Current Guidelines on
Appropriate Prescribing and Tapering of Opioids
for Non-Cancer Chronic Pain in Non-Pregnant Adults

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Pharmacotherapy Rounds

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Patient case

- RM is a 71 yo male with chronic pain. It recently came into light that he had received 628 tablets of hydrocodone 5/APAP 325mg over 59 days (Rx 224 tablets/28 days)

- PMH & Medications
  - BPH: Finasteride 5mg HS
  - Hyperlipidemia: atorvastatin 40mg HS
  - HTN: carvedilol 3.125mg BID
  - Arthritis, MS, trigeminal neuralgia, lumbar spondylosis pain:
    - APAP 650mg TID (limit 4000mg/day)
    - Hydrocodone 5/APAP 325mg – 2 tab QID PRN for severe pain, no more than 8 tab/day

Chronic Pain

- Definition: an unpleasant **sensory** and **emotional** experience associated with actual or potential tissue damage, or described in terms of such damage that persists over 3 months
- Affects more than **100 million** people in the United States
- Accounts for **20%** of outpatient visits, **12%** of all prescriptions, and over **$100 billion** in direct and indirect expenses
- Overall however, pain is still very poorly understood
Pain as a Disease State

- Type:
  - Neuropathic Pain
    - Cause: nerve damage
    - Sensation: burning, numbness
    - Ex. diabetic neuropathy, pain after a stroke
  - Nociceptive Pain
    - Cause: tissue damage or potentially tissue-damaging stimuli
    - Sensation: sharp, aching, throbbing
    - Ex. pain after surgery, arthritis, sports injuries and mechanical low back pain

Patient case

- RM has pain from arthritis, MS, trigeminal neuralgia, lumbar spondylosis pain. What type of pain does he have?
  A. Neuropathic pain
  B. Nociceptive pain
  C. Both

* Trigeminal neuralgia: chronic pain condition that affects the trigeminal nerve, which carries sensation from face to brain
* Lumbar spondylosis: degenerative changes of the vertebral joints and intervertebral discs of the low back

More about opioids...

- Common forms:
  - oral tablets, IM, IV, epidural, patch etc
- Common dosing schedule:
  - Hydrocodone 5/APAP 325 mg: Q4H-Q6H PRN
  - Max APAP 4000 mg/day
  - Morphine 2.5-5 mg IV Q3-4H
  - Hydromorphone 2-4 mg PO IR Q4H-Q6H
  - Oxycodone 5-20 mg Q4H-Q6H PRN
- SE: sedation, respiratory depression, constipation, headache, N/V

More about opioids...

- Common interactions:
  - Additive CNS depression with:
    - Anticonvulsants
    - Anticholinergics
    - Benzodiazepines
    - Serotonin syndrome
      - SSRI
      - SNRI
    - Triptans
    - P450 Enzyme interaction
      - Antibiotics ex clarithromycin
History of Addressing Pain/Opioid Use

- **Before 1800**: clinicians regarded pain as a consequence of age
- **1914**: Harrison Narcotic Control Act of 1914
- **1986**: World Health Organization (WHO) addressed under-treatment of postoperative and cancer pain
- **Max (1990)**: “therapeutic use of opiate analgesics rarely results in addiction”

History of Addressing Pain/Opioid Use

- **1995**: American Pain Society launched “pain as the fifth vital sign” campaign
- **1999**: Veteran’s Health Administration lent support to the campaign with the adoption of pain as the fifth vital sign initiative
- **2000**: Joint Commission published standards for pain management. Pharmaceutical companies heavily pushed use of opioids as “humane” treatment option
- **2002**: Federation of State Medical Boards and Drug Enforcement Agency also issued statements promising less regulatory scrutiny over opioid prescribers

