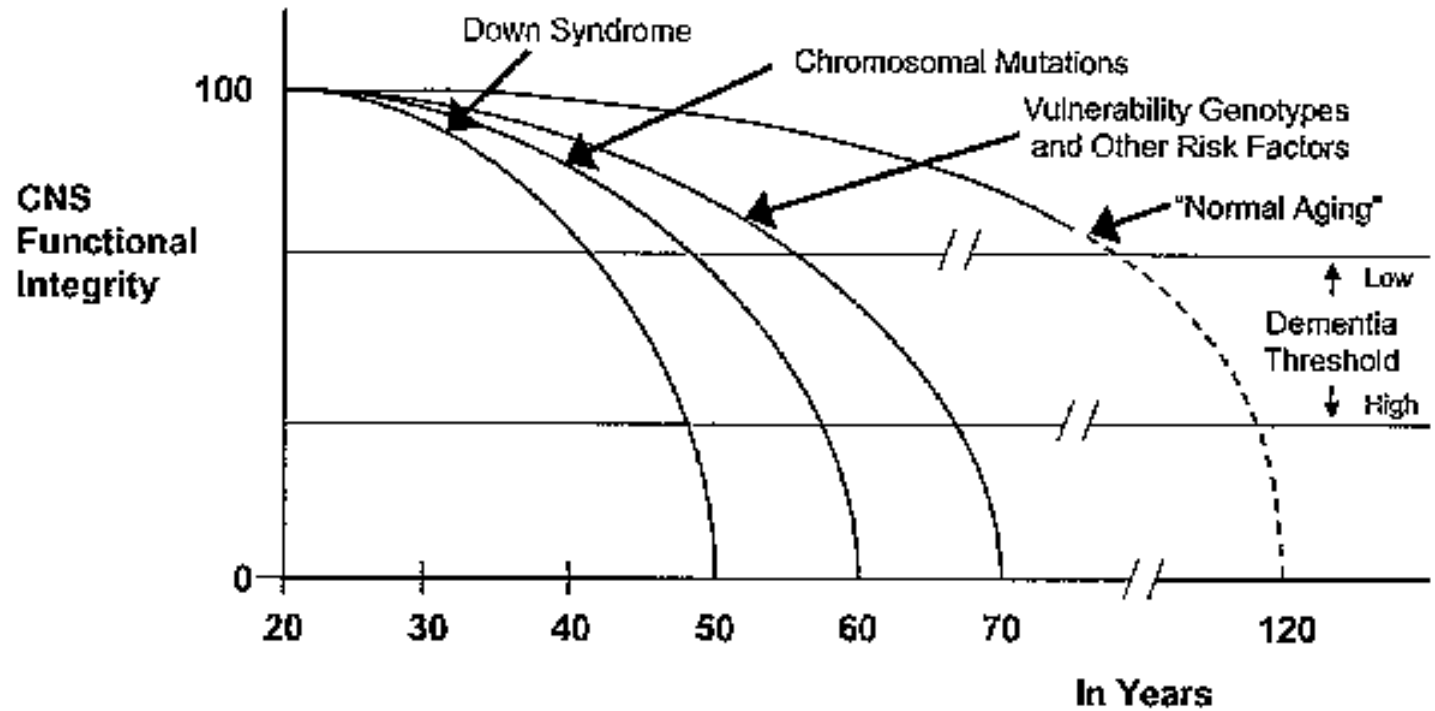
Dementia

Severe deficits, social and occupational consequences,
duration > 6 months

Cognitive decline and surgery



Cognitive Decline – Cognitive Reserve



Postoperative Brain Dysfunction

Delirium

Accurate definition available

Postoperative Cognitive Dysfunction (POCD)

