

The Role of Acute Care Prescribing in the Opioid Epidemic

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Funding and Disclosures

- Funding

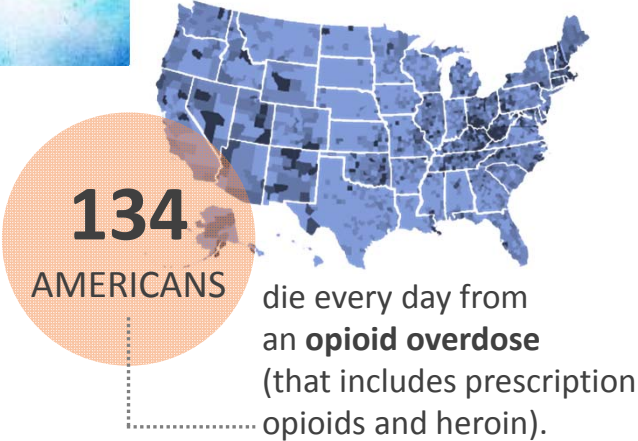
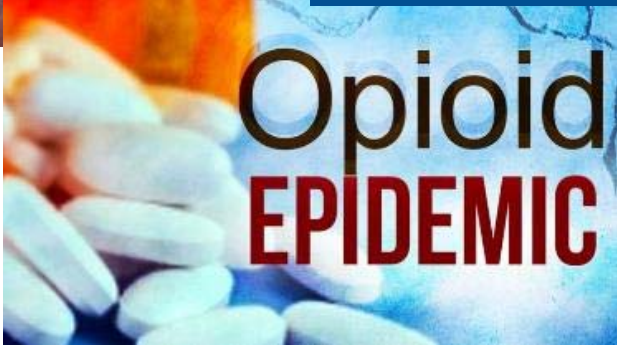
- NIAMS/NIH: R01 AR060392; P50 AR070600
- NIDA/NIH: R01 DA038261; R01 DA042859
- Michigan Department of Health and Human Services
- SAMHSA
- CDC
- Michigan Genomics Initiative
- Department of Anesthesiology
- Neuros Medical, Inc

- Disclosures

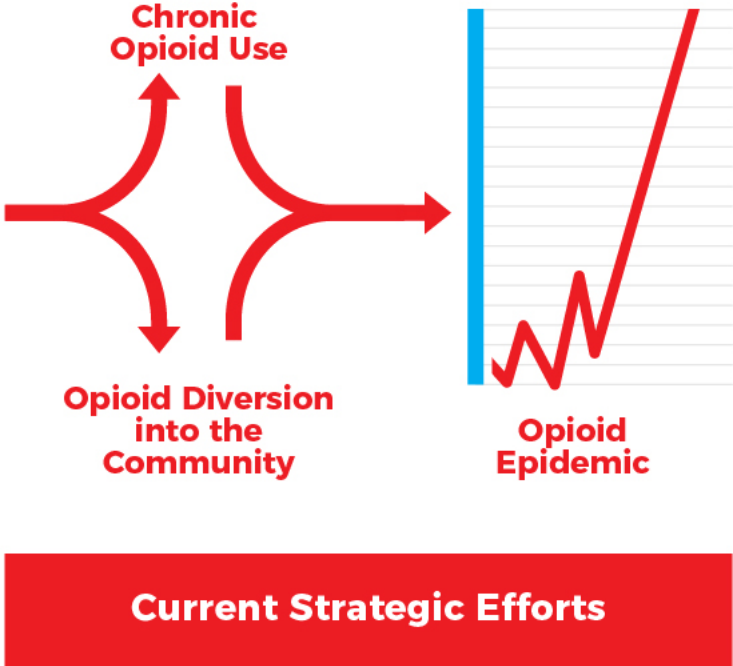
- Patent for the use of peripheral perineural dexmedetomidine alone and in combination with local anesthetics. Application number 12/791,506; Issue Date 4/2/13; Patent Number 8410140
- Consultant- Recro Pharma, Heron Therapeutics



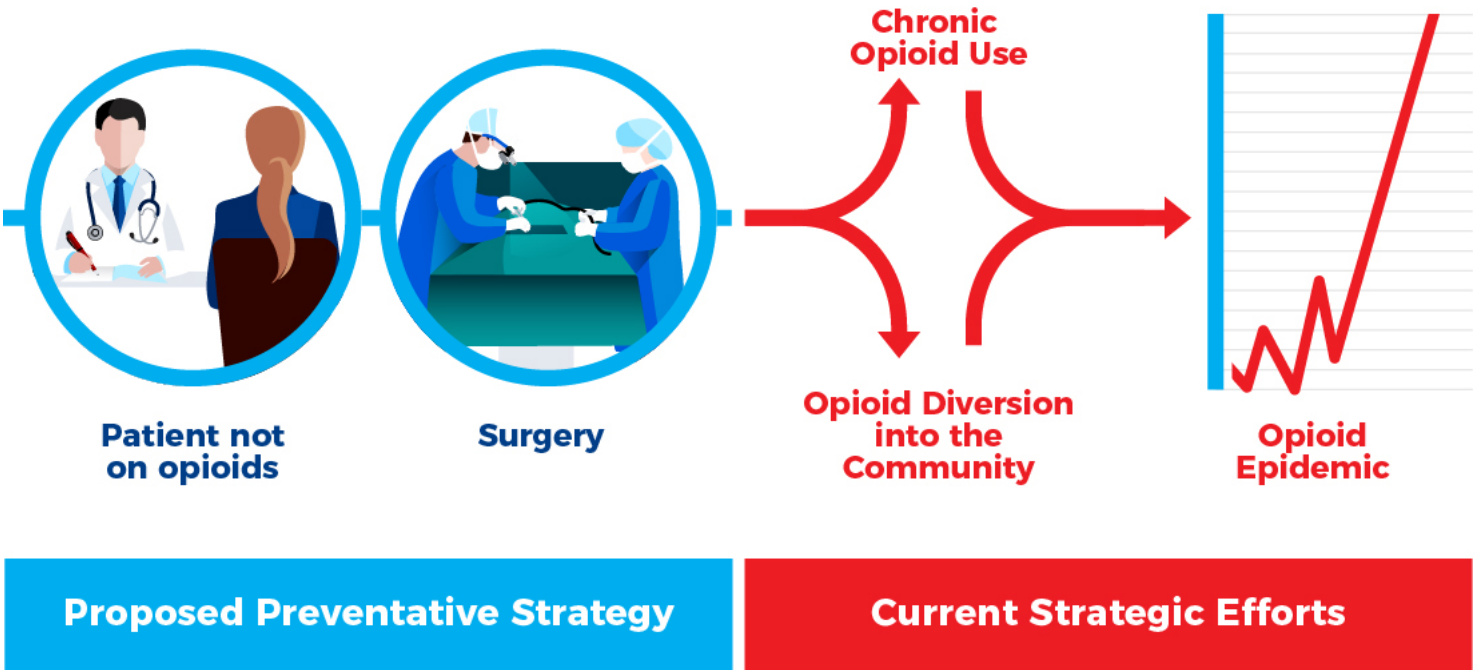
Opioid overdose kills
more individuals than those involved
in fatal motor vehicle accidents.



