

*Spotlight on Pain Management*

April 4, 2017

# **Pain, Alcohol, and Tobacco Smoking: Bidirectional Relations and Novel Treatment Considerations**

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# Outline

- Overview of Pain and Substance Use
- Pain, Nicotine, and Tobacco Smoking
- Pain and Alcohol
- Novel Treatment Considerations

# Pain and Addiction

- **Beyond opioids...**

– Growing empirical & clinical interest in complex interrelations between pain and substance use

...MEDICINE IN CONTEXT VOLUME 1, NO. 1

### Chronic pain, mental health and substance use disorders: How can we manage this triad in our healthcare system and in our communities?

Sydelle Ross, MD

Director of Pain Management, HELPPSI, Bronx, New York

DOI: 10.7916/D84M93M6

Citation: Ross S. Chronic pain, mental health and substance use disorders: How can we manage this triad in our healthcare system and in our communities? Col Med Rev. 2015 June 22; 16(57-62). doi: 10.7916/D84M93M6



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### Drug and Alcohol Abuse Linked to Self-Medicating Chronic Pain

Thursday, 12 May 2016 In the News 507 Hits



Many people who abuse drugs or alcohol are self-medicating chronic pain, a new study suggests.

Researchers at Boston University studied 589 people who fit the criteria for drug abuse or illicit drug use, and found 87 percent reported chronic pain.

Of the 576 patients who used illicit drugs (marijuana, cocaine and/or heroin), 51 percent reported using drugs to treat pain. The study found 81 percent of the 121 people who said they misused prescription opioid painkillers reported they did so to treat their pain.

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Published on June 21, 2013  
Filed in Addiction, Drug Addiction, Prescription Drug Addiction

Substance Abuse — Pain Connection

Up to 50 million Americans live with chronic pain at any given time. Coping with it can be so challenging that reaching for alcohol and/or drugs becomes a tempting quick fix. Getting drunk or high provides at least a temporary way to alleviate the intense discomfort and deal with the stress it causes. However, while substance abuse can seem to initially provide relief, it inevitably makes things worse.



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### Walking the Tightrope: Chronic Pain and Substance Abuse

Donna G. Benedict

Journal for Nurse Practitioners, 2008;4(8):604-605

Abstract and Introduction

Pain management is a high priority in health care, and pain is a common reason for visits to primary care providers. The most challenging patients to manage are chronic pain patients with substance abuse issues. This article reviews 2 models that assist with making difficult decisions about when to prescribe opiates for chronic nonmalignant pain. A clear understanding of the terms addiction, tolerance, dependence, and pseudo-addiction is necessary. Appropriate precautions include assessing for risks of substance abuse, continual assessment of pain level, daily functioning, and aberrant behaviors, and complete documentation

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### Chronic Pain & Substance Abuse

Is there a role for the acute care nurse practitioner to improve patient care and satisfaction?

By Jessie Mae Dotson, MSN, AGACNP

Posted on: May 2, 2016

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Patients enter the hospital for a multitude of reasons and have varied past medical histories including chronic pain and/or substance abuse.

FOCUS ON

# Pain and Addiction

- ***Poll Question***

- Have you ever suspected that the experience of pain and co-occurring (non-opioid) substance use may be related?

- Yes
    - No

# Overview of Pain and Substance Use

# Overview of Pain and Substance Use

- Chronic Pain + SUD (Morasco et al., 2011)
  - Highly prevalent and frequently co-occur in the general population (up to 48% have current SUD)
    - Higher rates of psychiatric disorders
      - Especially depression and anxiety
    - Greater pain and physical impairment
    - Greater use/misuse of prescribed opioid medications
      - Higher doses, multiple prescriptions, use to alter mood



# Directions of Empirical Inquiry

- Effects of Substance Use on Pain
- Effects of Pain on Substance Use

# Directions of Empirical Inquiry

- Effects of Substance Use on Pain



EFFECTS OF SUBSTANCE USE ON PAIN

Chronic Substance Use as a Risk Factor for Chronic Pain  
Acute Analgesic Effects  
Abstinence-Induced Hyperalgesia

# Directions of Empirical Inquiry

- Effects of Pain on Substance Use

Pain as a Motivator of Substance Use  
Use of Substances to Cope with Pain  
Pain as a Barrier to Quitting