No agreed definition

Dementia

Accurate definition available

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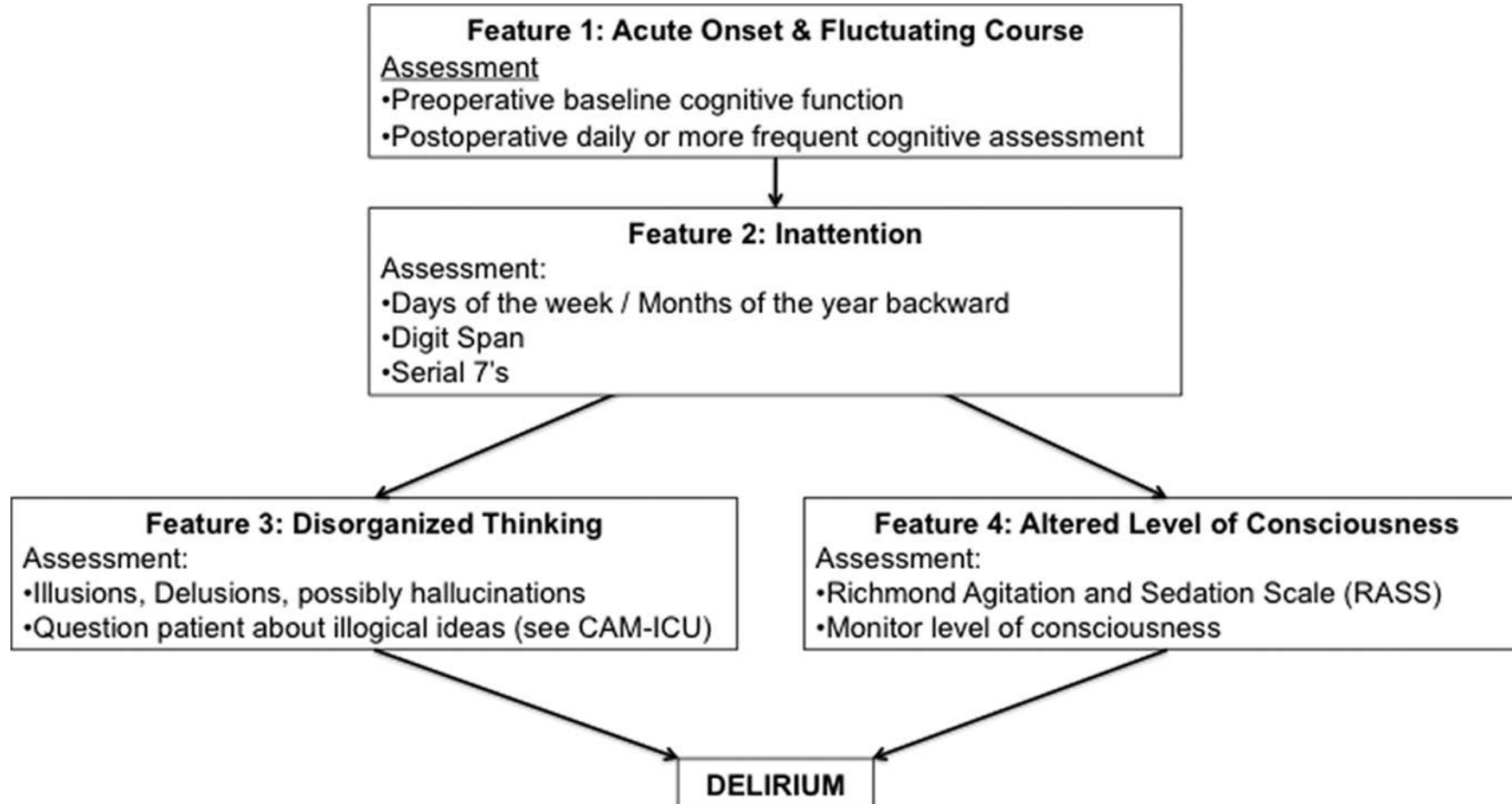
Detection

