EMORY UNIVERSITY SCHOOL OF MEDICINE | Department of Anesthesiology

Modern Pain Management: Acute and Chronic

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DISCLOSURE

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- No other financial disclosures

OBJECTIVES

- Perils of opioid use
- Opioids for post surgical pain
- Strategies to minimize post-op opioids
  - Multimodal analgesia
  - Regional analgesia
- Opioid weaning

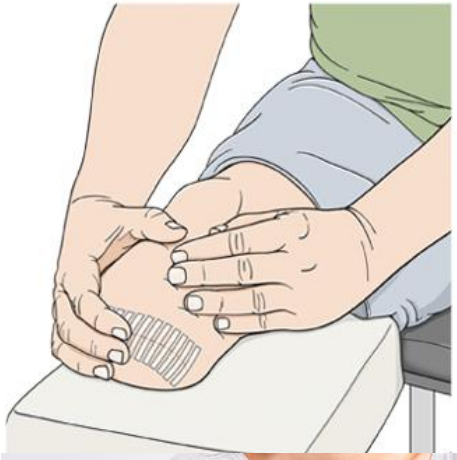
POOR POST-OP ANALGESIA

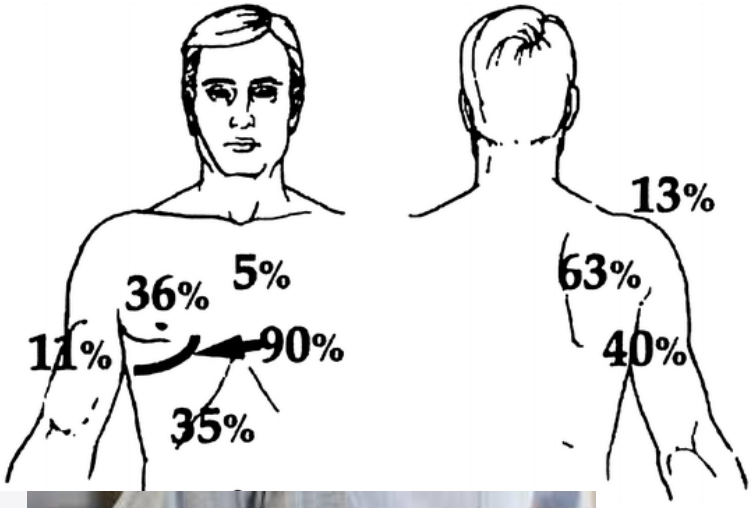
- Tachycardia, Hypertension
- Venous stasis, hypercoagulability
- Decrease alveolar ventilation
- Immunosuppression
- Hyperglycemia, impaired wound healing
- Hospital length of stay ($$)
- Risk of chronic pain

Ip et al. *Anesthesiology*; 2009.
Macintyre et al. Acute Pain Management, 2015.
Wu et al. Lancet, 2011.

INCIDENCE-CHRONIC POST SURGICAL PAIN

Amputation	50–85%
Thoracotomy	5–65 %
Cardiac surgery	30–55 %
Mastectomy	20–50 %
Cholecystectomy	5–50 %
Hernia repair	5–35 %
Hip replacement	12 %
Caesarean section	6%





Macrae et al. Br J Anaesth, 2008.

CHRONIC PAIN

- Defined by the IASP as :

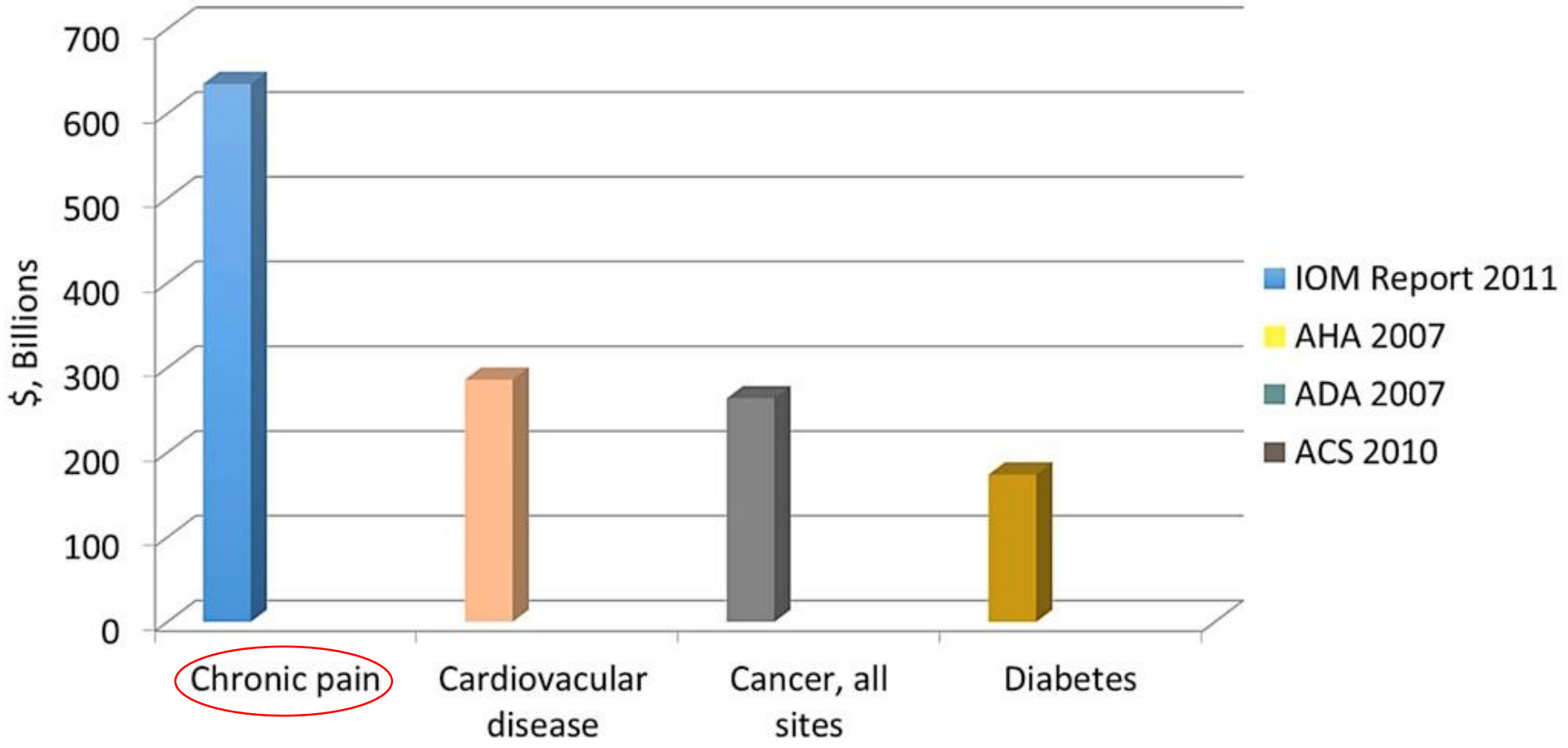
  Pain that persist beyond normal tissue healing time, which is assumed to be 3 months.”

NUMBER AFFECTED IN USA

Condition	Prevalence	Source
Chronic Pain	**116 million**	Institute of Medicine of The National Academies
Diabetes	25.8 million Americans (diagnosed and estimated undiagnosed)	American Diabetes Association
Coronary Disease	16.3 million Americans	American Heart Association
Stroke	7.0 million Americans	American Heart Association
Cancer	**11.9 million Americans**	American Cancer Society

- American Cancer Society. Cancer Facts and Figures 2010
- American Diabetes Association. Diabetes Care 2008
- American Heart Association figure calculated on Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey 2007
- Institute of Medicine, Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research 2011

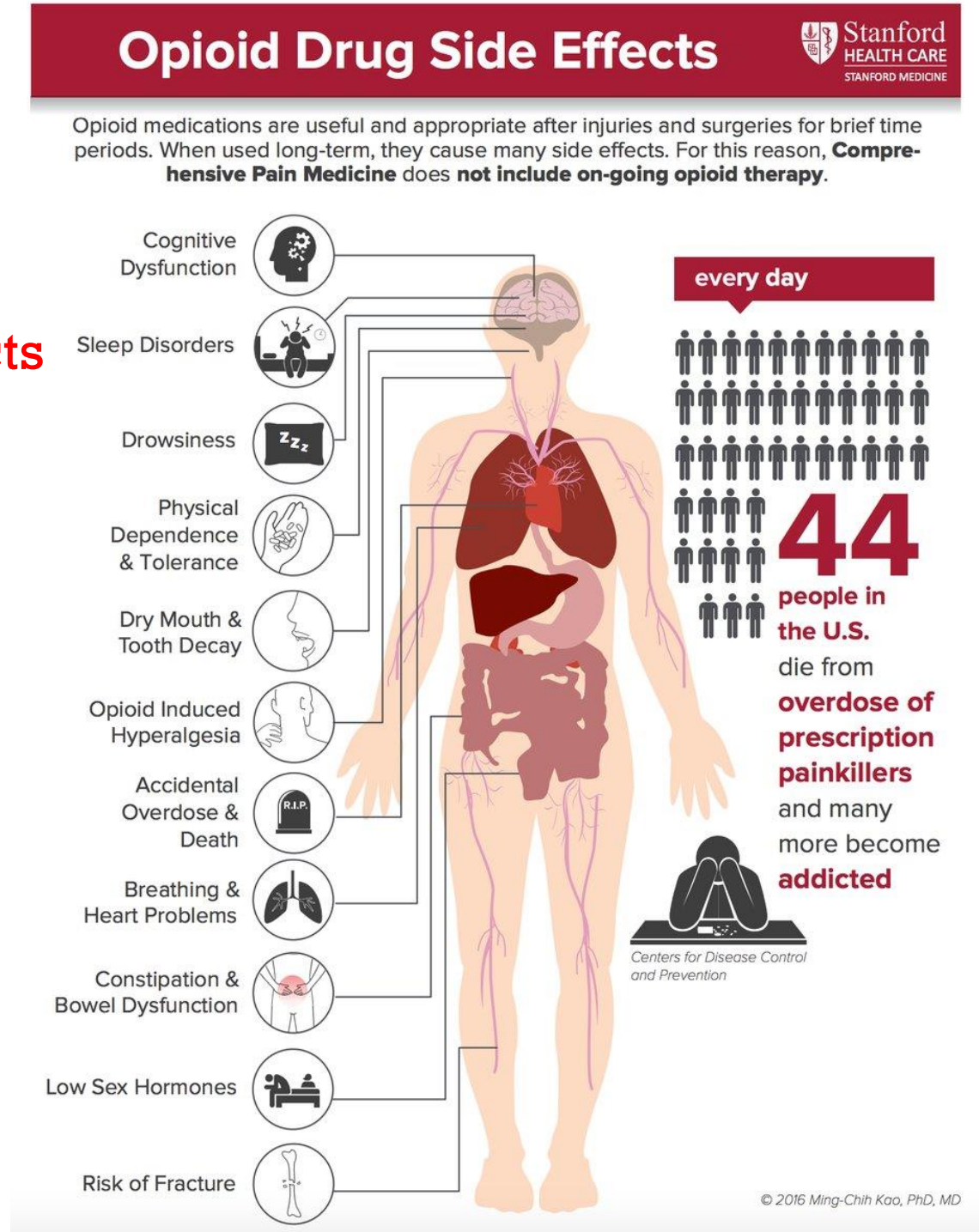
COST



- Georgi K. Calculating the cost of pain. Chronic Pain Perspect 2011;12:F2
- Bonakdar RA. Med Clin North Am. Integrative Pain Management. 2017 Sep;101(5):987-1004.

OPIOIDS

Opioid cause negative side effects for almost every body part!



OPIOIDS- SIDE EFFECTS LIST

Common Adverse Events	Tolerance	Dependence	Hyperalgesia	Hypogonadism	Addiction (use despite harm)
• Constipation • Nausea • Vomiting • Respiratory depression • Sedation • Urinary retention • Pruritus	• Leads to loss of treatment effectiveness requiring an increase in dose • Increased dose in turn leads to a greater risk for adverse events	• Can be both mental and physical • Lead to risk of withdrawal	• Diffuse heightened pain sensitivity despite increasing dosage of opioids or disease stability	• Decreased testosterone- leading to fatigue • Osteopenia- leading to risk of fractures	• Leads to risk of aberrant behavior

- Hersh et al. *Clin Ther.* 2007.
- Lee et al. *Pain Physician.* 2011.
- Katz et al. *Clin J Pain.* 2009.
- De Maddalena et al. *Pain Physician.*2012.

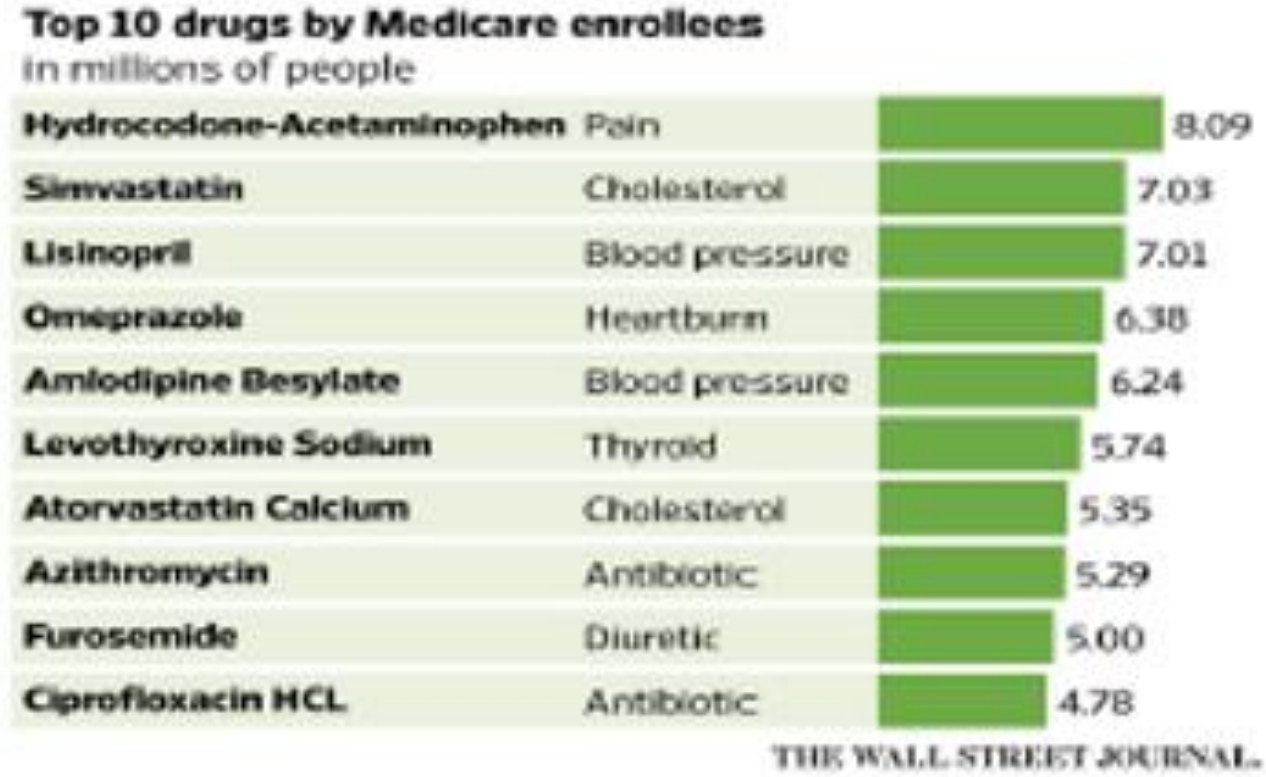
TABLE 1 Summarized DSM-5 diagnostic categories and criteria for opioid use disorder

Category	Criteria
Impaired control	• Opioids used in larger amounts or for longer than intended • Unsuccessful efforts or desire to cut back or control opioid use • Excessive amount of time spent obtaining, using, or recovering from opioids • Craving to use opioids
Social impairment	• Failure to fulfill major role obligations at work, school, or home as a result of recurrent opioid use • Persistent or recurrent social or interpersonal problems that are exacerbated by opioids or continued use of opioids despite these problems • Reduced or given up important social, occupational, or recreational activities because of opioid use
Risky use	• Opioid use in physically hazardous situations • Continued opioid use despite knowledge of persistent physical or psychological problem that is likely caused by opioid use
Pharmacological properties Not counted if taking prescribed opioids only.	• Tolerance as demonstrated by increased amounts of opioids needed to achieve desired effect; diminished effect with continued use of the same amount • Withdrawal as demonstrated by symptoms of opioid withdrawal syndrome; opioids taken to relieve or avoid withdrawal

OUD Diagnosis: Mild 2-3, Moderate- 4-5, Severe- 6+

HYDROCODONE + ACETAMINOPHEN

- In **2007**, **hydrocodone was** the **most popular** prescription drug
- **>135 million prescriptions** written, much more than cholesterol lowering agents(statins), blood pressure medications or antibiotics
- High level of acetaminophen causes liver damage



OPIOIDS- USAGE, RISING ADDICTION

- 2014- DEA rescheduled hydrocodone combination products to Schedule II from Schedule III

- Rescheduling alerts the prescribers about addiction and misuse potential

- Traynor et al. *Am J Health-Syst Pharm.* 2014

THE OPIOID EPIDEMIC BY THE NUMBERS

130+
People died every day from opioid-related drug overdoses[3] (estimated)

11.4 m
People misused prescription opioids[1]

28,466
Deaths attributed to overdosing on synthetic opioids other than methadone[2]

47,600
People died from overdosing on opioids[2]

2.1 million
People had an opioid use disorder[1]

81,000
People used heroin for the first time[1]

886,000
People used heroin[1]

2 million
People misused prescription opioids for the first time[1]

15,482
Deaths attributed to overdosing on heroin[2]

