

Digital Hope: Design and the Opioid Crisis

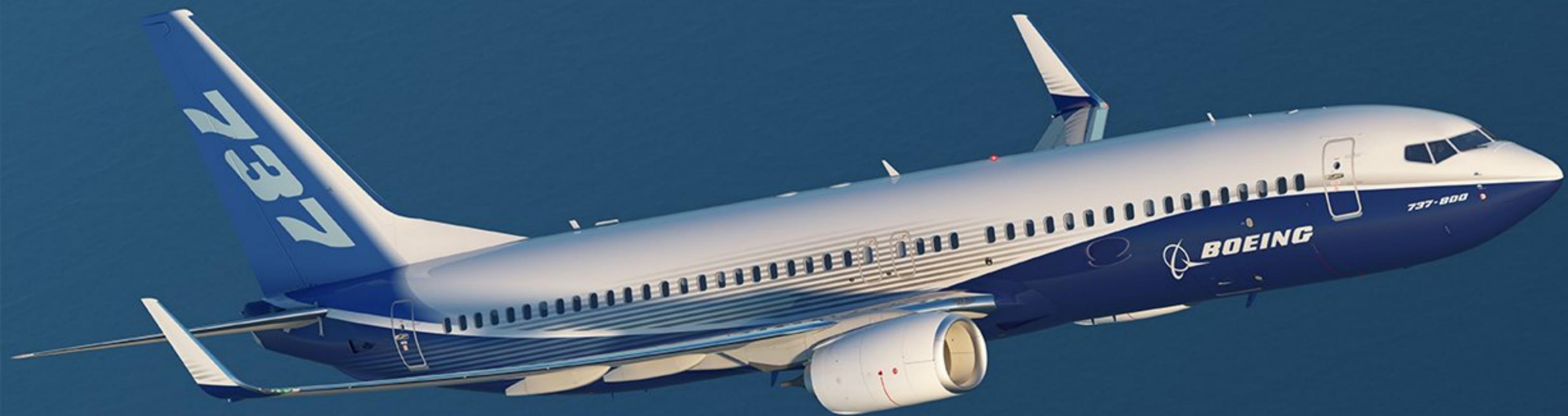
A discussion on the technologies, legislative barriers and challenges:

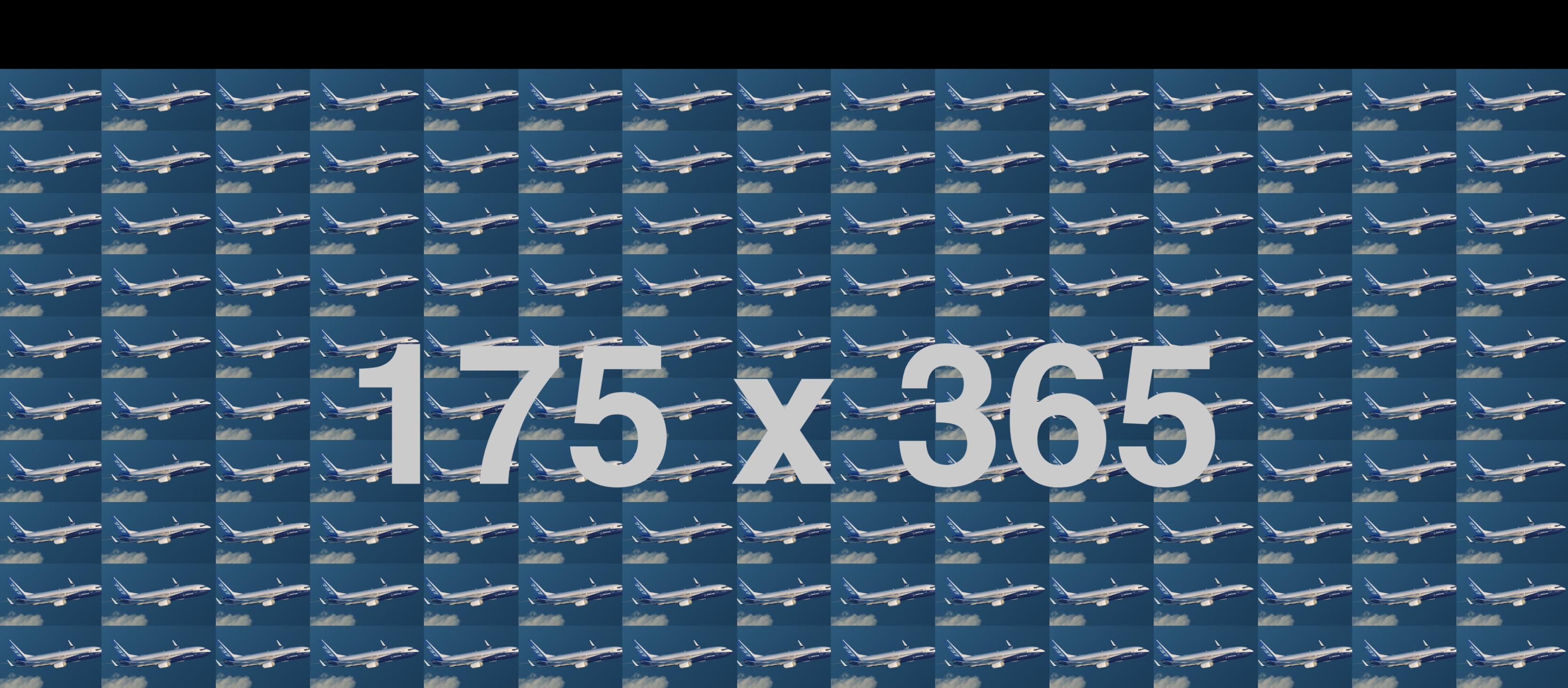
- Overview of Opioids in America
- History and Contributing Factors
- Recent Evolution and Escalation
 - Legislation and Intervention
- Current Technology and Design Solutions
 - Potential Future-Scape

“A great design process embeds the optimal experience into the product and service”

~ Charles Austen Angell FIDSA, Address to USPTO

Today, more than 175 Americans will die after overdosing on opioids.
The typical Boeing 747 carries 162-189 passengers.





175 x 365

The toll in the coming year could be as high as 63,875

2X



2X



Overview of Opioids in America

What is the crisis?

Opioids versus Opiates

Economic Impact

Scope

Human Cost

1

Opiates

Opiates are chemical compounds that are extracted or refined from natural plant matter (poppy sap and fibers).

- **Opium**
- **Morphine**
- **Codeine**
- **Heroin**

Opioids

Opioids are chemical compounds that generally are not derived from natural plant matter. Most opioids are "made in the lab" or "synthesized."

