The Role of Acute Care Prescribing in the Opioid Epidemic

Chad M. Brummett, M.D.
Associate Professor
Department of Anesthesiology
Division of Pain Medicine
University of Michigan Medical School
Email: cbrummet@med.umich.edu
www.michigan-OPEN.org
http://medicine.umich.edu/dept/pain-research
Twitter: @drchadb
Funding and Disclosures

• Funding
  • NIAMS/NIH: R01 AR060392; P50 AR070600
  • NIDA/NIH: R01 DA038261; R01 DA042859
  • Michigan Department of Health and Human Services
  • SAMHSA
  • CDC
  • Michigan Genomics Initiative
  • Department of Anesthesiology
  • Neuros Medical, Inc

• Disclosures
  • Patent for the use of peripheral perineural dexmedetomidine alone and in combination with local anesthetics. Application number 12/791,506; Issue Date 4/2/13; Patent Number 8410140
  • Consultant- Recro Pharma, Heron Therapeutics
die every day from an opioid overdose (that includes prescription opioids and heroin).
Preventing Chronic Opioid Use and Abuse Before it Starts

Current Strategic Efforts
Preventing Chronic Opioid Use and Abuse Before it Starts

- Patient not on opioids
- Surgery
- Chronic Opioid Use
- Opioid Diversion into the Community
- Opioid Epidemic

Proposed Preventative Strategy

Current Strategic Efforts
Acute care prescribing 2010-2016

Change in % of new opioid Rx 2010-2016

- 17.6%
- 68%
+ 2.4%
- 8.2%

OMEs in Rx 2010-2016

240 → 403
143 → 154
128 → 226
201 → 283

Larach et al. Annals of Surgery 2018
Acute care prescribing 2010-2016

<table>
<thead>
<tr>
<th>Change in % of new opioid Rx 2010-2016</th>
<th>OMEs in Rx 2014-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 17.6%</td>
<td>396 → 403</td>
</tr>
<tr>
<td>+ 68%</td>
<td>153 → 154</td>
</tr>
<tr>
<td>+ 2.4%</td>
<td>197 → 226</td>
</tr>
<tr>
<td>- 8.2%</td>
<td>380 → 283</td>
</tr>
</tbody>
</table>

Larach et al. Annals of Surgery 2018
Why do surgeons prescribe too much?
The amount of opioid prescribed after surgery was not associated with patient satisfaction or refill rate.

New Persistent Opioid Use

- 6% Brummett CM et al. *JAMA Surg.* 2017; 152(6).
- 13% Johnson SP et al. *JHS.* 2016;41(10).
- 10% Lee JS et al. *JCO.* 2017. Epub.
Persistent Opioid Use After Wisdom Tooth Extraction

70,942 patients age 13-30 years with commercial insurance underwent wisdom tooth extraction

Postoperative opioid prescribing was common

78% of patients filled an opioid prescription

Opioid prescribing increased risk for persistent use

2.7x increased odds of new persistent opioid use

Routine opioid prescribing in dental extractions should be avoided

Opioid prescribing places patients at risk for chronic use and dependence

Harbaugh CM, et al. JAMA 2018
www.michigan-OPEN.org
Can we improve prescribing?

Yes
Guidelines
50 pills → 15 pills

Average Prescribed
Average Consumed

No change in calls for refills (3-4%)
No change in patient-reported pain scores
Patients consumed fewer pills
Guidelines
50 pills $\rightarrow$ 15 pills

Average Prescribed
Average Consumed

No change in calls for refills (3-4%)

No change in patient-reported pain scores

Patients consumed fewer pills
Supersize it!

David Marchiori, Esther K. Papies, Olivier Klein, The portion size effect on food intake. An anchoring and adjustment process?, Appetite (2014),
doi: 10.1016/j.appet.2014.06.018
370 Patients \times \downarrow 35 \text{ pills per patient} = 13,000 \text{ pills kept out of the community}
Michigan Surgical Quality Collaborative (MSQC) participating sites

Counties
Deaths per 100,000
- Data unavailable
- 5 to 10
- 10 to 15
- 15 to 20
- 20 to 25
- 25 or more