History of Addressing Pain/Opioid Use

- **2000s**: Opioid consumption continued to climb, rising from 47,000 kg in 2000 to 166,000 kg in 2012
- **2005**: Vila H Jr et al find incidence of opioid over sedation more than doubles for inpatient hospital days with implementation of new pain treatment policies
- **2015**: CDC reports proportionate quadrupling of Rx opioid sales and mortality in both men and women over the past 15 years/ DEA announces arrest of 280 people, including 22 doctors and pharmacists after 15 month sting operation
- **2018**: Purdue Pharma pleads guilty to federal charges related to misbranding of OxyContin

Current Guidelines for Opioid Prescribing and Taper

- **2018**: Purdue Pharma pleads guilty to federal charges related to misbranding of OxyContin
**2016 CDC Guideline**

- Non-pharmacological and non-opioid preferred
- IR preferred
- Prescribe lowest effective dosage
  - Caution >50 MME/day
  - Avoid >90 MME/day if possible
- For acute pain, prescribe lowest dose IR
  - ≤3 days often sufficient
  - >7 days rarely needed
- Evaluate benefit vs harm
  - 1-4 weeks of starting or dose increase
  - Every 3 months

- Offer naloxone
- Review state prescription drug monitoring program (PDMP)
  - Starting
  - Routine every Rx to every 3 months
- Consider urine drug testing
  - Starting
  - At least annually
- Offer treatment for patients with opioid use disorder

**2016 CDC Guideline**

- Consider tapering when:
  - Patient requests dose reduction
  - No clinically meaningful improvement in pain and function
  - Dosages ≥50 MME/day without benefit
  - Opioids + benzodiazepines
  - Shows signs of substance use disorder
    - Work or family problems
    - Difficulty controlling use
  - Overdose or other serious ADR

- How to taper:
  - 10% decrease of original dose per week reasonable
    - If patient has been on opioids longer time, slow taper may be easier
    - Adjust for withdrawal symptoms
  - Make sure patients receive appropriate psychosocial support
    - Include mental health providers
  - Adjust rate and duration of taper according to response
    - May slow or pause
  - Once smallest dose reached, interval can be extended
    - May be stopped if taken less than once a day

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**Patient case**

- Using the CDC Guideline, is opioid taper indicated for RM? If so, why?
  - A. No
  - B. Yes, patient may be using >50 MME/day
  - C. Yes, patient may be taking a benzodiazepine
  - D. Yes, patient is showing signs of substance use disorder
  - E. B and C
  - F. B and D
  - G. C and D

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**Calculating morphine milligram equivalents (MME)**

<table>
<thead>
<tr>
<th>OPIOID</th>
<th>Dose in milligram where index (%)</th>
<th>CONVERSION FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>Fentanyl</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>Hydrocodeine</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Methadone</td>
<td>1-20 mg/day</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>21-40 mg/day</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>41-60 mg/day</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>≥ 61-80 mg/day</td>
<td>12</td>
</tr>
<tr>
<td>Morphine</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Oxycodeine</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

*These dose conversions are estimated and cannot account for all individual differences in genetics and pharmacokinetics.*
2017 VA/DoD Guideline

**Initiation**
- Alternatives to opioids (non-pharm and non-opioid)
- Against initiating long term opioid therapy for chronic pain
  - Especially in
    - Untreated substance use disorder (SUD)
    - Concurrent benzodiazepine use
    - Less than 30 years of age
- Short duration, re-evaluate if ≥90 days
- Risk mitigation
  - Random urine drug testing
  - Check state prescription drug monitoring programs
  - Prescribe naloxone
  - Evaluate at least every 3 months or dose increase

**2017 VA/DoD Guideline**

**Initiation**
- Tapering of opioid therapy to reduced dose or to discontinuation when risk of long term opioid therapy outweigh benefits
  - Avoid abrupt d/c unless required for safety
  - Consider interdisciplinary care
    - Pain
    - Substance Use Disorder
    - Mental Health Problems
  - Against
    - >90 MME/day for chronic pain
    - Long-acting opioids for acute pain, as PRN or initiation of long-term opioid therapy

**Continuation**
- Assess for SUD, suicide and consider tapering
  - Evidence of untreated SUD, close monitoring, SUD treatment and tapering
  - If opioid + benzo, consider tapering one or both
  - For patients taking >90 MME/day, evaluation for tapering to reduced dose or discontinuation

