Perioperative Oral Morphine Equivalence Phenotype for Anesthesia Procedures

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DISCLOSURE:

I have no financial relationships with commercial support to disclose.



Background and Summary

Background:

Two decades of rapid increase in the use of opioid medications in the United States Use within the hospital setting is often a focus: nursing and discharge opioid prescribing Little to no quantitative analysis of intraoperative opioid use and potential consequences

Goal: understanding of opioid administration intraoperatively

- Challenge: quantifying use of opioids is challenging as potencies vary across routes and agents

Summary:

- Created a system for assessing intraoperative/perioperative OME
- Implemented this system over the entire MPOG / ASPIRE registry
- This work offers a method for **understanding variation** in intraoperative opioid administration and may allow the examination of relationships between intraoperative and postoperative opioid utilization.
- This approach is important in **understanding effectiveness** of opioid reduction interventions for example in enhanced recovery after surgery (ERAS) protocols
- By identifying provider and institutional variabilities in opioid consumption, researchers, educators and quality innovators can be empowered to **understand strategies to reduce opioid use**



Methods:

Created an **institutional dashboard** compares opioid administration for several case groups, and accounts for both patient weight and case length. **Informational measure for analysis**.

Dashboard:

- All cases less than 1 hr long were assumed to be 1 hr
- Case groups are based on CPT codes
- Opioid administration was calculated from anes start to anes end
- Preoperative or PACU opioids were not included
- IV, oral, spinal, epidural, and transdermal routes were included
- Remifentanil was not included in equivalency calculations; but noted if as administered
- Opioids included in the anesthetic record without a dose were not included in the calculation, but noted as "unknown"
- Average administration doses are displayed as IV (intravenous) route. For conversation to oral multiply by 3
- Average administration doses are based on average case times and patient weights



<u>Opioid</u>	<u>Route</u>	Measure Table				
Morphine ^{1,2}	Oral	30.00				
MS Contin (controlled release)	Oral	30.00				
Codeine ^{1,2}	Oral	200.00				
Hydromorphone (Dilaudid) ^{1,2}	Oral	7.50				
Hydrocodone ²	Oral	30.00				
Oxycodone ^{1,2}	Oral	20.00				
Oxymorphone ^{1,2}	Oral	10.00				
Meperidine ¹	Oral	300.00				
Levorphanol ¹	Oral	2.00				
Tramadol ¹	Oral	120.00				
Tapentadol ¹	Oral	100.00				
Methadone ⁸	Oral	6.00				
Fentanyl ²	transdermal	12.50				
Buprenorphine (Suboxone) ³	Sublingual	0.40				
Morphine ¹	IV	10.00				
Codeine ¹	IV	100.00				
Fentanyl ¹	IV	0.10				
Hydromorphone (Dilaudid) ¹	IV	1.50				
Oxymorphone ¹	IV	1.00				
Meperidine ¹	IV	100.00				
Tramadol ¹	IV	100.00				
Buprenorphine (Suboxone) ¹	IV	0.40				
Nalbuphine ¹	IV	10.00				
Butorphanol ¹	IV	2.00				
Alfentanil ⁷	IV	0.50				
Sufentanil ⁵	IV	0.01				
Remifentanil	IV	0.00				
Methadone ³	IV	5.00				
Hydromorphone ⁶	epidural	0.30				
Morphine ⁴	epidural	1.00				
Fentanyl ⁶	epidural	0.03				
Fentanyl ⁶	IT	0.01				
Morphine ⁴	IT	0.10				
Hydromorphone ⁶	IT	0.06				

Equianalgesic dose ratios are approximations to compare opioids estimating oral morphine equivalents (OME)