SOURCES

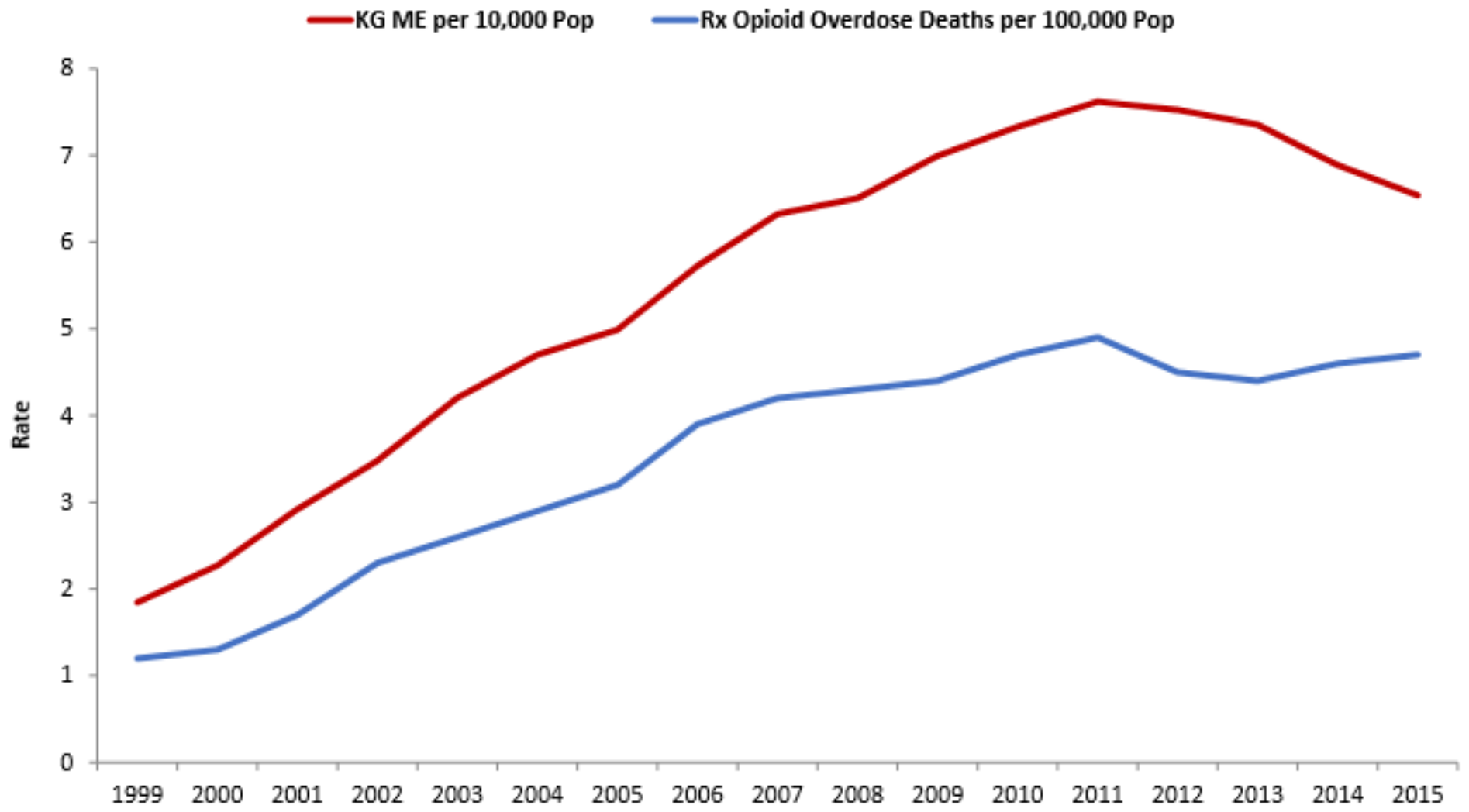
1. 2017 National Survey on Drug Use and Health, Mortality in the United States, 2016
2. NCHS Data Brief No. 293, December 2017
3. NCHS, National Vital Statistics System. Estimates for 2017 and 2018 are based on provisional data.

OPIOID USE DISORDER

- In 2016, 11.5 million people self-reported personally misusing prescription opioids
- Most commonly-reported reason for misuse was to relieve pain (62.3 %)

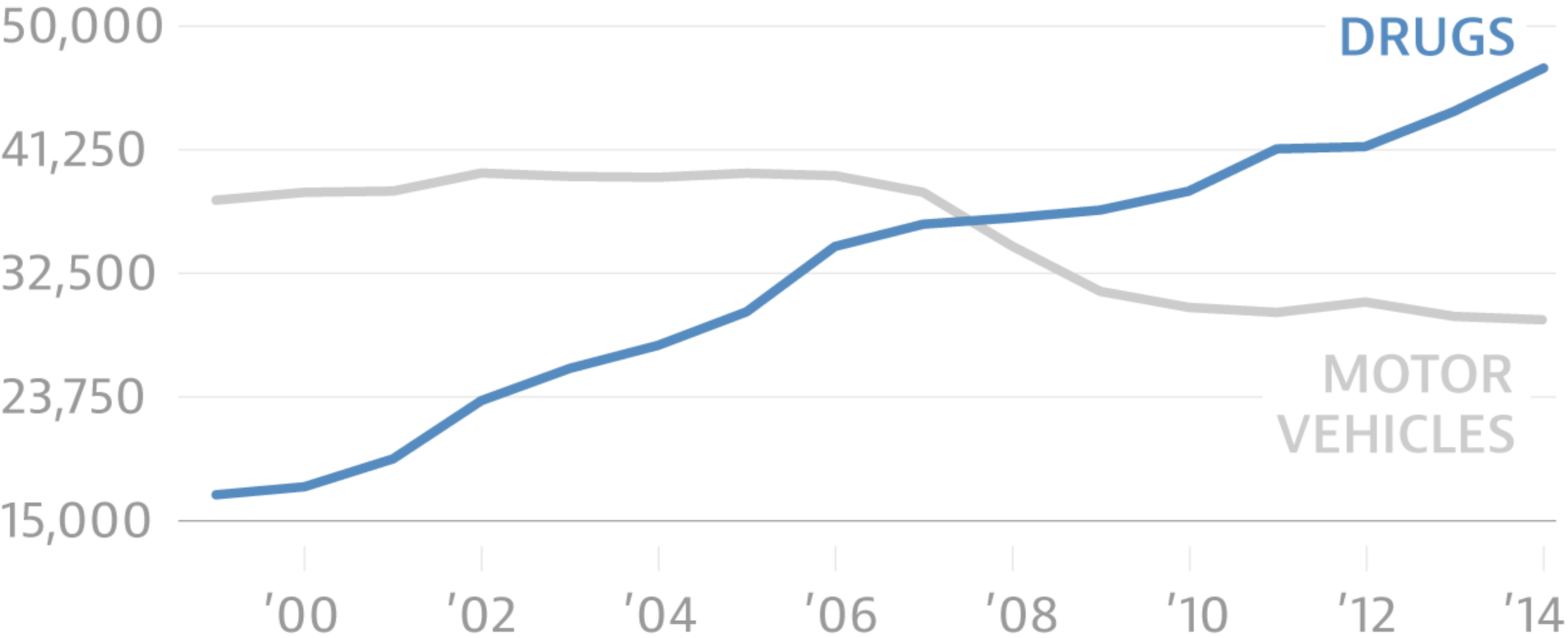
- https://www.cdc.gov/drugoverdose/data/overdose.html
- Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health.

Increases in Rx Opioid Prescribing Coincide with Increases in Rx Opioid Overdose Deaths



Source: Analysis of CDC National Vital Statistics Data and DEA ARCOS data,1999-2015.

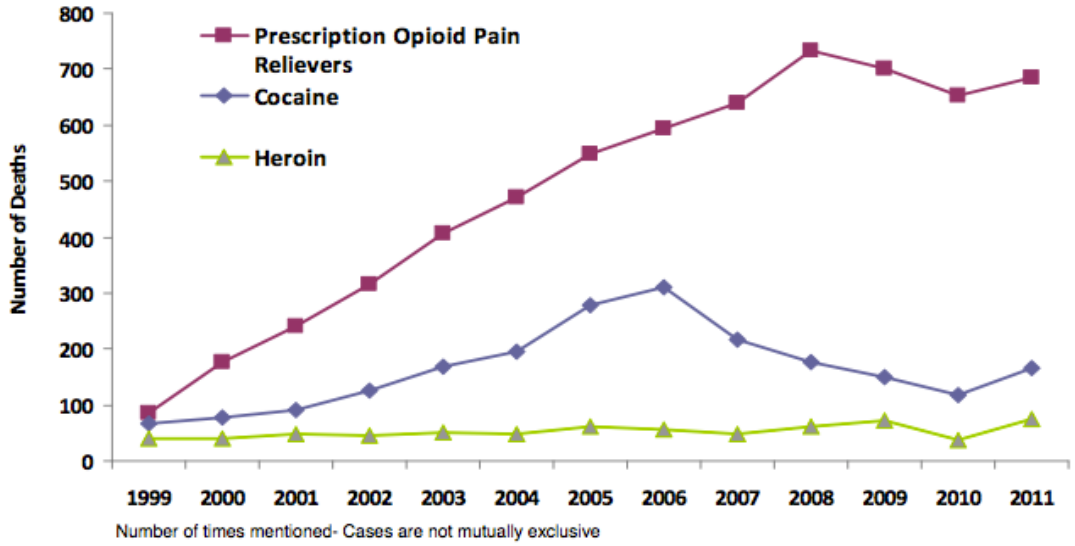
Drug Overdose & Motor Vehicle Accident Deaths



Data: CDC

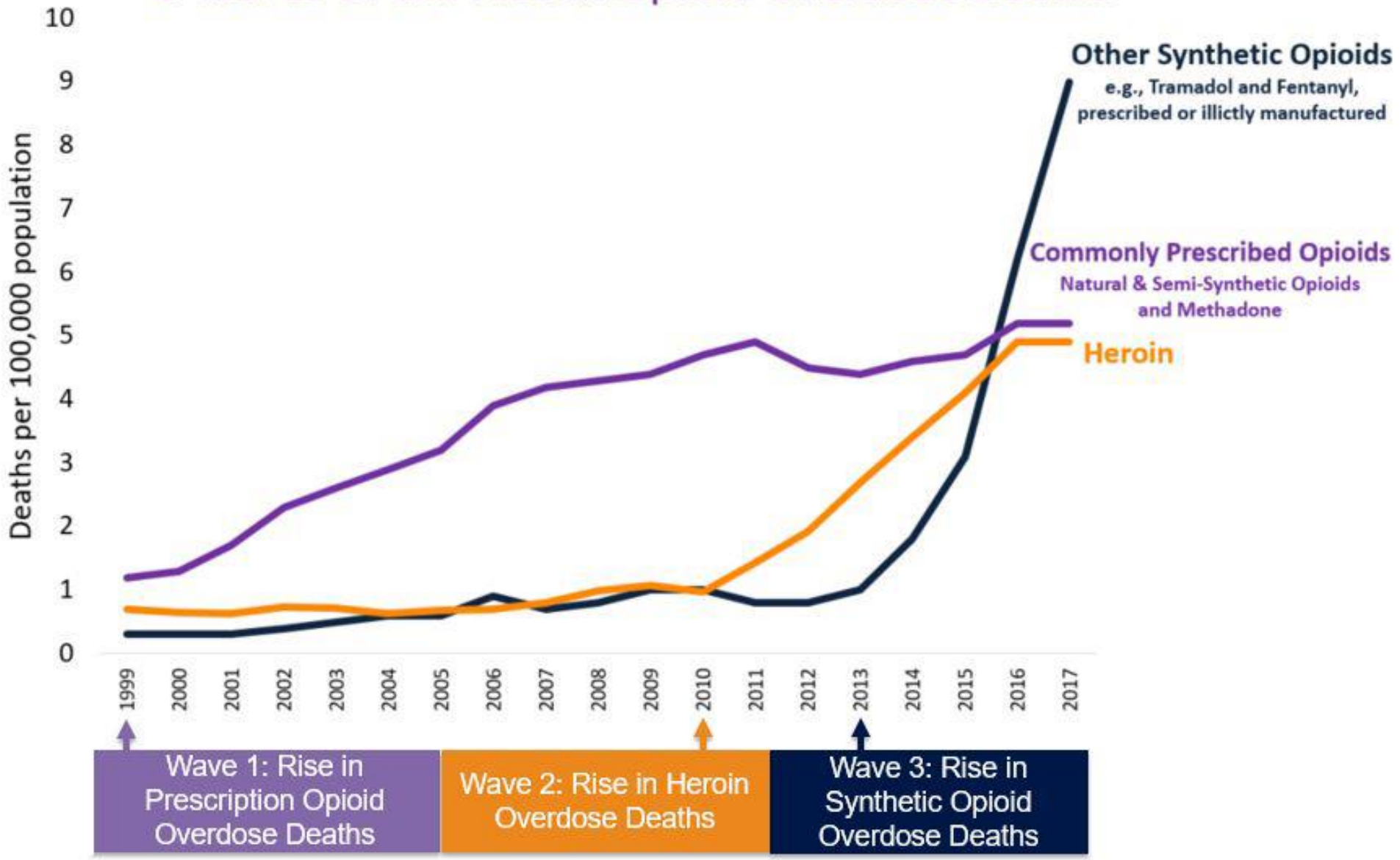
DEATHS FROM OPIOID OVERDOSE

- Opioids now account for *more* overdose *deaths* than *heroin and cocaine combined*.
- 50-85% of heroin users start by abusing prescription opioids

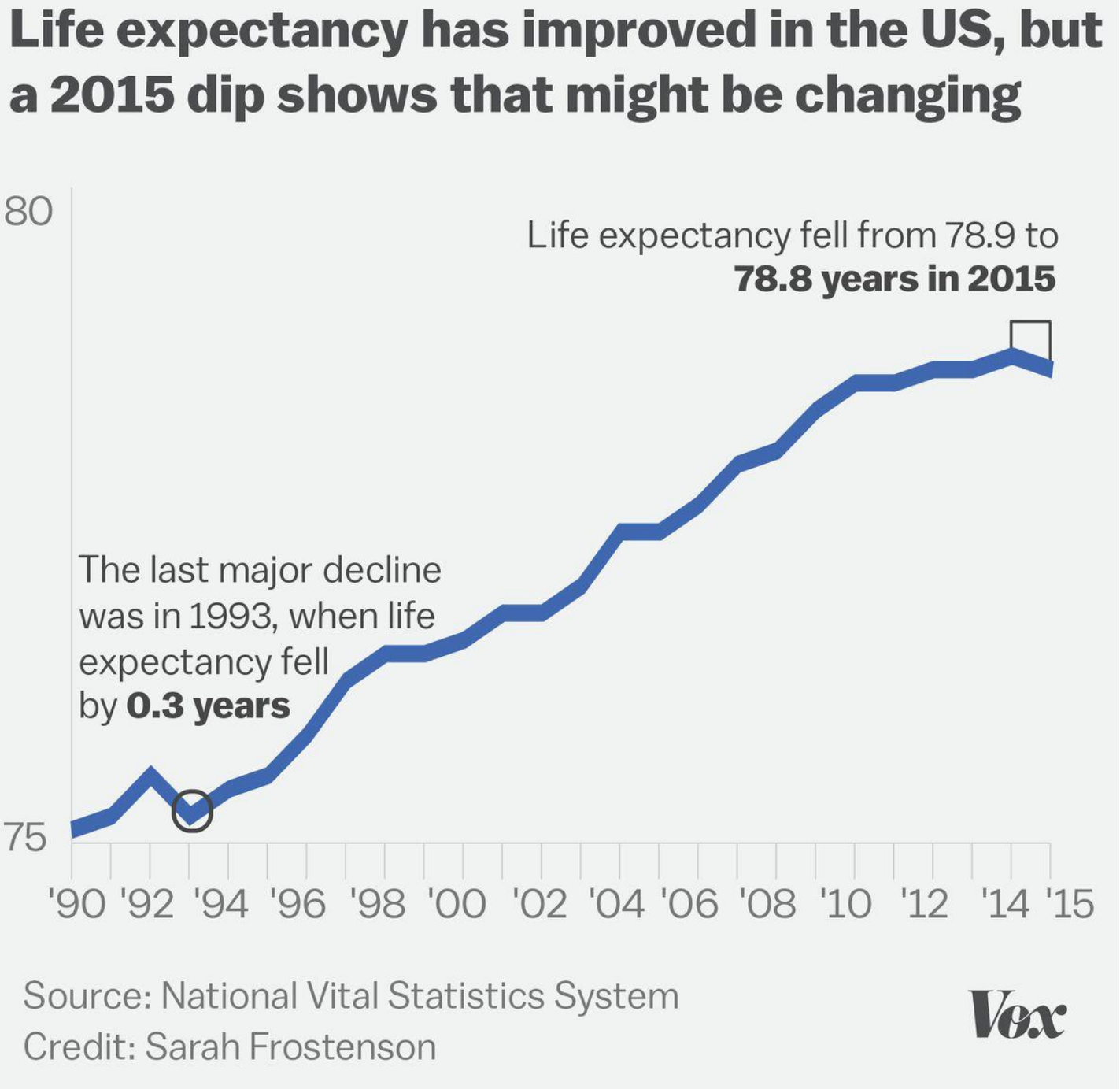


- Jonaki B, etal. Center for Behavioral Health Statistics and Quality. National Survey on Drug Use and Health 2016; http://www.samhsa.gov/data/.

