

# Perioperative Management of the old patient – where does it start?

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# Hirslanden Bern (HiBe)

BEAUSITE



Abdominal surgery  
Cardiovascular surgery  
Internal medicine/Geriatrics

SALEM



Joint and vertebral surgery  
Gynecology  
Internal Medicine/Geriatrics

PERMANENCE



Sportsmedicine  
Orthopedic Surgery  
Internal medicine/Geriatrics



Senior Physician Internal Medicine, Geriatrics, Hirslanden Bern  
Member of NIDUS delirium research hub, Member of American Delirium Society  
Member of ISPOR, Specialized in Health Care Management / Health Economy and  
Pharmacoeconomy ALOS Management / Yield protection

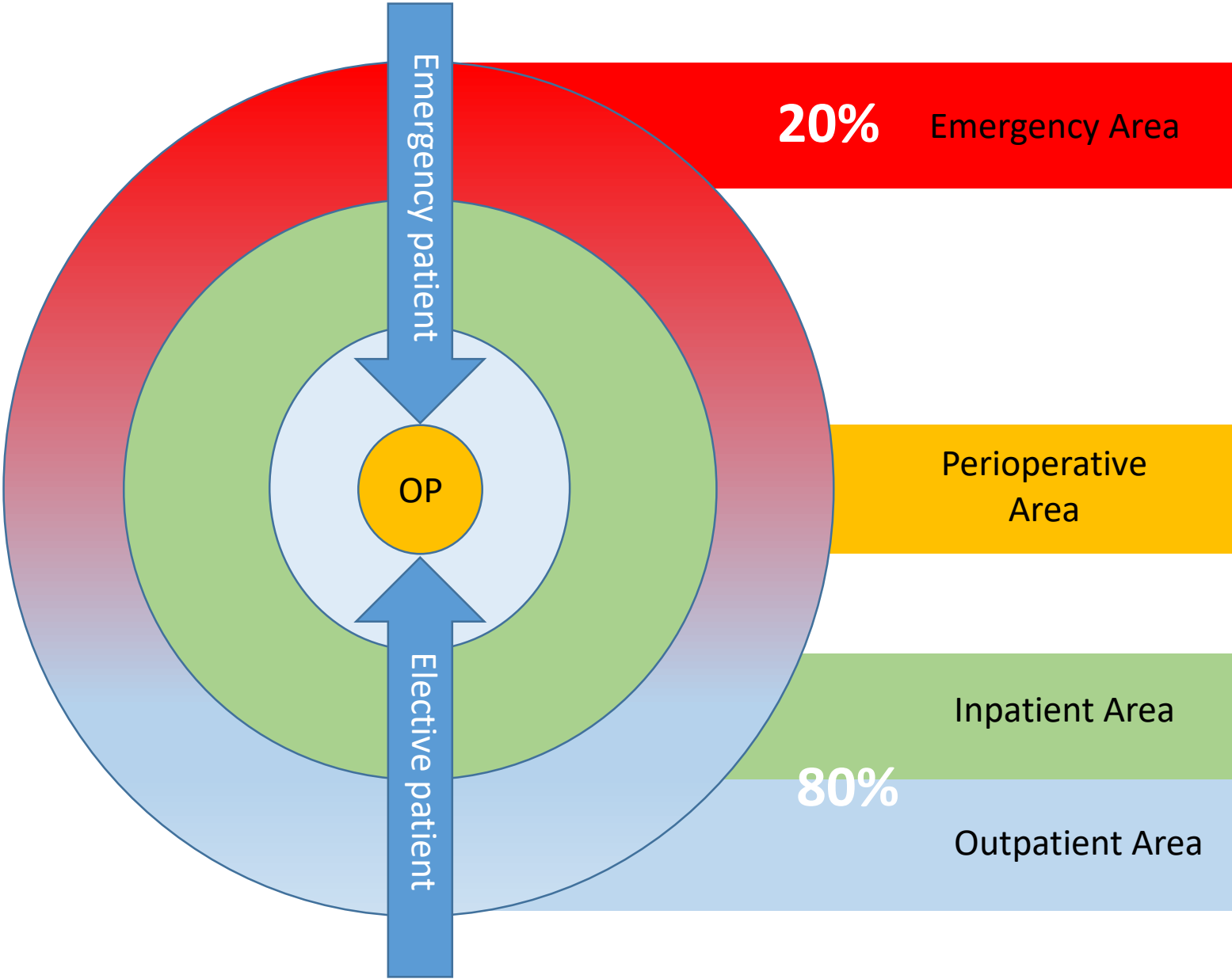
# Why should we talk about delirium?

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- **It`s common:** One third of the general medical patients > 70 years have delirium - the condition is present in half of these patients on admission (Marcantonio 2011); Delirium is the most common surgical complication (Ely 2004) with an incidence of 15-25% in elective surgery and up to 50% after high risk procedures (hip fractures)
- **It`s dangerous:** increased morbidity and mortality (Haley 2019) persistent functional decline (Haggstrom 2017), increased nursing time per patient (Hsieh 2015)
- **It`s expensive:** Costs ranged between 806 und 24.000 USD (Kinchin et al 2020, Caplan et al 2020, Lieshout et al 2022), Total cost 66.000 USD/delirium (Pezulla et al 2019), 0.3CMP (Hyperactive delirium, Weinrebe et al 2016), 3.3-4.6CMP (Encephalitis & Delirium, Weinrebe et al 2022)



Where do our patients come from?