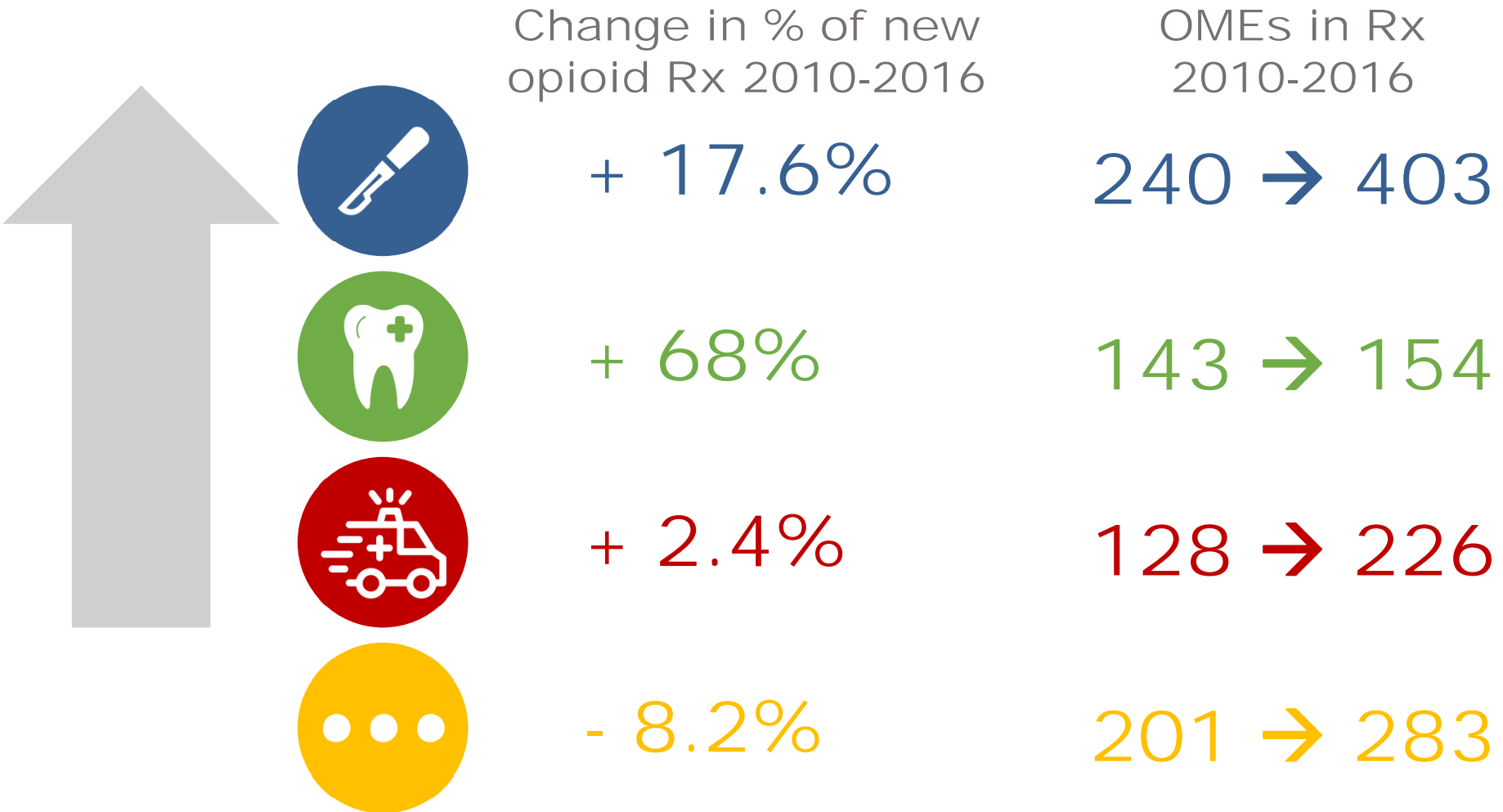
Preventing Chronic Opioid Use and Abuse Before it Starts



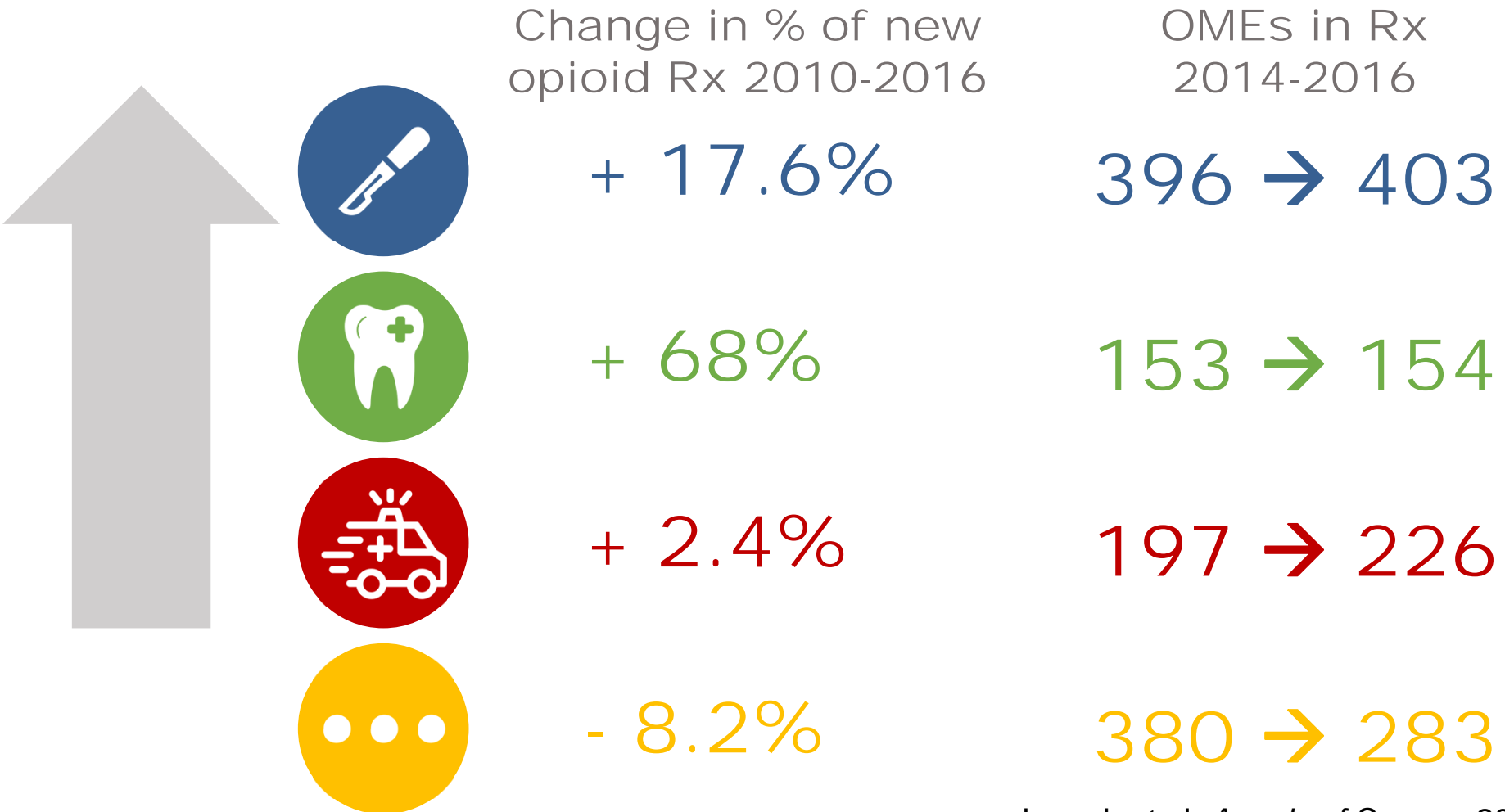
Preventing Chronic Opioid Use and Abuse Before it Starts



Acute care prescribing 2010-2016



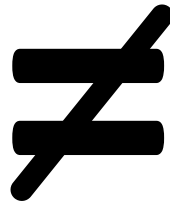
Acute care prescribing 2010-2016



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).



8%

Goesling J et al. *Pain.* 2016;157(6).



13%

Johnson SP et al. *JHS.* 2016;41(10).



13%

Deyo RA et al. *Pain.* 2018. Epub.



5%

Harbaugh CM et al. *Pediatrics.* 2017. Epub.



10%

Lee JS et al. *JCO.* 2017. Epub



19%

Marcusa D et al. *PRS.*⁸
2017;140(6).

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



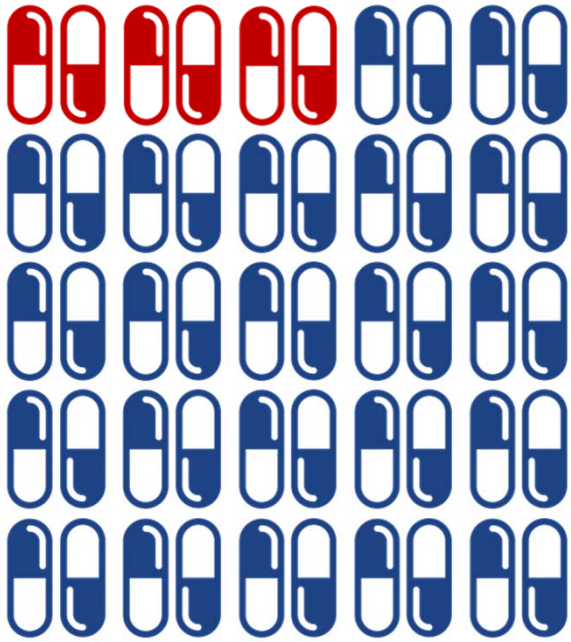
Opioid prescribing places patients at risk for chronic use and dependence

Can we improve prescribing?

