Origins of the US opioid epidemic, and the future of multidisciplinary pain management

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George Washington University School of Medicine and Health Sciences

http://hyperboleandahalf.blogspot.com/2010/02/boyfriend-doesnt-have-ebola-probably.html
I’m Not Comfortable With Pain!

• Neither are your patients!
• Pain management is one of the core competencies of hospital medicine
• It’s not that complicated, BUT complicated by
  – History
  – Cultural Expectations
  – Lack of knowledge/understanding
  – Lack of systems of support

“Tell us please, what treatment in an emergency is administered by ear?“

....I met his gaze and I did not blink. "Words of comfort," I said to my father.

-- Abraham Verghese, Cutting for Stone
A Brief History of Pain

Something, somewhere went terribly wrong
Opioids In The News

- 14.5% of prescriptions filled in Boston drug stores contain opiates
- 1/3 of Pennsylvania’s physicians write 90% of opioid prescriptions
- 150,000 active US opioid users

Pain After the Civil War

- Chronic Pain and Alcoholism were both widely treated with opium and morphine in the period following the civil war.
- “That some cases [of addiction] do result from opiate prescriptions cannot be denied… The prime causes of the opium-habit are undoubtedly to be found in the unrestricted sale of opiates, and in the multitude of proprietary nostrums containing opium.”

Sears Catalog, c. 1902

“While surpassing other remedies in its beneficent effects, it is alike remarkable in its power for harm. There are times when the dangers and disadvantages of this most brilliant of drugs seem wholly out of proportion to its benefits.

The disadvantages of opium are these:

1. In an overdose it is an active poison.
2. In ordinary doses its benefits are largely offset by various functional derangements.
3. Its use involves the danger of the opium-habit.”

Sears Catalog, c. 1902

Addiction: 1885-1922

- Became addicted to cocaine shortly after discovering its anesthetic properties in 1885
- Socially withdrawn, work suffered, entered drug rehabilitation in Rhode Island
  - Introduced to morphine in rehabilitation as therapy for his cocaine addiction and was addicted to both cocaine and morphine for the rest of his life
Addiction: 1885-1922

• In 1892, William Osler, first Chief of Medicine at JHUH and Halsted’s personal physician, attested to the president of Johns Hopkins University that Halsted’s appointment as a full professor of surgery was “safe”
Addiction: 1885-1922

- Later Osler noted in his diary, “About 6 months after the full position had been given I saw him in a severe chill, and this was the first intimation I had he was still taking morphia.”
- Osler never disclosed Halsted’s morphine use noting “he could do his work comfortably and maintain his usual physical vigor.”
- From 1892-1922 Dr. Halsted led one of the most productive and influential careers in US history… the entire time addicted to morphine.

By the time of its passage most of the excessive use of opium and morphine, endemic after the civil war had been curtailed.

By 1915 with the Harrison Act (largely a prohibition measure) treasury department agents took an aggressive stance against physicians and pharmacists perceived as prescribing excessively.

Federal Agents Destroying Narcotics, 1920

• Less and less opioid use for pain
• 1960’s a surge in heroin importation during Vietnam War
• 1970 US Controlled Substances Act
• 1973 Richard Nixon Creates the DEA and declares “War on Drugs”

A Brief History of Pain

1970
1975
1980
1985
1990
1995
2000
2005
2010
2016

*Depa*

(Received 14 February 1986, revised 10 May,
Complying with Pain Management Standard PC.01.02.07

1973 Undertreatment of Inpatients
1980 NEJM Addiction Rare With Narcotics
1986–87
• High Incidence of Pain
• WHO Analgesic Ladder
• Opioids Safe for Chronic Pain

1996
• Endorse Opioids for Chronic Non-Cancer Pain
• Pain 5th Vital Sign
• Fewer Restrictions on Opioid Prescribing

2000
• JCAHCO Adopts 5th Vital Sign
• US Congress-Pain Relief Promotion Act

School of Medicine & Health Sciences
THE GEORGE WASHINGTON UNIVERSITY
smhs.gwu.edu
• Both houses of congress pass in October 2000, The Pain Relief Promotion Act of 2000
  – HR 2260
  – Designates the decade beginning January 1, 2001, as the Decade of Pain Control and Research

• Authorizes the Secretary of Health and Human Services to award grants, cooperative agreements, and contracts for development and implementation of programs to provide education and training to health care professionals in pain management and palliative care.

