

Pharmacist-led teamwork implementation of ICU PADIS care bundle in a tertiary hospital in Taiwan: A retrospective cohort study

Hsuan-Ling Hsiao^{1,4}, Tzu-Yu Lin¹, Pei-Chen Tsai², Tzu-Cheng Tsai¹, Hui-Yu Chen¹,
Kuo-Chin Kao, MD^{3,4}

¹Department of Pharmacy, Linkou Chang Gung Memorial Hospital

²Department of Nursing, Linkou Chang Gung Memorial Hospital

³Department of Pulmonary and Critical Care Medicine, Linkou Chang Gung Memorial Hospital

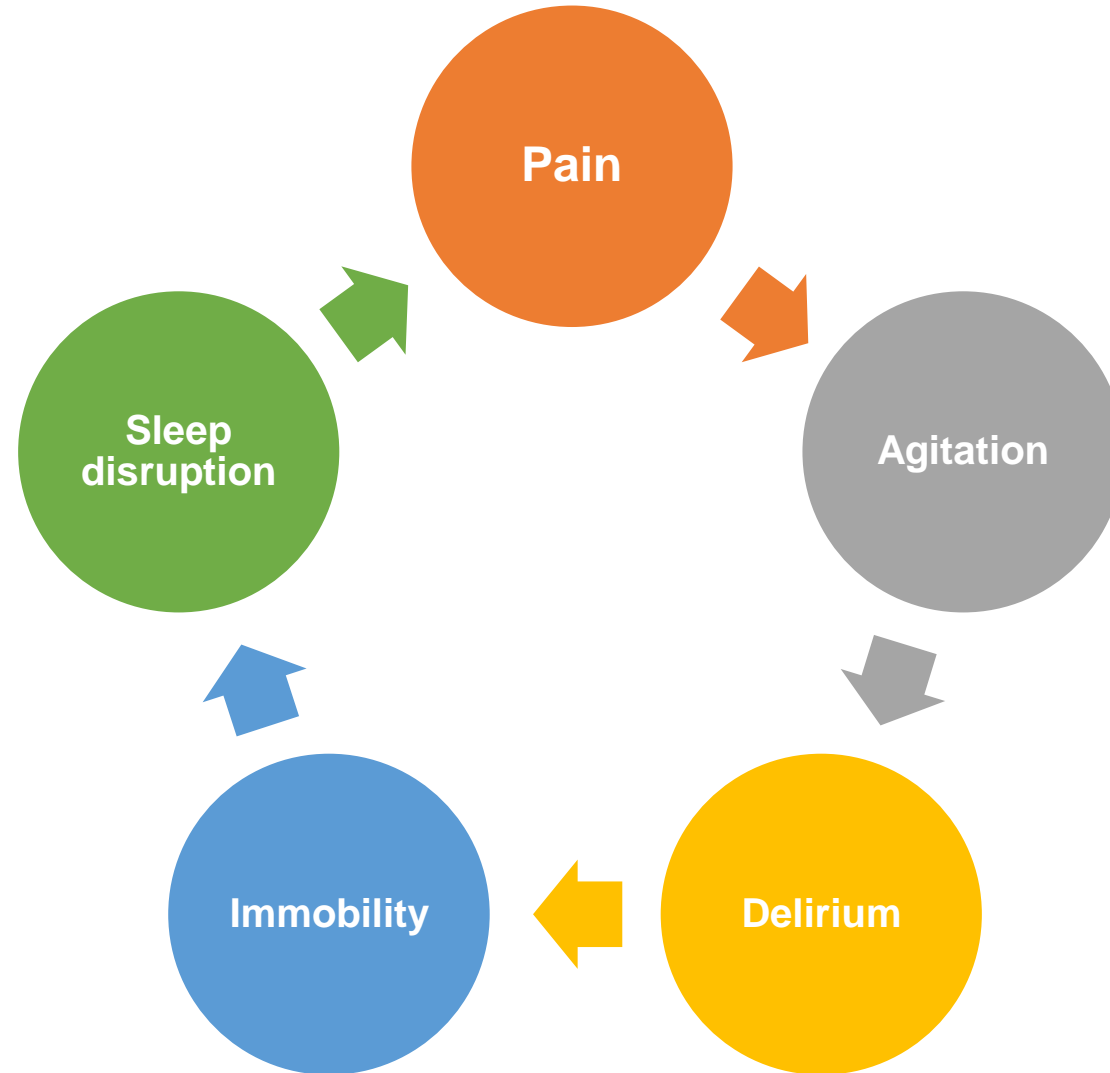
⁴Department of Respiratory Therapy, Chang Gung University



