

Appendix

This appendix was part of the submitted manuscript and has been peer reviewed. It is posted as supplied by the authors.

Table 1. Respondents by state public/ private status and bed capacity

State	Intensive Care Unit Bed Capacity				
	Private (n)	Public (n)	Feb 2020 *	April 2020 (during Survey)	Max Planned Surge Capacity
Qld	1	20	246	290	545
NSW	3	14	261	362	594
Vic	5	14	285	358	1265
SA	1	2	83	100	178
WA	2	5	120	150	308
Tas	0	2	31	45	77
ACT	0	2	37	37	256
NT	0	2	28	35	45
TOTAL	12	61	1091	1377	3268

* Seven sites stated that they had '0' ICU beds at baseline, 4 sites did not provide bed numbers.

Table 2. Preferred therapy for phases of induction/ ventilation (scores: 1 = 1st preference, 2 = 2nd preference etc)

Phase of intubation/ventilation	Drug class	Preference	Agent (no. responses)	Median score (IQR)	p*		
Rapid Sequence Induction	Sedative	1	Propofol (70)	1 (1-2)			
		2	Ketamine (68)	2 (1-3)	0.007		
	Analgesic	2	Midazolam (66)	2 (2-3)	< 0.001		
		4	Thiopentone (53)	4 (4-4)	< 0.001		
		1	Fentanyl (71)	1 (1-1)			
		2	Morphine (63)	2 (2-2)	< 0.001		
		3	Oxycodone (47)	3 (3-4)	< 0.001		
		4	Remifentanil (49)	4 (3-4)	< 0.001		
		Neuromuscular blocking agent	1	Rocuronium (72)	1 (1-1)		
			2	Suxamethonium (69)	2 (2-2)	< 0.001	
			3	Vecuronium (58)	3 (3-4)	< 0.001	
			3	Cisatracurium (53)	3 (3-4)	< 0.001	
		Acute Phase Sedation	Sedative	1	Propofol (67)	1 (1-2)	
				2	Midazolam (70)	2 (1-2)	< 0.001
3	Diazepam (45)			3 (3-4)	< 0.001		
4	Clonazepam (39)			4 (3-4)	< 0.001		
5	Thiopentone (41)			5 (4-5)	< 0.001		
Analgesic	1		Fentanyl (70)	1 (1-1.25)			
	2		Morphine (69)	2 (1.5-2)	< 0.001		
	3		Oxycodone (55)	3 (3-3)	< 0.001		
	4		Remifentanil (48)	4 (3-4)	< 0.001		
	Neuromuscular blocking agent		1	Cisatracurium (64)	1 (1-1)		
			2	Vecuronium (59)	2 (2-3)	< 0.001	
			2	Rocuronium (61)	3 (2-3)	< 0.001	
			4	Suxamethonium (35)	4 (4-4)	< 0.001	
	Renal impairment		Sedative	1	Propofol (66)	1 (1-1)	
2		Midazolam (67)		2 (2-2)	< 0.001		
3		Diazepam (43)		3 (3-4)	< 0.001		
4		Clonazepam (38)		4 (3-4)	< 0.001		
5		Thiopentone (38)		5 (4-5)	< 0.001		
Analgesia		1	Fentanyl (68)	1 (1-1)			
		2	Morphine (60)	2 (2-3)	< 0.001		
		2	Oxycodone (50)	2 (2-3)	< 0.001		
		Weaning phase	Sedative	1	Propofol (67)	1 (1-1)	
				2	Dexmedetomidine (66)	2 (2-2)	< 0.001
3	Midazolam (57)			3 (2-3)	< 0.001		
Analgesic	1		Fentanyl (67)	1 (1-1)			
	2	Morphine (65)	2 (2-3)	< 0.001			
	3	Clonidine (55)	3 (2-3)	< 0.001			

* p-value of preference score vs 1st preference agent

Table 3. Drug availability for 21-day periods of ventilation in ICU based on 1st and 2nd preference agents (data derived from 52 'Level 2 and 3' ICUs, excludes RSI dosing)