# Patients (Year 2022)

	Patients	Hosp 1	Hosp 2	Hosp 3
16.000	Total n	7700 (50%)	5960 (35%)	2650 (15%)
3.500	<b>Emergency Admissions</b>	1460 (19%)	1566 (26%)	450 (16%)
12.000	Emergency patients returned home	4350	1762	5936

If we talk about  
the old patient,  
we should know  
more about the  
„age  
distribution“

An internal analysis showed groups with nearly the same size  
(about 30%) found in emergency department

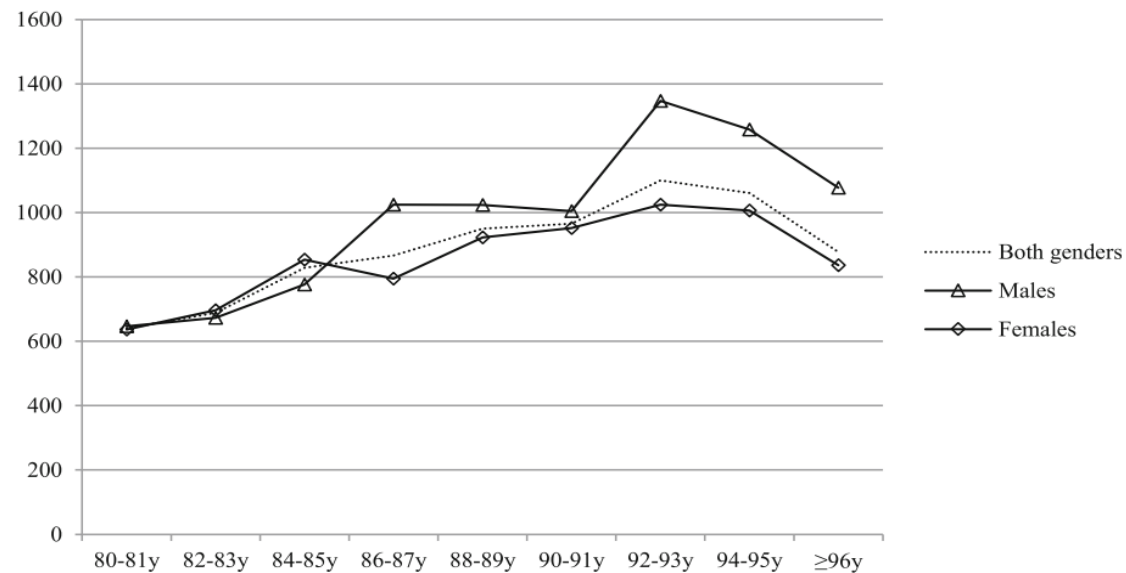
- 1-60 years of age
- 61-75 years of age
- > 75 years of age

# International Data prove that...

older adults account for up to 25% of all emergency department (ED) patient and encounters for 38% of emergency medical services (EMS) transports. Ringer et al. 2018

... and that it's prevalence even increases with age

Ukkonen et al. BMC Emergency Medicine(2019) 19:20



**Fig. 2** Age- and gender adjusted incidence of emergency department visits (total number of visits/1000 same aged inhabitants/year) among older inhabitants (aged 80 years or over)



# The internal analysis found another interesting fact concerning the LOS/h

Outpatients, Emergency treatment  
Discharged

1-60	n	LOS	Einzel L.
SA	622	1,5	90
BS	148	3,3	195
PE	793	1,3	78

61-75	n	LOS	Einzel L.
SA	110	1,9	114
BS	71	3,9	233
PE	106	1,5	92

>75	n	LOS	Einzel L.
SA	113	2,5	150
BS	53	4,6	287
PE	74	1,8	100

Outpatients, Emergency treatment  
Hospitalized

	LOS	CMI	DMI
1-60	4,2	0,92	0,21
61-75	6,6	1,1	0,16
>75	8,1	1,2	0,14

# What`s the reason for the longer duration?

**Table 2** Comparison between those requiring hospital care in tertiary care services and those discharged home

Variable	Hospitalized <sup>a</sup> n = 5423	Discharged <sup>b</sup> n = 6755	All patients n = 17,769
Gender, female, %	64.9%	68.9%	67.7%
Age, median (range)	85y (80-103y)	85y (80-104y)	85 (80-104y)
Octogenarians, %	80.1%	83.6%	79.1%
Nonagenarians, %	19.9%	16.4%	20.9%
Distribution of diagnoses <sup>c</sup> , %			
Non-specific symptoms	17.0%	23.2%	20.3%
Cardiovascular diseases	18.7%	10.2%	13.4%
Injuries	11.5%	15.8%	12.9%
Genitourinary diseases	3.8%	5.8%	7.0%
Pulmonary diseases	6.2%	3.4%	6.4%
Musculoskeletal diseases	1.7%	7.3%	4.8%
Infectious diseases <sup>d</sup>	3.0%	1.7%	3.1%
Gastrointestinal diseases	5.2%	2.6%	3.1%
Mental illnesses	1.4%	1.3%	1.7%
Nervous diseases	2.1%	1.2%	1.6%
Miscellaneous	29.4%	27.5%	25.7%

<sup>a</sup> Hospitalized in our hospital's tertiary care services



# The internal analysis found a third striking point: The influence of the way of admission on to LOS

**Elective patients,**  
mean age 75y, LOS 7.3d

MD	n	LOS	CM	CHOP
Primäre Erstimplantation Hüfte	72	7,20	1,65	81.51.11
Primäre Erstimplantation Knie primär	49	8,06	1,91	81.54.21
Primäre Erstimplantation Knie sekundär	14	6,64	1,81	81.54.21
Primäre Erstimplantation Knie sonstige	32	6,09	1,74	81.54.21
Mechanische Komplikationen	14	8,57	2,34	81.54.33 /32

**Emergency patients,**  
mean age 78y, LOS 10.4d

MD	n	LOS	CM	CHOP
Schenkelhalsfraktur	15	10,73	2,26	81.51.11
Femurfraktur	12	10,58	1,84	79.15.12
Trochanterfraktur	10	10	1,84	79.15.12
Frakturen sonstigem (Femur/Subtrach.)	14	10,44	1,92	79.15.13

← Delta 2,5-3 d →

## Length of Stay...

→ LOS is a risk factor for potential complications and delirium

Increased ED LOS in Hallway is Associated with Delirium *van Loveren and Singla et al. 2021*

ED Length of Stay is Associated with Delirium in Older Adults *Elder et al 2023*

Question: Are there other groups of patients that show a prolonged length of stay?



# Other groups of patients that show a prolonged length of stay

- Depending on to the portfolio of the services, the specializations and the organisation we see
- 70-75 % Inlier and Profitier (ALOS of about 2-3d)
- 20-22% Costlier (ALOS of 5-8d)
- 2-5% Highoutlier (ALOS > 12d)

# What are the concrete numbers?

Total	16311	ANTEIL	MVD TARGET	MVD MEAN	CM MEAN	Daymix mean
PROFITLIER	10723	0.66	4.97	3.09	1.34	0.43
INLIER	1726	0.11	1.32	1.32	0.51	0.39
COSTLIER	3474	0.21	5.96	9.22	1.41	0.15
HIGHOUT LIER	388	0.02	7.12	18.78	1.74	0.09

...so there is a hugh group with potential for delirant states...  
And we should think about measures...