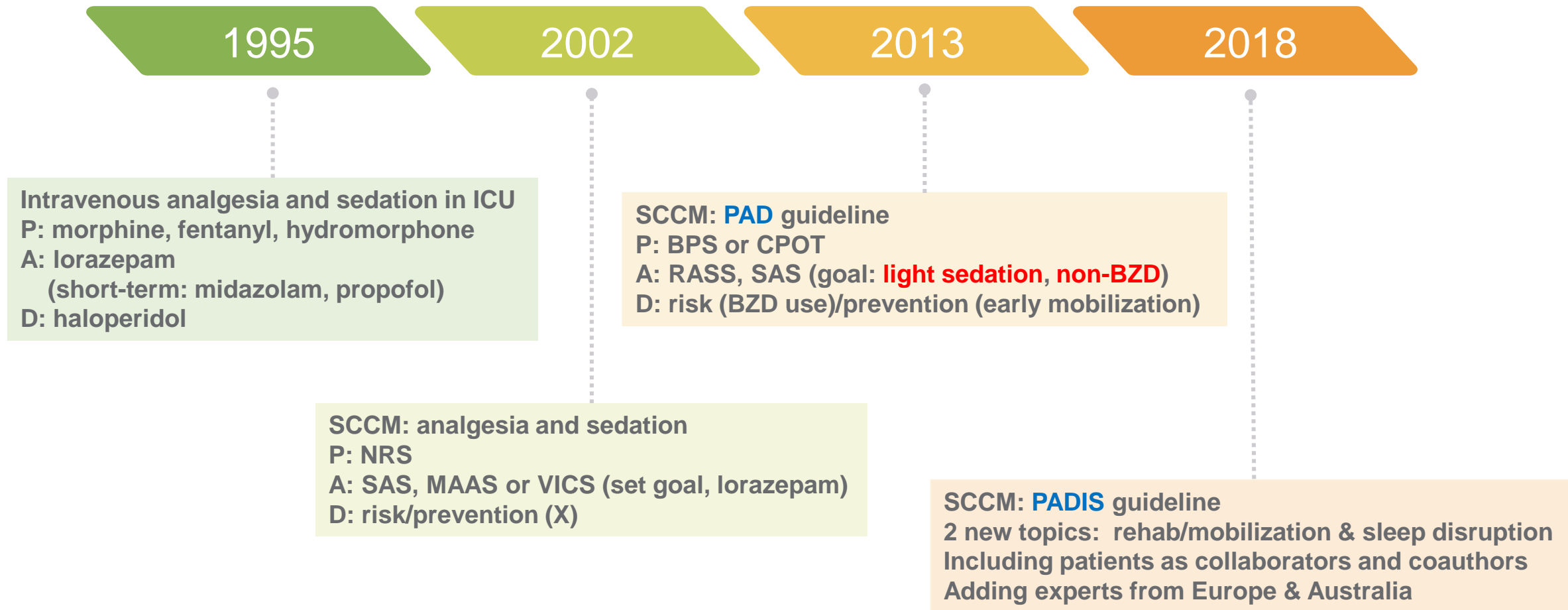
Outline

- Introduction of PADIS care bundle and the role of pharmacist
- Study design and methods
- Results
- Discussions
- Conclusions

PADIS care bundle in ICU



History of PADIS guideline



Crit Care Med. 1995; 23(9):1596-1600.

Crit Care Med. 2002; 30(1):119-141.

Crit Care Med. 2013; 41:263-306.

Crit Care Med. 2018; 46:e825-e873.

ABCDEF bundle

Category	Bundle
A	Assessment, prevention and management of pain
B	Both spontaneous awakening trials (SATs) and spontaneous breathing trials (SBTs)
C	Choice of sedation and analgesia
D	Delirium assessment, prevention and management
E	Early mobility and exercise
F	Family engagement and empowerment

ABCDEF bundle

□ Multicomponent process

1. Improve collaboration among clinical team members
2. Standardize care processes
3. Break the cycle of **oversedation** and **prolonged ventilation**

□ Ultimately improve outcomes in patients experiencing ICU-acquired **delirium** and **muscle weakness**