“state medical board will consider inappropriate treatment, including the undertreatment of pain, a departure from an acceptable standard of practice”

“this policy have [sic] been developed to clarify the Board’s position on pain control, particularly as related to the use of controlled substances, to alleviate physician uncertainty and to encourage better pain management.

“The Board recognizes that controlled substances including opioid analgesics may be essential in the treatment of acute pain due to trauma or surgery and chronic pain, whether due to cancer or non-cancer origins.”

http://www.med.ohio.gov/pdf/Fedpainstatement.pdf
1990-2010

- Opioids seemed to offer safe and cost effective miracle for chronic pain

- Reimbursement reduced or eliminated for comprehensive pain management
  - Particularly behavioral and physical therapy

- Most US multidisciplinary pain management centers were closed due to insolvency

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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>23 million</td>
<td>90</td>
<td>Some public, some private, some mixed</td>
<td>Some public, some private, some mixed</td>
<td>255,555</td>
<td>6 months (median)</td>
<td>Increase</td>
</tr>
<tr>
<td>Belgium</td>
<td>11 million</td>
<td>9</td>
<td>9</td>
<td>Private clinics also exist*</td>
<td>1,222,222</td>
<td>7 months</td>
<td>Increase</td>
</tr>
<tr>
<td>Canada</td>
<td>35 million</td>
<td>203</td>
<td>122</td>
<td>81</td>
<td>172,413</td>
<td>6 months (public), 2 weeks (private)</td>
<td>Increase</td>
</tr>
<tr>
<td>Denmark</td>
<td>5.6 million</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>560,000</td>
<td>18 months (public), 1 month (private)</td>
<td>Increase</td>
</tr>
<tr>
<td>England and Wales</td>
<td>56 million</td>
<td>138</td>
<td>138</td>
<td>Private clinics also exist*</td>
<td>405,797</td>
<td>4-5 months</td>
<td>Increase</td>
</tr>
<tr>
<td>France</td>
<td>65 million</td>
<td>81</td>
<td>78</td>
<td>3</td>
<td>802,469</td>
<td>1.5 months</td>
<td>Increase</td>
</tr>
<tr>
<td>Israel</td>
<td>8 million</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>727,000</td>
<td>3 months (mean)</td>
<td>Increase</td>
</tr>
<tr>
<td>Netherlands</td>
<td>17 million</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>2,438,571</td>
<td>2.5 months</td>
<td>Increase</td>
</tr>
<tr>
<td>New Zealand</td>
<td>4.4 million</td>
<td>10</td>
<td>10</td>
<td>Private clinics also exist*</td>
<td>440,000</td>
<td>4 months</td>
<td>Increase</td>
</tr>
<tr>
<td>Spain</td>
<td>46 million</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>7,666,666</td>
<td>3 months (mean)</td>
<td>Increase</td>
</tr>
<tr>
<td>Sweden</td>
<td>9.5 million</td>
<td>28</td>
<td>23</td>
<td>34-5</td>
<td>339,283</td>
<td>1.5 months (median)</td>
<td>Increase</td>
</tr>
<tr>
<td>United States (non-VHA†)</td>
<td>292 million</td>
<td>90 (est.)</td>
<td>0</td>
<td>90</td>
<td>3,244,444</td>
<td>Unknown</td>
<td>Decrease</td>
</tr>
<tr>
<td>United States (VHA†)</td>
<td>21.8 million</td>
<td>59</td>
<td>50</td>
<td>0</td>
<td>269,491</td>
<td>Varies</td>
<td>Increase</td>
</tr>
</tbody>
</table>

* No data on their numbers were available.
† Veterans Health Administration.

