

Opioid Utilization After Trauma: The Impact of Injury Burden

Evan Ross, MD
Walter Meyer, III MD
David Herndon, MD

Department of Surgery
Department of Psychiatry

The University of Texas Medical Branch
Galveston, Texas

 Health Department of Surgery

Disclosures

- None of the authors have any relevant conflicts of interest to disclose
- A previous version of this analysis was presented at the Academic Surgical Congress, February 2018

 Health Department of Surgery

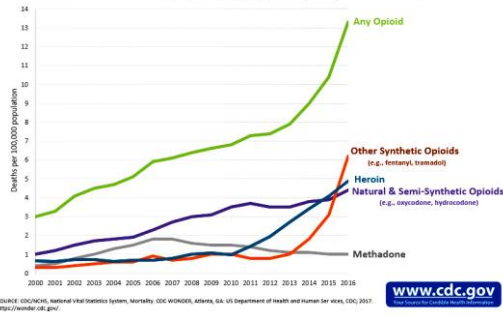
The Opioid Epidemic

- The CDC reports a total of **63,632** drug overdose deaths in the year 2016
 - **42,249 (66%)** deaths were due to some opioid drug
 - **17,087 (27%)** deaths were due to prescription opioids

https://www.cdc.gov/nchs/data/databriefs/db294_table.pdf
<https://www.cdc.gov/mmwr/volumes/67/wr/mm6712a1.htm>

 Health Department of Surgery

Overdose Deaths Involving Opioids, by Type of Opioid, United States, 2000-2016



utmb Health Department of Surgery

Surgery as a Risk Factor

- Previous evidence suggests that elective, outpatient surgery is a risk factor for the development of long-term opiate utilization
- Rates range from 3.1% to 7.7% depending on definition of long-term utilization, patient population, and opioids included in the analysis

Alam A, et al. *Arch Intern Med* (2012)
 Clarke H, et al. *BMJ* (2014)
 Brummett CM, et al. *JAMA Surg* (2017)

utmb Health Department of Surgery

Question & Hypothesis

- What is the pattern of long-term opioid utilization for otherwise opioid naïve patients after trauma?
- We hypothesized that patients who were admitted for their injuries (thus indicating a higher injury burden) would demonstrate significantly higher rates of long-term opioid utilization by comparison to patients who were not admitted for their injuries

utmb Health Department of Surgery

Methods

- Retrospective review of the Truven MarketScan® Commercial Claims and Encounters Research Databases
- National private insurance claims database
 - Includes linked inpatient, outpatient and pharmacy claims data
- Included years 2012-2015

Methods

- Inclusion criteria
 - Pediatric patients: 0-17 years old
 - Adult patients: 18-64 years old
 - Enrolled in prescription coverage
 - ICD-9 codes **800-959.9** exclusive of **905-924.9, 930-939.9, 940-949**
- Exclusion criteria
 - Filled prescription in 180 days prior to injury
 - In-hospital mortality

Methods

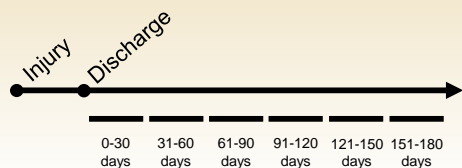
- Prescriptions were included in the analysis if they were for an opioid-type medication
- Prescriptions were excluded if the formulation was used to for
 - Cough suppression
 - Headache / Migraine
 - Maintenance therapy (i.e. Methadone, Suboxone)

Methods

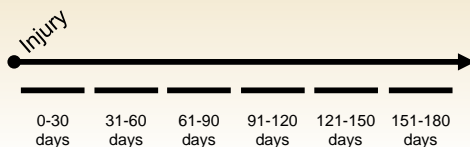
- Chronic utilization (“use”) was defined as filling a prescription for opioids beyond 30 days after injury or discharge
- The prescriptions were then sorted into one of six date ranges:

0-30 days	91-120 days
31-60 days	121-150 days
61-90 days	151-180 days

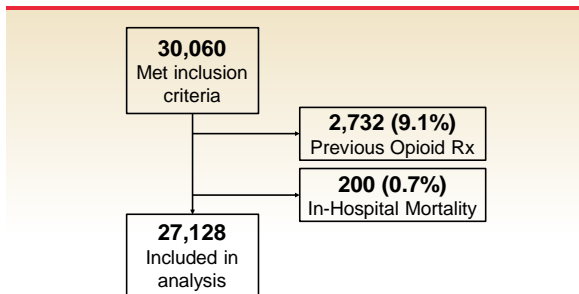
Analysis Timeline - Inpatient



Analysis Timeline - Outpatient



Inpatient Pediatrics



utmb Health Department of Surgery

Pediatric Trauma

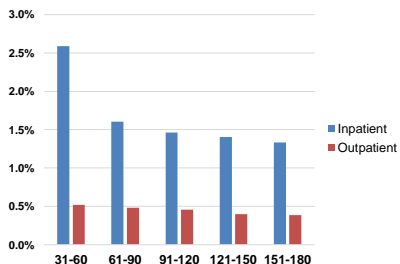
Pediatric inpatients have higher rates of chronic opioid utilization compared to outpatients

	Inpatient	Outpatient	p-value
31-60 days	2.6%	0.5%	p<0.0001
61-90 days	1.6%	0.5%	p<0.0001
91-120 days	1.5%	0.5%	p<0.0001
121-150 days	1.4%	0.4%	p<0.0001
151-180 days	1.3%	0.4%	p<0.0001

Chi-squared test

utmb Health Department of Surgery

Pediatric inpatients have higher rates of chronic opioid utilization compared to outpatients



utmb Health Department of Surgery

Pediatric Inpatient Trauma

Pediatric inpatient trauma patients who chronically utilize opioids are older than those who do not

	Chronic Use (Avg ± SD)	No Chronic Use (Avg ± SD)	p-value
31-60 days	13.3 ± 4.2	10.1 ± 5.7	p<0.0001
61-90 days	13.5 ± 4.1	10.1 ± 5.7	p<0.0001
91-120 days	12.5 ± 4.7	10.1 ± 5.7	p<0.0001
121-150 days	12.7 ± 4.4	10.1 ± 5.7	p<0.0001
151-180 days	12.9 ± 4.2	10.1 ± 5.7	p<0.0001

Two-sided Student's t-test with a Benferroni correction

utmb Health Department of Surgery

Pediatric Inpatient Trauma

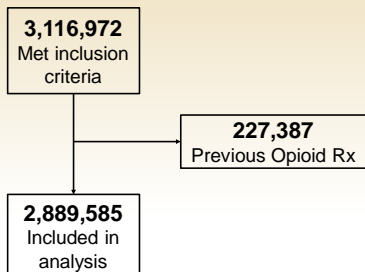
There is no clear effect of biological sex on rates of chronic opioid utilization for pediatric inpatients

	Chronic Use % Female	No Chronic Use % Female	p-value
31-60 days	37%	41%	p = 0.02
61-90 days	40%	41%	p = 0.63
91-120 days	40%	41%	p = 0.61
121-150 days	40%	41%	p = 0.85
151-180 days	39%	41%	p = 0.54

Chi-squared test

utmb Health Department of Surgery

Outpatient Pediatrics



utmb Health Department of Surgery

Pediatric Outpatient Trauma

Pediatric outpatient trauma patients who chronically utilize opioids are **older** than those who do not

	Chronic Use (Avg \pm SD)	No Chronic Use (Avg \pm SD)	p-value
31-60 days	13.3 \pm 4.2	10.1 \pm 5.0	p<0.0001
61-90 days	13.4 \pm 4.2	10.1 \pm 5.0	p<0.0001
91-120 days	13.4 \pm 4.2	10.1 \pm 5.0	p<0.0001
121-150 days	13.4 \pm 4.3	10.1 \pm 5.0	p<0.0001
151-180 days	13.4 \pm 4.2	10.1 \pm 5.0	p<0.0001

