



PURSuing COMFORT AND COGNITIVE IN PADIS

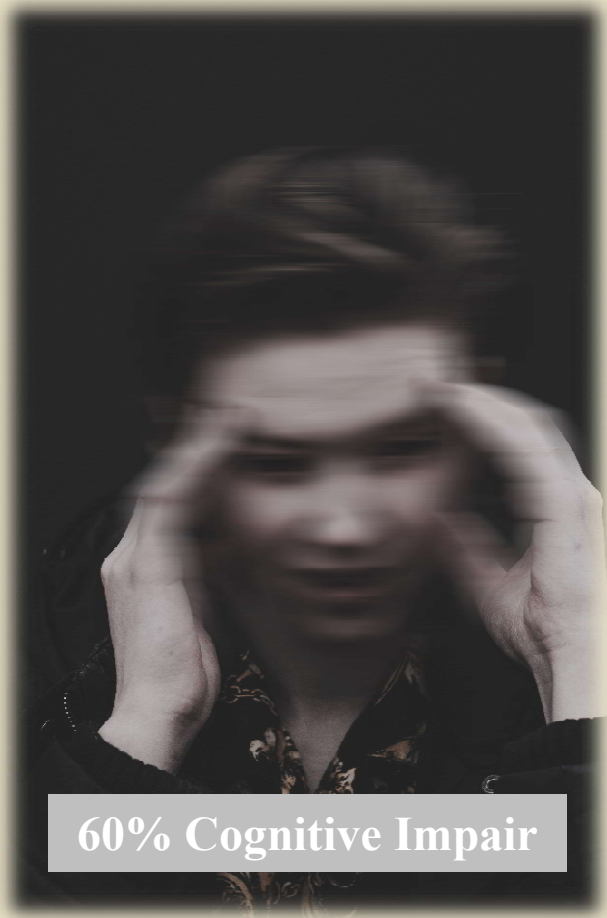
高雄榮民總醫院

重症醫學部

郭書宏醫師



20% Mental Health



60% Cognitive Impair



70% Function Impair

Pain-Agitation-Delirium Important

- **Pain** affects cardiac instability, respiratory compromise, and immunosuppression
 - Poor ICU outcome
- **Agitation** is frequently associated with elevated anxiety, prolonged mechanically ventilated, and agitation-related harm
 - Increased morbidity
- **Delirium** is associated with worse mortality, morbidity, and prolonged mechanically ventilated, and much higher ICU and hospital LOS and costs

Immobility-Sleep Disruption Important

- **Immobility** significantly worsen the muscle strength at ICU discharge
 - Prolong mechanical ventilation use
- **Sleep Disruption** induce emotional distress
 - Delirium
 - Prolong mechanical ventilation use
 - Immune function
 - Neurocognitive dysfunction

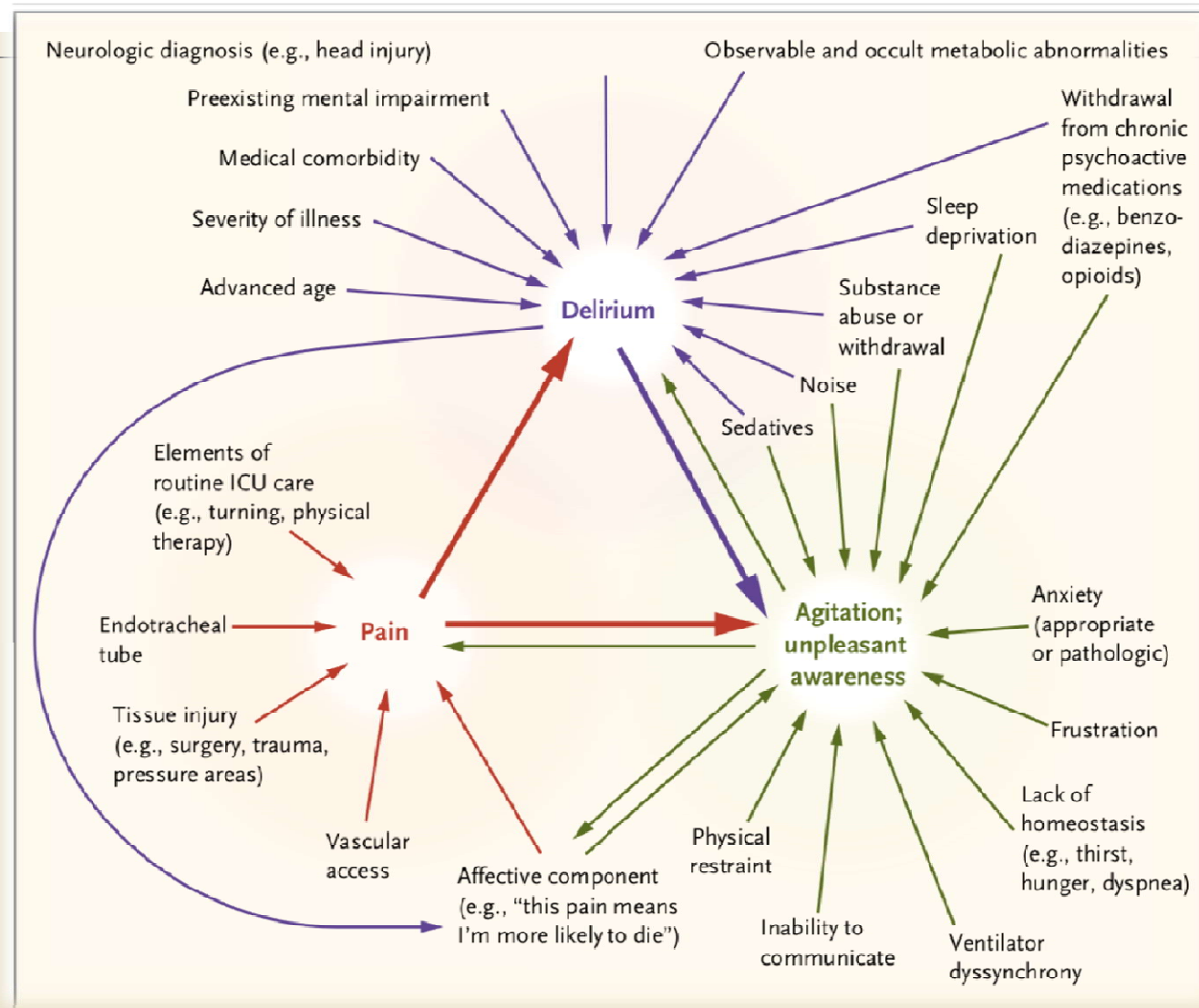
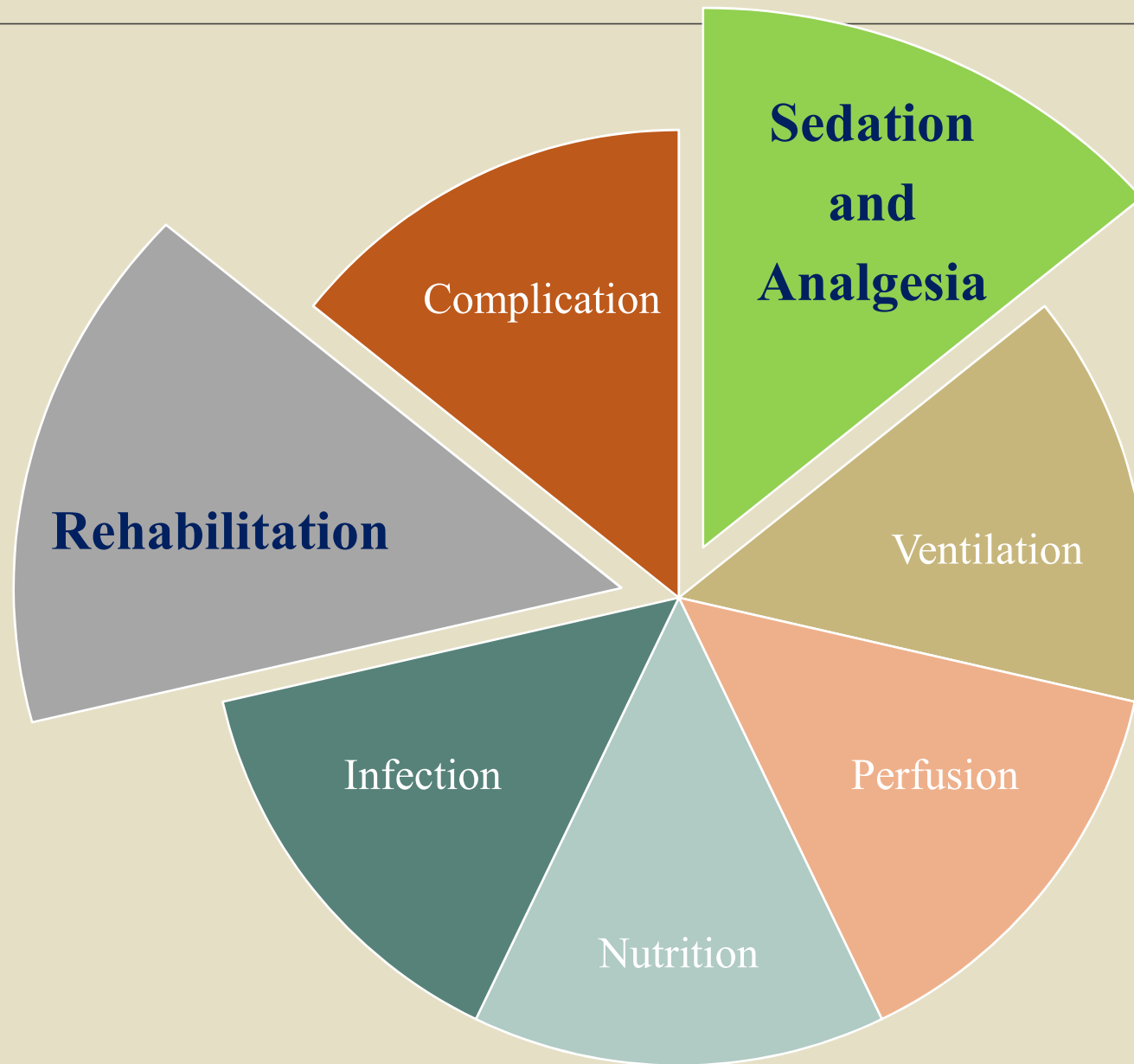
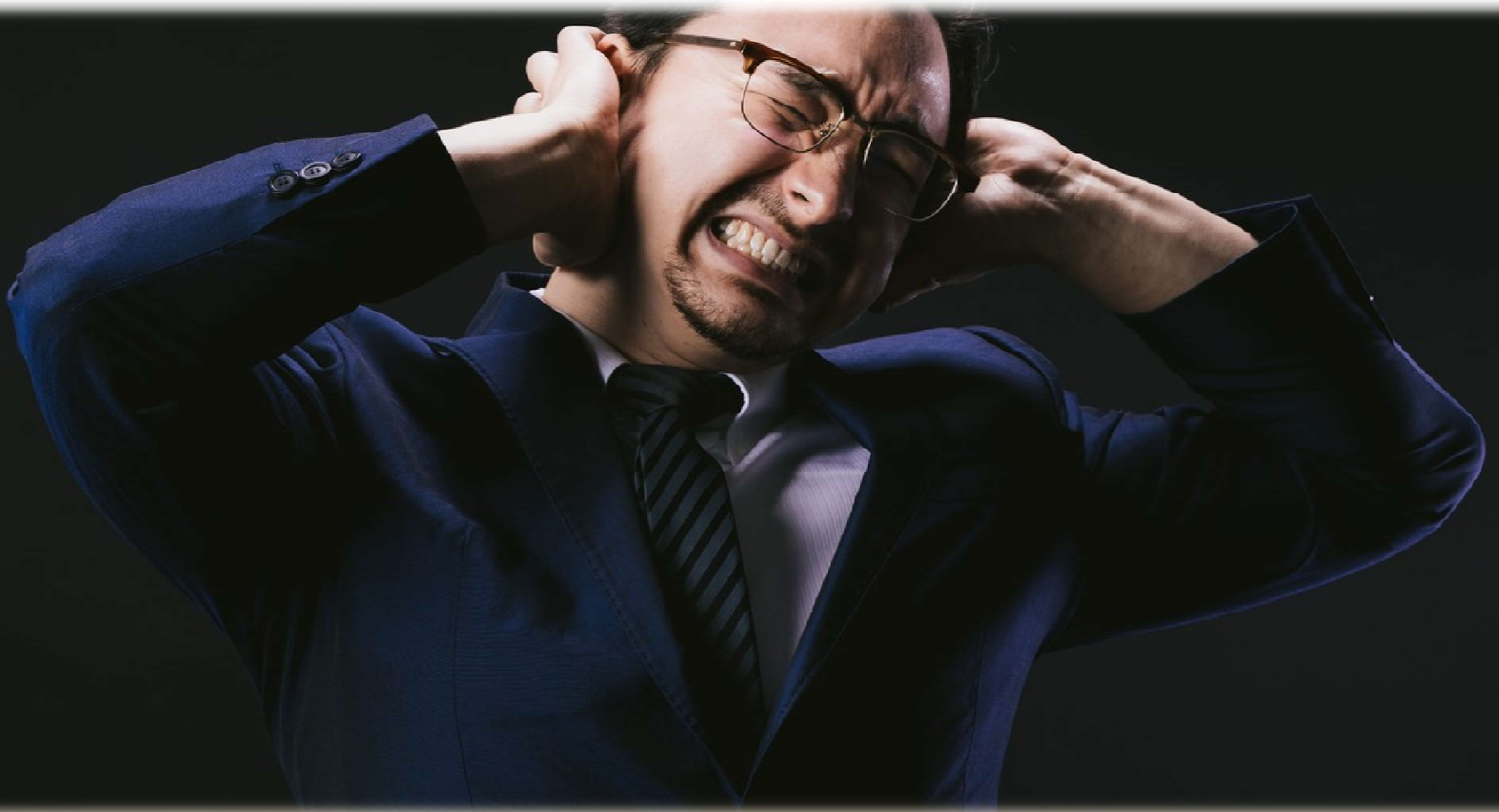


Figure 1. Causes and Interactions of Pain, Agitation, and Delirium.

Drugs and other treatments for pain, agitation, and delirium form an “ICU triad” cognitive management analogous to the “triad of anesthesia,” which highlights interactions among hypnotics, analgesics, and muscle relaxants to encourage balanced anesthesia. The “ICU triad” concept highlights that changing one element is unlikely to be as effective as a coordinated approach.



- **Comfort**
- **Orientated**
- **Early mobilized**
- **Normal sleep-wake pattern**



PAIN

Difficult Approach

- **Individualized**
- **Complex and many origins**
- **Poorly recognized and interpreted**
- **Imperfect protocol**
- **No medication with balanced benefits versus risks**

Protocol-Based Assessment/Management

- **Routine** assessment
- Treated **before** sedative agent
- Assessment-driven, protocol-based, stepwise approach
- **Analgesia-first sedation**
- **Analgesia-based sedation**

藥物

- **Medication**

- **Non-neuropathic pain**

- IV opioids as 1st-line

- **Neuropathic pain**

- IV Opioids+enteral gabapentin/carbamazepine
 - HLA-B 1502 screening for carbamazepine

- **Non-opioid analgesics as adjuvant**

- **Delivery route**

Table 1. Sedatives and Analgesics in Common Use in the ICU.*

Drug (Brand Name)	Mechanism of Action	Typical Adult Dose	Pharmacokinetic Properties	Adverse Effects
Remifentanyl (Ultiva)	μ -Opioid agonist (also with κ -opioid agonist effects)	0.5 to 2 $\mu\text{g/kg/min}$; loading dose of 0.4 to 0.8 $\mu\text{g/kg}$ may be considered	Half-life, 3 to 4 min; does not accumulate with prolonged infusion; metabolized by plasma esterases and so is unaffected by organ function	Nausea, constipation, respiratory depression, bradycardia
Fentanyl (Sublimaze)	μ -Opioid agonist (also with κ -opioid agonist effects)	20 to 100 $\mu\text{g/hr}$; loading dose of 50 to 100 μg may be considered	Half-life, 1.5 to 6 hr; highly fat soluble, so rapid onset but accumulates with prolonged infusion; metabolized by hepatic oxidation; no active metabolites	Nausea, constipation, respiratory depression, skeletal-muscle rigidity with high bolus doses
Morphine (Roxanol; Duramorph)	μ -Opioid agonist (also with κ -opioid and δ -opioid agonist effects)	1 to 5 mg/hr; loading dose of 2 to 5 mg may be considered	Half-life, 3 to 7 hr; more water soluble, so slower onset than fentanyl with less accumulation; metabolized by hepatic glucuronidation to morphine-6-glucuronide (10%) (20 times as active as parent drug) and morphine-3-glucuronide (90%) (inactive as an analgesic but causes neuro-excitation, at least in animal models), both with renal excretion	Nausea, constipation, respiratory depression, histamine release and consequent vasodilatation and hypotension, itch
Hydromorphone (Dilaudid)	μ -Opioid agonist (also with κ -opioid and δ -opioid agonist effects)	0.5 to 2 mg/hr; loading dose of 0.4 to 1.5 mg may be considered	Half-life, 1.5 to 3.5 hr; 7 to 11 times as potent as morphine; metabolized by hepatic glucuronidation to hydromorphone-3-glucuronide, with effects similar to those of morphine-3-glucuronide	Nausea, constipation, respiratory depression

Fentanyl

- **u-opioid agonist**
- **Dose: loading 50-100mcg, keep 20-100mcg/hr**
- **Rapid onset**, half-life: 1.5-6hr
- **Metabolized by the liver, no active metabolites**
- **Highly fat soluble, accumulates with prolonged infusion**
- **Nausea, constipation, respiratory depression**

Morphine

- **u-opioid agonist**
- **Dose: loading 2 - 5 mg, keep 1-5mg/hr**
- **Slower onset**, half-life: 3-7hr
- **Metabolized by the liver, with active metabolites (excreted through kidney)**
- **Water soluble, so slower onset and less accumulation than Fentanyl**
- **Nausea, constipation, respiratory depression**