Yes



MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN



Guidelines
50 pills → 15 pills



Average Prescribed
Average Consumed



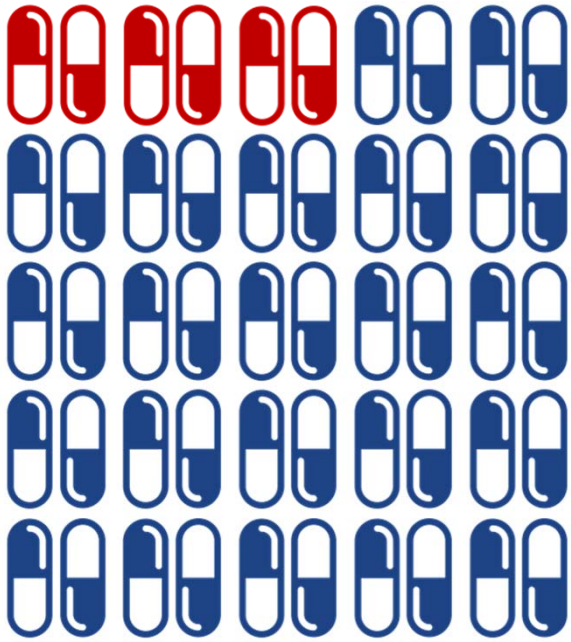
No change in calls
for refills (3-4%)