Preference of agents	Drug class	Agent	Acute Sedation phase hypothetical dose	Weaning phase dose hypothetical dose	Median no. of 21-day treatments available per ICU (IQR) *
1 st preference agents	Sedative	Propofol	5000mg/d	5000mg/d	5 (3-11)
	Analgesic	Fentanyl	2400mcg/d	1200mcg/d	8 (4-14)
	NMBA*	Cistatracurium	3mcg/kg/min	<i>Not indicated</i>	1 (0-2)
2 nd preference agents	Sedative	Midazolam	480mg/d		2 (1-4)
		Dexmedetomidine		1.5mcg/kg/hr	3 (1-9)
	Analgesic	Morphine	480mg/d	240mg/d	2 (1-3)
	NMBA*	Vecuronium	1mcg/kg/min	<i>Not indicated</i>	1 (0-2)

* NMBA used as continuous infusion for first 5 days of acute sedation phase only

Table 4. Supply: percentage completion of orders placed in past week (% of responses)

Sedative	Unavailable	<25%	25-50%	>50%-<100%	100%	Didn't order
Propofol (n=65)	17%	12%	15%	25%	20%	11%
Midazolam (n=64)	13%	16%	16%	14%	27%	16%
Clonazepam (n=64)	6%	3%	2%	5%	31%	53%
Diazepam (n=63)	2%	0%	6%	2%	27%	63%
Thiopentone (n=64)	2%	0%	3%	0%	14%	81%
Dexmedetomidine (n=64)	8%	3%	3%	6%	28%	52%
Clonidine (n=64)	6%	0%	6%	3%	38%	47%
Total (mean)	8%	5%	7%	8%	26%	46%
Analgesic						
Fentanyl (n=63)	5%	5%	11%	21%	38%	21%
Morphine (n=62)	2%	3%	6%	19%	50%	19%
Oxycodone (n=60)	0%	0%	3%	8%	42%	47%
Remifentanyl (n=62)	0%	0%	0%	6%	29%	65%
Total (mean)	2%	2%	5%	14%	40%	38%
NMBA						
Cistracurium (n=66)	38%	9%	5%	3%	15%	30%
Vecuronium (n=66)	24%	11%	3%	8%	24%	30%
Rocuronium (n=66)	9%	3%	14%	14%	33%	27%
Suxamethonium (n=66)	33%	9%	8%	5%	14%	32%
Total (mean)	26%	8%	7%	7%	22%	30%

Figure 1. REDcap survey

Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Queensland.^{1,2}

REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies, providing 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources.

Medicines in ICU in the time of COVID-19

Record ID

Please specify the name of the hospital you work in

State

- Queensland
- NSW
- Victoria
- South Australia
- Western Australia
- Tasmania
- ACT
- Northern Territory

Please specify your profession?

- Medicine
- Pharmacy

Please specify medical designation

- Registrar
- Consultant
- Other

Please specify other medical designation

Please specify pharmacy designation

- Director of pharmacy
- ICU pharmacist
- Procurement pharmacist
- Other

Please specify other pharmacy designation

Please provide your first and last name for feedback and follow-up purposes (optional)

Please provide your email address for feedback and follow up purposes (optional)

Please provide your telephone number for feedback and follow up purposes (optional)

A 65 year old male, smoker with a history of hypertension, BMI 35, is COVID-19 positive and is day 5 of hospital admission with tachycardia, tachypnoea, decreased O2 saturations and admitted to your Intensive care unit for intubation, sedation and mechanical ventilation.

In order of preference, what are your team's agents of choice for sedative induction?

	First choice	Second choice	Third choice	Fourth choice
Midazolam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Propofol IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ketamine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thiopentone IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

In order of preference, what are your team's agents of choice for analgesic induction?

	First choice	Second choice	Third choice	Fourth choice
Fentanyl IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morphine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oxycodone IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Remifentanyl IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

In order of preference, what are your team's agents of choice for paralysis induction?