POCD: Neuropsychological testing

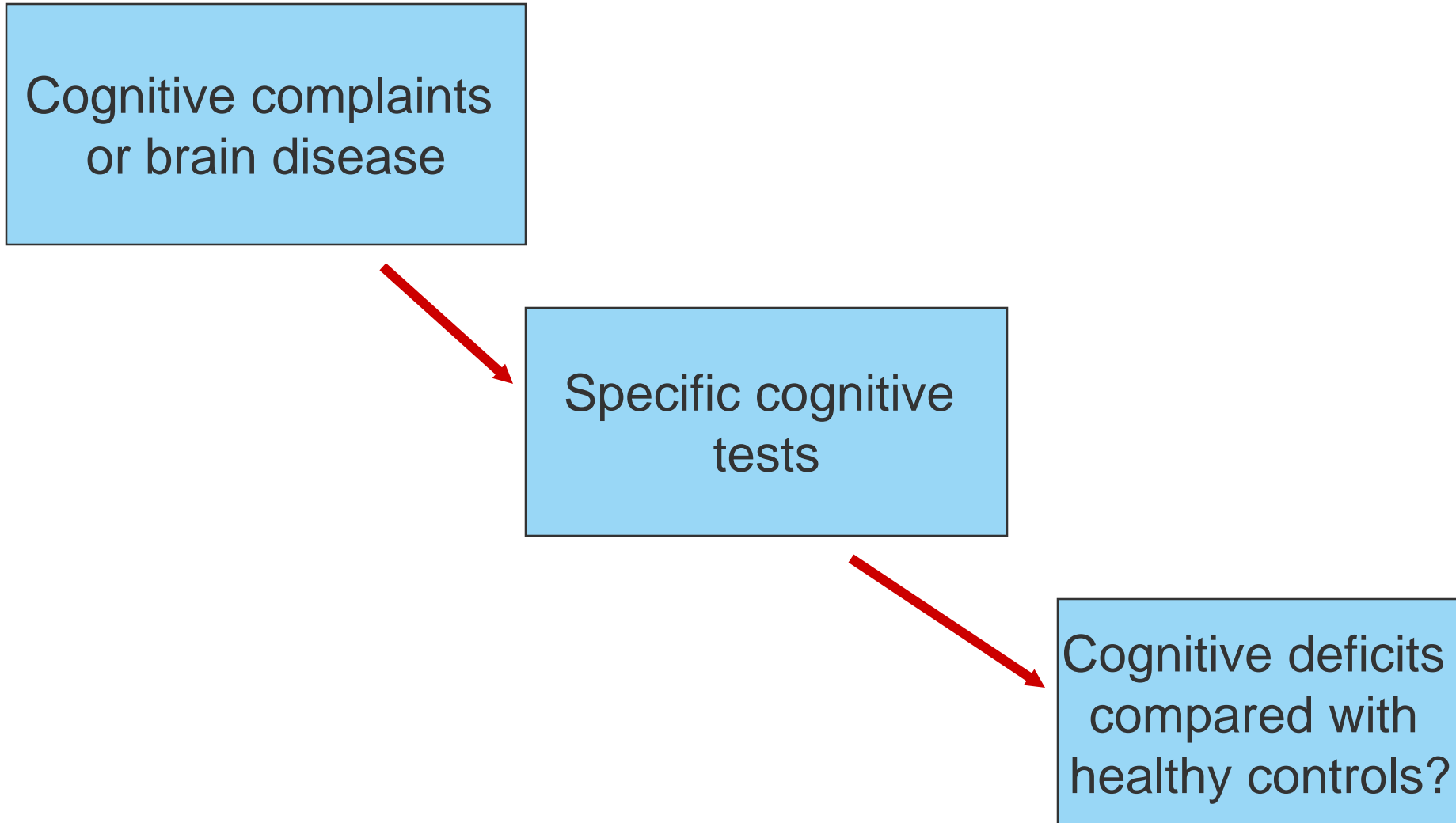
Delirium: Clinical examination CAM



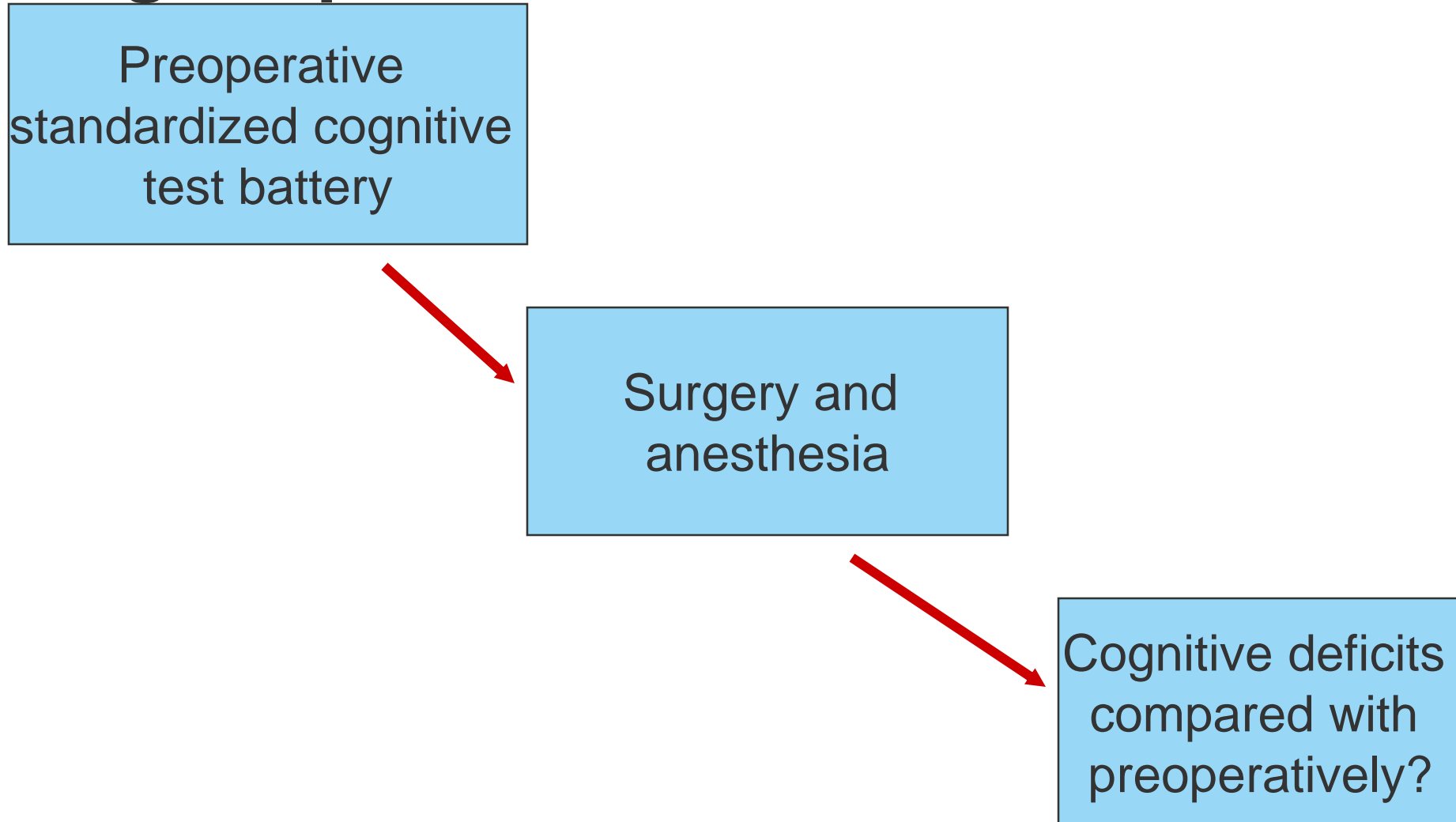
Delirium detection - CAM



Clinical neuropsychology



Surgical patients with no brain disease



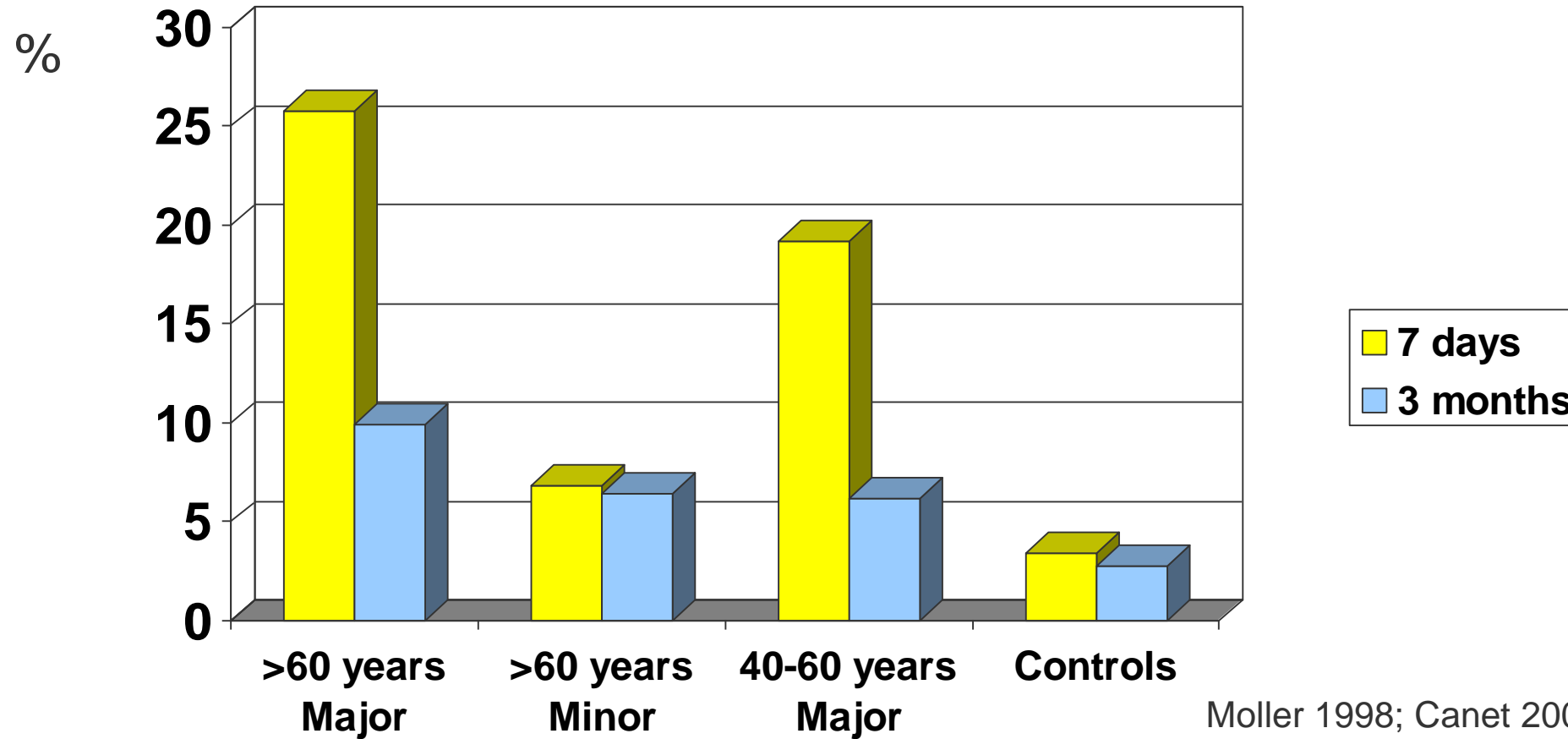
Neuropsychological testing in surgical patients- problems

- Learning
- Variability
- Floor-ceiling effects
- Composition of test battery
- Baseline performance?
- Test intervals
- Statistical analysis
- Definition of deficits

Cognitive dysfunction in 176 volunteers

• 1 SD in 1 test	29.0%
• 1 SD in 2 tests	6.8%