No change in patient-
reported pain scores



Patients consumed
fewer pills



Guidelines
50 pills → 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

x

↓35 pills
per patient

= **13,000** pills kept
out of the community

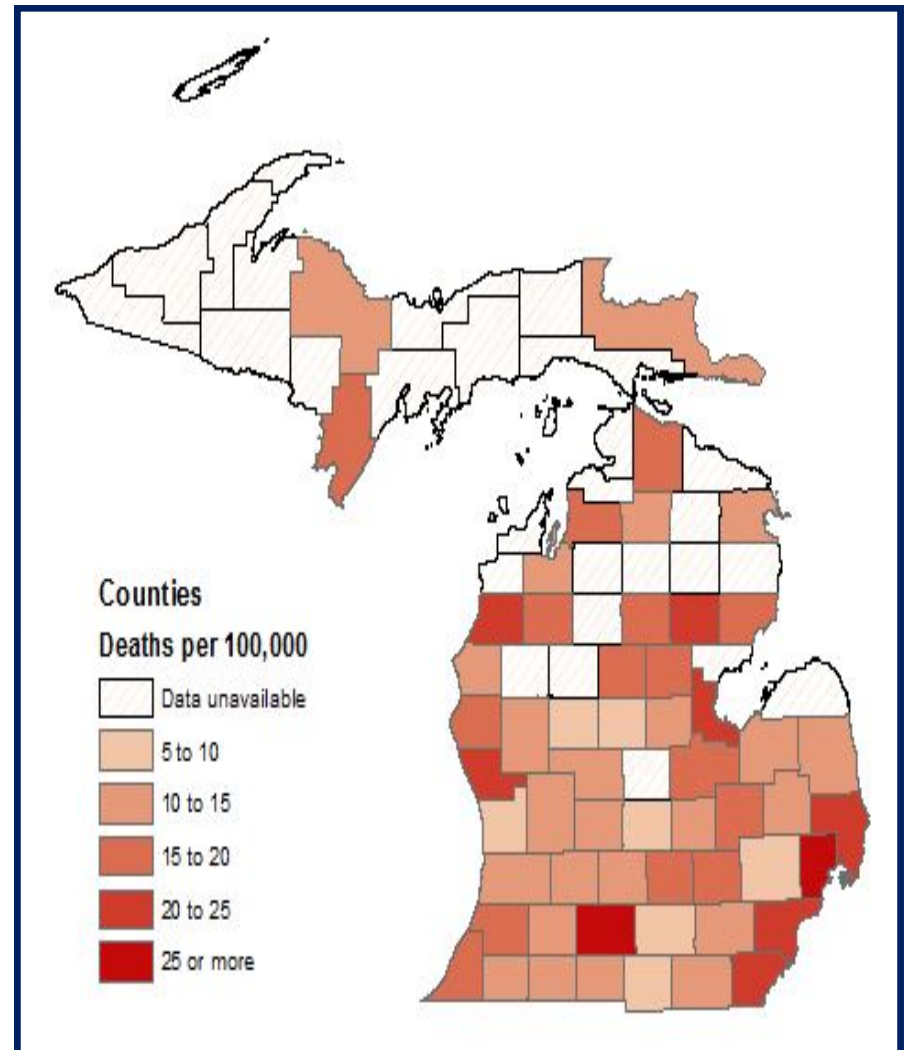
MSQOC

Michigan Surgical Quality Collaborative



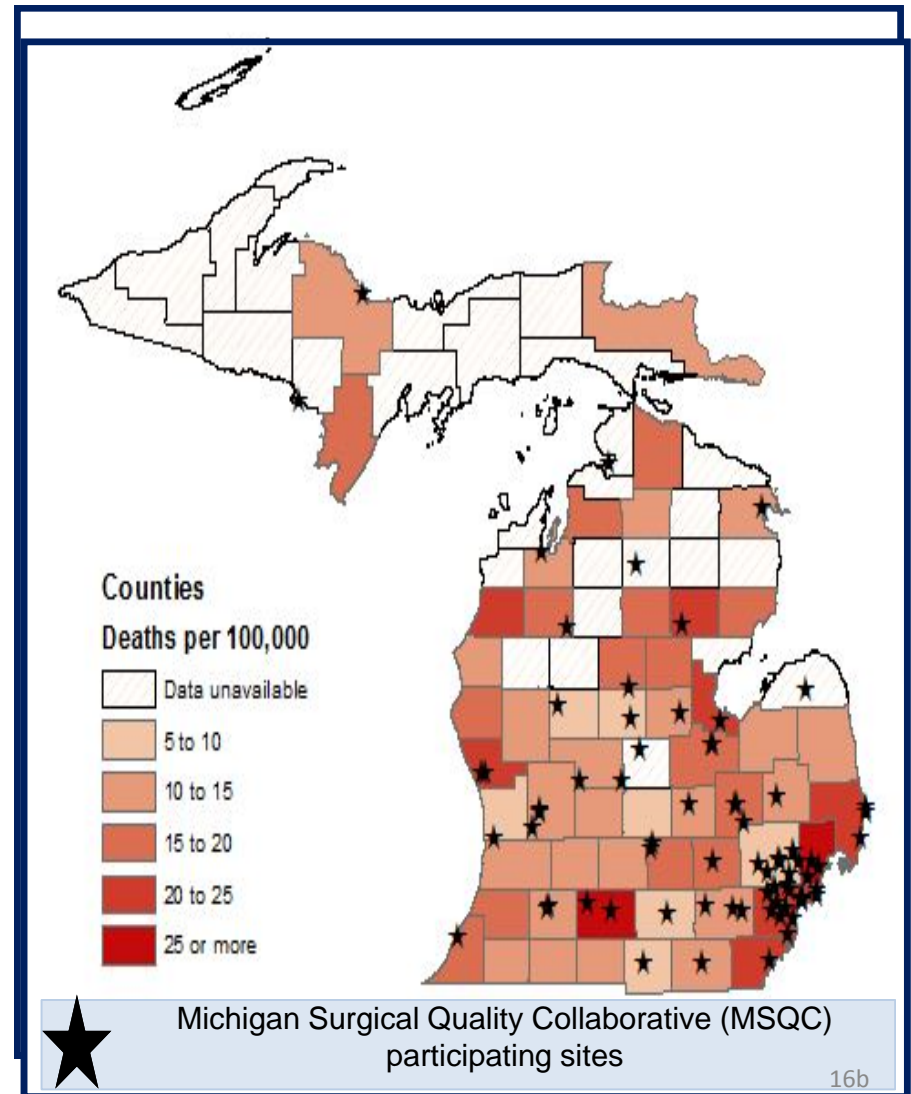
ASPIRE

Anesthesiology Performance Improvement and Reporting Exchange



MSQCC

Michigan Surgical Quality Collaborative

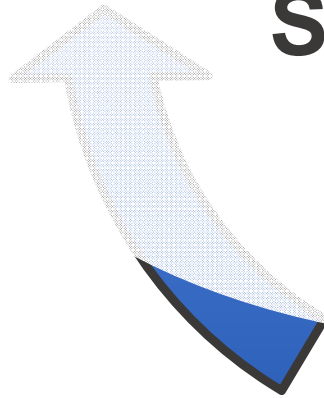


Procedure	Hydrocodone (Norco) 5 mg tablets	Hydromorphone (Dilaudid) 2 mg tablets
	Codeine (Tylenol #3) 30 mg tablets	
	Tramadol 50 mg tablets	Oxycodone 5 mg tablets
Laparoscopic Cholecystectomy	15	10
Laparoscopic Appendectomy	15	10
Inguinal/Femoral Hernia Repair (open/laparoscopic)	15	10
Open Incisional Hernia Repair	30	20
Laparoscopic Colectomy	30	20
Open Colectomy	30	20
Ileostomy/Colostomy Creation, Re-siting, or Closure	40	25
Open Small Bowel Resection or Enterolysis	30	20
Thyroidectomy	10	5
Hysterectomy		
Vaginal	20	10
Laparoscopic & Robotic	25	15
Abdominal	35	25
Wide Local Excision ± Sentinel Lymph Node Biopsy	30	20
Simple Mastectomy ± Sentinel Lymph Node Biopsy	30	20
Lumpectomy ± Sentinel Lymph Node Biopsy	15	10
Breast Biopsy	10	5
Sentinel Lymph Node Biopsy Alone	15	10

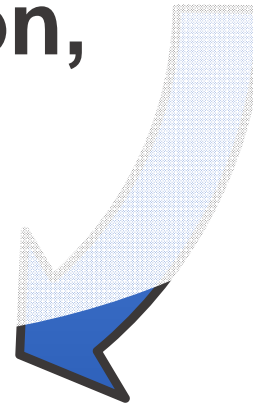
Reductions in
patient opioid
consumption

New prescribing
recommendations
based on patient
consumption

**Monitor
Satisfaction,
PROs**



Reductions in
opioid prescribing



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

1. Howard R, Waljee J, Brummett C, Englesbe M, Lee J. Reduction in Opioid Prescribing Through Evidence-Based Prescribing Guidelines. JAMA Surg. 2017.
2. Hill MV, Stucke RS, McMahon ML, Beeman JL, Barth RJ, Jr. An Educational Intervention Decreases Opioid Prescribing After General Surgical Operations. Ann Surg. 2017.

Our Goals

OPEN

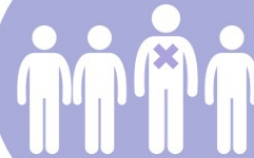
OPIOID PRESCRIBING ENGAGEMENT NETWORK



Eliminate unnecessary opioid exposures



Reduce opioid use when necessary



Eliminate new persistent use



Manage pain



Enable functional recovery

Practical Guidelines for Postop Prescribing



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



Prescribe only 1 short-acting opioid



No long-acting opioids



Avoid pre-op opioid prescription



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.



OPEN

OPIOID PRESCRIBING ENGAGEMENT NETWORK

Learn more about our work:

<http://michigan-open.org>

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<http://precisionhealth.umich.edu>

<https://www.michigan-genomics.org>



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@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

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

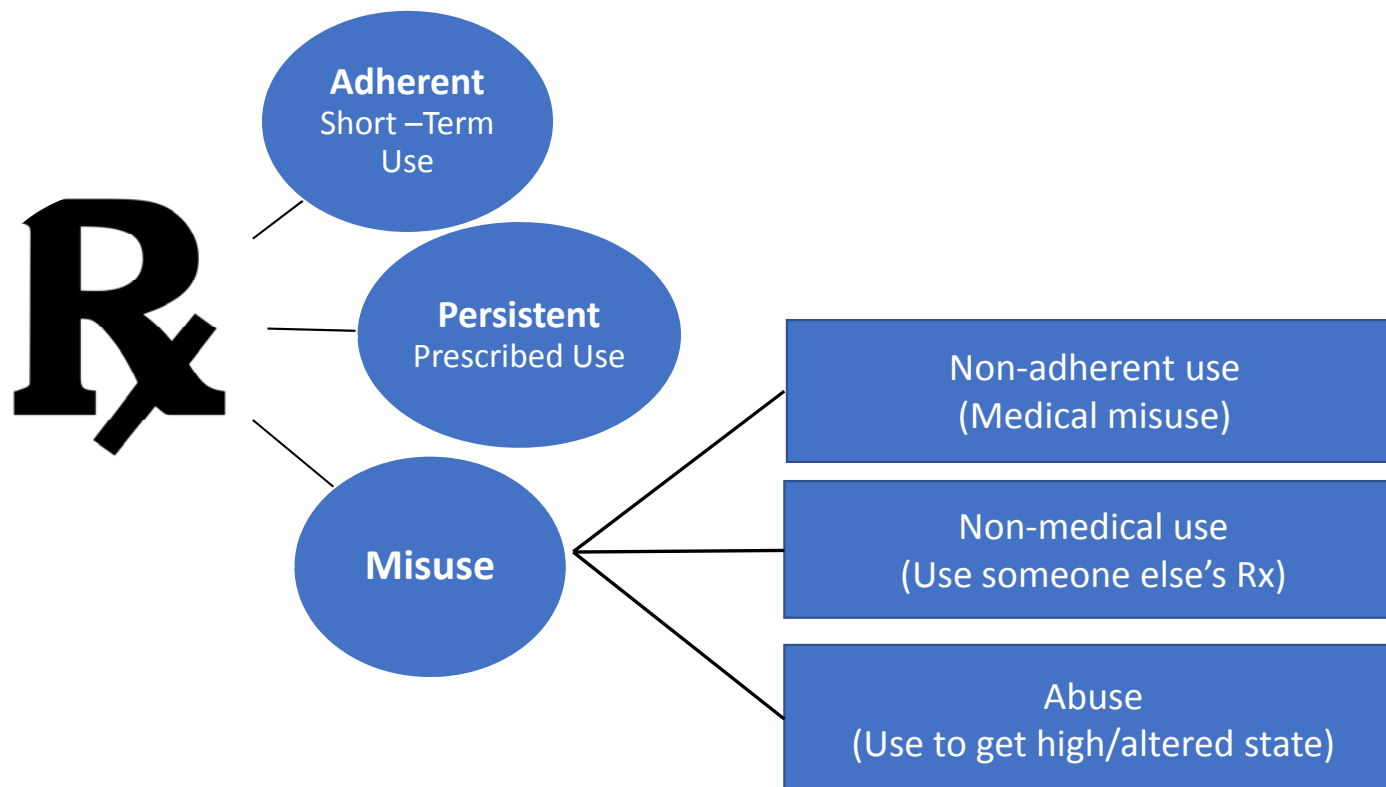
Colleagues and staff:

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

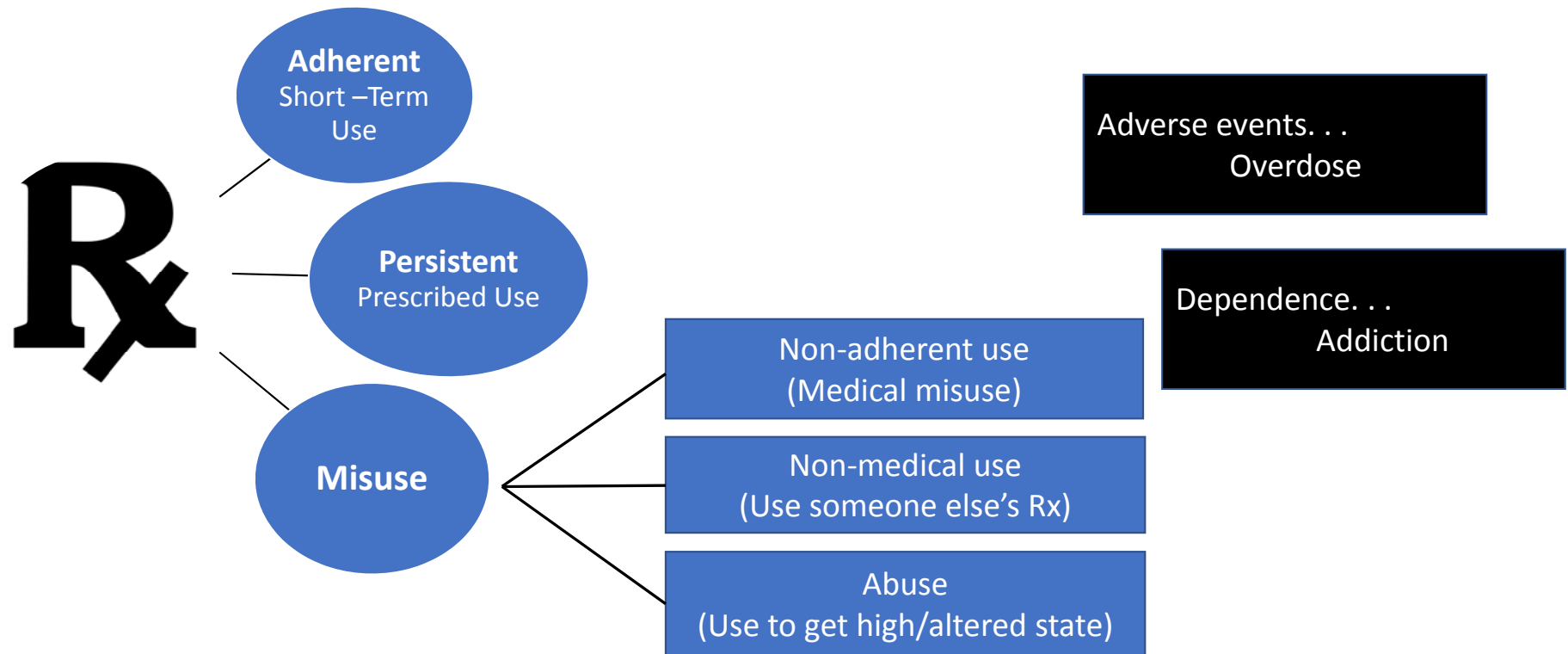
Purpose

- 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



Trajectories after Legitimate Use



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

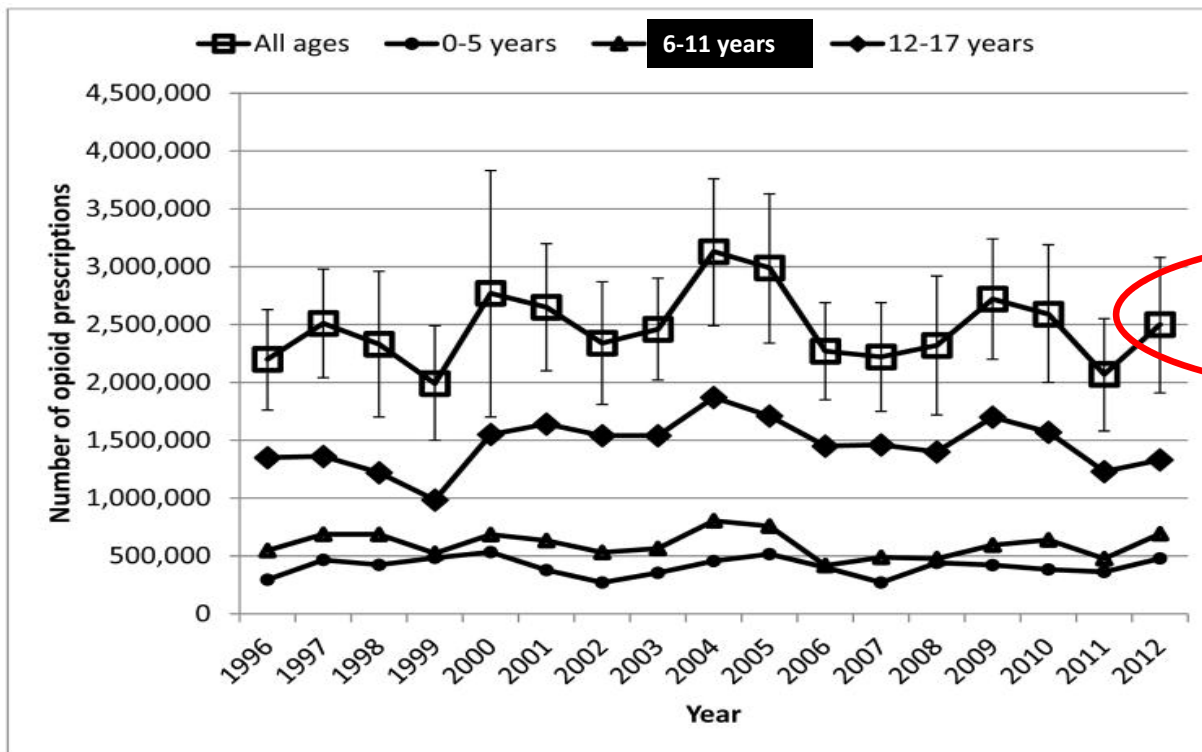
Other outcomes

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

Data Source	“Persistent” Pain
Single Center Surveys	<u>Presence</u> of pain at 3, 6, 12, 24 months or longer <u>Pain severity</u> (generally 0-10 scales) <u>Nature</u> (symptom descriptors for neuropathic pain)