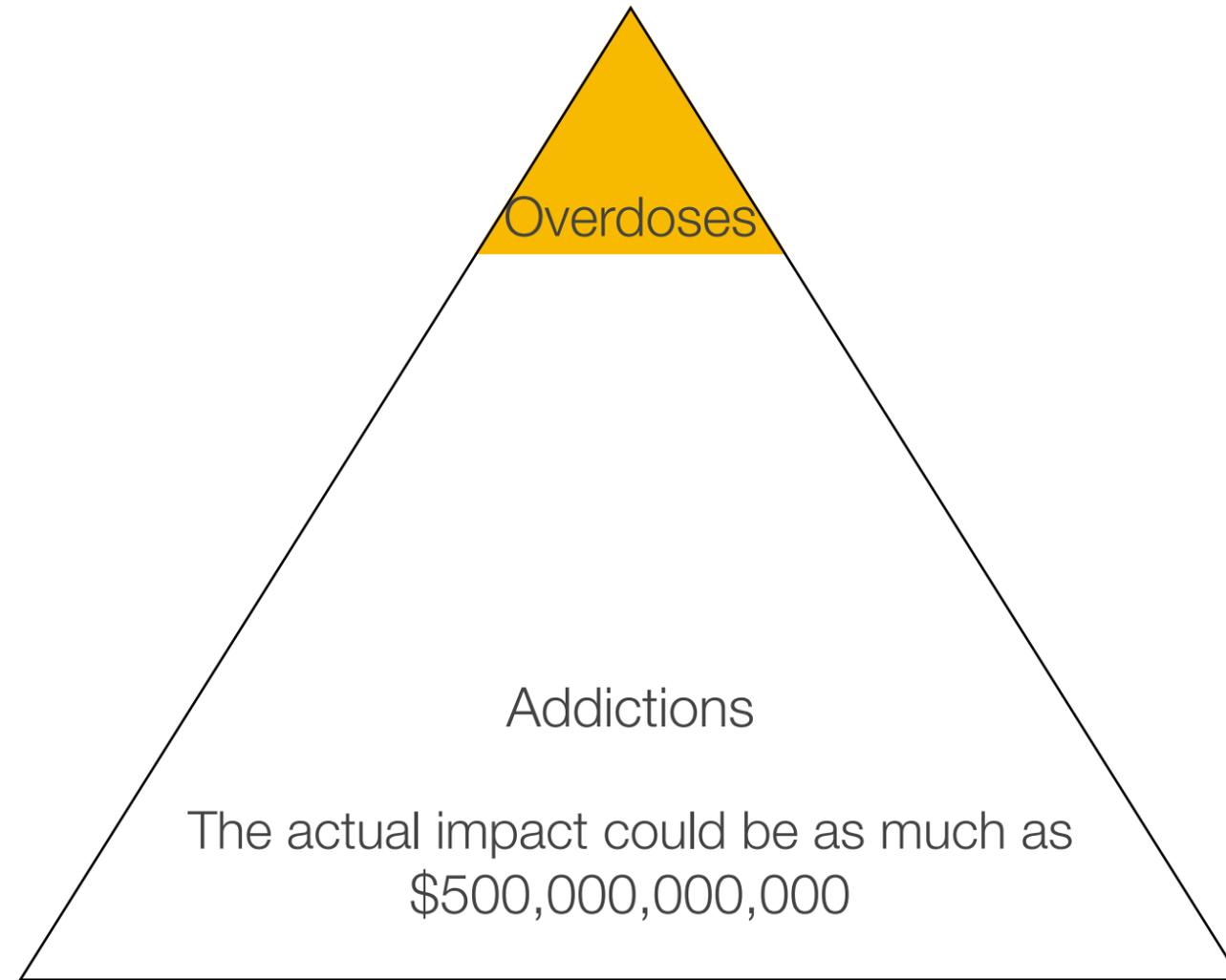
However:

Our language is evolving: lately many people, especially journalists and politicians, are tending to refer to all of these drugs as "opioids."

- **Dextromethorphan (U.S. over the counter, e.g., NyQuil, Robitussin, TheraFlu, Vicks)**
- **Dextropropoxyphene (e.g., Darvocet-N, Darvon)**
- **Loperamide (e.g., Imodium)**
- **Hydrocodone (e.g., Vicodin)**
- **Oxycodone (e.g., Oxycontin, Percocet)**
- **Oxymorphone (e.g., Opana)**
- **Meperidine (e.g., Demerol)**
- **Methadone (e.g., Dolophine)**
- **Fentanyl/fentanil (e.g., Ultiva, Sublimaze, Duragesic patch)**
- **Carfentanyl/carfentanil (e.g., Wildnil, for veterinary use)**

“In 2015, the U.S. spent 2.8% of its GDP on the opioid crisis.”

~ The White House Council of Economic Advisers (CEA)



The Centers for Disease Control and Prevention estimates that the total "economic burden" of prescription opioid misuse alone in the United States is \$78.5 billion a year, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement.

“The amount of opioids prescribed in the U.S. is still too high, with too many opioid prescriptions for too many days at too high a dosage.”

~ Anne Schuchat, M.D. 2017

Acting director of the Centers for Disease Control and Prevention.

- ~ 25% percent of patients prescribed opioids misuse them.
- ~ 10% percent develop an opioid use disorder.
- ~ 30% of people who misuse prescription opioids transition to illegal narcotics.
- ~ 75% of people who use heroin first misused prescription opioids.