Beneath the patients own risk profil  
(baseline risk factors)  
there are several structural risks for  
delirium in a hospital for older  
patients

# The perioperative structural delirium risk profile is given in hospitals -

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Janssen 2019

**The way of admission and prolonged stay** in hospital induces the probability of delirant states due to the following consequences

→ **multiple interventions for diagnostics/therapy**

→ **change of location/staff**

→ **danger of immobilisation**

→ **danger of new medication/pain/infection**



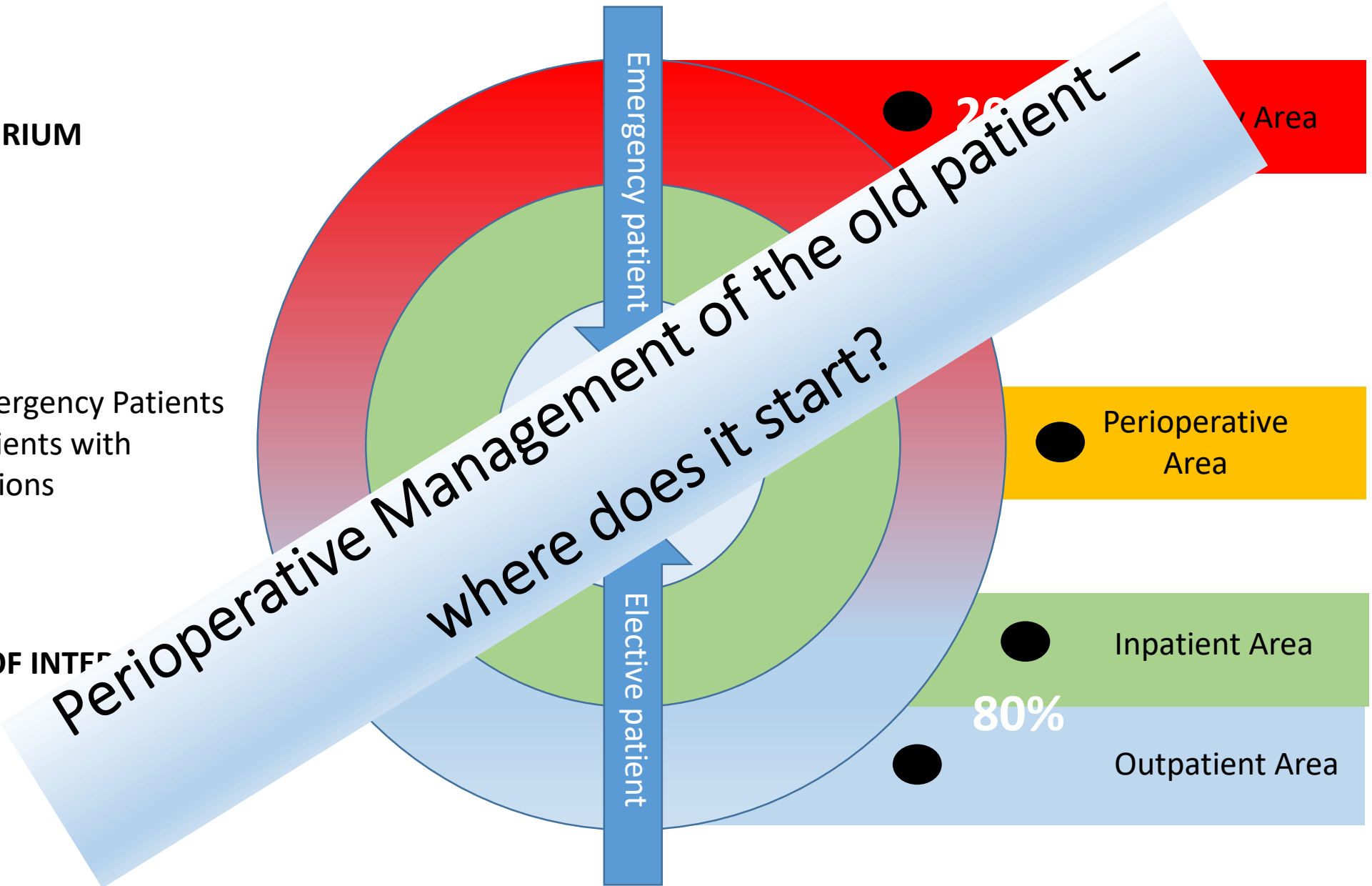
Inouye 2014

**1 TOPIC DELIRIUM**

**2 GROUPS**

- Older Emergency Patients
- Older Patients with Interventions

**4 REGIONS OF INTEREST**



# Definition/Classification



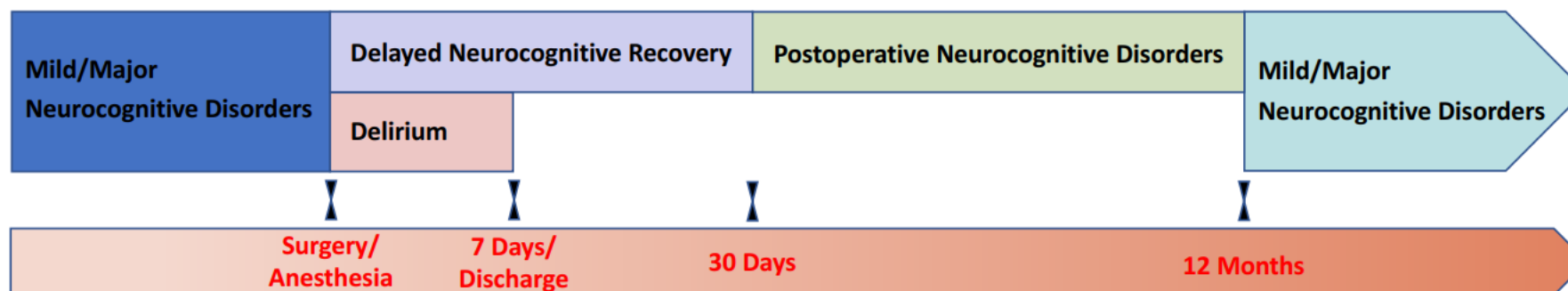
Delirium is probably only one form of a group of neurocognitive disorders (NCD) that may appear perioperative



These are: postoperative delirium, delayed neurocognitive recovery and postoperative NCD



For the sake of simplicity or convenience in the following we refer only to delirium knowing that we might not be exact and accept some uncertainty



Kong et al. 2022



FIGURE 1 Classification of perioperative neurocognitive disorders

**First step** is the commitment –  
the commitment to prevent delirium

Why?