**Taper**
- When safety allows, gradual taper rate **5-20% reduction every 4 weeks recommended**
  - If concern for risk ex unmasked OUD, exacerbation of underlying mental health condition; consider interdisciplinary services ex mental health, SUD, primary care, pain care

**Patient case**
- Using the VA/DoD Guideline, is opioid taper indicated for RM? If so, why?
  A. No
  B. Yes, patient may be using >90 MME/day
  C. Yes, patient is on a long acting opioid
  D. Yes, patient is showing signs of substance use disorder
  E. B and C
  F. B and D
  G. C and D

**Guideline Summary**
- Use Non-pharmacological or non-opioids as first line for pain
- If opioids must be used, use IR in the smallest amount necessary
- Monitor weekly to monthly. Routinely assess benefit vs risk. Once stable, monitor every 3 months
- There is increased risk of harm when ≥50 MME/day and ≥90 MME/day
- Avoid concomitant use of benzodiazepines
- Taper: May consider taper if patient is not getting benefit compared to risk
  - May try 10% reduction weekly or 5%-20% reduction within 4 weeks
- Supplement taper with necessary support such as mental health, pain management
What is the Appropriate Goal for Opioid Taper?

CONSORT Study (Dunn 2010)

- **Study**
  - Retrospective, observational study set in 29 clinics
- **Inclusion criteria**
  - Age 18-99 initiating new episode of opioid use between 1997 and 2005
  - 3+ Rx for opioid analgesics in the first 90 days of the episode
  - Diagnosis of non-cancer pain 2 weeks prior to initial opioid Rx
  - Back or neck pain, OA, headache, extremity pain, abdominal pain, hernia, menstrual pain, temporomandibular disorder pain and fractures/injuries

CONSORT Study (2010)

- **Exclusion criteria**
  - Individuals with cancer diagnosis (except non-melanoma skin cancer)
  - Individuals not enrolled for at least 270 days in the one-year period prior to study cohort entry
- **IRB**
  - Approved by Group Health Cooperative Institutional Review Board
- **Funding**
  - National Institute of Drug Abuse

CONSORT Study (2010): Methods

- Age 18+ initiating new opioid use (no opioid Rx previous 6 months) between 1997 and 2005
- 3+ Rx for opioid analgesics in the first 90 days of episode
- Diagnosis of non-cancer Pain (N=9940)

CONSORT Study (2010): Endpoints

- **Primary endpoint**
  - Non-fatal and fatal overdoses based on:
    - MME/day
- **Secondary endpoint**
  - Non-fatal and fatal overdoses based on:
    - Age
    - Gender
    - History of depression diagnosis
    - History of substance abuse diagnosis

CONSORT Study (2010): Patient Population (N= 9940)

- Female: 60%
- Mean Age: 54
- Most Common Diagnosis:
  - Back pain (38%) or Extremity pain (30%)
- Mean dose: 13.3 MME/day
- Hydrocodone most commonly prescribed (46%)
- Predominately long-acting opioids (10%)
- Prescribed sedative-hypnotics (74%)

61% complete follow up
32% left GHC during the study period
7% died
Primary Endpoint: Non-fatal and fatal overdoses based on MME/day

<table>
<thead>
<tr>
<th>Opioid dosage level (MME/day)</th>
<th>No of overdoses</th>
<th>Overdose rate (95% CI) per 100,000 person years</th>
<th>All overdose events Hazard ratio (95% CI)</th>
<th>Serious overdose events Hazard ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-&lt;20</td>
<td>22</td>
<td>160 (100-233)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>20-&lt;50</td>
<td>6</td>
<td>260 (95-505)</td>
<td>1.44 (0.57, 3.62)</td>
<td>1.19 (0.40, 3.60)</td>
</tr>
<tr>
<td>50-&lt;100</td>
<td>6</td>
<td>677 (249-1317)</td>
<td>2.73 (1.47, 9.50)</td>
<td>3.11 (1.01, 9.51)</td>
</tr>
<tr>
<td>100+</td>
<td>11</td>
<td>1791 (894-2995)</td>
<td>8.87 (3.99, 19.72)</td>
<td>11.18 (4.80, 26.03)</td>
</tr>
<tr>
<td>Any opioid use</td>
<td>45</td>
<td>256 (187-336)</td>
<td>5.16 (2.14, 12.48)</td>
<td>8.39 (2.52, 27.98)</td>
</tr>
</tbody>
</table>