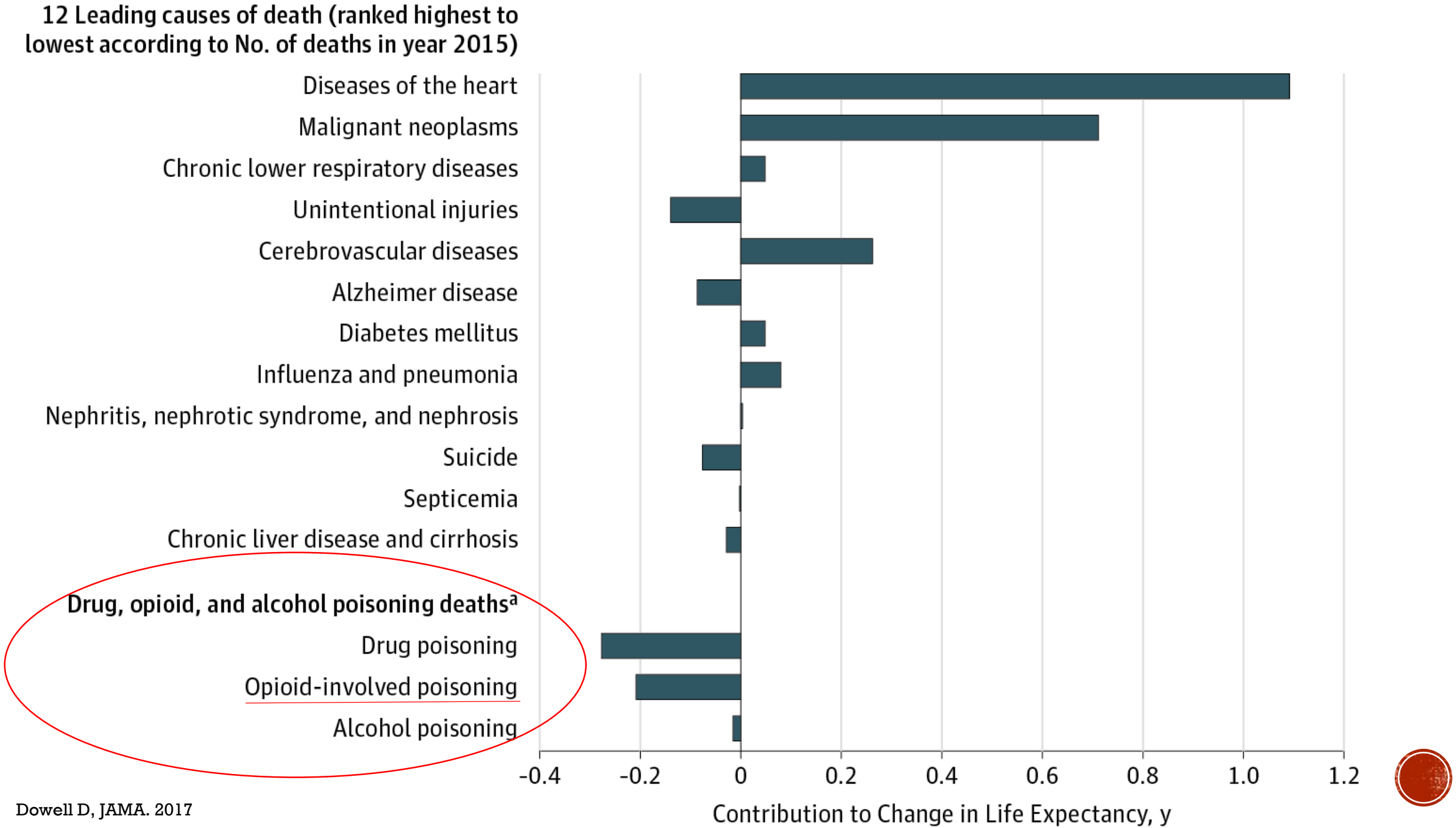
3 Waves of the Rise in Opioid Overdose Deaths



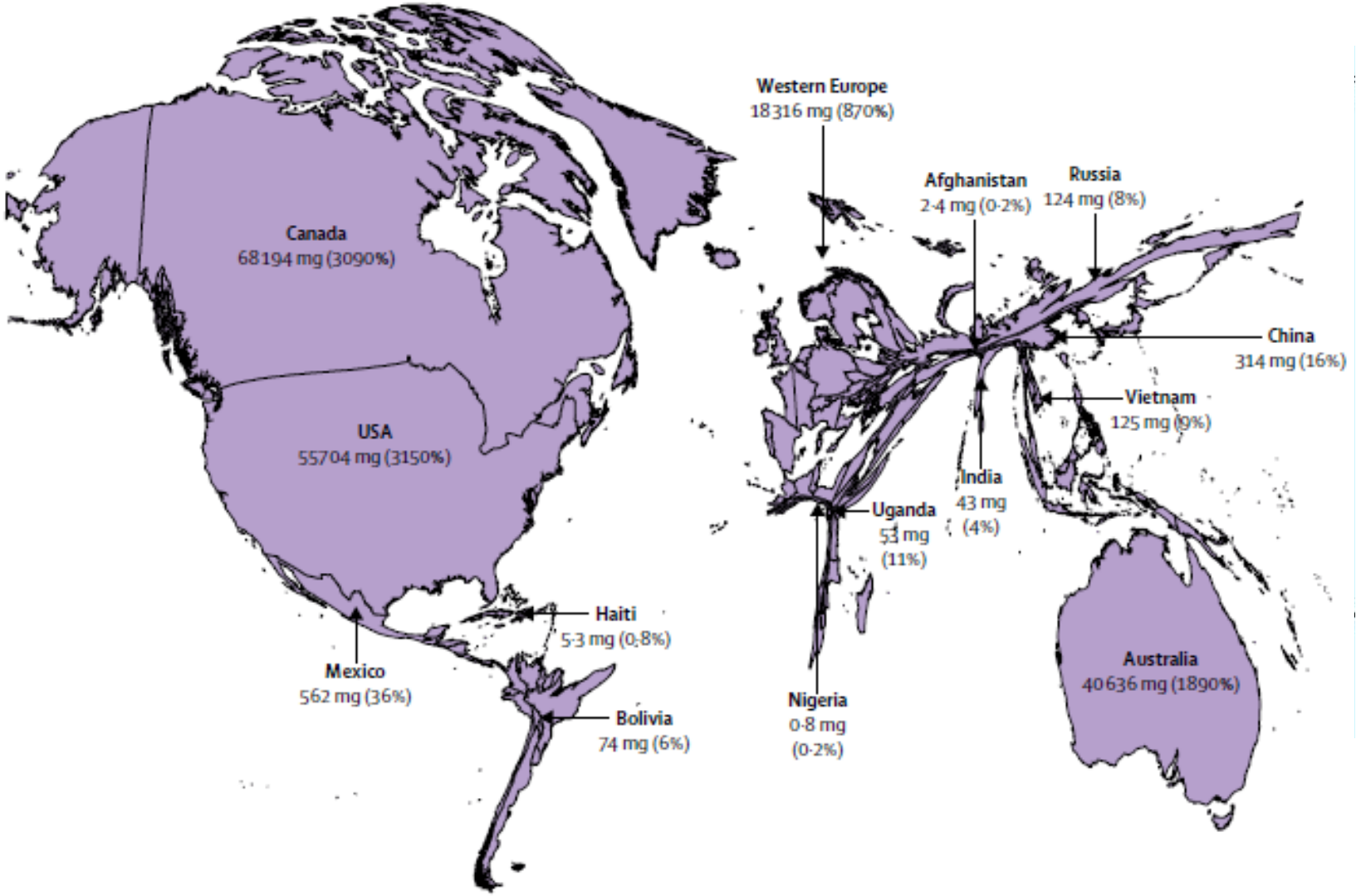
SOURCE: National Vital Statistics System Mortality File.



Most of this loss (96%) was unintentional;
0.21 years were lost to opioid related deaths.

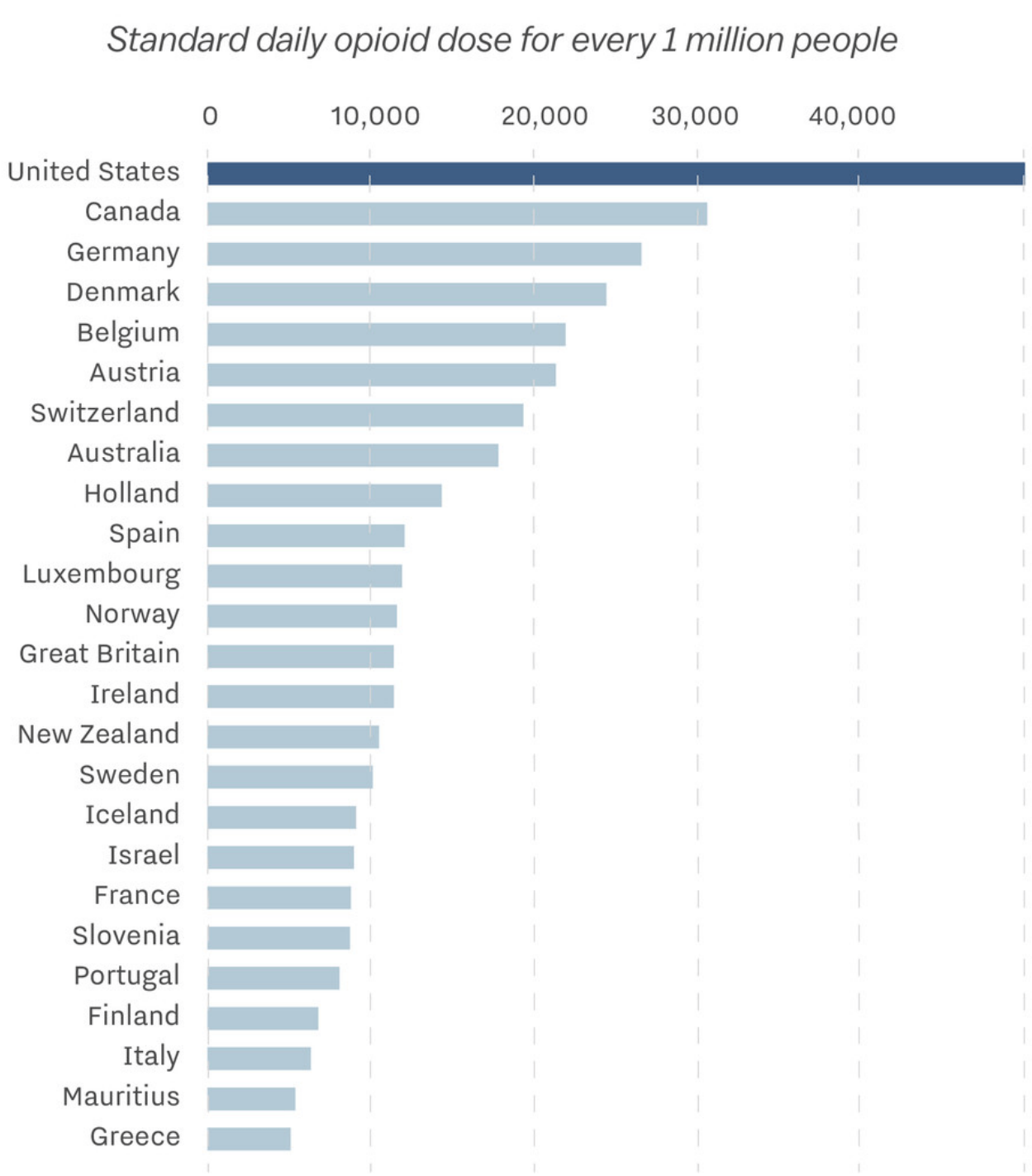


Dowell D, JAMA. 2017



Distributed MEQ (morphine in mg/patient in need of palliative care, average 2010-2013), and % of need that is met.

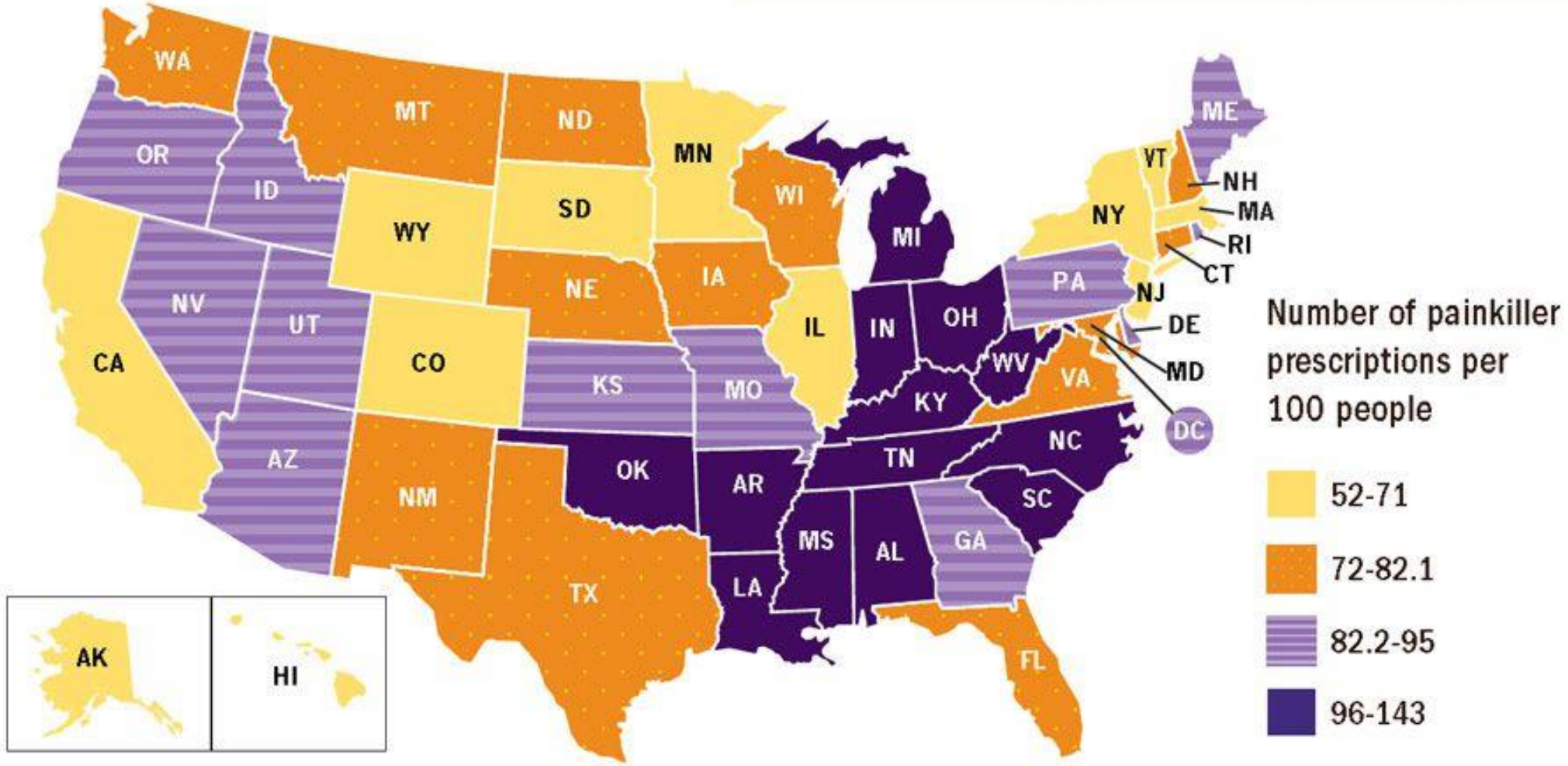
http://www.worldmapper.org/
Knaul et al. The Lancet. 2017
International Narcotics Control Board and WHO Global Health Estimates, 2015



Americans consume more opioids than any other country.

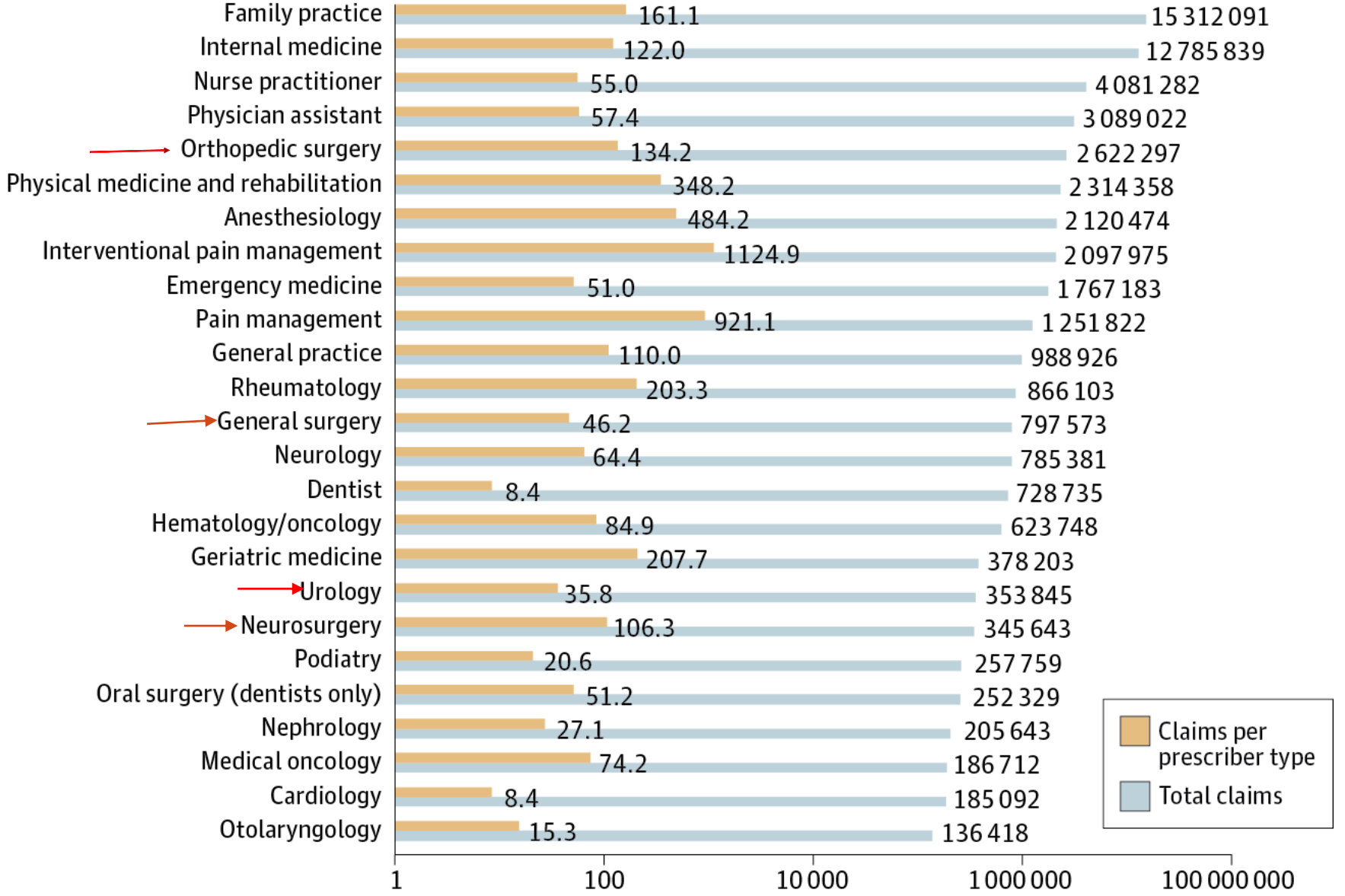
Source: United Nations International Narcotics Control Board
Credit: Sarah Frostenson

Some states have more painkiller prescriptions per person than others.



SOURCE: IMS, National Prescription Audit (NPA™), 2012.

SO WHO'S PRESCRIBING?.....EVERYONE!