Note: These results were provided by pain societies or individuals within pain societies, and their exact accuracy cannot be verified. For some nations, the information that was provided was incomplete or represented national pain society estimates. Additionally, some of the individuals who were contacted did not respond, or replied that the data were unavailable. Finally, definitions of “interdisciplinary pain management” clearly vary between nations, although efforts were made to identify the number of programs that involve a minimum of a physician, a mental health professional, and a physiotherapist. Accordingly, the data represent estimates of access to interdisciplinary care for some nations.
Safe use of opioids in hospitals

1970
1975
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1973
Under-treatment of Inpatients

1980
NEJM
Addiction Rare With Narcotics

1986 – 87
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2000
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• US Congress-Pain Relief Promotion Act

2010 NEJM
• "A Flood of Opioids, A Rising Tide of Deaths"
• Opioid analgesics noted to be responsible for majority of drug overdoses

2012
JCAHCO Sentinel Event Warning on Dangers of Opioids in Hospitals
2010 Cost of Pain in US: $560-$635 billion

- Direct Health Care Costs
  - $261 to $300 billion

- Compared to a person without pain
  - $4,475 vs. $12,201 per year

- Heart Disease
  - $309 billion

- Cancer
  - $243 billion

- Diabetes
  - $188 billion

2011 IOM Consensus Statement: Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. www.iom.edu
• Delaware ranked #2 (per 100 persons) for long acting/extended release
  – 21.7%

• #1 for high dose (>100mg oral morphine) opioid pain relievers
  – 8.8%
Delaware Opioid Treatment Admissions

- **2005**: Number of admissions
- **2008**: Number of admissions
- **2011**: Number of admissions

The chart shows an increase in opioid treatment admissions from 2005 to 2011.
What do we do for back pain?

- Imaging
- Meds: Opioids et. al.
- PT/OT
- Specialist Referral
  - Pain
  - Neurosurgery
  - Psych
What do we do for back pain?

EXHIBIT 5
Annual Imaging Costs Per Health Plan Enrollee, By Anatomic Area, 1997–2006

Dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>CNS/spine (CAG 12%)</th>
<th>Cardiac/chest (CAG 9%)</th>
<th>Abdomen (CAG 6%)</th>
<th>Extremity (CAG 8%)</th>
<th>Breast (CAG 3%)</th>
<th>Vascular (CAG 7%)</th>
<th>Obstetrical (CAG 1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1999</td>
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<td>2001</td>
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<tr>
<td>2003</td>
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<tr>
<td>2005</td>
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</tbody>
</table>

**SOURCE:** Group Health Cooperative data.

**NOTES:** Data are adjusted to a standard age distribution across all years of study. CNS is central nervous system. CAG is compound annual growth.

Smith-Bindman R et al. Health Aff 2008;27:1491-1502

- Medicare spending on inpatient surgery more than doubled from 1992-2003, Medicare spent more than $1 billion on back surgery in 2003.
- Spending for lumbar fusion, increased more than 500% from $75 million to $482 million.
- In 1992, lumbar fusion represented 14% of total spending for back surgery; by 2003, lumbar fusion accounted for 47% of spending.

What is the result of “Standard Care” for low back pain?


• Claims data from over 550,000 patients between 2000 and 2005.

• Patients were stratified by opioid use duration and dose (in morphine equivalents).

• Across the board, acute use (<=90 days) or chronic use (>90 days), had increased odds of developing opioid abuse and dependence.

• Acute use was associated with a 3-fold increase in the likelihood of developing opioid abuse and dependence regardless of dose.