Secondary Endpoint: Non-fatal and fatal overdoses based on age, gender, diagnosis

<table>
<thead>
<tr>
<th></th>
<th>No of overdoses</th>
<th>Overdose rate (95% CI) per 100,000 person years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sample</td>
<td>51</td>
<td>148 (116)</td>
</tr>
<tr>
<td>Age Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-44</td>
<td>15</td>
<td>163 (119)</td>
</tr>
<tr>
<td>45-64</td>
<td>18</td>
<td>118 (92)</td>
</tr>
<tr>
<td>65+</td>
<td>18</td>
<td>181 (151)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>21</td>
<td>152 (123)</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>146 (112)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression No</td>
<td>25</td>
<td>96 (77)</td>
</tr>
<tr>
<td>Depression Yes</td>
<td>26</td>
<td>311 (239)</td>
</tr>
<tr>
<td>SUD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUD No</td>
<td>45</td>
<td>138 (107)</td>
</tr>
<tr>
<td>SUD Yes</td>
<td>6</td>
<td>329 (274)</td>
</tr>
</tbody>
</table>

CONSORT Study (2010): Results

- Results
  - 51 opioid related overdoses
  - 6 deaths
  - Compared to 1-20 MME/day (0.2% annual overdose rate)
    - 50-99 MME/day
      » 3.7 fold increase (95% CI 1.5, 9.5)
      » 0.7% annual overdose rate
    - 100+ MME/day
      » 8.9 fold increase (95% CI 4.0, 19.7)
      » 1.8% annual overdose rate

CONSORT Study (2010): Critique

- Design: appropriate since randomized control trial would be unethical
- Limitations:
  - Small sample size: 9940
  - Short opioid therapy (90 days)
  - Patients receiving higher MME/day may be in more pain, which may be due to more progression in disease state
  - Some incidents of overdose may be due to misuse
    - Used double fentanyl patch
    - Sucking on a fentanyl patch
    - Since observational study, cannot establish causation

CONSORT Study (2010): Author’s Conclusion

Patients receiving higher doses of prescribed opioids are at increased risk of opioid overdose, underscoring the need for close supervision of these patients

CONSORT Study (2010): Critique

- Statistics: minimally mentioned, used 95% Confidence Interval
- Strengths:
  - One of the first studies to look at overdose risk and increase in opioid dose
  - Sample size, while not large, is still sufficient for preliminary data
  - Beneficial for designing future studies
- Applicability:
  - Use data with caution
  - Risk may be different due to population difference

VHA Study (Bohnert 2011)

- **Study**
  - Case-cohort design
- **Inclusion criteria**
  - Age 18+
  - 5% random samples of VHA patients FY2004 and FY2005 (n=14684) + all FY2004 and 2005 patients who died of opioid overdose before end of FY2008 (n=750)
  - Individuals treated with opioids (included cancer pain)

- **Exclusion criteria**
  - Individuals with indicators of palliative care consultations or hospice care

- **IRB**
  - Approved by national Veterans Health Administration (VHA) IRB

- **Funding**
  - Department of Veterans Affairs Office of Mental Health Services, Patient Care Services and a Health Services Research and Development Service

VHA Study (Bohnert 2011): Methods

- Age 18+
- 5% of patients that received opioids for pain FY2004 and FY 2005
- All FY2004 and 2005 patients who died of opioid overdose before end of FY2008

VHA Study (Bohnert 2011): Endpoints

- **Primary endpoint**
  - Association of maximum prescribed daily opioid dose and dosing schedule with risk of opioid overdose death in:
    - Cancer
    - Chronic pain
    - Acute pain
    - Substance Use Disorders