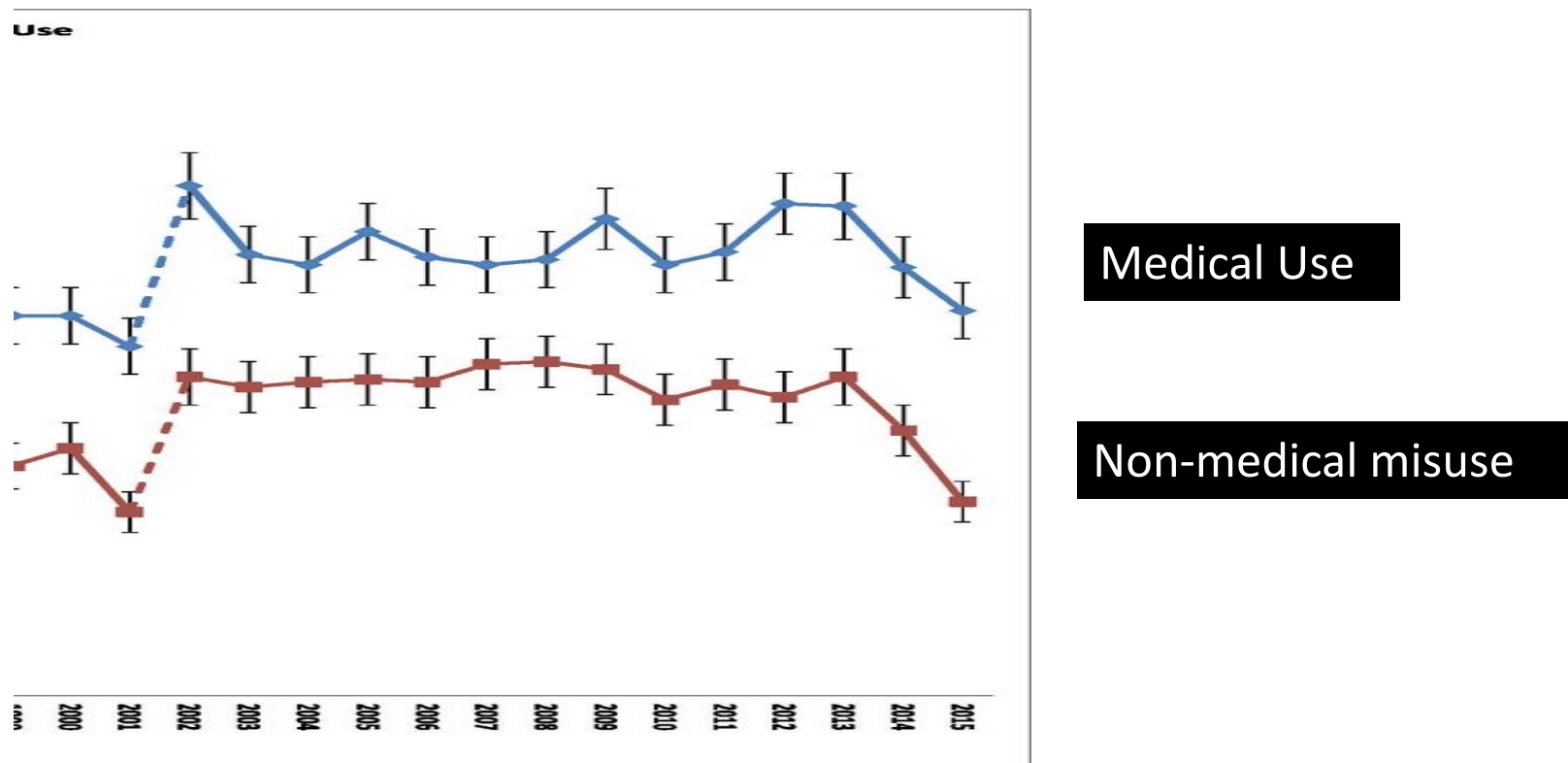
Opioid Prescriptions to US Youth

Data Source: Medical Expenditure Panel Surveys



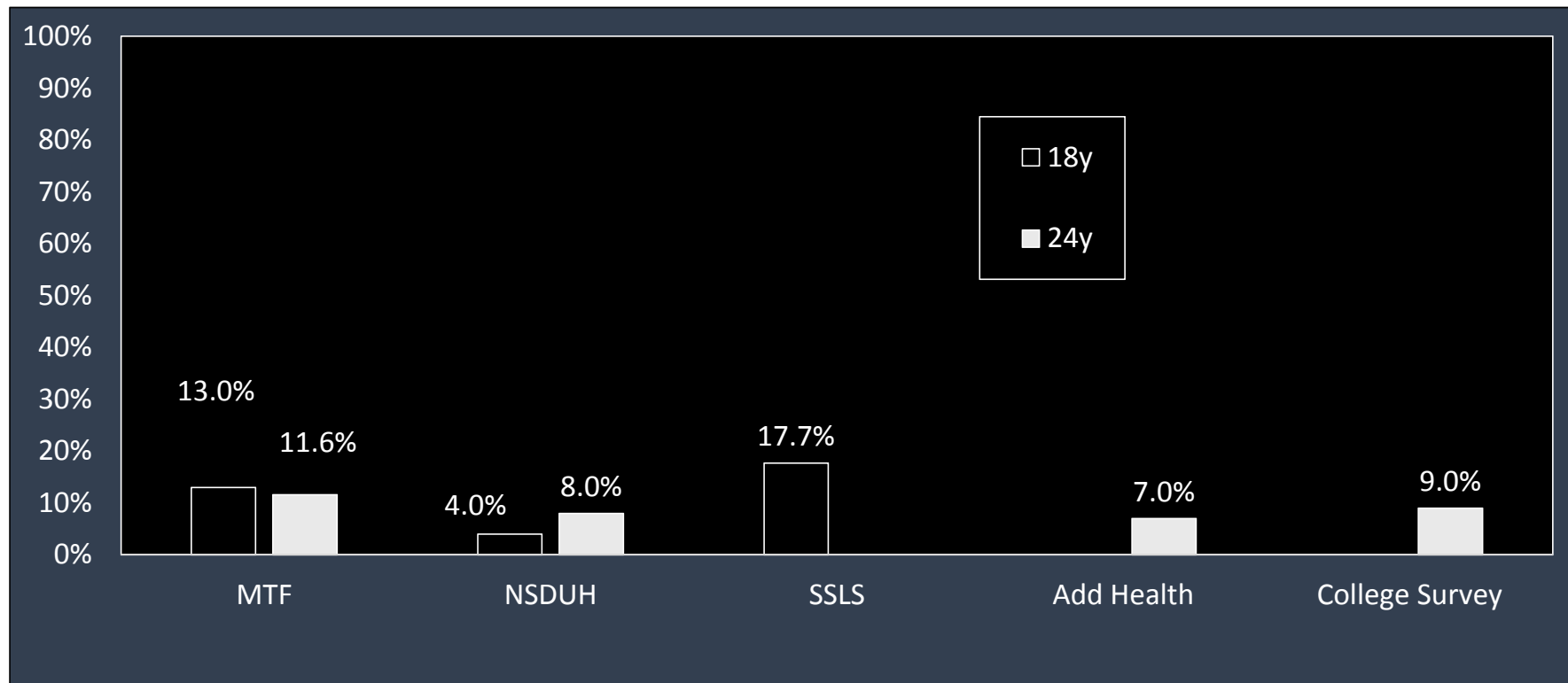
2.5 million exposures
[95% CI 1.47-2.15]

Medical and Nonmedical Use (“misuse”) - High School Seniors



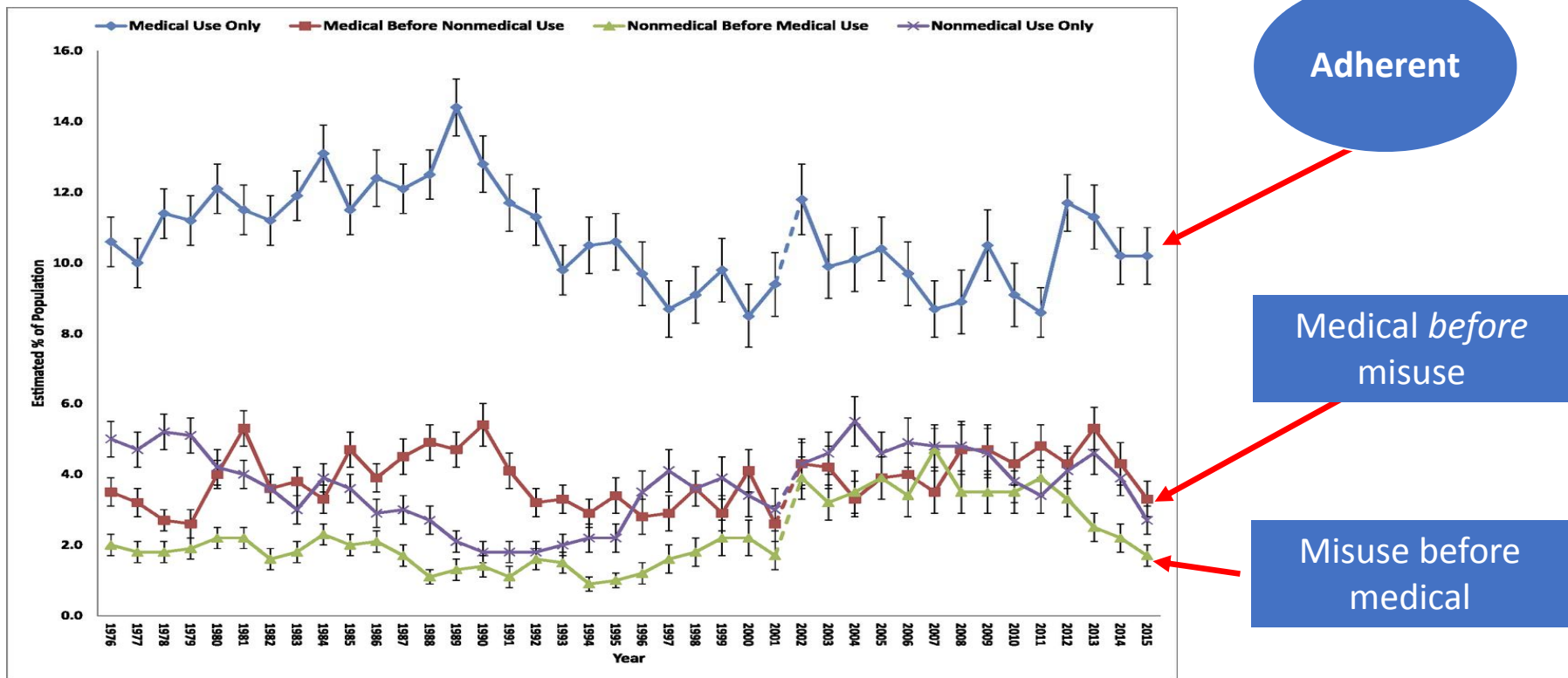
McCabe SE et al. Pediatrics 2017;139:e20162387