• 1 SD in 3 tests	0.0%
• 20% in 2 tests	15.9%
• 25% in 1 test	40.3%
• 25% in 2 tests	9.1%
• Z-score > 2	3.4%

Postoperative Cognitive Dysfunction - Incidence



Moller 1998; Canet 2003; Johnson 2002

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Nomenclature

Align POCD with cognitive change in other contexts:

- Neurocognitive disorder (DSM-V)
 - A concern for cognition by individual, informant or clinician
 - Objective evidence
- Mild cognitive impairment (NIA-AA)

SPECIAL ARTICLE

Recommendations for the nomenclature of cognitive change associated with anaesthesia and surgery—2018

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Steven T. DeKosky⁴ | Lars S. Rasmussen⁵ | Esther S. Oh⁶ | Greg Crosby⁷ |
Miles Berger⁸ | R. G. Eckenhoff⁹ | The Nomenclature Consensus Working Group^a

Cognitive Decline

30 days



Surgery

Recovery

Delirium

Delayed
neurocognitive
recovery



Neurocognitive Disorder



Future criteria for preoperative impairment or postoperative decline

- Subjective complaint (subject, informant, clinician)
- Objective impairment/change
 - Mild: 1 to 2 SD below norms or controls
 - Major: > 2 SD below norms or controls
- Instrumental activities of daily living (for major NCD/dementia)