Michigan Surgical Quality Collaborative (MSQC) participating sites
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Hydrocodone (Norco)</th>
<th>Hydromorphone (Dilaudid)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 mg tablets</td>
<td></td>
</tr>
<tr>
<td>Codeine (Tylenol #3)</td>
<td>30 mg tablets</td>
<td>2 mg tablets</td>
</tr>
<tr>
<td></td>
<td>50 mg tablets</td>
<td></td>
</tr>
<tr>
<td>Tramadol</td>
<td>50 mg tablets</td>
<td></td>
</tr>
<tr>
<td>Oxycodone</td>
<td>5 mg tablets</td>
<td></td>
</tr>
<tr>
<td>Laparoscopic Cholecystectomy</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Laparoscopic Appendectomy</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Inguinal/Femoral Hernia Repair (open/laparoscopic)</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Open Incisional Hernia Repair</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Laparoscopic Colectomy</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Open Colectomy</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Ileostomy/Colostomy Creation, Re-siting, or Closure</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Open Small Bowel Resection or Enterolysis</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Thyroidectomy</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Laparoscopic &amp; Robotic</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Abdominal</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Wide Local Excision ± Sentinel Lymph Node Biopsy</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Simple Mastectomy ± Sentinel Lymph Node Biopsy</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Lumpectomy ± Sentinel Lymph Node Biopsy</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Breast Biopsy</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Sentinel Lymph Node Biopsy Alone</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>
Reductions in patient opioid consumption

New prescribing recommendations based on patient consumption

Monitor Satisfaction, PROs

Reductions in opioid prescribing
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Old Recs</th>
<th>New Recs</th>
<th>% Change</th>
<th>Data for Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopic Cholecystectomy</td>
<td>75</td>
<td>75</td>
<td>-</td>
<td>Howard[1], Hill[2]</td>
</tr>
<tr>
<td>Laparoscopic Appendectomy</td>
<td>75</td>
<td>75</td>
<td>-</td>
<td>None. Analogy to lap chole.</td>
</tr>
<tr>
<td>Inguinal/Femoral Hernia Repair (open/laparoscopic)</td>
<td>75</td>
<td>75</td>
<td>-</td>
<td>Hill[2], Howard &quot;spillover&quot; data</td>
</tr>
<tr>
<td>Open Incisional Hernia Repair</td>
<td>200</td>
<td>150</td>
<td>-25%</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Laparoscopic Colectomy</td>
<td>185</td>
<td>145</td>
<td>-22%</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Open Colectomy</td>
<td>200</td>
<td>150</td>
<td>-25%</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Ileostomy/Colostomy Creation, Re-siting, or Closure</td>
<td>-</td>
<td>200</td>
<td>-</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Open Small Bowel Resection or Enterolysis</td>
<td>-</td>
<td>150</td>
<td>-</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Thyroidectomy</td>
<td>-</td>
<td>50</td>
<td>-</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>125</td>
<td>100</td>
<td>-20%</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Laparoscopic &amp; Robotic</td>
<td>175</td>
<td>125</td>
<td>-29%</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Abdominal</td>
<td>220</td>
<td>185</td>
<td>-16%</td>
<td>New MSQC data(75th percentile)</td>
</tr>
<tr>
<td>Wide Local Excision ± Sentinel Lymph Node Biopsy</td>
<td>150</td>
<td>150</td>
<td>-</td>
<td>Michigan Medicine institutional guideline</td>
</tr>
<tr>
<td>Simple Mastectomy ± Sentinel Lymph Node Biopsy</td>
<td>150</td>
<td>150</td>
<td>-</td>
<td>Michigan Medicine institutional guideline</td>
</tr>
<tr>
<td>Lumpectomy ± Sentinel Lymph Node Biopsy</td>
<td>75</td>
<td>75</td>
<td>-</td>
<td>Hill[2]</td>
</tr>
<tr>
<td>Breast Biopsy</td>
<td>75</td>
<td>37.5</td>
<td>-50%</td>
<td>Hill[2]</td>
</tr>
<tr>
<td>Sentinel Lymph Node Biopsy Alone</td>
<td>-</td>
<td>75</td>
<td>-</td>
<td>Michigan Medicine institutional guideline</td>
</tr>
</tbody>
</table>

Our Goals

Eliminate unnecessary opioid exposures
Reduce opioid use when necessary
Eliminate new persistent use

Manage pain
Enable functional recovery
Educate patients and set expectations

Encourage Acetaminophen, NSAIDs, local anesthetics, and other non-opioid treatments

Avoid co-prescribing benzodiazepines and sedatives

Check a PDMP before prescribing opioids
Opioid Prescribing for Opioid Naïve Patients

1. Prescribe only 1 short-acting opioid
2. No long-acting opioids
3. Avoid pre-op opioid prescription
4. Prescribe naloxone in high-risk patients
How do we stop this from happening?
How do we stop this from happening?