History and contributing factors

How did we get here?

Latrogenic - byproduct of medical treatment

Anonymous Crime - untracked acute user, not chronic

Good Intentions, unintended outcomes

Medical Industry: Illness, Injury, and Pain

Heroin was once legal in the the United States.



All legal sales of Heroin were banned in 1923.

This is considered to be the kick-off point for accelerated growth in the illegal drug trade.

Today, roughly 430-450 tons of heroin and other opioid drugs flow into the global market every year.

75% Heroin addicts today started with prescription Opioids.

Stigma to taking medication drastically lowered.

Recent evolution and escalation

From the 90's until now.

Health system change 1990-2000 to cost-driven health care.

Pharmaceutical companies assured us that Opioids were less addictive.

Doctors started being evaluated on patient satisfaction.

2001: JCAHO institutes 1st national standards requiring pain assessment & control in all hospitals & nursing homes.

The report + subsequent media attention gains traction, Doctors begin to prescribe narcotics in record numbers.

2013: SAMSHA reports that more than 6.5 million Americans above the age of 11 used prescription drugs for non-medical reasons in 2013.

2000: Joint Commission on the Accreditation of Healthcare Organizations, (JCAHO), the basic national health care review board, releases scathing report on the under treatment of pain by doctors.

Increased accessibility and availability leads to prescription narcotic use at unprecedented levels.

2015: President Obama announces a plan to combat opioid epidemic in partnership with multiple federal agencies & professional medical associations.



Doctors evaluated on basis of patient satisfaction, ergo pain management.

Opioids cheaper than than surgery.

Unsecured but “controlled” substances?

220,000,000 prescriptions x 30-40 doses per prescription x 10 years.

77,000,000,000

67-92% of prescriptions are fully taken.

% of returned drugs is negligible.

Between 8-33% of 77,000,000,000 narcotics in uncontrolled circulation.

A measurable % of population can be addicted in four days of use.

Due to the highly addictive nature of Opioids, those who take them to deal with chronic pain may find themselves becoming dependent on them.

Those who use Opioids for acute conditions may leave a percentage of their prescription unused and accessible (i.e. medicine cabinet) for abuse by others.

More frequent use causes the body to become used to having Opioids in the system.

In some communities drug testing is being dropped because too many people have drugs in their system.

Opioids could be the issue that drives medical compliance.

Legislation and Intervention

Broad variation

“Track and Trace”

The Drug Quality and Security Act (DQSA), was enacted by Congress on November 27, 2013.

Legislation tends to ping pong between treatment and enforcement, but the solution is in public health policy, but current legislation is primarily focused on therapy.

Addressing the situation requires multiyear plans rather than single year spikes in budgets.

Florida passed legislation this month that if doctor thinks there is an overdose danger they must include NARCAN.

4

Challenge
Problem



The U.S. Department of Health and Human Services (HHS) five major priorities:

1. improving access to treatment and recovery services
2. promoting use of overdose-reversing drugs
3. strengthening our understanding of the epidemic through better public health surveillance
4. providing support for cutting-edge research on pain and addiction
5. advancing better practices for pain management

The National Institutes of Health (NIH), a component of HHS, is the nation's leading medical research agency and categorizes the challenge with 3 calls to action:

1. safe, effective, non-addictive strategies to manage chronic pain
2. new, innovative medications and technologies to treat opioid use disorders
3. improved overdose prevention and reversal interventions to save lives and support recovery

Politico article: Of the 500,000,000 HHS gave to states for Opioid treatment, states are giving back 375,000,000 unspent.



Balance the focus...

Current technology and design solutions

Managing Opioids Differently
New Classes of Medication
Different medical approaches to Pain
Alternate Technology for Pain

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Managing Opioids Differently

Overall:

Current tech activity is 1% and 90% of that activity is apps.

Tracking:

Database PDMPs prescription drug monitoring program,

All opioids are entered into the PDMP database by the state and/or pharmacies

However there is only 13% compliance in Oregon. (This is the same issue as we've seen with the 15 yr EMR challenge.)