	First choice	Second choice	Third choice	Fourth choice
Rocuronium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suxamethonium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vecuronium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cisatracurium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

In the acute sedation phase (Days 1-6), what are your team's agents of choice for sedation, in order of preference?

	First choice	Second choice	Third choice	Fourth choice	Fifth choice
Midazolam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Propofol IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clonazepam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thiopentone IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diazepam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

In the acute sedation phase (Days 1-6), what are your team's agents of choice for analgesia, in order of preference?

	First choice	Second choice	Third choice	Fourth choice
Fentanyl IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morphine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oxycodone IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Remifentanyl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify if other

In the acute sedation phase (Days 1-6), what are your team's agents of choice for paralyzing infusion, in order of preference?

	First choice	Second choice	Third choice	Fourth choice
Cisatracurium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suxamethonium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vecuronium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rocuronium IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify if other

On Day 4 the patients renal function decreases to a creatinine clearance ~20 ml/ min. In this circumstance, what are your team's agents of choice for ANALGESIA, in order of preference?

	First choice	Second choice	Third choice
Fentanyl IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Morphine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oxycodone IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

On Day 4 the patients renal function decreases to a creatinine clearance ~20 ml/ min. In this circumstance, what are your team's agents of choice for SEDATION, in order of preference?

	First choice	Second choice	Third choice	Fourth choice	Fifth choice
Midazolam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Propofol IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clonazepam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thiopentone IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diazepam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

In the mechanical ventilation weaning phase, what are your team's preferred agents for SEDATION, in order of preference?

	First choice	Second choice	Third choice
Propofol IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dexmedetomidine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Midazolam IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

In the mechanical ventilation weaning phase, what are your team's preferred agents for ANALGESIA, in order of preference?

	First choice	Second choice	Third choice
Fentanyl IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morphine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clonidine IV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify

ICU Bed Capacity

What is the pre-COVID-19 ICU bed capacity at your institution (February 2020)

_____ (Please express as number of beds)

What is the current ICU bed capacity at your institution (April 9, 2020)

_____ (Please express as number of beds)

What is the planned maximum ICU bed capacity at your institution?

_____ (Please express as number of beds)

Medication capacity and stock availability (Please use the tab key to progress through questions in the following section)**Values defaulted to 0**

ANALGESICS

How many vials of fentanyl 100mcg/2ml do you have in stock within the pharmacy today (not including imprest)

How many vials of fentanyl 250mcg/5ml do you have in stock within the pharmacy today (not including imprest)

How many vials of fentanyl 500mcg/10ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 5mg/ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 10mg/ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 15mg/ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 20mg/ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 30mg/ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 50mg/5ml do you have in stock within the pharmacy today (not including imprest)

How many vials of morphine 100mg/5ml do you have in stock within the pharmacy today (not including imprest)

How many vials of oxycodone 10mg/ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of oxycodone 20mg/2ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of oxycodone 50mg/ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of remifentanyl 1mg do you have in stock within the pharmacy today (not including imprest)?

How many vials of remifentanil 2mg do you have in stock within the pharmacy today (not including imprest)?

How many vials of remifentanil 5mg do you have in stock within the pharmacy today (not including imprest)?

In the past week, have you been able to receive stock of an order placed for the below analgesics?

	Unavailable	< 25% of order	25-50%	>50% and < 100%	100%	Did not order
Fentanyl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morphine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Oxycodone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Remifentanyl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SEDATION

How many vials of propofol 200mg/20ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of propofol 500mg/50ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of propofol 1000mg/100ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of midazolam 5mg/1ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of midazolam 5mg/5ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of midazolam 15mg/3ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of midazolam 50mg/10ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of clonazepam 1mg/ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of diazepam 10mg/2ml do you have in stock within the pharmacy today (not including imprest)?

How many vials of thiopentone 500mg do you have in stock within the pharmacy today (not including imprest)?

How many vials of dexmedetomidine 200mcg/2ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of dexmedetomidine 400mcg/4ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of dexmedetomidine 1mg/10ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of clonidine 150mcg/ml do you have in stock within the pharmacy today (not including imprest)? _____

In the past week, have you been able to receive stock of an order placed for the below sedatives?

