

As if Heroin wasn't enough?

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1

Opioid Epidemic...

- **70,000 Americans died of drug overdoses in 2017.**
 - Nearly 48,000 involved at least one type of opioid.
 - About 28,000 deaths involved fentanyl or some other kind of synthetic opioid,
 - 15,500 involved heroin
 - 14,500 involved prescription opioid painkillers.
- From 1999 to 2017, more than **700,000 people have died** from a drug overdose.
- Around 68% of the more than 70,200 drug overdose deaths in 2017 involved an opioid.
- In 2017, the number of overdose deaths involving opioids (including prescription opioids and illegal opioids like heroin and illicitly manufactured fentanyl) was **6 times higher than in 1999.**

Widespread online data for epidemiologic research (V-ONDER) 4/19/18, G4 CDC, National Center for Health Statistics 2017.

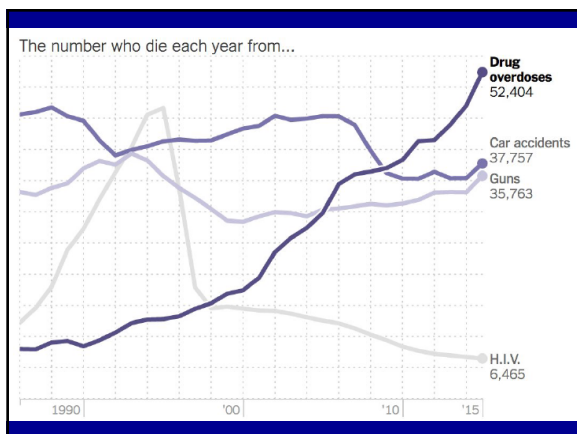
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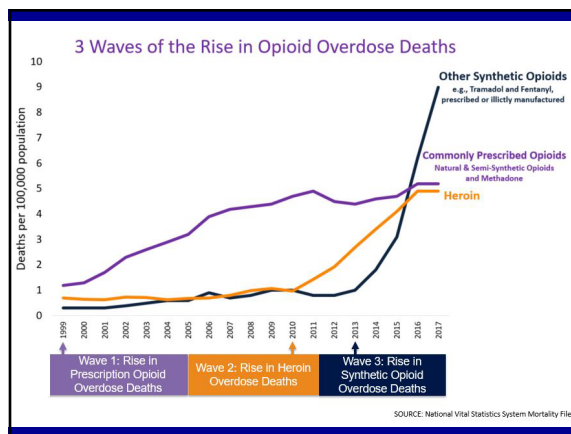
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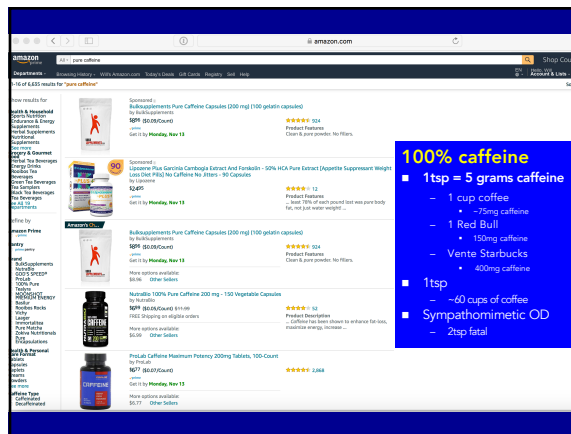
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6

The drugs of 2019

9



10

Alcohol

- Toxidrome**
 - CNS depression
 - Ataxia
 - Slurred Speech
 - Nystagmus
 - Respiratory depression
 - Hypoglycemia
- Treatment**
 - ABCs
 - IVF's
 - Prevent aspiration
 - Sedation if necessary
 - Glucose and thiamine

11

Newer ETOH Preparations

- Powdered alcohol**
 - Adsorbing ethanol to sugar yields powdered alcohol
 - Instant cocktail contains 15 grams ETOH
 - Snorting
 - Banned by multiple states
- Stuffing alcohol**
 - Tampons
- Smoking (vaporizing) alcohol**
 - Dry ice
 - Vaping