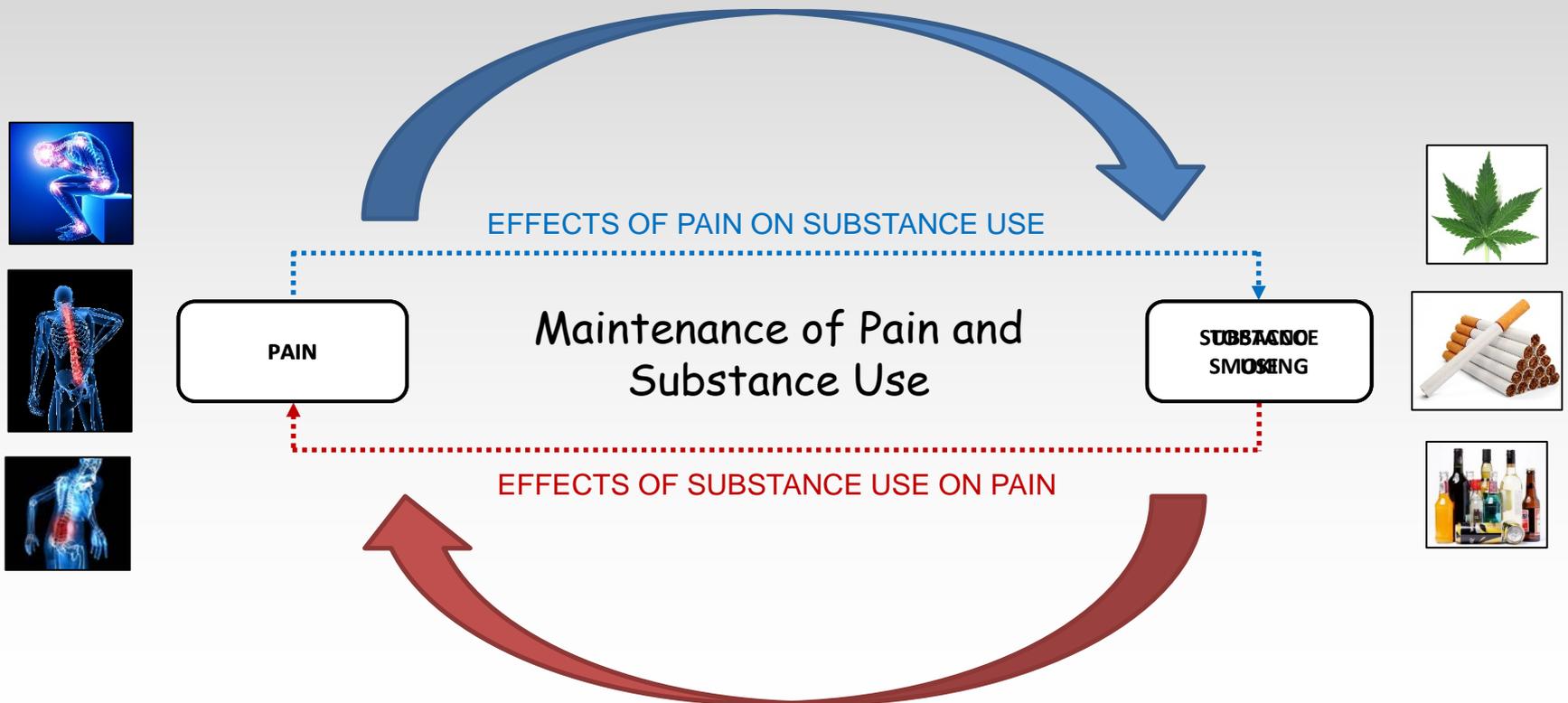
PAIN

EFFECTS OF PAIN ON SUBSTANCE USE



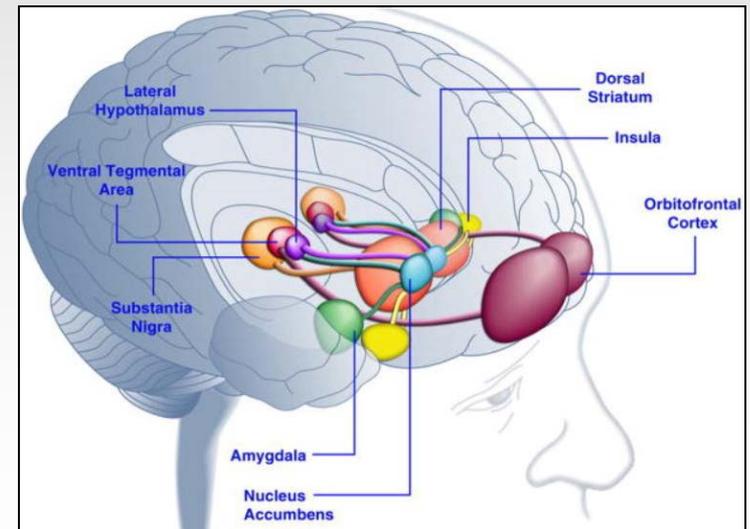
# Bidirectional Relations

- Effects of Substance Use on Pain
- Effects of Pain on Substance Use



# Overview of Pain and Substance Use

- Overlapping Pain/Reward Neurocircuitry
  - Insula
    - Consistently activated during heightened pain
    - Also Implicated in substance craving/withdrawal
  - Nucleus Accumbens (NAc)
  - Central Amygdala
  - Prefrontal Cortex



# Overlapping Neurocircuitry

- Reciprocal Dysregulation?
- Allostatic Load Model of Pain and Addiction  
(Koob & Le Moal, 1997, 2001; Egli, Koob, & Edwards, 2012)
  - **Chronic substance use** (via repeated opponent process cycles of substance-induced analgesia and withdrawal-induced hyperalgesia) can dysregulate overlapping neural substrates and homeostatic pain mechanisms to **engender a persistent imbalance that favors *pain facilitation***

# Overlapping Neurocircuitry

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Highly consistent with **negative reinforcement** and **self-medication** models of addiction motivation