Literature of delirium prevention is more robust  
than that for delirium treatment

(SIGN Guideline, Risk reduction and management of delirium 2019)



# Prevention of delirium has also expanded to ICU setting

## The ABCDEF bundle

A= Assessment and treatment of Pain

B=Both spontaneous awakening and Breathing trials

C=Medication choice and De-Escalation

D=Delirium Screening and Prevention

E=Early Mobilisation

F=Family engagement

The ABCDEF Bundle, Pun et al 2019



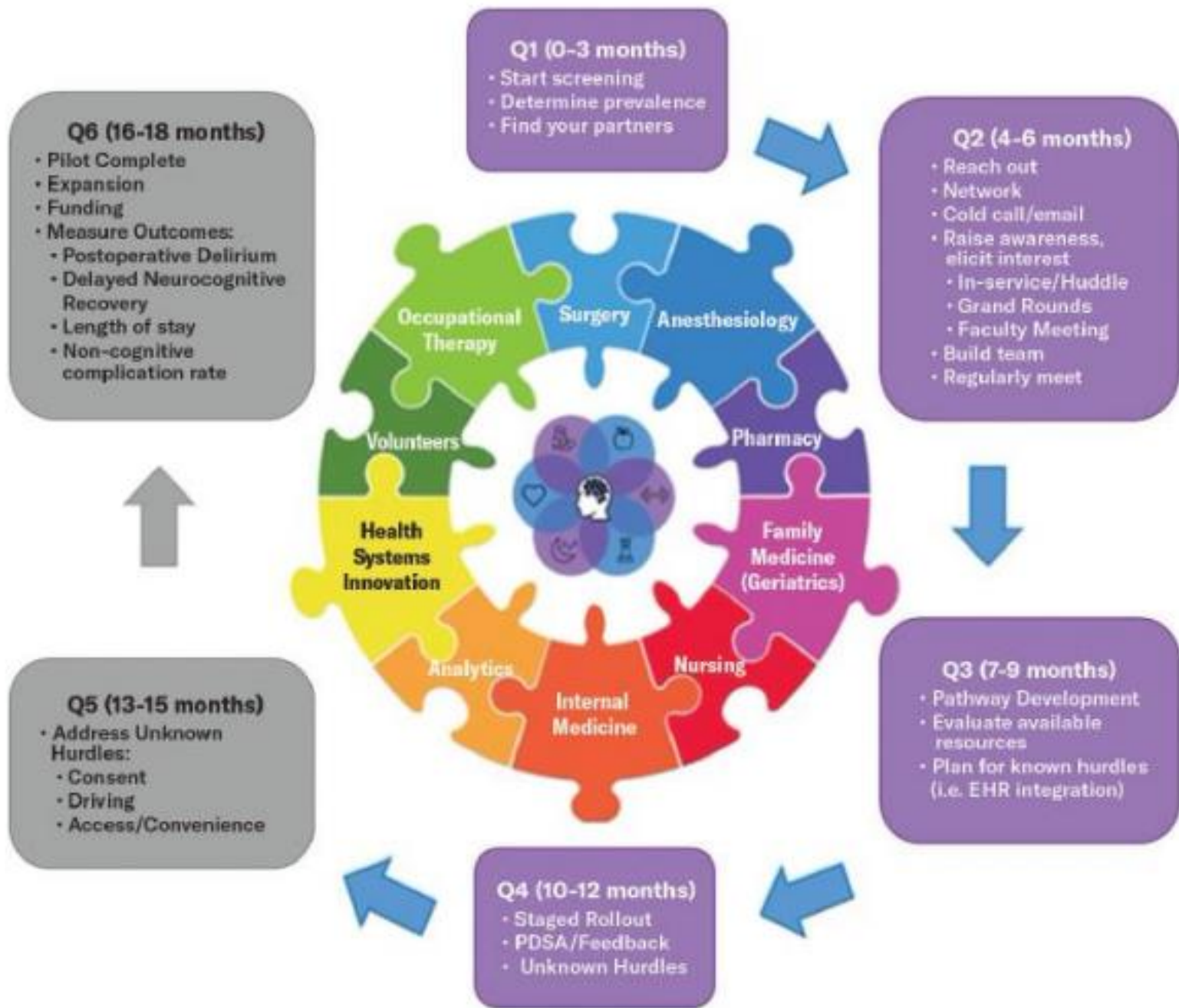
Society of Critical Care Medicine, <https://www.sccm.org>

# American Society of Anaesthesiologists (ASA)

- Perioperative Brain Health Initiative: six recommendations 2021

<https://www.asahq.org/madeforthismoment>

1. Training and education
2. Preoperative cognitive screening
3. Postoperative cognitive screening
4. Not pharmacologic Interventions to prevent delirium
5. Pain control
6. Treating delirium without antipsychotic medication



# The second step: check the given recommendations and the actual situation

	FOCUS	ANALYSIS	RECOMMANDATIONS
Risk Level for delirium ↓	Emergency Area	??	
	Perioperative Area	??	
	Inpatient Area	??	
	Outpatient Area	??	

# Emergency Area: recommendations

European Geriatric Medicine (2022) 13:309–317 <https://doi.org/10.1007/s41999-021-00578-1>

- P01: Comprehensive Geriatric Assessment in the Emergency Department (available languages: DE, PL, PT, TR)
- P02: Age / Frailty Adjusted Risk Stratification (available languages: DE, PL, PT, TR)
- P03: Environment (available languages: DE, PL, PT, TR)
- P04: Delirium and Cognitive Impairment (available languages: DE, PL, PT, TR)
- P05: Medication reviews in the ED for older adults (available languages: DE, PL, PT, TR)
- P06: Inclusion of family, friends and other informal and formal carers in ED (available languages: DE, PL, PT, TR)
- P07: Silver Trauma – Major trauma in older adults (available languages: DE, PL, PT, TR)
- P08: End of Life Care (available languages: DE, PL, PT, TR)

# GUIDELINE FOR IDENTIFICATION OF COGNITIVE IMPAIRMENT AND/OR DELIRIUM IN ED

## Think DELIRIUM

- All older patients require routine brief cognitive screening in the ED
- If cognitive impairment: get a **collateral history** of baseline cognition /function



Download online version

## Older Adult presents to ED

### Complete 4AT\*

see Green Box on right

- ≥4 Possible delirium +/- cognitive impairment
- 1-3 Possible cognitive impairment
- 0 Delirium or severe cognitive impairment unlikely (but delirium still possible if information incomplete)

\* or validated alternative.g. CAM-ED

### No evidence delirium

Proceed with admission/ discharge plan

#### DISCHARGE

Ensure documentation of cognitive status on discharge letter.