	Unavailable	< 25% of order	25%-50%	>50% and < 100%	100%	Did not order
Propofol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Midazolam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clonazepam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diazepam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thiopentone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dexmedetominide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clonidine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NMBA

How many vials of cisatracurium 5mg/2.5ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of cisatracurium 10mg/5ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of cisatracurium 20mg/10ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of cisatracurium 150mg/30ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of vecuronium 10mg do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of rocuronium 50mg/5ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of rocuronium 100mg/10ml do you have in stock within the pharmacy today (not including imprest)? _____

How many vials of suxamethonium 100mg/2ml do you have in stock within the pharmacy today (not including imprest)? _____

In the past week, have you been able to receive stock of an order placed for the following NMBA's?

	Unavailable	< 25% of order	25-50%	>50% and < 100%	100%	Did not order
Cisatracurium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vecuronium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rocuronium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suxamethonium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. PA Harris, R Taylor, R Thielke, J Payne, N Gonzalez, JG. Conde, Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support, *J Biomed Inform.* 2009 Apr;42(2):377-81.

2. PA Harris, R Taylor, BL Minor, V Elliott, M Fernandez, L O'Neal, L McLeod, G Delacqua, F Delacqua, J Kirby, SN Duda, REDCap Consortium, **The REDCap consortium: Building an international community of software partners**, *J Biomed Inform.* 2019 May 9 [doi: 10.1016/j.jbi.2019.103208]