12

Marijuana

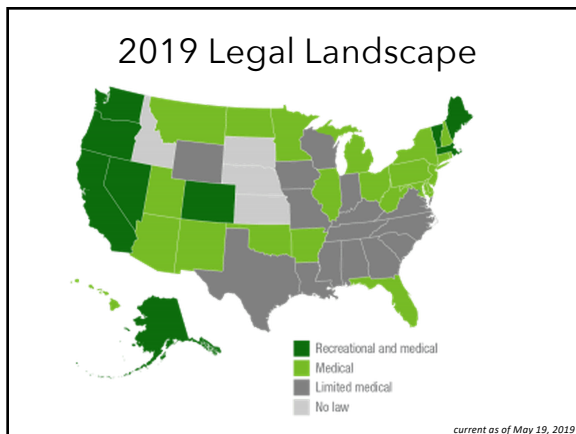
- Toxidrome**
 - Altered sensorium
 - Injection of eyes
 - Dry mucous membranes
 - Tachycardia
- Treatment**
 - ABCs
 - IVF's
 - Sedation for a bad high

13

Marijuana history

- Yesterday**
 - Potency of THC in standard dosing was about 3%
 - Straight weed
 - Underground use
- Today**
 - Potency of THC in standard dosing is about 12%
 - Who knows - synthetic agents and lacing
 - Mainstream, legal use

14



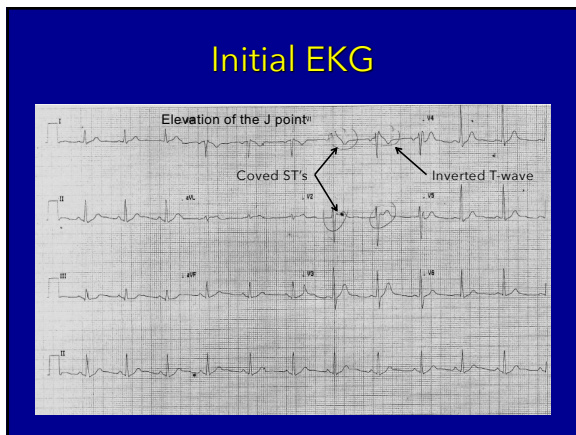
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19 Year old with EKG abnormality

- A 19-year-old male patient with a previous unremarkable history presents to emergency department with a history of palpitations after cannabis consumption. The patient had been smoking cannabis during the afternoon for recreational purposes.
- Pt reported that he had a dizzy episode, without loss of consciousness. During the night he began to have several more palpitations and decided to go to the hospital.
- HR 78, BP 108/65, Resp 14, even and unlabored.

Alonso JV, Tso BM, del Rovo RJ, et al. (2016) Brugada electrocardiogram pattern induced by cannabis; is cannabis safe? American Journal of Emergency Medicine 34: 1736.e1-1736.e4

16



17

Brugada Syndrome

- Genetic disease that causes sudden unexplained death syndrome also known as sudden adult death syndrome.
- EKG changes
 - Elevation of the J point,
 - coved-type ST segment of V1 and V2
 - inverted T wave in V1 and V2.
- Relevant Hx (must have 1)
 - family history of sudden cardiac death in a family member younger than 45 years or ECG showing Brugada type 1 in relatives
 - arrhythmia-related symptoms
 - syncope
 - seizures
 - nocturnal agonal respiration
 - ventricular arrhythmias
 - polymorphic ventricular tachycardia
 - ventricular fibrillation

18

Effects on the body

- Hyperemesis Syndrome
 - High concentrations of THC in body fat contribute to persistently elevated THC levels and induce N/V
 - Often associated with Hot baths - pt's report resolution of N/V with hot baths or showers
 1. Cutaneous Steal syndrome - cutaneous vasodilation leads to decreased splanchnic blood flow
 2. Dose-dependant THC-induced hypothermia effects on the hypothalamus (CTZ) can be returned to homeostasis

Lu M and Louis RY. (07/01/2015). Cannabinoid hyperemesis syndrome: Marijuana is both antiemetic and proemetic. Cleveland Clinic journal of medicine, 82 (7), p.429