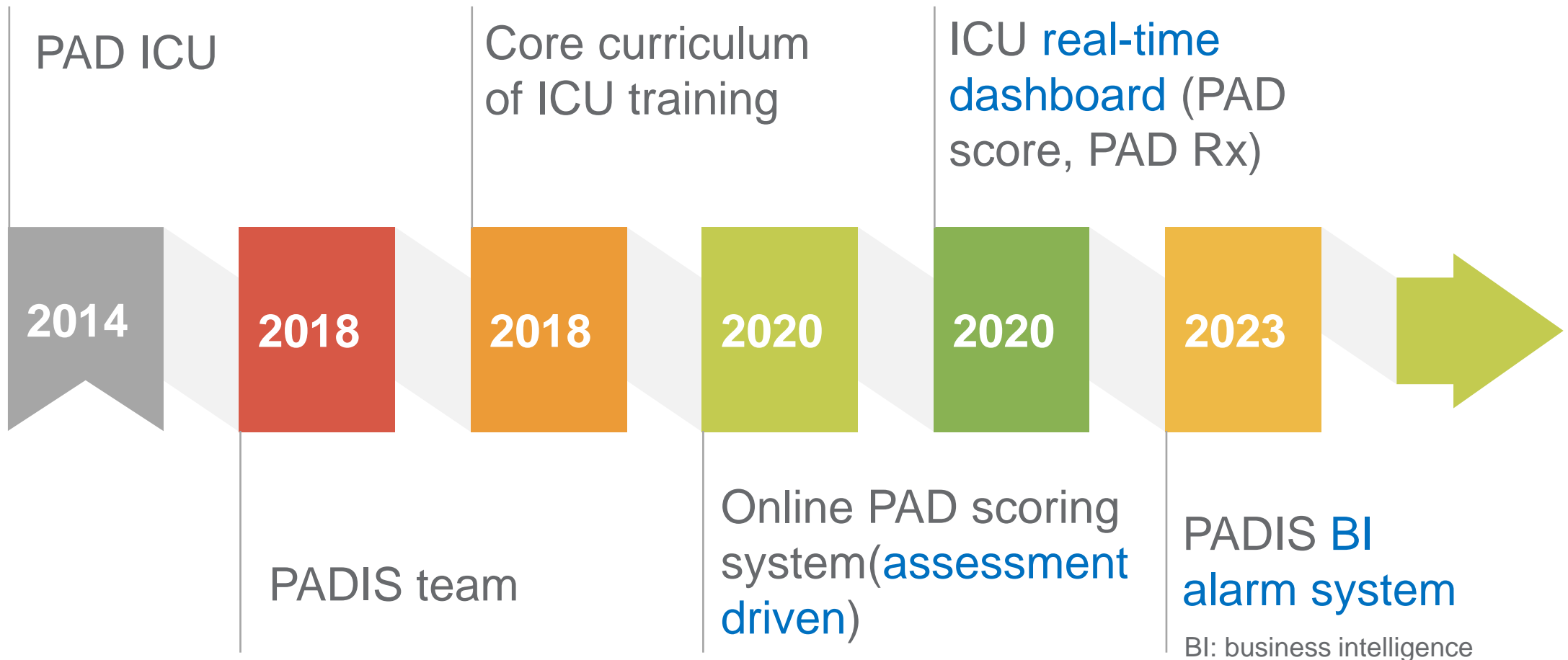
□ Ventilator-free days

- Intervention group vs. controls: **14.7** days vs. **11.6** days; $p = 0.02$

□ ICU stay