Smart caps

Electronic Pill boxes

Monitoring:

Proteus

Apps (user driven)

Controlled Return

IOT play

Treating Pain Differently

Massage

Acupuncture

Mindfulness Training

Meditation

Discipline

New classes of Medication:

Cortico Steroids (masking pain)

Antidepressants (depression, co-morbidity and perceived pain state)

NSAIDS (Non-steroidal anti-inflammatory drugs) as effective in patient reported side by side VA study for Pain (non-addictive)

November 2016 FDA drug packaging guidelines were updated. The FDA released their guidelines for packaging for opioids and controlled substance, which eliminated entire classes of devices such as pill bottle with pill caps, self stock dispensers, etc.

Example: Curadite

Proactive Medication Adherence

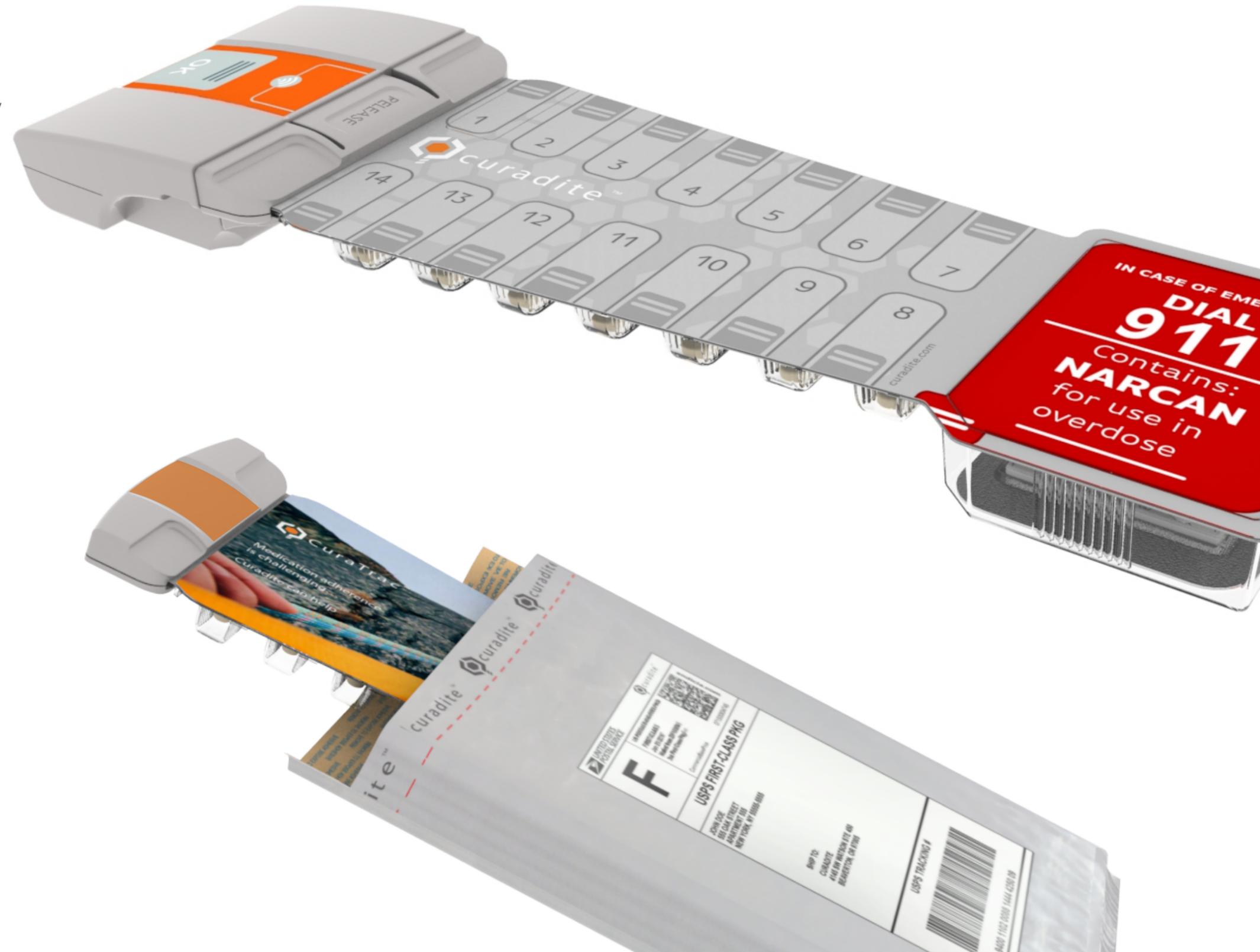
Curadite empowers patients, clinicians, caregivers and family members to work together with the support of our intelligently linked, proactive medication adherence platform. Charles Austen Angell and Modern Edge have collaborated with Curadite across the spectrum of user research, UX/UI, design and engineering to create a nimble platform and family of products addressing adherence and support issues.