# Pain and Tobacco Smoking

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# Pain and Tobacco Smoking

- Tobacco smoking

- ~16% of U.S. adults

- >400K U.S. deaths each year

- \$200B annual health care costs/lost productivity

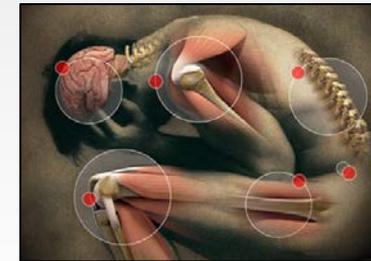


- Chronic (non-cancer) pain

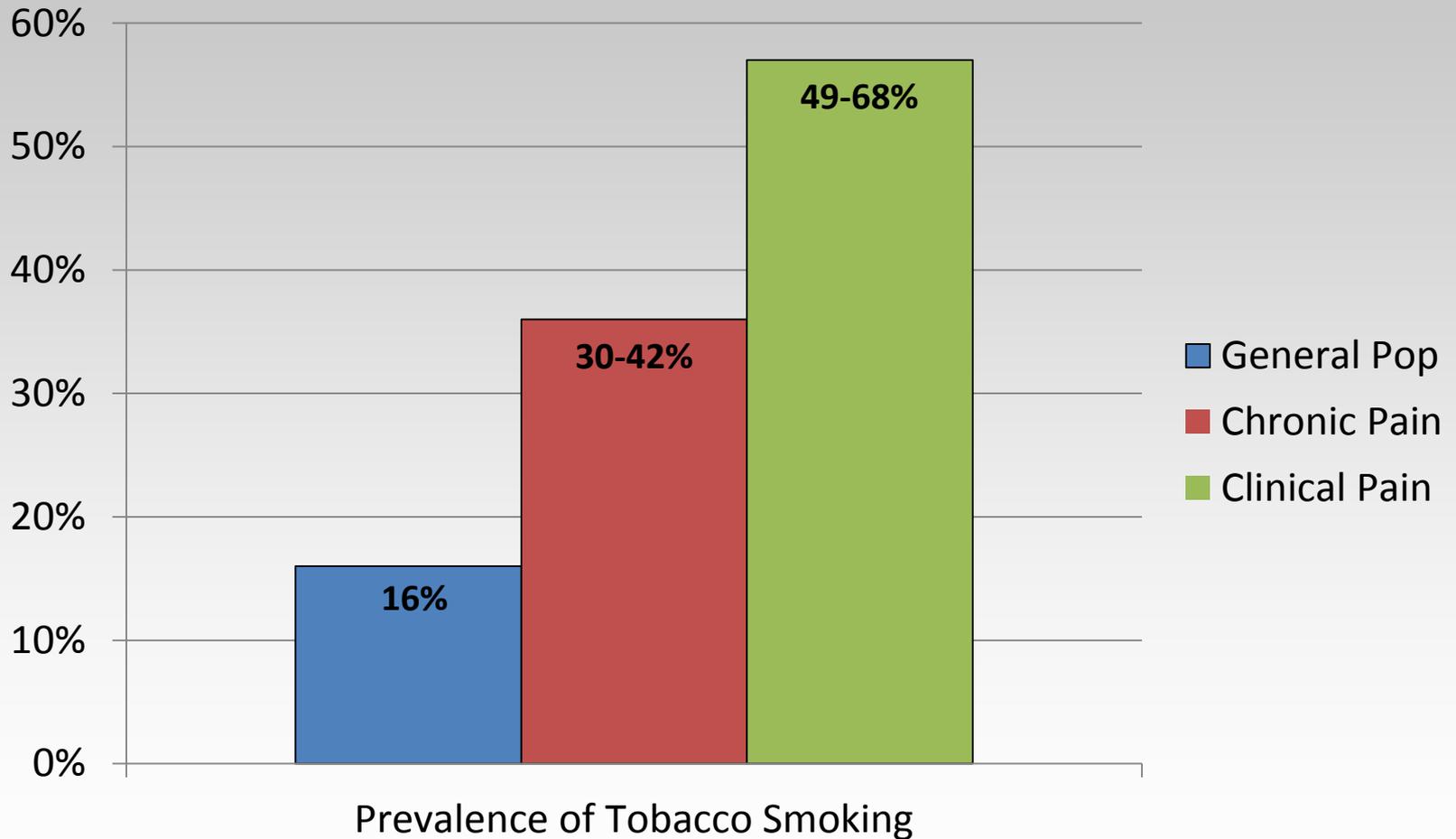
- Critical national health problem

- 25-43% of U.S. adults (>100 M)

- >\$600B annual health care costs/lost productivity

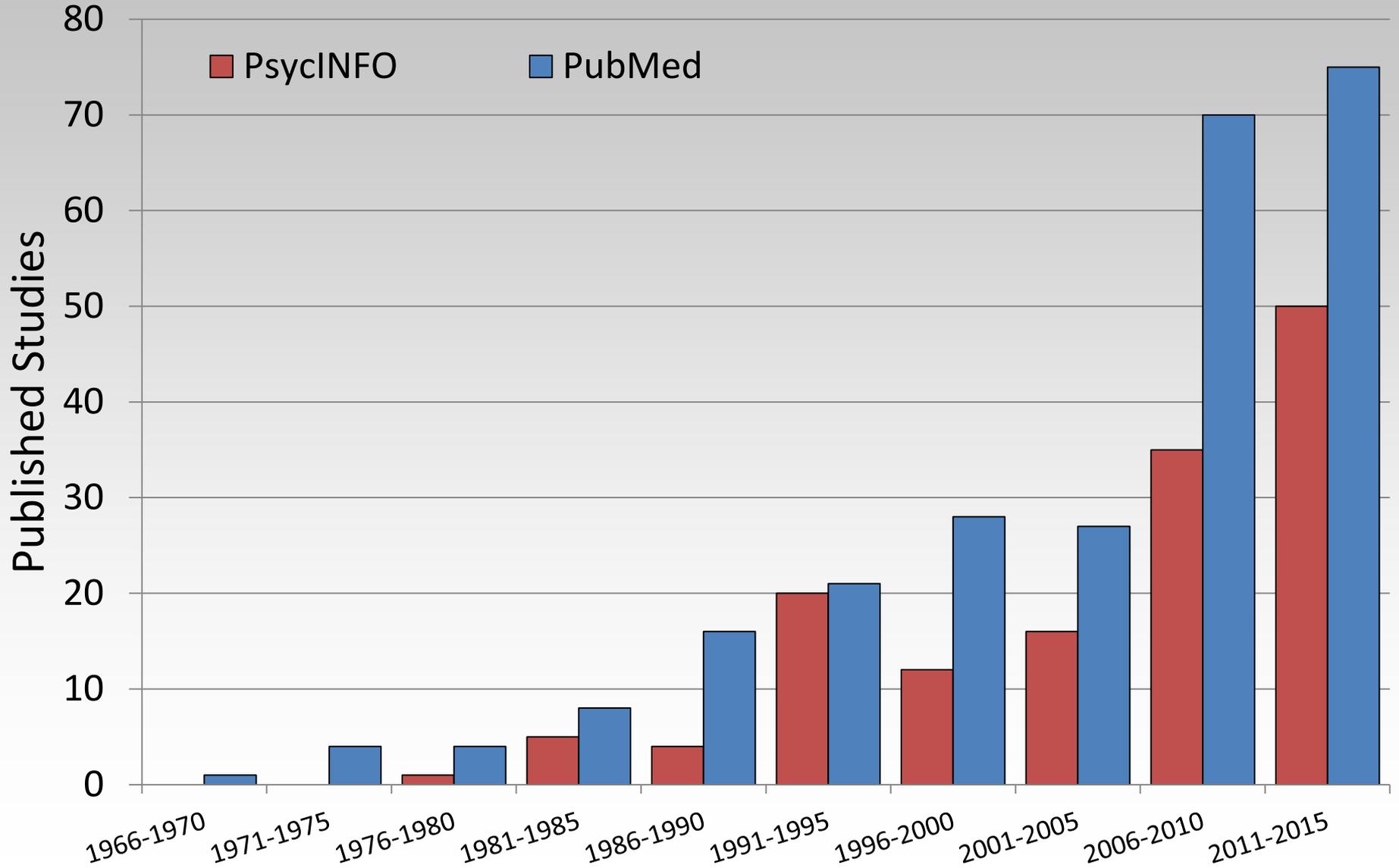


# Smoking Among Persons w/ Pain



- Even after accounting for sociodemographic, medical, and psychiatric features
- Similar rates observed in Denmark, Norway, Sweden, Canada, and the UK