If any concerns about cognitive impairment arrange follow-up via local memory services / geriatrician or family doctor


#### ADMIT

Screen for risk-factors for delirium (See Yellow Box on right)

Those with ANY risk factors should be monitored for development of delirium during their stay

### Suspected delirium


#### ADMIT\*\*

(NB Delirium is a Medical Emergency) 

- Discuss diagnosis with senior doctor and nurse in ED.
- Discuss diagnosis with carer/ relative
- Start search for causes of delirium (Remember there is frequently more than one, See Red Box on right)

Ensure admitting team know that delirium is suspected

\*\* The vast majority of patients with delirium need admission it is a diagnosis with high mortality. Exceptionally and only after senior discussion should a patient with delirium go home or be admitted to CDU

Consider if the patient will require enhanced supervision when transferred to the ward (e.g. if increased falls risk, wandering) 

## 4AT

### 1. Alertness

- Normal (fully alert, but not agitated, throughout assessment) 0
- Mild sleepiness for <10 seconds after waking, then normal 0
- Clearly abnormal 4

### 2. AMT4

Age, Date of birth, Place (name of hospital/building), Current Year

- No mistakes 0
- 1 mistake 1
- 1 ≥2 mistakes/untestable 2

### 3. Attention

Months of the year Backward

- Achieves 7 months or more correctly 0
- Starts but scores <7 months / refuses to start 1
- Untestable (cannot start because unwell, drowsy, inattentive) 2

### 4. Acute

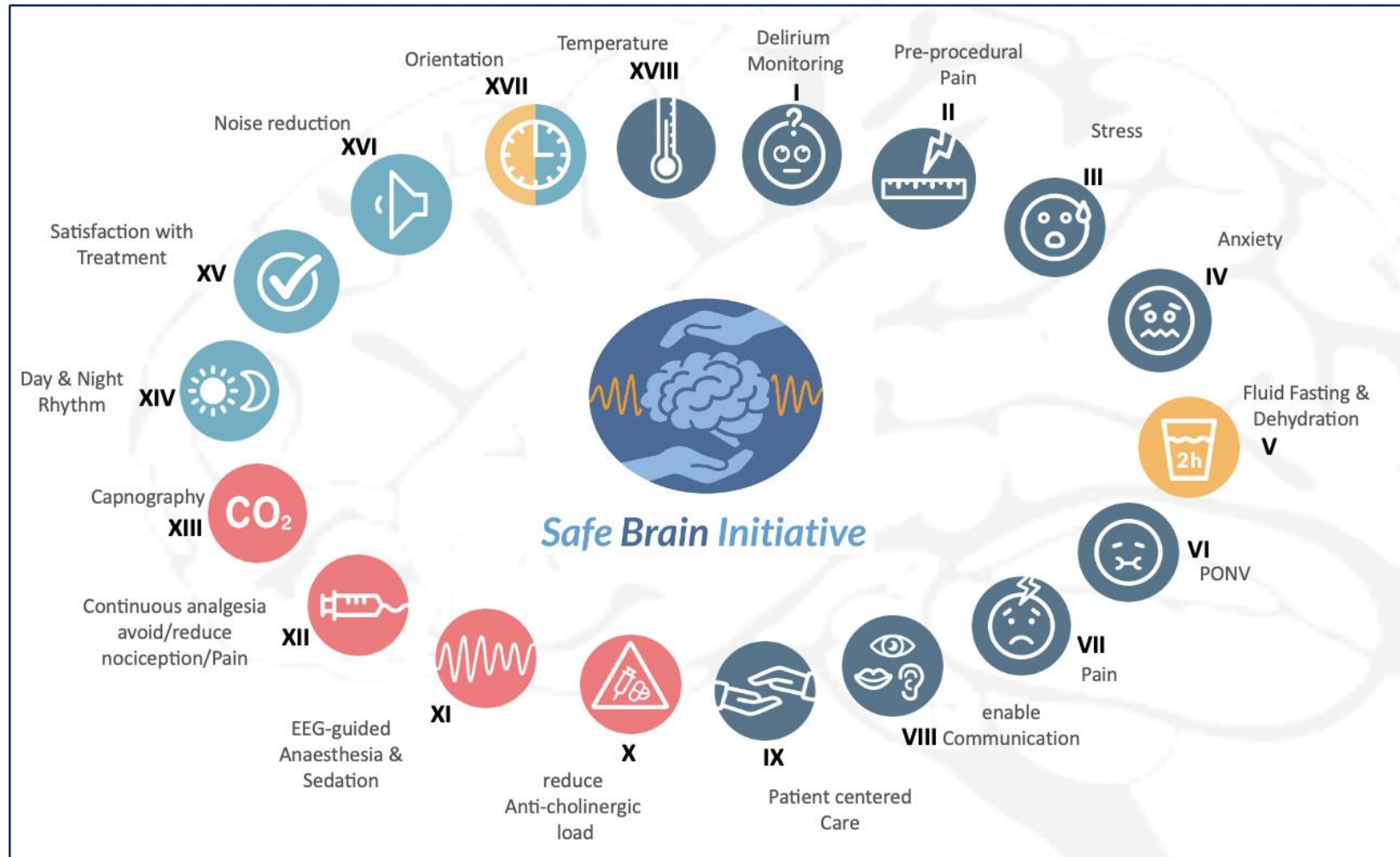
Acute Change or fluctuating symptoms?

