Opioid Overdose Prevention

Responding to a crisis

praxis

MA Department of Public Health
BSAS
Bureau of Substance Addiction Services
Prevent • Treat • Recover • For Life

Center for Social Innovation

Some Opiate History

- **3400 BC** – First evidence to cultivation and use of opiate poppy plants in Mesopotamia. Sumerians referred to it as the “joy plant”
- **357 BC** – Hippocrates “The Father of Medicine” documents the usefulness of opiates to treat a variety of internal diseases
- **1806** a German chemist introduces a new derivative of opium which he named after the Greek god of dreams, Morpheus.
- **Morphine** quickly becomes a mainstay in medicine and was used widely to treat a variety of conditions including: pain, anxiety, respiratory problems, consumption and *women’s ailments*.

Meanwhile, right here in the U.S.

- Morphine used widely to treat pain for battle injuries during the Civil War
- Many men returned home from the war with an addiction to morphine, known as “soldier’s disease”
- Because of the rampant use of morphine and the numbers of people who reported being addicted, a safer alternative to morphine was sought

Introduction of Heroin 1893

- 15 times more powerful painkiller than Morphine (now formulated to be about 20-30 times more powerful than Morphine)
- *Claimed to be safe from addiction*
- Like its predecessor Morphine, Heroin swept the medical market

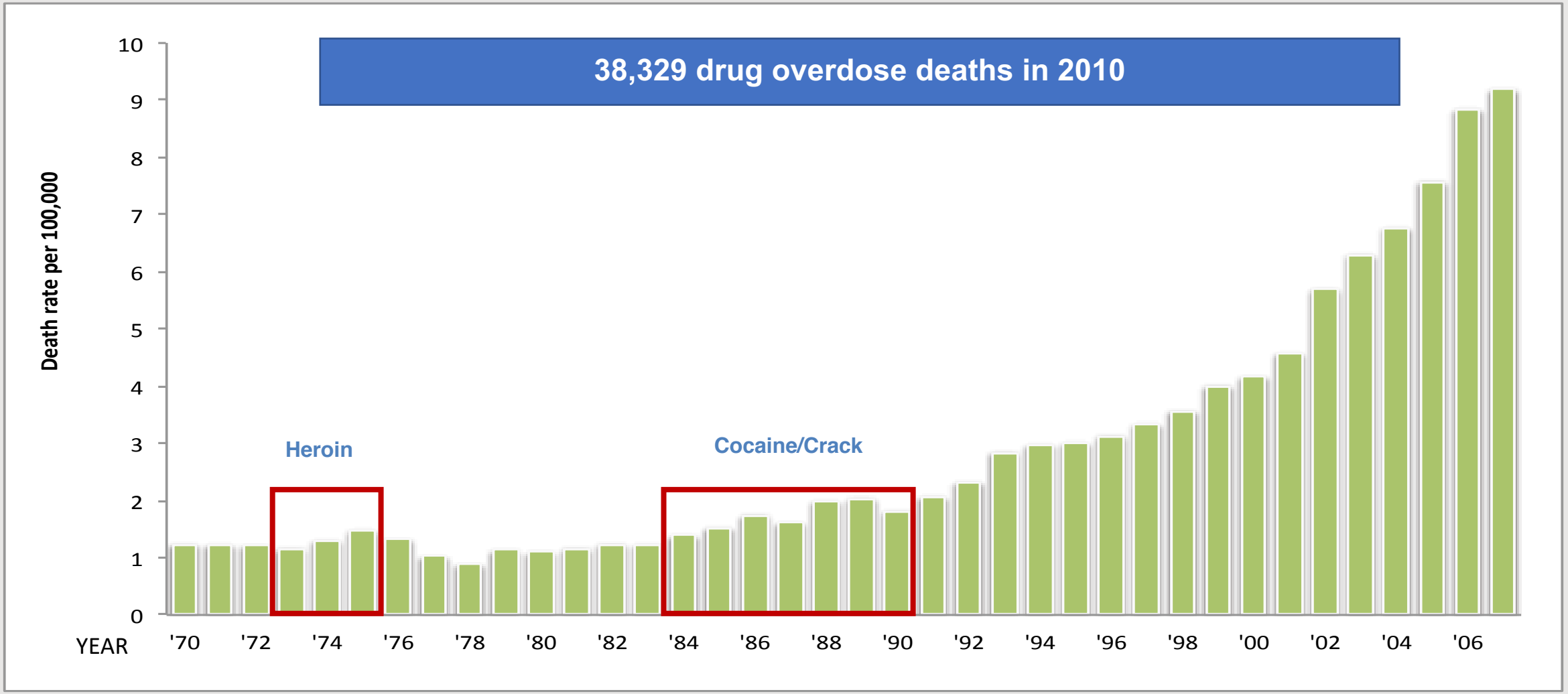
Direct Marketing to Public

Main Opioid Effects

- Pain blocker/Euphoric effects
- Cough suppressant
- Constipation

In 1916 German scientists formulate **oxycodone** as a safe painkilling option to heroin which was now no longer in production.

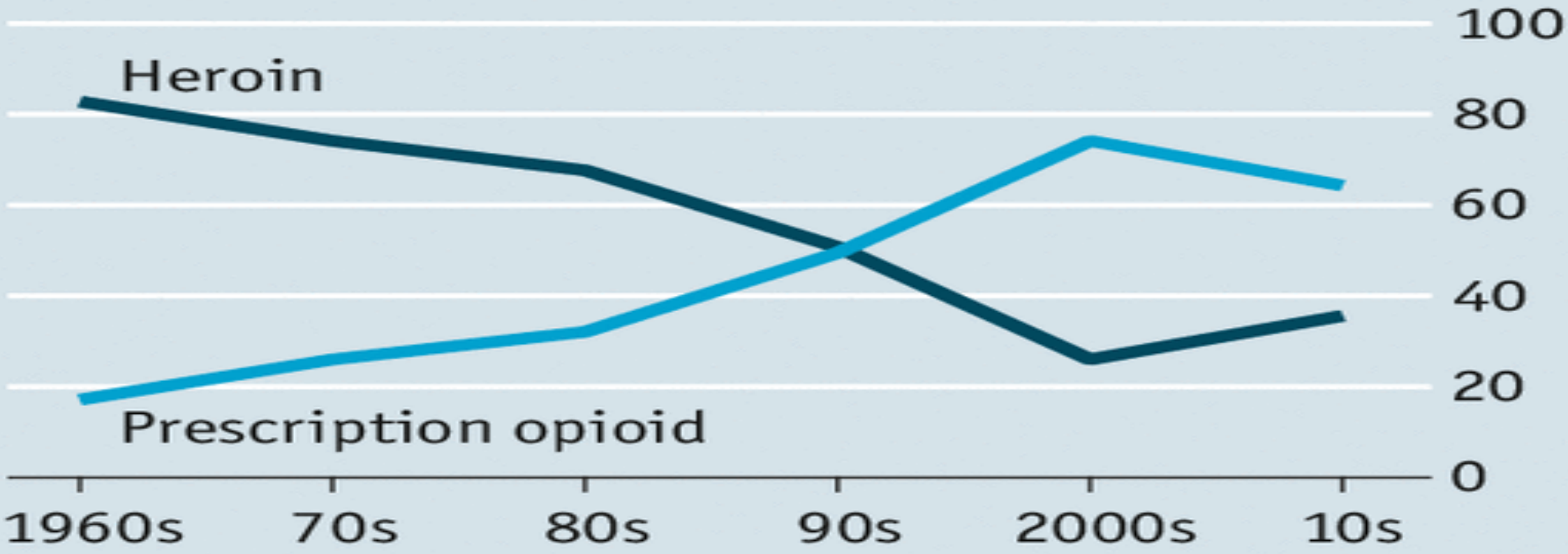
Unintentional Drug Overdose Deaths United States, 1970–2007



New means, same end

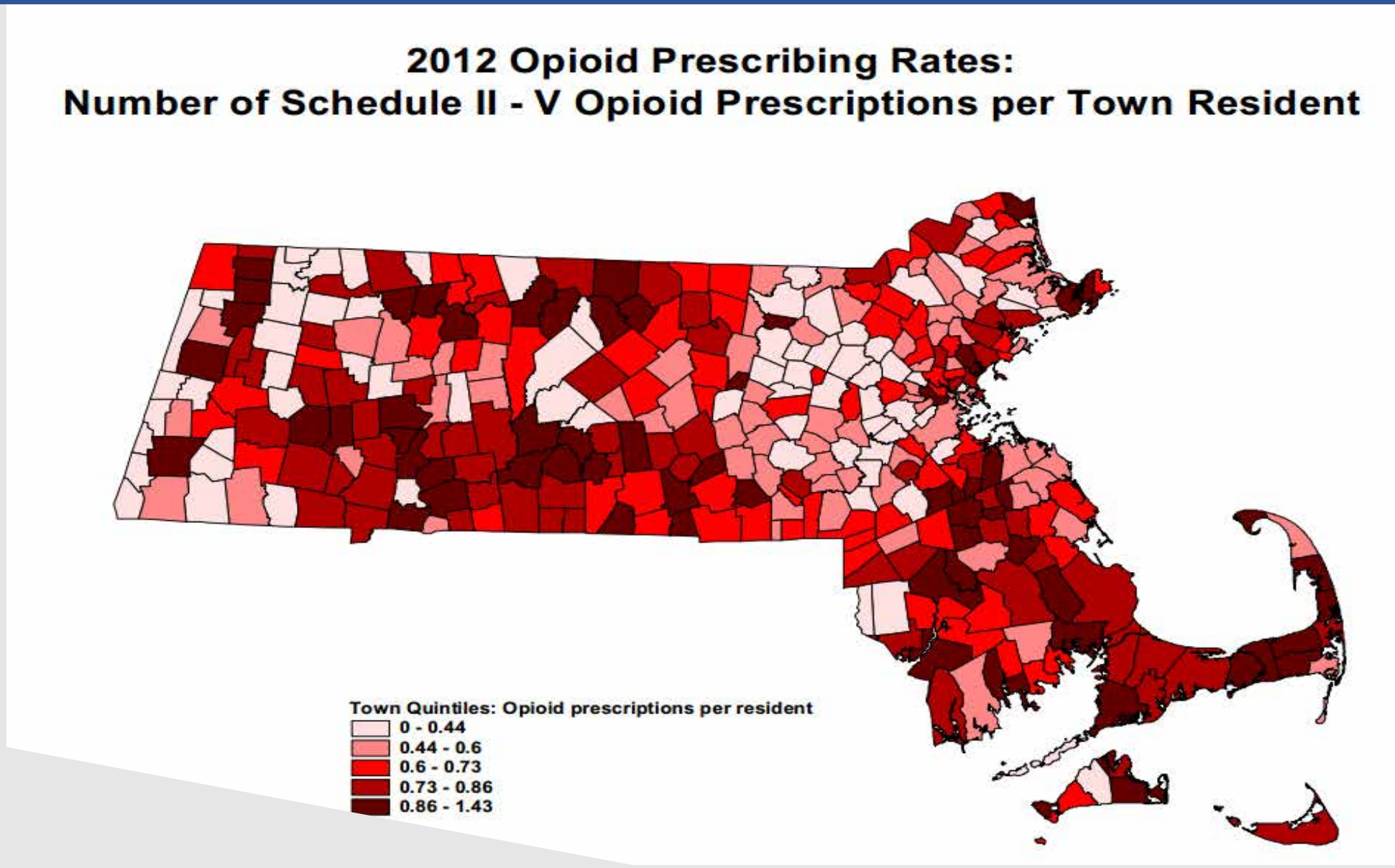
Heroin-dependent sample that used heroin or a prescription opioid as their first opioid of abuse