# Research on Pain and Smoking



# Covariation of Pain and Smoking

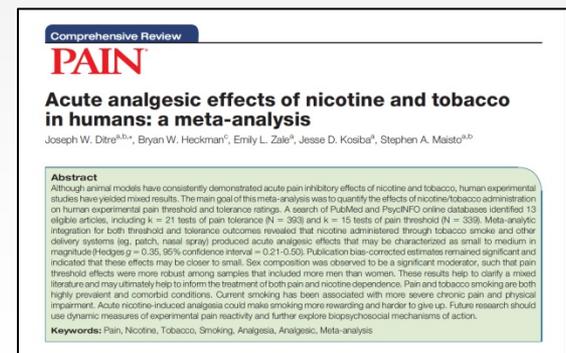
# Covariation of Pain and Smoking

- Smokers tend to experience greater pain intensity and functional impairment than nonsmokers (e.g., Weingarten et al., 2008)
  - Smokers also tend to self-administer more analgesic medication (e.g., opioids) than nonsmokers (e.g., Broekmans et al., 2010)



# Effects of Smoking on Pain

- Chronic smoking identified as a unique causal factor in onset and progression of:
  - Chronic Low Back Pain (Shiri et al., 2010)
  - Rheumatoid Arthritis (Sugiyama et al., 2010)
- Acute Analgesic Effects
  - Meta-analysis human experimental studies (Ditre et al., 2016)
    - Effect sizes were “small to medium”
      - (Hedge’s  $g = .35$ ,  $p < .001$ )
        - Moderating effect of gender
        - Similar effects for smokers and nonsmokers

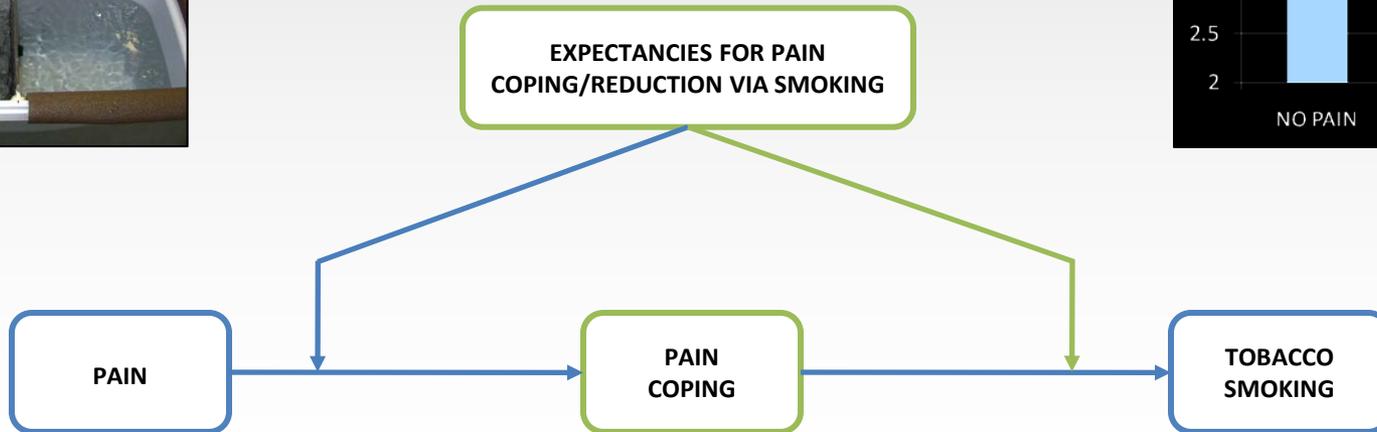
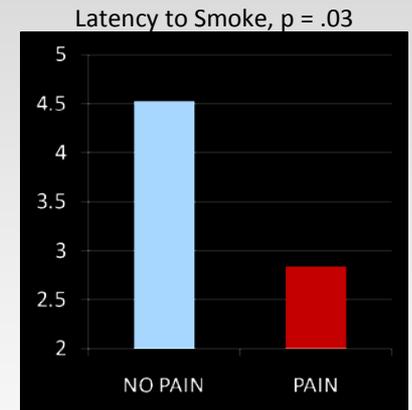
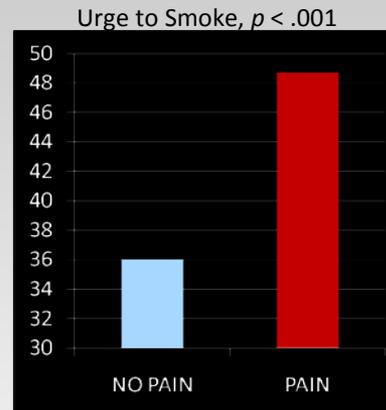


# Effects of Pain on Smoking

- Cross-sectional evidence
  - Pain patients report smoking to cope with pain  
(Hooten et al., 2011; Patterson et al., 2012)
  - Smoking rates may increase as a function of pain chronicity and severity (Fishbain et al., 2013)
- Prospective Evidence
  - Real-time EMA data has shown that increased pain often precedes smoking episodes (Dhingra et al., 2013)
  - Headache pain prospectively linked to the onset of smoking (Waldie et al., 2008)