Institutional Dashboard

CARDIAC Average administration: Based on a 6.7 hour case and 70kg patient (mg morphine IV)	SPINE Average administration: Based on a 3.3 hour case and 70kg patient (mg morphine IV)	UPPER ABDOMEN Average administration: Based on a 3.1 hour case and 70kg patient (mg morphine IV)
94 Average (all sites) 94	Average (all sites) 21	Average (all sites) 25
LOWER ABDOMEN Average administration: Based on a 2.7 hour case and 70kg patient (mg morphine IV)	HYSTERECTOMY Average administration: Based on a 3.7 hour case and 70kg patient (mg morphine IV)	KNEE/POPLITEAL Average administration: Based on a 2.5 hour case and 70kg patient (mg morphine IV)
Average (all sites) 23	Average (all sites) 25	Average (all sites) 13
HIP Average administration: Based on a 2.5 hour case and 70kg patient (mg morphine IV)		
15 Average (all sites) 15		
		MULTICENTER PERIOPERATIVE OUTCOMES GROUP

Institutional Dashboard - Details

Lower Abdomen case group includes:

- Procedures in lower abdomen including laparoscopy; not otherwise specified (CPT: 00840)
- Procedures in lower abdomen including laparoscopy; abdominoperineal resection (CPT: 00844)
- Procedures in lower abdomen including laparoscopy; pelvic exenteration (CPT: 00848)





Average OME by institution





Variation in Practice





Provider Tab



This dashboard displays the intraoperative OME per case normalized on patient weight (kg) and case duration (hr) and organized by attending. The default settings display cases without remiferitanil ("No" Remi) and those cases with a known opioid dose ("0" Unknown Dose). This dashboard represents cadiac cases at your institution within past 12 months. Click "View Details" for more provider information.



Individual Provider Distributions





Remi	Unknown Dose	MPOG.Cases	Average administration	Standard Deviation	Average Case Time	ViewButton	
No remi	No Unknown Dose	1	0.38	0.00	1.8	View Details	
No remi	No Unknown Dose	16	0.30	0.18	4.1	View Details	
No remi	No Unknown Dose	12	0.41	0.18	3.3	View Details	
No remi	No Unknown Dose	24	0.33	0.10	2.7	View Details	
No remi	No Unknown Dose	9	0.35	0.15	2.8	View Details	
No remi	No Unknown Dose	27	0.42	0.36	3.6	View Details	
No remi	No Unknown Dose	1	0.41	0.00	2.5	View Details	
No remi	No Unknown Dose	4	0.28	0.21	4.6	View Details	
No remi	No Unknown Dose	7	0.21	0.07	4.2	View Details	
No remi	No Unknown Dose	7	0.43	0.19	2.6	View Details	
No remi	No Unknown Dose	19	0.29	0.15	4.0	View Details	
No remi	No Unknown Dose	2	0.42	0.13	1.6	View Details	
No remi	No Unknown Dose	16	0.30	0.13	3.4	View Details	
No remi	No Unknown Dose	9	0.42	0.18	2.5	View Details	
No remi	No Unknown Dose	12	0.40	0.22	3.5	View Details	
		Showing 1 to 15 of	127			Next>	
		1,664	0.34	0.17	3.0	View Details	



Case List Tab

Overview Provider Case List

This dashboard displays the intraoperative OME (per patient weight in kg and per case duration in hr) phenotype (average per case) organized by month. The default settings only show cases without remifentanil ("No" Remi) and without an opioid given without a known dose ("0" Unknown Dose). This dashboard is for Upper Abdomen cases at your institution within past 12 months. Click "View Details" for more specific information within each month.



Institution Case Average – by month



ULTICENTER PERIOPERATIN OUTCOMES GROUP

Institutional Case Average – by month (table)