CFQ

	Very often	Quite often	Occasionally	Very rarely	Never
1. Do you read something and find you haven't been thinking about it and must read it again?	4	3	2	1	0
2. Do you find you forget why you went from one part of the house to the other?	4	3	2	1	0
3. Do you fail to notice signposts on the road?	4	3	2	1	0
4. Do you find you confuse right and left when giving directions?	4	3	2	1	0
5. Do you bump into people?	4	3	2	1	0
6. Do you find you forget whether you've turned off a light or a fire or locked the door?	4	3	2	1	0
7. Do you fail to listen to people's names when you are meeting them?	4	3	2	1	0
8. Do you say something and realize afterwards that it might be taken as insulting?	4	3	2	1	0
9. Do you fail to hear people speaking to you when you are doing something else?	4	3	2	1	0
10. Do you lose your temper and regret it?	4	3	2	1	0
11. Do you leave important letters unanswered for days?	4	3	2	1	0
12. Do you find you forget which way to turn on a road you know well but rarely use?	4	3	2	1	0
13. Do you fail to see what you want in a supermarket (although it's there)?	4	3	2	1	0
14. Do you find yourself suddenly wondering whether you've used a word correctly?	4	3	2	1	0
15. Do you have trouble making up your mind?	4	3	2	1	0
16. Do you find you forget appointments?	4	3	2	1	0
17. Do you forget where you put something like a newspaper or a book?	4	3	2	1	0
18. Do you find you accidentally throw away the thing you want and keep what you meant to throw away – as in the example of throwing away the matchbox and putting the used match in your pocket?	4	3	2	1	0
19. Do you daydream when you ought to be listening to something?	4	3	2	1	0
20. Do you find you forget people's names?	4	3	2	1	0
21. Do you start doing one thing at home and get distracted into doing something else (unintentionally)?	4	3	2	1	0
22. Do you find you can't quite remember something although it's 'on the tip of your tongue'?	4	3	2	1	0
23. Do you find you forget what you came to the shops to buy?	4	3	2	1	0
24. Do you drop things?	4	3	2	1	0
25. Do you find you can't think of anything to say?	4	3	2	1	0

POCD and subjective symptoms

	POCD: No	POCD: Yes
Increase in CFQ: No	452	57
Increase in CFQ: Yes	401	37

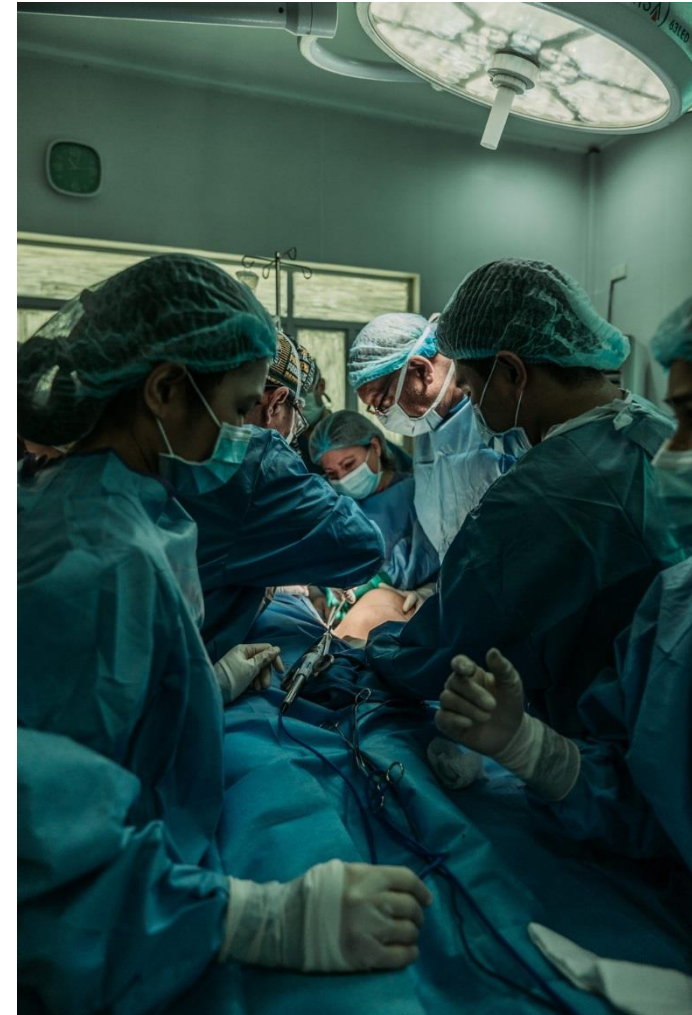
CFQ = Cognitive Failures Questionnaire

POCD and subjective symptoms

	POCD at test: No	POCD at test: Yes
Symptoms: No	Uncomplicated	Lack of insight? Variability in tests?
Symptoms: Yes	Insensitive tests? Criteria too restrictive?	"True POCD"?