• However for chronic use, the likelihood was more pronounced with odds ratios of ~15, 28, and 122 for low, medium and high dose opioids, respectively.
The effects of chronic opioid administration on analgesia and respiratory response in rhesus monkeys. The animals were studied under baseline conditions, then after receiving two levels of opioid dosing for 4 weeks each, and finally after abstinence. After each treatment course, they were challenged with various doses of morphine, and analgesic and respiratory responses were assessed. This mimics the clinical setting of a patient receiving chronic opioid who is administered morphine in the perioperative period. Analgesic responses were studied as tail withdrawal latency and reported as percentage of maximum possible effect (MPE); ventilator responses were reported as minute ventilation ($V_E$) and reported as percent of control. The results show development of reversible tolerance to the analgesic effects of opioids (A), but no tolerance development to the respiratory effects (B). Modified from Paronis and Woods. J Pharmacol Exp Ther 1997; 282:355–62.6

**Figure Legend:**
The effects of chronic opioid administration on analgesia and respiratory response in rhesus monkeys. The animals were studied under baseline conditions, then after receiving two levels of opioid dosing for 4 weeks each, and finally after abstinence. After each treatment course, they were challenged with various doses of morphine, and analgesic and respiratory responses were assessed. This mimics the clinical setting of a patient receiving chronic opioid who is administered morphine in the perioperative period. Analgesic responses were studied as tail withdrawal latency and reported as percentage of maximum possible effect (MPE); ventilator responses were reported as minute ventilation ($V_E$) and reported as percent of control. The results show development of reversible tolerance to the analgesic effects of opioids (A), but no tolerance development to the respiratory effects (B). Modified from Paronis and Woods. J Pharmacol Exp Ther 1997; 282:355–62.6

School of Medicine & Health Sciences

Figure Legend:
Despite Tolerance, Opioids Suppress Ventilation

Figure 3. Incidence, severity, and duration of hypoxemia after opioid injection. Black diamonds represent hypoxemia after heroin injection in 16 subjects, gray circles represent hypoxemia after methadone injection in 9 subjects. Subjects contribute up to three data points (one for each range of hypoxemia severity).

Robert Stoermer, Juergen Drewe, Kenneth M Dursteler-Mac Farland, Christoph Hock, Franz Mueller-Spahn, Dieter Ladewig, Rudolf Stohler, Ralph Mager

Safety of injectable opioid maintenance treatment for heroin dependence


http://dx.doi.org/10.1016/S0006-3223(03)00290-7
# High-inspired oxygen concentration further impairs opioid-induced respiratory depression

**Table 1**

Effect of remifentanil on respiratory variables. Values are mean (SD).

*P*<0.01 vs baseline.  #P<0.05 vs normoxic baseline. Baseline=1 min average before drug infusion. Peak effect=1 min average of data with lowest value after drug infusion. N, normoxia; H, hyperoxia

<table>
<thead>
<tr>
<th></th>
<th>Normoxia</th>
<th>Hyperoxia</th>
<th>Peak effect H vs N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ventilation (l/min)</strong></td>
<td>7.4 (1.3)</td>
<td>7.9 (1.0)</td>
<td>1.2 (1.2)*</td>
</tr>
<tr>
<td><strong>Respiratory rate (bpm)</strong></td>
<td>13.1 (2.9)</td>
<td>13.2 (3.0)</td>
<td>3.6 (4.0)*</td>
</tr>
<tr>
<td><strong>SpO₂ (%)</strong></td>
<td>98.4 (1.5)</td>
<td>99.7 (0.7)*</td>
<td>98.7 (1.0)</td>
</tr>
<tr>
<td><strong>End-tidal PCO₂ (kPa)</strong></td>
<td>5.1 (0.5)</td>
<td>5.7 (0.3)*</td>
<td>6.1 (0.6)*</td>
</tr>
</tbody>
</table>

True or False

• There is no evidence to suggest that opioids at stable doses increase the risk of fatal and/or non-fatal motor vehicle collisions.

• Thus, if a patient does NOT feel impaired or demonstrate impairment, there is no increased risk of a car accident while on a stable dose of opioids.
Do Opioids Affect Driving Ability?