VHA Study (Bohnert 2011): Patient Population (N= 155434)

- Male: 93.3%
- Most Common Diagnosis:
  - Chronic bodily pains (69%) and Cancer (24%)
- Most Common Age: 50-59
- Caucasian (72%)

Primary Endpoint: Cox Proportional Hazards Models of Risk of Death by Prescription Opioid Overdose (95% CI)

<table>
<thead>
<tr>
<th>Opioid Fill Type</th>
<th>Chronic Pain (N=111 750)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular scheduled only</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>As needed only (PRN)</td>
<td>1.10 (0.85-1.43)</td>
</tr>
<tr>
<td>Simultaneous PRN and scheduled</td>
<td>1.34 (0.99-1.79)</td>
</tr>
<tr>
<td>Maximum prescribed daily opioid</td>
<td></td>
</tr>
<tr>
<td>dose, mg/d</td>
<td></td>
</tr>
<tr>
<td>1-&lt;20 MME/day</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>20-&lt;50 MME/day</td>
<td>1.86 (1.33-2.67)</td>
</tr>
<tr>
<td>50-&lt;100 MME/day</td>
<td>4.63 (3.18-6.74)</td>
</tr>
<tr>
<td>&gt;100 MME/day</td>
<td>7.16 (4.85-10.65)</td>
</tr>
</tbody>
</table>
VHA Study (Bohnert 2011): Results

- Results
  - The association of simultaneous as needed and regularly scheduled opioids was not significant after adjustment
  - HR estimates were statistically significant for 50-<100 MME/day and 100+ MME/day for chronic pain

VHA Study (Bohnert 2011): Author’s Conclusion

- The risk of opioid overdose should continue to be evaluated relative to the need to reduce pain and suffering and be considered along with other risk factors

VHA Study (Bohnert 2011): Critique

- Design: appropriate since randomized control trial would be unethical
- Limitations:
  - Patients receiving higher MME/day may be in more pain, which may be due to more progression in disease state
  - Minorities were under-represented
  - There may be selection bias based on how the 5% of patients receiving opioids for pain were selected

VHA Study (Bohnert 2011): Critique

- Statistics: Cox², appropriately defined p value, alpha, power
- Strengths:
  - Large population sample (n=155434)
  - Included cancer patients
  - Patients that have used opioid therapy for ~2 years were included, which is more realistic

- Applicability:
  - More applicable than Dunn study due to large sample size and longer use of opioids

Larochelle MR (2016)

- Study
  - Retrospective cohort study
- Inclusion criteria
  - Age 18-64
  - Individuals who had a nonfatal opioid overdose during long-term opioid therapy for noncancer pain between May 2000 and December 2012
  - With evidence of long-term opioid therapy

Larochelle MR (2016)

- Exclusion criteria
  - Out-of-hospital overdoses and opioid overdose-related deaths
  - Diagnosis of cancer
- IRB
  - Harvard Pilgrim Health Care IRB
- Funding
  - Health Resources and Services Administration
Larochelle MR (2016): Methods
- Age 18-64
- Individuals who had a nonfatal opioid overdose during long-term opioid therapy for noncancer pain between May 2000 and December 2012

- <50 MME/day
- 50-<100 MME/day
- 100+ MME/day

Larochelle MR (2016): Endpoints
- Primary endpoint
  - MME/day dispensed from 60 days before to up to 730 days after index overdose
  - Categorized as
    - large (≥100 MME/day)
    - moderate (50 to <100 MME/day)
    - low (<50 MME)
- Secondary endpoint
  - Time to repeated overdose stratified by daily dosage as a time-varying covariate

- Male: 40%
- Mean Age: 44
- Most Common Diagnosis:
  - Extremity (88%) and Neck (67%)
  - *not mutually exclusive
- MME before overdose
  - <50 MME/day (32.6%)
  - 50 to <100 MME/day (21.8%)
  - ≥100 MME/day (45.6%)