Specific to the Opioid crisis, Curadite has developed a scalable opioid management platform that combines cellular-enabled packaging with usage reminders/messages, education, and incentives. With the design of custom packaging, Curadite provides increased access to Narcan, the lifesaving, non-addictive drug that reverses opioid overdose.

According to Sarah Wakeman, MD, medical director of the Substance Use Disorder Initiative and the Addiction Consult Team at Boston's Massachusetts General Hospital, "Co-prescribing naloxone is important to ensure all people being prescribed opioids at risk for overdose have this lifesaving medication at home, similar to how we might think about co-prescribing glucagon to someone with insulin-dependent diabetes."

The system is currently under review for a deployment study in Oregon, California Washington, Mississippi by and under review by Senators and Congresspersons, Fienstien, Merkley Murray, Shelby, Cockrin, and Walden

It has been endorsed by the Oregon Health Authority



Example: Meagan Medical

Implanted Pain Management and Therapy

Meagan Medical believes that by offering alternatives to Opioids and NSAIDS they can significantly reduce morbidity and costs.

Modern Edge is collaborating with Meagan Medical and their partners to enhance the design and usability of this uniquely improved technology.

The Meagan Medical team is committed to vigorously pursuing research and collaborative relationships in the areas of pain control, spinal cord stimulation and a variety of other neurological applications of electro-stimulation therapy.

<http://www.meaganmedical.com/>



Potential Future Scape

Video

Immediate Future:

Amber pill bottles and smart caps to fade for opioid and controlled medications

Dispensers will be rethought due to supply potentially being uncontrolled

Change packaging to increase accountability

Limiting prescriptions will be common

HMO in good position for their population, look for other group accountability mechanisms

Future-Scape:

1.) Track and Trace through to Disposal

2.) Secure delivery and pick up home or pharmacy or secure Amazon kiosk

3.) Spectrum of pain treatments with opioid and non-opioid components common even with individual patients

"Designers are part of a creative community which exists with one binding common belief: It is within us to make tomorrow better."

- Charles Austen Angell, Seattle International Design Conference 2015

Design
Engineering
Ethnographic Research
Strategy + Service Design
Brand



Modern Edge, Inc. is a strategic design firm. We create iconic products and innovative brand experiences for our clients.

We integrate imagination with business intelligence through a robust development process.

We're a team of enthusiasts + craftsmen; designers, technicians, engineers, researchers, modelers, managers with passion for innovation, authenticity and generating dynamic interactions.

A close-up, high-resolution photograph of a person's eye, looking slightly to the right. The eye is light-colored, possibly blue or green, with dark, well-defined eyelashes. The skin around the eye is fair and shows fine texture. The lighting is soft, creating a natural and intimate feel. Overlaid on the lower part of the eye is the text "We put the user at the center of the design experience >>".

We put the user at the center of the design experience >>



EASTMAN



3M

Gillette



Johnson & Johnson



P&G

QUALCOMM



tervis

Sunbeam



**SONIVATE
MEDICAL**



donuts
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CURADITE

NASA

US DOD

US AIRFORCE

US ARMY

THANK YOU