• 2009 American Pain Society and American Academy of Pain Medicine Practice Guidelines

• “In the absence of signs or symptoms of impairment, there is no evidence that patients maintained on stable doses of COT (chronic opioid therapy) should be restricted from driving.”
What is the result of “Standard Care” for low back pain?

Risk Estimates and Confidence Intervals of Included Studies Assessing Relationships Between Opioid Use and Crashes.

2014 ACOEM Guidelines

Acute or chronic opioid use is not recommended for patients who perform safety-sensitive jobs.

These jobs include operating motor vehicles, other modes of transportation, forklift driving, overhead crane operation, heavy equipment operation and tasks involving high levels of cognitive function and judgment.
What is the result of “Standard Care” for low back pain?

• We have created an opioid epidemic (again)
  – More deaths from Drug Overdoses than Car Accidents
  – AND At least some Car Accidents from Opioids

• Physicians and health systems are incentivized to maximize costs

• Care coordination between healthcare professionals is limited to non-existent

• Patients continue to suffer as much or more as they would have without medical intervention
What is the result of “Standard Care” for low back pain?

- 1997-2005 average total health expenditures increased from $4,800 per year in 1997 to about $6,100 per year in 2005
  - inflation-adjusted increase of 65%

- 1997-2005 U.S. adults with spine problems reported similar or worse scores for mental health, physical functioning, work or school limitations

- From 1992-2003 %persons with chronic low back pain that impaired activity increased from 3.9% to 10.2%

• (COT = Chronic Opioid Therapy; CNCP=Chronic Non-Cancer Pain)

• Consider a trial of COT if CNCP is
  – moderate or severe,
  – having an adverse impact on function or quality of life,
  – potential therapeutic benefits outweigh or are likely to outweigh potential harms (strong recommendation, low-quality evidence).

• Before initiating COT, clinicians should conduct a history, physical examination and appropriate testing, **including an assessment of risk of substance abuse, misuse, or addiction** (strong recommendation, low-quality evidence).

• **A benefit-to-harm evaluation including** a history, physical examination, and appropriate diagnostic testing, **should be performed and documented before and on an ongoing basis during COT** (strong recommendation, low-quality evidence).
• Monitoring should include
  – documentation of pain intensity
  – level of functioning,
  – progress toward achieving therapeutic goals
  – adverse events
  – adherence to prescribed therapies (strong recommendation, low-quality evidence).

• If high risk patients or +ADRB (aberrant drug-related behaviors)
  – periodically obtain urine drug screens or other information to confirm adherence to the COT plan of care (strong recommendation, low-quality evidence).
  – **AVOID COT:** history of drug abuse, psychiatric issues, or serious aberrant drug-related behaviors UNLESS:
    • able to implement more frequent and stringent monitoring parameters. In such situations, clinicians should strongly consider consultation with a mental health or addiction specialist

• If not at high risk and no ADRB,
  – consider periodically obtaining urine drug screens or other information to confirm adherence to the COT plan of care (weak recommendation, low-quality evidence).
When to STOP OPIOIDS

- repeated aberrant drug-related behaviors or drug abuse/diversion,
- experience no progress toward meeting therapeutic goals,
- experience intolerable adverse effects (strong recommendation, low-quality evidence).
CDC warns doctors about the dangers of prescribing opioid painkillers

PRACTICES AND ACTIONS

USE NONOPIOD TREATMENT
Opioids are not first-line or routine therapy for chronic pain (Recommendation #1)

In a systematic review, opioids did not differ from nonopioid medication in pain reduction, and nonopioid medications were better tolerated, with greater improvements in physical function.

START LOW AND GO SLOW
When opioids are started, prescribe them at the lowest effective dose (Recommendation #5)

Studies show that high dosages (≥100 MME/day) are associated with 2 to 9 times the risk of overdose compared to <20 MME/day.

REVIEW PDMP
Check prescription drug monitoring program data for high dosages and prescriptions from other providers (Recommendation #9)

A study showed patients with one or more risk factors (4 or more prescribers, 4 or more pharmacies, or dosage >100 MME/day) accounted for 55% of all overdose deaths.

