The Emergence of Gabapentin as a Drug of Abuse in a Cohort of Rural Appalachian Drug Users

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Goals

• Describe the epidemiology of gabapentin abuse/misuse
• Examine gabapentin abuse/misuse in a cohort of rural Appalachian drug users
• Determine next steps
The Appalachian Regional Commission uses an index-based county economic classification system to identify and monitor the economic status of Appalachian counties. See the reverse side for a description of each economic level.

Map Created: March 2014
Data Sources:
- Poverty data: U.S. Census Bureau, American Community Survey, 2008–2012

County Economic Levels
- Red: Distressed (90)
- Light Orange: At-Risk (108)
- Medium Orange: Transitional (210)
- Dark Orange: Competitive (10)
- Blue: Attainment (2)
Review of Studies Noting Gabapentin Misuse/Abuse

• Literature searched for peer-reviewed manuscripts describing misuse/abuse of gabapentin
  – *Misuse/abuse*: taking larger doses than prescribed, taking without a prescription, and diversion

• 23 case studies and 11 epidemiological studies met inclusion criteria

Smith, Havens and Walsh. *Addiction*, 2016
Review of Studies Noting Gabapentin Misuse/Abuse

- Papers from US, UK, Germany, Finland, India, South Africa and France
- Only 1 study estimated national prevalence (in the UK) at 1.1%
- Prevalence higher in samples also abusing other prescription or illicit drugs

Smith, Havens and Walsh. *Addiction*, 2016
Review of Studies Noting Gabapentin Misuse/Abuse

- Lower than expected prevalence of gabapentin abuse in those with alcohol dependence; higher in those with opioid dependence
- A study conducted in Scotland found that more than 1% of deaths were attributable to gabapentin; 0.3% of post-mortem toxicology results positive for gabapentin in Finland
- Toxicological results from a study of U.S. drivers found 0.6% to be positive for gabapentin

Smith, Havens and Walsh. *Addiction*, 2016
Longitudinal Study to Determine Vulnerabilities to Prescription Opioid Abuse and Associated Harms in Rural Appalachia

- Social Networks among Appalachian People (SNAP) study
- Purpose: determine prevalence and incidence of HCV, HIV and HSV-2 in relation to social network characteristics among rural drug users
- 500 rural out-of-treatment PWID/non-PWID recruited using RDS and followed at 6-, 12-, 18-, 24-, 30-, and 36-, 42-months post-baseline (still actively following 430 participants from original cohort)

Young, Rudolph, Quillen and Havens. *J Epidemiol and Community Health*, 2014
Eligibility Criteria

• Age 18+
• English-speaking
• PWID (initial seeds)
• Use of at least 1 of the following drugs to get high in prior 30 days:
  – Rx Opiates (illicit use)
  – Cocaine
  – Heroin
  – Methamphetamine
Data Collection Procedures

• Interviewer-administered questionnaire
  – Computer-assisted personal interview (CAPI) via tablet PC

• Serologic testing (with pre- and post-test counseling – all rapid tests)
  – HIV
  – HCV
  – HSV-2 (through 2016)
  – Syphilis (2017 – on)
Measures

- Expanded (additional prescription drugs) *Addiction Severity Index* to measure drug use (including gabapentin specifically) and demographics
- *Name generating questionnaire* to measure drug, sex, support networks (sociocentric)
- *Risk Behavior Assessment* to determine sex and injection-risk behaviors
# Participant Characteristics

**N=503**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>286</td>
<td>56.7</td>
</tr>
<tr>
<td>Age, median (IQR)</td>
<td>31</td>
<td>94.2</td>
</tr>
<tr>
<td>Caucasian</td>
<td>474</td>
<td>34.4</td>
</tr>
<tr>
<td>Employed Full-Time</td>
<td>173</td>
<td>78.3</td>
</tr>
<tr>
<td>Lifetime Injection Drug Use</td>
<td>394</td>
<td>94.8</td>
</tr>
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</table>
# Age of Onset – Comparison of Older and Younger Users

<table>
<thead>
<tr>
<th>Substance</th>
<th>Age of Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana</td>
<td>13</td>
</tr>
<tr>
<td>Alcohol</td>
<td>14</td>
</tr>
<tr>
<td>Benzos</td>
<td>16</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>17</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>18</td>
</tr>
<tr>
<td>OxyContin</td>
<td>17</td>
</tr>
<tr>
<td>Crack</td>
<td>18</td>
</tr>
<tr>
<td>Cocaine</td>
<td>19</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>21</td>
</tr>
<tr>
<td>IDU</td>
<td>21</td>
</tr>
<tr>
<td>Alcohol</td>
<td>14</td>
</tr>
<tr>
<td>Marijuana</td>
<td>15</td>
</tr>
<tr>
<td>Benzos</td>
<td>20</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>21</td>
</tr>
<tr>
<td>Cocaine</td>
<td>22</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>24</td>
</tr>
<tr>
<td>Methadone</td>
<td>28</td>
</tr>
<tr>
<td>IDU</td>
<td>29</td>
</tr>
</tbody>
</table>