# Effects of Pain on Smoking

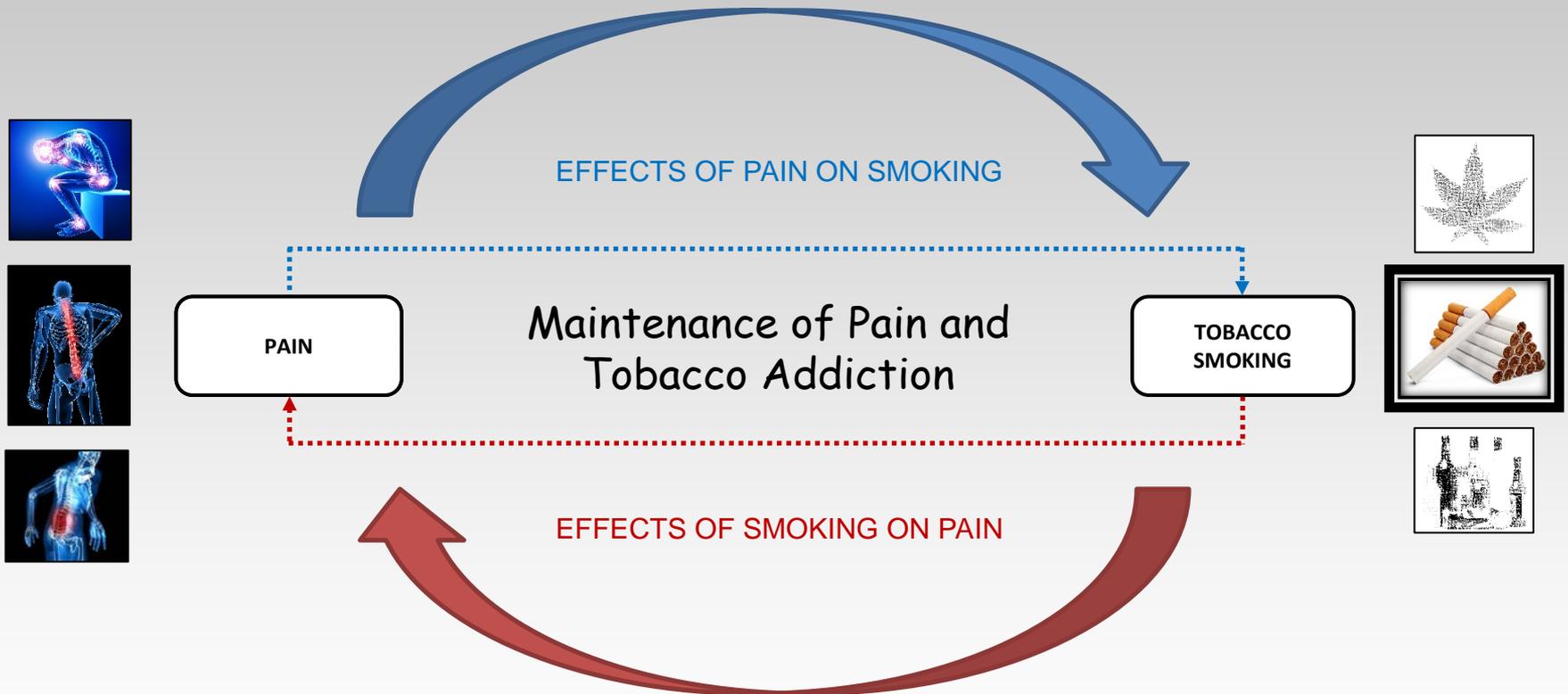
- Experimental evidence – pain as a motivator



# Reciprocal Model of Pain and Smoking

- Effects of Pain on Smoking
- Effects of Smoking on Pain

# Reciprocal Model of Pain and Smoking



# Pain and Smoking Cessation



# Pain and Smoking Cessation

- Smokers with co-occurring pain (vs. no pain):
  - Smoke more cigarettes per day
  - Experience more severe nicotine withdrawal and greater difficulty quitting
  - Less confident in their ability to quit
  - More likely to use pharmacotherapy

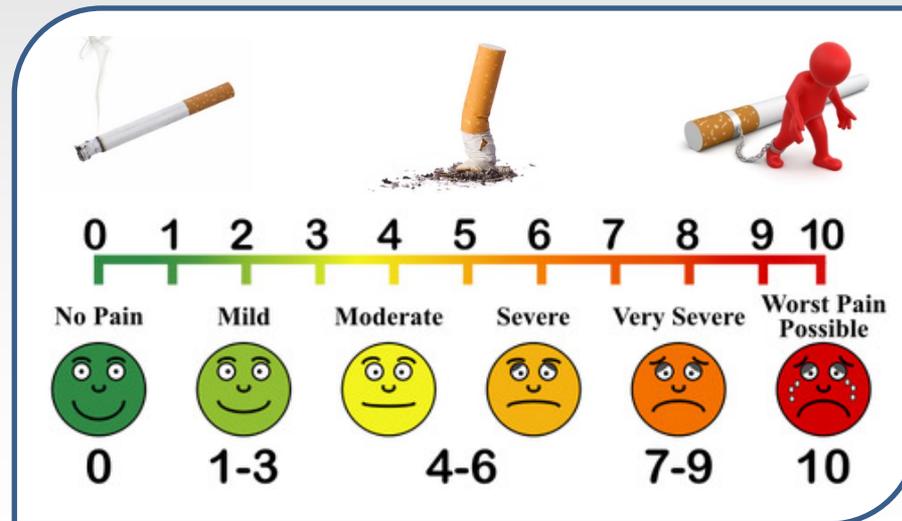


# Pain and Smoking Cessation

- **Poll Question**
- Have you ever encountered a patient who suggested or reported that trying to stop using a substance (like tobacco) actually made their pain worse?
  - Yes
  - No

