The Economic Impact of the Prescription Opioid Crisis in Tennessee:

Matthew C. Harris, Ph.D.
Lawrence M. Kessler, Ph.D.

Boyd Center for Business and Economic Research
Opioids have economic impact through many channels

• Life and death (mortality)
• Labor force participation
• Law Enforcement, Judiciary, and Corrections
• Health Care Utilization
• Education and Human Capital Formation
• Children and Families
Less like a cannonball splash: ' 
More like a sodium brick'
Our time today:

• Talk about magnitudes, but . . .
  • Estimates vary and in some cases are unknown.
• Highlight secondary and tertiary economic impacts of opioids.
• Highlight areas of intersection between these areas.
• Discuss evidence that efforts to reduce prescribing, without the right support, can do more harm than good.
Two things that bear repeating:

• “There is some optimal number of opioids prescribed, and that number is not zero.” – Jason Hockenberry

• Policies, in all likelihood, will trade “Type 1” vs. “Type II” errors in who gets opioids.
Overdose deaths – source: CDC
Economic Impact: Mortality

• What we know:
  • TN 2017: 1,269 overdose deaths attributed to opioids.
  • CDC estimates the average net present value economic loss for each overdose at $1.3M. $
    • Most of this impact comes from foregone wages/productivity after the death.

• What we know less about:
  • How overdose deaths yield long run economic impact via family spillovers.
  • What is the correct “counterfactual” for an overdose death?
Economic Impact: Labor Force

• Economic impact of prescription opioid use is complicated and difficult to measure.
  • Most early impact studies focused on loss of life and resulting lost productivity.
  • Labor market effects are one component, but easily quantifiable.
• Prompted by anecdotes and rumors from local chambers of commerce.
  • Harris, Kessler, Murray, and Glenn (2018): First study to examine the causal relationship between opioid use and labor market outcomes.
Potential for ambiguous effects

- **Potential for positive effects:**
  - Opioids may have some therapeutic value and may help some continue working a la Cox-2 inhibitors (Garthwaite, 2012; Butikofer and Skira, 2017).

- **Potential for Negative Effects:**
  - Concerns about dependence, misuse, and reduced performance/labor force participation.
  - Relationship may be similar to that of alcohol/illicit drug use and labor market outcomes
    - (Cook and Moore, 1993; French and Zarkin, 1995; Mullahy and Sindelar, 1993, 1996; Buchmueller and Zuvekas, 1998; Zarkin et al., 1998; DeSimone, 2002; Auld, 2005; Bray, 2005).
What we do

- Empirically examine the relationship between per-capita Schedule II opioid prescription and labor market outcomes using county-level data.
  - Data from CSMD/PDMP from ten states.
- Why county-level analysis?
  - Data availability
  - Appropriate for estimating aggregate effects due to concerns about diversion (Lipari and Hughes, 2017; Garnier et al., 2010; Surratt et al., 2014)
    - 2013-2014: 66.3 percent of ‘misused’ opioids were from a friend/relative
    - 25.2 from a doctor
    - Only 8.5 from a drug dealer or stranger
  - County is a decent proxy for immediate physical social network AND a common region for policies to promote labor force engagement and economic development.
Empirics and Causal Identification

\[ Y_{ist} = \beta_0 + \beta_1 X_{ist} + \beta_2 O_{ist} + \beta_3 R_{is} + \gamma_s + \delta_t + \epsilon_{ist} \]
“Instrumental Variable”
What we find

• We find causal evidence that at the mean, a 10% increase in opioids prescribed per capita leads to a .56 percentage point decrease in labor force participation.

• This implies that increases in opioid use per capita can explain over half of the decline in labor force participation since 2000.
So, what does this mean in Tennessee?

A 10% decrease in prescription opioid use would lead to an additional $825 million in personal income.
Change in Per-capita Income from 10% decrease in opioids prescribed

Figure ___ : ________________________________

Tennessee: _____
United States: _____

Source: ________________________________

Legend:
- Less than 120.0
- 120.0 to 149.9
- 150.0 to 179.9
- 180.0 or greater
Economic Impact: Labor Market

Opioids

Labor + Force +

Econ. Growth

?
Economic Impact: Law Enforcement, Judiciary, and Corrections

Number of Incarcerated Felons in Tennessee - Primary Offense: Drugs

Source: TN Department of Corrections Annual Reports
Economic Impact: Law Enforcement, Judiciary, and Corrections

• Crime is costly–
  • Drug related crimes affect individuals’ lives, property costs, and require people to take costly security and personal protection measures they wouldn’t otherwise take.

