The Epidemiology of Opioid Abuse

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ACKNOWLEDGEMENTS

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The project’s mission is to evaluate the scope of the opioid epidemic in Mississippi and build statewide surveillance systems utilizing different data sources.

Objectives:
- Research, data analyses, and public health reporting
- Translating data and research into action

Achievements:
- In 2017, the Mississippi State Department of Health was awarded a three-year grant from the Department of Justice
- Five national conferences: 6 oral presentations
- Five public health reports
- Multiple state presentations
In 2015, opioids killed over 33,000 people. In 2016, opioids killed over 42,000 people.

Inside a Killer Drug Epidemic: A Look at America’s Opioid Crisis

The opioid epidemic killed more than 33,000 people in 2015. What follows are stories of a national affliction that has swept the country, from cities on the West Coast to bedroom communities in the Northeast.

JAN. 6, 2017
How Did We Get Here? The Genesis of an Epidemic

Greed
Hubris
Good Intentions
“Those who cannot remember the past are condemned to repeat it” George Santayana

- New pain reliever promoted by Bayer
- Improvement over morphine
- Marketed as a non-addictive alternative to morphine
- Approved by the American Medical Association for general use
- The year 1906
- The drug: Heroin
BAYER
PHARMACEUTICAL PRODUCTS.

We are now sending to Physicians throughout the United States literature and samples of
ASPIRIN
The substitute for the Salicylates, agreeable of taste, free from unpleasant after effects.

HEROIN
The Sedative for Coughs,
HEROIN HYDROCHLORIDE
Its water-soluble salt.
You will have call for them. Order a supply from your jobber.

Write for literature to
FARBENFABRIKEN OF ELBERFELD CO.
40 Stone Street, New York,
SELLING AGENTS.
Arthur Sackler

- Physician
- Marketing Executive
- Made early fortune marketing Librium and valium
- Established medical newspaper Medical Tribune as venue to market drugs
- Early pioneer of pharmaceutical marketing
1952 Sackler’s bought a small pharmaceutical company that made laxatives and ear wax treatment (Purdue Frederick).

Purdue Pharma – made great profits from MS Contin.

1980’s – MS Contin patent expiring.

Long acting oxycodone pursued as alternative (doses of 10 mg up to 160 mg).
1986 article by Portenoy, Foley

*Chronic use of opioid analgesics in non-malignant pain: report of 38 cases*

“We conclude that opioid maintenance therapy can be a safe, salutary and more humane alternative to the options of surgery or no treatment in those patients with intractable non-malignant pain and no history of drug abuse.”
1996 – 2001 Purdue trained > 5000 physicians and other health professionals for speakers bureau

Used reps to target primary care physicians (rather than oncologists and pain management) and high volume prescribers

Aggressive marketing for “non-malignant pain”

Claimed risk of addiction extremely small (<1%) based on misleading data
In remarkable labeling FDA approved package insert safer than rival painkiller due to patented delayed-release formulation based on NO data

FDA examiner that managed approval process later joined Purdue Pharma

12 hour efficacy refuted by an internal study (publication was not allowed)
David Haddox – senior medical advisor for Purdue creates concept of pseudoaddiction in a paper in *Pain* based on a single case report.

“seems similar to addiction, but is due to unrelieved pain” according to Purdue pamphlet.

Solution: give more opioids.
1990’s American Pain Society promoted pain scale as the “Fifth Vital Sign”

2001 – Joint Commission established the 5\textsuperscript{th} Vital Sign as a necessary component of patient assessment

CMS later adopts pain control measures as a component of quality reporting and reimbursement
The Fifth Vital Sign

Pain:
Current Understanding of Assessment, Management, and Treatments
“there is no evidence that addiction is a significant issue when persons are given opioids for pain control.”
**Table 6. Common Misconceptions About Pain**

The incorrect beliefs that:

- Physical or behavioral signs of pain (e.g., abnormal vital signs, grimacing, limping) are more reliable indicators of pain than patient self-report.
- Elderly or cognitively impaired patients cannot use pain intensity rating scales.
- Pain does not exist in the absence of physical or behavioral signs or detectable tissue damage.
- Pain without an obvious physical cause, or that is more severe than expected based on findings, is usually psychogenic.
- Comparable stimuli produce the same level of pain in all individuals (i.e., a uniform pain threshold exists).
- Prior experience with pain teaches a person to be more tolerant of pain.
- Analgesics should be withheld until the cause of the pain is established.
- Noncancer pain is not as severe as cancer pain.
- Patients who are knowledgeable about pain medications, are frequent emergency department patrons, or have been taking opioids for a long time are necessarily addicts or “drug seekers.”
- Use of opioids in patients with pain will cause them to become addicted.
- Patients who respond to a placebo drug are malingering.
- Neonates, infants, and young children have decreased pain sensation.

Sources: References 13 and 140.
JC pain management guide - references pseudo-addiction

“pseudoaddiction, refers to patient behaviors that may occur when pain is undertreated, including increased focus on obtaining medications (“drug seeking”), “clock watching,” and even illicit drug use or deception. Pseudoaddiction can be distinguished from true addiction because such behaviors resolve with effective pain management.”
Is the USA Facing an Epidemic of “Deaths of Despair?"

Between 1998 and 2013, midlife all-cause mortality declined among Africans Americans and Hispanics but surged among Caucasians.

The increase in all-cause mortality among 45-54 aged Caucasians was due to:
- Suicides
- Drug overdoses
- Chronic liver disease

The most affected groups:
- Less-educated
- Rural residents

A parallel decrease in:
- Labor force participation
- Marriage rates

Lack of economic opportunities
Lack of social support
Deaths of despair
In 2016, the five states with the highest rates of drug overdose deaths were West Virginia (52.0 per 100,000), Ohio (39.1 per 100,000), New Hampshire (39.0 per 100,000), Pennsylvania (37.9 per 100,000), and Kentucky (33.5 per 100,000).

Opioids were involved in 42,249 deaths in 2016, and opioid overdose deaths were five times higher in 2016 than 1999.

**Deaths Involving Opioids: US, 2016**

**Overdose Deaths Involving Opioids, by Type of Opioid, United States, 2000-2016**

- Any Opioid
- Other Synthetic Opioids (e.g., fentanyl, tramadol)
- Heroin
- Natural & Semi-Synthetic Opioids (e.g., oxycodone, hydrocodone)
- Methadone

Deaths Involving Opioids: Changing Patterns

THREE WAVES*

Still - 40% all opioid overdose deaths involved a prescription opioid in 2016

1999-2010

- prescription opioids

2010-2013

- heroin

2013-present

- fentanyl and fentanyl analogues


- Natural and semisynthetic opioids
  - 2015: 3.9
  - 2016: 4.4

- Synthetic opioids
  - 2015: 3.1
  - 2016: 6.2

- Heroin
  - 2015: 4.1
  - 2016: 4.9

The Mississippi Opioid Epidemic: Surveillance Data

- What data sources do we have to track the MS opioid epidemic?
- What can we measure with these data sources?
“I remember the moments of shame and guilt after being resuscitated from an overdose. It didn’t start like that, but no one told me it would end like that.”

ZACH NEUSER, MIDLAND, TEX.
• Almost every day in 2016 someone died from a drug overdose in Mississippi.
• Between 2011 to 2016, there were a total of 1,899 drug overdose deaths.
• From 2011 to 2014, overdose deaths increased by 24.7%.
Opioid Mortality Data: Patterns and Trends

During 2016 deaths involving:
- Natural or semisynthetic opioids: 98 deaths (57.0%)
- Synthetic opioids: 41 deaths (23.4%)
- Heroin: 28 deaths (16.3%)

From 2011-2016 deaths involving:
- Natural or semisynthetic opioids doubled from 49 in 2011 to 98 in 2016
- Synthetic opioids increased by 156.3% from 16 in 2011 to 41 in 2016
- Heroin overdose deaths demonstrated a steep and steady increase from 2011 until 2015.
**Opioid Mortality Data: Demographics, 2011-2016**

- **Overdose Deaths Involving Opioids by Race, MS, 2011-2016**
  - Caucasian: 649 (90.8%)
  - African American: 58 (8.1%)
  - All other races: 8 (1.1%)

- **Overdose Deaths Involving Opioids by Sex, MS, 2011-2016**
  - Male: 402 (56.2%)
  - Female: 313 (43.8%)

- **Demographics**
  - Males: 56.2%
  - Single, separated, or divorced: 69.7%
  - No college degree: 81.1%
  - Caucasian race: 90.8%
“I was in love with it the first time I tried it. I craved and sought it through every step of my days.”