*These ages are illustrative and may vary between individuals.*

**< 30 YEARS OF AGE**

**> 30 YEARS OF AGE**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Buprenorphine (illicit)</td>
<td>Not queried</td>
<td>26.5</td>
<td>19.2</td>
</tr>
<tr>
<td>Methadone (illicit)</td>
<td>60.8</td>
<td>11.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Heroin</td>
<td>4.4</td>
<td>0.1</td>
<td>1.4</td>
</tr>
<tr>
<td>OxyContin</td>
<td>69.8</td>
<td>0.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Roxicodone</td>
<td>72.4</td>
<td>18.6</td>
<td>17.3</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>81.3</td>
<td>28.1</td>
<td>23.3</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>85.3</td>
<td>27.1</td>
<td>28.8</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>3.4</td>
<td>4.0</td>
<td>4.6</td>
</tr>
<tr>
<td>Cocaine</td>
<td>22.5</td>
<td>7.2</td>
<td>9.8</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>0</td>
<td>14.7</td>
<td>47.7</td>
</tr>
</tbody>
</table>

1Lofwall and Havens. Drug and Alcohol Depend, 2012
Emerging Trends in Prescription Drug Abuse

• Neurontin (gabapentin)
  – 165% increase in abuse between 2013 and 2014
  – 2950% increase in abuse between 2008 and 2014
  – Participants reporting a mean of 25 days of use in past 30
  – More likely (p<0.05) to also be abusing IR oxycodone, buprenorphine and benzodiazepines

Qualitative Analysis of Gabapentin Abuse

- Data collected from two active cohorts in Appalachian Kentucky
- Eligibility criteria: recent (< 1 year) gabapentin abuse
- 33 participants (5 males, 27 females) across four focus groups conducted at field site in Hazard, KY
- March – September 2015

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Qualitative Analysis of Gabapentin Abuse

- **Initiation**: 5-10 years since first use
- **Source**: prescription for nerve-related pain, mental health disorders

“That’s how everybody got introduced to gabapentin, it’s through doctors”

- Family/friends also mentioned as initial source of gabapentin

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Qualitative Analysis of Gabapentin Abuse

• Reasons for First Use: legitimate medical concern and hearing about it from peers
  “I mean, its like more and more and more…as years went on, people just started gabapentin. You’d hear other people talking about taking them, and I was like “well let me try it” and it went from there”

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. Psychology of Addictive Behaviors, 2018
Qualitative Analysis of Gabapentin Abuse

- Physical experience: muscle relaxation, pain reduction, hallucinations, sleepiness, feeling drunk or high
- Participants likened high to that of opiates
- Some described stimulant-like effects

“[like a] shot of cocaine”

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Qualitative Analysis of Gabapentin Abuse

• **Motivations for continued use:** primarily for pharmacodynamic effects (getting high)
  – Other reasons for continued use:
    • Pain relief
    • Withdrawing from other substances such as cocaine, buprenorphine and oxycodone

• **Getting high with gabapentin is “cheap” and “always available”**

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Qualitative Analysis of Gabapentin Abuse

• **Characteristics of Abuse**: use of tolerance to enhance high
  “You wait a few days and don’t take any, then you take some – you feel good”

• **Route of administration**: primarily oral, some snorting
  – Effect enhanced with concomitant use of caffeine
  – Used as a way to come down from cocaine

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Qualitative Analysis of Gabapentin Abuse

• Physical Effects: reports of both stimulant-like effects
  “Just keeps you wanting to move”

• Reports of depressant effects consistent with side effect profile
  “Relaxes your body” and “helps with rest”

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Qualitative Analysis of Gabapentin Abuse

• **Longitudinal Trends:** long-standing awareness of drug, but noted increases in popularity in community starting in 2012-13
• More use among younger drug users
• Concern about becoming scheduled (which did occur in July, 2017)

“And that why they gonna make them scheduled…cause everybody’s getting them”

Smith, Boland, Young, Lofwall, Quiroz, Staton and Havens. *Psychology of Addictive Behaviors*, 2018
Changes in laws to curb opioid abuse – unintended consequences?

- Changes in opioid epidemic – prescription drugs to heroin; mitigated by changes in laws and practices increasing scarcity of prescription opioids
- Similarly, changes in laws around opioid prescribing/PDMP may be driving use of gabapentin in rural areas
- Now scheduled in Kentucky as of 7/2017 – will have data to demonstrate how this affected use longitudinally
Next Steps

• Examine longitudinal trends of gabapentin in abuse/misuse
  – Effect of changes in scheduling
    • Policy implications for other states with PDMPs contemplating scheduling
  – Drug co-usage with opioids, stimulants
  – Motivations for use and source
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