- Intervention group vs. controls: **9.1** days vs. **12.9** days; $p = 0.01$

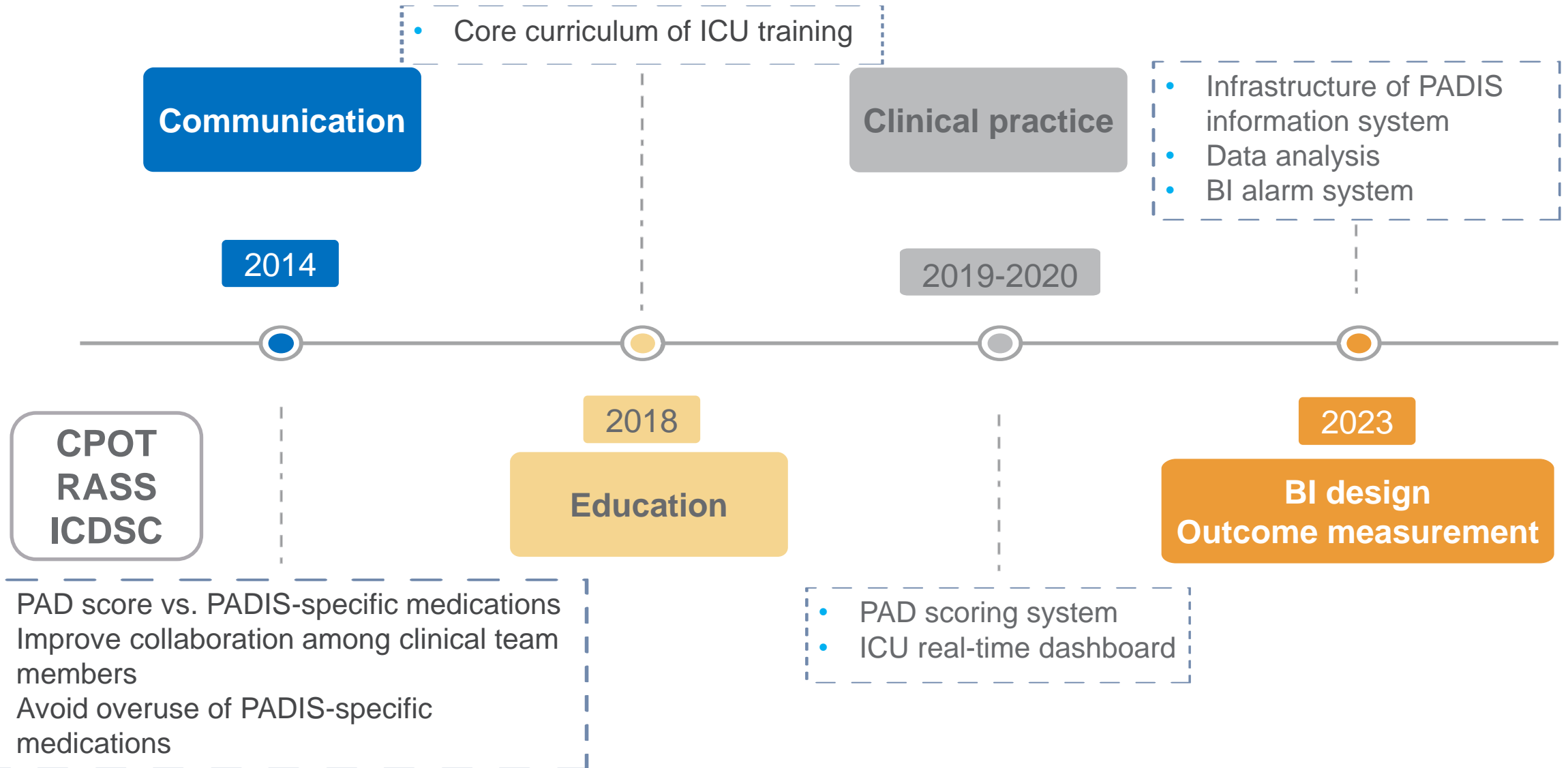
Timeline of implementation of PADIS care bundle in LK CGMH