19

K2 - Mary Jane's ugly cousin

- Aka Spice, Bliss, Cowboy Kush, and Scooby Snax
- Superagonist
- Binds Cannaboid receptors - more than Marijuana
- Virtually undetectable - great for people on work release - legal everywhere right now

20

K2 - Mary Jane's ugly cousin



- Potency of these push the physiologic envelope
 - Acute Psychosis that outlasts the intoxication half-life
 - Myocardial Infarctions
 - Seizures
 - Hyperemesis

Rosenbaum CD, Comino SF & Babu KM. (2012). Here today, gone tomorrow and back again? A review of herbal marijuana alternatives (K2, spice), synthetic cannabinoids (Khalifa, Jintan, Salvia divinorum, methoxetamine, and piperazines). *Journal of Clinical Investigation*. 122(1): 11-22

21

What is K2 and how is it used

- Benign herbs sprayed with synthetic cannabinoids
- Most Often smoked

22

Management Strategies

| | |
|---|--|
| Supportive Care for the bulk of cases | Nausea/Vomiting ↓ Antiemetics |
| Agitation & Psychosis ↓ Benzodiazepines | Cardiovascular Signs ↓ Benzodiazepines & IVF |

23

Stimulants

| | |
|--|--|
| <ul style="list-style-type: none"> ■ Toxidrome <ul style="list-style-type: none"> - Agitation - Hypertension - Tachycardia - Large pupils - Dehydration - Rhabdomyolysis - Hallucinosis - Seizure - Hyperthermia - Grandiosity | <ul style="list-style-type: none"> ■ Treatment <ul style="list-style-type: none"> - ABCs - Sedation - IVFs - Cooling |
|--|--|

24

Cocaine

- Overdose deaths related to cocaine rose by over a third between 2016 and 2017
- Blocks reuptake of Serotonin, norepi, and dopamine

↑

Elevates mood, memory, appetite, sexual desire

↑

increases cardiac contractility, exacerbates psychosis



↑

increases HR and BP, triggers the release of glucose from energy stores, increases blood flow to skeletal muscle,

25

Speedball

- Heroin (opiate) with Cocaine
- Cocaine fades and heroin stays

26

Ecstasy, GHB E, Molly

- MDMA (3,4,-methylenedioxymethamphetamine)
- Methamphetamine like properties
 - Promotes Serotonin release (Elevates mood, memory, appetite, sexual desire)
- Hyperthermia, Rhabdo, Seizures, SAH
- SIADH
 - Sweating
 - Increased H2O intake
 - Intrinsic Vasopressin stimulation
- Cooling, Fluid restriction, Hypertonic saline
- 1/100 lack enzyme for break down
- Electronic dance festivals as public health concern
- Other drugs often ingested as ecstasy

27

Synthetic Cathinones: Bath salts

- Cathinone (beta ketone amphetamine)
 - stimulant found in Khat plant
 - MDPV synthetic cathinone similar to MDMA
 - Inhibits reuptake of dopamine & Norepi
- Snorted, Ingested, Smoked
- Meth like drug w/ prolonged agitation & psychosis
- Negative drug test

the guardian
 News Sport Comment Culture Business Money London 2012
 Home World news Florida
Miami man shot dead eating a man's face may have been on LSD-like drug
 Witness describes incident as 'heavily, really horrific' as police and doctors suggest attacker was on drug called bath salts
 Richard Luscombe in Miami
 (Associated Press) Tuesday 29 May 2012 18:56 BST

Public on Miami's Skyway
 A man shot dead by police as he ate the face of another man may have been under the influence of a potent LSD-like drug called bath salts, investigators believe.

28

New Bath Salt :Flakka / Gravel

- Chemical cousin of Cathinone
- synthetic stimulant Alpha-PVP
- Snorted, smoked, injected, eaten
- 800% increase in use last 3 yrs
- Highly addictive and more potent

29

Opiates

- Toxidrome
 - ALOC/Coma
 - Pin point pupils
 - Respiratory depression
 - Bradycardia
 - Hypotension
 - Hypothermia
 - Hyporeflexia
 - Decreased peristalsis

- Treatment
 - Naloxone (high dose)
 - Drips more common
 - Supportive
 - Airway/ventilation
 - Fluids / Pressors

30

Epidemiology

- Over 4 million poisonings occur annually.
- 10% of ED visits and EMS responses involve toxic exposures.
- The number of deaths from opioids in the United States has doubled since 2014
- Every day, more than 130 people die from opioid overdose.
- Last year, an estimated 12 million people misused opioids and almost 2 million people were addicted.