Add-On

- **Rest**

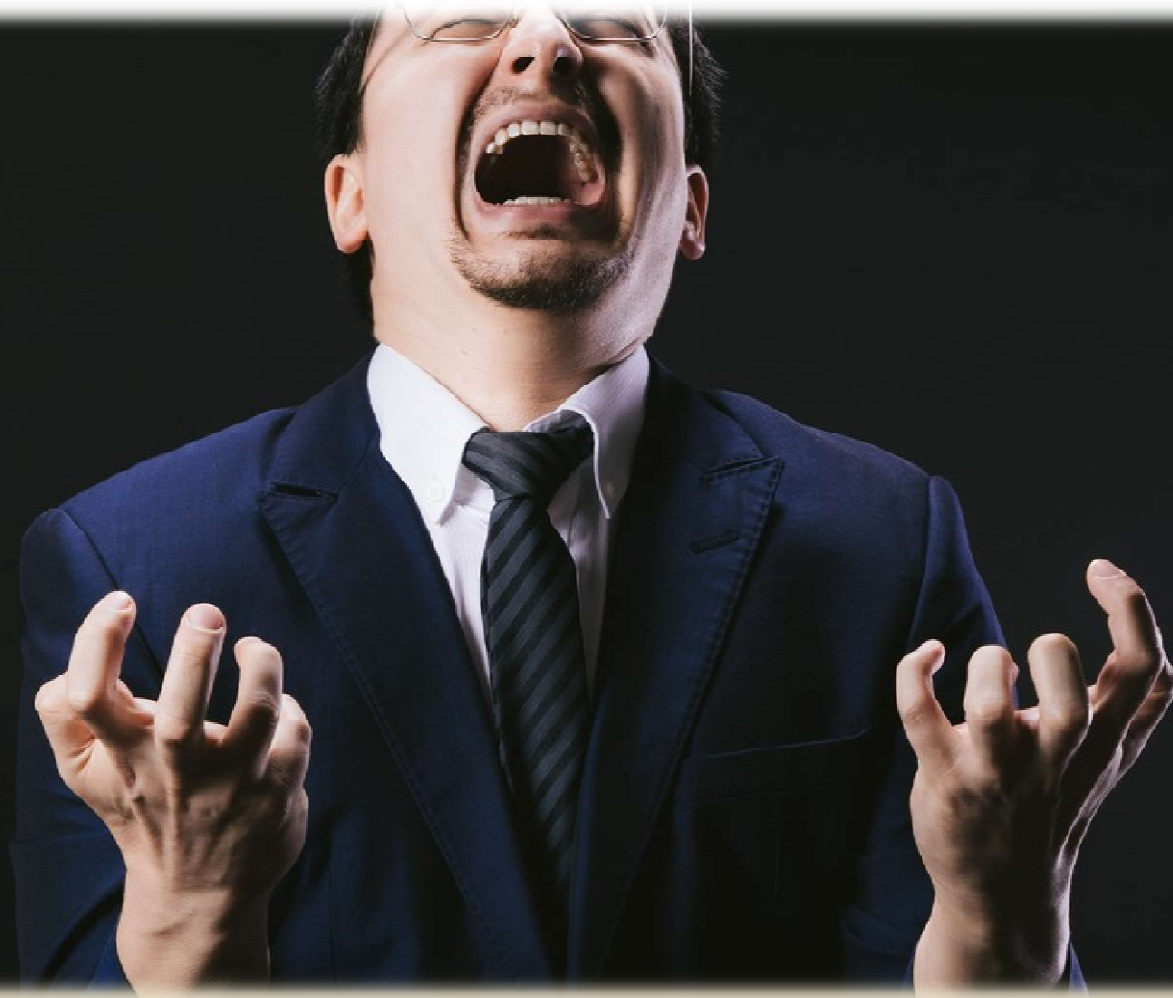
- **Acetaminophen**
- **Nefopam**
- **Ketamine-** low dose in surgical patient
- **Neuropathic pain medication-** neuropathic pain management
conditionally used on post CVS surgery

- **Procedural**

- **Opioid-** lowest effective dose
- **NSAID by all routes-** discrete and infrequent procedures

輔助療法

- **Massage**
- **Music- rest and procedural**
- **Cold therapy- procedural**
- **Relaxation techniques- procedural**



AGITATION

Sedation Consideration

- **Light level sedation** unless contraindicated
 - Improved outcome
- **Daily Sedation Interruption(DSIs)**
- **NP-targeted sedation**
- **Suggest analgo-sedation**
- **Non-BZD based regimen** recommended

理想藥物

- ▶ **Rapid** onset and offset
- ▶ Minimal **respiratory depression**
- ▶ No effect on **cardiovascular** function
- ▶ **Inactive metabolites** or lack of metabolites
- ▶ Metabolism and elimination not dependent on **hepatic** function
- ▶ Metabolism and elimination not dependent on **renal** function
- ▶ No drug interactions
- ▶ No pain on injection
- ▶ No associated tolerance or withdrawal
- ▶ **Amnestic**
- ▶ Inexpensive

Table 1. Sedatives and Analgesics in Common Use in the ICU.*

Drug (Brand Name)	Mechanism of Action	Typical Adult Dose	Pharmacokinetic Properties	Adverse Effects
Midazolam (Versed)	GABA _A agonist	Bolus, 1 to 5 mg; infusion, 1 to 5 mg/hr	Half-life, 3 to 11 hr; active metabolite accumulates with prolonged infusion; metabolized by hepatic oxidation, with renal excretion of active metabolite	Possibly a higher risk of delirium and tolerance than with certain other sedatives
Diazepam (Ativan)	GABA _A agonist	Bolus, 1 to 4 mg; infusion, 1 to 5 mg/hr	Slower onset (5 to 20 min) than that of midazolam or diazepam (2 to 5 min); half-life, 8 to 15 hr; metabolized by hepatic glucuronidation, with no active metabolites, so offset may be more predictable than that of midazolam in critical illness	Possibly a higher risk of delirium and tolerance than with certain other sedatives
Diazepam (Valium; Diazemuls)	GABA _A agonist	Bolus, 1 to 5 mg	Half-life, 20 to 120 hr; metabolized by hepatic desmethylation and hydroxylation; active metabolite accumulates in renal failure	Poorly soluble in water, so prolonged peripheral intravenous infusion may cause phlebitis; possibly a higher risk of delirium and tolerance than certain other sedatives
Propofol (Diprivan)	GABA _A agonist, with other effects, including on glutamate and cannabinoid receptors	50 to 200 mg/hr or 1 to 3 mg/kg/hr	Half-life, 30 to 60 min after infusion; longer after prolonged infusion because of redistribution from fat stores; metabolized by hepatic glucuronidation and hydroxylation	Vasodilatation or negative inotropy causing hypotension or bradycardia; propofol infusion syndrome (lactic acidosis, arrhythmia, and cardiac arrest), mostly associated with prolonged infusion rates of >4 to 5 mg/kg/hr; hypertriglyceridemia; pancreatitis
Clonidine (Prevex) dexmedetomidine (Precedex)	α_2 -Agonist	0.2 to 1.5 μ g/kg/hr	Half-life, 2 hr; does not accumulate with prolonged infusion; metabolized by hepatic glucuronidation and oxidation, with no active metabolites	Transient hypertension, then hypotension; bradycardia, dry mouth, nausea

Midazolam

- **GABA agonist**
- **Dose: Bolus 1-5mg IVP; infusion: 1-10mg/hr**
- **Onset: 2-3 minutes**
- **Half-life: 3 – 11 hr (accumulates in fat)**
- **Active metabolite accumulates with prolonged infusion**
- **Metabolized by hepatic oxidation, with renal excretion of active metabolite**
- **Reversed with Flumazenil**
- **Obese (high lipid soluble) or patients with reduced serum albumin levels have prolonged sedative effect**
- **Possibly higher risk of delirium and tolerance**

Propofol

- **GABA agonist**
- **Dose: 20-100mcg/kg/hr**
- **Onset: 1-2 minutes**
- **Half-life: 30-60 minutes, longer after prolonged infusion because of redistribution from fat stores**
- **Metabolized by the liver**
- **Vasodilatation** or negative inotropy causing hypotension or bradycardia
- **10% lipid emulsion provides 1.1kcal/ml**

Dexmedetomidine

- **Alpha-2 agonist**
- **Dose: 0.2 – 1.5mcg/kg/hr**
- **Onset: 6-10 min**
- **Half-life: 2hrs**

- **Metabolized by liver, no active metabolites**
- **Does not accumulate with prolonged infusion**
- **Transient hypertension, then hypotension**
- **Does not cause respiratory depression**
- **Analgesic effects**

Which Best

- **Propofol** or Benzodiazepines in MV patients
- **Propofol or Dexmedetomidine over Benzodiazepines**
 - Propofol or Dexmedetomidine might be better
 - Monitor **TG** when > 2 days
 - **Calories** from Propofol
 - **Bradycardia** and **Hypotension**
- **Propofol or Dexmedetomidine**
 - Favor **Dexmedetomidine**

Other Tools Available

- **Objective measures in non-comatose patients**
 - Auditory evoked potentials
 - **Bispectral index- best suited for sedative titration during deep sedation or NMBAs**
 - Narcotrend index
 - Patient state index
 - State entropy
- **Objective measures can't substitute subjective sedation scoring**

BIS Index- a Scale correlate to EEG

- **BIS Index: dimensionless number from 0 to 100 scaled correlate to EEG**

BIS™ Monitoring Value Range	100	Awake Responds to normal voice
	80	Light/Moderate Sedation May respond to loud commands or mild prodding/shaking
	60	General Anesthesia — Low probability of explicit recall — Unresponsive to verbal stimulus
	40	Deep Hypnotic State
	20	Burst Suppression
	0	Flatline EEG



Time to Paralysis

- **Indications for continuous deep sedation or even paralysis**
 - Intracranial hypertension
 - Severe respiratory failure
 - Refractory status epilepticus
 - Prevention of awareness in patients treated with NMBAs

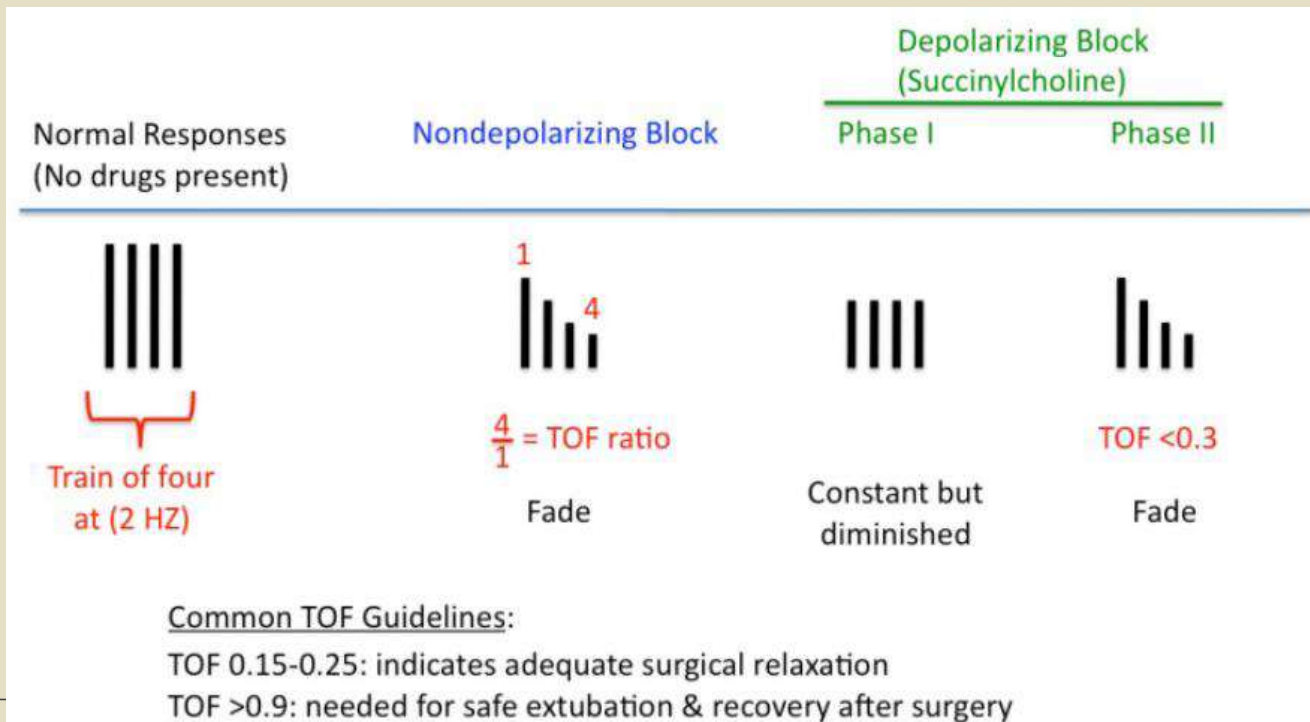
EEG based Patient State Index(PSI)

- **PSI: proprietary computed EEG variable that is related to the effect of anesthetic agents**
- **Suppression Ratio(SR): the suppression of the electrical activity of the frontal and pre-frontal cortex of the brain as a percentage of time**
- **Asymmetry(Asym): difference in brain activity between the L't and R't**
- **EMG: the detected muscle activity**
- **對深度鎮靜或麻醉病人意識更完整掌握**



Neuro Muscular Transmission(NMT) Measurement

- **Train-Of-Four Stimulation mode(TOF)**
- 對深度鎮靜或麻醉病人意識更完整掌握





DELIRIUM

- **Acute change** in global cognitive function affecting attention, arousal, orientation, or perception
- **Worsen prognosis of ICU patients**
- **Prolong ICU stay**
- **Influences subsequent cognitive dysfunction outside ICU**
- **Encourage monitoring ICU patients for symptoms of delirium with an objective instrument**

- **1/3** patients > 70 y/o admitted to hospital
 - * 50% delirious on admission
 - * 50% develops delirium in the hospital
- Postoperative delirium among seniors:
 - * elective surgery: 15-25%
 - * high risk procedures (hip Frx and CVS): > 50%
- ICU: may > 75%
- End of life: as high as 85%

Risk Factors for Delirium in ICU

- Pre-existing **Dementia** or cognitive impairment
- High **Severity** of illness on admission
- **Sedative**-induced and multifactorial coma
- **Old** age
- History of **Alcohol or Drug** abuse

During the
ICU/Hospital Stay

- Increased **mortality**
- **3x** greater re-intubation rate
- Average **10 additional days** in hospital
- Higher costs of care

After Hospital
Discharge

- Increased **mortality**
- Long-term **cognitive impairment**
- Requirement for chronic care facility
- Decreased functional status at 6 months

藥物治療 及 非藥物治療

- 絕對要先排除病人生理（疾病）的問題！
- 情緒和環境的支持為主
- Medications: **Quetiapine** (recommended), haloperidol, risperidone
- Bring **familiar objects** (glasses, hearing aids, clockers, calendars, photos of families and friends)
- Regular **reorientation** of the patient by a familiar person
- Room with **natural lights** and restore **normal sleep-wake cycle**
- Recommend **early mobilization** whenever feasible

非藥物治療

Antipsychotics 僅減少躁動

- 治療造成Delirium之原因
- Review medication (減少非必要用藥/anticholinergics)
- 減少約束/保持安全性?/情緒支持 and 提供安全感
- 固定照顧的醫療人員/避免更換床位
- 反覆加強定向感 (大數字時鐘/日曆/電視?/music)
- 改善夜間睡眠品質 (夜晚減少噪音&治療/控制光線)
- 盡早讓病人下床活動/抬高床頭/床上活動/看書報
- 向家屬解釋Delirium相關知識/熟悉的家人探望
- 適當營養/水分補充/O₂
- 視力/聽力輔助用具(眼鏡/助聽器)

- **Recommend early mobilization** whenever feasible to reduce delirium
- **Not suggested:** prevention with haloperidol or atypical antipsychotics
- **Not recommended:** treatment with Dexmedetomidine
 - no evidence?

有效處置

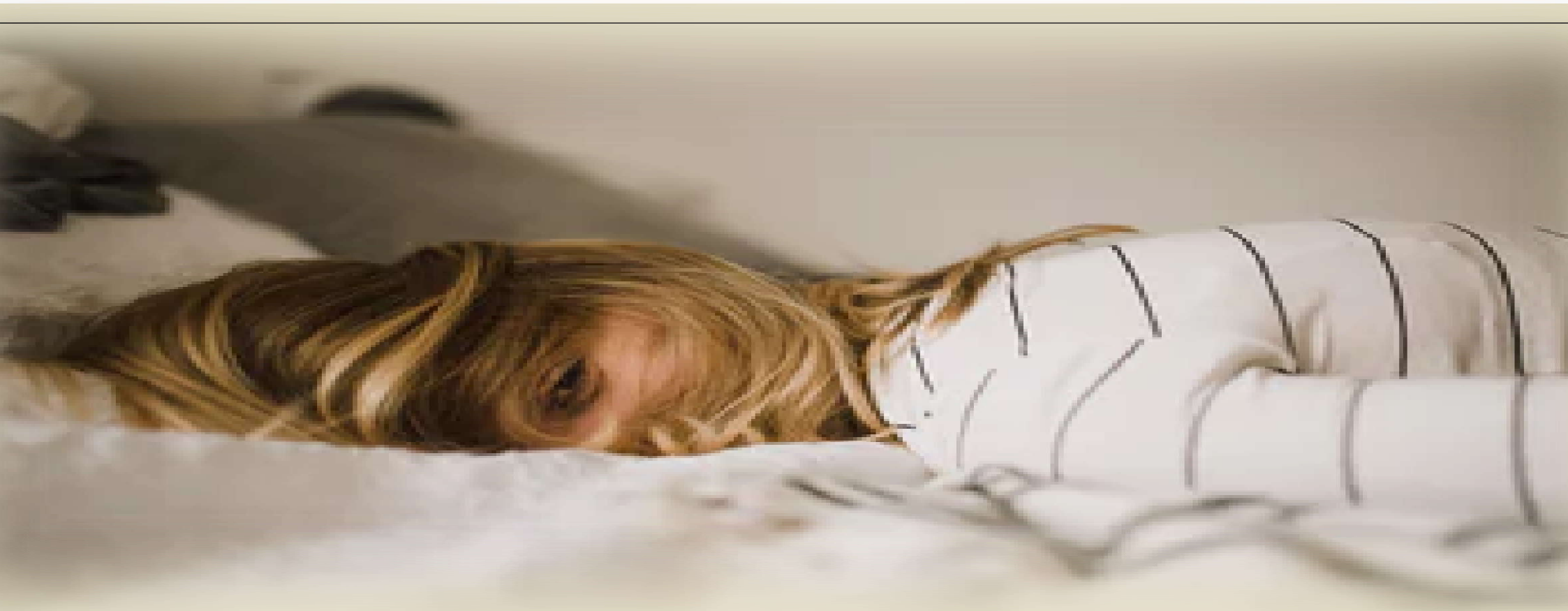
- **Dexmedetomidine** for delirium in mechanically ventilated adults where agitation is precluding weaning/extubation
- Multicomponent, nonpharmacologic intervention that is focused on (but not limited to) **reducing modifiable risk factors** for delirium, improving cognition, and optimizing sleep, mobility, hearing, and vision
- Performing **rehabilitation or mobilization** in critically ill adults to optimize functioning and reduce disability in individuals with a health condition