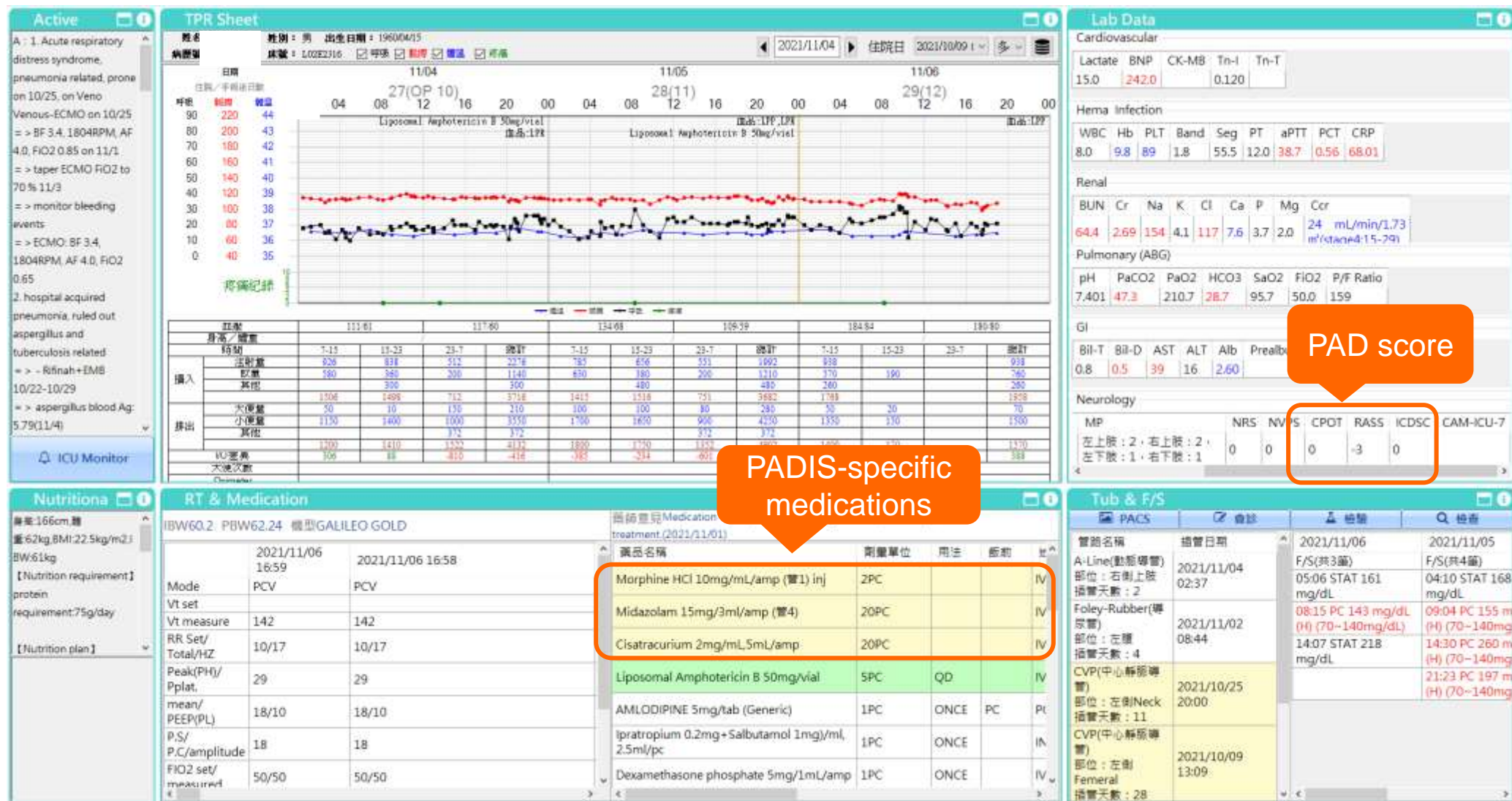
Responsibility of PADIS team members

- Intensivist and resident: establish **goals** of PADIS treatment
- Critical care nurse: **assessment** of pain, agitation and delirium, adjustment **dosage** of medication according to the prescription
- Clinical pharmacist: drug of **choice**, dosage **conversion** and **education**
- Respiratory therapist: ventilator **weaning** protocol
- Physiatrist/physiotherapist: **rehabilitation**
- Psychiatrist: assessment and management of **delirium**