% of total

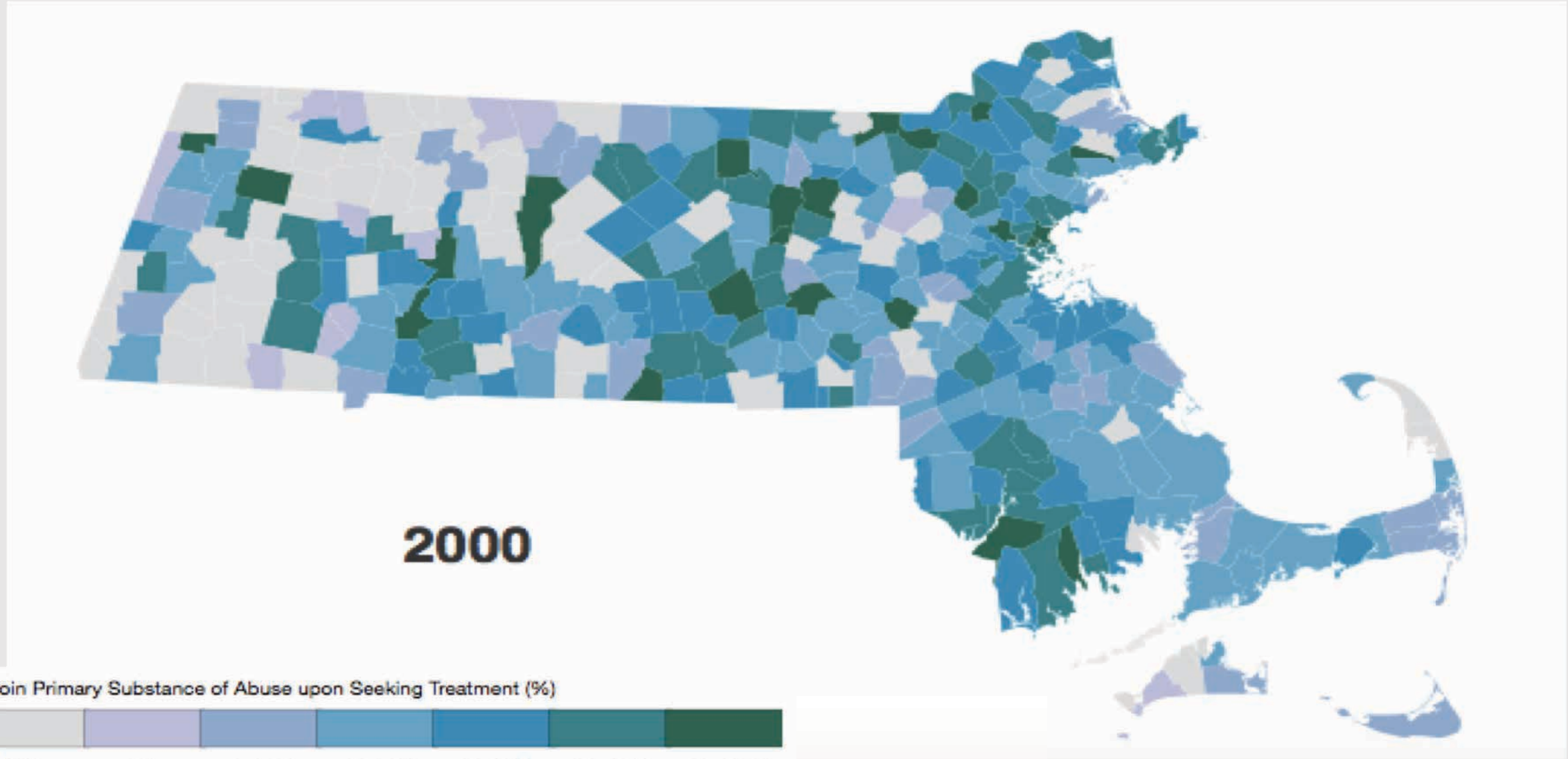


Source: *JAMA Psychiatry*

Right Here at Home



Percentage of Patients in Treatment Listing Heroin as their Primary Substance of Use



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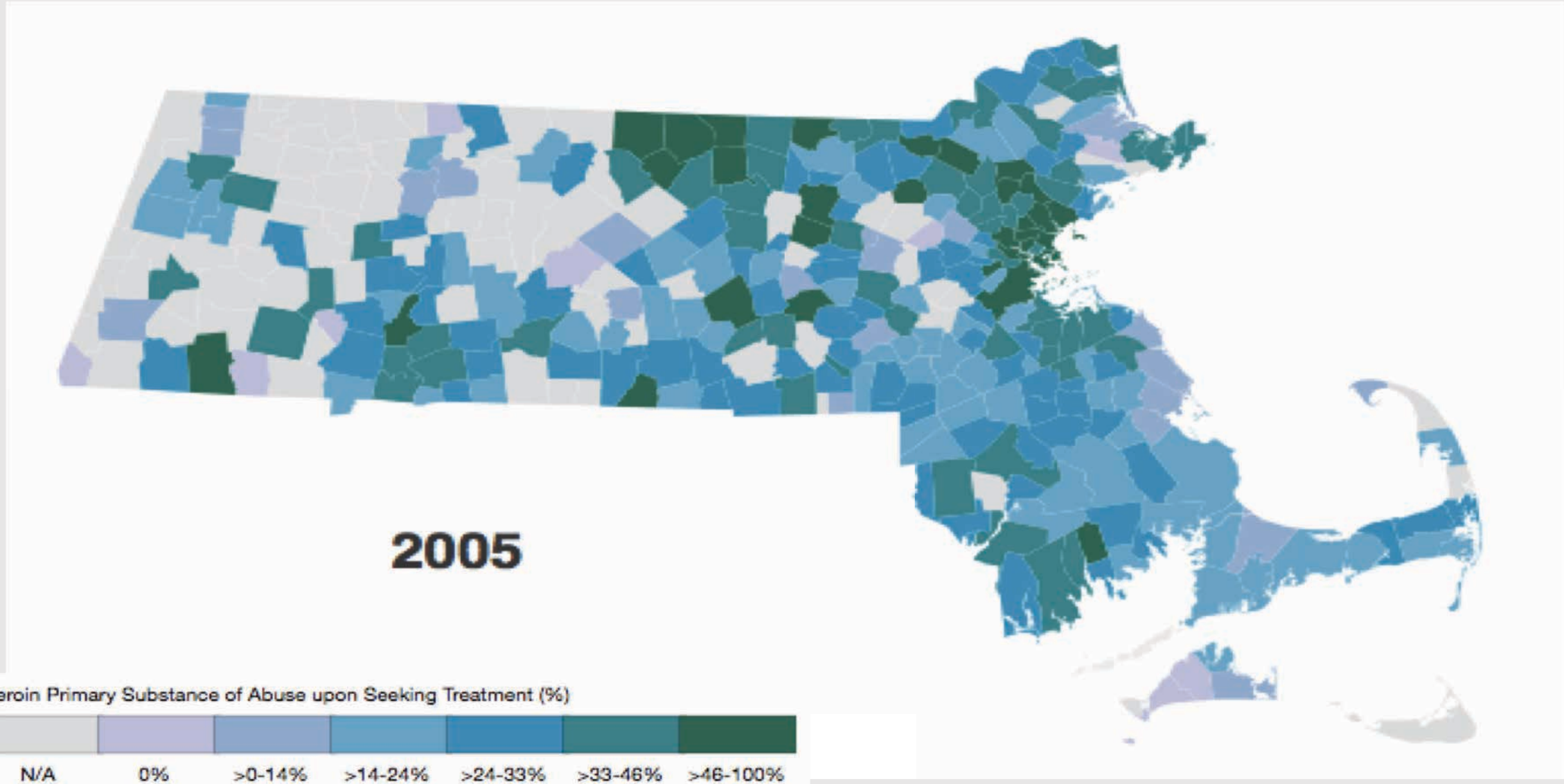

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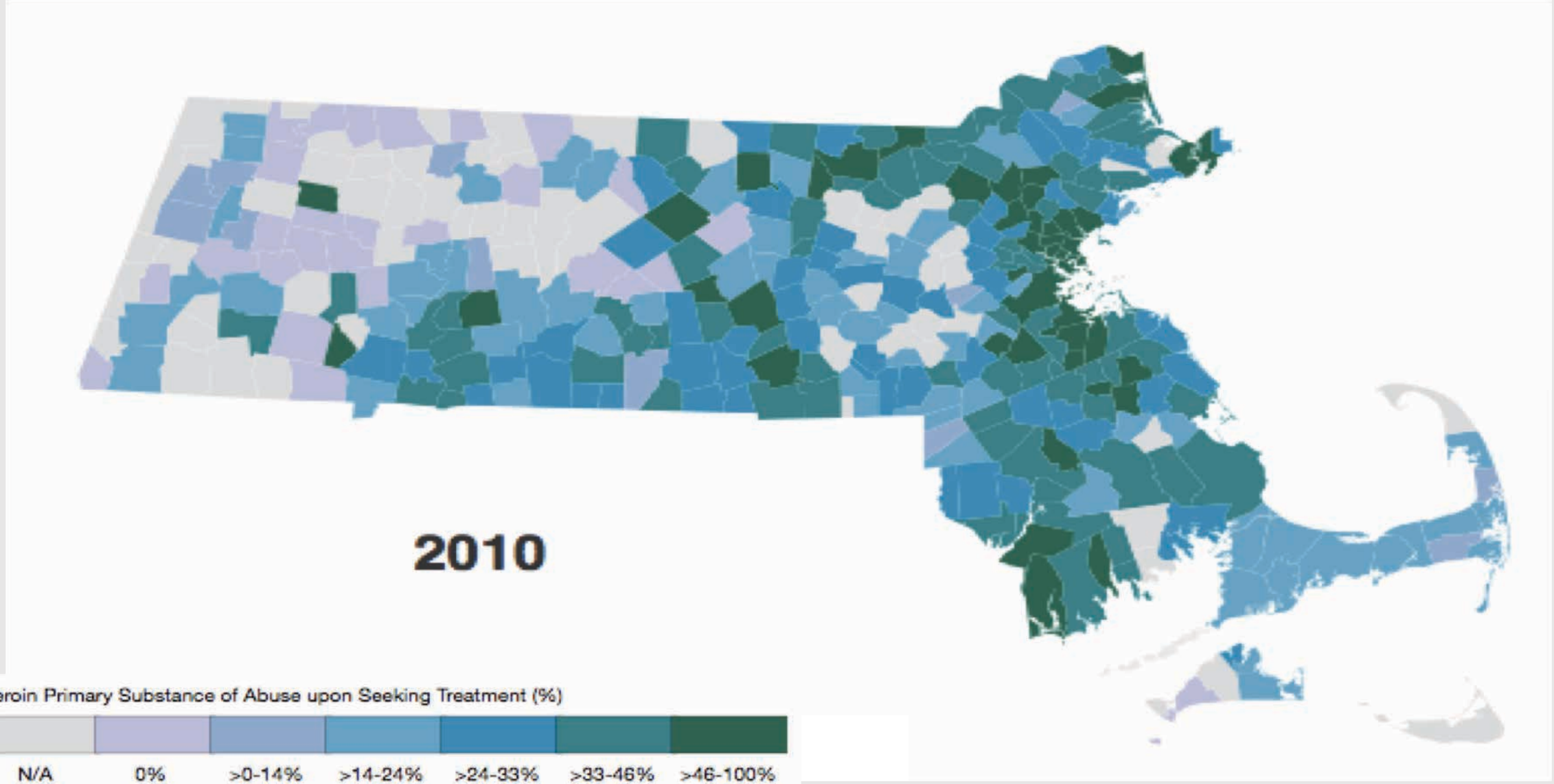