A recent study

- Cognitive testing 3.4 years after cardiac surgery
- Cognitive Failures Questionnaire
- Informant Questionnaire on Cognitive decline
- Instrumental Activities of Daily Living



Compared with 10 years ago how is this person at:

	1	2	3	4	5
1. Remembering things about family and friends e.g. occupations, birthdays, addresses	Much improved	A bit improved	Not much change	A bit worse	Much worse
2. Remembering things that have happened recently	Much improved	A bit improved	Not much change	A bit worse	Much worse
3. Recalling conversations a few days later	Much improved	A bit improved	Not much change	A bit worse	Much worse
4. Remembering his/her address and telephone number	Much improved	A bit improved	Not much change	A bit worse	Much worse
5. Remembering what day and month it is	Much improved	A bit improved	Not much change	A bit worse	Much worse
6. Remembering where things are usually kept	Much improved	A bit improved	Not much change	A bit worse	Much worse
7. Remembering where to find things which have been put in a different place from usual	Much improved	A bit improved	Not much change	A bit worse	Much worse
8. Knowing how to work familiar machines around the house	Much improved	A bit improved	Not much change	A bit worse	Much worse

The Lawton Instrumental Activities of Daily Living Scale

A. Ability to Use Telephone

1. Operates telephone on own initiative; looks up and dials numbers1
2. Dials a few well-known numbers.....1
3. Answers telephone, but does not dial.....1
4. Does not use telephone at all.....0

B. Shopping

1. Takes care of all shopping needs independently.....1
2. Shops independently for small purchases0
3. Needs to be accompanied on any shopping trip.....0
4. Completely unable to shop.....0

C. Food Preparation

1. Plans, prepares, and serves adequate meals independently1
2. Prepares adequate meals if supplied with ingredients0
3. Heats and serves prepared meals or prepares meals but does not maintain adequate diet.....0
4. Needs to have meals prepared and served.....0

D. Housekeeping

1. Maintains house alone with occasion assistance (heavy work).....1
2. Performs light daily tasks such as dishwashing, bed making.....1
3. Performs light daily tasks, but cannot maintain acceptable level of cleanliness.....1
4. Needs help with all home maintenance tasks.....1
5. Does not participate in any housekeeping tasks.....0

E. Laundry

1. Does personal laundry completely.....1
2. Launders small items, rinses socks, stockings, etc1
3. All laundry must be done by others0

F. Mode of Transportation

1. Travels independently on public transportation or drives own car.....1
2. Arranges own travel via taxi, but does not otherwise use public transportation1
3. Travels on public transportation when assisted or accompanied by another1
4. Travel limited to taxi or automobile with assistance of another.....0
5. Does not travel at all.....0