Pharmacist's role in bundle implementation



ICU real-time dashboard



PADIS BI system

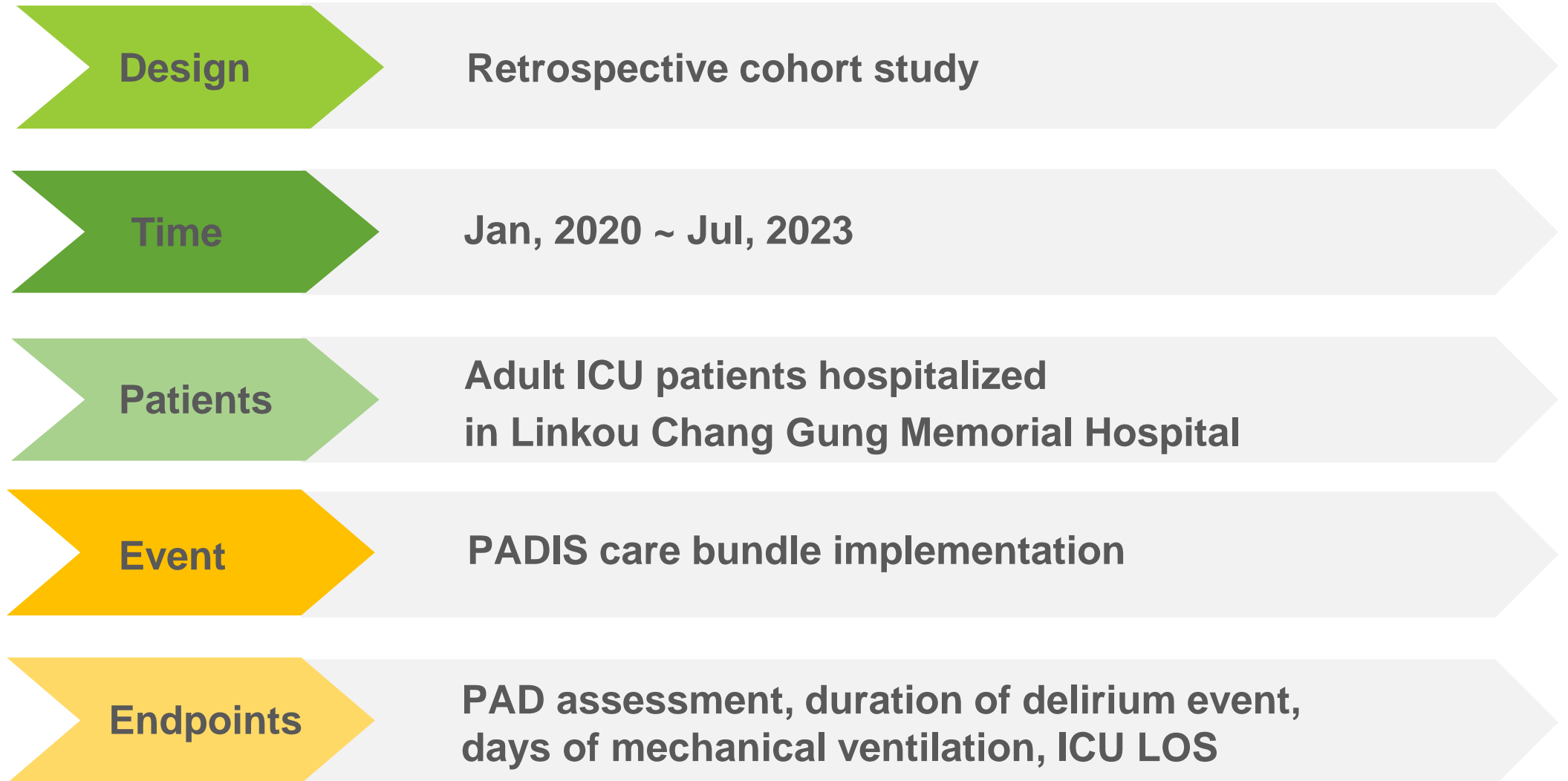


Oversedation

Aim

- Despite the known benefits of the PADIS care bundle, its impact has not been directly assessed in real-world critically ill patients in Taiwan.
- To examine whether **implementation of PADIS care bundle** would be resulted in a better outcome for patients in ICU.

Study design (IRB 202202213B0)



Statistical analysis

- Patient-related assessment score, medication use and outcome data were abstracted from clinical databases and Health Information System (HIS).
- The primary outcome was PAD assessment rate, duration of delirium event, days of mechanical ventilation and ICU LOS. ANOVA and generalized estimating equation (GEE) were used for outcome analysis.
- All statistical analyses were performed using SAS Enterprise Guide version 7.1.