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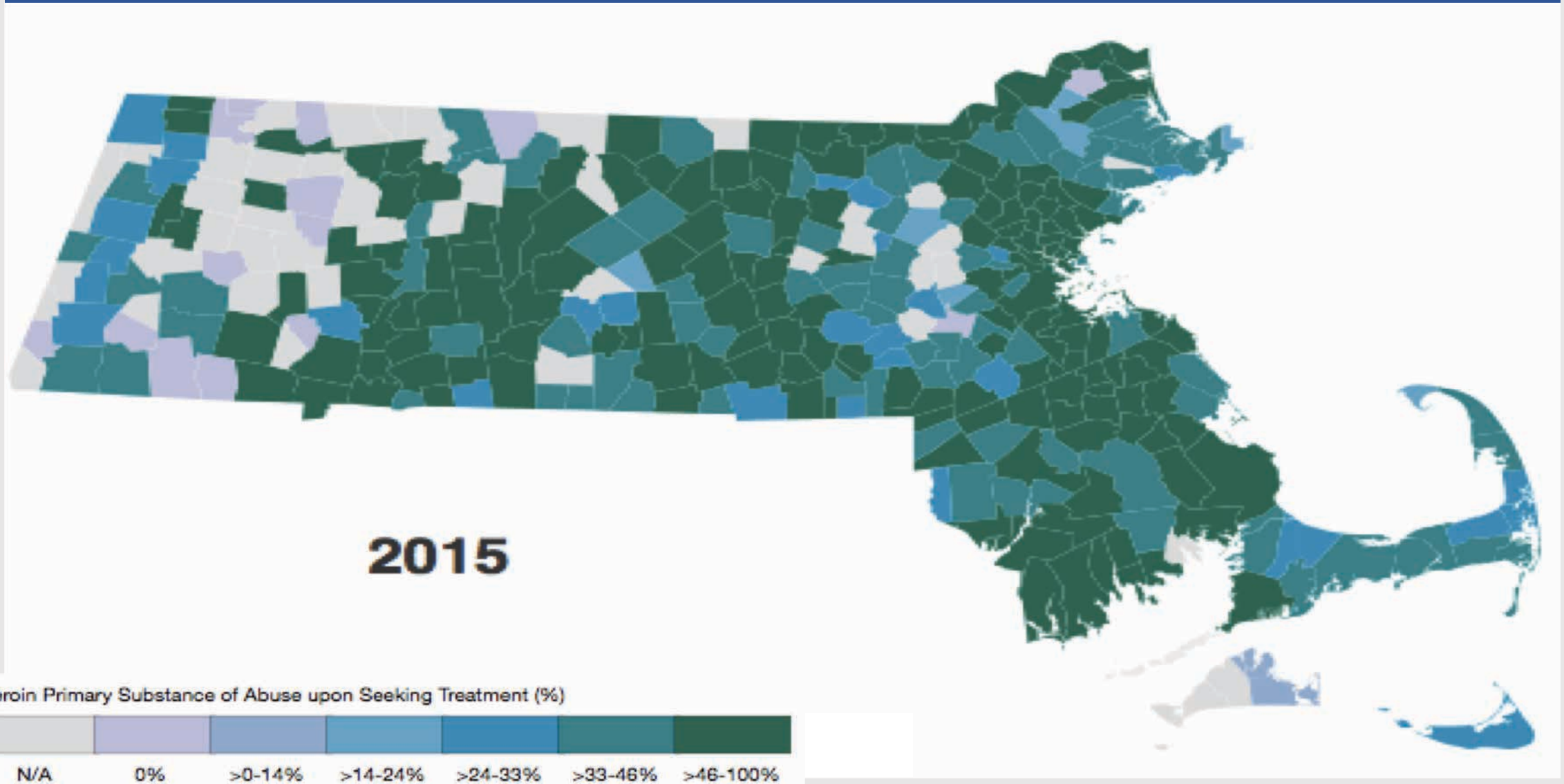
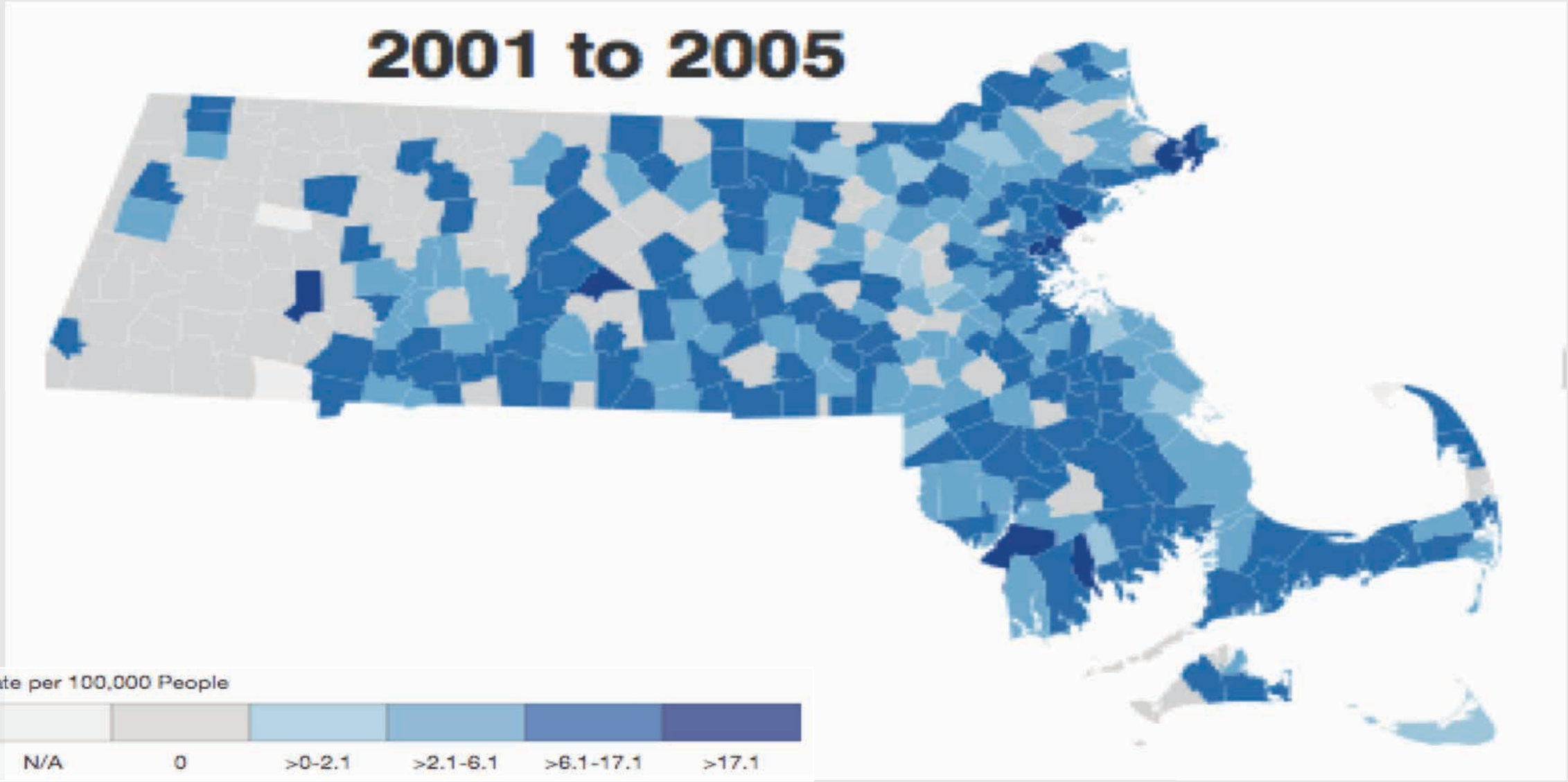
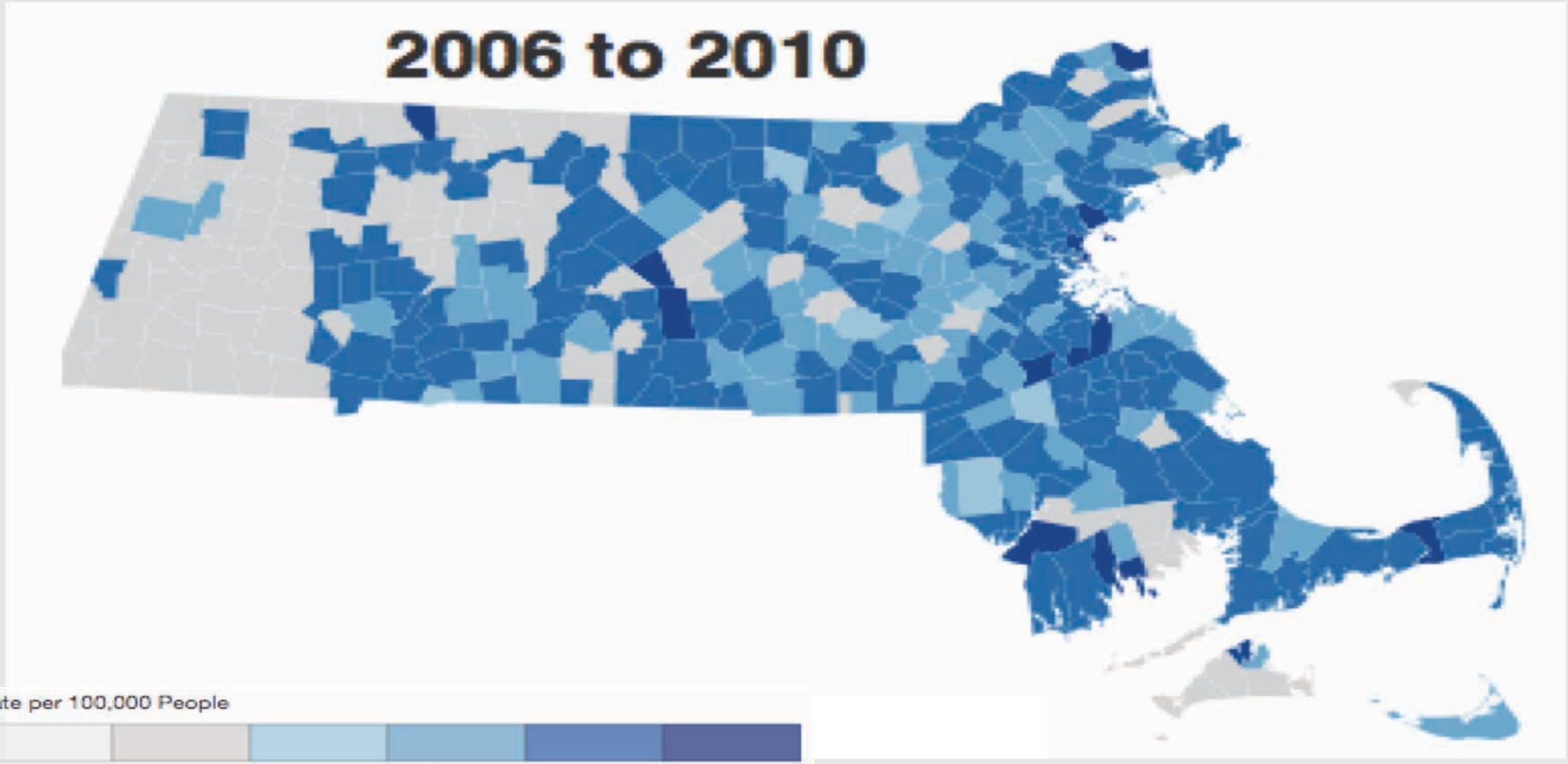