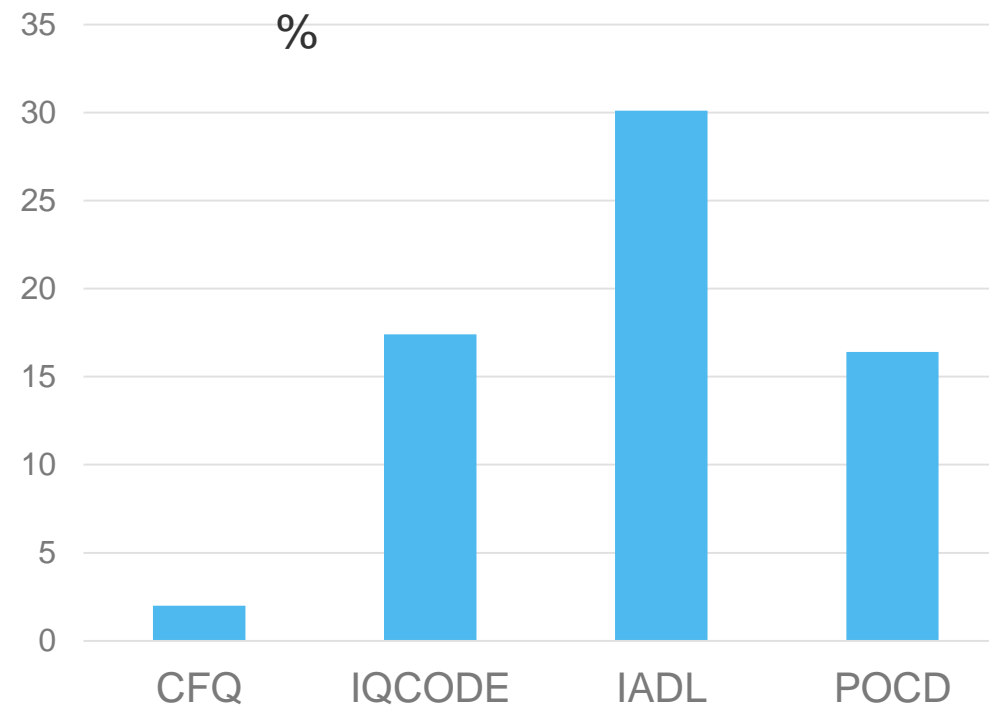
G. Responsibility for Own Medications

1. Is responsible for taking medication in correct dosages at correct time.....1
2. Takes responsibility if medication is prepared in advance in separate dosages.....0
3. Is not capable of dispensing own medication.....0

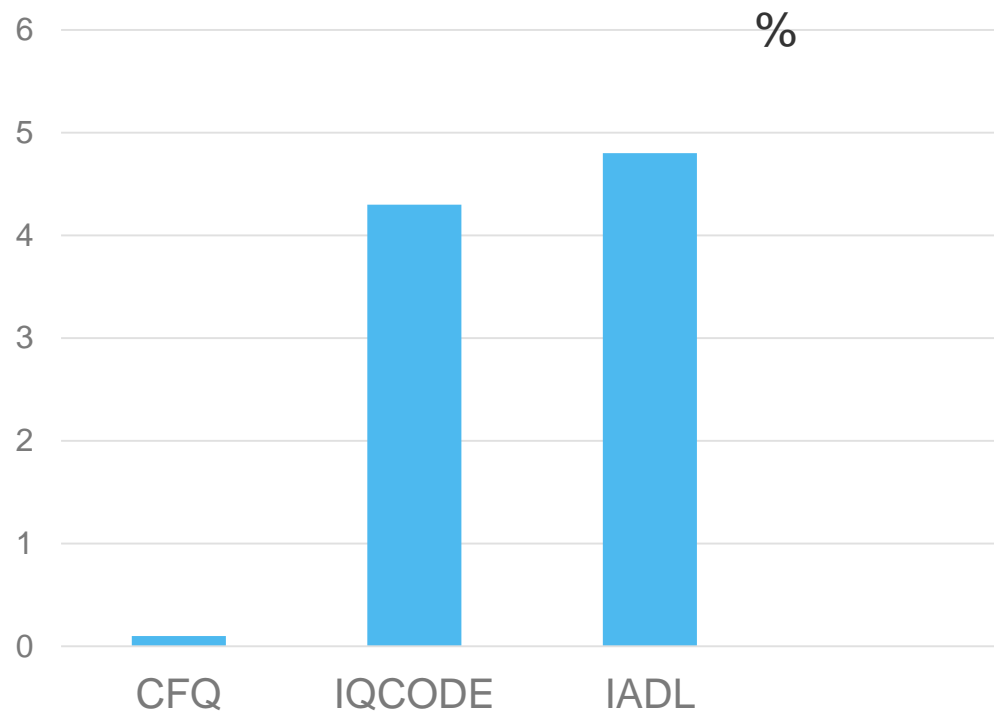
H. Ability to Handle Finances

1. Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income.....1
2. Manages day-to-day purchases, but needs help with banking, major purchases, etc1
3. Incapable of handling money0

Cardiac surgery patients after 3.4 years



Cardiac surgery patients with detected cognitive decline



Future criteria for preoperative impairment or postoperative decline

- Subjective complaint (subject, informant, clinician)
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Neurocognitive decline - conclusion

- Will be coming to an operating theater near you
- Subjective symptoms should be assessed
- Use a control group in cognitive testing
- Look at level of functioning