- GET DATA
- GUIDE/REWARD CHANGE
- COLLABORATE
Michigan OPEN Co-Directors

Jennifer Waljee, MD, MPH, MS  
Plastic and Hand Surgery

Michael Englesbe, MD  
Transplant Surgery

Chad Brummett, MD  
Pain Medicine/Anesthesiology
The Team, The Team, The Team.
Learn more about our work:
http://michigan-open.org

http://precisionhealth.umich.edu
https://www.michigangenomics.org

Follow me:
@drchadb
HOW RISKY IS OPIOID PAIN MANAGEMENT DURING ADOLESCENCE?

PERSISTENT USE, MISUSE, AND ABUSE

**Presenter:** Terri Voepel-Lewis, PhD, RN
Associate Professor School of Nursing
Research Associate Scientist, Department of Anesthesiology
University of Michigan, Ann Arbor, MI
No Conflicts of Interest
Acknowledgements

National Institutes of Health; National Institute on Drug Abuse (NIDA)

• RO1DA044245 – Scenario-tailored opioid messaging program: An interactive intervention to prevent analgesic-related adverse drug events in children and adolescents

Colleagues and staff:

Drs. Carol J. Boyd and Sean E. McCabe at the Center for Drugs Alcohol Smoking and Health, School of Nursing

Drs. Alan R. Tait and Shobha Malviya

Department of Anesthesiology, University of Michigan, Ann Arbor
Purpose

• Synthesize what is known about the trajectory from prescription opioid use during childhood/adolescence to misuse and abuse

• Identify known risk factors for prescription opioid misuse

• Highlight limitations to understanding opioid misuse and abuse

• Discuss targets for future risk reduction
Trajectories after Legitimate Use

- Adherent Short –Term Use
- Persistent Prescribed Use
- Misuse
  - Non-adherent use (Medical misuse)
  - Non-medical use (Use someone else’s Rx)
  - Abuse (Use to get high/altered state)
Trajectories after Legitimate Use

- **Adherent**
  - Short-Term Use

- **Persistent**
  - Prescribed Use

- **Misuse**
  - Non-adherent use (Medical misuse)
  - Non-medical use (Use someone else’s Rx)
  - Abuse (Use to get high/altered state)

**Adverse events... Overdose**

**Dependence... Addiction**
<table>
<thead>
<tr>
<th>Data Source (self-report)</th>
<th>Misuse Question(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring the future (MTF) (≥ 8th grade; subset longitudinal)</td>
<td>Take narcotics on own without Dr. telling you to take them</td>
</tr>
</tbody>
</table>
| National Survey on Drug Use & Health (NSDUH) (≥ 12 yrs)       | Q 1) Use of someone else’s Rx  
Q 2) Use of one’s own Rx in way not directed by Dr. (e.g., greater amounts, more often or longer, other way) |
| Adolescent to Adult Health (Add Health) (Longitudinal from 7th grade - age 32) | Use of pain killers without Dr.’s permission                                      |
| National Epidemiologic Survey on Alcohol & Related Conditions (NESARC) (≥ 18 yrs) | Use without a prescription, in greater amounts, more often or longer than prescribed, or for a reason other than directed by Dr. |
| Secondary Student Life Survey (SSLS) (Longitudinal 7-12th grade 2007-’12) | Q1) Use of drug not prescribed for you  
Q2) Use own Rx in higher or more frequent doses or to get high or to increase effect of other drugs |
| Single center surveys (College Life Survey and Emerging Adult Survey) | Used drug not prescribed to you  
Used higher or more frequent dose than prescribed or taken for a reason other than prescribed |
Other outcomes