Variable Self-Reported Lifetime Misuse



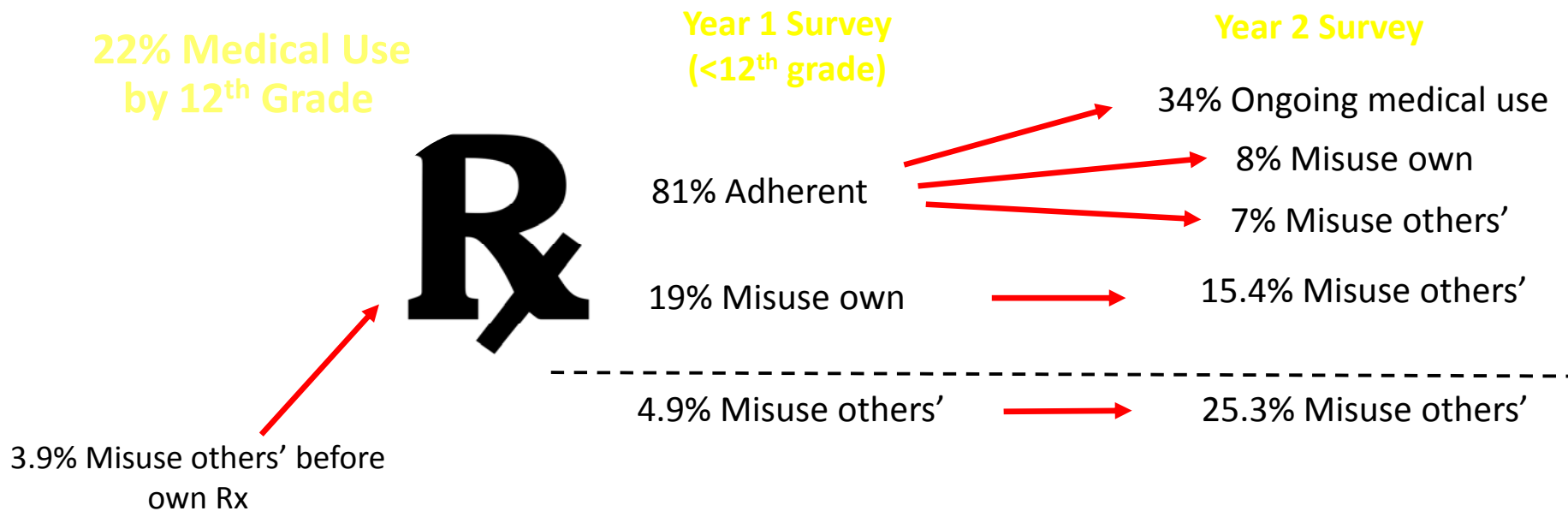
Data extrapolated from cited sources throughout; vary based on year of survey, sample, question asked

Patterns of Non-Medical Use HS Seniors (MTF data)



Trajectory of Misuse During High School

(SSLS longitudinal data)



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
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

McCabe SE et al. Addiction 2013;109:102

Trajectory to Misuse Young Adulthood (MTF data 12th through age 23 yr)

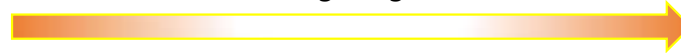
Misuse = use of Rx opioid on own for the purpose of getting high, to relax or feel good

15% Legitimate use by Grade 12*



Risk stratification analyses

*Low substance use
through highest use*



*Grades
Race
Parent education
Disapproval marijuana*

Rx increased the risk for low risk groups:

- 1.8-3% probability:
OR 3.01 [95% CI 1.8-5.07]
- 3-<5% probability of misuse:
OR 1.95 [1.15-3.34]

**1990-2012 wave 1 data*

**Outcome misuse at any follow-up wave; ages 19-23; response*

69%; 25% imputed missing data;

Stratified sample by risk factors to examine impact of Rx

OR = Odds Ratio CI=Confidence Interval

Miech R. Pediatrics 2015;136:e1169-e1177

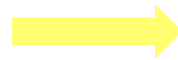
Trajectory to Misuse Young Adulthood (MTF data through age 23)

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

Abuse Rx opioid 12th grade

Abuse Rx opioid age 19-23 yrs

- 1-2 occasions
- 3-5 occasions
- 20-39 occasions



RR 1.97 [1.4 - 2.77]

RR 2.8 [1.83 - 4.29]

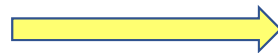
RR 5.88 [3.19 - 10.8]

RR = Relative Risk

Miech R. Pediatrics 2015;136:e1169-e1177

Trajectory to Misuse College Sample

Lifetime Medical Use

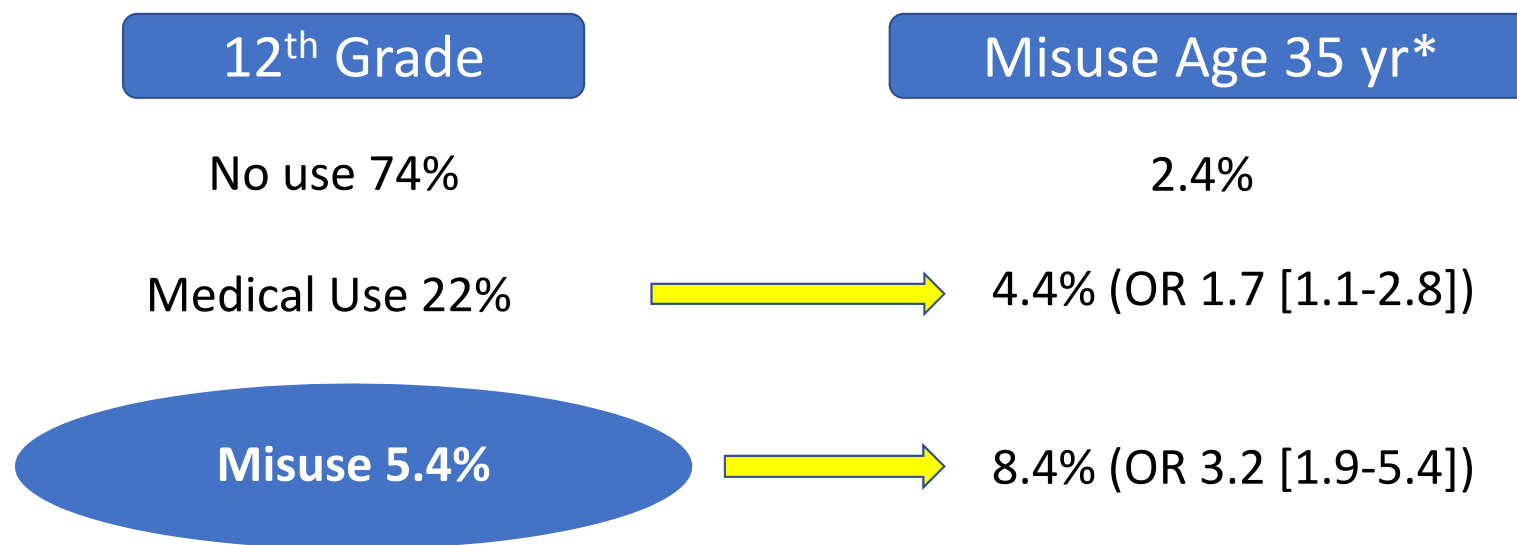


Associated with 2X risk of misuse (AOR
2.02 [1.78 – 2.31])*

**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)



**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)

Pattern misuse	AOR Lifetime Illicit Drug Use	AOR Misuse Other Rx Medications
Medical use → misuse	3.3 [2.0 - 5.7]	4.2 [2.7- 6.6]
Misuse → medical use	26.6 [16.9 – 41.9]	27.6 [17.7 – 43]