Primary Endpoint: MME/day dispensed from 60 days before to up to 730 days after index overdose

Secondary Endpoint: Time to repeated overdose stratified by daily dosage as a time-varying covariate

Larochelle MR (2016): Results
- Results
  - Median follow-up 299 days
  - Opioids dispensed to 91% of patients after overdose
  - 7% (n=212) had repeated opioid overdose
  - After 2 years, cumulative incidence of repeated overdose:
    - 17% (95% CI 14% to 20%) for high dose
    - 15% (95% CI 10% to 21%) for moderate dose
    - 9% (95% CI 6% to 11%) for low dose
Almost all patients continue to receive prescription opioids after an overdose. Opioid discontinuation after overdose is associated with lower risk for repeated overdose.

Larochelle MR (2016): Critique

- Design: appropriate since randomized control trial would be unethical
- Limitations:
  - Unable to conclude relationship between opioid dosage after nonfatal overdose and risk for repeated overdose due to study design
  - Missing important contextual factors from claims data including medical and social circumstances surrounding overdose
  - Limited to commercially insured persons

Larochelle MR (2016): Critique

- Statistics: Multivariable Cox regression model of time to repeated overdose
- Strengths:
  - Included patients from 50 states
  - First study to examine treatment patterns after an overdose and risk for repeated overdose
- Applicability:
  - More applicable to patients with private insurance, not patients with VA care of Medicaid/Medicare

So.... Back to the Patient case

RM is a 71 yo male with chronic pain. It recently came into light that he had received 628 tablets of hydrocodone 5/APAP 325mg over 59 days (Rx 224 tablets/28 days)

PMH & Medications
- BPH: Finasteride 5mg HS
- Hyperlipidemia: atorvastatin 40mg HS
- HTN: carvedilol 3.125mg BID
- Arthritis, MS, trigeminal neuralgia, lumbar spondylosis pain:
  - APAP 650mg TID (limit 4000mg/day)
  - Hydrocodone 5/APAP 325mg – 2 tab QID PRN for severe pain, no more than 8 tab/day


Key Points

- Increase in risk of overdose
  - >100 MME/day compared to 1-<20MME/day
  - 50-<100 MME/day

- Increase in risk of repeat overdose
  - large (>100 MME/day)
  - moderate (50 to <100 MME/day)
  - low (<50 MME)

Patient case

- Given RM received 628 tablets of hydrocodone 5/APAP 325mg over 59 days,
  - Most likely taking 50+ MME/day
  - Exhibiting signs of dependence
- Given the primary literature, what MME/day should we aim for RM?
  A. Give RM rest period then start opioid back up
  B. Taper to 0-50 MME/day to reduce risk of overdose
Patient case

• What would be an appropriate dose for RM?
   A. Morphine 15 mg PO BID
   B. Hydromorphone PCA 0.2 mg
   C. Oxycodone 15mg SA; 2 tablets
   D. Methadone 5mg; 4 tablets

Patient case

• Patient is taken off of hydrocodone 5mg/APAP 325mg and switched to morphine 15mg PO BID

• Patient takes morphine 15mg PO daily for 2 days. Wife notices patient is unresponsive and mumbling words. Patient is taken to the ICU

• Patient is given Narcan. Patient cries saying “everything was fine when I was on hydrocodone”

Patient case

• What did we do wrong?
   A. We calculated the MME wrong
   B. All the studies we just looked at is wrong
   C. Patient is 71 years old and the medication change may have “tipped” patient’s mental state. We can follow the guidelines and the studies but sometimes we can still have unintended consequences

• Would you continue the taper?
   A. Yes
   B. No

Objectives

1. Gain understanding of pain and how opioids work
2. Describe the events that led to the Opioid Epidemic
3. Understand elements of appropriate opioid prescribing and tapering recommendations
4. Be able to articulate the relationship between opioid dose and risk in overdose

Acknowledgements

• Evaluator
  • Dr. Gordon Ang

• Preceptors at Central Texas Health Care System

• Co-Residents
  • Olivia, Chelsey and Zahava
Questions?

References


References