IMMOBILITY

- **Survivors long-term sequelae-ICU-acquired muscle weakness (ICUAW)**
 - **Occur in 25–50%**
 - **Associated with survival, physical functioning, and quality of life**
- **Most important risk factor for ICUAW is bed rest**
 - **Influence on ICUAW and impaired physical functioning**
 - **Beneficial as a delirium management**
 - **Participant effect on analgesic and sedation practices**

- **Rehabilitation/mobilization:**
 - **Significantly:**
 - Improve **muscle strength** at ICU discharge
 - Reduce **duration of mechanical ventilation**
 - **Moderate but not significant:**
 - Improve **health-related quality life** in 2 Mons of discharge
 - **Adverse events incidence very low**



SLEEP DISRUPTION

重症睡眠照護

提升重症病人睡眠品質

國外的文獻很少

國內**沒有**相關文獻

重症睡眠評估**不易執行**

大多數醫院沒有重症睡眠評估

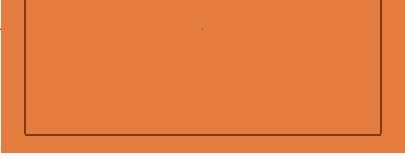
重症優質睡眠**不易達到**



重要性

- **Common complaint**
- **Source of distress**
- **Characterized by**
 - **Sleep fragmentation**
 - **Abnormal circadian rhythms**
 - **Increased light sleep**
 - **Decreased slow-wave and REM sleep**

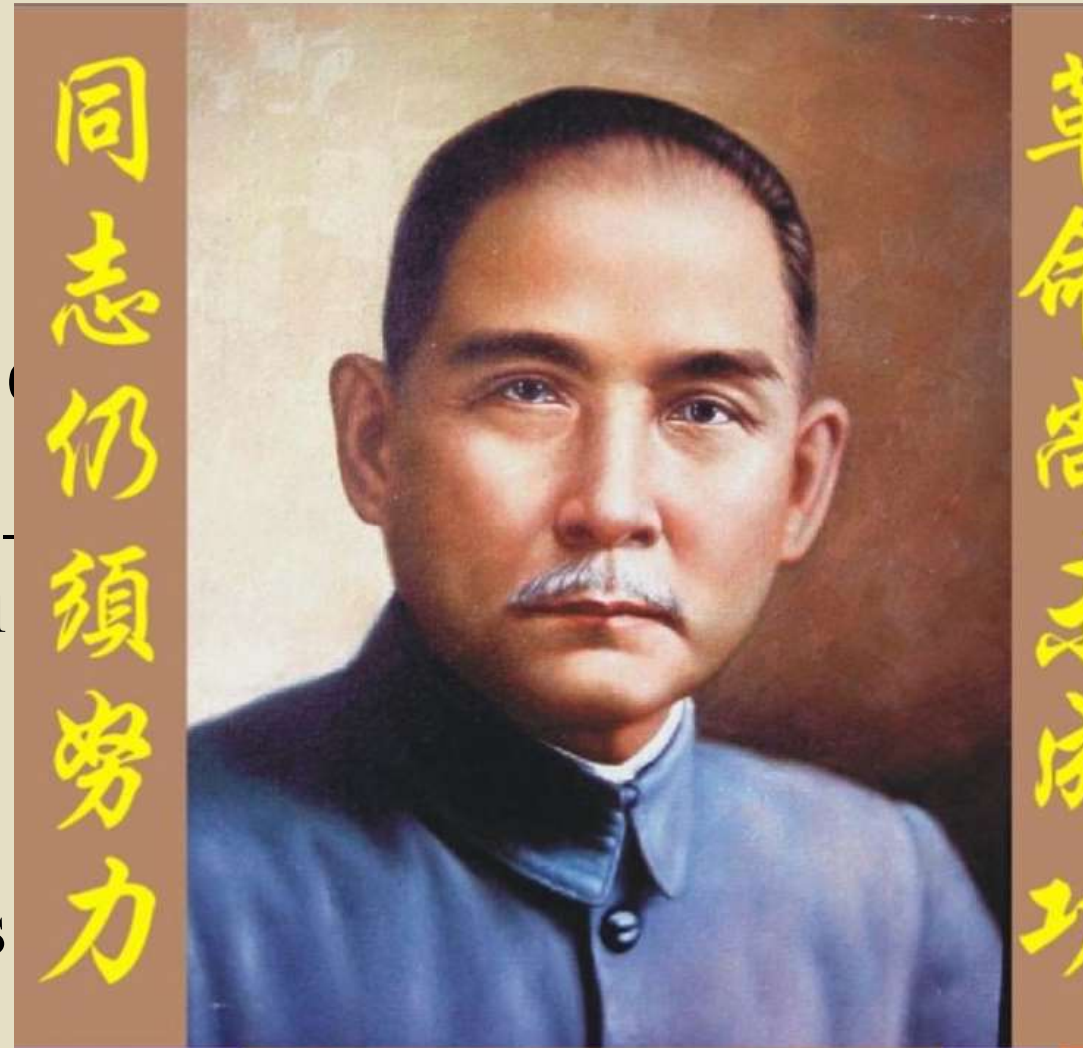
- Sleep-promoting **multicomponent protocol** suggested
- **No** preferred medication?



**REACHING GOAL
.....YET?**

EPOC Strategies

- Cohort studies
 - Mortality (risk ratio [RR] 1.01; 95% CI, 0.82–1.03)
 - **Delirium** (RR 0.92; 95% CI, 0.82–1.03)
 - MV duration (weighted mean difference –0.77 d; 95% CI, –1.51 to 0.00)
 - ICU LOS (WMD –0.77 d; 95% CI, –1.51 to 0.00)
- RCTs
 - Reduced Mortality and MV duration
 - No difference over **Delirium** or ICU LOS



HHS Public Access

Author manuscript

Crit Care Med. Author manuscript; available in PMC 2024 April 01.

Published in final edited form as:

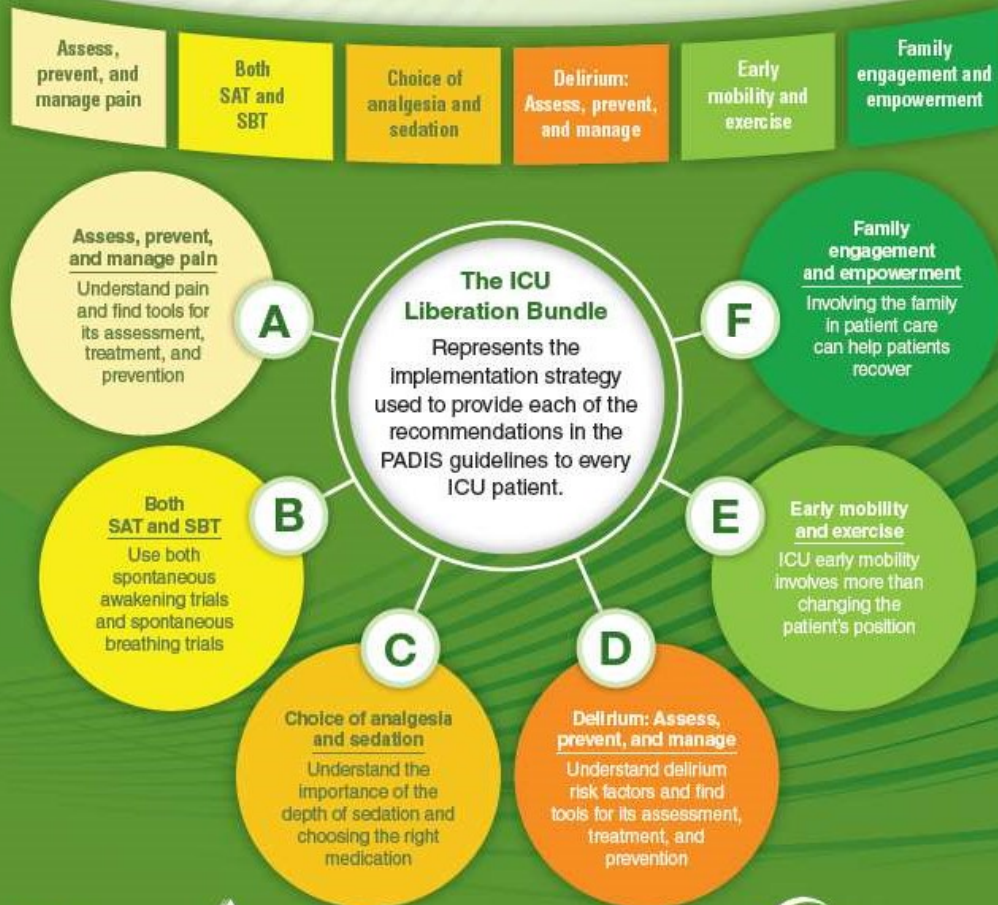
Crit Care Med. 2024 April 01; 52(4): 626–636. doi:10.1097/CCM.0000000000000611

ICU Liberation

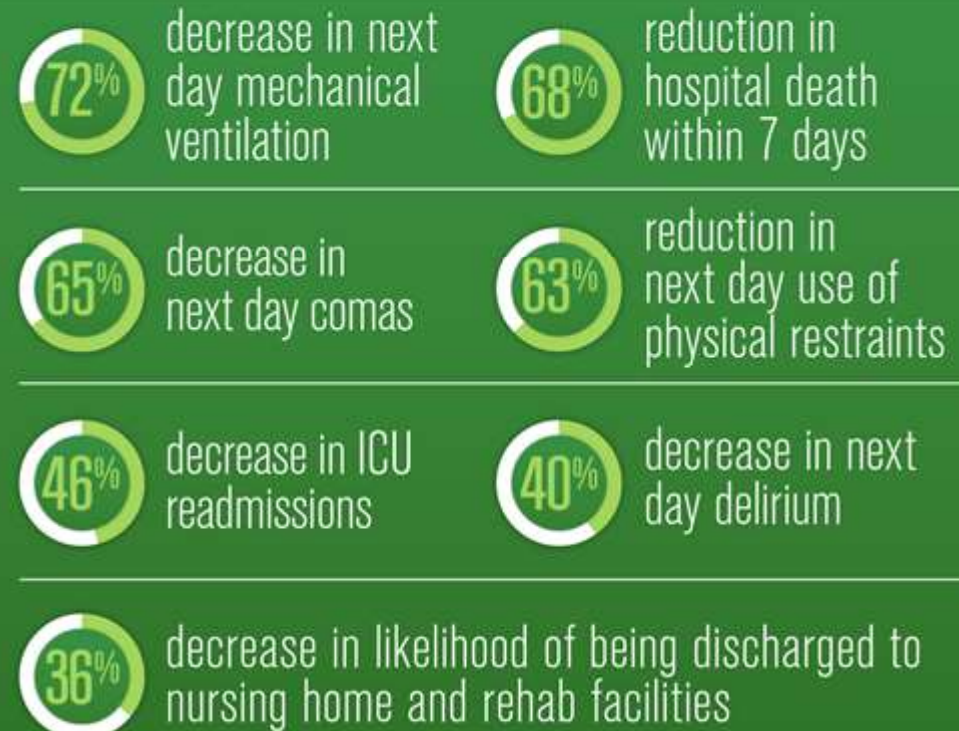
ICU Liberation is the overarching philosophy and practice directed at improving care by “liberating” ICU patients from pain, oversedation, delirium, mechanical ventilation, immobility and isolation, as well as from post-discharge sequelae that can be life-altering for many patients.

2018 Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU (PADIS Guidelines)

The PADIS Guidelines provide a roadmap for developing integrated, evidence-based, and patient-centered protocols which can be implemented through the ICU Liberation Bundle.



Implementation of the ICU Liberation Bundle is associated with:



Learn more about the ICU Liberation Initiative at iculiberation.org.

Physical Restraint

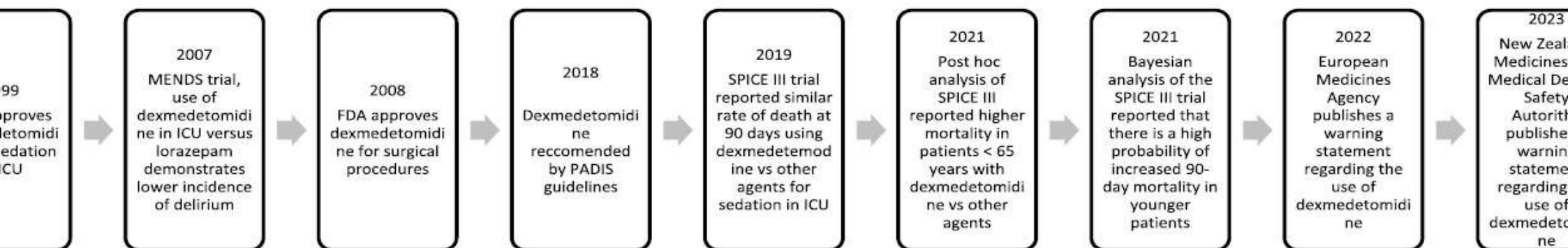


- **Restrained associated with**
 - **longer duration of ventilation** (5.9 ± 8.2 vs. 0.36 ± 1.4 days; $p < .001$)
 - **higher 28-day mortality** (0.26 ± 0.45 vs. 0.07 ± 0.25 , $Z = 6.86$, $p < .001$)
- **More in-hospital antipsychotic treatment** (60 [23.2%] vs. 11 [2.8%], respectively; $p < .001$)
- **Greater tendency for agitation**(episodes of RASS > 0 [1.7 ± 4.0 vs. 0.04 ± 0.27 ; $p < .001$])
- **Severer agitation scores** (max. RASS [0.19 ± 1.6 vs. 0.01 ± 0.54 , respectively; $p < .001$])

Dexmedetomidine

- **SE increased** by 37.6% (29.7;45.6 95% CI) versus 3.7% (11.4;18.8 95% CI)($p < .001$)
- **TST prolonged** by 271 min(210;324 95% CI) versus 27 min(82;135 95% CI)($p < .001$)
- No difference in REM sleep, delirium physical activity, or RASS score
- (DecatSepsis)Lower rescue Epinephrine usage
- No clinical beneficial effect on Septic shock patient
- (A2B RCT)Not superior to Propofol on weaning trial performance
- RASS: -2 as outcomes cutting level

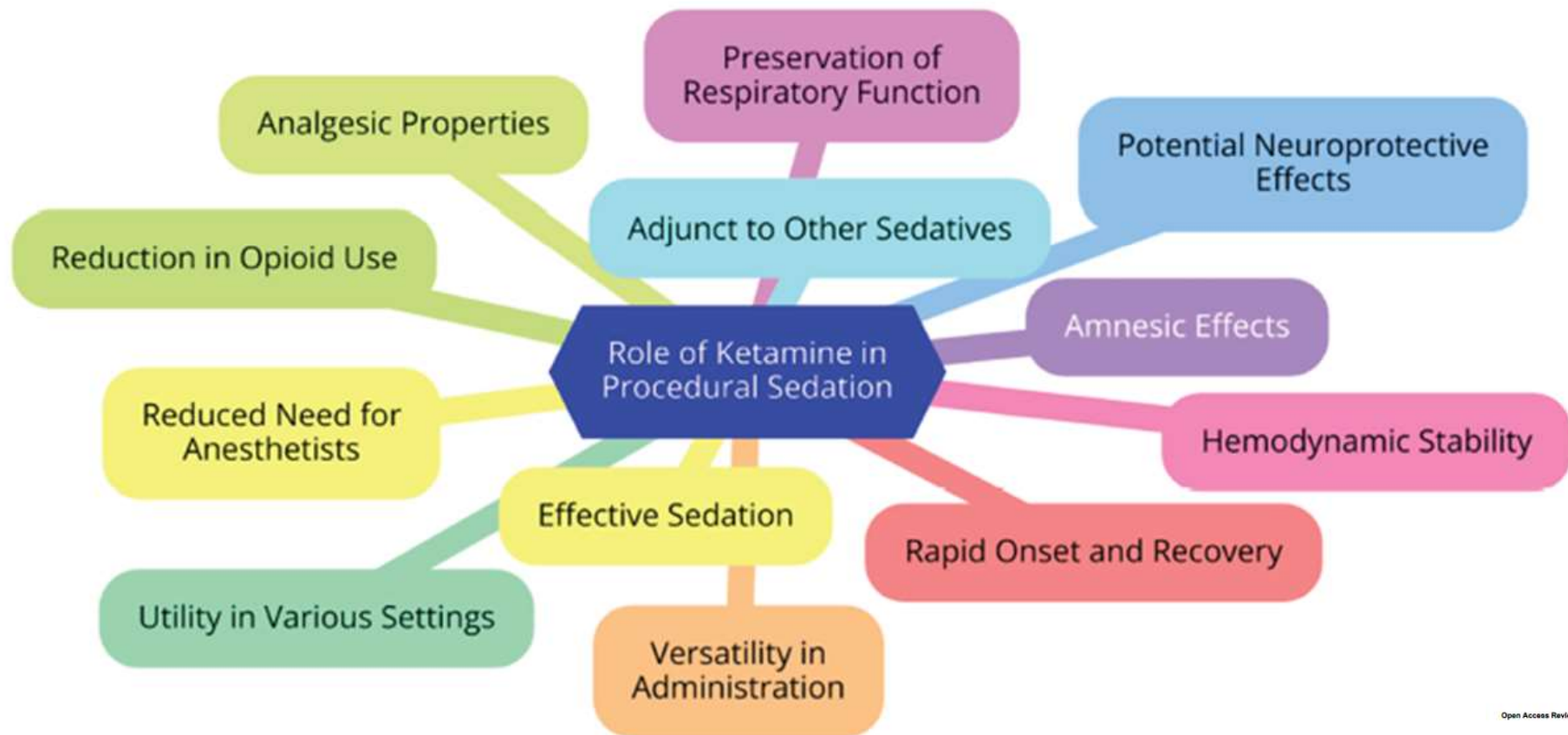




Timeline of key milestones in the use of dexmedetomidine in critically ill patients

- **Higher probability of 90-day mortality in aged ≤ 65 years**(OR 1.26, 95% CI 1.02–1.56) with a **98.5% probability of harm** compared to usual care
- Sub-analysis of SPICE III explored that **increasing the dexmedetomidine dose was associated with elevated 90-day mortality in younger (age < 65 years) patients** (median [IQR] dose, 0.54 [0.35–0.72] vs. 0.44[0.27–0.64] $\mu\text{g/kg/h}$; $p=0.001$; HR 1.3, 95% CI 1.03–1.65, $p=0.029$)
- Systematic review and meta-analysis of RCT evaluated the use of **dexmedetomidine in patients with sepsis reported a lower incidence of mortality** associated with dexmedetomidine compared to any other intervention (RR 0.83, 95% CI[0.69, 0.99])