<table>
<thead>
<tr>
<th>Data Source</th>
<th>“Persistent” Opioid Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truven Health Data (privately insured)</td>
<td>Refill between 90-180 days after procedure</td>
</tr>
<tr>
<td></td>
<td>90 day supply with no &gt; 32 day lapse in Rx</td>
</tr>
<tr>
<td>Single Center Surveys</td>
<td>Self-reported ongoing use at 2 - 12 months</td>
</tr>
<tr>
<td></td>
<td>Medical record retrieval</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Source</th>
<th>“Persistent” Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Center Surveys</td>
<td>Presence of pain at 3, 6, 12, 24 months or longer</td>
</tr>
<tr>
<td></td>
<td>Pain severity (generally 0-10 scales)</td>
</tr>
<tr>
<td></td>
<td>Nature (symptom descriptors for neuropathic pain)</td>
</tr>
</tbody>
</table>
Opioid Prescriptions to US Youth

Data Source: Medical Expenditure Panel Surveys

2.5 million exposures [95% CI 1.47-2.15]

Groenewald CB et al. Pain 2016;157:1021
Medical and Nonmedical Use (“misuse”) - High School Seniors

McCabe SE et al. Pediatrics 2017;139:e20162387
Variable Self-Reported Lifetime Misuse

Data extrapolated from cited sources throughout; vary based on year of survey, sample, question asked.
Patterns of Non-Medical Use HS Seniors (*MTF data*)

McCabe SE et al. Pediatrics 2017;139:e20162387
Trajectory of Misuse During High School
(SSLS longitudinal data)

22% Medical Use by 12th Grade

Year 1 Survey (<12th grade)
- 81% Adherent
- 19% Misuse own
- 4.9% Misuse others’

Year 2 Survey
- 34% Ongoing medical use
- 8% Misuse own
- 7% Misuse others’
- 15.4% Misuse others’
- 25.3% Misuse others’

McCabe SE. Arch Pediatr Adolesc Med 2012;166:797
McCabe SE. Pain 2013;154:708
Trajectory through Young Adulthood

- 12-15% misused ≥ 1 occasion (College cross-sectional sample)
- 55% misused on 1-2 occasions in past year
  \textbf{20\% on 3-5 occasions}
  
  McCabe SE. Addictive Behaviors 2007;32:562

- 11.6\% [95\% CI 11.2-12] reported misuse (MTF longitudinal sample)
- 69\% 1 wave only
  21\% 2 waves

Trajectory to Misuse Young Adulthood
(MTF data 12\textsuperscript{th} through age 23 yr)

\textit{Misuse} = \textit{use of Rx opioid on own for the purpose of getting high, to relax or feel good}

15% Legitimate use by Grade 12*

\begin{itemize}
  \item Risk stratification analyses
  \begin{itemize}
    \item Low substance use
    \item through highest use
  \end{itemize}
  \begin{itemize}
    \item Grades
    \item Race
    \item Parent education
    \item Disapproval marijuana
  \end{itemize}

  Rx increased the risk for low risk groups:
  \begin{itemize}
    \item 1.8-3% probability:
      \begin{itemize}
        \item OR 3.01 [95\% CI 1.8-5.07]
      \end{itemize}
    \item 3-<5% probability of misuse:
      \begin{itemize}
        \item OR 1.95 [1.15-3.34]
      \end{itemize}
  \end{itemize}
\end{itemize}

*1990-2012 wave 1 data

*Outcome misuse at any follow-up wave; ages 19-23; response 69\%; 25\% imputed missing data;
\textit{Stratified sample by risk factors to examine impact of Rx}
\textit{OR} = \textit{Odds Ratio CI=}\textit{Confidence Interval}

Miech R. Pediatrics 2015;136:e1169-e1177
Trajectory to Misuse Young Adulthood (MTF data through age 23)

- From 12th grade history to follow-up (19-23 year olds)

<table>
<thead>
<tr>
<th>Abuse Rx opioid 12th grade</th>
<th>Abuse Rx opioid age 19-23 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 occasions</td>
<td>RR 1.97 [1.4 - 2.77]</td>
</tr>
<tr>
<td>3-5 occasions</td>
<td>RR 2.8 [1.83 - 4.29]</td>
</tr>
<tr>
<td>20-39 occasions</td>
<td>RR 5.88 [3.19 - 10.8]</td>
</tr>
</tbody>
</table>

RR = Relative Risk

Miech R. Pediatrics 2015;136:e1169-e1177
Trajectory to Misuse College Sample

Lifetime Medical Use \rightarrow \text{Associated with 2X risk of misuse (AOR 2.02 [1.78 – 2.31])}^*

