Gender in Opioid Research: Basic, Clinical and Translational Implications

Nora D. Volkow, M.D.
Director
National Institute on Drug Abuse
@NIDAnews
Overdose Death Rates

National Drug Opioid Overdose Deaths by Gender

OVERDOSE FATALITIES

EVOLUTION OF THE OPIOID CRISIS

Source: Centres for Disease Control and Prevention

Sex Related Differences in Opioid Prescribing


Source: IQVIA™ Total Patient, Tracker, 2017 Enhanced
Recommendations included *addressing disparities in the experience of pain*

Women Appeared To Suffer More Pain In Many Categories

And Women’s reports of pain were more likely to be dismissed

**Rates of U.S. Adults > 18 and Older Reporting Pain, 2015**

<table>
<thead>
<tr>
<th>Pain Type</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe headache or migraine</td>
<td>9.9%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Low back pain</td>
<td>27.6%</td>
<td>30.4%</td>
</tr>
<tr>
<td>Neck pain</td>
<td>13.9%</td>
<td>17.4%</td>
</tr>
</tbody>
</table>

*Source: CDC and NCHS, 2015*
Gender and Age Effects on Mu-Opioid Receptors (MOR) in Human Brain (PET $[^{11}\text{C}]$Carfentanyl)

Zubieta at al., Am J Psychiatry 1999
Gender Differences in Kappa Opioid Receptor Availability

- Males had higher K receptor availability than females presumably from increased dynorphin, which is aversive.
- This might help explain gender differences in pain catastrophizing.

MEDICATIONS FOR OUD (MOD)

OUD CASCADE OF CARE IN USA

Williams AR, Nunes E, Offson M. Health Affairs Blog, 2017
MEDICATIONS FOR OUD (MOD)

DECREASES
- OPIOID USE
- OPIOID-RELATED OVERDOSE DEATHS
- CRIMINAL ACTIVITY
- INFECTIOUS DISEASE TRANSMISSION

INCREASES
- SOCIAL FUNCTIONING
- RETENTION IN TREATMENT

MOD IS HIGHLY UNDERUTILIZED!
RELAPSE RATES ARE VERY HIGH (50% IN 6 MONTHS)
Priority Research Areas

- Expand Therapeutic Options
- Optimize Effective Treatment Strategies
- Develop New/Improved Prevention & Treatment Strategies
- Enhance Treatments for Infants with NAS/NOWS
Women Are Less Likely To Receive Naloxone Than Males

Offspring of mothers receiving BUP had shorter hospital stays than mothers receiving methadone and shorter duration of Neonatal Abstinence Syndrome (NAS).

If BUP is adopted as standard of care, then 7.5 fewer hospital days X $1,500/day x 23,000 babies = $258,750,000 SAVINGS/YEAR

Pregnancy: Barriers to Accessing MOD

Graphic Courtesy of Department of Health Policy, Vanderbilt University School of Medicine/Data from Patrick SW et al., Substance Abuse 2018.
17% of pregnant women are prescribed an opioid during pregnancy.

Buprenorphine resulted in a shorter duration of NAS treatment and length of hospital stay than treatment with morphine.


HEALTHY BRAIN AND CHILD DEVELOPMENT (HBCD) STUDY

Large multi-site longitudinal study to examine brain, cognitive, behavioral, social, and emotional development beginning prenatally and extending through childhood.

Oversample for prenatal opioid exposure