AVOID CONCURRENT PRESCRIBING
Avoid prescribing opioids and benzodiazepines concurrently whenever possible (Recommendation #11)

One study found concurrent prescribing to be associated with a near quadrupling of risk for overdose death compared with opioid prescription alone.

OFFER TREATMENT FOR OPIOID USE DISORDER
Offer or arrange evidence-based treatment (e.g. medication-assisted treatment and behavioral therapies) for patients with opioid use disorder (Recommendation #12)

A study showed patients prescribed high dosages of opioids long-term (>90 days) had 122 times the risk of opioid use disorder compared to patients not prescribed opioids.

1. Non-opioid therapies are preferred
2. When considering opioids establish clear treatment goals for both pain and function and plan for discontinuing
3. Discuss risks before starting and periodically during therapy
4. When initiating therapy, immediate release opioids should be prescribed over extended release forms
5. Prescribe the lowest effective dose, carefully reassess the risks in going above 50mg/day morphine equivalents (~33mg oxycodone), and avoid increasing above 90mg/day morphine equivalents (~60mg oxycodone)

6. When using opioids for acute pain, 3 days or less is often sufficient: more than 7 days is rarely needed
7. Reassess the benefits/harms every 1-4 weeks after initiation/dose escalation and every 3 months for continued therapy. If benefits do not outweigh harms, taper and discontinue.

8. Before initiating and on an ongoing basis establish risk factors for opioid related harms

9. Review PDMP when initiating and at least every 3 months thereafter.
10. Urine Drug Screening should be performed on initiation of therapy and at least annually thereafter.

11. Avoid Opioids and Benzodiazepines.

12. Offer evidence based treatment for patients with an opioid use disorder (usually methadone or buprenorphine).
Multiple Provider Episode rates per 100,000 residents by Drug Class, Delaware

Multiple provider episode rate is defined as use of 5 or more prescribers and 5 or more pharmacies within 3 months and is based on the current 3 months. Rates are calculated by drug class for those receiving a prescription in the drug class.

Source: Delaware PMP (Department of State) as provided by Brandeis University
Multiple provider episode rate is defined as use of 5 or more prescribers and 5 or more pharmacies within 6 months and is based on the current 6 months. Rates are calculated by drug class for those receiving a prescription in the drug class. The annual rate is calculated as the average half-year rate for the specified year.

Source, Delaware PMP (Department of State) as provided by Brandeis University

Table 4.9
How do you feel now?
Open a “Pain Clinic”

- The problem is too big to be solved by a pain clinic or consult service
- A comprehensive pain program focusing on population health
- This would include access to telemedicine and home visits, support for primary care providers, non-medical multimodal physical and behavioral therapy as well as well as safe and effective non-opioid pharmacologic therapy
Open a “Pain Clinic”
Predictors of chronic pain 12 months after serious injury

- Not working at the time of injury
- Poor pre-injury health
- Compensable injury
- High beliefs in the need for medication
- Lower pain control beliefs
- Pain severity at the time of injury
“The mind is its own place, and in itself can make a heaven of hell.”

John Milton, *Paradise Lost*
The NMDA Receptor

• Plays a central role in both central and peripheral sensitization
  – Central/Peripheral sensitization also goes by the terms “kindling” and “wind-up”
• In the 1980’s injection of NMDA antagonists into spinal fluid reduced pain transmission in c-fibers
• Hundreds of papers now published on the anti-hyperalgesic and anti-depressant effects of NMDA receptor antagonists
NMDA Receptor

- **NMDA is an excitatory neurotransmitter, that is a Ca2+ ion channel**
- **Must be co-bound with glycine and glutamate**
- **Blocked by magnesium binding**
- **Channel only opened by simultaneous agonist binding and depolarization**