CDC/NCHS, National Vital Statistics System, Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC, 2018. <https://wonder.cdc.gov>
<https://www.cdc.gov/drugoverdose/pdf/pubs/2018-cdc-drug-surveillance-report.pdf>

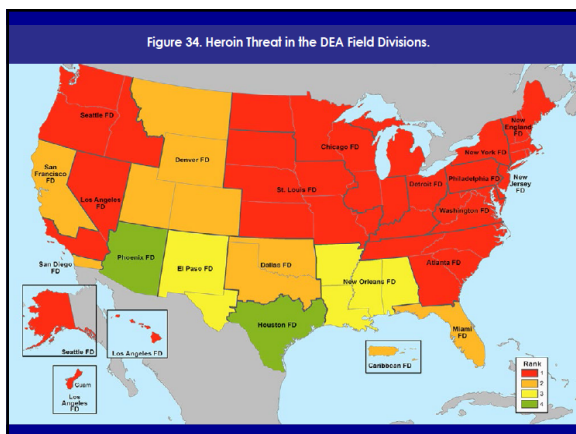
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TOP 10 Hydrocodone utilizers

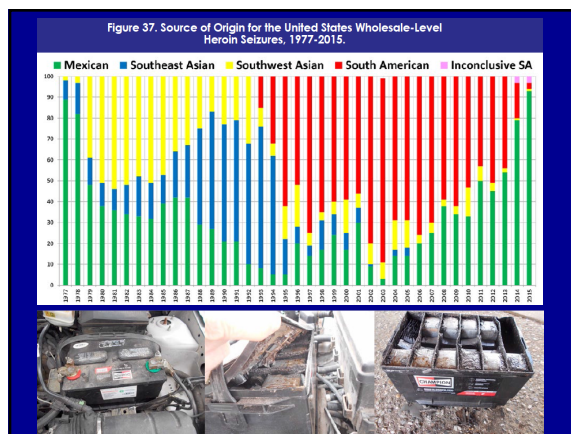
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|----------------------|------------------------|
| • 10 Guatemala | 10 kilograms |
| • 09 India | 10 kilograms |
| • 08 Vietnam | 20 kilograms |
| • 07 China | 20 kilograms |
| • 06 Denmark | 25.5 kilograms |
| • 05 Columbia | 30 kilograms |
| • 04 Syrian Republic | 50 kilograms |
| • 03 Canada | 115.5 |
| • 02 United Kingdom | 200 kilograms |
| • 01 United States | 79,700 kilograms 99.3% |

UN International Narcotics Control Board website. Estimated World Requirements of Narcotic Drugs in grams for 2014. <http://www.incb.org>. Accessed April 14, 2014.

32



33

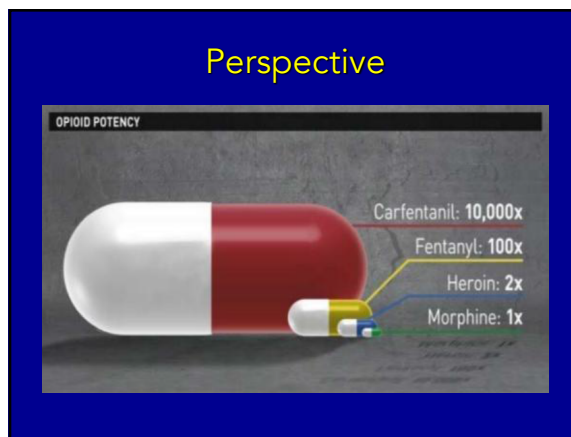


34

Profitability

| | Cost per KG | Yield per KG | Price per KG | Profit per KG |
|---------------|---------------------|--------------|--------------|-----------------------------|
| Heroin | \$5,000- \$7,000 | 1 KG | \$80,000 | \$80,000 |
| Pure Fentanyl | Columbia | 16-24 KG | \$80,000 | \$1,280,000- \$1,920,000 |
| | China | | | |
| | | | | |