- No 0
- Yes 4

Total:

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# Perioperative Area: e.g. Save Brain Initiative



**Legend:** 1. Delirium monitoring; 2. Pre-procedural Pain; 3. Stress; 4. Anxiety 5. Fluid fasting time & Dehydration; 6. PONV; 7. Pain; 8. enable Communication; 9. Patient centered care; 10. Reduce anticholinergic influence; 11. EEG guided Anesthesia & Sedation 12. Continuous analgesics (remifentanyl) avoid/reduce nociception and pain; 13. Capnographie; 14. Day/Night Rhythm; 15. Patient Satisfaction with treatment. 16. Noise reduction 17. Orientation; 18. Temperature

# Inpatient Area: recommendations

Non-pharmacological interventions for preventing delirium in hospitalised non-ICU patients (Review), Cochrane 2021

## Key findings

Multicomponent approaches probably reduce occurrence of delirium by 43% compared to usual hospital care. This means that two in five cases of delirium in adults in hospital wards (other than ICU) can be prevented by multicomponent, non-pharmacological approaches. These interventions may also reduce the length of time people stay in hospital and, if delirium does occur, they may reduce the duration of the delirium episode by about a day.

# Outpatient area

## upfront informations...

- How did he/she live before
- What type of patient is he/she?
- Did he/she have functional/cognitive problems?
- How did he/she get into the clinic?
- Are there critical facts?

## a structure ...

- How to document and process delirant patients
- Which screening should be used where
- Focussed training for the staff and specialists
- Well defined targets

# Outpatient Area

- Check the elective patients ambulatory and upfront
- Assess for mental and cognitive functions
- Questioning known complications upfront
- Check if there are any prehabilitation possibilities
- Evaluate regularly contacts with the family doctors of that patients

## Third step:

build a group,  
seek partners,  
found an SOP,  
define the target.

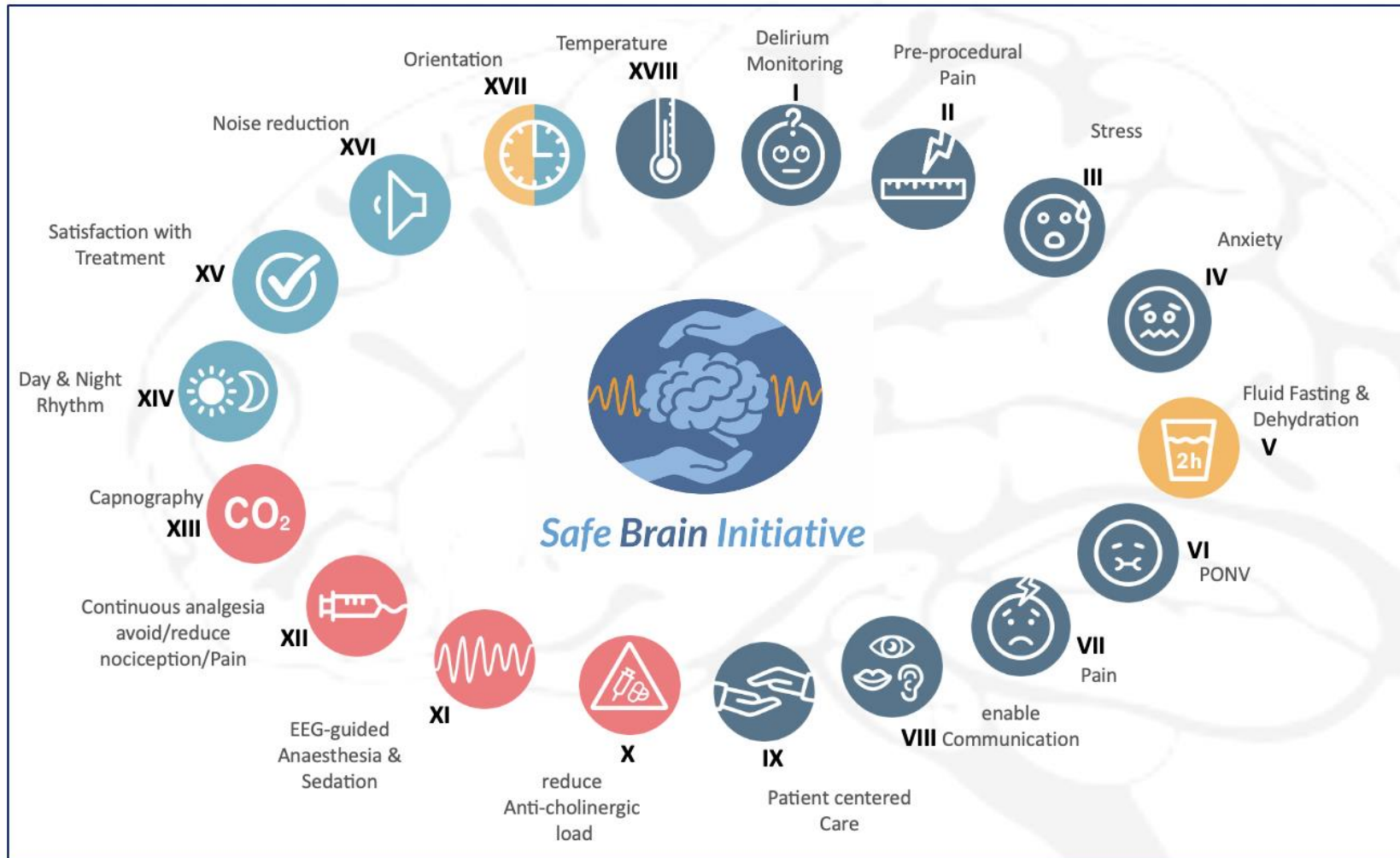
We did that check

# Check Emergency Area: Situation

- 4AT/ESI in discussion, implementing an APN in emergency area for testing and assessments
- Geramover Screening in place (Kapteina, Uni Bern 2023)
- Geriatric Consultancy in place



# CHECK Perioperative Area: Save Brain Initiative (SBI under the lead of Prof. J. Berger)



**Legend:** 1. Delirium monitoring; 2. Pre-procedural Pain; 3. Stress; 4. Anxiety 5. Fluid fasting time & Dehydration; 6. PONV; 7. Pain; 8. enable Communication; 9. Patient centered care; 10. Reduce anticholinergic influence; 11. EEG guided Anesthesia & Sedation 12. Continuous analgesics (remifentanyl) avoid/reduce nociception and pain; 13. Capnographie; 14. Day/Night Rhythm; 15. Patient Satisfaction with treatment. 16. Noise reduction 17. Orientation; 18. Temperature

# Safe Brain initiative

Approval by the Hospital CEO

Submission for ethical approval as Quality Enhancement project

Preparation of training contents

Training of main stakeholders (in-House Masterclass)