Figure 2. Schematic illustration of the role of NMDARs in central sensitization. A: Normal synaptic transmission. NMDARs do not participate in normal synaptic transmission because of their voltage-dependent block by extracellular magnesium. B: Postsynaptic depolarization and removal of the magnesium block of NMDARs. A constant drive of noxious afferent input after tissue damage depolarizes membrane strong enough to permit participation of NMDARs in synaptic transmission. Nociceptive input to the dorsal horn is further increased via positive feedback through presynaptic NMDARs. C: Posttranslational changes of NMDARs. Calcium entry causes activation of protein kinases and results in phosphorylation of NMDARs. As a consequence, the magnesium block at resting membrane potentials is decreased and channel opening time is prolonged. AMPAR = [alpha]-amino-3-hydroxy-5-methyl-4-isoxasolepropionic acid receptor; NK1R = neurokinin 1 receptor; NMDAR = N-methyl-d-aspartate receptor; VSCC = voltage-sensitive calcium channel; Glu = glutamate; SP = substance P; PLC = phospholipase C; PKC = protein kinase C; Src = protein tyrosine kinase; P = phosphate group.
Short treatment of ketamine triggers new synaptic activity between the spine and the pre-frontal cortex in rats.

This provides a scientific mechanism for the rapid and sustained anti-depressant effects of ketamine.

This same pathway, that is pathologically atrophic in depression and stress, also inhibits pain.

Li, N, et. al. MTOR-dependent synapse formation underlies the rapid antidepressant effects of NMDA antagonists. Science: 2009:329,(5994)959.
Clinical Effectiveness of Ketamine

Ketamine produces effective and long-term pain relief in patients with Complex Regional Pain Syndrome Type 1. Sigtermans, Marnix; van Hilten, Jacobus; Bauer, Martin; Arbous, Sesmu; Marinus, Johan; Sarton, Elise; Dahan, Albert

DOI: 10.1016/j.pain.2009.06.023

Fig. 3. (A) Weekly pain scores observed in the ketamine and placebo treatment groups (n = 30 in each group). S(+)-ketamine treatment had a significantly more favorable effect on pain scores than placebo treatment with a main effect of P n = 30). Values are means +/- SEM.
Breif Psychological Interventions Can Be Effective

- Single Center retrospective analysis, examining chronic pain high-utilizers (>4 ED visits in a month)
- Intervention: 15-30 minute psychological intervention
  - Non-medical coping strategies
  - Importance in using PCP
  - Access to Free Pain Support Group
  - Follow-up call encouraging them to attend pain support group

Cost Savings By Targeting High Utilizers

- Six 30 minute physician visits over 1 year
- An average of three 30 minute case management visits.
- Dramatic reduction in cost and ED utilization

Waller, R.C. 151 Biopsychosocial Intervention of High Frequency Emergency Department Utilizers. Annals of Emergency Medicine, Volume 58, Issue 4, S228
Telemedicine

Project ECHO: A Revolution in Medical Education and Care Delivery

Project ECHO is a lifelong learning and guided practice model that revolutionizes medical education and exponentially increases workforce capacity to provide best-practice specialty care and reduce health disparities. The heart of the ECHO model™ is its hub-and-spoke knowledge-sharing networks, led by expert teams who use multi-point videoconferencing to conduct virtual clinics with community providers. In this way, primary care doctors, nurses, and other clinicians learn to provide excellent specialty care to patients in their own communities.

- People need access to specialty care for their complex health conditions.
- There aren’t enough specialists to treat everyone who needs care, especially in rural and underserved communities.
- ECHO trains primary care clinicians to provide specialty care services. This means more people can get the care they need.
- Patients get the right care, in the right place, at the right time. This improves outcomes and reduces costs.

- Project ECHO, a program from University of NM, to help primary care offices care for patients with complex conditions including chronic pain

http://echo.unm.edu/nm-teleecho-clinics/
Future Pain Program

• Support Patients and Primary Care Providers

• Sustainable systems to enable patient centered care, operational efficiency, compliance

• More: Healthy choices, access, and psychosocial support

• Less: Opioids/MRI’s/ED visits
Thank You!