BRADEN EWELL, ODESSA, TEX.
In 2016, MS had the 4th highest opioid prescription rate in the country. Preceded only by AL, AR, and TN.

On average, for every resident in the state, there is more than one opioid prescriptions each year.

In six years, the total number of prescriptions for opioid analgesics reached 19,802,910.

Note: The CDC and PMP data may yield slightly different rates.
Prescriptions for Opioids: Numbers and Trends, 2011-2016

- Opioid analgesics accounted for 88% of all opioids. These prescriptions have been decreasing since 2012.
- Prescriptions for addiction-treatment, however, steadily increased until 2015. This trend suggests a significant surge in opioid use disorders in the state.

### Opioid Prescriptions by Type of Opioid, 2016

- Opioid analgesics: 3,212,603 (88.3%)
- Addiction-treatment medications: 209,700 (5.8%)
- Opioid-containing antitussive medicines: 214,652 (5.9%)

### Prescriptions for Major Opioid Categories, Percent Change, MS, 2011-2016

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<tr>
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</thead>
<tbody>
<tr>
<td>Addiction-treatment medications</td>
<td>0.0%</td>
<td>12.7%</td>
<td>16.5%</td>
<td>14.6%</td>
<td>10.6%</td>
<td>-1.0%</td>
</tr>
<tr>
<td>Opioid analgesics</td>
<td>0.0%</td>
<td>3.7%</td>
<td>-0.6%</td>
<td>0.0%</td>
<td>-3.2%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>Opioid-containing antitussive medicines</td>
<td>0.0%</td>
<td>9.1%</td>
<td>0.6%</td>
<td>-17.3%</td>
<td>-6.7%</td>
<td>-8.8%</td>
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</table>
Although the number of total prescriptions for opioid decreased by 4.3%, the number of prescriptions for oxycodone increased by 20.4% between 2014 and 2016.

**Top 3 Opioids**

<table>
<thead>
<tr>
<th>Top 3 Opioids</th>
<th>2014</th>
<th>2016</th>
<th>% of total prescriptions for opioid analgesics, 2014</th>
<th>% of total prescriptions for opioid analgesics, 2016</th>
<th>Change, 2014 and 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocodone</td>
<td>2,020,974</td>
<td>1,744,536</td>
<td>60.2%</td>
<td>54.3%</td>
<td>-13.7%</td>
</tr>
<tr>
<td>Tramadol</td>
<td>521,093</td>
<td>557,207</td>
<td>15.5%</td>
<td>17.3%</td>
<td>6.9%</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>449,243</td>
<td>541,008</td>
<td>13.4%</td>
<td>16.8%</td>
<td>20.4%</td>
</tr>
</tbody>
</table>

**Prescriptions for Major Opioids, 2014 and 2016**

- **Hydrocodone**: 2014 - 2,020,974, 2016 - 1,744,536
- **Tramadol**: 2014 - 521,093, 2016 - 557,207
- **Oxycodone**: 2014 - 449,243, 2016 - 541,008
- **Codeine**: 2014 - 126,016, 2016 - 122,627
- **Morphine**: 2014 - 83,828, 2016 - 91,652
- **Fentanyl**: 2014 - 68,860, 2016 - 71,436
Prescription Opioid Analgesics: Demographics

- Nearly two-third (63%) of all opioid prescriptions were dispensed to patients ≥ 50 y.
- Prescriptions dispensed to women accounted consistently for around 60% of all opioid prescriptions during each of the studied years.