Ketamine



Ketamine

- **NMDARs noncompetitive antagonist; u-opioid agonist**
- **Dose:**
 - **Pain: Bolus 0.1-0.2mg/kg Q5mins IVsP**
 - **Sedation: Bolus 1mg/kg IVP(> 1min); Infusion: 1mg/kg/hr(non-intubated), 1-2mg/kg/hr(intubated)**
- **Onset: 30s(IV), and 1-5mins(IM)**
- **Half-life: 10-15mins**

- **Metabolized by liver, with renal excretion**
- **Active metabolite(NorKetamine-1/3 potency) accumulates**
- **S(+)-Ketamine 2* potency than regular Ketamine in clinical practice**
- **Respiratory depression at higher dose(> 1mg/kg)**
- **Endogenous catecholamines(epinephrine and norepinephrine) maintaining blood pressure and heart rate**
- **Possibly higher risk of emergence reactions and dysphonia(max. at mid-dose: 0.3-0.8mg/kg)**

Ketamine

- **Against using ketamine as monotherapy** analgo-sedation in critically ill adults with iMV
 - If other analgo-sedatives available
- Ketamine **as an adjunct** to non-ketamine usual care sedatives (e.g., opioids, propofol, dexmedetomidine) or **continuing with** non-ketamine usual care sedatives alone

Critical Care Medicine

Ketamine Analgo-sedation for Mechanical Ventilation in Critically Ill Adults: A Rapid Practice Guideline for the Saudi Critical Care Society and the Saudi Society of Anesthesiology and Intensive Care Medicine

Marwa Amer^{1,2}, Morten Hylander Møller^{3,4,5}, Mohammed Alshahrani⁶, Yahya S. Yaseen M. Arabi⁶, Faye Alshamsi¹⁰, Martin Ingi Sigurdsson^{11,12}, Marius Rehn¹³, Michelle S. Chew¹⁴, Majja-Liisa Kalliomäki¹⁵, Kimberley Lewis^{16,17}, Faisal A. Al-Hassan M. Al-Dorzi¹⁸, Abdulrahman Al-Fares^{19,20}, Naif Alsadoon²¹, Carolyn M. Beattie²², Christine M. Groth²³, Rachael Parke^{24,25}, Sangeeta Mehta²⁶, Paul E. Wischmeyer²⁷, Klaus T. Oikarinen²⁸, Waleed Alhazzani^{1,8,19,26,27}

Inhaled Sedative Agents

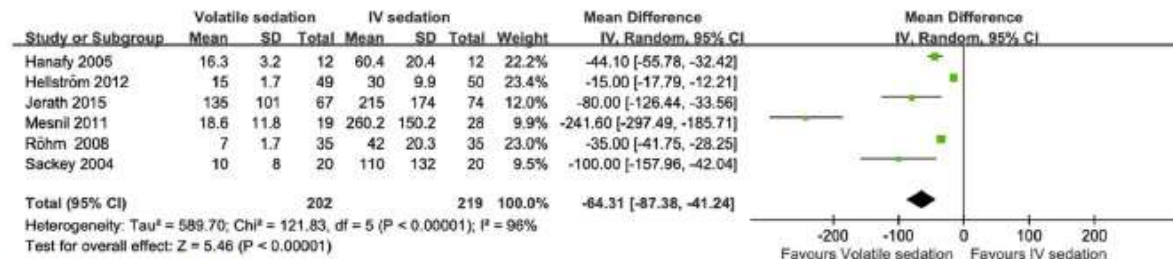


Fig. 4 Forest plot of awakening time (min) in the volatile sedation and IV sedation groups

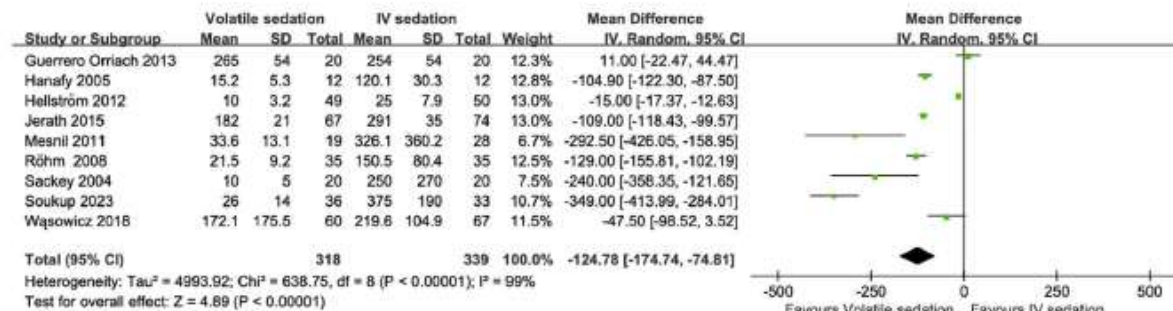


Fig. 5 Forest plot of extubation time (min) in the volatile sedation and IV sedation groups

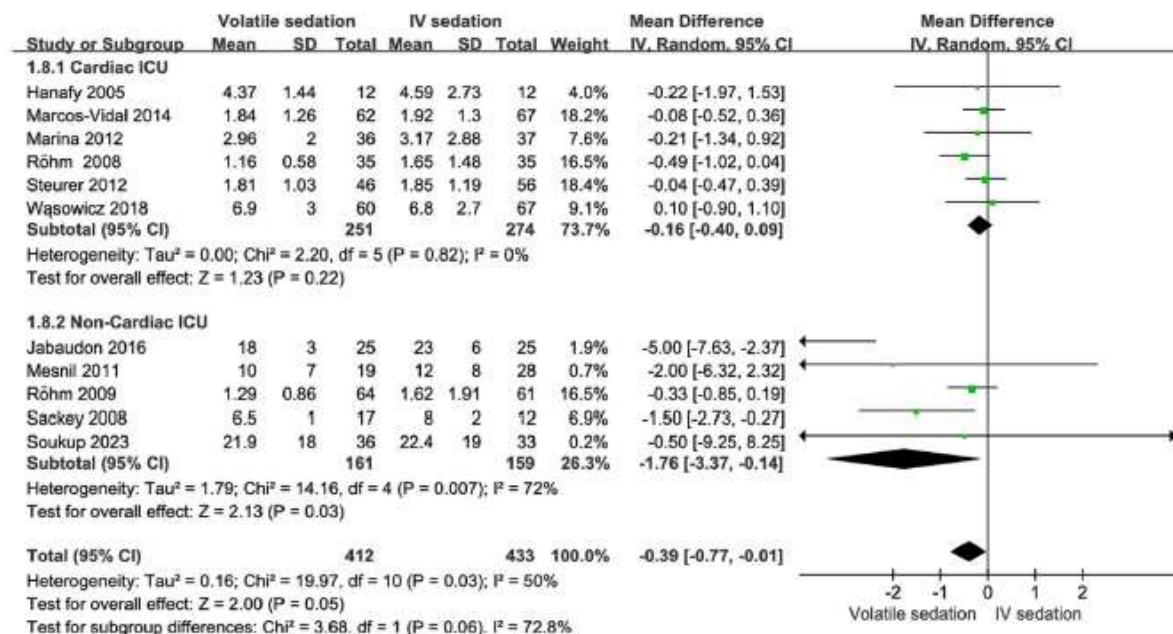
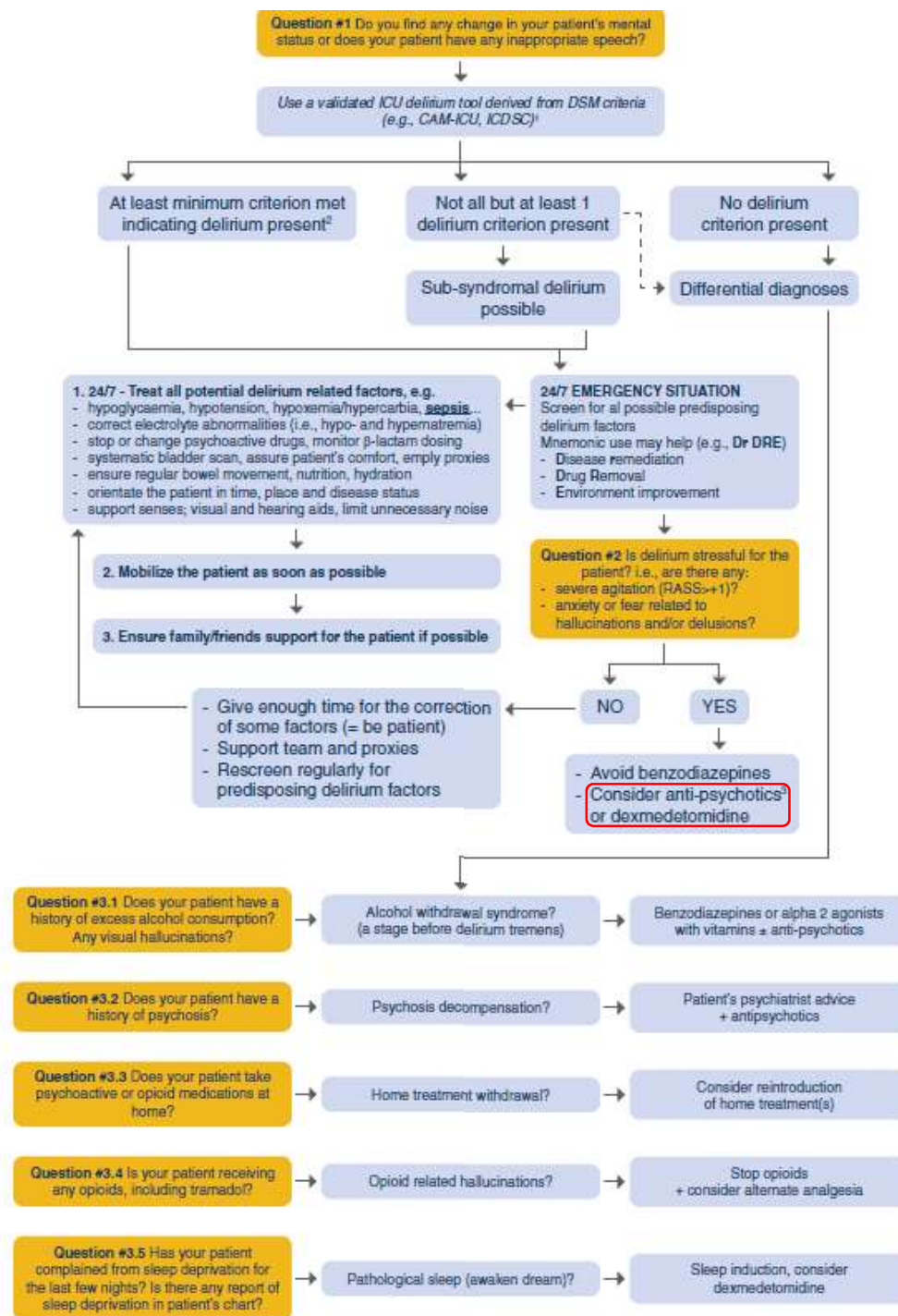


Fig. 6 Forest plot of ICU LOS (days) in the volatile sedation and IV sedation groups



NARRATIVE REVIEW

Delirium in critical illness: clinical manifestations, outcomes, and management

Joanna L. Stollings^{1,2*}, Katarzyna Kotfis³, Gerald Chanques⁴, Brenda T. Pun^{1,5}, and E. Wesley Ely^{1,5,7,8}

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VR

重症虛擬運動會



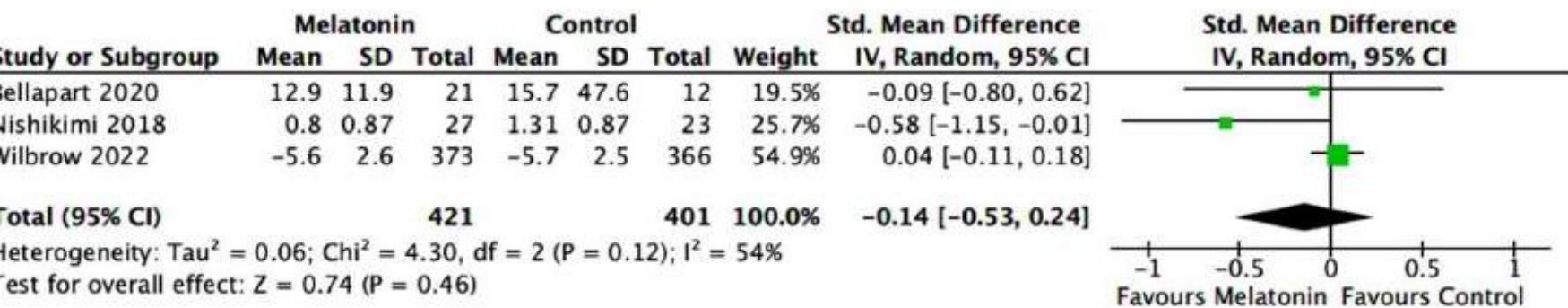
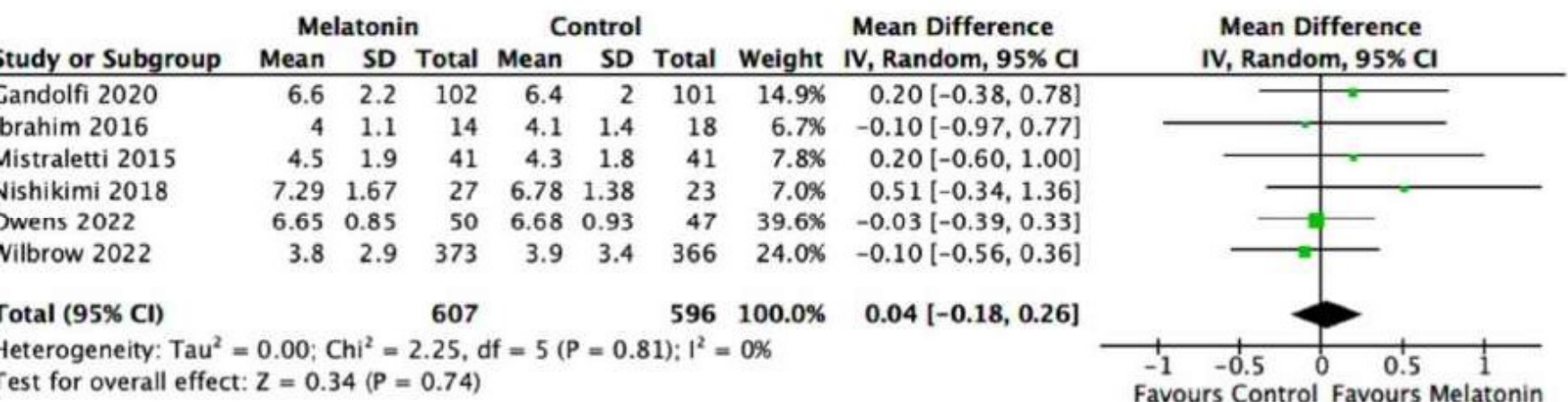
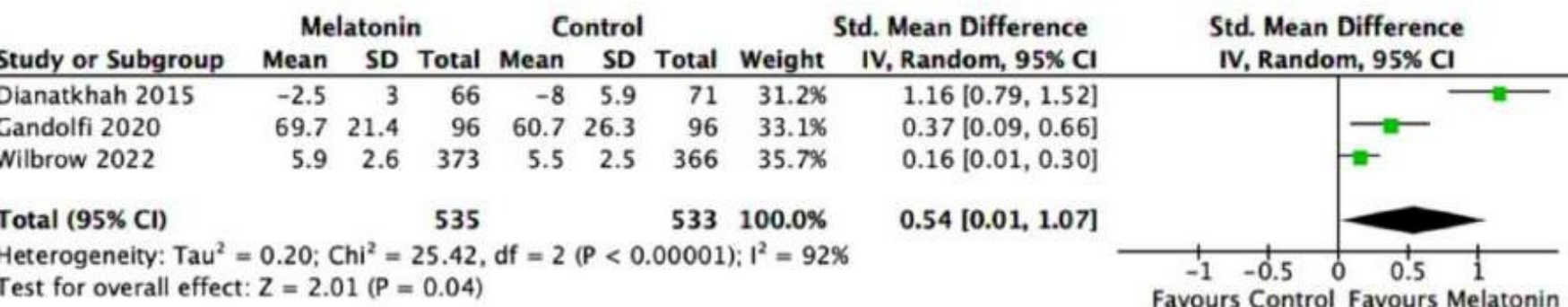
hanifa et al. *Mot and Feasibility Studies* (2020) 11:124
<https://doi.org/10.1186/s40814-025-01707-4>

RESEARCH

Virtual reality for relaxation in intensive care unit patients: feasibility, acceptability, and intervention adaptation

Ann Louise Hanifa^{1,2*}, Pia Dreyer^{1,2}, Søren Aagaard³ and Anna Holm^{1,2}

Melatonin



2. Forest plots of sleep outcomes. **A**, Perceived sleep quality (standard mean difference). **B**, Sleep quantity (total sleep time, hr).
 awakenings (standard mean difference). df = degrees of freedom.