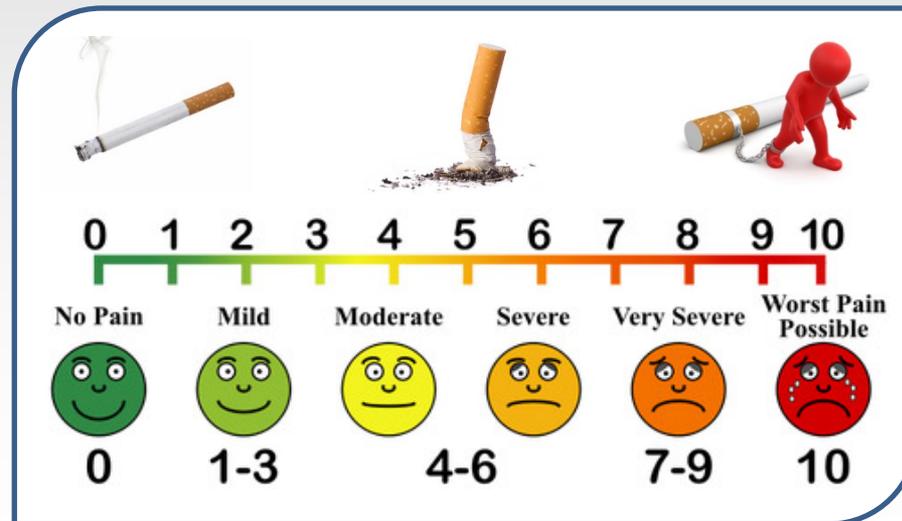
# Pain and Smoking Cessation

- Although the impact of smoking cessation on subsequent pain intensity remains unclear...  
(e.g., Bastian et al., 2015)
  - There is reason to suspect that pain may increase during the early stages of a quit attempt\*



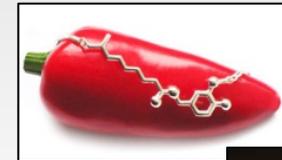
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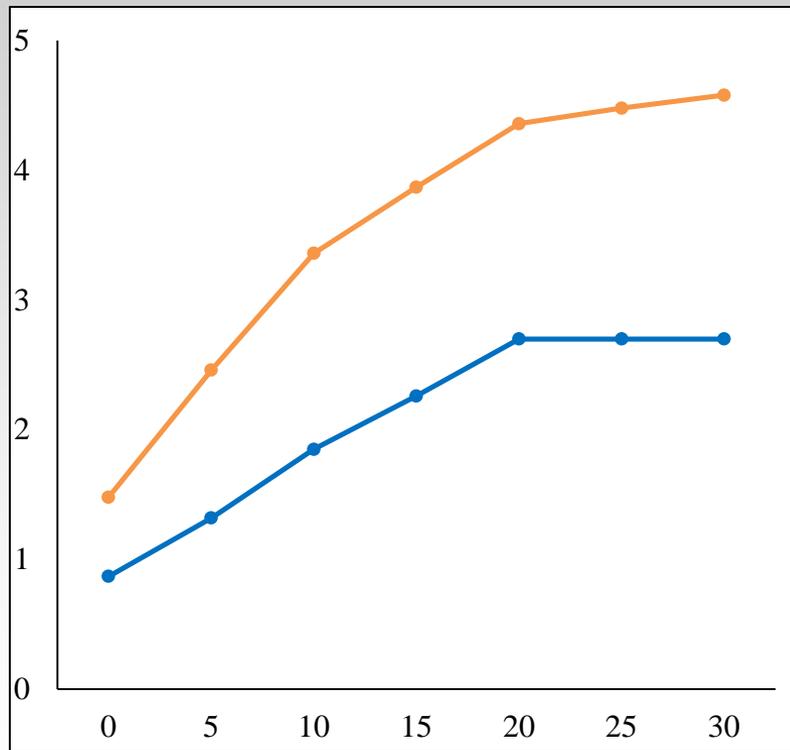
# Effects of Smoking Abstinence on Pain

- Participants
  - 165 daily smokers (M CPD = 22; 43% Female)
- Deprivation Manipulation
  - **Nicotine Deprivation**: Abstain 12-24 hours
  - **Continued Smoking**: Smoke as usual
- Capsaicin Pain Model
  - Pain Intensity (0-10 at 5-min intervals)
  - Neurogenic Inflammation (area of visible flare)