Prescriptions for Opioid Analgesics by Age Group

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<tbody>
<tr>
<td>18 years or less</td>
<td>74,837</td>
<td>223,928</td>
<td>384,495</td>
<td>509,261</td>
<td>765,166</td>
<td>682,943</td>
</tr>
<tr>
<td>19-29 years</td>
<td></td>
<td>7%</td>
<td>12%</td>
<td>16%</td>
<td>24%</td>
<td>21%</td>
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<tr>
<td>30-39 years</td>
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<tr>
<td>40-49 years</td>
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<tr>
<td>50-59 years</td>
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<tr>
<td>60-69 years</td>
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<tr>
<td>70 years and above</td>
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</tbody>
</table>

Prescriptions for Opioid Analgesics By Sex, 2011-2016

- Female
- Male

<table>
<thead>
<tr>
<th>Year</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>2012</td>
<td>41%</td>
<td>59%</td>
</tr>
<tr>
<td>2013</td>
<td>41%</td>
<td>59%</td>
</tr>
<tr>
<td>2014</td>
<td>59%</td>
<td>60%</td>
</tr>
<tr>
<td>2015</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>2016</td>
<td>41%</td>
<td>59%</td>
</tr>
</tbody>
</table>
Multiple Provider Episodes

Multiple provider episodes
≥ 6 doctors
≥ 6 pharmacies
Case Study
Doctor Shopping, 2011
- Female patient born in 1974
- Number of prescriptions for opioids: 146
- Number of different prescribers: 76
- Number of different pharmacies used: 30
- Number of different patient names: 10
- Number of cities of residence: 6
- Number of different payment types: 5

The number of MPEs showed a downward trend from 5,357 episodes in 2011 to 4,493 in 2014.
Pareto principle: 80% of the effects come from 20% of the causes

- Statewide, 17% of all prescribers issued 500 or more prescriptions during 2014.
- The majority of them (66.7%) issued less than 200 prescriptions.

Prescriptions for Opioid Analgesics per Provider: Number and Percentage

- >5,000 prescriptions 59 (0.6%)
- 1,000-4,999 prescriptions 680 (7.3%)
- 500-999 prescriptions 858 (9.2%)
- 200-499 prescriptions 1,508 (16.2%)

Statewide, 9,333 providers issued prescriptions for opioid analgesics in 2014.
During 2014 in Laurel:

- The number of prescribers issuing opioid prescriptions was **158**. These prescribers issued a total of **108,276** prescriptions for opioid analgesics.

- The majority (**57%**) of prescribers wrote less than 200 prescriptions.

- In fact, the top 6 prescribers of opioids prescribed **59% (64,137)** of all prescriptions.

- One prescriber wrote **31,713 or 29%** of all prescriptions for opioid analgesics dispensed in Laurel during 2014.
MS Pain Clinic:
Prescriptions for Opioid Analgesics, 2014
Total = 46,600

Every working day (261 workdays)
178.5 opioid prescriptions

Every working hour (8 hour days)
22.3 opioid prescriptions

Every 2.7 minutes
1 opioid prescription
Prescriptions for Opioid Analgesics: Jackson, MS

Jackson, MS, 2014
Prescribers: 1,620
Prescriptions = 296,160

- < 200 prescriptions: 1,295 (79.9%)
- 200 – 499 prescriptions: 177 (10.9%)
- 500 – 999 prescriptions: 93 (5.7%)
- 1,000 – 4,999 prescriptions: 53 (3.4%)
- > 5,000 prescriptions: 2 (0.1%)
Compared to 2012, MME and days of supply increased in 2012. There was a total of 245,969 high-dose opioid prescriptions (≥ 90 MME/day), accounting for 7.3% of all opioid prescriptions during 2014.

**Total Morphine Milligram Equivalents, MS, 2012-2014**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total MME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>2,336,236,612</td>
</tr>
<tr>
<td>2012</td>
<td>2,221,339,404</td>
</tr>
</tbody>
</table>

**Total Days of Supply, MS, 2012-2014**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>56,807,230</td>
</tr>
<tr>
<td>2012</td>
<td>54,646,214</td>
</tr>
</tbody>
</table>

**Morphine Milligram Equivalents: Daily Dosage per Prescription, MS, 2014**

- < 50 MME: 2,625,022 (78.4%)
- ≥ 50 but < 90 MME: 479,256 (14.3%)
- ≥ 90 MME: 245,969 (7.3%)
“Seven rehabs, suboxone, doctors, methadone clinics, money, money, money that you do not have but you would sell your soul to get.”