Presentation of the project to the Salem Anästhesie AG Salemspital,  
Hirslanden Medical Group Bern, Switzerland – Planned for the 5<sup>th</sup>  
January 2022

Registration in Easytrial

Access to the eCRF form

Access to the SBI Dashboard

Filming of explanatory videos – consider Blended Learning Format

Trial run

Training of all anaesthesia personnel

Weekly reports from main stakeholders  
regarding data collection

Further training of staff

Weekly 3-min report (Monday morning)  
on the findings of the previous week

Completed

## PATIENT SATISFACTION METRICS



Pre-med talk

All . 89%

Induction Anaesthesia

All . 75%

PACU Stays

All . 91%

## DATA QUALITY METRICS



Internal Consistency

All . 80%

Quality of Evaluation

All . 61%

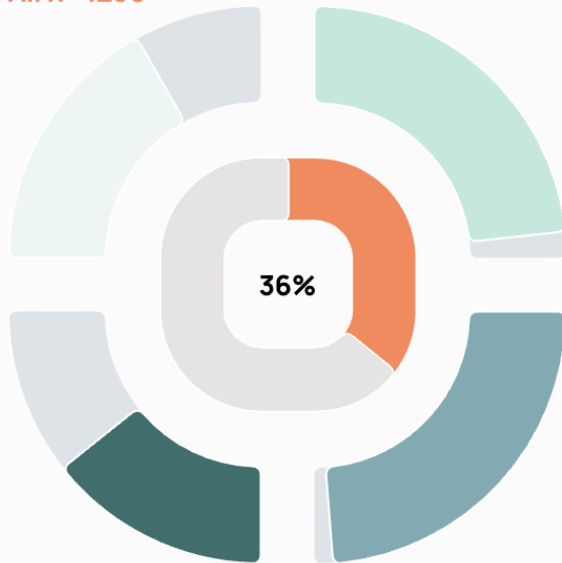
Completeness of Data

All . 14%

## QUATTRO METRICS



All n=1230



- 67% No Delirium / PND
- 93% No Nausea / Vomiting
- 95% No High Pain
- 57% No High Discomfort
- 36% QUATTRO

## PATIENTS REPORTED COMFORT AND OUTCOME METRICS

View by Standard



Delirium / PND



All . 33%

TRENDS DETAILS n=404

High Anxiety



All . 9%

TRENDS DETAILS n=106

Long Fluid Fasting Time



All . 36%

TRENDS DETAILS n=444

High Thirst



All . 15%

TRENDS DETAILS n=188

High Pain



All . 5%

TRENDS DETAILS n=64

Burst Suppression Time



All . 12.48 min

TRENDS DETAILS n=14

Throat/Airway discomfort



All . 1%

TRENDS DETAILS n=12

Shivering



All . 1%

TRENDS DETAILS n=8

High Stress



All . 12%

TRENDS DETAILS n=144

Nausea / Vomiting



All . 7%

TRENDS DETAILS n=80

Reduced well-being



All . 20%

TRENDS DETAILS n=251

Hypothermia avoided



All . 1%

TRENDS DETAILS n=8

## Results

- 721 patients (51,6% female, age:  $57,66 \pm 17.3$  years)
- Average fluid fasting time was  $6.27 \pm 3.64$ h.
- No significant variation in PONV ( $p=0.9$ ), pain ( $p=0.1$ ) or thirst ( $p=0.06$ ) after surgery.
- Significant reduction in postoperative delirium ( $p=0.04$ ) in the first 5 months of implementation.

## Discussion

- Innovative, patient-centred approach to perioperative care.
- **Clear benefit in POD incidence**
- By integrating PROMs and systematic feedback mechanisms, the SBI aims to expedite the advancement of efficient, patient-centered, precision perioperative care, improve patient outcomes, and elevate the overall quality of care.

# Check Inpatient Sector Area: Situation

- DOS Screening/CAM Score
- Delirium Visits in DOS > 3points
- Delirium Team
- >30.000 in the last 2 years
- 200
- implemented
- implemented



# Outpatients: Situation

We have a preoperative consultation started in June 2023

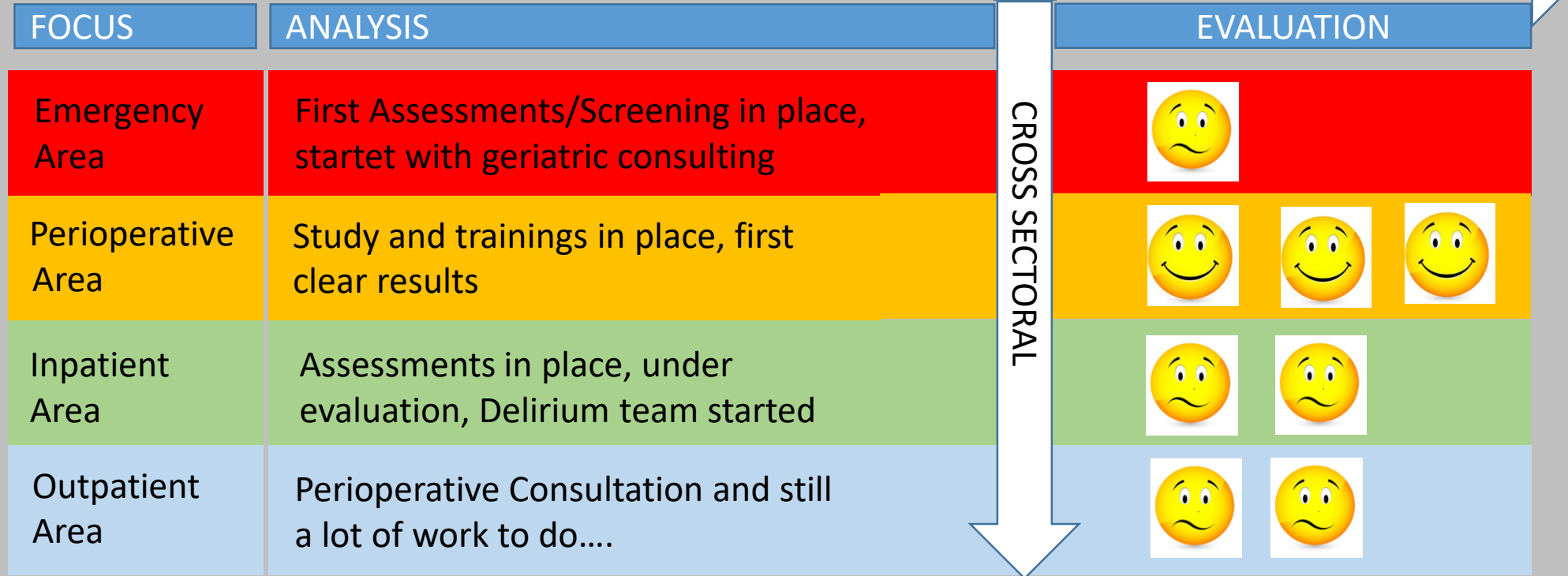
Checking medication, wellbeing, and problems upfront

We have no implementation of assessments yet, but we are on the way.