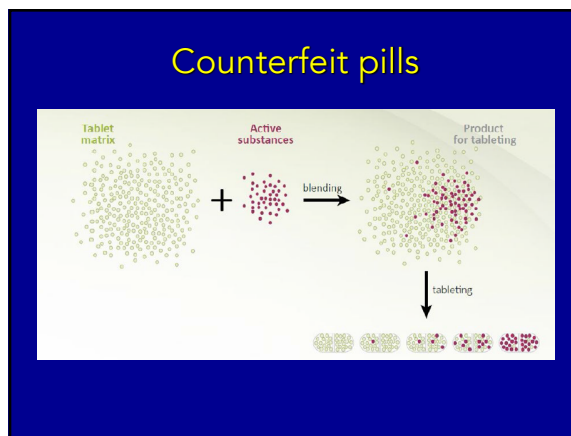
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36



37



38

Heroin

- Highly addictive
- processed from morphine
- The most abused and most rapidly acting of the opiates.
- white or brown powder or as a black sticky substance. The
 - differences in color are due to impurities left from the manufacturing process or the presence of additives.
- Pure heroin (white powder) with a bitter taste, is rarely sold on the streets.

39

Street Names

- H
- Smack
- Junk
- Horse
- China white
- Black tar
- Brown
- skag

40

Methods of Use...

- In the past heroin was mostly injected but in recent years it has been made in forms that can be smoked or snorted.
- The user feels the effect of heroin within seconds of taking it. Heroin is converted into morphine when it enters the brain, which disrupts normal brain activity and creates intense feelings of pleasure.

41

Short Term Effects of H

- Euphoria
- Warm flushing of the skin
- Dry mouth
- Heavy extremities
- Decreased mental ability
- Insensitivity to pain
- Vomiting
- Decreased Respirations
- Decreased heart rate
- DEATH

42

Long Term Effects of H

- Addiction
- High degree of tolerance
- Brain damage
- Arthritis
- Hepatitis
- Endocarditis
- HIV/AIDS
- Abscesses of the skin (at injection sites)
- DEATH

43

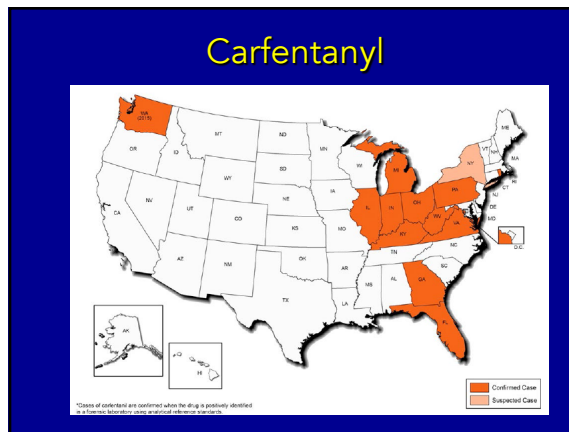
Withdrawal

- Heroin causes severe physical and psychological symptoms 6 to 8 hours after the last dosage. Painful withdrawal gets worse as time passes.
- Symptoms Include:
 - Runny nose muscle and bone pain
 - Emotional distress and restlessness
 - Diarrhea
 - Vomiting
 - Hot flashes and heavy sweating
 - Cold flashes with goose bumps
 - Insomnia
 - An overwhelming need for more heroin

44



45



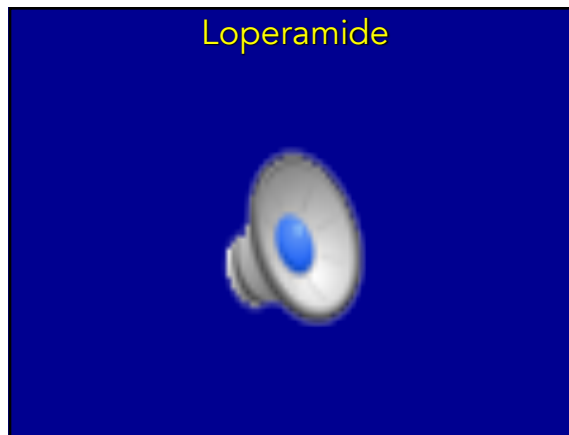
46

Loperamide

- aka immodium – max daily dose is 8 pills
- “Poor man’s methadone”
- 100-200 pills taken at a time – often blended into a smoothie.
- Death can be immediate or occur suddenly days to weeks after ingestion.
 - QT prolongation
 - Torsades
 - Ventricular arrhythmias
 - Syncope
 - Sudden cardiac arrest