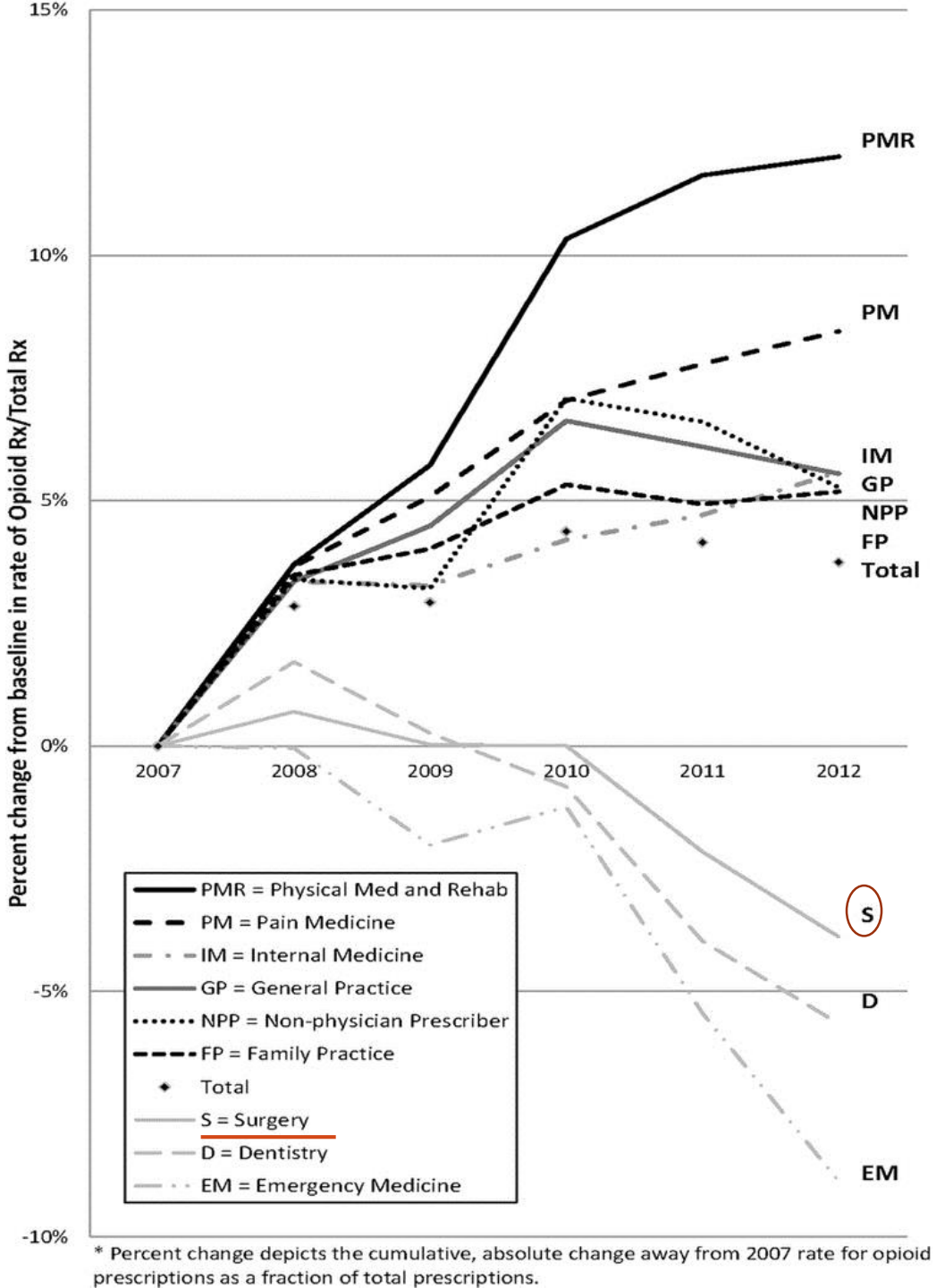


Top 25 Prescriber Specialties by Total Medicare Part D Claims for Schedule II Opioids in 2013

Values are reported on logarithmic scale.

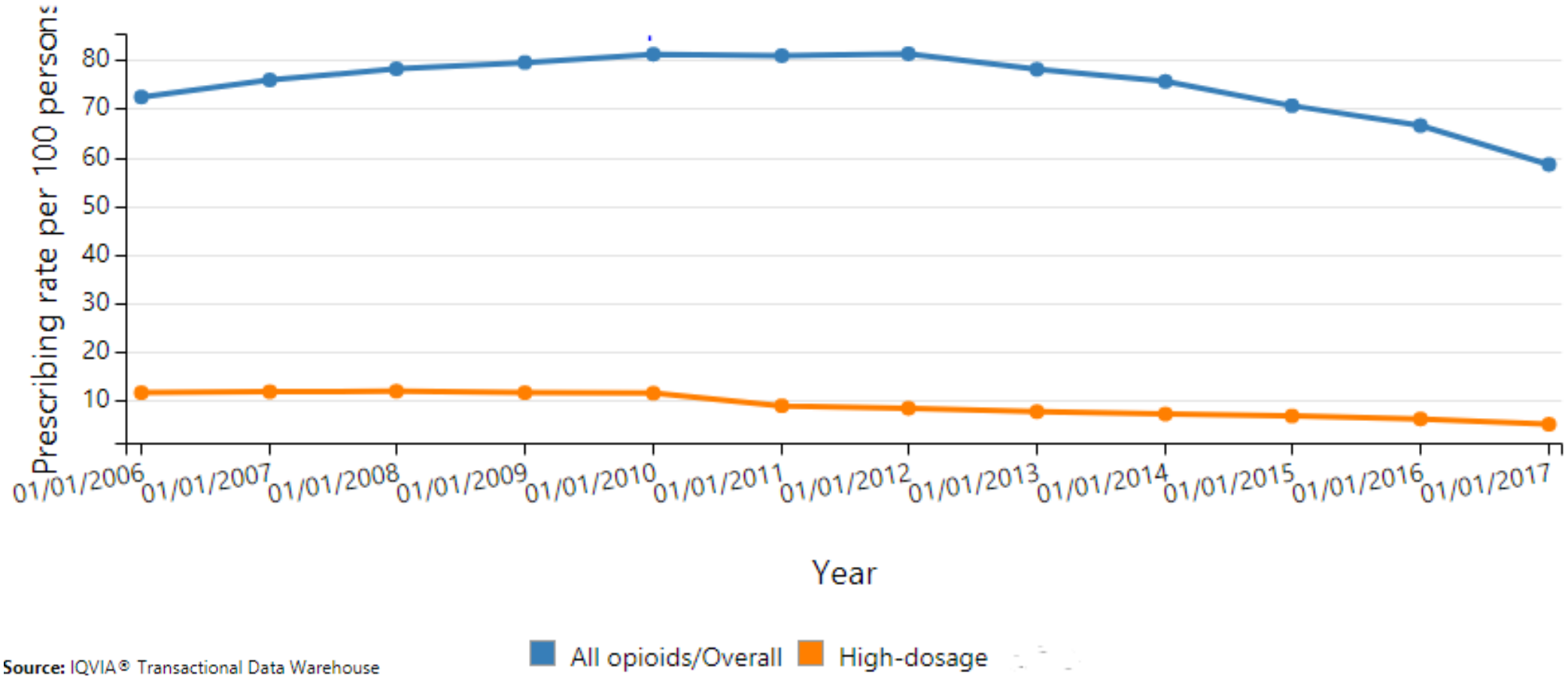
Chen et al. JAMA Intern Med 2016

Trends in Opioid Rx over Total Rx



* Percent change depicts the cumulative, absolute change away from 2007 rate for opioid prescriptions as a fraction of total prescriptions.

Trends in Annual Opioid Prescribing Rates by Overall and High-Dosage Prescriptions



Source: IQVIA® Transactional Data Warehouse

https://www.cdc.gov/drugoverdose/data/prescribing.html

EXCESSIVE AND WIDE VARIATIONS OF POST-OP OPIOID PRESCRIPTIONS

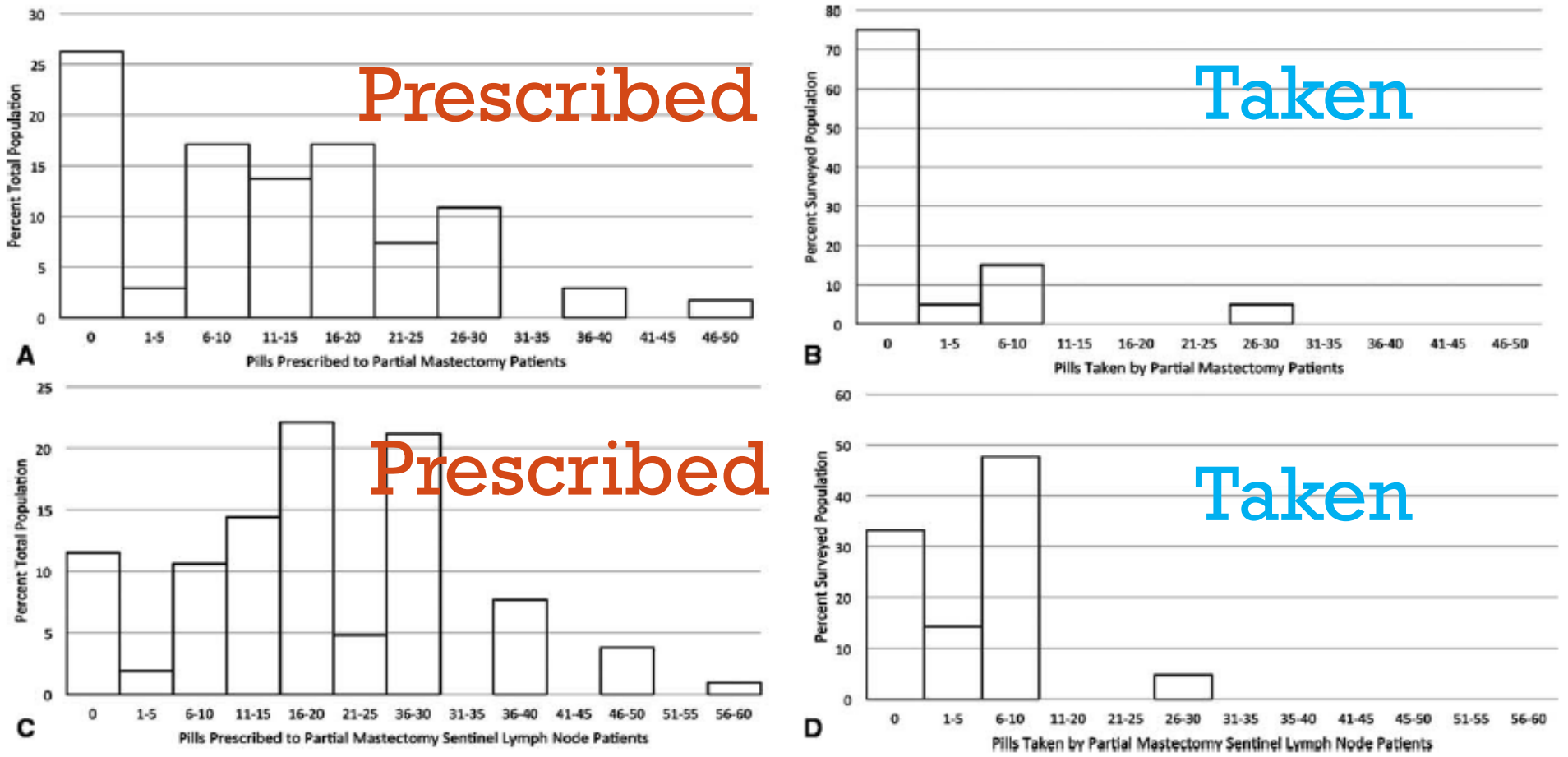


FIGURE 1. Frequency of opioid pills prescribed (A, C) and taken (B, D) after partial mastectomy and partial mastectomy with sentinel lymph node biopsy.

Hill, Annal Surg. 2016

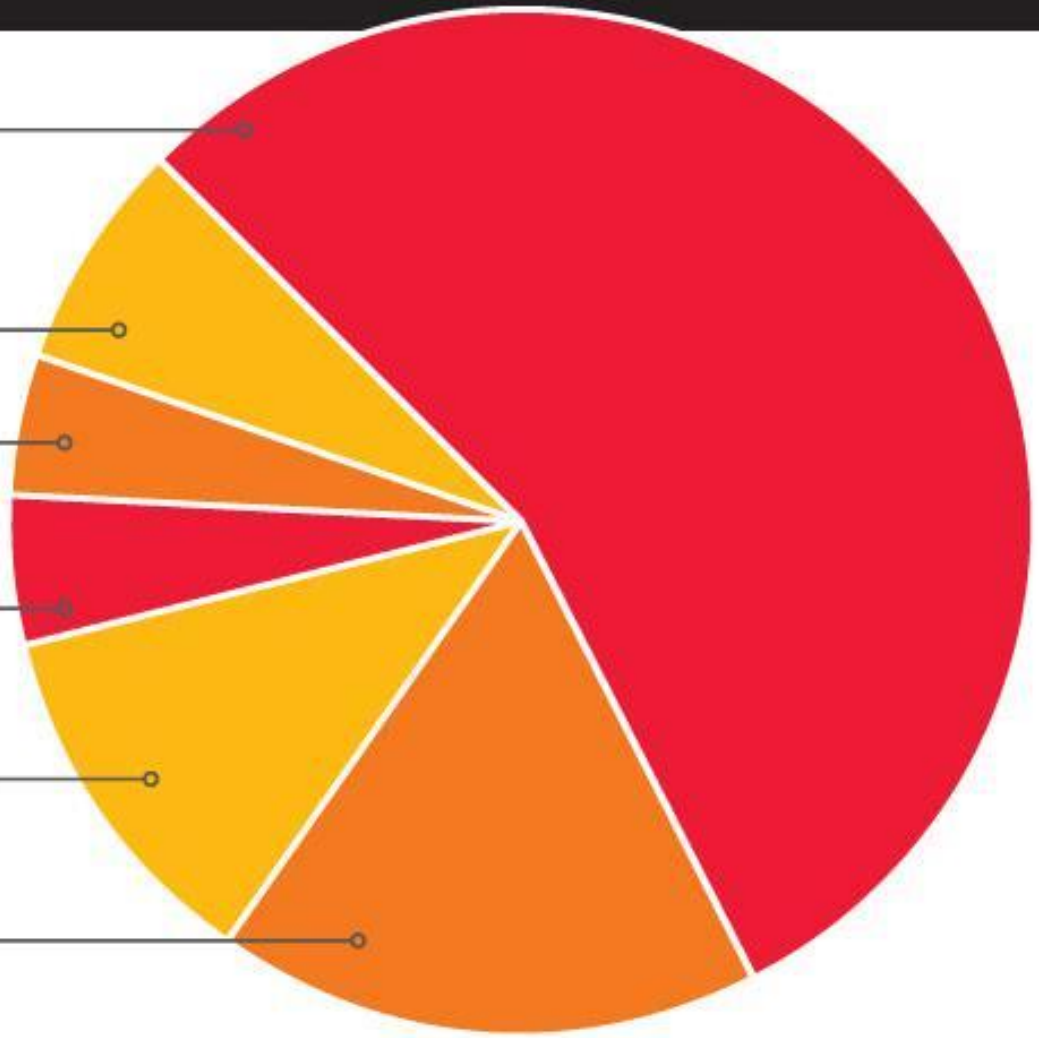
UNUSED PILLS- WHERE DID THEY GO

- 5% returned them to a DEA approved collection site
- 4% flushed them down the toilet
- 3% mixed it with coffee grounds or kitty litter and disposed them in trash
- 14% disposed directly in trash
- Rest (>70%) didn't recall a disposal method or still had them in possession

Hill, Annal Surg. 2016

FIGURE

ABUSERS' SOURCES OF PRESCRIPTION PAINKILLERS



55% Obtained free from friend or relative

7.1% Other source

4.4% Obtained from drug dealer or stranger

4.8% Took from friend or relative without asking

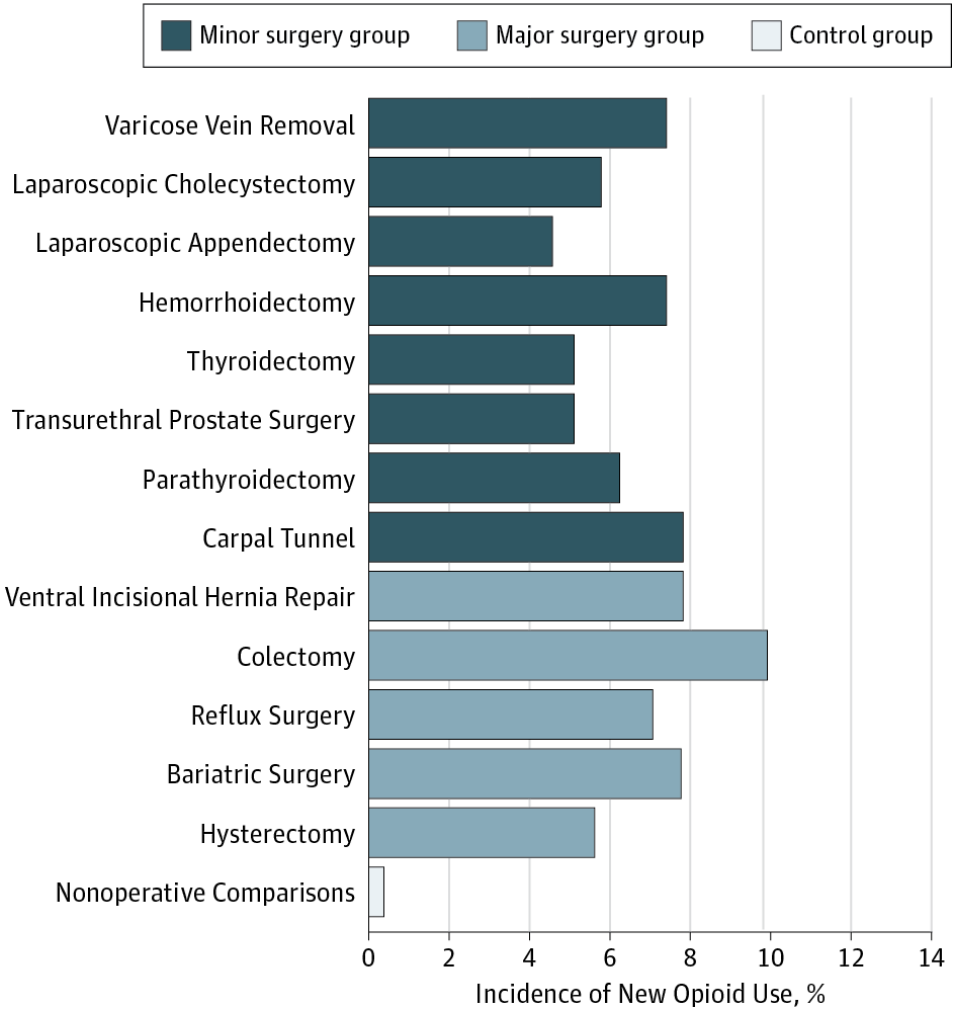
11.4% Bought from friend or relative

17.3% Prescribed by 1 doctor

Centers for Disease Control and Prevention.[6]

NEW PERSISTENT OPIOID USE AFTER MINOR AND MAJOR SURGICAL PROCEDURES IN US ADULTS

- Population-based study of 36 177 surgical patients
- Incidence of new persistent opioid use after surgical procedures was **5.9 to 6.5%**
- Did not differ between major and minor surgical procedures



Brummett et al. JAMA Surg 2017

ACUTE PAIN CDC RECOMMENDATION FOR OPIOIDS

- Use lowest effective dose
- Shortest expected duration of pain (<3 d for most, rarely>7d)

CDC Morbidity and Mortality Weekly Report (MMWR); 65: March 15, 2016.