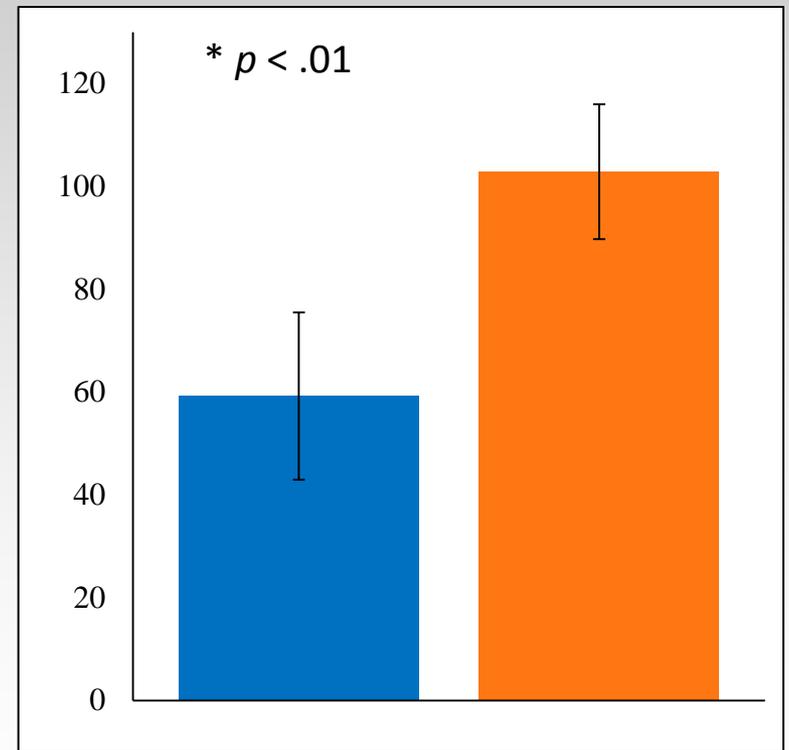
# Effects of Smoking Abstinence on Pain

## Mean Pain Ratings



■ Continued Smoking ■ Nicotine Deprivation

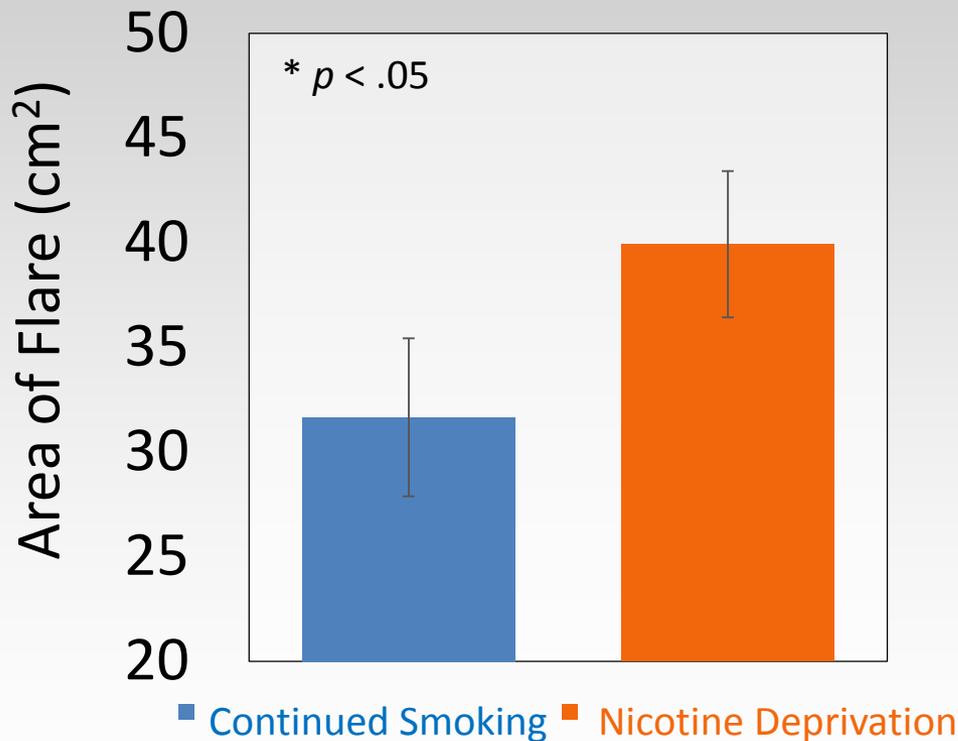
## AUC Pain Ratings



■ Continued Smoking ■ Nicotine Deprivation

# Effects of Smoking Abstinence on Pain

- Neurogenic Inflammation



- ND evinced larger area of flare than CS
- Implicates peripheral mechanisms of action



# Effects of Smoking Abstinence on Pain

- **Novel treatment consideration:**
  - Smokers in pain may experience a variety of negative pain-related sequelae during the early stages of a quit attempt
    - May precipitate relapse to smoking
  - Tailored cessation interventions should account for the antithetical influence of abstinence-induced amplification of pain



# Pain and Alcohol

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# Pain and Alcohol

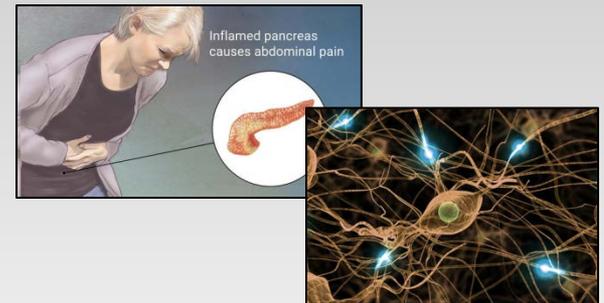
- Prevalence of Co-Occurring Pain & Alcohol Use
  - 73% of individuals seeking treatment for AUD report *moderate-to-severe* past-month pain
    - 43% problem drinkers
    - 30% non-problem drinkers

# Pain and Alcohol

- Prevalence of Co-Occurring Pain & Alcohol Use
  - Individuals with **chronic pain** are 30-60% more likely to endorse *heavy drinking* or meet criteria for *AUD*
  - 25% of **pain patients** endorse *heavy drinking*
    - Rates of reported alcohol use may be suppressed among clinical pain samples
      - *Reluctance to report drinking while using pain medications?*

# Effects of Alcohol on Pain

- Heavy alcohol consumption
  - Established causal agent in the development of:
    - alcohol-induced pancreatitis
    - alcohol-related neuropathy
  - Implicated in other chronic pain conditions:
    - osteoarthritis
    - widespread musculoskeletal pain
    - poorer pain outcomes following traumatic injury