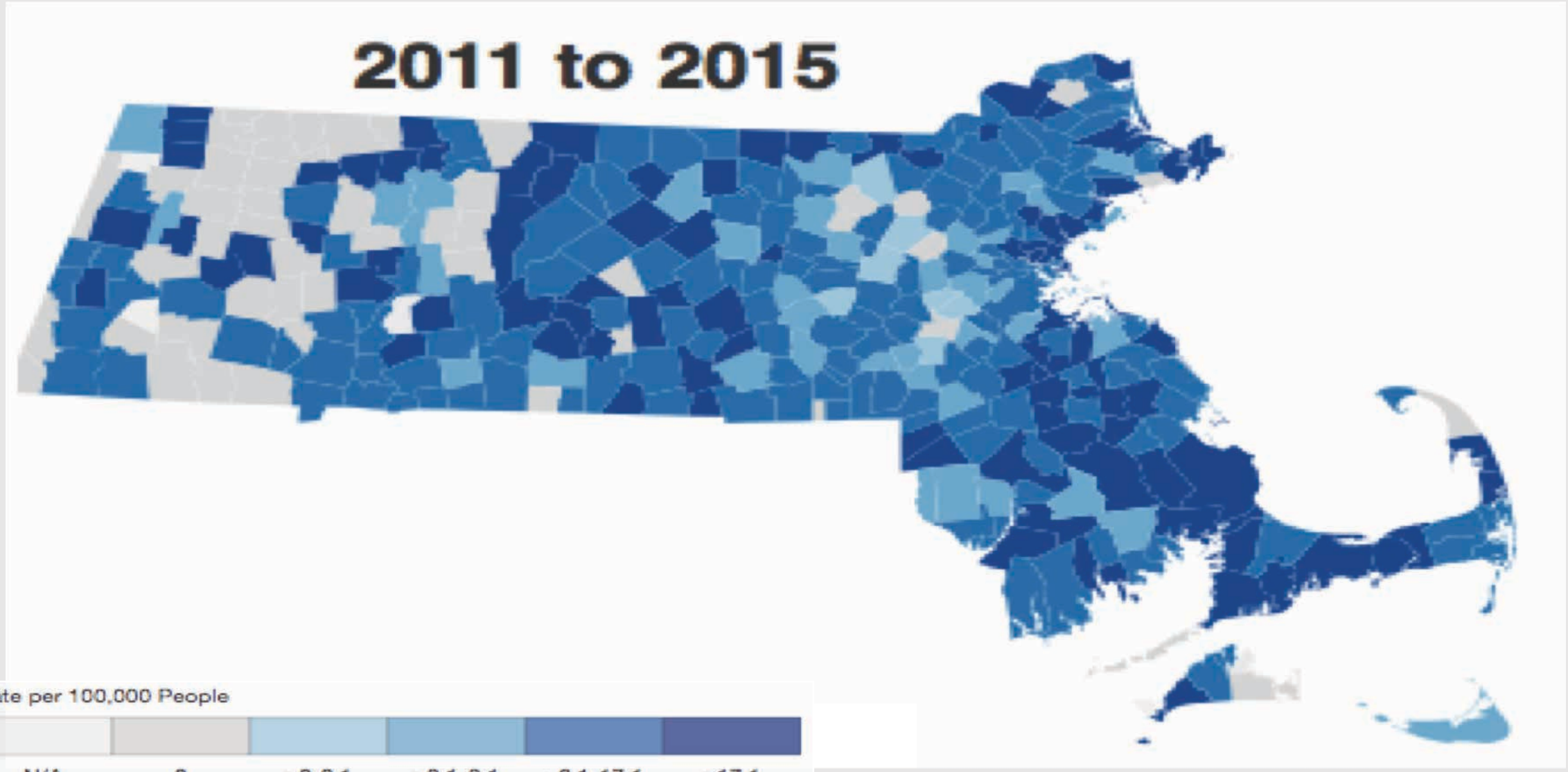
Unintentional Heroin Overdose Deaths in MA



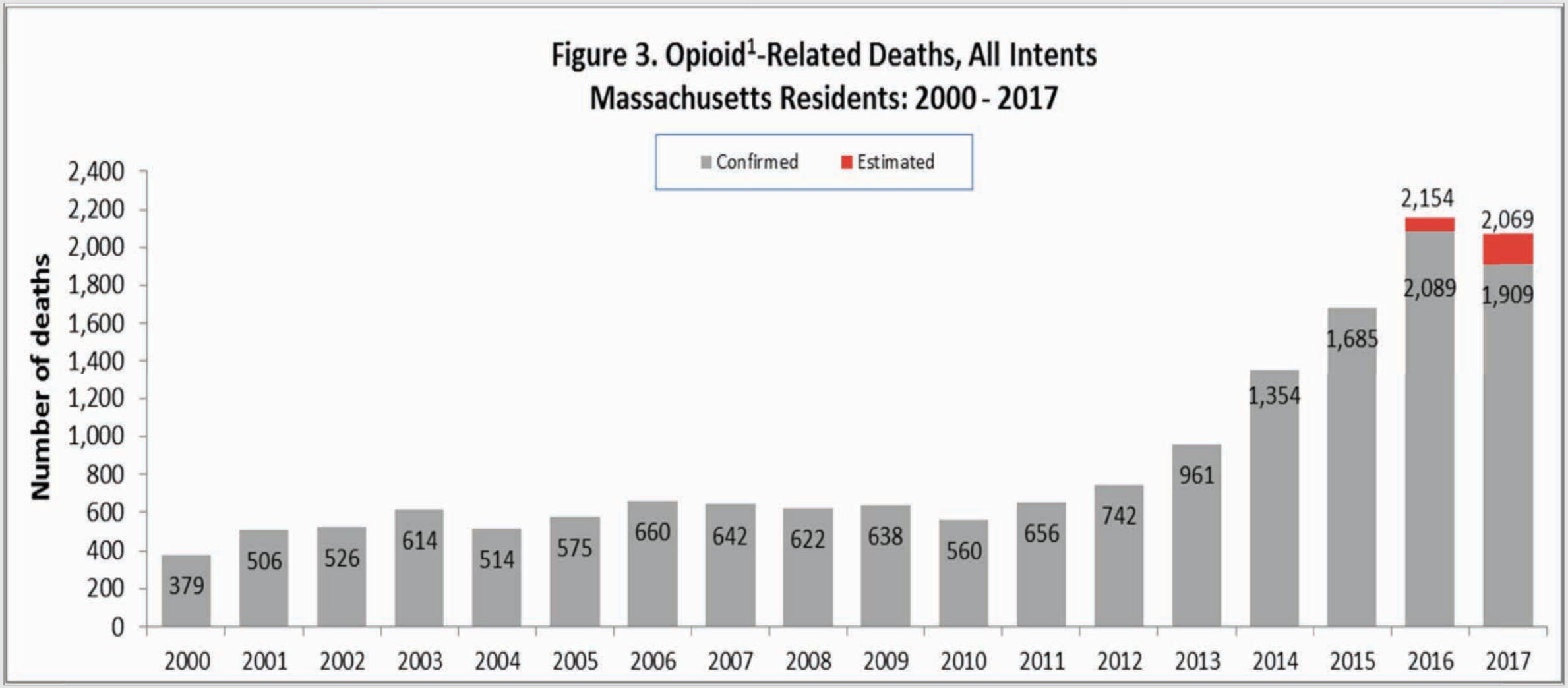
Unintentional Heroin Overdose Deaths in MA



Unintentional Heroin Overdose Deaths in MA



Unintentional Opioid Overdose Deaths in MA



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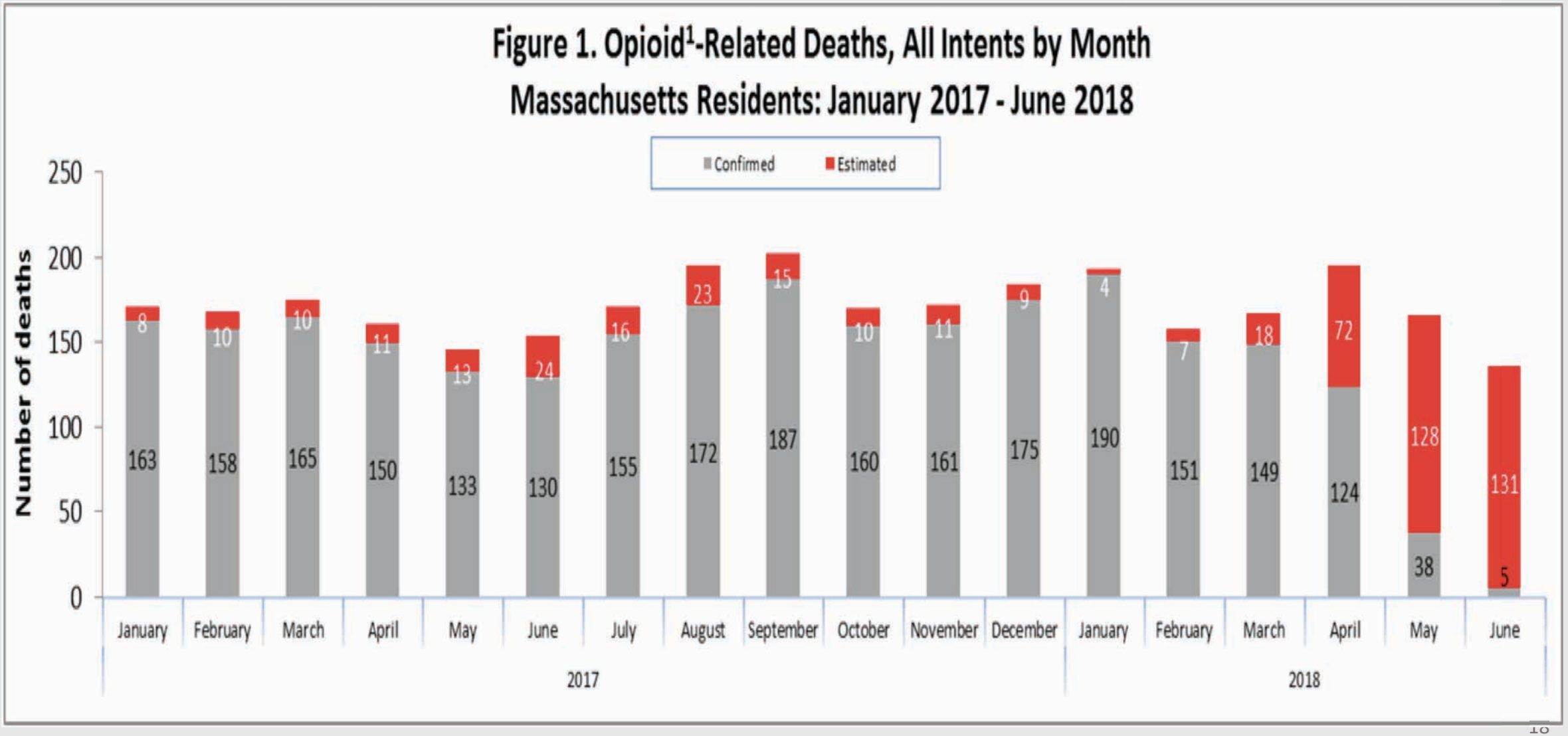
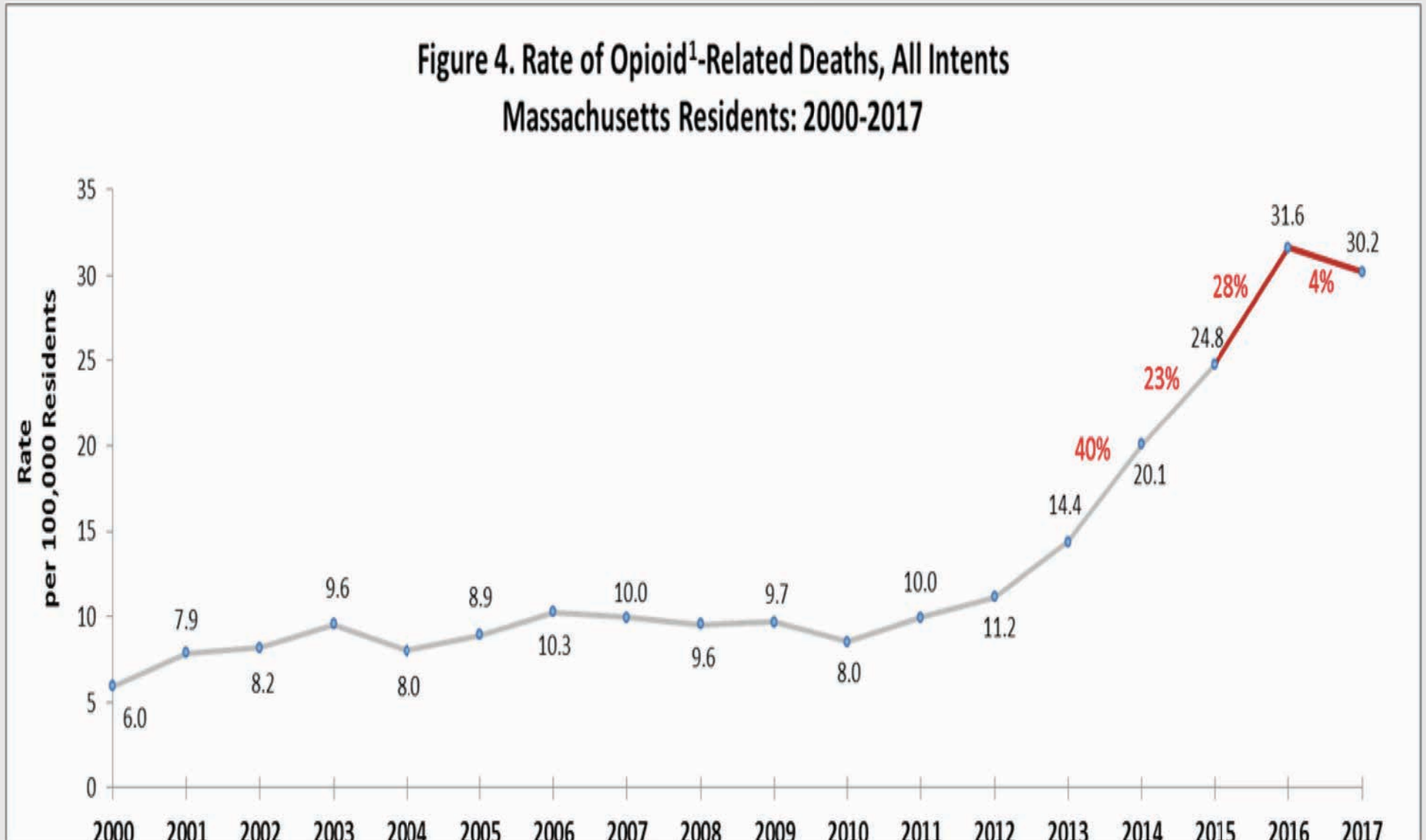