KAREN, YARDLEY, PA.
Opioid-Related Hospitalizations: Types

Opioid-Related Hospitalizations, 2014
Total Number = 6,355

- Dependence: 4,013 (63%)
- Abuse: 1,059 (17%)
- Overdose: 722 (11%)
- Adverse Effects: 766 (12%)

Over one third (2,393 or 38%) of all opioid-related discharges had a coexisting diagnosis of another type of drug misuse.
The number of opioid-related discharges increased by 33% (+1,571 discharges)

The hospitalization rate (number of opioid-related discharges/number of all other discharges) increased by 32% from 12.7 to 16.8 opioid-related discharges per 1,000 discharges.
Compared to patients hospitalized for all other causes, Caucasians (81% vs. 55%, p < .001) and males (45% vs. 42%, p < .001) were more likely to be hospitalized with a diagnosis indicating opioid misuse.
Females between the age of 25 and 44 years (reproductive age) accounted for 1,465 or 23.1% of all opioid-related discharges.
Residence Patterns

- There were 19.8 opioid-related hospitalizations per 10,000 MS residents during 2014. Nationwide range: between 7 and 40 per 10,000 persons.
- We identified a cluster of high hospitalization rates in the Southeast region of the state during 2010-11. This trend persisting during 2014.
Comorbidities: Inferential Statistics

Compared to all other hospitalizations, patients hospitalized with a diagnosis of opioid misuse were more likely to have a co-existing diagnosis of:

- Mental health disorders (72.9% vs 26.6%, p < .001)
- Chronic non-cancer-related pain (25.3% versus 4.0%, p < .001)
- Lower back pain (12.7% versus 2.5%, p < .001)

Interestingly, patients hospitalized with an opioid-related diagnosis were less likely to have a coexisting cancer diagnosis (2.9% versus 6.0%).

Note: Findings are preliminary.
## Societal Cost

<table>
<thead>
<tr>
<th>Year</th>
<th>Length of Stay</th>
<th>Total Charges</th>
<th>Length of Stay</th>
<th>Total Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>5.7 days</td>
<td>$20,444</td>
<td>27,424 days</td>
<td>$97,804,656</td>
</tr>
<tr>
<td>2014</td>
<td>6.5 days</td>
<td>$29,383</td>
<td>41,480 days</td>
<td>$186,727,420</td>
</tr>
</tbody>
</table>

### Opioid-Related Discharges: Total Charges, 2010 and 2014

- 2010: $97,804,656
- 2014: $186,727,420

The hospital charges almost doubled between 2010 and 2014.

**Societal Cost**

- Health care cost
- Lost workforce
- Disruption of family relations
- Criminal justice cost
# Key Findings

## Summary of MS Data Findings and Prevention Strategies

<table>
<thead>
<tr>
<th>Findings</th>
<th>Strategies</th>
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<tbody>
<tr>
<td>High rates of opioid prescribing</td>
<td>Minimize the number of opioid prescriptions</td>
</tr>
<tr>
<td>Increasing number of opioid use disorders and high level of multidrug use</td>
<td>Support effective treatment methods, including medication-assisted treatments</td>
</tr>
<tr>
<td>High prevalence of mental health issues among patients with opioid use disorders</td>
<td>Expand the state capacity to diagnose and treat mental health disorders</td>
</tr>
<tr>
<td>High prevalence of chronic pain conditions among patients with opioid use disorders</td>
<td>Teach and financially incentivize forms of alternative pain management</td>
</tr>
<tr>
<td>Increasing number of deaths due to dangerous synthetic opioids</td>
<td>Collaborate with law enforcement to find ways to combat illicit drug use</td>
</tr>
<tr>
<td>Caucasian race, low SES, social isolation</td>
<td>Study the underlying causes of the opioid epidemic. Target both supply and demand</td>
</tr>
</tbody>
</table>
What’s on the horizon

Marked increase in stimulant medication prescriptions

2011-2014 in MS
- 39% increase in amphetamines
- 57% increase in lisdexamfetamine
- 31% increase in methylphenidate

Gabapentin
THANK YOU!