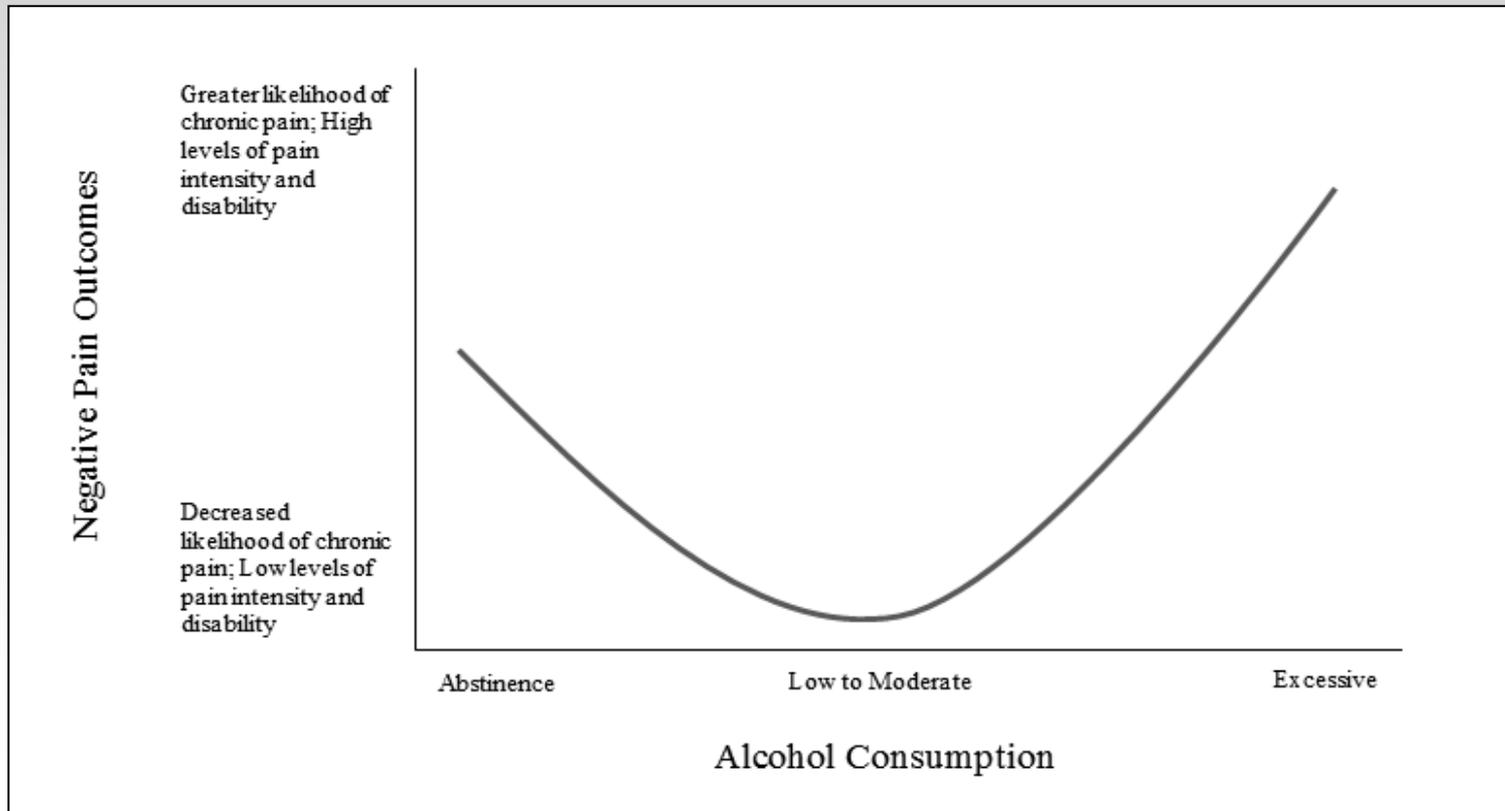
# Effects of Alcohol on Pain

- What about drinking that is not “heavy” or “excessive”?
  - In contrast to heavy drinking, low-to-moderate alcohol consumption may be associated with a ***decreased*** likelihood of developing chronic pain



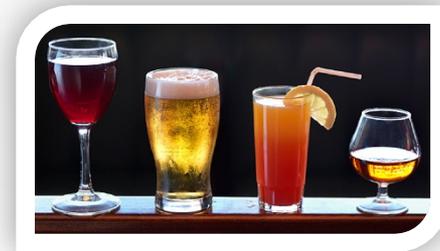
# Effects of Alcohol on Pain

- Interrelations between pain and alcohol:  
An integrative review (Zale, Maisto, & Ditre, 2015; *Clinical Psychology Review*)



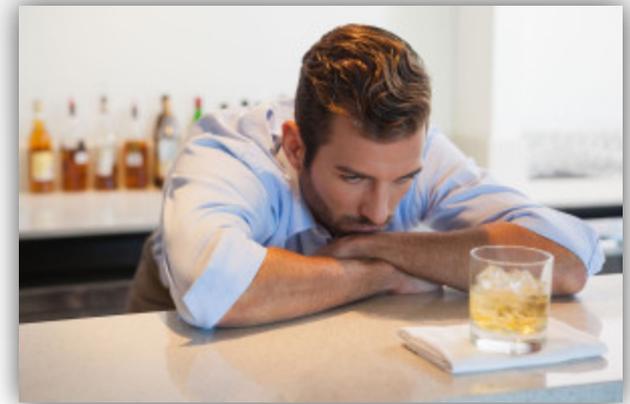
# Effects of Pain on Alcohol

- 25% of chronic pain patients report using alcohol for pain relief (Riley & King, 2009)
  - Common factors:
    - Frequent pain, depression, use of pain medications
  - Consistent with experimental evidence of acute alcohol-induced analgesia



# Pain and Alcohol

- **Novel treatment consideration:**
  - Depending on the extent to which (a) **alcohol may confer acute pain-inhibition**, and (b) **situational pain may serve as a proximal antecedent of alcohol consumption**, increased pain sensitivity during the early stages of abstinence may precipitate relapse to drinking
    - Ongoing study



# The Alcohol-Pain Connection: Mechanisms and Genetic/Psychological Correlates

- Aim 1 (DV = Pain):
  - Conduct first test of both pharmacological and expectancy effects in acute alcohol analgesia



# The Alcohol-Pain Connection: Mechanisms and Genetic/Psychological Correlates

- Aim 2 (DV = Alcohol Urge/Consumption):
  - Conduct first test of pain as a proximal antecedent of urge to drink and ad lib alcohol consumption



# Novel Treatment Considerations

# Novel Treatment Considerations

## – Pain Factors

- Severity, impairment/disability, pain-coping outcomes

## – Psychiatric Comorbidity

- Depression, anxiety, poly substance use

## – Medication/Opioid Interactions

- Effects of opioid use/misuse/tapering on substance use
- Effects of use/abstinence on opioid efficacy/metabolism

# Novel Treatment Considerations

- Abstinence-Induced Hyperalgesia
  - Increased pain in the context of quitting
- Pain as a Proximal Antecedent of Relapse
  - Painful stressors may reinstate extinguished drug-seeking

# Novel Treatment Considerations

- Integrated Treatment
  - Treat both conditions as primary and integrate content relevant to both disorders and how they may influence each other

# Novel Treatment Considerations

- *Personalized Feedback Intervention*
- *Brief Cessation Motivation Intervention*
  - Personalized feedback
  - Pain-smoking psychoeducation
  - Develop discrepancy between continued smoking and desired pain outcomes



# Brief Cessation Motivation Intervention

“Never once have I had a doctor or nurse... tell me... these are the ways that smoking is contributing to that pain. I think that makes a big difference... for me, it’s kind of changing my mind set a little bit and... giving me another reason to quit smoking.”

“I’m surprised the doctor hasn’t used it as another tool to try to help me. You know it gives you the frame of mind to say I gotta quit.”

In Conclusion...

# In Conclusion...

- The study of interrelations between pain and substance use is an emerging and complex area of clinical and experimental research
  - Pain and substance use may interact to influence their respective trajectories and outcomes

Thank You