*Adjusted for personal factors, year of survey, diversion
AOR = Adjusted odds ratio

McCabe SE. Addictive Behaviors 2014;39:1176
Trajectory into Later Adulthood (MTF data)

12th Grade

- No use 74%
- Medical Use 22%
- Misuse 5.4%

Misuse Age 35 yr*

- 2.4%
- 4.4% (OR 1.7 [1.1-2.8])
- 8.4% (OR 3.2 [1.9-5.4])

*46% loss to follow-up

McCabe SE. Pain 2016;157:2173
Misuse to Abuse

- Substance use behavior higher among misusers

(MTF HS Senior cross-sectional data 2007-2009)

<table>
<thead>
<tr>
<th>Pattern misuse</th>
<th>AOR Lifetime Illicit Drug Use</th>
<th>AOR Misuse Other Rx Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical use → misuse</td>
<td>3.3 [2.0 - 5.7]</td>
<td>4.2 [2.7- 6.6]</td>
</tr>
<tr>
<td>Misuse → medical use</td>
<td>26.6 [16.9 – 41.9]</td>
<td>27.6 [17.7 – 43]</td>
</tr>
</tbody>
</table>

*Reference group “no use”

McCabe SE. Arch Pediatr Adolesc Med 2012;166:797
Misuse to Abuse

• Lifetime abuse/dependence (any scheduled Rx drug) associated with lower age of first misuse (NESARC 2001-2002 data)\(^a\)
  • 25% with lifetime dependence (any substance) recalled onset before age 13
    (vs. only 7% recalled onset at >21yrs)

• 4 of 5 adolescent heroin users recall first exposure to Rx opioid\(^b\)
• 40-86% adult heroin abusers recall misusing Rx opioids before heroin\(^c\)

\(^a\)McCabe SE. Addiction 2007;102:1920-1930
\(^b\)Vosberg SK. J Child Adolesc Subst Abuse 2016;25:105
\(^c\)Compton WM. NEJM 2016;374:154
Primary Motives for Youth Misuse

Boyd CJ. Pediatrics 2006;118:2472
McCabe SE. Addictive Behav 2007;32:562
McCabe SE. Arch Pediatr Adolesc Med 2011;165:729
Voepel-Lewis T. J Adolesc Health 2018;63:594
Pain and Misuse

• Chronic pain in adolescence increased the risk of later misuse (Add Health 1995-2008)a
  • Early adulthood misuse (AOR 1.24 [1.05-1.46])
  • Later adulthood misuse (AOR 1.19 [1.04-1.36])
  • Other risk factors
    • Recent legitimate use (AOR 1.95)
    • Substance use (AOR 1.27)
    • Childhood trauma (abuse/neglect) (AOR 1.31)

• Association between childhood abuse and misuse mediated by painb

   aGroenewald CB. J Pain 2018; doi.org/10.1016/j.jpain.2018.07.007
   bAustin AE. Child Youth Serv Review 2018;86:84
Pain, Opioid Use and Misuse Intention
(15-24 yr old community sample)

- Deliberate intentions to misuse opioids for pain management associated with:
  - Past opioid misuse (AOR 1.8 [1.13 – 2.91])
  - Higher preference for pain relief (AOR 1.07 [1.03 -1.12])
  - Recent substance use (AOR 1.67 [1.2 – 2.33])
  - Higher perceptions of opioid risk reduced misuse intention (AOR 0.75 [0.66 – 0.86])

Voepel-Lewis T. J Adolesc Health 2018;63:594
Pain and Persistent Opioid Use Adolescents

- Prevalence chronic pain during adolescence ~22%
- “Persistent pain” after surgery/trauma ~20%
- “Persistent” opioid use after surgery
  - 4.8% [2.7 – 15.2] (13 select procedures)

Groenewald CB. J Pain 2018; doi.org/10.1016/j.jpain.2018.07.007
Sieberg CB. J Pain 2013;14:1694
Voepel-Lewis T. Pediatr Anesth 2018; doi.org/10.1111/pan.13467
Harbaugh C. Pediatrics 2018;141:e20172439
Pain, Persistent Opioid Use, Misuse

- Risk factors persistent pain and opioid use
  - Major surgery (cholectomy, cholecystectomy)
  - Gastrointestinal comorbidity
  - Pre- and perioperative pain and opioid use/analgesic use
  - Ongoing procedures