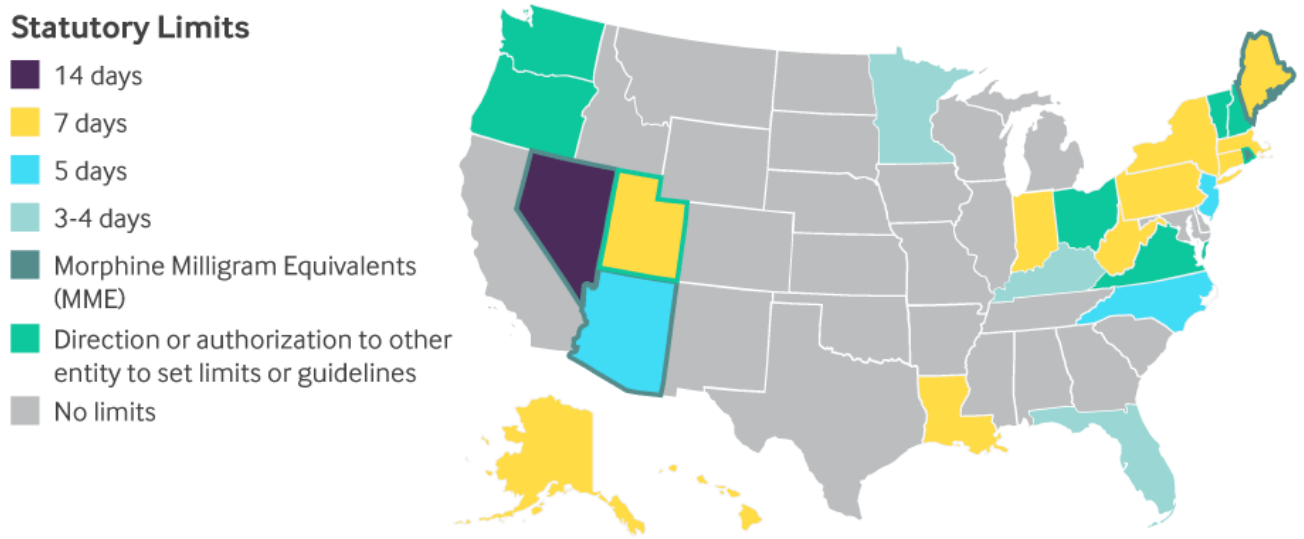
Responding to an Epidemic

115 Opioid Deaths Each Day

40% From Prescription Opioids

4x as many as in 1999 and still rising

28 States Have Limited Opioid Prescriptions



Source: Centers for Disease Control and Prevention, National Conference of State Legislatures

OPIOID PRESCRIBING RECOMMENDATIONS FOR OPIOID NAÏVE PATIENTS (UPDATED 2019)

Procedure	Oxycodone* 5mg tablets
Dental Extraction	0
Thyroidectomy	5
Laparoscopic Anti-reflux (Nissen)	10
Appendectomy – Lap or Open	10
Laparoscopic Donor Nephrectomy	10
Hernia Repair – Major or Minor	10
Sleeve Gastrectomy	10
Laparoscopic Cholecystectomy	10
Open Cholecystectomy	15
Colectomy – Lap or Open	15
Ileostomy/Colostomy Creation, Re-siting, or Closure	15
Open Small Bowel Resection or Enterolysis	20
Prostatectomy	10

Procedure	Oxycodone* 5mg tablets
Carotid Endarterectomy	10
Cardiac Surgery via Median Sternotomy	15
Cesarean Section	15
Hysterectomy – Vaginal, Lap/Robotic, or Abdominal	15
Breast Biopsy or Lumpectomy	5
Lumpectomy + Sentinel Lymph Node Biopsy	5
Sentinel Lymph Node Biopsy Only	5
Wide Local Excision ± Sentinel Lymph Node Biopsy	20
Simple Mastectomy ± Sentinel Lymph Node Biopsy	20
Modified Radical Mastectomy or Axillary Lymph Node Dissection	30
Total Hip Arthroplasty	30
Total Knee Arthroplasty	50

Opioid Prescribing Engagement Network. https://opioidprescribing.info/

CONCERNS?

- Concern: If we write for fewer opioids, there will be
  - an increase in phone calls for refills or
  - inadequate pain control.
- However studies found that with appropriate patient education,
  - not only did patients consume less medication,
  - but requests for refills did not increase.

Howard et al. *JAMA Surg.* 2018.

COUNSELLING PATIENTS

- SET EXPECTATIONS
  - *"Some pain is normal. You should be able to walk and do light activity, but may be sore for a few days. This will gradually get better."*
- SET NORMS
  - *"Half of patients who have this procedure take under 10-15 pills."*
- NON-OPIOIDS
  - *"Take acetaminophen and ibuprofen around the clock, and use the stronger pain pills only as needed for breakthrough pain."*
  - Avoid NSAIDs in patients with peptic ulcer disease and associated risk factors (smoking, drinking), bleeding disorders, renal disease, and specific operations at surgeon discretion.
- APPROPRIATE USE
  - *"These pills are for pain from your surgery, and should not be used to treat pain from other conditions."*
- ADVERSE AFFECTS
  - *"We are careful about opioids because they have been shown to be addictive, cause you harm, and even cause overdose if used incorrectly or abused."*
- SAFE DISPOSAL
  - *"Disposing of these pills prevents others, including children, from accidentally overdosing. You can take pills to an approved collector (including police stations), or mix pills with kitty litter in a bag and throw them in the trash."*

Michigan OPEN https://opioidprescribing.info/

AAOS-PAIN RELIEF TOOL KIT

Preoperative Pain Relief Discussion

Help prepare patients for what to expect and make a plan for pain relief.

Postoperative Pain Relief

Pain is part of the healing process and knowing what to expect will help patients achieve peace of mind.

Preoperative Screening Questionnaires

Determine your patients' risk for opioid dependence.

Doctor-Patient Scripts

Scripts for dealing with common pain reliefs situations.

Emergency Dept. Opioid Strategy

Strategies for relief of musculoskeletal pain in the Emergency Department.

Orthopaedic Dept./Service Strategies

Having a prescribing policy in place, such as receiving prescriptions from one provider or limiting the number of pills prescribed, will reduce the number of pills that can potentially be diverted, abused, and/or misused.

Safe Use, Storage, and Disposal

Strategies for safely using, storing and disposing of opioids.

https://aaos.org/PainReliefToolkit/?ssopc=1

POST-OP PAIN RELIEF

- Pain relief after surgery
  - Remember pain is part of the normal healing process after surgery
  - Pain will improve day by day. The first few days are the worst. Things will continue to heal and improve the entire next year.
  - To get the work done we have cut through healthy tissue. Your body needs time to heal.
- Getting comfortable
  - Try to take as little opioid pain medication as possible
  - If there is no acetaminophen in the opioid pills, add acetaminophen (Tylenol)- either take 2 extra strength every 6 hours or 2 regular strength every 4 hours for two days
  - Add ibuprofen 600-800mg every 6 hours for two days.
  - Stagger Tylenol and ibuprofen so that you are taking one or the other every 3 hours
  - Elevate surgical area, use ice (10 min on, 5 min off)
- If you had a nerve block
  - When your block is wearing off, you need to "catch up". You can take the stronger pain reliever every 3 hours for the next 3 doses.

https://www.aaos.org/Quality/PainReliefToolkit/AfterSurgery/

PRE-OP SCREENING TOOL

- A measure of effective coping strategies
  - Pain self efficacy questionnaire(PSEQ-2)
- A measure of symptoms of depression
  - Patient health questionnaire (PHQ-2)
- Risk of opioid abuse
  - The Screener and Opioid Assessment for Patients in Pain (SOAPP)

https://www.aaos.org/uploadedFiles/PreProduction/Quality/Patient_Safety/Pain_Relief_Toolkit/Preoperative_Screening_Questionnaire.pdf

Pre-operative Screening Tools

Pain Self-Efficacy Questionnaire – Short Form (PSEQ-2)1 –
A measure of effective coping strategies

1. "I can still accomplish most of my goals in life, despite the pain"

0 1 2 3 4 5 6

Not at all confident — Completely confident

2. "I can live a normal lifestyle, despite the pain"

0 1 2 3 4 5 6

Not at all confident — Completely confident

**Total score between 0-12, with 12 being more adaptive. Clinicians should not look for a cutoff score, but simply discuss where there may be opportunities for better by relief by becoming more resilient.*

Patient Health Questionnaire 2 (PHQ-2)2
A measure of symptoms of depression

Over the past 2 weeks, how often have you been bothered by any of the following problems?

1. Little interest or pleasure in doing things.

☐ Not at all ☐ Several days ☐ More than half of the days ☐ Nearly every day

2. Feeling down, depressed or hopeless.

☐ Not at all ☐ Several days ☐ More than half of the days ☐ Nearly every day

**Total score 0-6. A 'cutoff' score of 3 is suggested for considering additional screening and treatment for major depression, but the categories aren't as important as the fact that symptoms of depression will lead to greater pain. Working to decrease symptoms of depression prior to discretionary/elective surgery could be helpful.*

The Screener and Opioid Assessment for Patients in Pain (SOAPP®)
Brief paper and pencil tool to facilitate assessment and planning for chronic pain patients being considered for long-term opioid treatment.

Resources: SOAPP

1. General
   a. Intended for use by licensed health care professionals only
   b. Copyrighted by Inflexxion, Inc.
2. Available from: Inflexxion at http://www.painedu.org

Citations

1. Arjan G.J. Bot, M.D., Sjoerd P.F.T. Nota, M.D., David Ring, M.D., Ph.D. The Creation of an Abbreviated Version of the PSEQ: The PSEQ-2. Psychosomatics. Volume 55, Issue 4, July–August 2014, Pages 381–385
2. https://cde.drugabuse.gov/instrument/fc216f70-be8e-ac44-e040-bb89ad433387

AAOS
American Academy of Orthopaedic Surgeons

PHONE CALL SCRIPTS

Strategy:

- empathize
- normalize the pain
- rule out problems
- strategize
- be available

- One at a time with pauses between. Listen more than speak.
- "Does the surgery hurt more than you expected?"
- "Pain can feel like something is wrong" (Rule out compartment syndrome)
- "Your body needs time to heal"
- "Are you using all of the pain management strategies?"

https://www.aaos.org/Quality/PainReliefToolkit/Scripts/

RED FLAG WARNING SIGNS - PRESCRIBING AND DISPENSING CONTROLLED SUBSTANCES

- Screening tool to be considered before prescribing an opioid
- Developed by coalition of multiple societies, pharmacists, pharmacy stores and DEA:

- American Academy of Family Physicians
- American Medical Association
- American Osteopathic Association
- American Pharmacists Association
- American Society of Anesthesiologists
- American Society of Health-System Pharmacists
- Cardinal Health
- CVS Health
- Healthcare Distribution Management Association
- National Association of Boards of Pharmacy
- National Association of Chain Drug Stores
- National Community Pharmacists Association
- Pharmaceutical Care Management Association
- Purdue Pharma L.P.
- Rite Aid Walgreen Co.

RED FLAG WARNING SIGNS

Initial visit/Presentation

- Patients who travel to the prescriber's practice as a group and all request controlled substance on the same day
- Decline physical exam, or diagnostics, or permission to obtain records
- Conduct suggest abuse of controlled substances

Medication Taking/Supply

- Multiple unsanctioned dose escalations
- Route of drug administration used other than prescribed
- Seeking medications from non-coordinated sites of care- e.g., ED, urgent care
- Unintentional or intentional overdose

https://nabp.pharmacy/wp-content/uploads/2016/07/Red-Flags-Controlled-Substances-03-2015.pdf

RED FLAG WARNING SIGNS

Patient behavior/communication

- Prescriptions from multiple practitioner without the prescribers' knowledge of other prescriptions
- Discharged from another practice for egregious behavior
- Pressuring physician to prescribe by implying or making direct threats to the prescriber or staff

Treatment Plan Related

- Resists change in treatment plan despite clear evidence of adverse effects
- Refuse to sign or fail to comply with opioid agreement governing use of opioids

Illicit/Illegal

- Altering or forging prescriptions
- Diverting or selling medication, or "borrowing" drugs from others
- Requesting controlled substance prescriptions written in the other people names for whom patient is not the designated caregiver

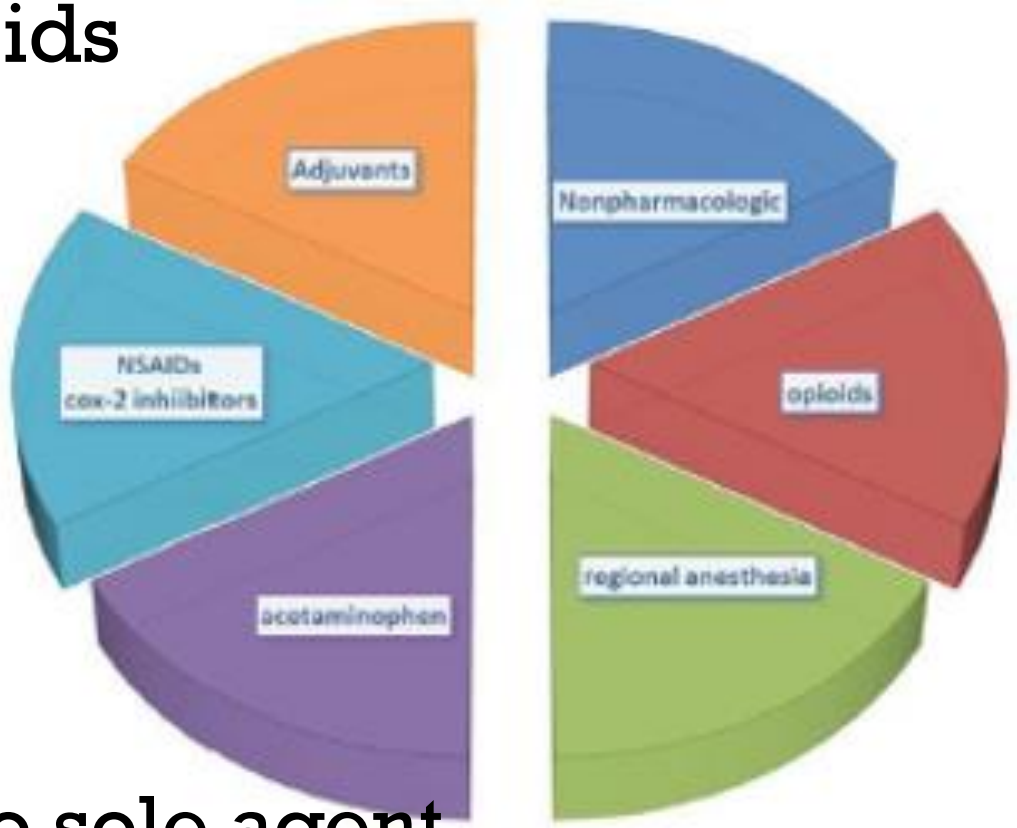
TRAINEES AS AGENTS OF CHANGE IN THE OPIOID EPIDEMIC

- Method
  - Anonymous online survey
  - At an ACGME accredited general surgery program at a university-based tertiary hospital
- Surgical trainees are relying almost exclusively on opioids for postoperative analgesia, often in excessive amounts.
- They are
  - heavily influenced by their superiors
  - are not receiving formal opioid-prescribing education
- Great need for increased resident education on postoperative pain and opioid management to help change prescribing habits.