Melatonin

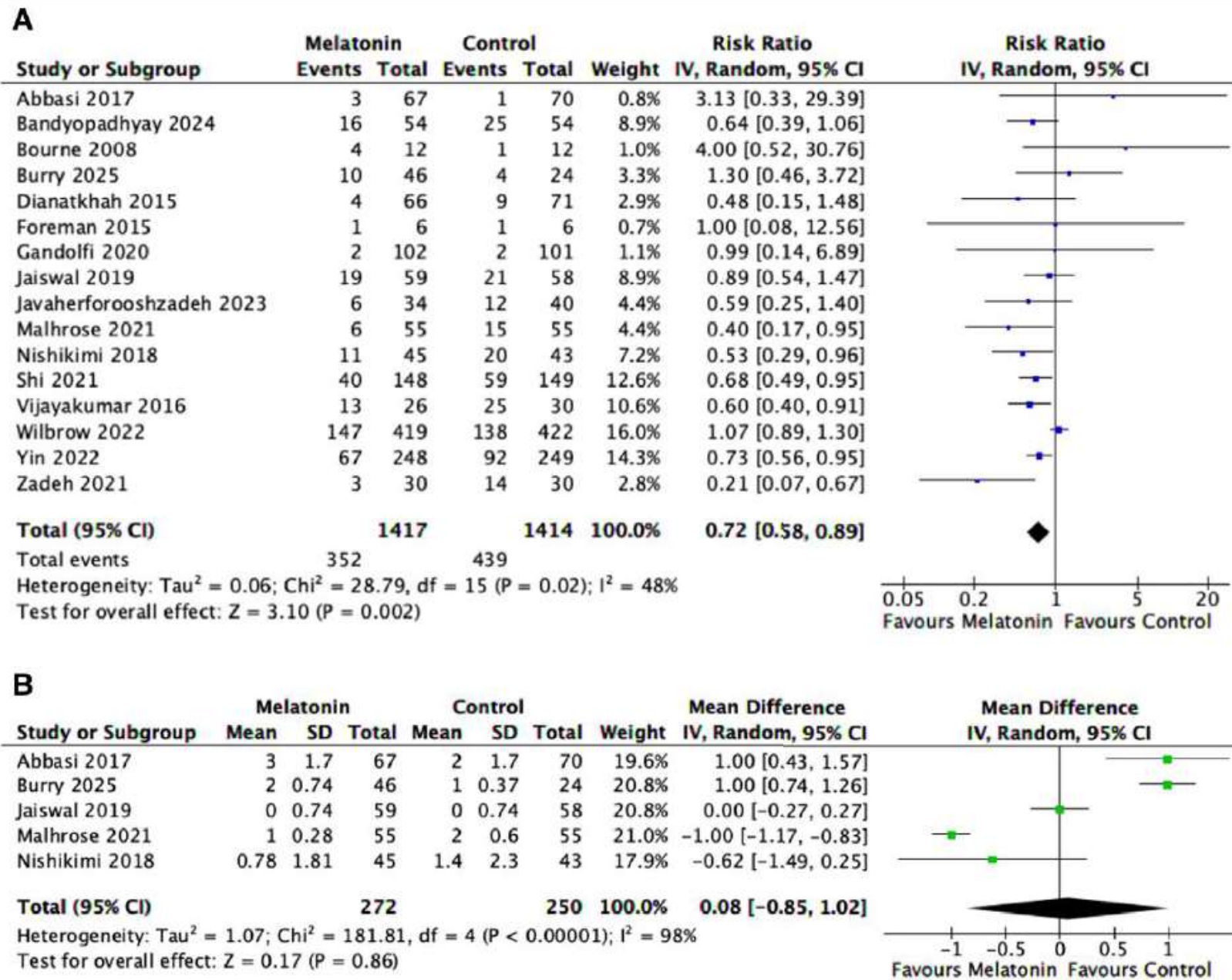


Figure 3. Forest plots for delirium outcomes. **A**, Prevalence of delirium. **B**, Duration of delirium (d). df = degrees of freedom.

Clinical Practice Guidelines for the Prevention and Management of Pain, Anxiety, Agitation/ Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU

SYMBOL KEY: Strength of Recommendation
 Strong Recommendation For:
 Conditional Recommendation For:
 Conditional Recommendation Against:
 Strong Recommendation Against:
 Certainty of Evidence
 Very Low:
 Low:
 Moderate:
 High:

This infographic visualizes results of a focused update to guidelines previously issued by the Society of Critical Care Medicine (SCCM).

POPULATION: Adult Critically Ill Patients
 (Specific recommendations for pediatric patients are not made.)

P Prevention and Management of Pain	(No updates made to previous guidelines recommendations for pain.)	
A Anxiety, Agitation/Sedation	Insufficient Evidence For explanation, see Full Focused Update Guidelines. Conditional Recommendation For Moderate Certainty of Evidence 	1. There is insufficient evidence to make a recommendation on the use of benzodiazepines to treat anxiety in adult patients admitted to the ICU. 2. We suggest using dexmedetomidine over propofol for sedation in mechanically ventilated adult patients admitted to the ICU where light sedation and/or a reduction in delirium are of highest priorities.
D Delirium	Conditional Recommendation For Intervention or Comparison Low Certainty of Evidence 	3. We are unable to issue a recommendation for or against the use of antipsychotics over usual care for the treatment of delirium in adult patients admitted to the ICU.
I Immobility	Conditional Recommendation For Moderate Certainty of Evidence 	4. We suggest providing enhanced mobilization/ rehabilitation over usual care mobilization/rehabilitation to adult patients admitted to the ICU.
S Sleep Disruption	Conditional Recommendation For Low Certainty of Evidence 	5. We suggest administering melatonin over no melatonin in adult patients admitted to the ICU.

KEY MESSAGES

Survivors of critical illness often experience profound physical, mental, and cognitive impairments that may persist for years after ICU discharge. As reflected in previous SCCM guidelines, compelling evidence indicates that these impairments may be avoided or minimized through the application of evidence-based care practices.

○ No specific update over **Pain** control

○ Not able to recommend treatment over **Anxiety**

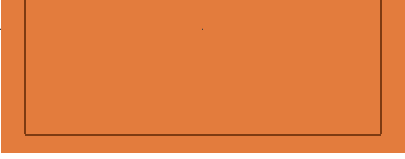
○ Suggest DEX over Propofol treatment over **Agitation/Sedation** management from the angle of light sedation and Delirium prevention

○ Not able to recommend treatment over **Delirium** with antipsychotic medication

○ Suggest enhancing rather than usual **Mobilization/Rehabilitation** plan

○ Suggest Melatonin for **Sleep Disruption** management

A Focused Update to the Clinical Practice Guidelines for the Prevention and Management of Pain, Anxiety, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU



本院實務成果

重症PADIS整合資訊評估處置系統

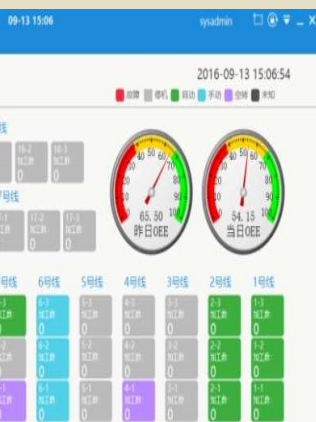
評估

提醒

處置

稽核

入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	護理	呼吸治療 (RT)
MDRO主動篩檢個案登錄表	MDRO泛抗藥性菌株每	加護中心特殊護理紀錄			2019/01/23	07:00
床邊復健紀錄表	I	成人加護病房PADIS	[每隔4小時自動紀錄]			
疼痛持續評估...		疼痛評估時機:除使用肌肉	鬆弛劑,所有病人每4小時			
CPOT(q4h)		評估一次。				
FLACC		若臨時醫囑、需要時醫囑	或劑量增加	P		
數字量表		CPOT(意識不清或使用鎮靜	劑、呼吸器而無法正常表			
臉譜量表		達。				
RASS(q2h)		不能用於使用肌肉鬆弛劑	病人)			
CAM-ICU評估(q8		CPOT無法評估(系統判斷)				
睡眠評估(7AM)		CPOT Scale				
		RASS				-3
		RASS變化		A		
		處方:				
		Midazolam 60 mg/238 ml				5/0.016
		0.9% NS				(77.5)
		特徵1:過去24小時RASS是				
		否變動				
		特徵2:注意力不集中(錯誤				
		>2)		D		
		特徵3:目前意識程度(RASS				
		是否為0)				
		睡眠評估(評估條件:意識清				



Pain

評估工具：數字量表、CPOT

評估人員：護理師

評估時機：

1. 除使用肌肉鬆弛劑，所有病人每4小時評估一次
2. 若臨時醫囑、需要時醫囑或劑量增加須再評估一次。
(針劑止痛藥後30分鐘、口服止痛藥後1小時)

結果及處置：

維持CPOT $\leq$ 2分、數字量表 $\leq$ 3分

若疼痛分數超過目標值，通知醫師調整止痛劑使用

重症評估資訊系統

評估

提醒

處置

稽核

入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	藥囑	醫囑	呼吸治療 (RT)	營養紀錄	藥師諮
成人加護病房PADIS [每隔4小時自動紀錄]				2019/01/26		03:00 05:00			
疼痛評估時機:除使用肌肉鬆弛劑,所有病人每4小時評估一次。				護理師每4小時評估疼痛程度					
若臨時醫囑、需要時醫囑或劑量增加 (針劑止痛藥後30分鐘、服止痛藥後1小時)須再評估一次。				評估疼痛程度內容					
疼痛(系統判定過去24小時疼痛過紀錄) 疼痛(系統判定CPOT >= 3) 疼痛(部位) 疼痛(強度)									
不能用於使用肌肉鬆弛劑病人)									
CPOT Scale				1					
顏面表情				1分:緊張					
肢體動作				0分:無動作					
肌肉無力				0分:放鬆					
呼吸器順應程度(插管患者)				0分:適應呼吸器					
聲音表達程度(自發性呼吸患者)									
總分				1					
Calculate Check									

創意來源

電子報稅系統

1基本資料	2標示部	3增價稅	4契稅	5契稅立約人	6登記申請書	7各式清單																																																						
編號:10012001 網際查詢現值 收件機關:苗栗縣 稅務稽徵處 竹南 分處																																																												
<table border="1"> <thead> <tr> <th>面積</th> <th>分子得分</th> <th>分母得分</th> <th>公告現值</th> <th>前次(原)地價</th> <th>增價稅(可免)</th> <th>前次(原)地價</th> <th>增價稅(可免)</th> <th>本筆增價</th> </tr> </thead> <tbody> <tr> <td>69.00</td> <td>1</td> <td>85</td> <td>21,000</td> <td>21,000.00</td> <td>0.00</td> <td>094.01</td> <td></td> <td>17,047</td> </tr> <tr> <td>6.00</td> <td>1</td> <td>2</td> <td>21,000</td> <td>4,800.00</td> <td>0.00</td> <td>078.05</td> <td></td> <td>63,000</td> </tr> <tr> <td>97.00</td> <td>1</td> <td>85</td> <td>32,667</td> <td>33,333.00</td> <td>33,333.00</td> <td>094.01</td> <td></td> <td>34,117</td> </tr> <tr> <td>13.00</td> <td>1</td> <td>2</td> <td>21,000</td> <td>4,800.00</td> <td>0.00</td> <td>078.05</td> <td></td> <td>136,500</td> </tr> <tr> <td>103.00</td> <td>1</td> <td>85</td> <td>21,000</td> <td>21,000.00</td> <td>0.00</td> <td>094.01</td> <td></td> <td>75,417</td> </tr> </tbody> </table>							面積	分子得分	分母得分	公告現值	前次(原)地價	增價稅(可免)	前次(原)地價	增價稅(可免)	本筆增價	69.00	1	85	21,000	21,000.00	0.00	094.01		17,047	6.00	1	2	21,000	4,800.00	0.00	078.05		63,000	97.00	1	85	32,667	33,333.00	33,333.00	094.01		34,117	13.00	1	2	21,000	4,800.00	0.00	078.05		136,500	103.00	1	85	21,000	21,000.00	0.00	094.01		75,417
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103.00	1	85	21,000	21,000.00	0.00	094.01		75,417																																																				
3-2 多筆前次及申報代理人 3-3 特殊事項及網路申報																																																												
產製所有申報書																																																												

Agitation

評估工具：RASS(Richmond Agitation-Sedation Score)

評估人員：護理師

評估時機：

1. 除使用肌肉鬆弛劑，所有病人每2小時評估一次
2. 若病人使用鎮靜劑，由護理人員依RASS分數（白天06:30後維持RASS 0~-1，晚上21:00後維持RASS -1~-3）
3. 調整鎮靜劑，維持輕微鎮靜為原則

鎮靜劑劑量調整建議（先減半再微調）

1. 使用Propofol/Precedex病人，於0630開始調整鎮靜劑
2. 使用Midazolam病人，於0500開始調整鎮靜劑

重症躁動評估資訊系統

評估

提醒

處置

稽核

入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	藥囑	醫囑	呼吸治療 (RT)	營養紀錄	藥師紀錄	復健科	檢驗核	
☐ MDRO主動篩檢個案登 ☐ MDRO泛抗藥性菌株每 ☐ 加護中心特殊護理紀錄 ☐ 成人加護病房PADIS ☐ 床邊復健紀錄表 ☐ 管路/傷口紀錄 ☐ 糖尿病患者INSULIN注 ☐ 謔妄評估紀錄(CAM-IC ☐ 體溫表					成人加護病房PADIS [每隔4小時自動紀錄]		2019/01/26 17:00		19:00		21:00	
RASS												
RASS變化												
☐ 處方												
☐ Pain Graph ☐ 疼痛持續評估... ☐ CPOT(q4h) ☐ FLACC ☐ 數字量表 ☐ 臉譜量表 ☐ RASS(q2h) ☐ CAM-ICU評估(q8												

<清除輸入>

+4= 攻擊行為

+3= 非常躁動，想要移除管路

+2= 躁動，無法配合呼吸器

+1= 焦慮

0= 警醒且平靜

-1= 對聲音有反應，眼神對焦>10秒

-2= 對聲音有反應，眼神對焦<10秒

-3= 只對聲音有反應

-4= 只對刺激有反應，對聲音沒有

-5= 完全沒有反應

無法評估

其他...



創意來源

電子報稅系統

2. 顯示	3. 增進稅	4. 契稅	5. 契稅立約人	6. 登記申請書	7. 各式清單
☐ 10012001 ☐ 網路查詢現值 ☐ 收件機關 ☐ 苗栗縣 ☐ 稅額稽徵處 ☐ 竹南 ☐ 分處					
面積	分子持分	分母持分	公告現值	前次(原)地價課稅(轉賣/承買/前移轉/年)	本筆單價
69.00	1	85	21,000	21,000.00	0.00 (94.01)
6.00	1	2	21,000	4,800.00	0.00 (78.05)
87.00	1	85	32,687	33,333.00	0.00 (94.01)
13.00	1	2	21,000	4,800.00	0.00 (78.05)
103.00	1	85	31,000	31,000.00	0.00 (94.01)
☐ 基本資料 ☐ 3-2 多筆前次及申報代理人 ☐ 3-3 特殊事項及網路申報					
☐ 請依法扣除土地增價總數額。 ☐ 符合自用住宅用地條件。 ☐ 自置自用住宅用地。 ☐ 產製所有申報備					

鎮靜藥物劑量自動導航資訊系統

評估

提醒

處置

稽核

護病房PADIS

成人加護病房PADIS

2019/06/17

2019/06/18

21:00

23:00

01:00

03:00

05:00

07:00

09:00

系統提醒判斷:是否調整鎮靜劑劑量

請調整鎮靜劑-調降用量

請調整鎮靜劑-調降用量

請調整鎮靜劑-調升用量

RASS

-2

-2

-3

-3

-3

-3

+

- 白天 : 06:00 ~ 21:59
 - 目標 : 維持病人 RASS 0 ~ -1
 - RASS ≥ 1 系統建議 “**調升**鎮劑藥物劑量”
 - RASS ≤ -2 系統建議 “**調降**鎮劑藥物劑量”
- 晚上 : 22:00 ~ 05:59
 - 目標 : 維持病人 RASS -1 ~ -3
 - RASS ≥ 0 系統建議 “**調升**鎮劑藥物劑量”
 - RASS ≤ -4 系統建議 “**調降**鎮劑藥物劑量”

創意來源
GOOGLE
自動導航



Delirium

評估工具：**CAM-ICU**

評估人員：**護理師**

評估時機：

1.所有病人每8小時評估一次

2.無法評估者：**RASS -3~-5**系統自動判定無法評估、失聰或
重聽到使用聽診器也聽不到

STEP 1

RICHMOND AGITATION-SEDATION SCALE (RASS)

Sedation Assessment

Scale	Label	Description	
+4	COMBATIVE	Combative, violent, immediate danger to staff	
+3	VERY AGITATED	Pulls to remove tubes or catheters; aggressive	
+2	AGITATED	Frequent non-purposeful movement, fights ventilator	
+1	RESTLESS	Anxious, apprehensive, movements not aggressive	
0	ALERT & CALM	Spontaneously pays attention to caregiver	
-1	DROWSY	Not fully alert, but has sustained awakening to voice (eye opening & contact >10 sec)	VOICE
-2	LIGHT SEDATION	Briefly awakens to voice (eyes open & contact <10 sec)	
-3	MODERATE SEDATION	Movement or eye opening to voice (no eye contact)	
If RASS is ≥ -3 proceed to CAM-ICU (Is patient CAM-ICU positive or negative?)			
-4	DEEP SEDATION	No response to voice, but movement or eye opening to physical stimulation	TOUCH
-5	UNAROUSEABLE	No response to voice or physical stimulation	
If RASS is -4 or -5 → STOP (patient unconscious), RECHECK later			

STEP 2 Confusion Assessment Method for the ICU (CAM-ICU) DELIRIUM ASSESSMENT

急性發作

1. Acute Change or Fluctuating Course of Mental Status:

- Is there an acute change from mental status baseline? OR
- Has the patient's mental status fluctuated during the past 24 hours?

NO

CAM-ICU negative
NO DELIRIUM

YES

2. Inattention:

- "Squeeze my hand when I say the letter 'A'."
Read the following sequence of letters: S A V E A H A A R T
ERRORS: No squeeze with 'A' & Squeeze on letter other than 'A'
- If unable to complete Letters → Pictures

0 - 2
Errors

CAM-ICU negative
NO DELIRIUM

> 2 Errors

3. Altered Level of Consciousness

Current RASS level (think back to sedation assessment in Step 1)

RASS other
than zero

CAM-ICU positive
DELIRIUM Present

RASS = zero

4. Disorganized Thinking:

1. Will a stone float on water?
2. Are there fish in the sea?
3. Does one pound weigh more than two?
4. Can you use a hammer to pound a nail?

Command: "Hold up this many fingers" (Hold up 2 fingers)
"Now do the same thing with the other hand" (Do not demonstrate)
OR "Add one more finger" (If patient unable to move both arms)

> 1 Error

0 - 1
Error

CAM-ICU negative
NO DELIRIUM

注意力不集中

意識改變

思考混亂

CAM-ICU資訊評估系統

評估

提醒

處置

稽核

特徵一、精神狀態改變
(24小時RASS是否波動)

智慧設計

是

特徵二、注意力不集中
(聽到特定數字能正確握手)

護理師評估

錯誤0-2 → 無譴妄

錯誤>2個以上

特徵三、意識程度改變
(RASS是否為0)

智慧設計

RASS=0

特徵四、無組織的思考
1.石頭會浮在水面上?
2.海裡有魚嗎?
3.一斤比兩斤重嗎?