Sieberg CB. J Pain 2013;14:1694
Harbaugh C. Pediatrics 2018;141:e20172439
Owusu-Agyemang P. Pediatr Anesth 2018;28:625
Voepel-Lewis T. Pediatr Anesth 2018; doi.org/10.1111/pan.13467
Bennett KG. J Craniofacial Surg 2018;29:1697
Persistent Opioid Use during Adolescence (Truven data)

- Diagnosis of any mental health condition associated with opioid use and long-term use
  - E.g., ADHD (HR 1.73 [1.54 – 1.95])
  - ≥ 2 conditions (HR 4.01 [3.62 – 4.46])
  - Benzodiazepine use (HR 3.9 [3.39 – 4.45])
  - Non-opioid SUD (HR 4.02 [3.48 – 4.65])
  - Opioid use disorder (HR 8.9 [5.85 – 13.54])

ADHD = Attention deficit hyperactivity disorder
SUD = Substance use disorder
HR = Hazard ratio

Risk Factors Associated with Misuse* During Adolescence

• MTF through 2005\(^a\); SSLS 2009-10\(^b\)
  • Binge drinking past 2 weeks AOR 1.4 - 5.0 [1.7-11.4]\(^{ab}\)
  • Marijuana in past year
    • Adherent use 1.6 [1.1-2.4]\(^b\)
    • Misuse (both own and others’) 2.6 [1.6-4.1]\(^b\)

\(^a\)Miech R. Pediatrics 2015;136:e1169-e1177
\(^b\)McCabe SE. J Adolesc Health 2007;40:76

*Odds ratios vary by year data obtained & models, but risk factors are fairly consistently significant
## Substance Use/Abuse and Misuse

Misuse during adolescence (SSLS\textsuperscript{ac}; NSDUH\textsuperscript{d}) or young adulthood (College Survey)\textsuperscript{b}

<table>
<thead>
<tr>
<th></th>
<th>Past Year Substance Use +DAST</th>
<th>Lifetime Substance Use +CRAFFT</th>
<th>Substance Use Disorder (SUD) (DSM-V Criteria)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Use Only</td>
<td></td>
<td></td>
<td>1.34 [1.08 - 1.69]\textsuperscript{d}</td>
</tr>
<tr>
<td>Any Misuse</td>
<td></td>
<td></td>
<td>3.71 [2.73 - 5.05]\textsuperscript{d}</td>
</tr>
<tr>
<td>Misuse Own</td>
<td>9.4 [4.6 - 19]\textsuperscript{a}</td>
<td>5.1 [2.4 - 10.6]\textsuperscript{c}</td>
<td></td>
</tr>
<tr>
<td>Misuse Others’</td>
<td>15.1 [11.5 - 19.8]\textsuperscript{b}</td>
<td>9.6 [3.9 - 23.6]\textsuperscript{c} (Non-pain motive)</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a}McCabe SE. Arch Pediatr Adolesc Med 2011;165:729
\textsuperscript{b}McCabe SE. Addictive Behaviors 2007;32:562
\textsuperscript{c}McCabe SE. Pain 2013;154:708
\textsuperscript{d}McCabe SE. Data under review Addictive Behaviors, 2018

\textsuperscript{+CRAFFT=Car Relax Alone Forget Friends Trouble Screener \geq2} \textsuperscript{+DAST=Drug Abuse Screening Test \geq 3/10]

\textit{DSM=Diagnostic and Statistical Manual of Mental Disorders}
Limitations

• Variation in operational definition of prescription misuse
• Variability in timeframe of assessments
  \((\text{lifetime, past 30 days, past week})\)

• Selection biases across all surveys
• Report bias (social desirability) & recall bias (lifetime)
• Loss to follow-up
  • E.g. 46% attrition over time MTF data

• Imputation techniques for missing data
Future Targets to Reduce Risks of Prescription Misuse

• Improve pain and symptom management (non-opioid) and longitudinal follow-up
• Mental health, substance use assessment and intervention
• Improve the type of risk information we give to adolescents at time of prescribing

• For future research:
• Adapt consistent definitions for misuse, abuse, and other outcomes
  • Misuse – “Drug taken with a therapeutic intent in a manner other than prescribed”