MA Opiate Overdose Deaths in MA 2000 - 2017



MA Opiate Overdose Deaths by Age
January – December 2017

Confirmed Opioid[1]-Related Deaths, All Intents
Compared to All Deaths by Age: January 2018-June 2018

	<15	15-24	25-34	35-44	45-54	55-64	65+	Unknown	Total
All Deaths	174	205	628	736	1,419	3,265	23,715	4	30,146
Confirmed Opioid[1]-Related Deaths, All Intents	1	39	215	183	135	72	12	0	657

MA Opiate Overdose Deaths by Race
January – December 2017

Confirmed Opioid[1]-Related Deaths, All Intents
Compared to All Deaths by Race and Hispanic Ethnicity: January 2018-June 2018

	White non-Hispanic	Black non-Hispanic	Asian non-Hispanic	Hispanic	Other/ Unknown	Total
All Deaths	26,639	1,352	634	1,201	320	**30,146**
Confirmed Opioid[1]-Related Deaths, All Intents	534	28	6	79	10	**657**

MA Prescription Monitoring Program County-Level Data

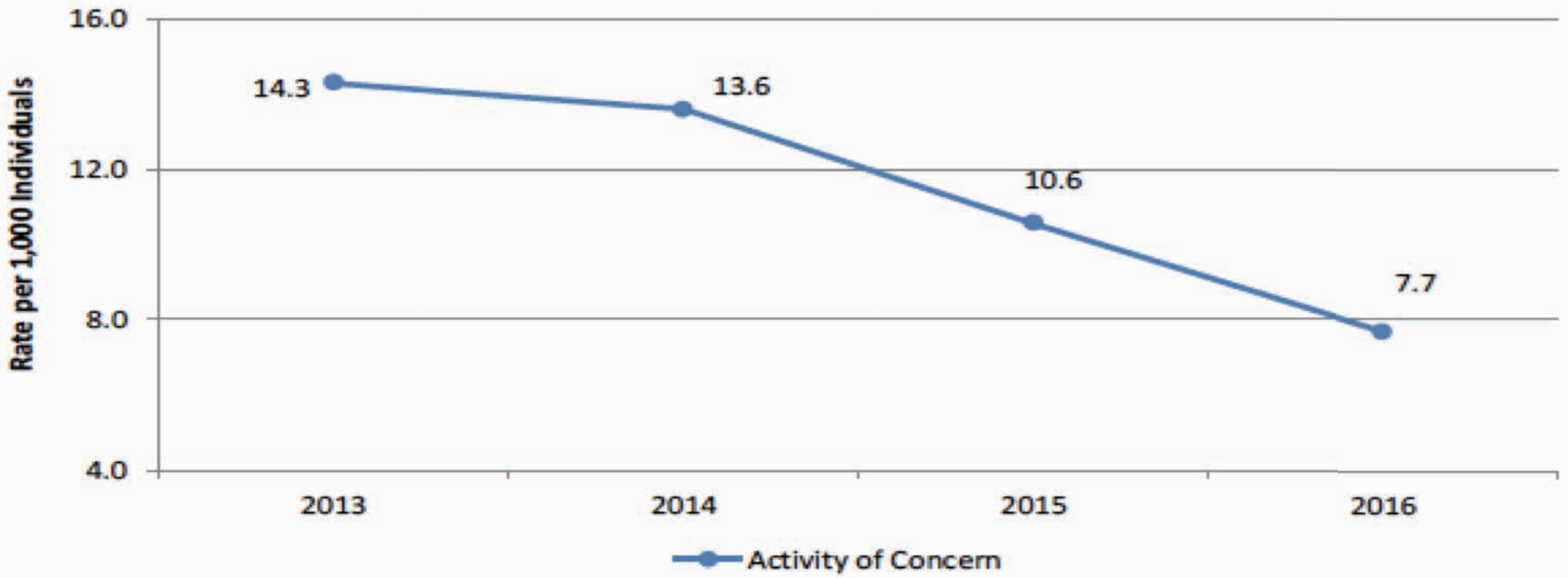
County (County classifications are by patient zip code; patient state must also = MA)	**Census Population**	**Total Schedule II Opioid Prescriptions**	**Total Number of Schedule II Opioid Solid Dosage Units**	**Individuals Receiving Schedule II Opioid Prescription**	**% of Individuals Receiving Schedule II Opioid Prescription (of total population)**	**Individuals with Activity of Concern**	**Rate of Individuals with Activity of Concern (per 1,000)**
Barnstable	214,990	113,486	7,068,323	30,146	14.0	465	15.4
Berkshire	130,016	63,015	3,627,531	14,932	11.5	160	10.7
Bristol	552,780	299,070	19,065,988	72,151	13.1	1,107	15.3
Dukes	17,256	8,704	595,884	2,462	14.3	22	8.9
Essex	762,550	288,345	17,208,100	84,517	11.1	946	11.2
Franklin	71,221	41,938	2,658,966	10,000	14.0	121	12.1
Hampden	467,319	285,285	17,770,362	71,999	15.4	1,162	16.1
Hampshire	159,596	75,911	5,164,695	17,855	11.2	189	10.6
Middlesex	1,552,802	427,499	25,593,366	139,180	9.0	1,515	10.9
Nantucket	10,399	4,548	218,004	1,369	13.2	5	3.7
Norfolk	681,845	241,216	15,159,612	72,975	10.7	923	12.6
Plymouth	501,915	235,010	14,937,973	66,038	13.2	1,039	15.7
Suffolk	755,503	232,597	15,049,960	72,114	9.5	1,050	14.6
Worcester	809,106	332,626	23,336,013	88,395	10.9	1,264	14.3
MA	**6,745,408**	**2,653,358**	**167,737,123**	**733,783**	**10.9**	**9,968**	**13.6**

MA Prescription Monitoring Program County-Level Data
April – August 2017

County (County classifications are by patient zip code; patient state must also = MA)	Census Population	Total Schedule II Opioid Prescriptions	Total Number of Schedule II Opioid Solid Dosage Units	Individuals Receiving Schedule II Opioid Prescription	% of Individuals Receiving Schedule II Opioid Prescription (of total population)	Individuals with Activity of Concern	Rate of Individuals with Activity of Concern (per 1,000)
Barnstable	213,444	22,781	1,245,369	10,422	4.9	18	1.7
Berkshire	126,313	14,173	742,644	6,143	4.9	< 5	NR
Bristol	561,483	66,587	4,005,044	27,771	4.9	25	0.9
Dukes	17,325	1,376	78,313	695	4.0	< 5	NR
Essex	785,205	67,498	3,612,326	31,423	4.0	26	0.8
Franklin	70,702	8,912	525,399	3,677	5.2	< 5	NR
Hampden	469,818	55,051	3,191,703	23,225	4.9	11	0.5
Hampshire	161,834	15,441	963,929	6,329	3.9	< 5	NR
Middlesex	1,602,947	94,863	4,950,009	47,627	3.0	34	0.7
Nantucket	11,229	983	39,648	484	4.3	< 5	NR
Norfolk	700,322	50,633	2,794,970	24,526	3.5	19	0.8
Plymouth	515,142	49,206	2,840,549	22,892	4.4	15	0.7
Suffolk	797,939	45,181	2,658,749	21,228	2.7	23	1.1
Worcester	826,116	75,366	4,595,493	33,351	4.0	20	0.6
MA	6,859,819	568,051	32,244,144	259,793	3.8	191	0.7

Note 1: Individuals with activity of concern "thresholds" for this report are based ONLY on a 3-month time period; see notes on previous page; CY18-Q2
Note 2: Counts greater than 0 but less than 5 are not reported. Rates based on these small values also are not reported (NR).
Note 3: Rates of individuals with activity of concern are based on the population of individuals who have received one or more Schedule II opioid prescriptions during the specified time period.
Note 4: Totals for all counties combined will differ slightly compared to the state totals presented elsewhere because some prescription records could not be assigned a county due to

MA Prescription Monitoring Program County-Level Data



[1] Rates of individuals with activity of concern are based on the population of individuals who have received one or more Schedule II opioid prescriptions.

[2] "Activity of Concern" is defined as an individual who received prescriptions for one or more Schedule II opioid drugs from four or more different prescribers and had them filled at four or more pharmacies during the specified time period.

[3] Activity of concern rates include only MA Residents

Opioids

Opiates	Semi-Synthetic	Synthetic
Opium	Heroin	Fentanyl
Morphine	Hydrocodone	Methadone
Codeine	Hydromorphone	Tramadol
	Oxycodone	
	Oxymorphone	
	Buprenorphine	

Opioids Differ

Drug	Duration	Potency
Methadone	24-32 hours	****
Heroin	6-8 hours	*****
Oxycontin	3-6 hours	*****
Codeine	3-4 hours	*
Demerol	2-4 hours	**
Morphine	3-6 hours	***
Fentanyl	2-4 hours	********

Chart from OOD Prevention & Reversal Trainers Manual-BPHC

Most Widely-used Opiates in the U.S.

Vicodin	A powerful pain reliever prescribed for acute episodes of pain (injury, post surgery) and chronic pain. Most abused prescription in the U.S. (Hydrocodone and Acetaminophen).
OxyContin	A powerful opiate originally formulated to time-release its effects. Easily overridden and abused. New formulations have made OxyContin less desirable on the streets, contributing to an increase in heroin and fentanyl.
Heroin	The most widely used non-prescription opiate. It is estimated that more than half of people currently using heroin began opiate use from a prescription.

