



**Methadone in Ambulatory Surgery**



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**Disclosures**

- None

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**Outline**

- Focus on using methadone as a primary strategy to treat pain in ambulatory surgical patients
- Why?
- Advantages
- Inpatient Studies
- Outpatient **Study**
- Where do we go from here

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**Too many people with postop pain**

- >50% - even in minor/medium level procedures

Journal of Clinical Anesthesia 16:200–206, 2004      Ann Surg 2019;269:856–865

Jnl of Pain 2016;17(2):131-157      Ann Surg 2017;266:516–524

- Acute post op pain is biggest risk factor for chronic postsurgical pain

Pain Reports 2022;7(6):e1048  
JPRAS Open 2022;31:32–49

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**Too Few Healthcare Workers**

A Public Health Crisis: Staffing Shortages in Health Care




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at home • Your Public Health Blog • A Public Health Crisis: Staffing Shortages in Health Care      March 2023

**Staff Shortages Choking U.S. Health Care System**

A growing shortage of health care workers is being called the nation's top patient safety concern.


By Steven Boss Johnson | July 28, 2022, at 4:45 p.m.



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### Worldwide Problem



**10 million** more health workers are needed by 2030, primarily in low and lower-middle income countries

A 2022 McKinsey report projects a shortage of 200,000 to 450,000 RNs and 50,000 to 80,000 physicians by 2025

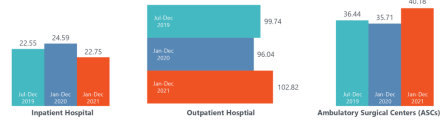
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### INSIGHTS

#### 2019-21 SURGERY LOCATIONS

CLAIMS PER 1,000



Location	Jan-Dec 2019	Jan-Dec 2020	Jan-Dec 2021
Inpatient Hospital	22.55	24.59	22.75
Ambulatory Surgical Centers (ASC)	99.74	96.04	102.82

7.3% DECREASE IN COMMERCIAL INSURANCE  
3.1% INCREASE IN UTILIZATION RATES FOR NON-EMERGENCY FACILITIES  
10.3% INCREASE IN UTILIZATION RATES IN ASC

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### Methadone Advantages

- Strong  $\mu$ -opioid receptor agonist
  - Incomplete cross tolerance with other opioids
- NMDA antagonist
- Inhibits reuptake serotonin and norepinephrine in CNS
- IV – “rapid” onset:  $t_{1/2} ke0 = 8$  minutes
- Long half life (1-2 days) = long duration

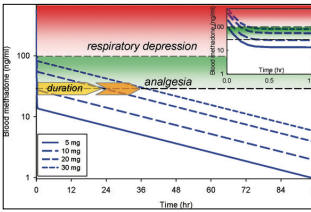
Opioid	$t_{1/2} ke0$	Elimination $t_{1/2}$
Remifentanyl	1 minute	0.5 hour
Alfentanil	1 minute	1 hour
Sufentanil	6 minutes	8 hours
Fentanyl	5 minutes	8-10 hours
Morphine	2-4 hours	2-3 hours
Methadone	8 minutes	24-36 hours

Anesth and Analg 2011;112:13-16

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### Figure 2



Study: “Intraoperative Methadone Improves Postoperative Pain Control in Patients Undergoing Complex Spine Surgery” Anesth Analg 2011;112(1):218-23

Wolters Kluwer | OvidSP

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### Methadone Studies

- “Intraoperative Methadone for the Prevention of Postoperative Pain: A Randomized, Double-blinded Clinical Trial in Cardiac Surgical Patients” 156 patients Anesthesiology 2015;122:1112-22
- “Clinical Effectiveness and Safety of Intraoperative Methadone in Patients Undergoing Posterior Spinal Fusion Surgery: A Randomized, Double-blinded, Controlled Trial” 115 patients Anesthesiology 2017;126:822-33
- “Perioperative Methadone and Ketamine for Postoperative Pain Control in Spinal Surgical Patients: A Randomized, Double-blind, Placebo-controlled Trial” 130 patients Anesthesiology 2021;134:697-708

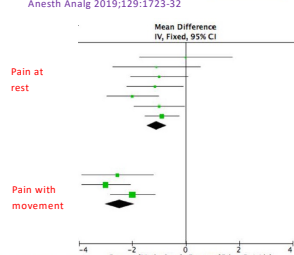
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### Systematic Review and Meta-analysis

Anesth Analg 2019;129:1723-32

- 13 studies; 929 patients
- variety of mostly inpatient surgery
- Lower postoperative opioid consumption in morphine equivalent dosage and better pain scores in methadone group



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### Systematic Review and Meta-analysis

Anesth Analg 2019;129:1723-32

- Improved patient satisfaction
- No significant difference in PONV or respiratory depression**
  - (6 studies with 462 patients)
  - Quality of evidence considered low

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### Summary of Inpatient Studies

- Better pain relief
- Less opioid use
- Better patient satisfaction
- No difference in side effect