護理師評估

錯誤>1 → 譴妄

錯誤0-1 → 無譴妄

系統自動判定

創意來源
GOOGLE
自動導航



譫妄提醒自動導航資訊系統

評估

提醒

處置

稽核

創意來源
GOOGLE
自動導航



入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	藥囑	醫囑	呼吸治療
MDRO主動篩檢個案登							
MDRO泛抗藥性菌株每							
加護中心特殊護理紀錄							
成人加護病房PADIS							
床邊復健紀錄表							
管路/傷口紀錄							
譫妄評估紀錄(CAM-IC							
體溫表							
Pain Graph							
疼痛持續評							
CPOT(q4h)							
FLACC							
數字量表							
臉譜量表							
RASS(q2h)							
CAM-ICU評估(q8							
睡眠評估(7AM)							
成人加護病房PADIS							
[每隔4小時自動紀錄]							
RASS						-2	-2
RASS變化							
處方							
特徵1：過去24小時RASS是否變動							是
特徵2：注意力不集中(錯誤>2)							是
誤>1)							
譫妄							是
譫妄變化							→*
Delirium Cause - I WATCH DEATH							
譫妄處理							
光療							

系統自動判定是否有譫妄

I WATCH DEATH

重症譫妄原因分析系統

入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	藥囑	醫
MDRO主動篩檢個案登	MDRO泛抗藥性菌株每	加護中心特殊護理紀錄	成人加護病房PADIS	2019/01/22		
			[每隔4小時自動紀錄]	09:00		
成人加護病房PADIS	床邊復健紀錄表	管路/傷口紀錄	Delirium Cause - I WATCH DEATH	2019/01/22		
譫妄評估紀錄(CAM-ICU)	體溫表			09:00 有資料,請展開欄位查看詳細內容		
			Infectious	BACTERIEMI		
			Withdrawal	benzodiaze		
			Acute metabolic	hepatic or		
			Trauma	renal failure		
			CNS pathology			
			Hypoxia			
			Deficiencies			
			Endocrinopathies			
			Acute vascular			
			Toxins, substanc			
			Heavy metals			
			譫妄處理	治療原本		
				疾病; 調整		
				藥物		



創意來源
口訣記憶法

最新 高普考 萬能考 千華數位文化

行政學口訣

獨家口訣記憶法

學習時間短、讀書計畫表 事先對 備考

本書情報 獨家口訣記憶 助你快速學習

圖表架構分析 提綱挈領整理 重點一目了然 關鍵字字珠璣

各章精闡解說 / 全面掌握必考關鍵
老師重點叮嚀 / 聰明學習事半功倍

精闡的行政學知識系統，為你量身訂作的記憶式教材，為行政學考試提供最佳教材！本書內容分類清晰，獨家口訣記憶法，讓你輕鬆掌握重點，精闡的行政學知識系統，為你量身訂作的記憶式教材！

Immobility

評估工具：**EGDM**和**IMS**

評估人員：**護理師**

評估時機：

- 1.所有病人每天評估一次
- 2.依排除條件系統自動判定排除及納入條件
- 3.由臨床主責團隊判斷是否早期活動暨復健介入

資訊系統自動篩選早期活動病人

篩選

提醒

執行

登錄

臨床資訊系統，每日0700自動搜尋病人過去24小時資料庫資料

EGDM*生理、臨床參數符合下床條件

ICIP白板出現請醫師評估EGDM

醫師臨床判定排除條件

無

照會復健科

開立運動處方

評估IMS**

依照IMS得分
安排心肺復健活動***

未達

未達收案條件

醫師臨床判定
不合適

醫師排除收案

請執行
心肺復健



創意來源
電腦選花生



*早期目標導向下床(Early goal-directed mobilization, EGDM)

**加護病房活動量表(ICU mobility scale, IMS)

重症分級(IMS)早期復健系統

篩選

提醒

執行

登錄

入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	藥囑	醫囑	呼吸治療 (RT)	營養紀錄	藥師紀錄	復健科
- MDRO主動篩檢個 - MDRO泛抗藥性菌 - 加護中心特殊護理 - 成人加護病房PAD 床邊復健紀錄表 - 管路/傷口紀錄 - 謇妄評估紀錄(CAI) - 體溫表		床邊復健紀錄表		2019/01/14						
				13:00	14:00	15:00	16:00	17:00		
		活動開始時間								
		活動結束時間								
		訓練時間 (分)								
		活動方式		IMS活動程度						
		行走距離(公尺)								
		肺部復健								
		使用工具								
		訓練用具(童玩復健)								
		IMS(ICU Mobility Scale)		2分:能... <清除輸入> 0分:被動翻身運動 1分:主動活動(但僅限床上) 2分:能被動地被轉移至椅上 3分:可經由協助坐於床旁 4分:可經協助或自行站立 5分:可自行下床至床旁椅就坐 6分:可經協助或自行在床邊踱步(至少4次,每隻腳2次) 7分:下床或離椅行走至少5公尺(2人扶持) 8分:下床或離椅行走至少5公尺(1人扶持) 9分:下床或離椅行走至少5公尺(輔助器或輪椅) 10分:下床或離椅行走5公尺						
		訓練次數(關節活動/呼吸肌訓練填寫)								
		病人活動感受度								
		患者是否願意再執行								
		護理人員協助病人完成此次活動在預防病人跌倒感受								
		護理人員協助病人完成此次活動在減少護理人員體力負擔上的感受								

創意來源
電影分級

電影分級資訊

- 0** 一般觀眾皆可觀賞。
- 6** 未滿六歲之兒童不得觀賞，六歲至十二歲之兒童須成人陪伴觀賞。
- 12** 未滿十二歲之兒童不得觀賞。
- 15** 未滿十五歲之人不得觀賞。
- 18** 未滿十八歲之人不得觀賞。

全國首創重症分級(IMS)早期復健系統

篩選

提醒

執行

登錄

使用工具：吹捲笛、童玩、床邊主被動手腳訓練器

入院文件	護理紀錄	護理文班事項	Physician Notes	藥類	醫類	呼吸治療
MDRO主動篩檢個		床邊復健紀錄表		2019/01/14		
MDRO泛抗藥性菌				13:00	14:00	15:00
加護中心特殊護理		活動開始時間				
成人加護病房PAD		活動結束時間				
床邊復健紀錄表		訓練時間 (分)				
管路/傷口紀錄		活動方式				
譫妄評估紀錄(CAI)		行走距離(公尺)				
體溫表		肺部復健				
		使用工具				
		訓練用具(童玩復健)		☒ <清除輸入>		
		IMS(ICU Mobility Scale)		☐ 未使用		
		訓練次數(關節活動/呼吸肌訓練填寫)		☐ VR		
		病人活動感受度		☐ 床邊主被動手腳訓練器		
		患者是否願意再執行		☐ 移動式軌道		
		護理人員協助病人完成此次活動在預防病人跌倒感受		☐ 助行器		
		護理人員協助病人完成此次活動在減少護理人員體力負擔上的感受		☐ 水平輸送搬運推床		
				☐ 輪椅		
				☐ 點滴架		
				☐ 水袋(100 mL)		
				☐ 水袋(250 mL)		
				☐ 水袋(500 mL)		
				☐ 水袋(1000 mL)		
				☐ 其他...		



創意來源
電影分級

電影分級資訊

- 一般觀眾皆可觀賞。
- 未滿六歲之兒童不得觀賞，六歲至十二歲之兒童須成人陪伴觀賞。
- 未滿十二歲之兒童不得觀賞。
- 未滿十五歲之人不得觀賞。
- 未滿十八歲之人不得觀賞。

Sleep Disruption

評估工具：高榮重症睡眠量表

評估人員：護理師

評估時機：

- 1.所有病人每天評估一次(早上0700)
- 2.意識清醒且無譫妄病人，記錄病人回應睡眠的情況

重症睡眠資訊評估系統

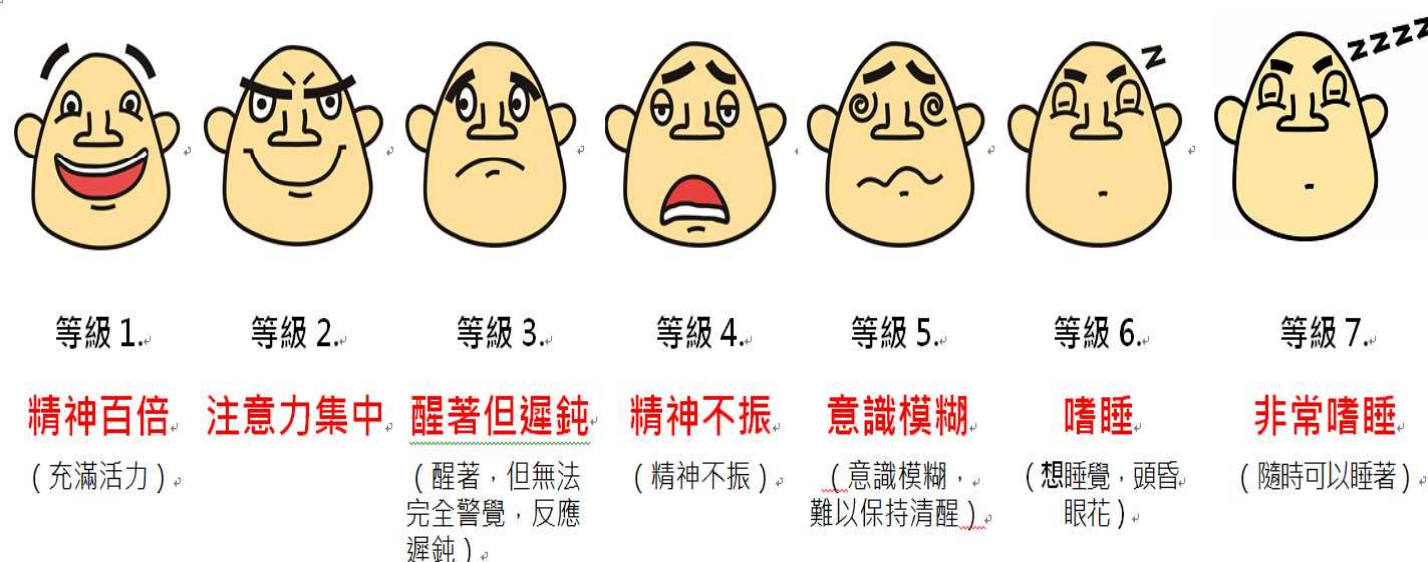


創意來源
健康睡眠文化



高雄榮總 重症睡眠量表

2018.12.03 製表



討論重症病人睡眠量表 (分七個睡眠等級臉譜)

建構量表資訊系統, 每日0700大夜護理師評估病人睡眠情況登錄

重症睡眠資訊評估系統



創意來源 健康睡眠文化



入院文件	FS流程表	N護理紀錄	N特殊交班事項	Physician Notes	藥醫	醫醫	呼吸治療 (F)	呼吸治療 (RT)	營養紀錄	藥師紀錄	復健科	檢驗檢查報告	表單/查核表	其他評估/計畫
成人加護病房PADIS					2019/01/23	2019/01/23								
[每隔4小時自動紀錄]					07:00	09:00	11:00	13:00	15:00	17:00				
睡眠評估(評估條件:意識清楚之病患)														
睡眠評估					等級2能集中注意力	等級2能集中注意力								
睡眠評估					等級2能集中注意力	等級2...								
系統判斷無法評估					<清除輸入> 等級1充滿活力，最清醒 等級2能集中注意力 等級3顯著，但無法完警覺，有點遲鈍 等級4模糊，精神不振 等級5意識模糊，無法專心，難以保持清醒 等級6嗜睡，頭昏眼花 等級7完全無法保持清醒，隨時可以睡著，為最嗜睡狀態 無法評估									

討論重症病人睡眠量表（分七個睡眠等級臉譜）
建構量表資訊系統，每日0700大夜護理師評估病人睡眠情況登錄

高榮ICU心情日記

- ✓溫馨片語
- ✓加油打氣話
- ✓家庭生活照片

ICU心情日記	
高雄榮總重症醫療團隊	
主治醫師	主治醫師 郭書宏
住院醫師	張宇辰:6065
護理師	專科護理師 陳認義
護理師	負責護理師 龔盈帆
今日治療目標	1.呼吸訓練 2.感染控制 3.預防出血
今天吃甚麼?	高蛋 I 1500 茶
做甚麼檢查?	腹部電腦断层
美好時光	請跟我說
保佑	打氣站
高雄榮總 重症醫學部 24小時守護您 07-3468279	



創意來源
聯絡簿

東山電子聯絡簿 105-2

帳號 90337

密碼

小老... 自動登入 已登入

2017-05-07

作業 考試

讀取中...

重要事項

重症數位溝通平台2.0

高榮ICU心情日記 高雄榮總 重症醫學部 24小時守護您 電話：07-3468279

16147389 蔡O昇
語言 閩南語國語
飲食 低油預解灌

主治醫師 郭書宏
住院醫師 郭書宏

專科護理師 吳孟貞
病房護理師 王姿瑤

05/10(五)

打氣站

- 阿爸加油，快出院了！05-10 程花 ✕
- 05-10 明雄 ✕
- 早日康復！05-10 ICU照護團隊 ✕

美好時光



打氣站/美好時光 PADIS/無管一身輕/治療目標/檢查點 衛教圖地 E-learning

高榮ICU心情日記 高雄榮總 重症醫學部 24小時守護您 電話：07-3468279

16147389 蔡O昇
語言 閩南語國語
飲食 低油預解灌

主治醫師 郭書宏
住院醫師 郭書宏

專科護理師 吳孟貞
病房護理師 王姿瑤

05/10(五)

PADIS

疼痛 2
躁動 0
譫妄 否
復健 無
睡眠 等級1充滿活力，最清醒

今天治療目標

- 1. 視耐受性續行呼吸訓練 ✕
- 2. 感染控制，抗生素治療 ✕

今天做什麼檢查

- 1. 10:10 支氣管纖維鏡檢查

無管一身輕

中心靜脈導管 (CVP) 無
氣管內管 (ENDO) 3
導尿管(FOLEY) 無

打氣站/美好時光 PADIS/無管一身輕/治療目標/檢查點 衛教圖地 E-learning



創意來源

我們是一家人廣告



內容:日期、時鐘、衛教短片、家庭生活之照片及影帶等增加病人安全感

重症藝術療癒病房



創意來源：藝術治療



藝術家現場彩繪



四季



自然



景觀



人文

軌道懸吊系統復健



重症虛擬運動會



重症虛擬運動記者會

家屬參與重症童玩肌力復健

創意來源
懷舊治療



飛鏢球



磁性飛鏢

增加上肢關節活動力、肌力、肌耐力、
手眼協調能力及促進專注力、培養耐心



籃球積木

增加關節活動度及柔軟度



套圈玩具

增加上肢關節活動力、肌力、肌耐力、
手眼協調能力及促進專注力、培養耐心

重症童玩肺部復健

吹捲笛

創意來源
懷舊治療



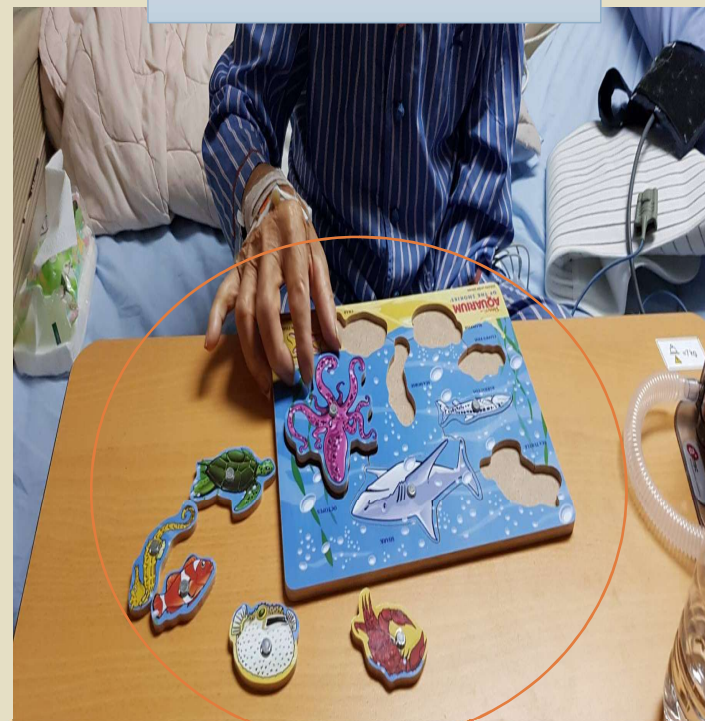
訓練呼吸肌，合併圓唇吐氣技巧

重症童玩腦部復健

塞車遊戲



拼圖遊戲



創意來源
懷舊治療



增進精細動作、刺激病人腦部復健、
手眼協調能力及促進專注力、培養耐心

優化重症睡眠照護流程

高榮重症病人 鎮靜劑使用照護 (AICU01-30)

	班別	貼心關懷
調整沐浴時間	大夜	昏迷(E1VTM1)
		中重度鎮靜的病人(RASS-3~-4)
		使用肌肉鬆弛劑病人
	白班 或 小夜	譫妄病人
		意識清醒病人
集中治療	鼓勵使用PICC	
	IV到期・大夜於0500-0800注射	
	大夜4~6小時翻身	
	病人睡覺時間(2300-0500)盡量減少干擾	
	病人午睡時間(1300-1400)盡量減少干擾	