Figure 2. Preferred agents for induction, acute phase ventilation and weaning

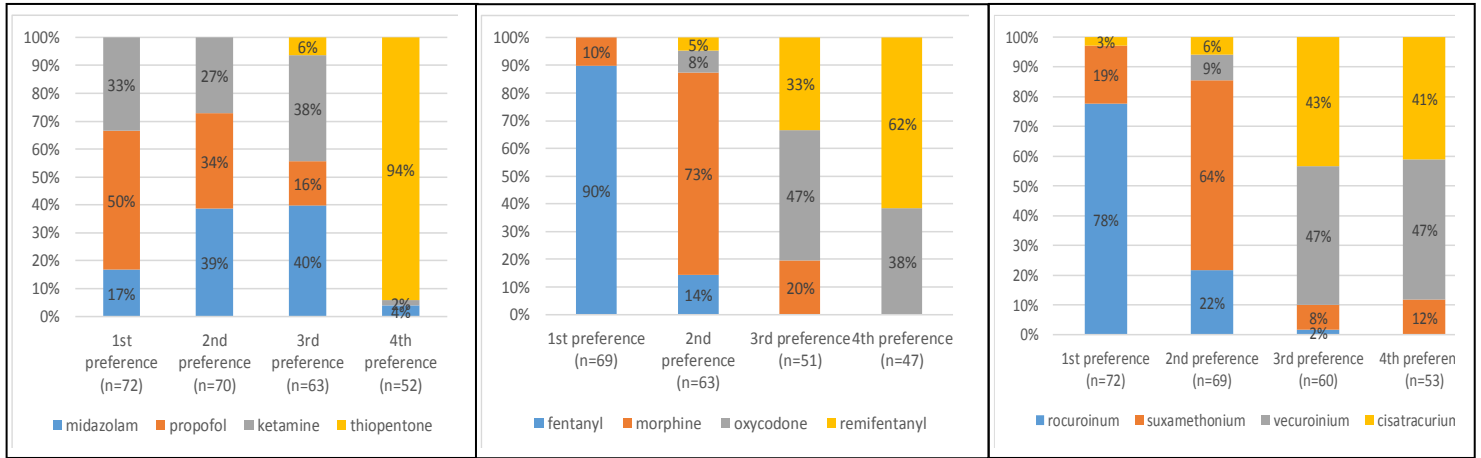


Figure 2a. RSI sedative

Figure 2b. RSI analgesia

Fig 2c. RSI NMBA

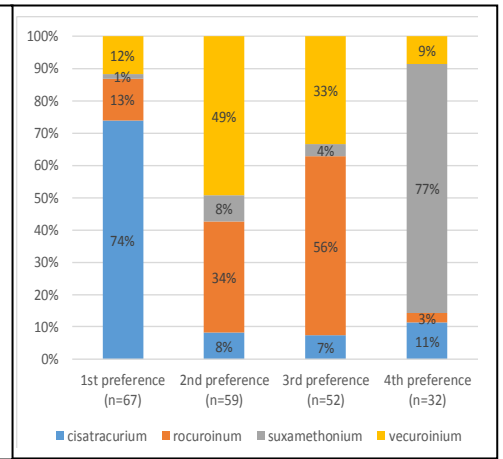
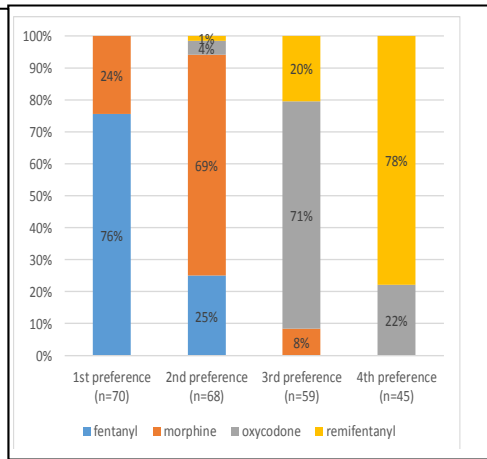
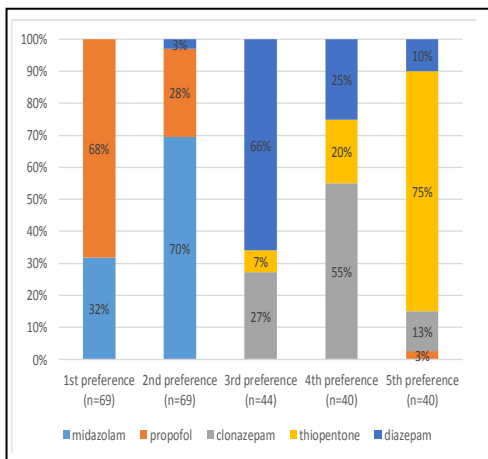


Figure 2d. Acute phase sedative

Figure 2e. Acute phase analgesia

Fig 2f. Acute phase NMBA

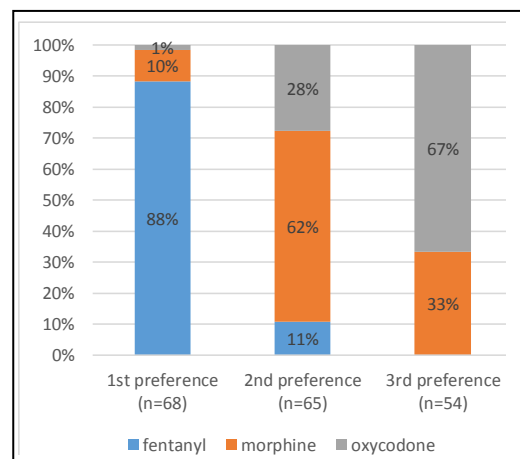
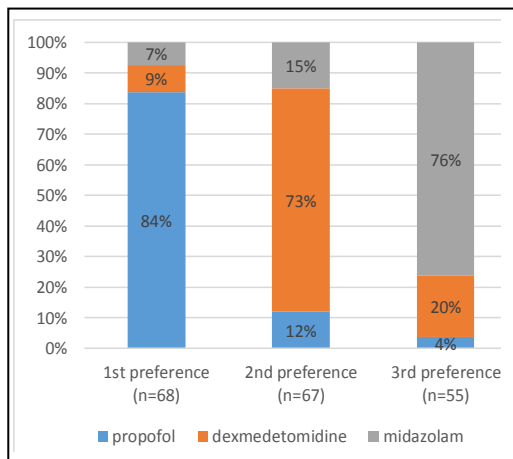


Figure 2g: Weaning sedative

Figure 2g. Weaning analgesia