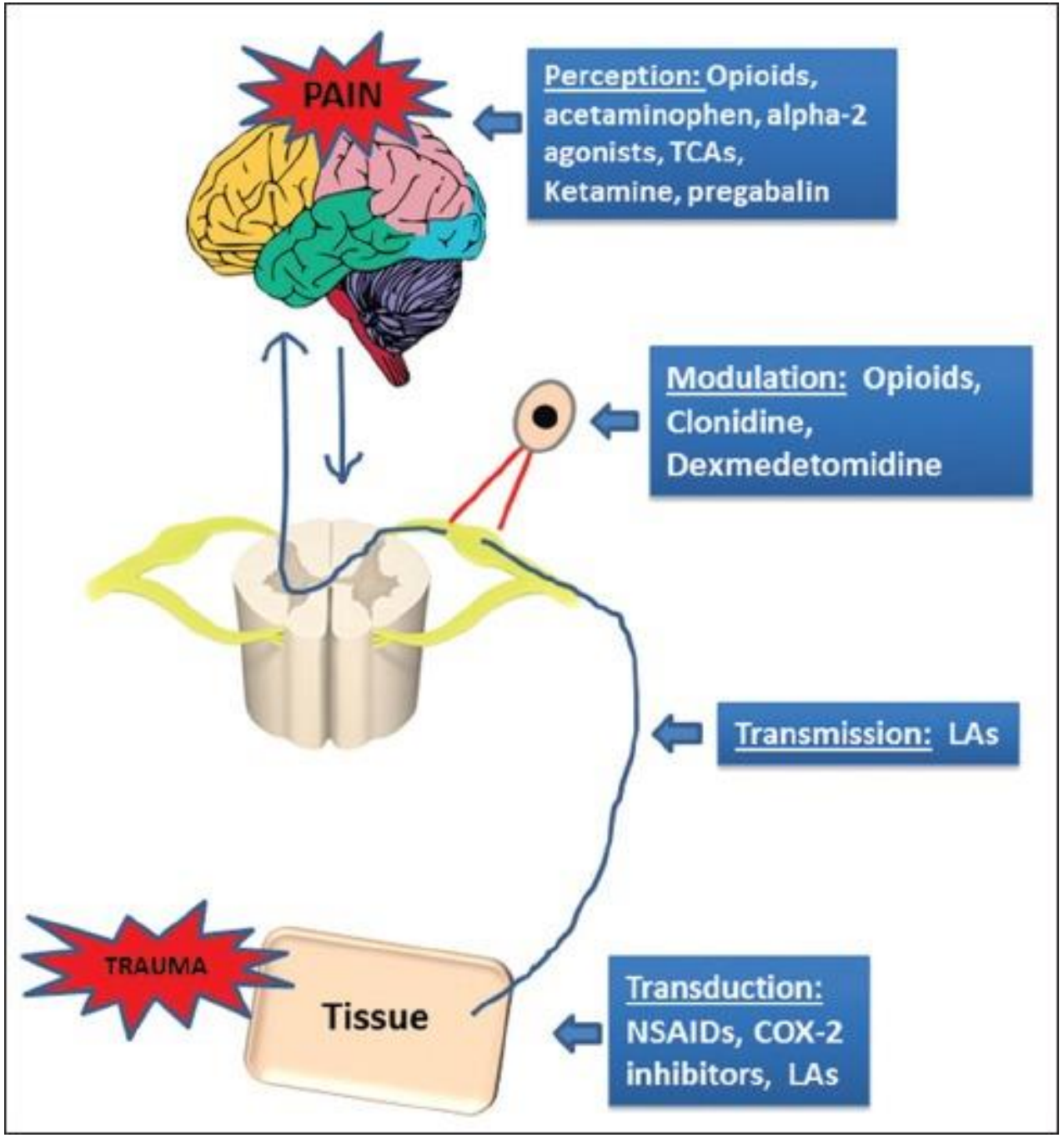
Chiu et al. J Surg Educ. 2018

MULTIMODAL ANALGESIA

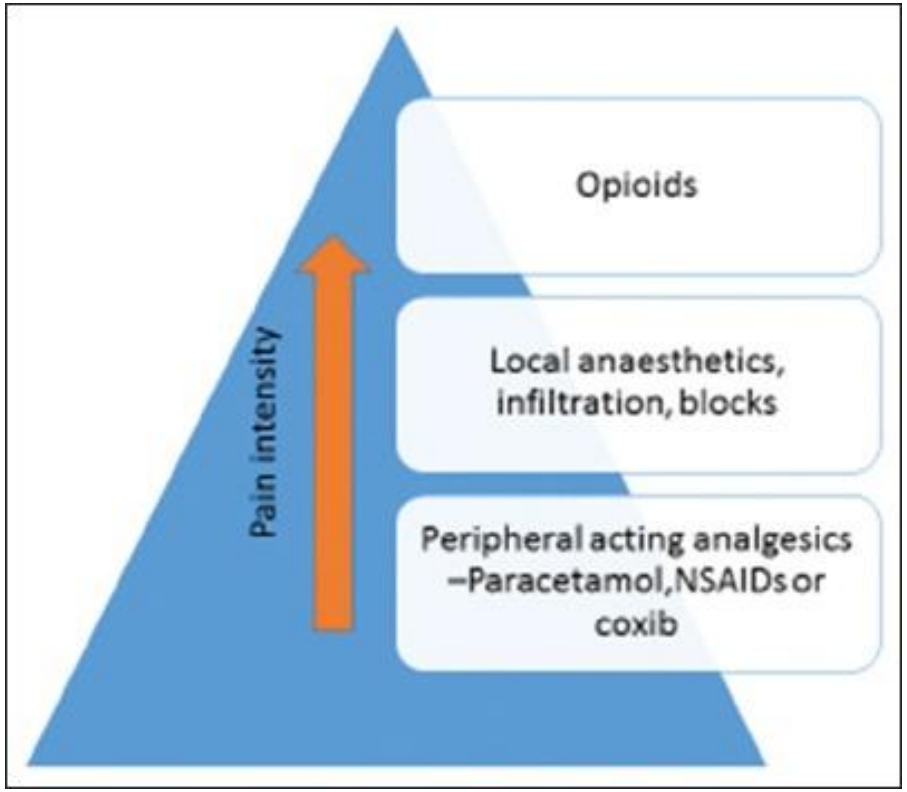
- Combination of analgesics that act by different mechanisms
  - Medications focusing on non-opioids
  - Local anesthetic infiltration
  - Regional anesthesia
  - Non-pharmacologic approaches
    - Physical therapy
    - Complementary therapy



- Result:
  - additive or synergistic analgesia
  - lowered adverse event compared to sole agent
  - decrease opioids



MULTIMODAL ANALGESIA



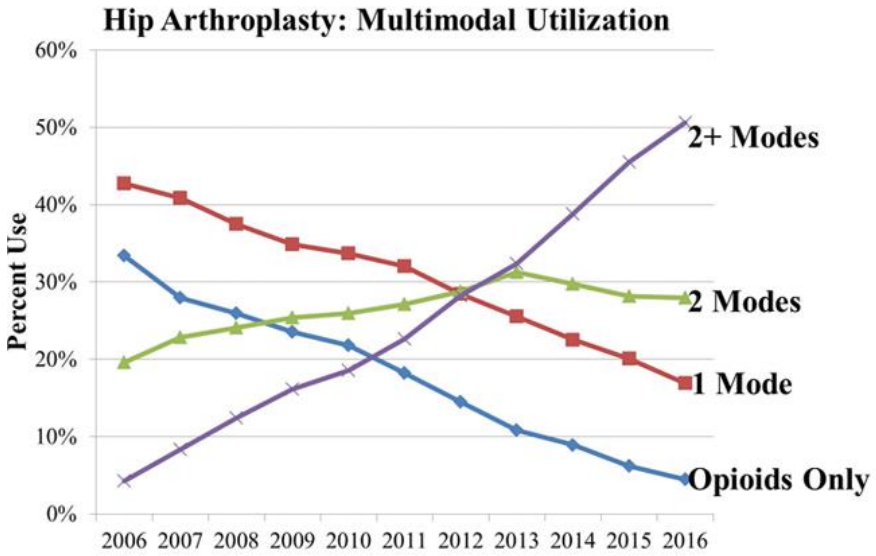
Kulkarni et al. Indian J Anesth, 2017.

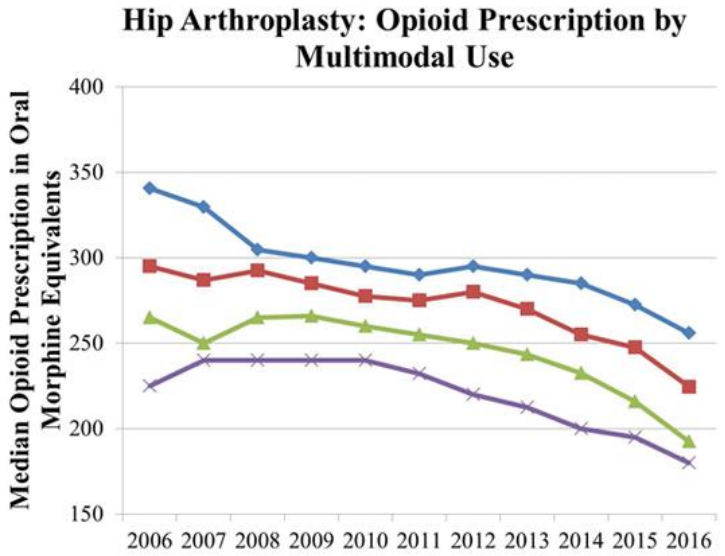
MANAGEMENT OF POSTOPERATIVE PAIN

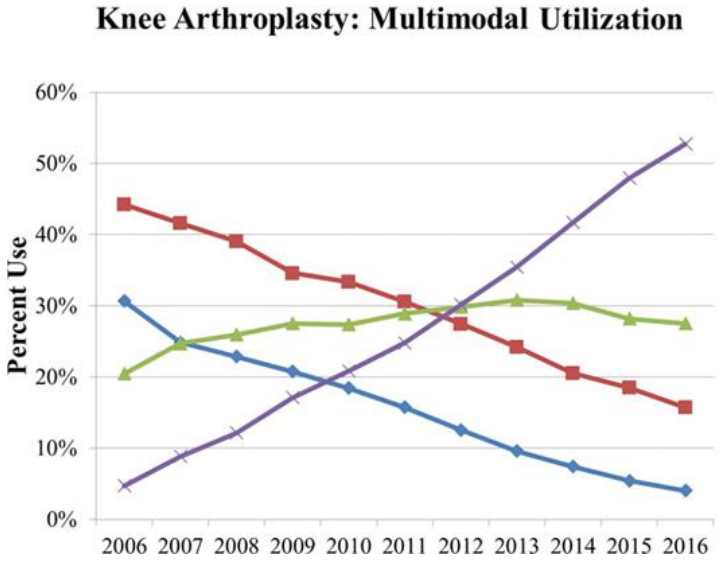
- Expert panel guideline from the
  - American Pain Society
  - American Society of Regional Anesthesia and Pain Medicine, &
  - American Society of Anesthesiologists
- Based on a systematic review of evidence on management of postoperative pain
- Support **use of multimodal regimens:** High quality evidence
- The exact components of effective multimodal care will vary depending on the patient, setting, and surgical procedure.

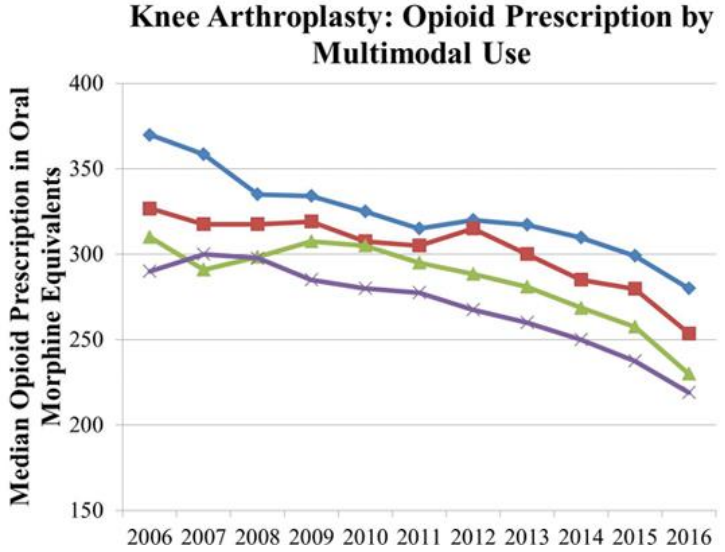
Chou et al. J Pain, 2016.

MULTIMODAL ANALGESIA REDUCES OPIOID USE









- Retrospective review, national population based data source
- >1.5 million patients

Memtsoudis et al. Anesthesiology, 2018.

MULTIMODAL ANALGESIA REDUCES ADVERSE EVENTS

- Patients receiving more than 2 modes (compared to "opioids only") experienced
  - 19% fewer respiratory complications
  - 26% fewer gastrointestinal complications
  - 18.5% decrease in opioid prescription
  - 205 vs. 300 overall median oral morphine equivalents)
  - 12.1% decrease in length of stay

Memtsoudis et al. Anesthesiology, 2018.

REGIONAL ANESTHESIA- MECHANISM

- Temporarily blocks nerve impulses to a certain intended area of the body, thus reducing pain
  - Inhibits neural conduction from the surgical site to the spinal cord
  - Decreases spinal cord sensitization
- In some cases may be used as the sole anesthetic

Chen et al. Cochrane Database of Systematic Reviews 2014

REGIONAL ANESTHESIA-OPTIONS

- Duration:
  - Single shot or continuous
- Central to peripheral:
  - Neuraxial- spinal/epidural
  - Plane blocks and Peripheral nerve block
  - Local infiltration

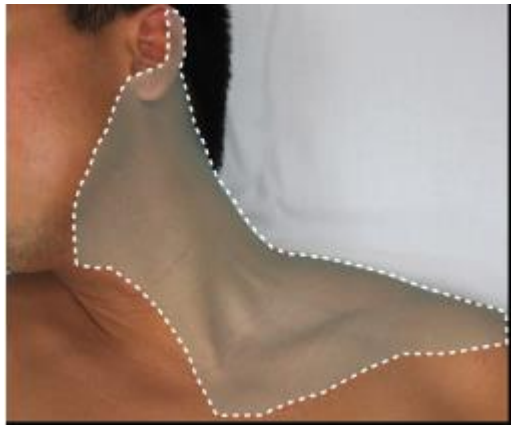
EXAMPLES OF REGIONAL

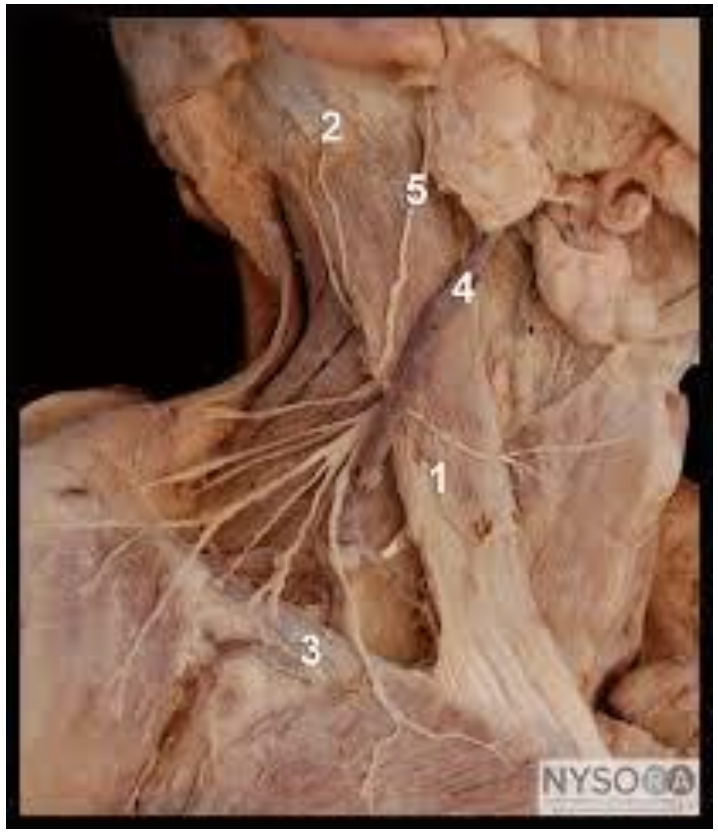
- Gastrointestinal: epidural, spinal or paravertebral nerve blocks/ catheters
- Gynecology: epidural, spinal or paravertebral nerve blocks and catheters
- Ophthalmology: injection of local anesthetics
- Orthopedics: epidural, spinal, or peripheral nerve blocks/catheters
- Thoracic surgery: epidural, paravertebral or intercostal nerve blocks/catheters
- Urology: epidural, spinal or paravertebral nerve blocks/catheters
- Vascular surgery: cervical blocks for carotid surgeries; epidural or paravertebral nerve block for abdominal aortic endovascular or lower extremity bypass procedures

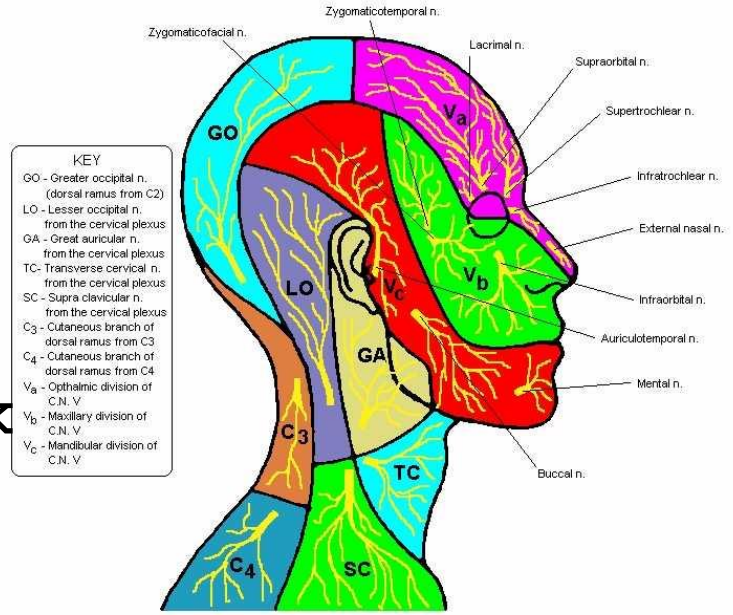
https://www.asra.com/page/41/regional-anesthesia-for-surgery

PERIPHERAL NERVE BLOCK- HEAD AND NECK

- **Retrobulbar and peribulbar block**
- **Superficial cervical plexus block**
- Occipital nerve block
- Trigeminal nerve block
  - Supraorbital,
  - Infraorbital
  - Maxillary and
  - Mandibular divisions
- Glossopharyngeal nerve block