• Enforcement is costly
  • Like everyone else, police resources are finite.
Economic Impact: Law Enforcement, Judiciary, and Corrections

• Incarceration is costly –
  • Operations costs: TDC could provide a better number than my guesstimate.
    • However, diversion from prison to treatment has been shown to be highly costs effective (Zarkin et al., 2018)
  • Opportunity costs: incarcerated individuals are not contributing to the tax base or GDP.
  • Dynamic costs: Individual with felony convictions are 10% less likely to be employed in the future and usually at lower wages.
    • Audit studies: felons are 50% less likely to receive a call back from job applications.
  • Dynamic costs: Effects of incarceration on children and outcomes over their lifecycle.
Economic Impact: Health Care
NAS Births

Number of inpatient hospitalizations with any diagnosis of NAS in TN
Economic Impact: Health Care

NAS Births

• Still climbing: 2017 – 1090 NAS births.
  • Hospital costs for infant with NAS: $19,340
  • Hospital costs for infant w/o NAS: $3,700
    • (Winkelman et al., 2018)

• Long-term costs:
  • Increased care needs over first year.
  • Children with NAS 33% more likely to have educational disabilities, requiring classroom therapy, etc. (Fill et al., 2018)
    • This studies are on a birth cohort from 2008-2011. We still have no idea what the true long-run costs are.
Economic Impact: Health Care

• Florence et al (2013) estimate based on matched sample that individuals who are opioid dependent cost an additional $13,700 - $17,042 to treat per year.
  • Extrapolates to $617M in TN if we are nationally representative in dependency rates.
Economic Impact: 'Children and Families'

- Estimates of the lifetime economic impact of child maltreatment range: 200K-800K.

- How do opioids affect child maltreatment?

- Over the last few years, we (Evans, Harris, and Kessler) observe a negative correlation between opioid use and child maltreatment.
  - Perplexing.
As we become more aware of the crisis – prescribing is falling.
Similar pattern with child maltreatment
Don’t shut it off . . .
Good Intentions, Mixed Results

- PDMP’s
  - Reduce misuse of schedule II opioids (Mallatt, 2018; Buchmueller and Carey, 2018)
  - Reduce foster care admissions (Gihleb et al., 2018)
  - Increase heroin related crime in counties with high opioid use prior to PDMP implementation (Mallatt, 2018)
- OxyContin reformulation
  - Increased heroin use (Cicero et al., 2012; Cicero and Ellis, 2015)
  - Increase heroin overdose deaths (Alpert et al., 2018; Evans et al., 2019; Larochelle et al., 2015; Coplan et al., 2013)
  - Increase Hepatitis C incidence (Powell et al., 2019)
In high dependency counties – reformulation of OxyContin is linked to child maltreatment.
Working on this in real time

• Evaluating how the implementation of a must-access PDMP affects child maltreatment.
• Can we triangulate these adverse family effects using arrests for runaways or domestic violence?
• How does access to alternative like Medication Assisted Therapy mitigate these outcomes?
Key Takeaway: You are in the right room. This is worth doing.

- There are substantial economic gains to be had on a number of fronts from addressing the opioid epidemic.
- All of these facets of our population are inexorably linked.
- Evidence suggests that for any solution to be effective – each component has to be designed mindful of how these components are related.
  - Medical/Health care
  - Economic and Community Development
  - Law Enforcement, Judiciary, and Corrections
  - Neighbors and Community
  - Education
- We have to figure this out together.
Key caveat

• No matter what plans of action come from this, empirical research reveals that people don’t always respond to nudges/programs the way we expect.

• Even solid, evidence-based practices may have unanticipated spillovers.
  • Syringe exchange programs → Increased HIV (Packham, 2019)
Thank you!

... and let us know how we can help

mharris@utk.edu