The Current Nightmare:

Fentanyl

Origins of Fentanyl

- Developed in 1959 in Belgium by Dr. Paul Janssen
  - Analgesic 35-40x stronger than morphine (now 50 – 100x more powerful)
  - Many times more powerful than heroin and far cheaper and easier to manufacture

- Quickly adopted in medical settings as a pain reliever and intravenous anesthetic (Sublimaze)

A Young Pain-killer Grows Up

- Analogues quickly developed
  - Slight molecular reformulation of fentanyl to enhance different effects
- Duragesic® developed in 1992
  - Delivers fentanyl via a transdermal patch
  - Used in chronic pain management
- Actiq® available to the public in 1999
  - Dissolved in the mouth (fentanyl lollipop)
  - Intended for opioid-tolerant individuals
  - Found effective in treating breakthrough pain in cancer patients because of its potency

The Darker Path

- Illicit use of pharmaceutical fentanyl first appeared in the mid-1970s **in the medical community**.

- The first documented presence of fentanyl on the streets was in Los Angeles 1979 under the name of "*China White.*"

The Evil Analogues

- In addition to the many legal analogues produced over the years at least 36 different illegal fentanyl analogues have been identified by law enforcement in the U.S.

- Analogues are sometimes produced to circumvent regulations in a variety of countries. U.S. has laws to circumvent this effort.

- The source for many of these analogues are clandestine laboratories in countries like Mexico and “legitimate” factories in China.

The China Connection

Chinese companies are:

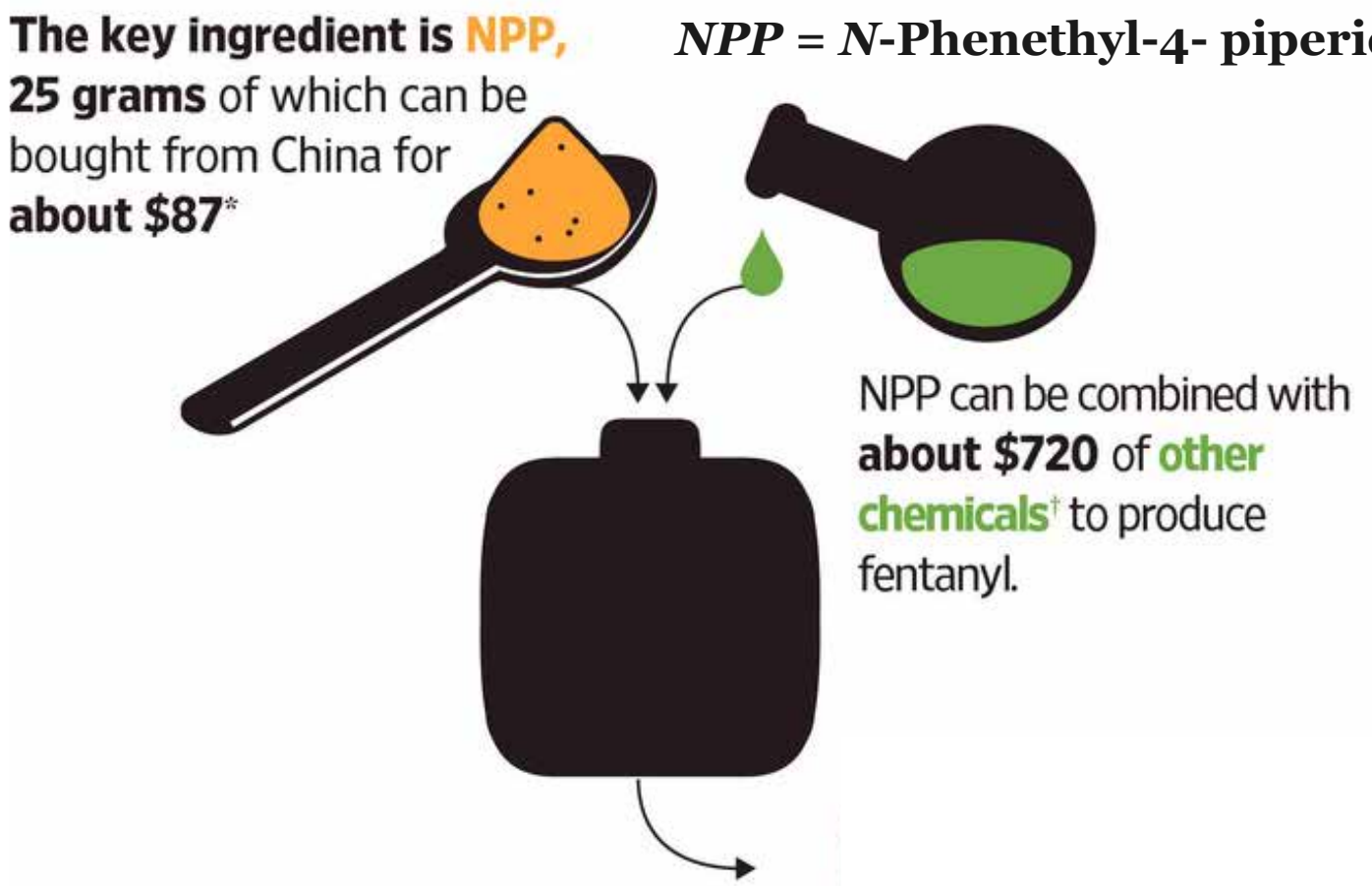
- Pressing various analogues into pills and selling online to a variety of countries including the U.S.
- Where the pills cannot be sold, companies are selling key ingredients to assist people in manufacturing their own analogues.
- Companies are also selling machinery used to press pills and mold plates for a variety of legal pills.

Black Market Fentanyl Economics

Traffickers manufacturing Fentanyl often purchase key ingredients from China, which does not regulate its sale.

A small investment in ingredients can translate to a tremendous profit margin…

Black Market Fentanyl Economics



***NPP* = *N*-Phenethyl-4- piperidinone**

The resulting 25 grams of Fentanyl cost about $810 to produce…

From the Drug Dealer's Perspective

- Heroin is expensive to produce and import
  - Plants, cultivation, harvesting, refining, importing
- Chemicals can be shipped cheaply into the U.S. or other countries
- Its potency makes volumes easier to ship (cars vs.trucks, planes vs. boats)

Who is buying and manufacturing?

- Variety of companies in China are manufacturing and exporting with little regulation
- Small cells in the U.S. and Canada, individuals or small crews around the countries
- Larger cartels in Central and South America, mostly Mexico, and most of that product ends up in the U.S and Canada.
- Because it is so much cheaper to produce than heroin and 50x more potent, fentanyl is often times being used to “cut” heroin or replace it entirely.

Fentanyl
BURSTS ON TO THE STREETS

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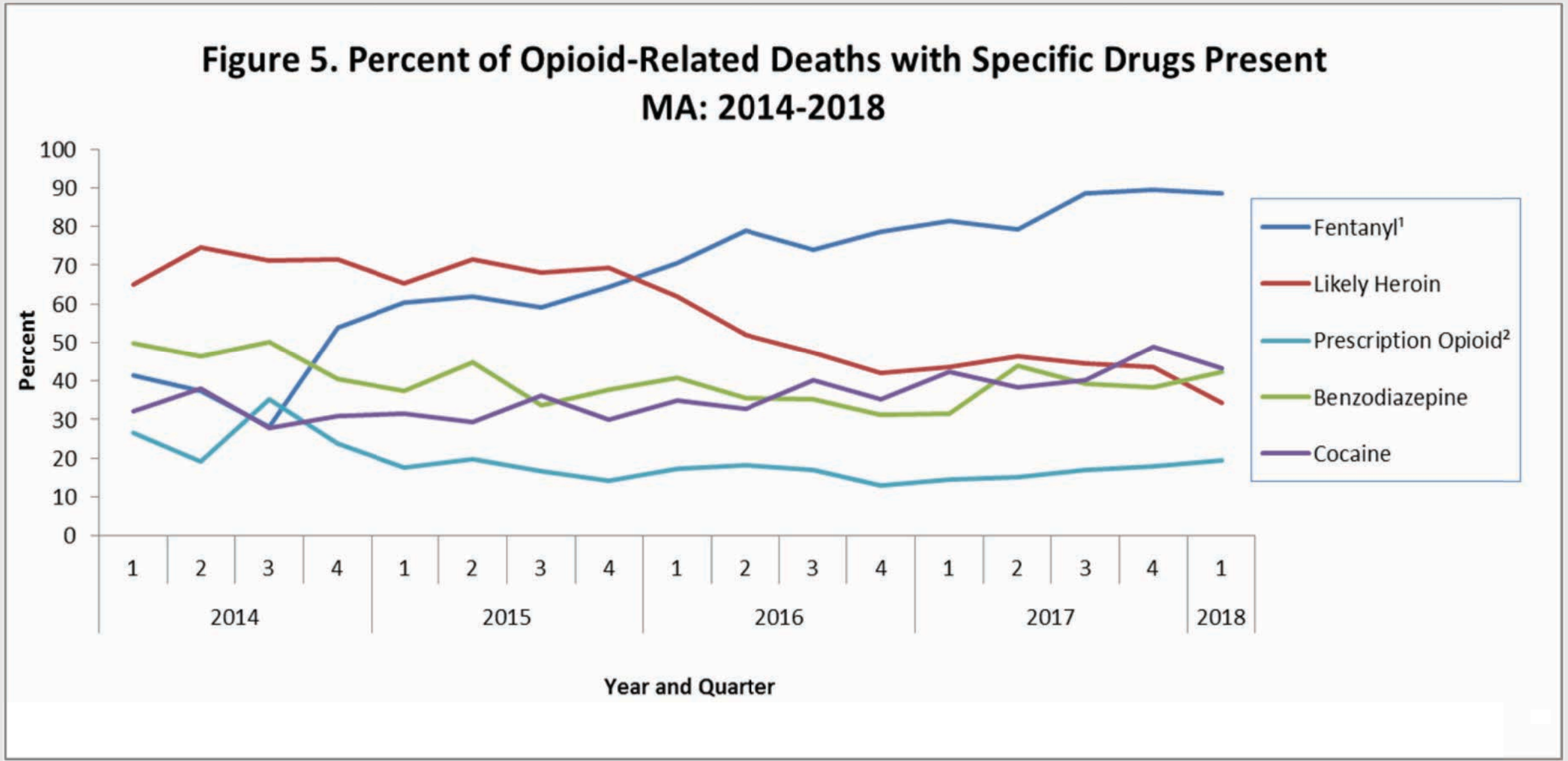
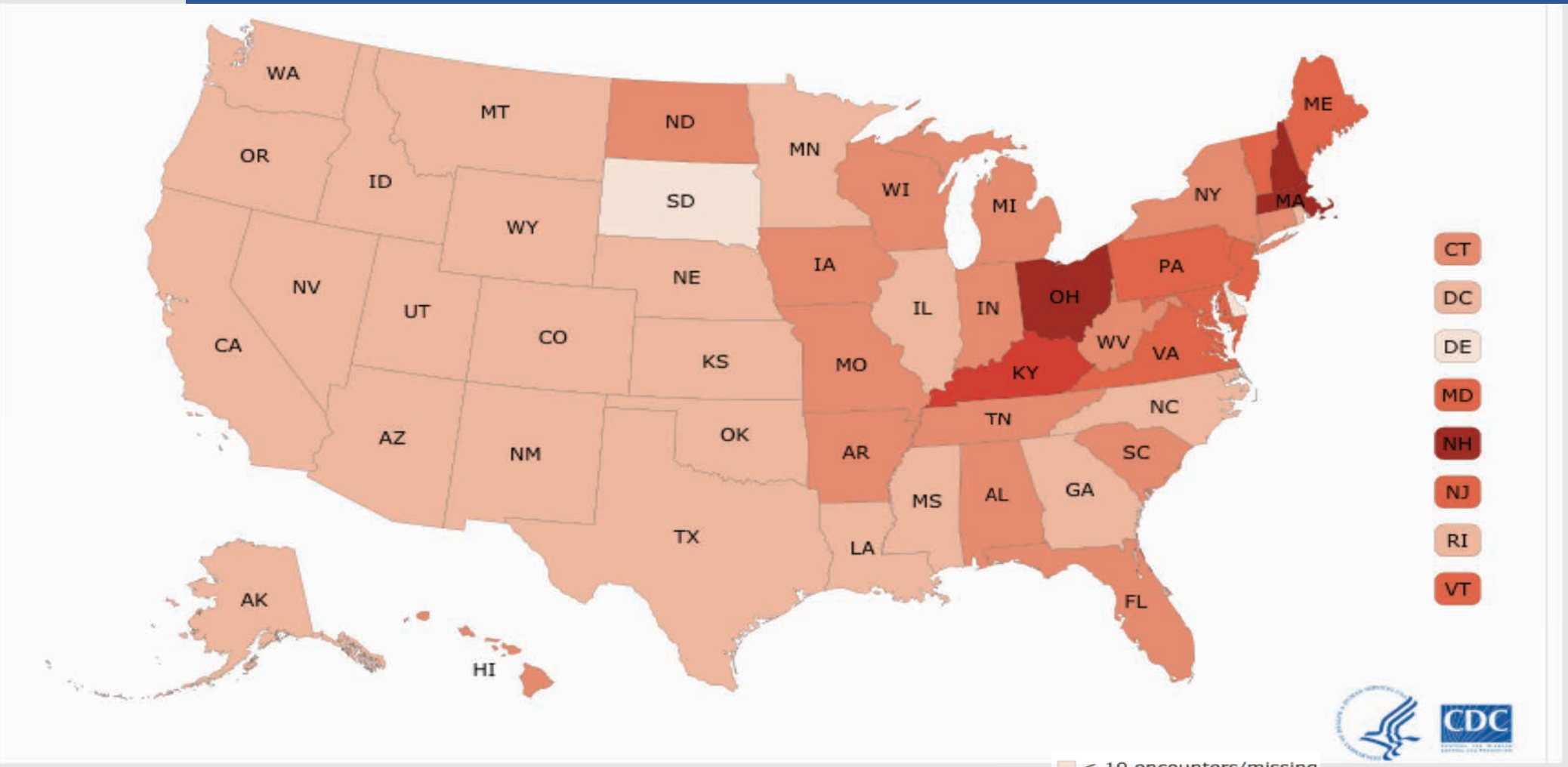
MA Opiate Overdose Deaths in MA 2000 - 2017