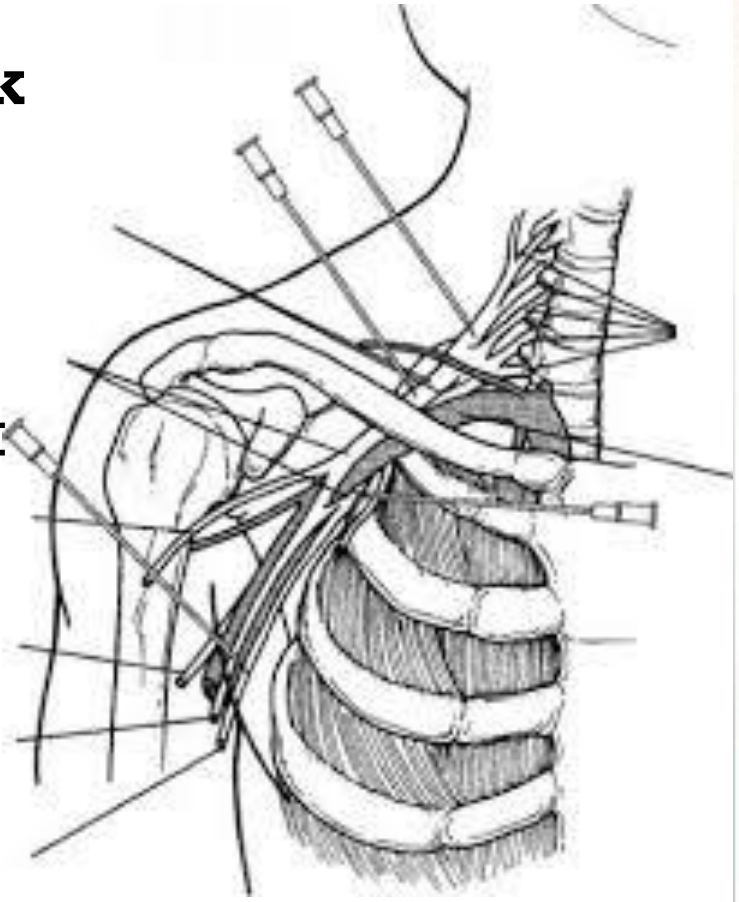


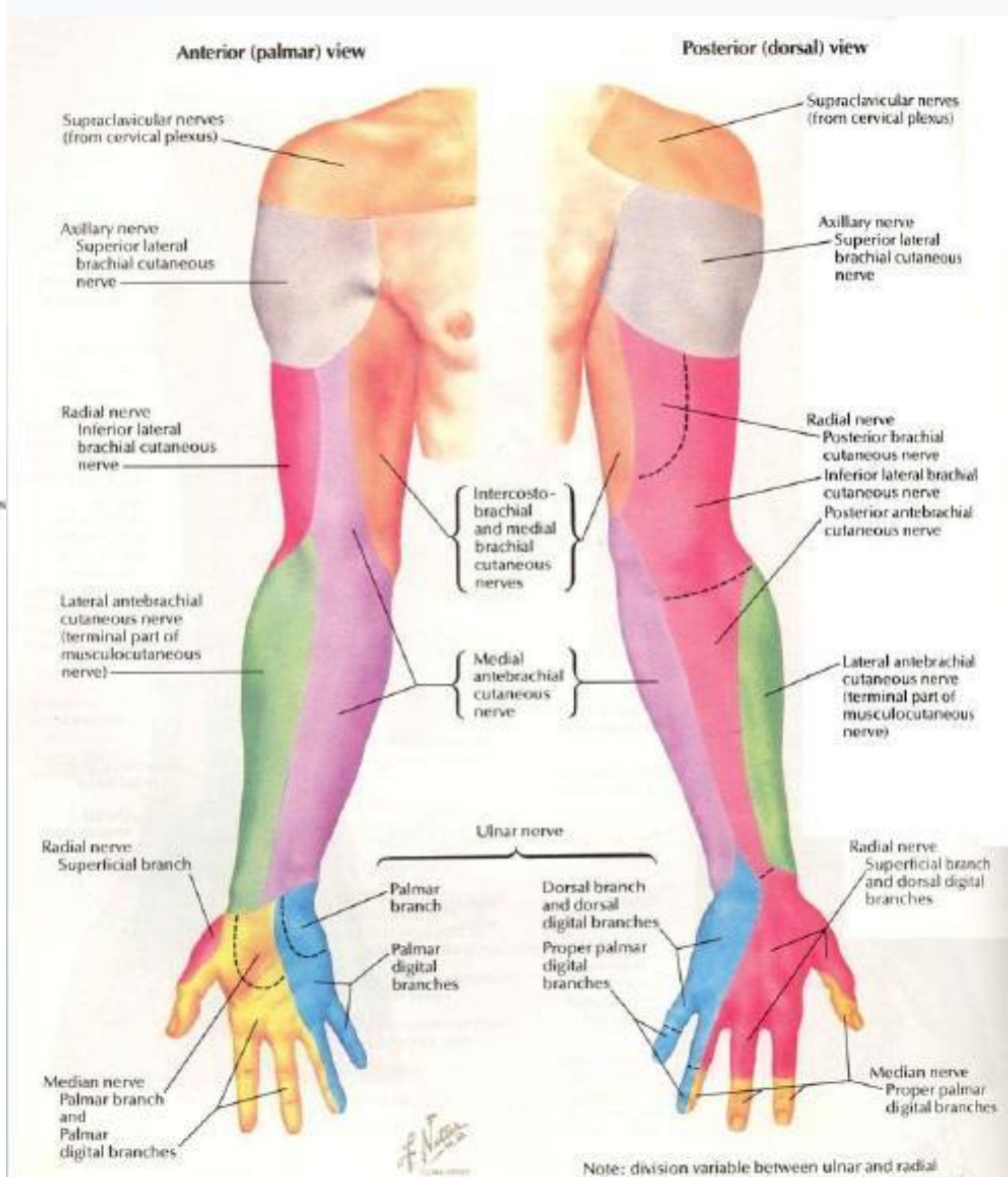




PERIPHERAL NERVE BLOCK- UPPER EXTREMITIES

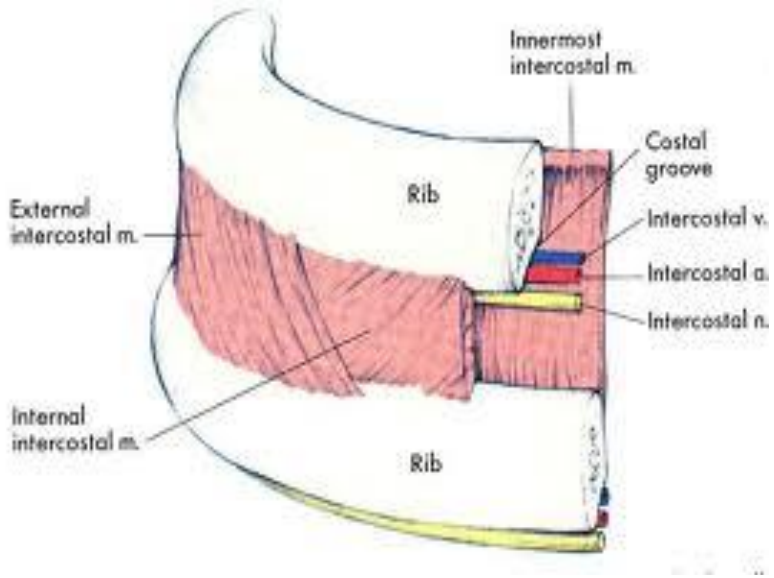
- **Brachial plexus block**
  - Interscalene
  - Supraclavicular
  - Infraclavicular
  - Axillary
- Individual nerve block
  - Median,
  - Radial,
  - Ulnar,
  - Musculocutaneous
  - Suprascapular block
  - Axillary nerve block





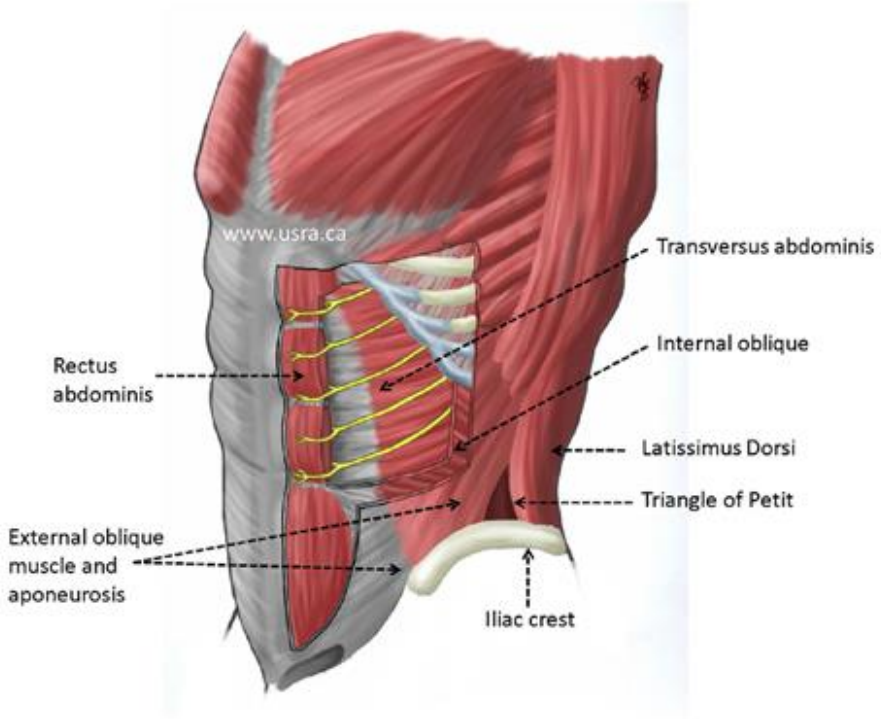
PERIPHERAL NERVE BLOCK- CHEST AND THORAX

- Paravertebral block
- Erector spinae block
- Intercostal nerve block
- Pec I and II block
- Serratus anterior plane block



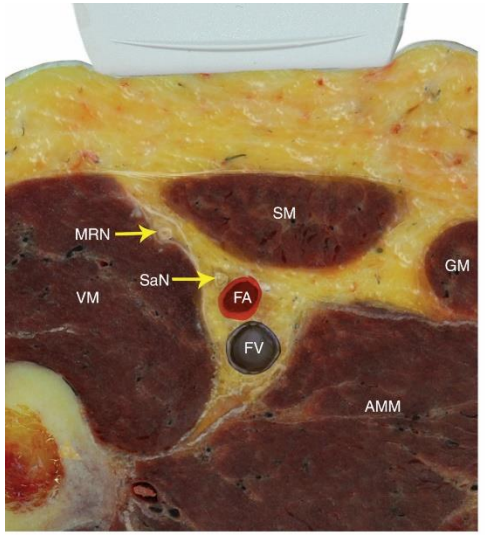
PERIPHERAL NERVE BLOCK-ABDOMEN, GROIN AND GENITALIA

- Transversus Abdominis Plane block
- Rectus sheath block
- Quadratus lumborum block
- Ilioinguinal nerve block
- Genitofemoral nerve block
- Pudendal nerve block



PERIPHERAL NERVE BLOCK- LOWER EXTREMITIES

- Lumbar plexus
- Fascia iliaca
- Lateral femorocutaneus nerve block
- Femoral/Adductor canal/saphenous nerve block
- Sciatic/popliteal/post tibial/peroneal/sural nerve block
- Obturator nerve block
- Ankle block, Digital block



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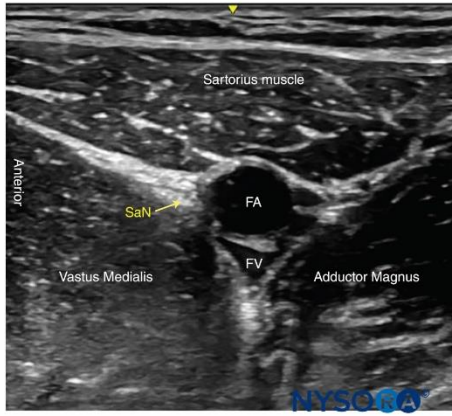

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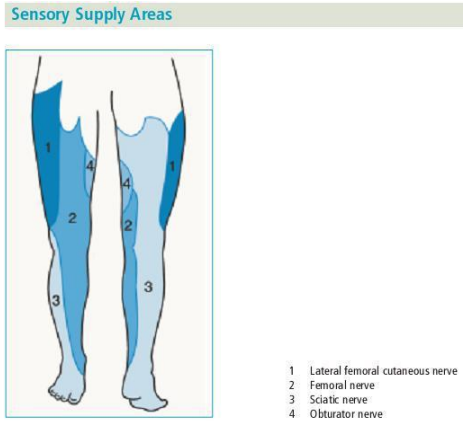


Fig. 5: Sensory supply areas of the lumbosacral plexus

ANESTHESIOLOGY
Education | July 2011

Thoracic Epidural Analgesia and Acute Pain Management

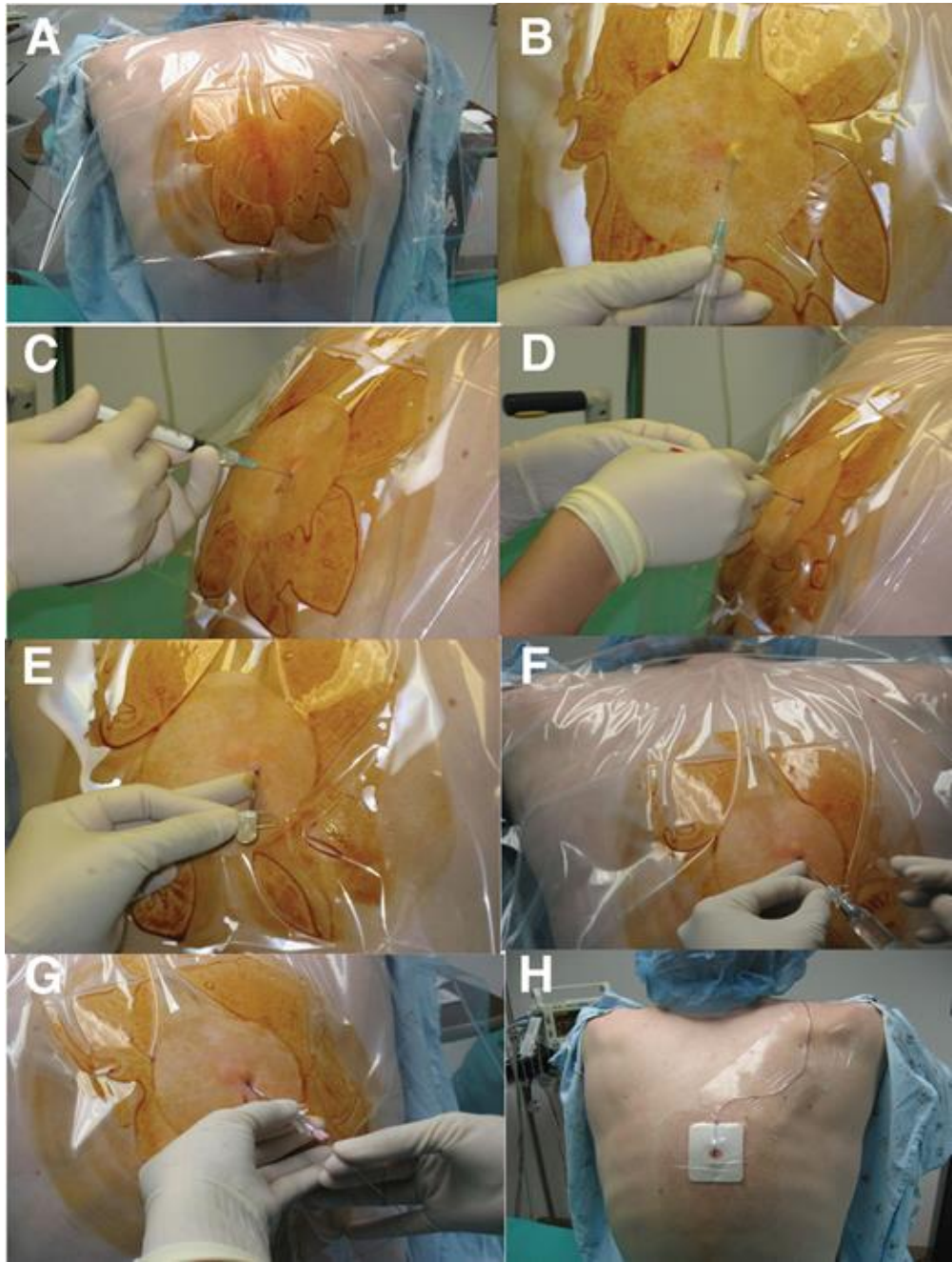
Smith C. Manion, M.D.; Timothy J. Brennan, Ph.D., M.D.

Table 1. Open Surgeries in Which Thoracic Epidural Analgesia Can Be Used

Thoracic Surgery	Upper Abdominal Surgery	Colorectal Surgery	Urologic Surgery	Gynecologic Surgery
Thoracotomy	Esophagectomy	Colectomy	Cystectomy	Ovarian tumor debulking
Repair of pectus deformities	Gastrectomy	Bowel resection	Nephrectomy	Pelvic exenteration
Thoracic aortic aneurysm repair	Pancreatectomy	Abdominal perineal resection	Ureteral repair	Radical abdominal hysterectomy
Thymectomy	Hepatic resection		Radical abdominal prostatectomy	
	Abdominal aortic aneurysm repair			
	Cholecystectomy			

NEURAXIAL-BENEFITS OF THORACIC EPIDURAL

- Better pain control
- Reduced opioid intake
- Optimizes respiratory function
- Avoids sedation
- Blunts surgical stress response
- Lower incidence of DVT
- Improved bowel recovery
- Decrease nausea



Liu et al. Anesth Anal 2007
Carli et al. Dis Col Rectum 2001
Manion et al. Anesth 2011

IMPACT OF PERIPHERAL NERVE BLOCKS ON PERIOP OUTCOME

- >1 million patients who underwent hip and knee arthroplasty reviewed
- Only 12.5% received peripheral nerve block
- Several benefits noted for those received peripheral nerve block :
  - Reduce opioid consumption
  - Reduced odds of wound complications
  - Reduced odds of pulmonary complications
  - Decrease length of stay
  - Lower rates of transfusion
  - Lower rate of ICU admission

Memtsoudis et al. Pain 2016

Cochrane Database of Systematic Reviews

Local anaesthetics and regional anaesthesia versus conventional analgesia for preventing persistent postoperative pain in adults and children

- Effect of Regional anesthesia on persistent post surgical pain
  - Moderate-quality evidence- Reduced risk after thoracotomy and caesarean section
  - Low-quality evidence -Reduce the risk after breast cancer surgery

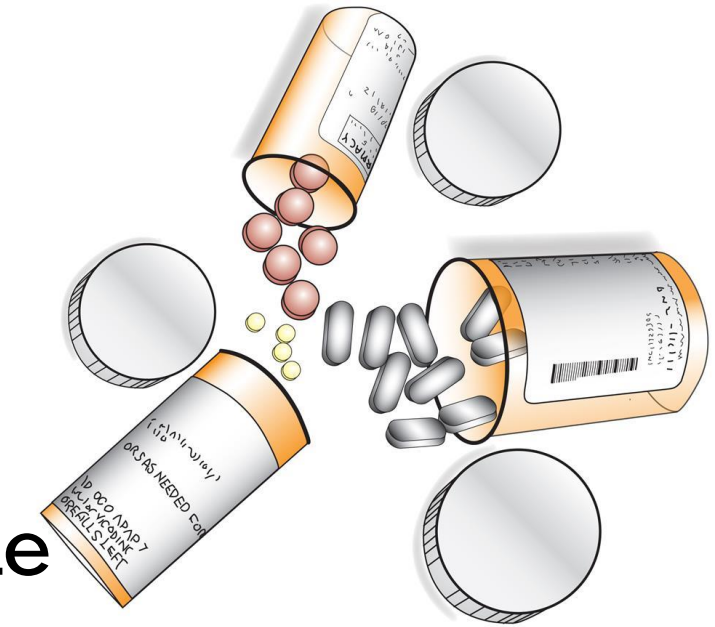
- Effect of intravenous infusion of local anaesthetics
  - Moderate evidence after breast cancer surgery