20201121修訂

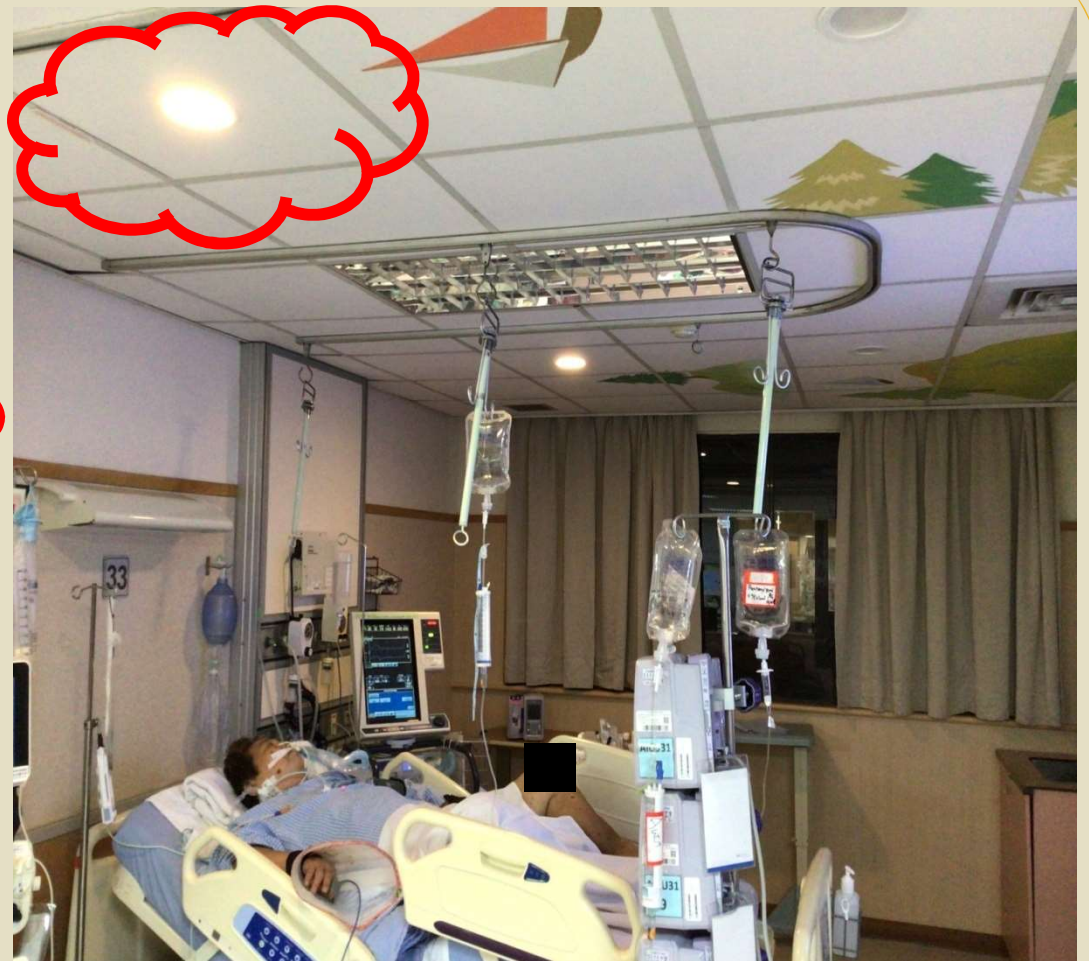
高雄榮總

重症加護病房24小時守護您

重症智慧情境照明系統



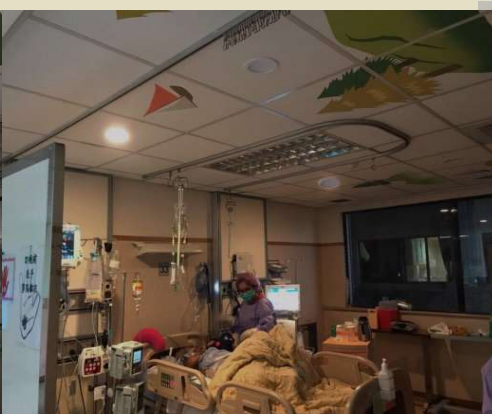
裝設重症時控燈光照護系統



重症智慧情境照明系統



0% 靜謐的夜



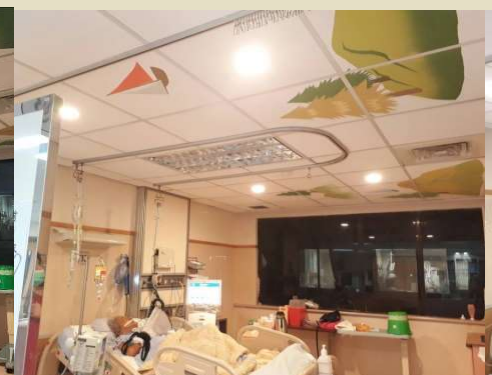
20% 璀璨繁星



40% 舒眠月光



60% 午後時分



80% 暖陽斜照



100% 旭日東昇



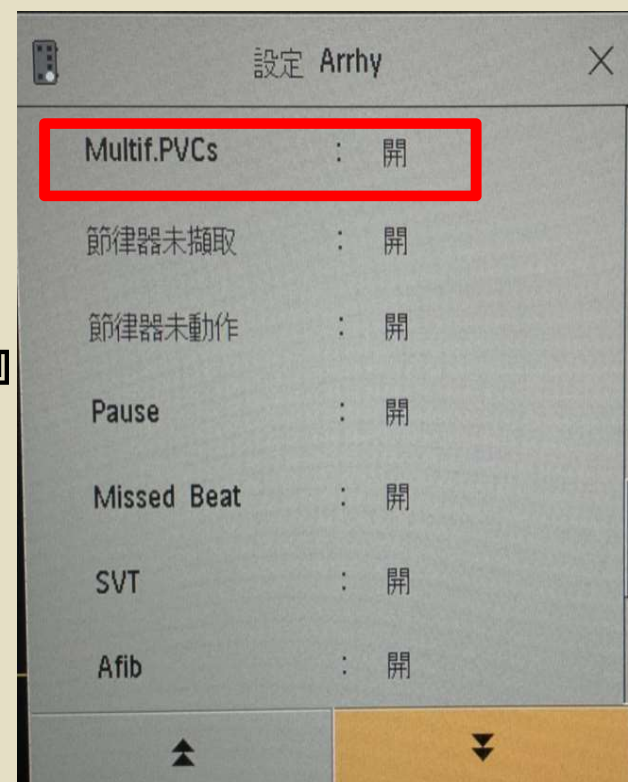
創意來源
薇閣精品旅店



精進重症警訊作業系統

• 調整警示設置系統

- 更改生理監視器警示系統設定
- 調控非必要警示指標
- PAIR PVCs警告設定為『關/靜音』
- Multif. PVCs警告設定為『關/靜音』
- 心跳設定在45-125次/分
- 呼吸設定在8-35次/分
- Spo2 小於89%



精進重症警訊作業系統

利用大數據調控重症警訊示指標

1

數據
採集

2

數據
分析

3

快速
調整

創意來源
Amazon電商
平台



	改善前	改善中	改善後
所有警告次數	1279.5	1248.0	581.2
黃色警告	1117.7	1093.9	512.6
紅色警告	161.7	154.1	68.6
心律不整相關警告	1261.4	1215.0	556.6
SpO2相關警告	3.4	10.4	6.4
呼吸相關警告	13.8	20.6	16.9
ABP <u>disconnet</u>	0.9	1.3	1.3

所有警告次數=黃色警告+紅色警告

所有警告次數=心律不整相關警告+ SpO2相關警告+呼吸
相關警告+ ABP disconnet

建置重症寧靜照護病房 Silent ICU

調整重症遠端警示照護系統

1

智慧
設備

2

無聲
監控

3

安全無
差別

創意來源
智慧掃地機器
人



建置重症寧靜照護病房 Silent ICU

- 電腦播放保持安靜提醒



- 夜間停止廣播

- 停止播放音樂



建置重症寧靜照護病房 Silent ICU

調整生理監視器警訊音量



生理監視器 靜音
遠端警報儀 警示功能開啟



生理監視器 警示功能開啟
遠端警報儀 警示功能開啟

優化睡眠障礙處置作業

創新「高榮重症舒眠包」

- 舒眠照護
- 貼心設計
- 一次到位
- 經濟實惠

創意來源
務艙旅行包



高榮重症舒眠包



優化睡眠障礙處置作業

重症穴位紅外線照射舒眠法

- 醫師處方
- 穴道舒緩
- 安全控溫
- 溫暖療癒

創意來源
A紓壓治療



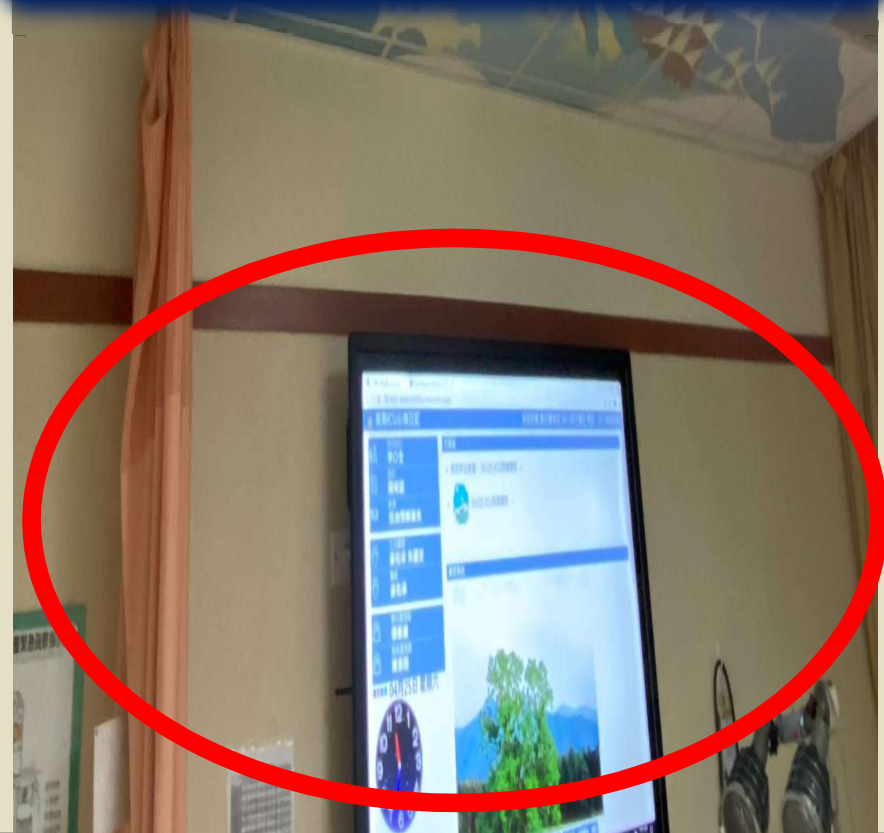
照射距離45-60公分
照射時間15分鐘

優化睡眠障礙處置作業

- 依病人體感溫度需求使用「冰敷或熱敷」，促進舒適。

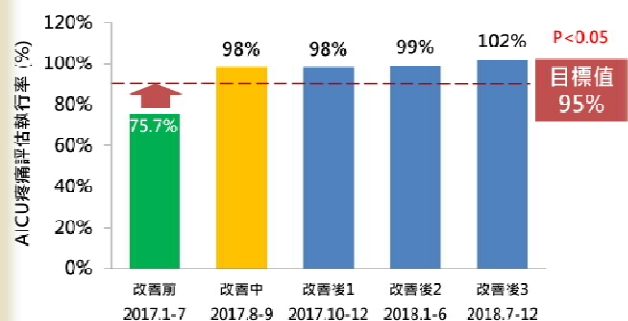


- 客製化舒眠音樂治療



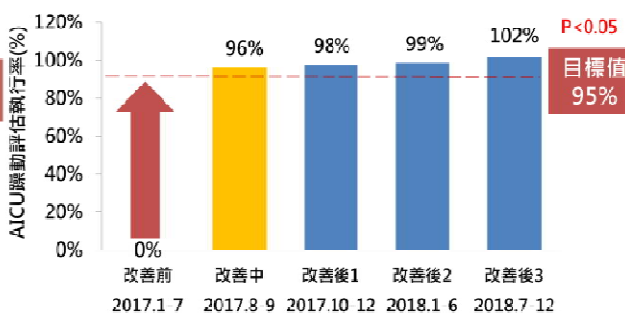
PAD

效果確認(主目標1) 疼痛評估執行率



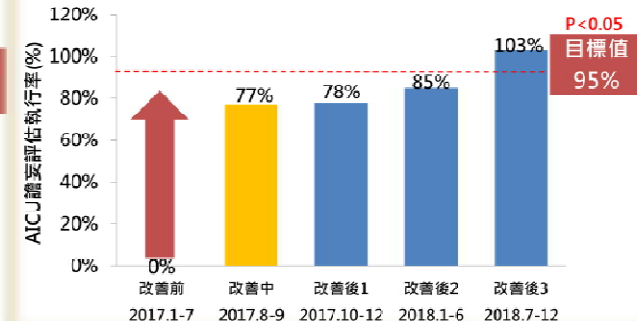
PAD

效果確認(主目標2) 躁動評估執行率



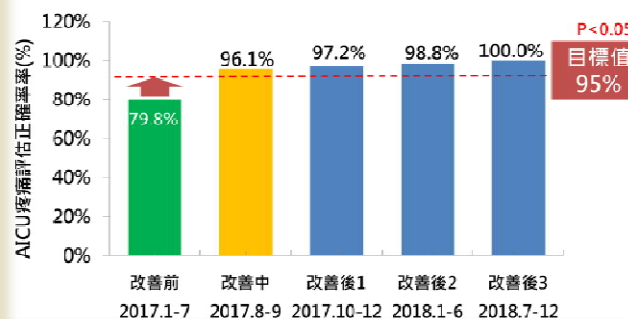
PAD

效果確認(主目標3) 譫妄評估執行率



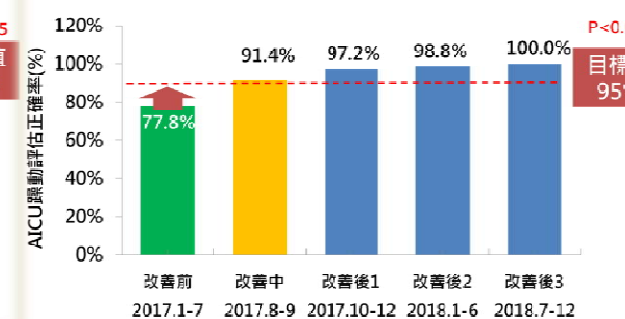
PAD

效果確認(主目標4) 疼痛評估正確率



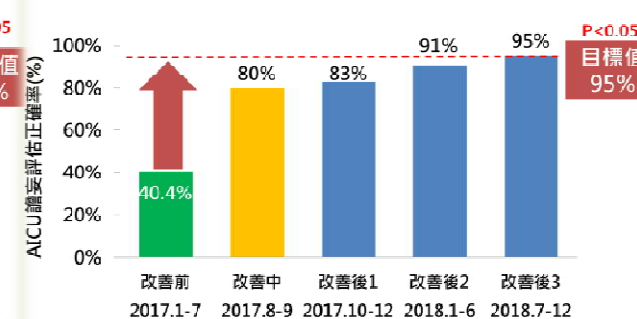
PAD

效果確認(主目標5) 躁動評估正確率



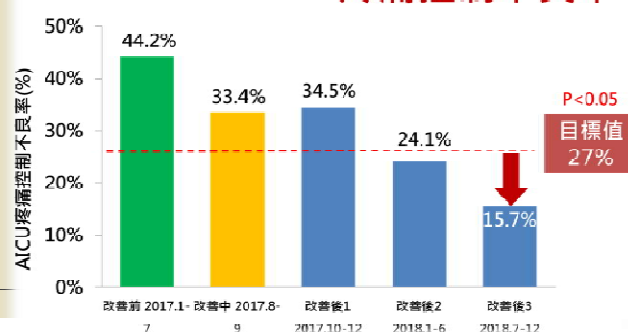
PAD

效果確認(主目標6) 譫妄評估正確率



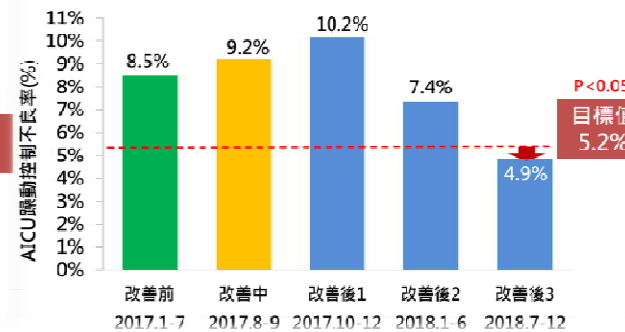
PAD

效果確認(主目標7) 疼痛控制不良率



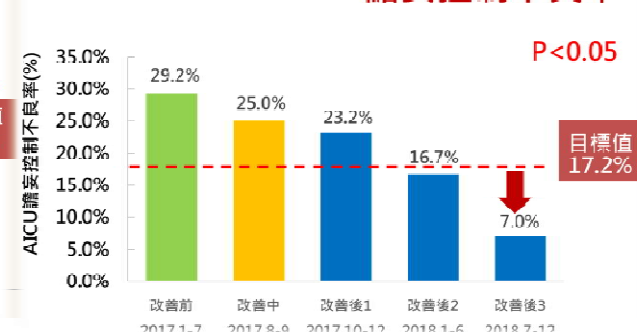
PAD

效果確認(主目標8) 躁動控制不良率



PAD

效果確認(主目標9) 譫妄控制不良率



效果確認(附加效益過程指標)

醫護人員疼痛認知

醫護人員躁動認知

醫護人員譫妄認知

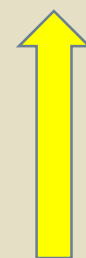


AICU早期復健執行人次

AICU早期復健執行率

睡眠評估執行率

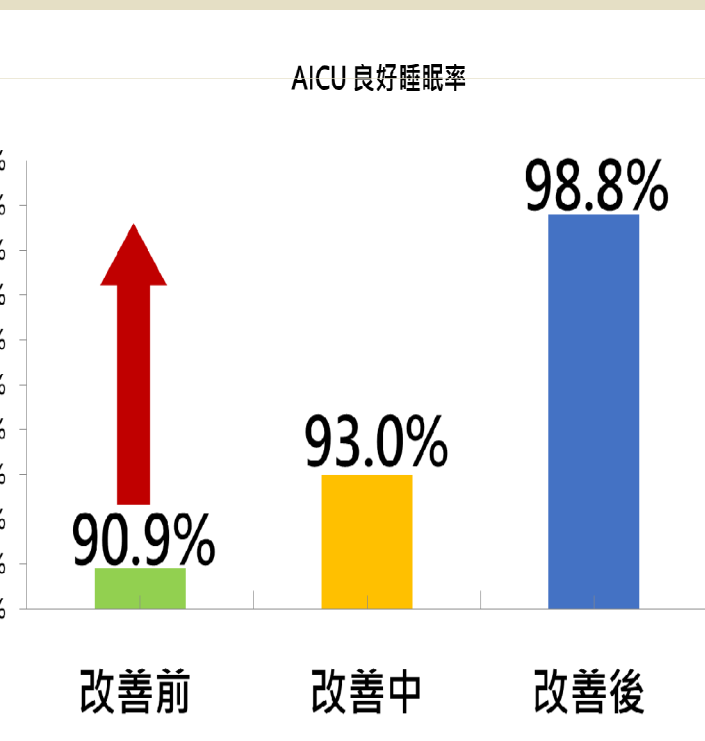
AICU早期復健執行人次



效果確認(附加效益成果指標)