Clinical outcomes of PADIS bundle implementation

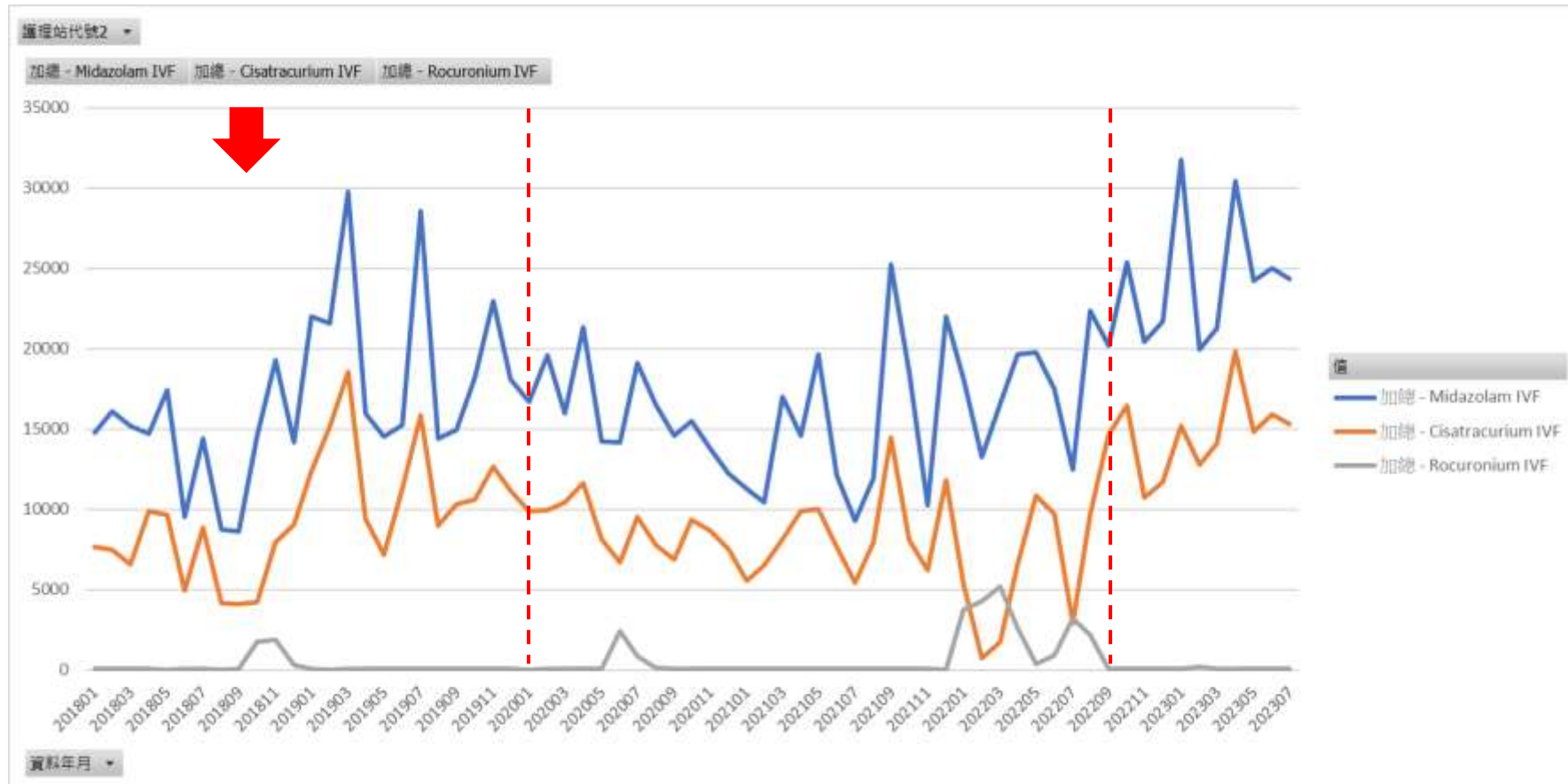
Characteristics	2020	2021	2022	2023/01-2023/07	P
Demographics					
ICU admission, patient-days/month	6016.8 ± 268.2	6058.1 ± 459.8	6201.3 ± 387.5	6374.7 ± 252.0	0.1728
Age, year	61.7 ± 16.7	62.4 ± 16.7	63.0 ± 16.5	62.6 ± 16.0	<.0001
Gender (male), %	63.2 ± 2.4	64.9 ± 1.8	64.2 ± 2.5	65.8 ± 0.9	0.0646
APACHE II score	14.3 ± 7.5	14.5 ± 4.8	14.8 ± 4.7	14.7 ± 4.4	0.8196
Clinical characteristics					
Pain assessments, %	30.0 ± 39.2	95.4 ± 0.6	95.3 ± 1.1	94.5 ± 0.8	<.0001
Agitation assessments, %	26.2 ± 28.9	95.5 ± 0.6	95.5 ± 1.1	94.5 ± 0.9	<.0001
Delirium screening, %	13.9 ± 27.4	83.5 ± 2.2	79.4 ± 5.2	83.6 ± 2.8	<.0001
Maintained in light sedation, %	16.5 ± 20.7	64.7 ± 1.9	62.1 ± 1.8	60.3 ± 2.3	<.0001
Use of light sedation medication, %	6.3 ± 0.7	6.9 ± 0.7	7.7 ± 0.8	7.1 ± 0.6	0.013
DID of midazolam, DDD/1000*pt-days	2.7 ± 0.5	2.5 ± 0.8	3.1 ± 0.5	3.9 ± 0.7	0.0001
DID of cisatracurium, DDD/1000*pt-days	1.5 ± 0.3	1.4 ± 0.4	1.4 ± 0.8	2.4 ± 0.4	0.0004
Clinical outcomes					
Prevalence of delirium, patient/ICU admission, %	6.0 ± 6.8	15.9 ± 1.2	13.6 ± 1.2	12.5 ± 1.1	<.0001
Prevalence of delirium, patient-day/ICU patient-days, %	3.2 ± 2.8	7.1 ± 0.7	6.2 ± 0.6	5.3 ± 0.6	<.0001
Delirium duration, days	4.0 ± 1.8	2.8 ± 0.3	2.9 ± 0.3	2.8 ± 0.2	0.0096
Days of mechanical ventilation, days	3.6 ± 0.3	3.7 ± 0.2	3.8 ± 0.2	3.9 ± 0.3	0.2502
ICU LOS, days	6.5 ± 2.3	6.7 ± 2.4	7.0 ± 2.9	7.0 ± 2.4	0.1159
Mortality rate (with AAD), %	12.4 ± 0.8	12.3 ± 1.8	12.4 ± 1.7	12.9 ± 1.2	0.8093