## Number of patients studied is small!

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### Intraoperative Methadone in Same-Day Ambulatory Surgery: A Randomized, Double-Blinded, Dose-Finding Pilot Study

Anesth Analg 2019;128:802-10

Helga Komen, MD,\* L. Michael Brunt, MD,† Elena Deych, MS,‡ Jane Blood, RN,\* and Evan D. Kharasch, MD, PhD\*§||

- Dose-escalation study (ended up with 2 doses studied)
- Laparoscopic surgeries
  - Chole, tubal, salpingectomy/oophorectomy, inguinal hernia
- Looked at pain scores and narcotic usage both in hospital and post discharge
- Looked at complications

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### Methadone in Ambulatory Surgery (Same-day cohort)

60 Patients

Anesth Analg 2019;128:802-10

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- Cohort # 1 (18 pts) 0.1 mg/kg ideal body weight methadone
  - Median dose = 6 mg
- Cohort # 2 (21 pts) 0.15 mg/kg ideal body weight methadone
  - Median dose = 9 mg
- Controls (21 pts) fentanyl or fentanyl/hydromorphone
- Fentanyl/hydromorphone prn at end of case/PACU

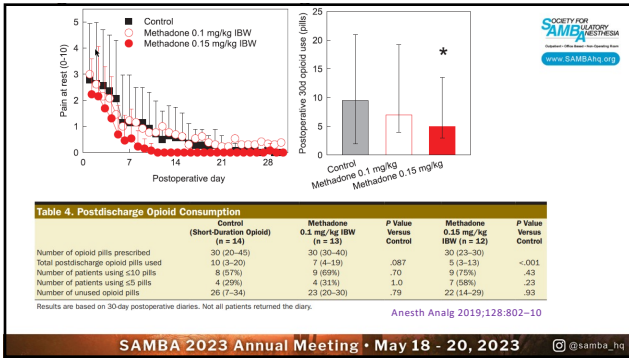
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	Control (Mean [SD])	Methadone 0.1 mg/kg IBW (Mean [SD])	P Value Versus Control	Methadone 0.15 mg/kg IBW (Mean [SD])	P Value Versus Control
<b>Primary outcomes</b>					
Total PACU nonmethadone opioid (mg morphine equivalent)	20.9 (9.9-25.8)	18.0 (8.3-24.1)	<.0001	18.0 (8.3-24.1)	<.0001
Total PACU nonmethadone opioid (mg morphine)	9.3 (1.3-11.0)	5.0 (3.3-8.5)	<.0001	5.0 (3.3-8.5)	<.0001
<b>Secondary outcomes</b>					
Number of patients (%) needing no PACU opioid	5 (24%)	2 (15%)	.42	12 (57%)	.06
Total post-PACU nonmethadone opioid (mg morphine equivalent)	0.0 (0.0-2.9)	0.0 (0.0-0.6)	.19	0.0 (0.0-2.5)	.79
Total day of surgery non-OR (PACU + post-PACU) total nonmethadone opioid (mg morphine equivalent)	10.0 (2.5-14.3)	5.4 (3.3-9.6)	.42	3.3 (0.1-5.8)	.01
Total day of surgery nonmethadone opioid (mg morphine equivalent)	35.3 (25.0-44.0)	7.1 (3.7-10.0)	<.0001	3.3 (0.1-5.8)	<.0001
Total day of surgery opioid (mg morphine equivalent)	35.3 (25.0-44.0)	13.5 (8.3-19.4)	<.0001	7.4 (3.8-11.3)	<.0001

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### Summary of Outpatient Study

- Better pain relief in PACU and post discharge
- Less opioid use
- Better patient satisfaction
- No difference in side effect

**Number of patients studied is very small!**

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### A guide to perioperative methadone use

- IV bolus in OR at/before induction
  - Inpatient (>1 night): **20 mg** (15 mg if >60 yr “physiologically”)
  - Outpatient (23 hr overnight): **15 mg**
  - Outpatient (same-day discharge): **10 mg**
- “Set it & forget it” (i.e. no/minimal additional intraop opioids unless the pt “proves” they need it - e.g. big reconstructive spines)
- End case:
  - ETCO<sub>2</sub> hi 40’s low 50’s for spontaneous ventilation (same for typical PACU pt comfortable with opioids)
  - Titrate additional methadone 2 mg to RR ~12 before emergence
  - PACU: 2 mg IV methadone q5-10 min, max 6 mg then call (needing more is rare)
- Minimize CNS depressants (gabapentinoids, antihistamines, sedating antiemetics, postop benzodiazepines, etc). *This is very important!*

Figure courtesy of Evan Kharasch, MD PhD

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### Conclusions

- High confidence that pain control and patient satisfaction superior with methadone for acute postop pain
  - Lower opioid needs at home May be helpful in opioid epidemic?
  - Better pain control at 30 days May decrease chronic pain?
- No difference in adverse effects (low confidence)
  - Numbers too small to remark on safety
- Personal practice: still inpatient only - but looking into a protocol

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