Fentanyl Report in NFLIS by State: 2016



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Top 10 states by total Fentanyl Seizures, 2016

Rank	State	Number of Fentanyl seizure
1	Ohio	1,355
2	Massachusetts	870
3	Pennsylvania	449
4	Maryland	402
5	New Jersey	390
6	Kentucky	252
7	Virginia	243
8	Florida	209
9	New Hampshire	198
10	Indiana	144

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Impact in Massachusetts

- A continued drop in death rates involving **heroin**, which have decreased at approximately the same rate that **fentanyl**-related deaths have increased.
- A continued rise in the number of fentanyl-related deaths with **88-89 percent of deaths** in Q1 of FY18 that had a toxicology screen showing a positive result for **fentanyl**.

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What's the Difference?

Heroin

- Derived from the alkaloids found in the Poppy plant
- Formulated to be 15 times stronger than morphine**
- Schedule I drug with no recognized legitimate use
- Stimulates opiate receptors in the brain & brainstem
- Will show up on a routine general opioid screening test

Fentanyl

- Human made through chemicals
- Formulated to be 100 times stronger than morphine
- Schedule II drug with limited medical use
- Stimulates opioid receptors in the brain & brainstem
- Will **NOT** show up on a routine general opioid screening test

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The Catch

What makes fentanyl different from other opioids?

- Fentanyl binds faster than any other opiate for an elevated feeling of euphoria
- Fentanyl is 100x stronger than Morphine and 25-50x stronger than Heroin
- Smaller margin for error regarding overdose

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What Sets Fentanyl Apart

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What Sets Fentanyl Apart

Fentanyl works exactly like all other opioids, just significantly faster which is what makes it more “potent.”

Where overdose from other opioids usually takes 1 to 3 hours, overdose from fentanyl can occur in as little as **5 to 10 minutes**.

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What Sets Fentanyl Apart

Fentanyl Induced Chest Wall Rigidity: **"Wood Chest"**

- A condition which causes a seizing of the chest muscles
- Makes rescue breathing and CPR ineffective
- Can be reversed with Narcan

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Why Overdoses Happen

- Opioid overdose happens when a person takes so much opioid that there respiration slows and stops.
- Many do not know the purity or exact content of the drug they are taking
- Many do not know the risks of mixing drugs and alcohol or Benzodiazepine
- Many overdose deaths happen because people who witness ODs do not know how to respond

When Overdoses Happen

- May happen 1-3 hours after use or quicker when fentanyl is involved (as little as 5 to 10 minutes)
- After periods of abstinence/relapse (after treatment stay, hospitalization, incarceration)
- New city/residential location
- New dealer/source
- New route of administration
- Post incarceration

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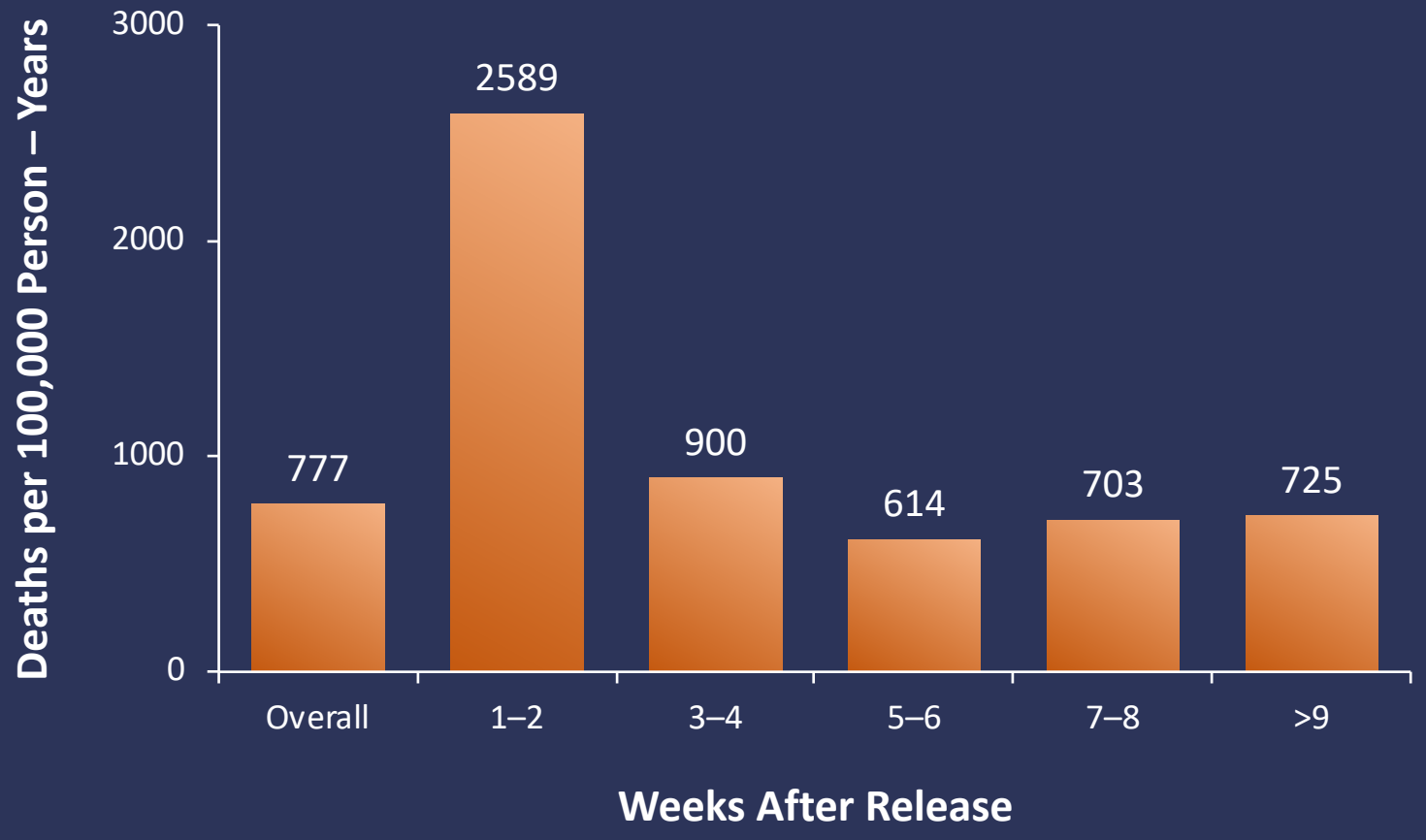
Reentry and Drug Overdose



In the first 2 weeks post-release, a former inmate's risk for death by drug overdose = **129** times the risk for the general population.

Binswanger IA, Stern MF, Deyo RA, Heagerty PJ, Cheadle A, Elmore JG, Koepsell TD. *Release from prison-a high risk of death for former inmates.* N Engl J Med. 2007;356(2):157–165.

Top Overdose Risk Factors

- Using drugs alone – **use must be coordinated** – spaced out 10 minutes
- Misjudging body tolerance
- Poor physical health (advance liver damage, respiratory issues)
- Variation of substance
- Using an opioid with other depressants such as alcohol or benzodiazepines
- Cocaine is a stimulant but can contribute to overdose risk

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What are Benzodiazepines?

- Class of prescription drugs that depress central nervous system and commonly used to treat anxiety and insomnia and alcohol detox
- Benzos are often misused, diverted or sold illegally
- Commonly used benzodiazepines are Xanax, Klonopin, Ativan, Valium, Librium
- Presents an extreme risk-factor for overdose when combined with any opioid

Signs of an Overdose

- **White/fair skin** – blue tint to the skin, eyelids and nail beds, deep bluing of the lips
- **Black/Brown skin** – grey tint to the skin, greying or deep purpling of the lips, vivid whitening of the nail beds
- Shallow breathing, infrequent breathing, or no breathing
- Shallow snoring, gurgling, labored breathing sounds – **DEATH RATTLE**
- Not responsive to loud sound or appropriate physical stimulation

Intoxicated or Overdose?

Intoxicated

- Small pupils
- Drowsy, but arousable
  - R… …ub
- Speec…
- Drows… …breathing
  - 8 or more times per minute

Stimulate and observe

Overdose

- Small pupils
- Not arousable
- N…
- Br… …topped
  - < 8 times per minute
  - May hear choking sound or a gurgling/snoring noise
  - Blue/gray lips and fingertips

Give naloxone
Rescue breathing

Responding to an Overdose

Old Protocol

- Call 911
- Rescue breathing
- Administer Narcan
- Stay with the person until help arrives
- Recovery position as needed

New Protocol

- ***Call 911***
- **ADMINISTER NARCAN**
- ***Rescue breathing/Chest Compressions***
- Stay with the person until help arrives
- Recovery position as needed

➢ These steps must happen as quickly as possible in whichever order makes the most sense given the situation.

***Chest Compressions should only be done if there is no sign of a pulse**

Overdose: Most Critical Signs

1

Responsiveness to stimuli

2

Breathing

1 Recognize overdose?

Steps to teach patients, family, friends, caregivers:

- If a person is not breathing or is struggling to breathe: call out name and rub knuckles of a closed fist over the sternum
- Look for signs of overdose
  - Slow or absent breathing
    - Gasping for breath
  - Pinpoint pupils
  - Blue/gray lips and nails

Or a snoring sound

Rescue Breathing

Make sure there is nothing in the mouth

Tilt head back, lift chin, pinch nose

Watch to ensure the chest rises

Give a breath every *5 seconds* or do the best you can, no more than **90 seconds**.