Two-sided Student's t-test with a Benferroni correction

utmb Health Department of Surgery

Pediatric Outpatient Trauma

Pediatric outpatient trauma patients who chronically utilize opioids are **more likely to be female** than those who do not

	Chronic Use % Female	No Chronic Use % Female	p-value
31-60 days	51%	55%	p<0.0001
61-90 days	49%	55%	p<0.0001
91-120 days	47%	55%	p<0.0001
121-150 days	46%	55%	p<0.0001
151-180 days	48%	55%	p<0.0001

Chi-squared test

utmb Health Department of Surgery

Adult Trauma

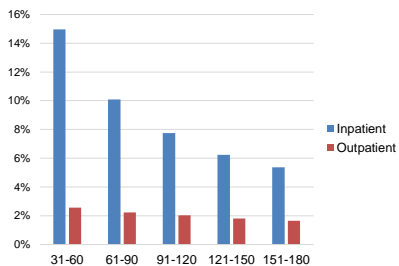
Adult inpatients have higher rates of chronic opioid utilization compared to outpatients

	Inpatient	Outpatient	p-value
31-60 days	15%	2.6%	p<0.0001
61-90 days	10%	2.2%	p<0.0001
91-120 days	7.8%	2.0%	p<0.0001
121-150 days	6.2%	1.8%	p<0.0001
151-180 days	5.4%	1.6%	p<0.0001

Chi-squared test

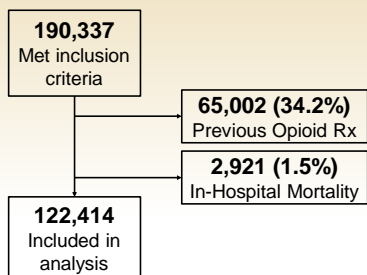
utmb Health Department of Surgery

Adult inpatients have higher rates of chronic opioid utilization compared to outpatients



utmb Health Department of Surgery

Inpatient Adults



utmb Health Department of Surgery

Adult Inpatient Trauma

Adult inpatient trauma patients who chronically utilize opioids are **older** than those who do not

	Chronic Use (Avg ± SD)	No Chronic Use (Avg ± SD)	p-value
31-60 days	46.1 ± 13.6	45.0 ± 14.8	p<0.0001
61-90 days	46.5 ± 13.5	45.0 ± 14.8	p<0.0001
91-120 days	46.8 ± 13.2	45.1 ± 14.8	p<0.0001
121-150 days	46.9 ± 13.3	45.1 ± 14.7	p<0.0001
151-180 days	46.9 ± 13.3	45.1 ± 14.7	p<0.0001

Two-sided Student's t-test with a Benferroni correction

utmb Health Department of Surgery

Adult Outpatient Trauma

Adult inpatient trauma patients who chronically utilize opioids are **more likely to be female** than those who do not

	Chronic Use % Female	No Chronic Use % Female	p-value
31-60 days	55%	52%	p=0.0004
61-90 days	57%	52%	p<0.0001
91-120 days	57%	52%	p<0.0001
121-150 days	57%	52%	p<0.0001
151-180 days	58%	52%	p=0.006

Chi-squared test

utmb Health Department of Surgery

Conclusions

- There are observable differences in long-term opioid utilization when comparing patients treated on an outpatient basis and those treated on an inpatient basis
- Chronic utilization may be associated with advancing age and female gender, though more research will be required to confirm these effects
- Adults appear to have much higher rates of utilization when compared to children

utmb Health Department of Surgery

29

Limitations

- Retrospective claims data
 - Limited to patients with private insurance who maintained coverage
- Focused on opioid naïve patients
- Not adjusted for severity within groups
- Differences are statistically significant but may not be clinically significant

utmb Health Department of Surgery

Future Directions

- We need to better understand the drivers of long-term opioid prescribing
 - Chronic pain?
 - Misuse, abuse, and addiction?
 - Overprescribing?

 Health Department of Surgery

Thank You



 Health

 Health Department of Surgery