I think we have to get our work cut out ..

CONCEPTUAL APPROACH/TARGET:  
OLD PATIENT

INFORMATION FLOW (IF)



I think we`ve got our work cut out  
There`s still plenty of room for improvement...



# Steering group and SOP: A-E-I-O-U for the topic of delirium

Aneasthesia-Emergency-Inpatient-Outpatient -Utility

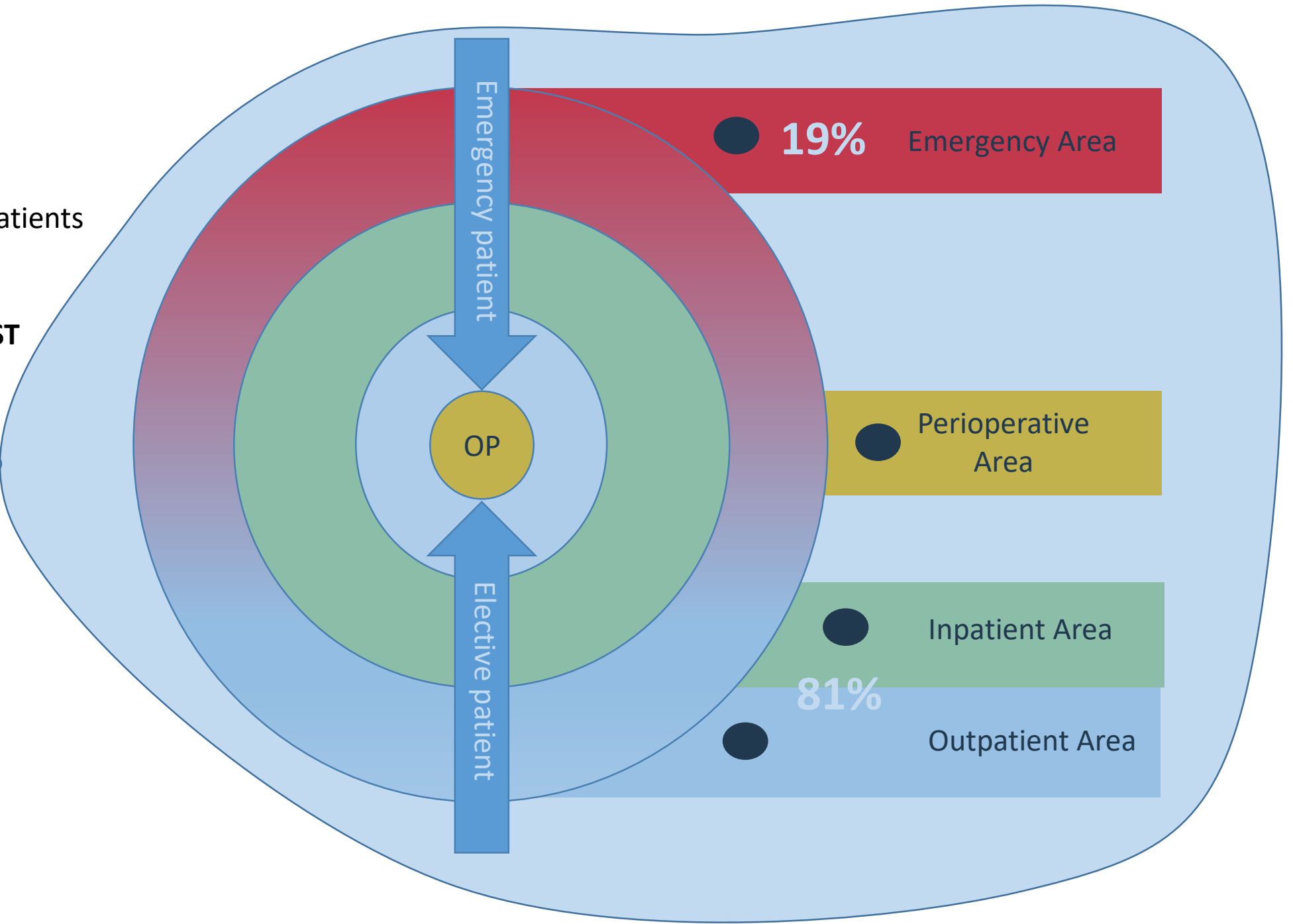
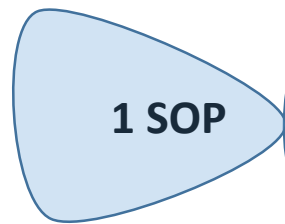
- The optimal treatment of delirium requires multi-professional expertise from several different specialist disciplines.
  - Specialists from the fields of anaesthesia, neurology, psychiatry, geriatrics, nursing and emergency medicine were therefore consulted for the creation of this SOP Delir in order to give the urgent implementation and the associated structural and process changes the necessary power and acceptance.
  - Geriatrics Dr. Wolfram Weinrebe
  - Emergency Dr. Stefan Trummler
  - Delirium Nurse, APN, Manuela Wyss
  - Psychiatry Dr. Michael Sonntag
  - Neurology Prof. Dr. Bernhard Voller
  - Anesthesia Prof. Dr. Joanna Berger, head of the Save Brain Initiative in Bern
  - Intensive Care Medicine Dr. Raphael Knüsel
-

**1 TOPIC DELIRIUM**

**2 GROUPS**

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# Summary

- Delirium needs decision and structure
- Delirium needs knowledge and teamwork
- Delirium needs knowledge coming to action
- Perioperative delirium management starts at the patients home but latest in the emergency area
- We should get our informations transmitted to all areas of treatment
- We should clarify the economic significance of untreated delirium to the management: the implementation of efficient procedures (training and teaching) will definitively increase benefits and reduce costs