Illustration from the Harm Reduction Coalition

Recovery Position

If you must leave the person who is overdosing, put them into the recovery position so they will not choke on their own vomit

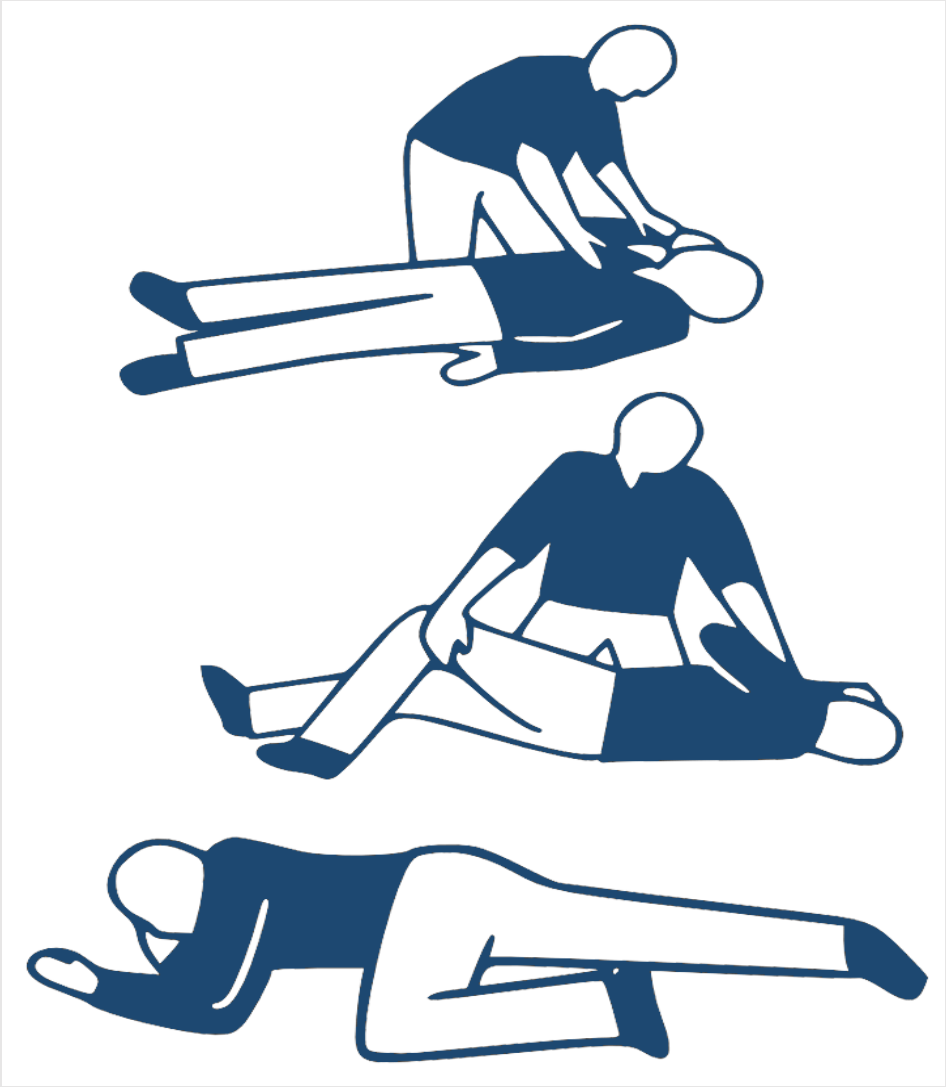


Illustration from the Harm Reduction Coalition

Naloxone

Naloxone (Narcan) will reverse the effects of opioids, reversing an overdose

- A prescription medicine that does nothing but reverse an opioid overdose
- Injectable and intranasal applications, simple nasal spray (most common formulation)
- Wakes a person who is overdosing in 3-5 minutes and lasts 30-90 minutes
- No effect other than blocking the opioids
- No adverse reactions
- No potential for abuse
- Cannot cause harm, even if the person is not overdosing but may cause withdrawal symptoms

Timing Is Everything: The Duration of Naloxone & Opioids

Drug	Duration	Naloxone wears off in…
Methadone	24-32 hours	**30-90 mins**
Heroin	6-8 hours	**30-90 mins**
Oxycontin	3-6 hours	**30-90 mins**
Codeine	3-4 hours	**30-90 mins**
Demerol	2-4 hours	**30-90 mins**
Morphine	3-6 hours	**30-90 mins**
Fentanyl	2-4 hours	**30-90 mins**

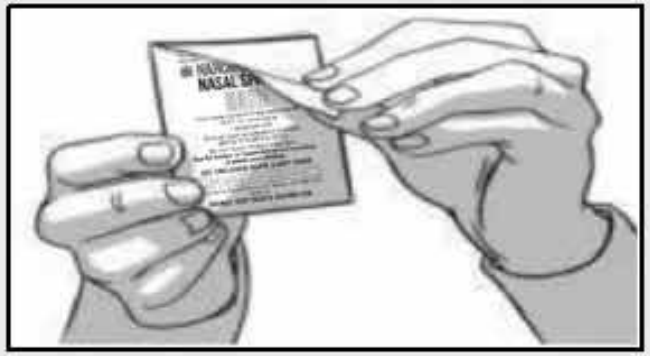
Chart from OOD Prevention & Reversal Trainers Manual - BPHC

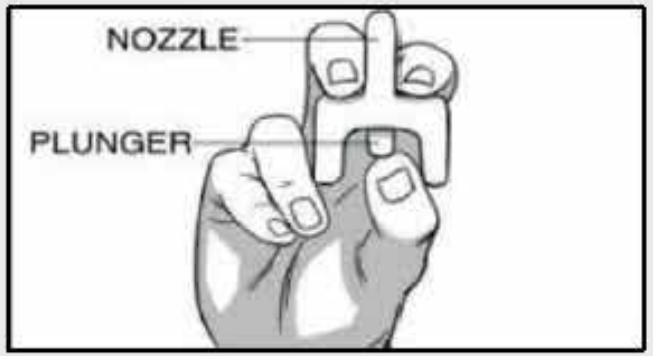
Center for Social Innovation

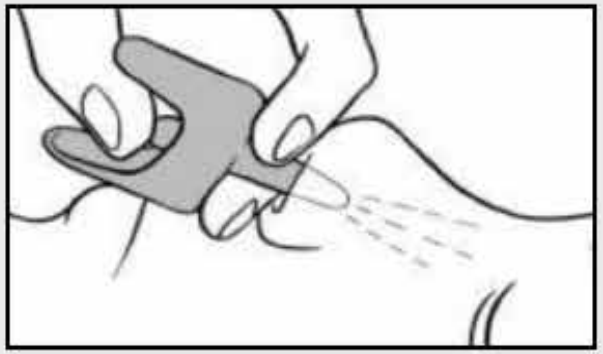
Naloxone Facts

- Reverses an overdose by blocking opioid receptors for 30-90 minutes
- After a maximum of 90 minutes any opioids in the body will return to the receptors (likely will happen sooner)
- Advise against using more opioids as overdose can occur again once the naloxone/Narcan wears off
- Remind people that they've been given Narcan and will not feel any opioids they take for the next 30 to 90 minutes
- Not everyone given Narcan goes into withdrawal
- If in withdrawal, symptoms will pass in 20 to 90 minutes

Single-Step Nasal Spray Administration







1 **PEEL** back the package to remove the device.

2 **PLACE** the tip of the nozzle in either nostril until your fingers touch the bottom of the patient's nose.

3 **PRESS** the plunger firmly to release the dose into the patient's nose.

Naloxone Single Step Administration

Single-step:

- Comes with a pre-assembled applicator with Narcan built in
- Requires **no assembly**, just insert in nostril and push the button
- Delivers **4 milligrams dose via a spring-action button** that delivers a full dose in **one nostril**
- Delivered via nasal cavity with reports of delivery via anus when nasal was not an option

Naloxone from Pharmacies

1. Obtain a prescription from your prescriber and take it to a pharmacy that stocks naloxone

2. Go directly to a pharmacy with a naloxone standing order and request a naloxone kit at cost. Price ranges from $41 to as much as $400 for the auto-injection model

** Most insurers cover naloxone including Mass Health*

Myths: What NOT To Do

- **DON'T** leave the person alone
- **DON'T** leave the person without calling 911
- **DON'T** lock the door behind you
- **DON'T** put the person in a cold water bath or shower – they could drown!
- **DON'T** inject them with salt water, milk, or other drugs (like cocaine or speed)
- **DON'T** put ice on their genitals, Ice won't help.
- Neither will tea, coffee, or alcohol.
- **DON'T** make them vomit – they could choke!

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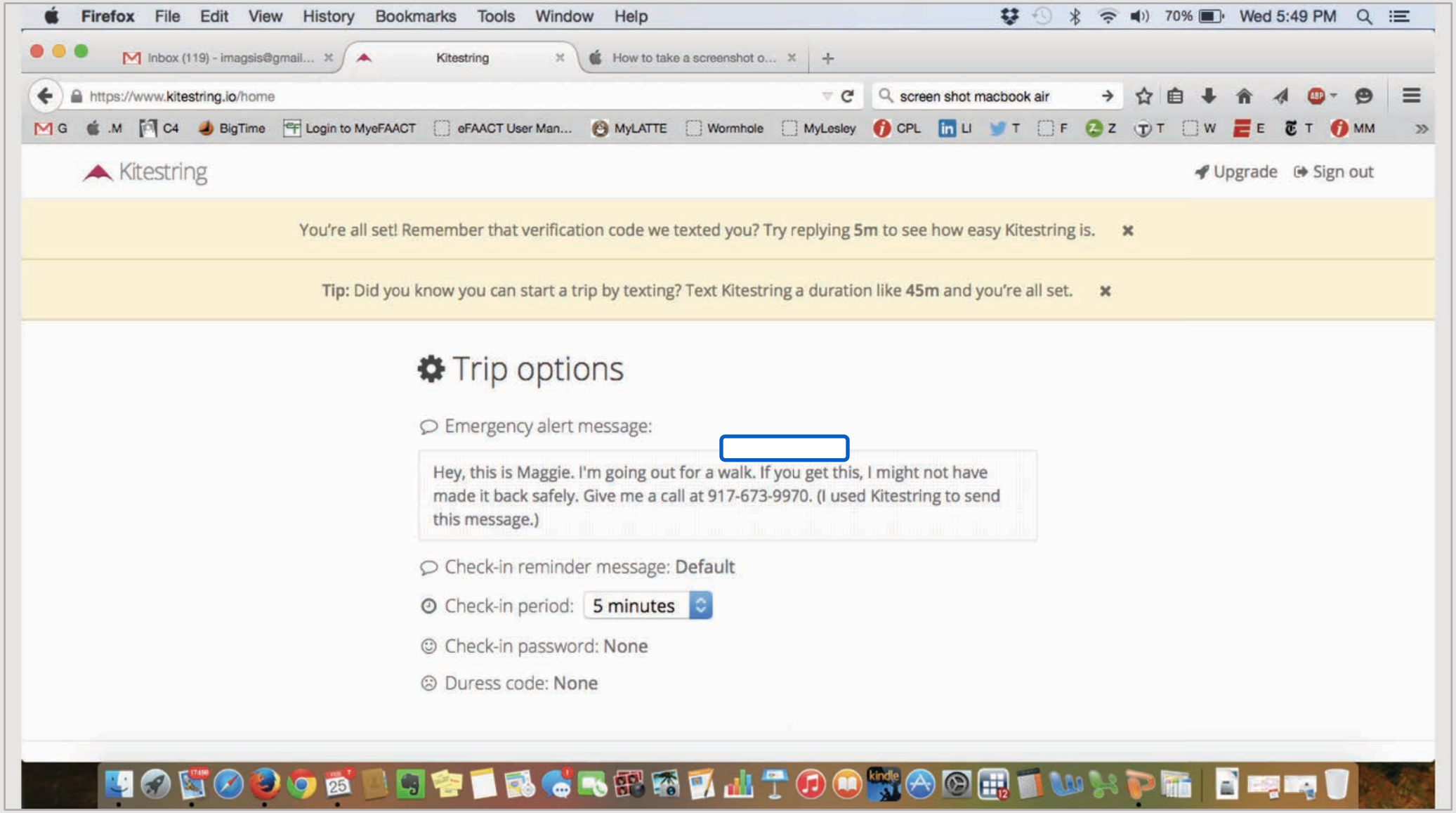

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