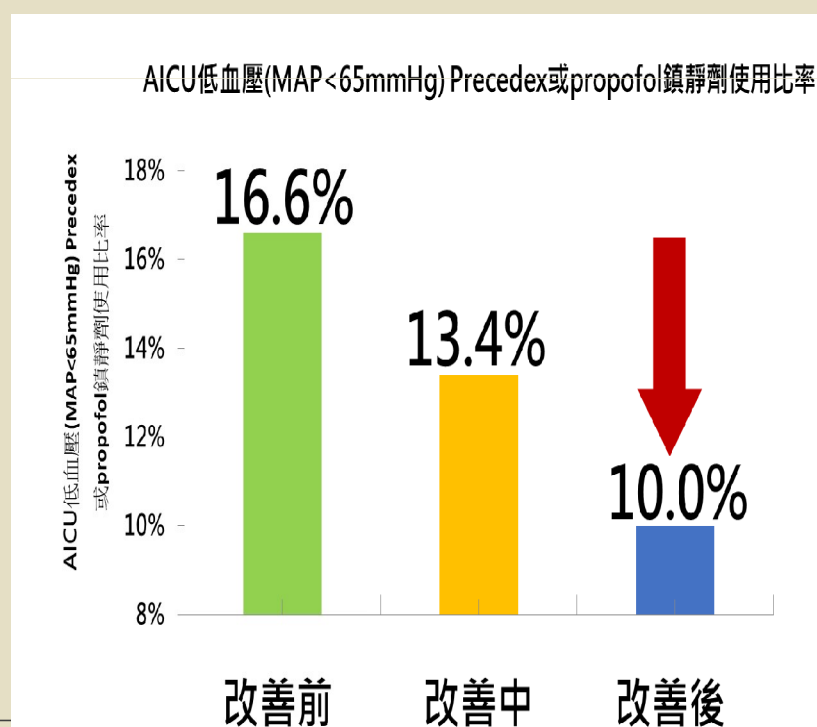
加護病房各優質睡眠比率

成果指標



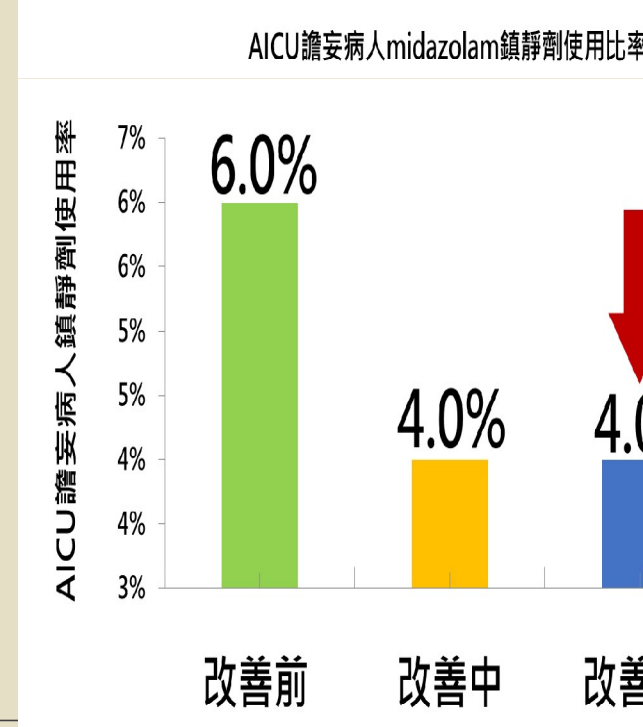
低血壓(MAP<65mmHg) Precedex或propofol鎮靜劑使用比率

過程指標



譫妄病人BZD使用比率

過程指標



效果確認(附加效益成果指標)

平均住院天數



呼吸器脫離平均天數



AICU呼吸器平均使用天數(天)

呼吸器相關性肺炎感染密度



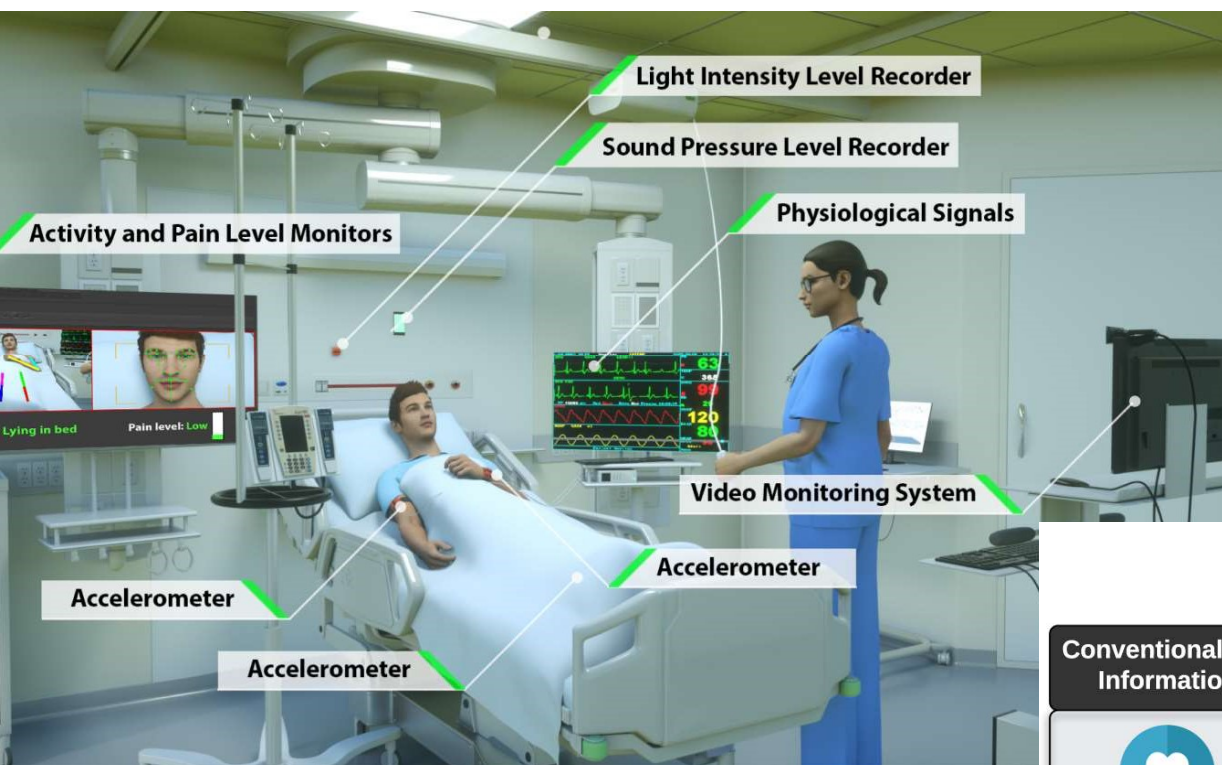
AICU病人死亡率





結論

- Effectively diagnosis, treat, and manage pain, agitation, and delirium in the ICU is **key to reduce cost and improve ICU outcomes**
- A **multidisciplinary, protocolized approach** can significantly assist clinician's in identifying the diagnosis, direct choice of treatment goals, and assist in mitigating oversedation with sedation algorithms
- **Comfort** and **Cognitive** still not able to be addressed simultaneously
- **Artificial intelligence** from **Humanity angle** facilitate in all aspects



a)

Conventional ICU Information



Physiological signals



Electronic Health Records



Questionnaires



Pervasive ICU Sensing



Vision



Wearable Sensors



Light Sensor



Noise Meter

Pervasive Patient Information



Face Detection



Face Recognition



Facial AU Detection

Expression Recognition



Head Pose Detection



Posture Recognition



Actigraphy Analysis

Pervasive Environment Information



Noise Level Detection

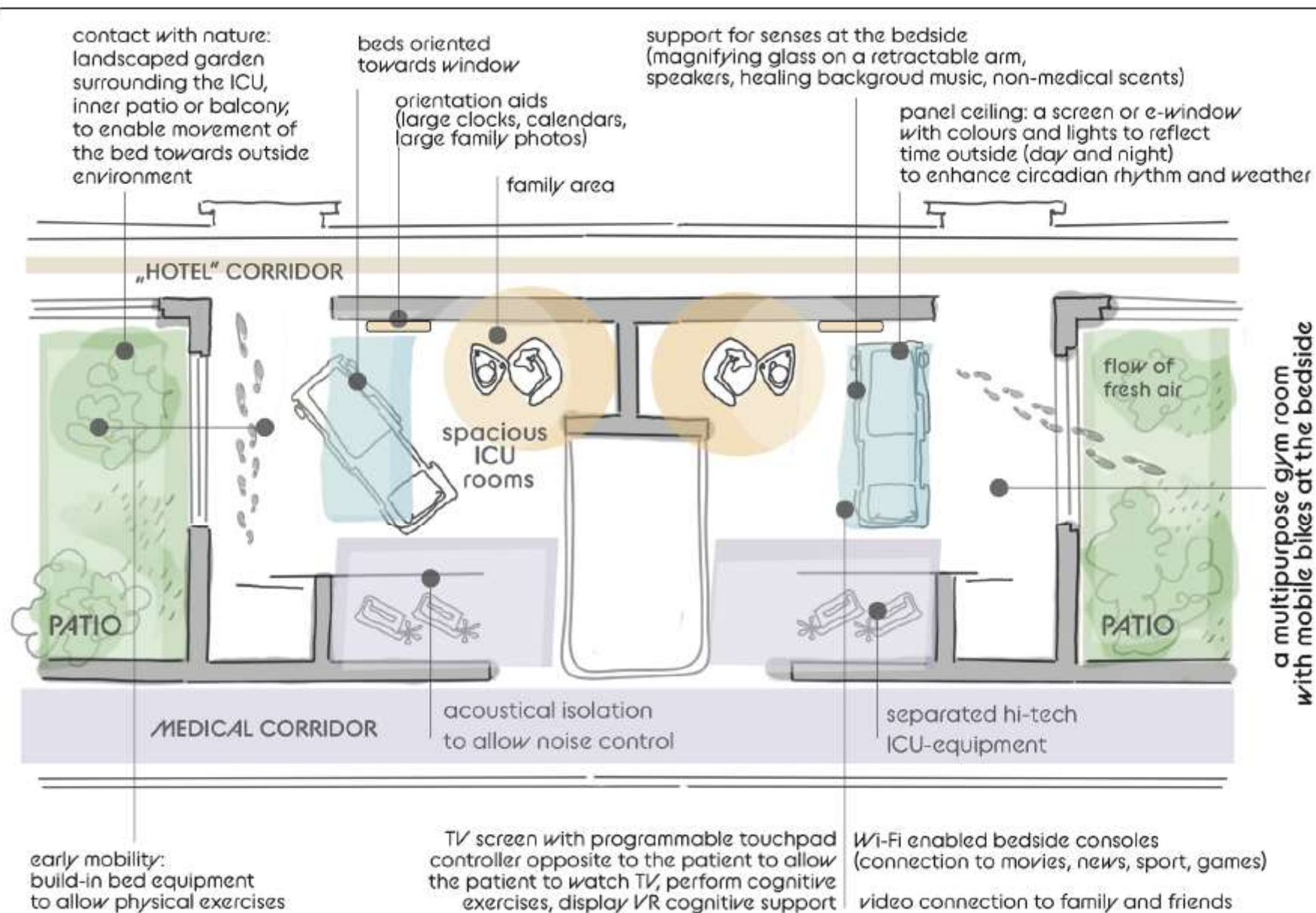


Light Level Detection



Visitor Frequency Detection

Intelligent ICU for Autonomous Patient Monitoring Using Pervasive Sensing and Deep Learning (2019)



a. Future of delirium-free ICU-design – hotel space vs medical space

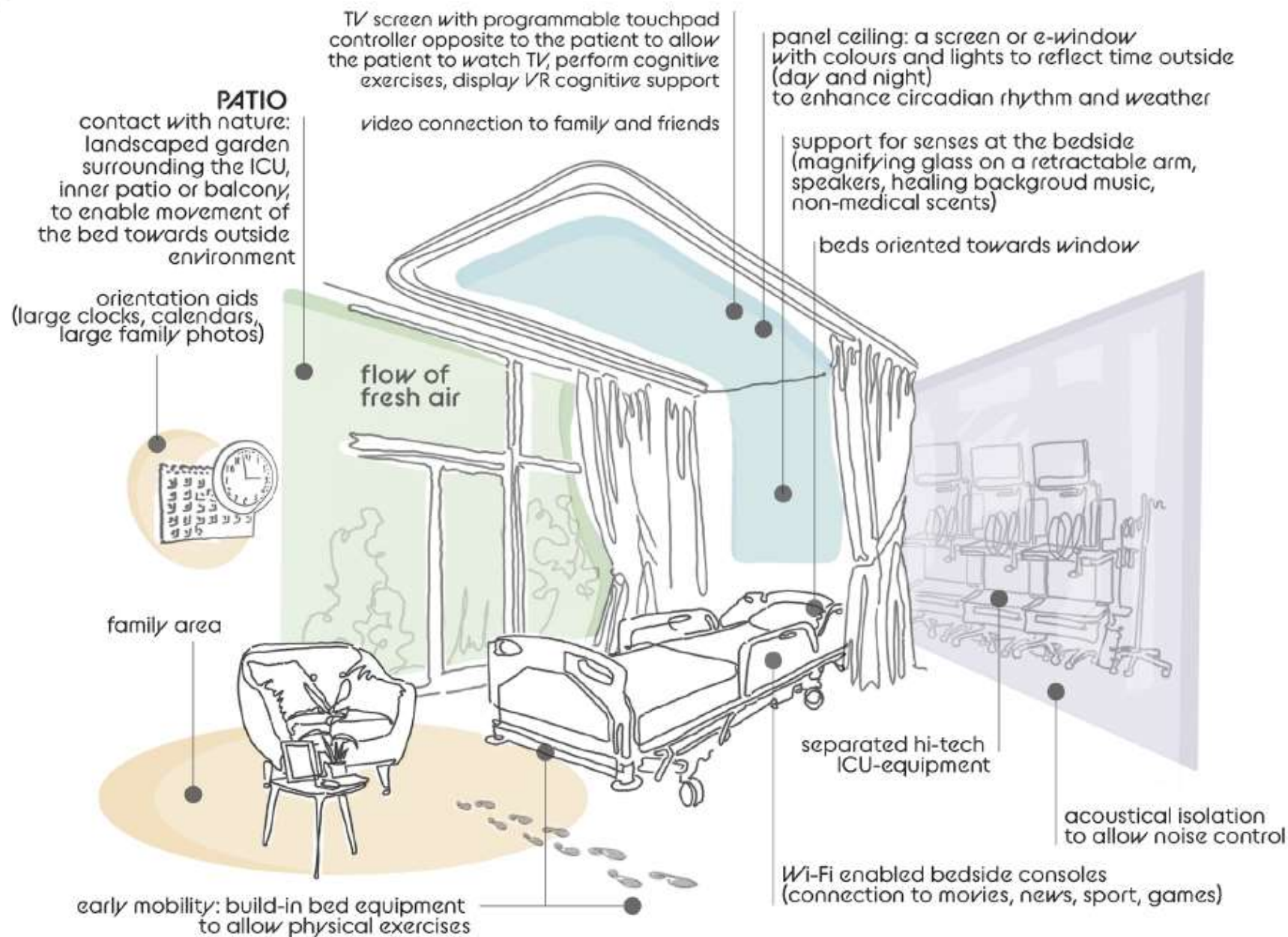
Fig. 1 a Future of delirium-free ICU-design – hotel space vs medical space. **b** Future of delirium-free ICU-design—the importance of healing environment.

Korff et al. Critical Care (2022) 26:201
<https://doi.org/10.1186/s13054-022-34877-y>

PERSPECTIVE

The future of intensive care: delirium no longer be an issue

Katarzyna Korff^{1*}, Jeroen van Dieën-Zaai^{2,3}, Shavienika Williams-Roberts⁴, Mark van den Boogaard⁵, Yahya Shehab^{6,7} and E. Wesley Bly^{8,9,10,11}



b. Future of delirium-free ICU-design – the importance of healing environment

Fig. 1 continued

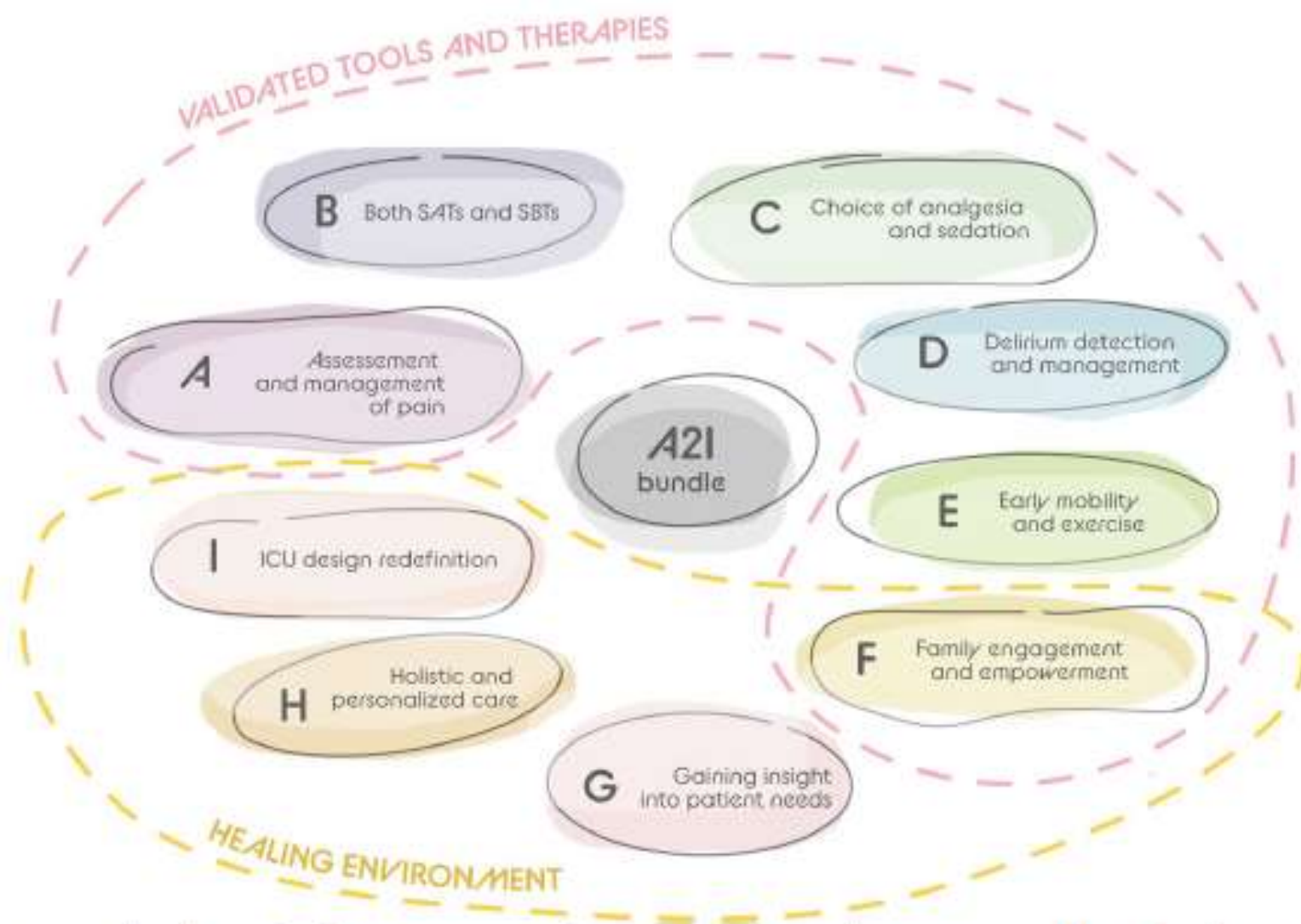


Fig. 2 The ABCDEFGHI bundle—A–I bundle. A—Assessment and management of pain: subjective (NRS, VAS) behavioral tools (CPOT, BPS) should

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<https://doi.org/10.1186/s13054-023-04077-y>

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謝謝聆聽 請指教