Wu PE & Jurlink DN (2017). Clinical Review: Loperamide Toxicity. *Annals of Emergency Medicine*. 70(2), 205-202

47



48

Are we at risk from incidental/passive fentanyl exposure?

- American College of Medical Toxicology (ACMT) and the American Academy of Clinical Toxicology (AACT) say **NO**
- 2017 joint position statement discussing occupational fentanyl and fentanyl analog exposure to emergency responders. Their position is that the risk of clinically significant exposure to fentanyl and its analogs to emergency responders is extremely low. They also report that the transdermal absorption of fentanyl powder is extremely unlikely to occur. Inhalation is equally unlikely because fentanyl powder isn't aerosolized, and it would be exceptionally rare for drug droplets or particles to be suspended in the air.

Moss MJ, Warrick BJ, Nelson LS, et al. ACMT and AACT position statement: Preventing occupational fentanyl and fentanyl analog exposure to emergency responders. *J Med Toxicology*. 2017;13(4):347-351.

49

Before we talk about narcan

- In pharmacokinetic studies, the dose adjusted bioavailability of a single 4 mg dose of Narcan Nasal Spray is approximately 47% as compared to naloxone administered by intramuscular (IM) injection.

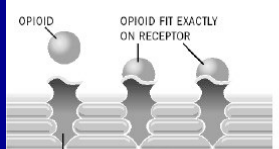
NARCAN Nasal Spray - naloxone hydrochloride nasal spray 4mg/0.1ml. Daily Med; [cited 2016 August]. Available from: <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=724df050-5332-4d0a-9a5f-17bf08a547e1>.

50

Pharmacokinetics of Narcan

OPIOID OVERDOSE

The brain has many receptors for opioids. An overdose occurs when too much of an opioid, such as heroin or Oxycodone, fits in too many receptors, slowing and then stopping breathing.

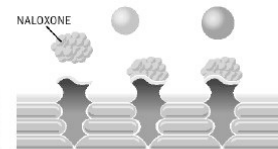


OPIOID

OPIOID FIT EXACTLY ON RECEPTOR

NALOXONE REVERSING AN OVERDOSE

Naloxone has a stronger affinity to the opioid receptors, so it knocks the opioids off the receptors for a short time. This allows the person to breathe again and reverses the overdose.



NALOXONE

51

JAMA Internal Medicine | Original Investigation | HEALTH CARE POLICY AND LAW

Association Between State Laws Facilitating Pharmacy Distribution of Naloxone and Risk of Fatal Overdose

Rahi Abouk, PhD, Rosalie Liccardo Pacula, PhD; David Powell, PhD

- NALs were associated with 0.313 (95% CI, 0.148-0.478; P = .001) fewer opioid deaths per 100 000 people relative to the year before adoption. In the following years, we estimate even greater reductions, implying 0.387 (95%CI,0.119-0.656;P = .007) fewer opioid deaths per 100000 people. Relative to the mean number of opioid deaths in the 2016 states without direct-authority NALs (1.14 per 100000 people), these estimated reductions imply **decreases of 27%** in the second post adoption year **and 34%** in subsequent years.

Abouk R, Pacula RL, Powell D. Association Between State Laws Facilitating Pharmacy Distribution of Naloxone and Risk of Fatal Overdose. JAMA Intern Med. Published online May 06, 2019. doi:10.1001/jamainternmed.2019.0272

52



Washington
10:17 AM ET

OVERDOSE EPIDEMIC

SURGEON GENERAL: OPIOID OVERDOSES AN EPIDEMIC

CNN
7:37 AM PT
NEWSROOM

53



54

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56

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57