Average administration (per case) organized by month								
Date of Service	Remi	Unknown Dose	MPOG.Cases	Average administration	Standard Deviation	Average Case Time	ViewButton	
9/1/17	No remi	No Unknown Dose	181	0.31	0.18	3.5	View Details	
10/1/17	No remi	No Unknown Dose	215	0.35	0.21	3.2	View Details	
11/1/17	No remi	No Unknown Dose	176	0.33	0.19	3.2	View Details	
12/1/17	No remi	No Unknown Dose	201	0.34	0.19	3.2	View Details	
1/1/18	No remi	No Unknown Dose	200	0.33	0.18	3.3	View Details	
2/1/18	No remi	No Unknown Dose	178	0.32	0.20	3.3	View Details	
3/1/18	No remi	No Unknown Dose	184	0.34	0.18	3.1	View Details	
4/1/18	No remi	No Unknown Dose	195	0.30	0.19	3.3	View Details	
5/1/18	No remi	No Unknown Dose	181	0.30	0.15	3.3	View Details	
6/1/18	No remi	No Unknown Dose	220	0.29	0.16	3.3	View Details	
7/1/18	No remi	No Unknown Dose	104	0.31	0.15	3.3	View Details	
			2,035	0.32	0.18	3.3	View Details	



View Details – individual case level

Administration (/kg/hr) by case															10±0
MPOGCaseKey	Attending	^	CRNA/Resident	Date of Service	Procedure	Operating Room	AnesDura	tion CPT	OME	Remi	Unknown Dose	Spin	al Epidura	l Neuraxia	al View Case
					LAPAROSCOPIC COLECTOMY SIGMOID		3.5	00790	0.26	No remi	No Unknown Dose	0	0	0	View Case
					LAPAROSCOPIC SLEEVE GASTRECTOMY		2.5	00797	0.26	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE EXPLORATORY LAPAROTOMY		3.1	00790	0.24	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE DIAGNOSTIC LAPAROSCOP FLEXIBLE SIGMOIDOSC.		4.4	00790	0.22	No remi	No Unknown Dose	0	-1	1	View Case
					GASTROCUTANEOUS FISTULA REPAIR		1.8	00790	0.50	No remi	No Unknown Dose	0	0	0	View Case
					CT DRAINAGE PROCEDURE		1.9	00790	0.24	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE LAPAROSCOPIC ESOPHAGOMYOTOMY / [PHI] FLEXI		2.8	00790	0.44	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE LAPAROSCOPIC ESOPHAGOMYOTOMY / [PHI] FLEXI		3.0	00790	0.51	No remi	No Unknown Dose	0	0	0	View Case
					ILEOSTOMY TAKEDOWN		2.1	00790	0.52	No remi	No Unknown Dose	0	0	0	View Case
					TOTAL GASTRECTOMY		3.0	00790	0.27	No remi	No Unknown Dose	0	0	0	View Case
					LOOP ILEOSTOMY CLOSURE		3.1	00790	0.46	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE AUGMENTATION CYSTOPLASTY		6.6	00790	0.32	No remi	No Unknown Dose	0	0	0	View Case
					EXPLORATORY LAPAROTOMY		2.5	00790	0.32	No remi	No Unknown Dose	0	0	0	View Case
					EXPLORATORY LAPAROTOMY		3.1	00790	0.05	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE LAPAROSCOPIC HIATAL HERNIA REPAIR WITH DAVI		4.6	00790	0.26	No remi	No Unknown Dose	0	0	0	View Case
					MIDLINE EXPLORATORY LAPAROTOMY		2.6	00790	0.25	No remi	No Unknown Dose	0	1	1	View Case
					UNKNOWN HEPATIC LOBECTOMY		5.3	00792	0.33	No remi	No Unknown Dose	0	0	0	View Case
					HEPATIC LOBECTOMY		4.7	00792	0.59	No remi	No Unknown Dose	0	0	0	View Case
					EXPLORATORY LAPAROTOMY		1.8	00790	0.30	No remi	No Unknown Dose	0	1	1	View Case
					LAPAROSCOPIC COLECTOMY LEFT COLON		2.9	00790	0.30	No remi	No Unknown Dose	0	0	0	View Case
< Previous					Showing 1 to 20 of 181										(Next>



View Case – individual case level



> Ventilator

> Neuromuscular blockade

Prophylaxis

Medications

Fluids

> Physiologic



Neural network illustration. Propagation flows from left to right, inputs to outputs through neurons which are interconnected through synapses. Neurons (circles) can be considered data states while synapses (arrows) can be considered mathematical formulas or relations.