NON-OPIOID MEDICATIONS FOR PAIN

- Herbals
  - Turmeric, ALA
- **NSAIDs**
  - Selective Cox-2- meloxicam, celecoxib
- **Acetaminophen**
- Topicals
  - Lidocaine ointment/patch(OTC as aspercream w/lido), voltaren gel(OTC as emugel)

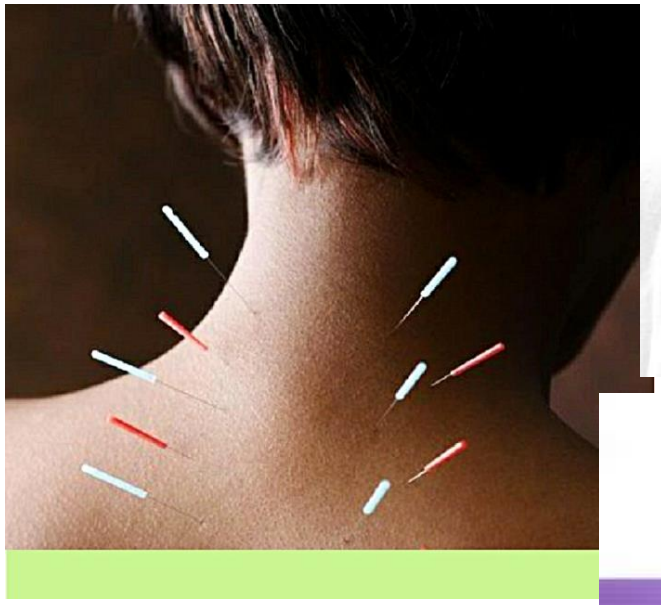
NON-OPIOID FOR PAIN

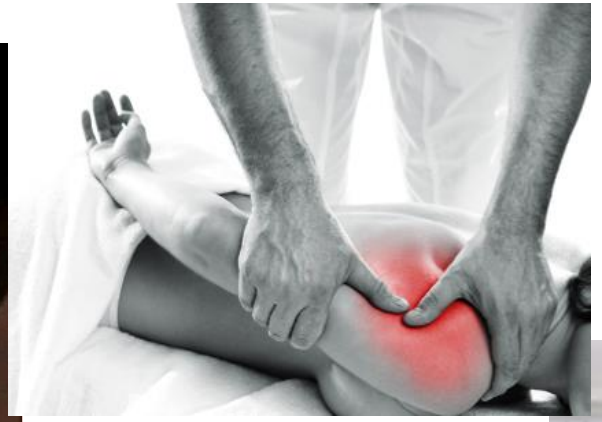
- Anticonvulsants
  - Gabapentin, pregabalin, topamax, levitiracetam
- Antidepressants/Anxiolytics
  - TCAs(nortriptyline, amitriptyline),
  - SNRIs(duloxetine, venlafaxine)
- Muscle relaxants
  - Baclofen, cyclobenzaprine, tizanidine

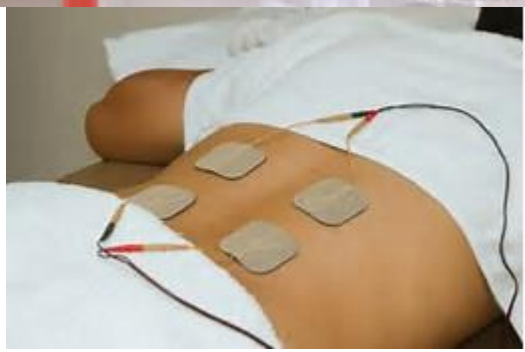


NON-PHARMACOLOGIC OPTIONS

- Ice/heat
- TENS
- Acupuncture
- Massage
- Yoga
- Physical therapy
- Mindfulness/Meditation
- Cognitive behavioral skills
- Biofeedback







CHRONIC OPIOIDS AND WEANING

When to start opioids for chronic pain?

- Presence of clear anatomical source of pain
- Moderate to severe pain having an adverse impact on function or quality of life
- Failure of other conservative methods such as
  - physical therapy
  - non-opioid medications
- Opioid risk assessment - low/moderate risk for opioid use disorder
- Potential therapeutic benefits outweigh potential harms

❑Chou et al. J Pain. 2009.

OPIOID RISK ASSESSMENT TOOLS

- The Opioid Risk Tool (ORT)
  - five-question
  - self-administered assessment
  - should be utilized on a patient's initial visit
  - accurately predicted risks of exhibiting aberrant, drug-related behaviors associated with abuse or addiction

AT INITIATION OF CHRONIC OPIOIDS

- Prescription database monitoring should be used in decision making
- An opioid agreement should be signed
- Regular drug monitoring, e.g. urine testing, should be done, at least every 3 months, while patient is maintained on opioids
- Advise to take the opioid medications as sparingly as possible
- Discuss goals of opioid therapy, alternatives, use of concomitant therapy, indications for tapering/discontinuing

❑Chou R et al. J Pain. 2009.

MAINTENANCE THERAPY: MONITOR 4 AS

- Continued use of opioids should be guided by assessing the following 4 areas:
  - **A**nalgesia: Does the patient derive pain relief?
  - **A**ctivity: Does use of opioids improve activity levels/functioning?
  - **A**dverse effects: Are there significant medication side effects?
  - **A**berrant behavior: Is the patient engaging in any inappropriate behavior with regard to opioid medication use-such as frequent request for early refills, perseverating about opioid medication?

❑ Passik et al. Adv Ther. 2000.

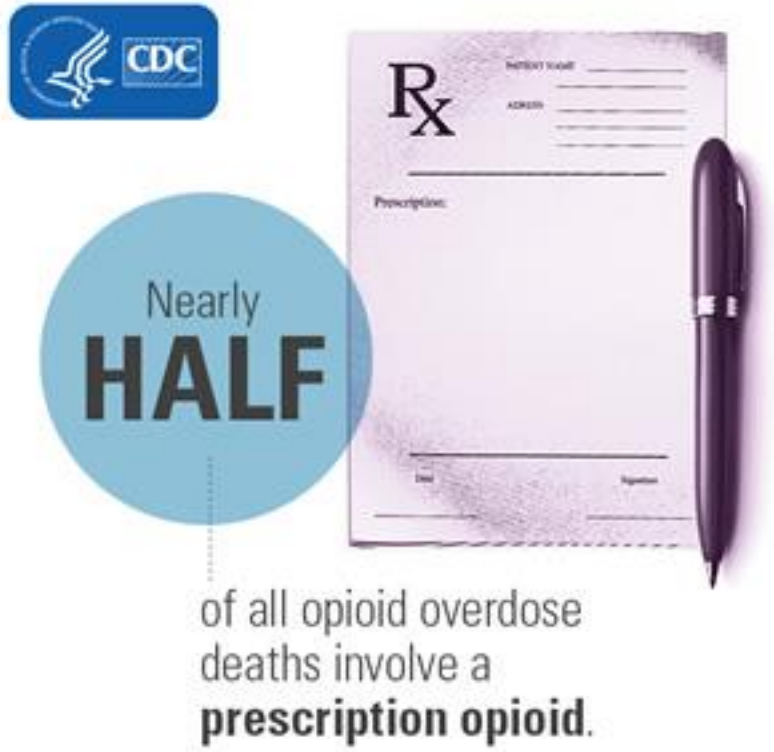
CURRENT OPIOID MISUSE MEASURE (COMM)

- 17 item self-assessment to monitor patients on maintenance opioid
- Questionnaire identifies 6 key issues to determine aberrant medication related behaviors:
  - Signs and symptoms of intoxication
  - Emotional volatility
  - Evidence of poor response to medications
  - Addiction
  - Healthcare use patterns
  - Problematic medication behavior
- Simple to score, completed in <10 minutes, score >9 is positive

❑ Butler et al. Pain. 2007.

HOW MUCH OPIOIDS IS OK?

- Dose response relationship between –
  - risk of opioid overdose death and
  - max daily prescribed dose of opioid
- Significant increase in risk of opioid overdose
  - >/= 50mg/day MEQ (morphine equivalent)
- Adjusted hazard ratios for risk of overdose death
  - at >/=100 MEQ vs 1-20 MEQ => 7.18
  - at 50-100 MEQ vs 1-20 MEQ => 4.63
  - at 21-50 MEQ vs 1-20 MEQ => 1.88



- Bohnert et al. JAMA 2011.
- Dunn et al. Ann Intern Med 2010
- https://www.cdc.gov/drugoverdose/images/opioids/Opioid_use_in_United_States_RX-300x300.jpg

WHEN TO WEAN OPIOIDS?

- Failure to achieve or maintain anticipated pain relief or functional improvement
- Intolerable adverse effects at minimum dose that produces effective analgesia
- Persistent nonadherence with patient treatment agreement- ex.
  - failure to comply with monitoring,
  - selling prescription drugs, forging Rx, stealing or borrowing drugs,
  - aggressive demand for opioids, unsanctioned dose escalation, concurrent use of illicit drugs,
  - multiple prescribers, multiple pharmacies, recurring ER visits for pain
- Physical, emotional, or social deterioration secondary to opioids
- Resolution or healing of the painful condition

❑ Berna Opioid Taper Mayo Clin Proceeding 2012

HOW TO WEAN?

- Daily to dose to prevent withdrawal is ~25% of previous days dose
- No published data on speed of tapers in patients on long term opioid treatment for chronic non-cancer pain
- Patients who take PRN opioids less than once daily do not need formal taper

- Fishbain et al. Ann Clin Psychiatry. 1993
- Berna. Mayo Clin Proc. 2008

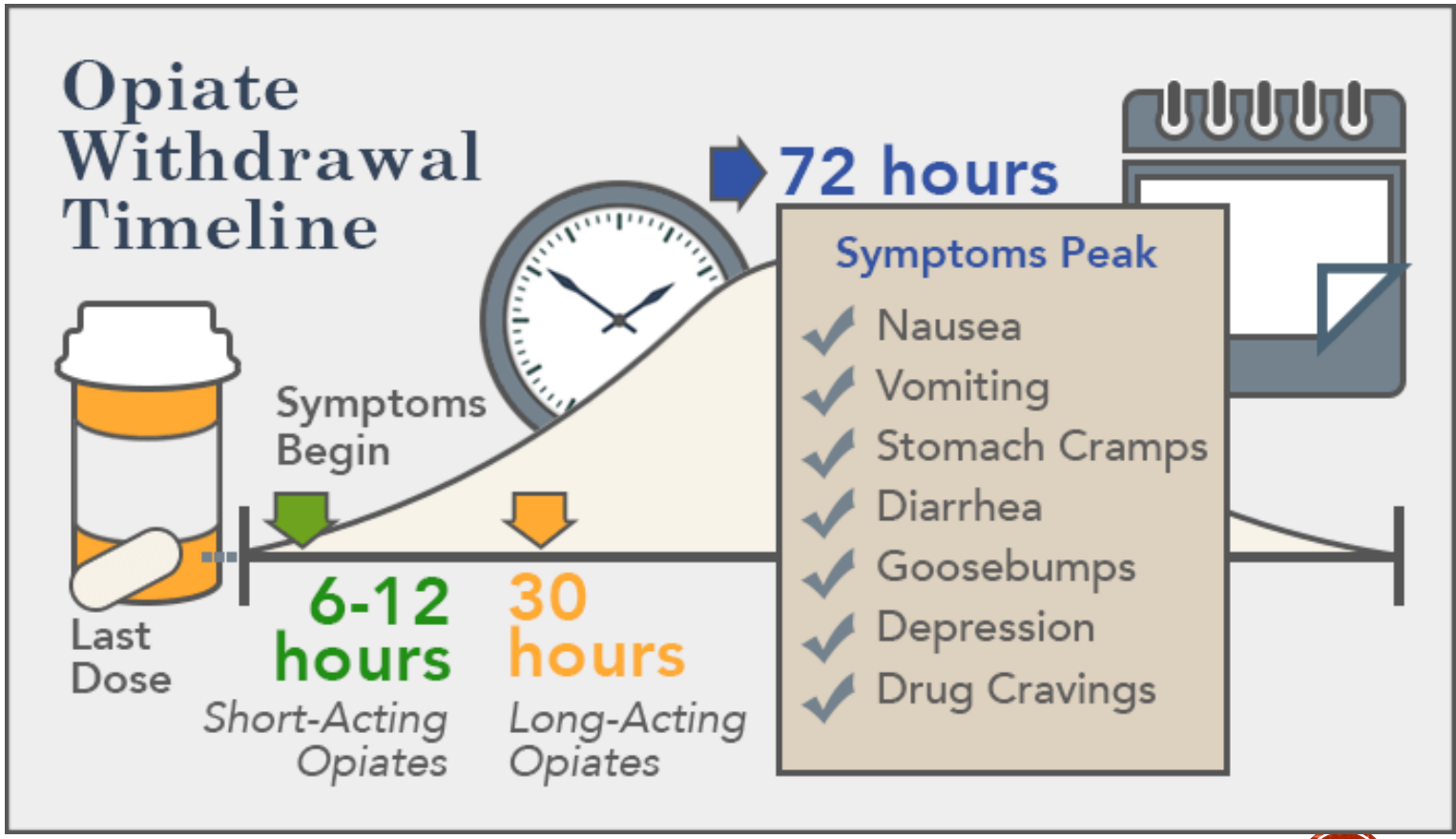
HOW TO WEAN?

- First reduce dose of the medication to the smallest available dose
- Next increase time interval
- Example-wean 10% per week, until last 1/3 then wean 5% per week
- May choose slower wean (ex. 10% per month)for patients who have been on opioid for long term.

- Berna C. Mayo Clin Proc 2008

OPIOID WITHDRAWAL ONSET

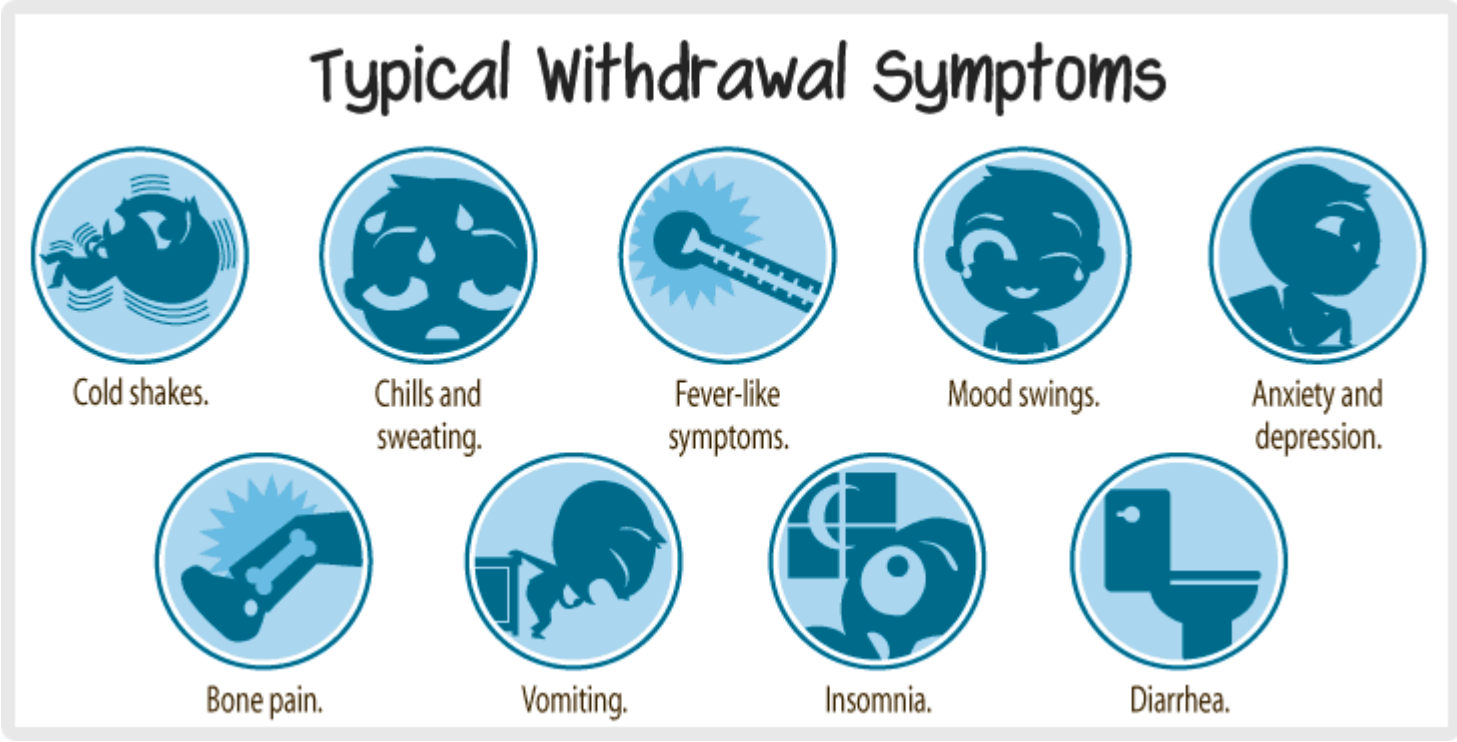
- Symptoms start 2 to 3 half-lives after the last dose of opioid
- Ex.- for oxycodone- $t_{1/2}$- 3-4 hours; symptoms would start after 6-12 hours)
- In this situation, symptoms
  - peak at ~ 48 to 72 hour
  - resolve within 7 to 14 day
- Variability depending on
  - specific dose,
  - speed of taper, and
  - duration of use



- Farrell M. Addiction. 1994.
- Fishbain DA et al. Ann Clin Psychiatry. 1993.
- https://americanaddictioncenters.org/withdrawal-timelines-treatments/opiate/

OPIOID WITHDRAWAL SYMPTOMS

- Signs and symptoms of sympathetic stimulation (from decreased sympathetic antagonism of opioids)
  - Anxiety, Restlessness, Insomnia,
  - Dizziness
  - Hypertension, Tachycardia,
  - Mydriasis, Lacrimation, Diaphoresis,
  - Yawning, Piloerection
  - Tremor, Shivering,
  - Rhinorrhea, Sneezing
  - Nausea, Anorexia
  - Abdominal cramps, Diarrhea,
  - Hot flashes, Myalgias or arthralgias



- Symptoms can be mitigated by use alpha 2 agonist such as clonidine - 0.1mg Q6 hours PO or 0.1mg per 24 hours transdermal patch

CONCLUSION

- Basics of modern pain management
  - Minimize opioids
  - Use multiple modalities
  - Regional anesthesia has strong evidence

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