Discussion

- Pain, agitation **assessment** and delirium **screen** in 2023 were continuously **increasing** and had **sustained** adherence.
- Patients who were maintained in **light sedation** (RASS: -1 ~ +1) were **increased** (16.5% vs. 60.3%, $p < 0.0001$) and medication **prescription** for light sedation was **increasing** significantly (6.3% vs. 7.1%, $p = 0.013$).
- **Delirium prevalence** during ICU admission was **decreased** (15.9% vs. 12.5%, $p < 0.0001$) and **delirium course** was **decreased** significantly (4.0 days vs. 2.8 days, $p = 0.0096$).

Discussion

- Consumption of midazolam and cisatracurium (DDD)



Discussion

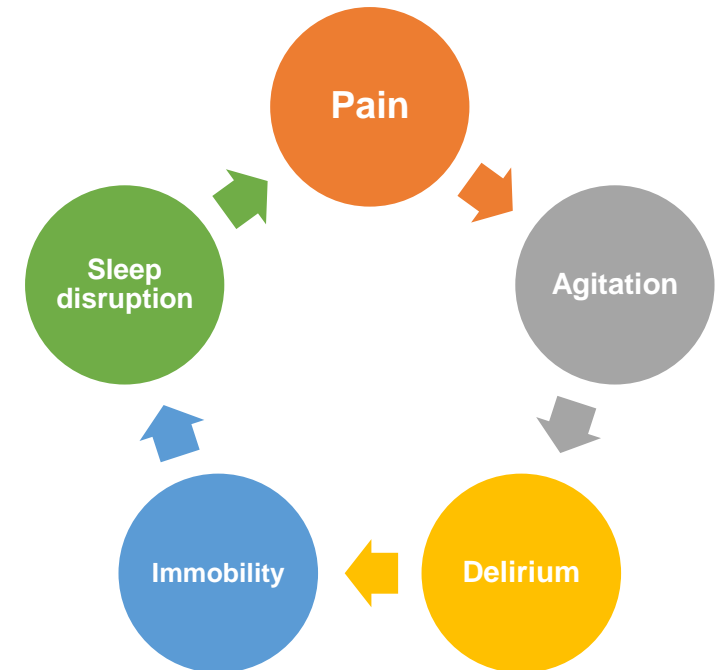
- PADIS care bundle is an **assessment-driven**, protocol-based, stepwise approach.
- Balance the benefits versus risks of medication **exposure**.
 - Trend to overuse: midazolam, cisatracurium, fentanyl.
 - Sedation management strategies, such as maintaining a **light** level of **sedation** (when appropriate) and minimizing sedative exposure (alternative propofol, dexmedetomidine).
- **Infrastructure of PADIS information system**: communication **platform** for PADIS bundle care.

Limitation

- Single-center retrospective analysis
- Not apply to pediatric patient
- Screen rate of delirium
- Rehabilitation input
- Assessment of sleep

Conclusions

- Our findings suggest that implementation of PADIS care bundle was associated with clinical benefit in critically ill patients in ICU.
 - PAD screen were continuously **increasing** and had **sustained adherence**.
 - Multidisciplinary team were more convinced the **benefit of light sedation** in ICU.
 - **Delirium prevalence** was decreased and **delirium course** was decreased.
- Pharmacists' role in PADIS care bundle
 - Avoid overuse of PADIS-specific medications
 - Improve collaboration among clinical team members
 - Education
 - Infrastructure of PADIS information system
 - Outcome measurement and feedback
 - ICU resource



Acknowledgments

ICU
管理委員會

PADIS
推動小組

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Thank you for your time and attention.