**Reference group “no use”*

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

Misuse to Abuse

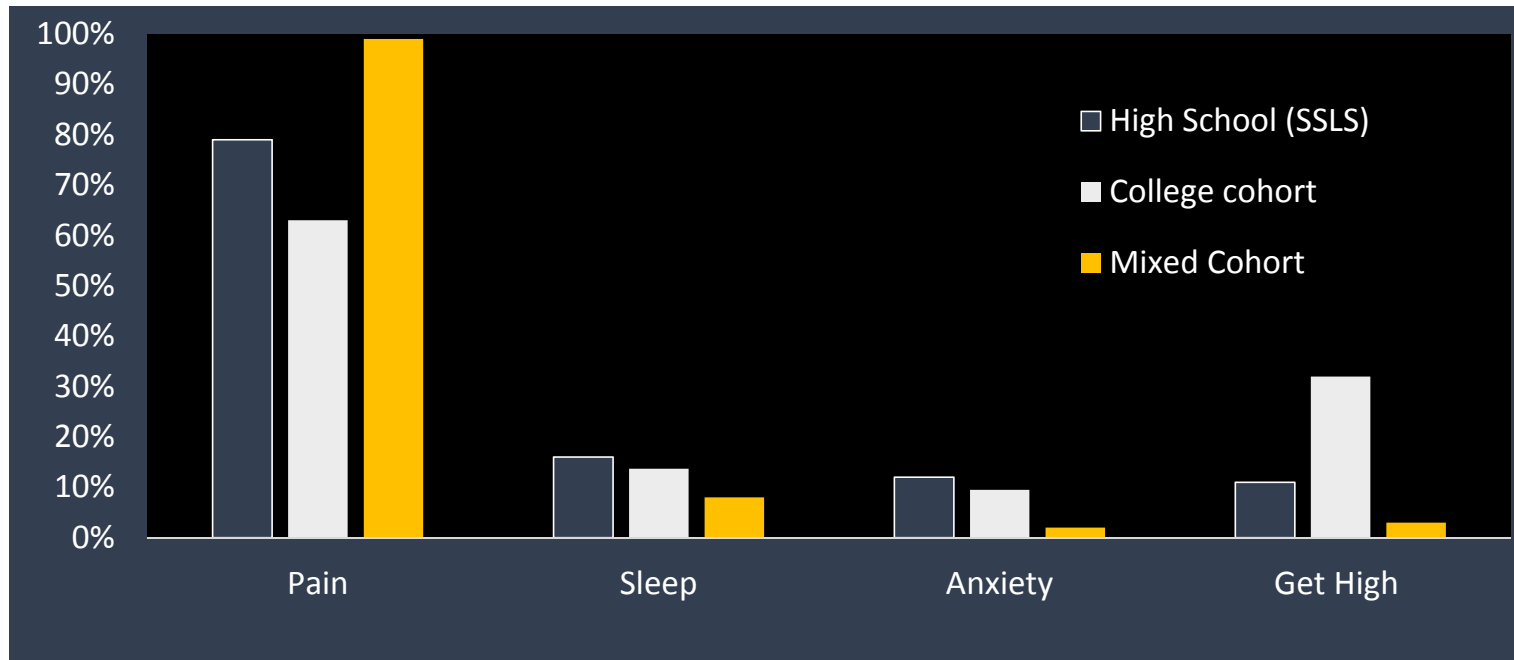
- Lifetime abuse/dependence (*any scheduled Rx drug*) associated with **lower age of first misuse** (NESARC 2001-2002 data)^a
 - 25% with lifetime dependence (any substance) recalled onset before age 13
(*vs. only 7% recalled onset at >21yrs*)
- 4 of 5 adolescent heroin users recall first exposure to Rx opioid^b
- 40-86% adult heroin abusers recall misusing Rx opioids before heroin^c

^aMcCabe SE. *Addiction* 2007;102:1920-1930

^bVosberg SK. *J Child Adolesc Subst Abuse* 2016;25:105

^cCompton 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 pain^b

^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

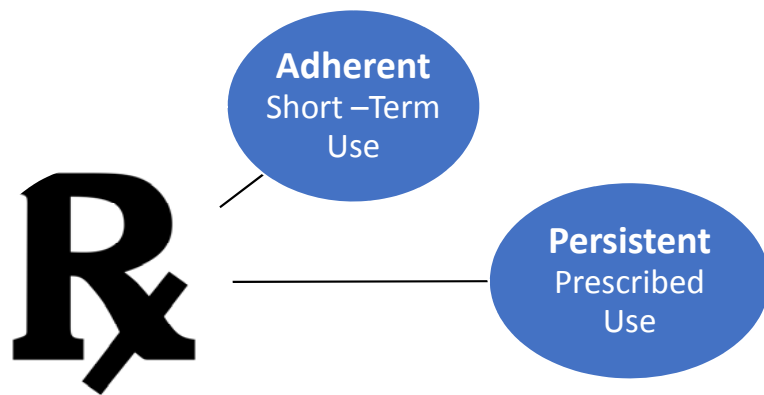
(15-24 yr old community sample)

- 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)

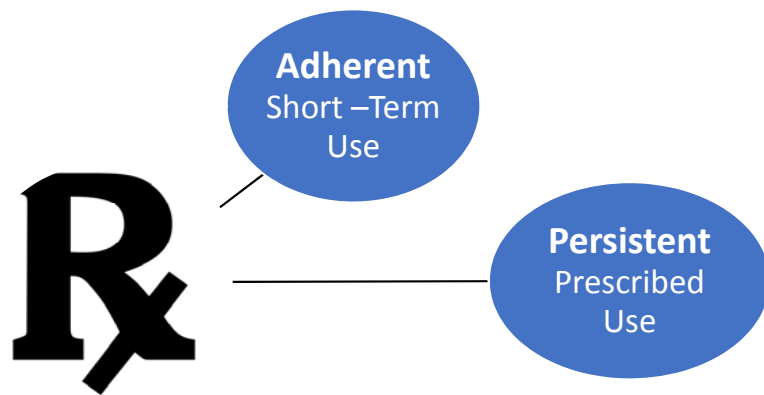
Groenewald CB. J Pain 2018; doi.org/10.1016/j.jpain.2018.07.007

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

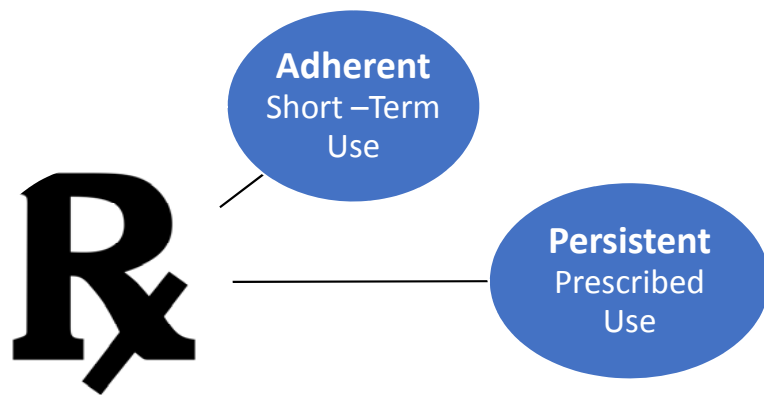
Owusu-Agyemang P. Pediatr Anesth 2018;28:625

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

Quinn PD. *Jama Pediatr* 2018;doi:10.1001/jamapediatrics.2017.5641

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

^aMiech R. Pediatrics 2015;136:e1169-e1177

^bMcCabe 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^{ac}; NSDUH^d) or young adulthood (College Survey)^b

	Past Year Substance Use +DAST	Lifetime Substance Use +CRAFFT	Substance Use Disorder (SUD) (DSM-V Criteria)
Medical Use Only			1.34 [1.08 - 1.69] ^d
Any Misuse			3.71 [2.73 - 5.05] ^d
Misuse Own	9.4 [4.6 - 19] ^a	5.1 [2.4 - 10.6] ^c	
Misuse Others'	15.1 [11.5 - 19.8] ^b	9.6 [3.9 - 23.6] ^c (Non-pain motive)	

+CRAFFT=Car Relax Alone Forget Friends Trouble Screener ≥ 2

+DAST=Drug Abuse Screening Test $\geq 3/10$

DSM=Diagnostic and Statistical Manual of Mental Disorders

^aMcCabe SE. Arch Pediatr Adolesc Med 2011;165:729

^bMcCabe SE. Addictive Behaviors 2007;32:562

^cMcCabe SE. Pain 2013;154:708

^dMcCabe SE. Data under review Addictive Behaviors, 2018

Limitations

- Variation in operational definition of prescription misuse
- Variability in timeframe of assessments
(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”