

The Neurobiology of Addiction and Provider Wellness During the Pandemic

New England HIMSS

DISCLOSURE:

I have no connection to nor financial interests in any
pharmaceutic or other agencies

Objectives

- Introduction to the neurobiology of addiction
- Providing care in the emergency department and residential treatment center through the pandemic
- Discuss the impact of COVID-19 on provider wellness and strategies for maintaining wellness

Emergency Medicine 1990-1993



Griffin Hospital



- Community Hospital Derby, Connecticut
- 160 Beds
- ED 35,000 Visits
- Admission Rate 14%
- 30% ED visits are substance abuse related
- Planetree/Patient Centered Care





- 115 beds
- Level 3.3 Facility
- 60% of the staff in recovery
- Provide Psychiatric and Rehabilitation Services
- Average LOS 29 days
- Approximately 1,000 annual residential visits

High Watch Recovery Center



Medical model of addiction



In 1980, Addiction is
considered a moral
failure.



Medical model of addiction

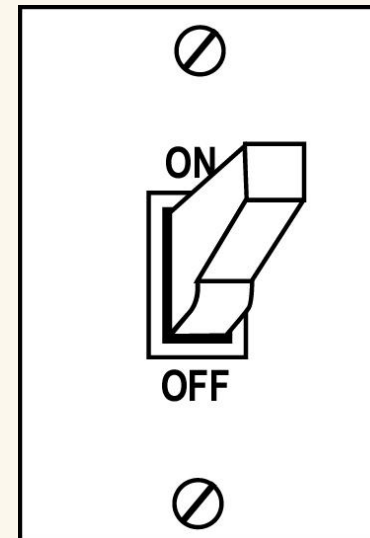
Biopsychosocial Model:

Biological factors

Psychological factors

Social factors

Relapse: triggers, stress, primers



Neurotransmitters

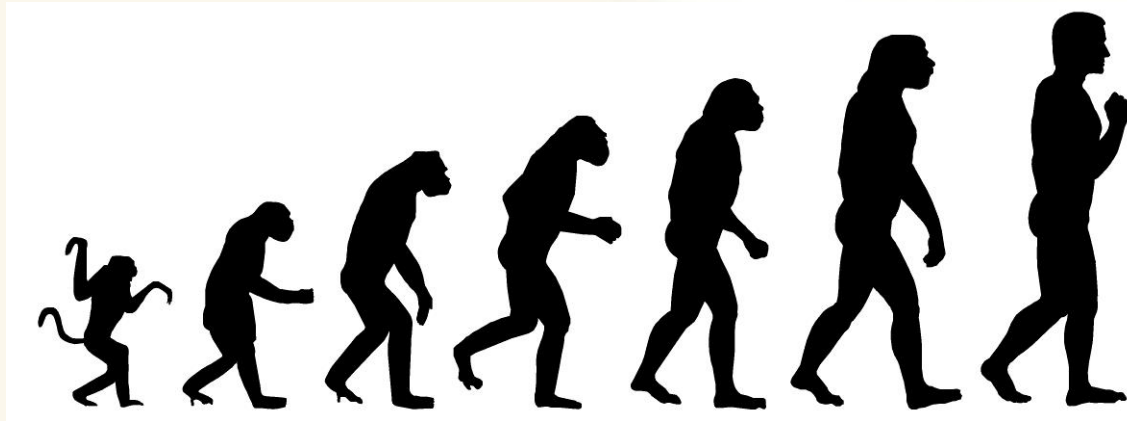


DRUGS OF ABUSE	ENDOGENOUS NEUROTRANSMITTERS
ALCOHOL	GABA, Glutamate
AMPHETAMINES and COCAINE	Dopamine
BENZODIAZEPINES and GHB	GABA
CANNABIS	Anandamide
HALLUCINAGENS and MDMA	Serotonin
NICOTINE	Acetylcholine
OPIIDS	Endorphins
PHENCYCLIDINE and KETAMINE	Glutamate

Final Pathway of Abuse

Drugs of abuse increase dopamine in the Nucleus Accumbens in ways that surpass the dopamine increases that occur when triggered by natural reinforcers such as food and sex.

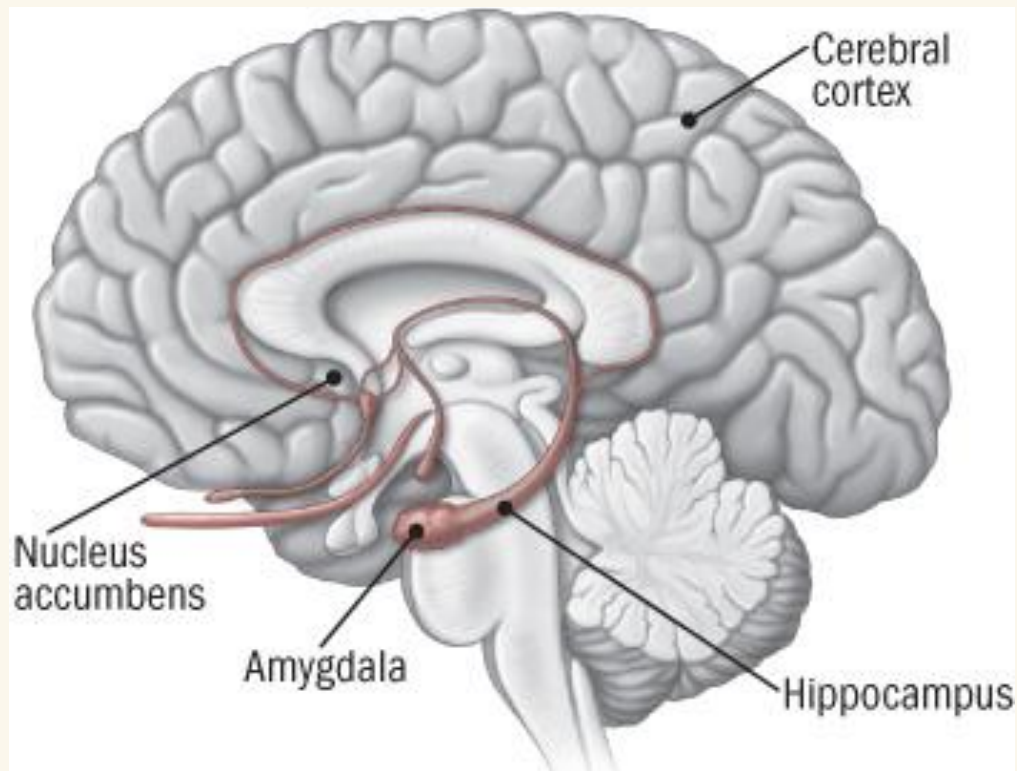
Evolution of Human Race



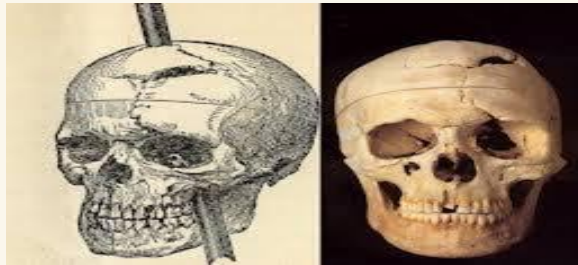
SIX HUMAN NEEDS

- **CERTAINTY**
- **VARIETY**
- **SIGNIFICANCE**
- **LOVE / CONNECTION**
- **GROWTH**
- **CONTRIBUTION**

Nucleus Accumbens



September 13th, 1848



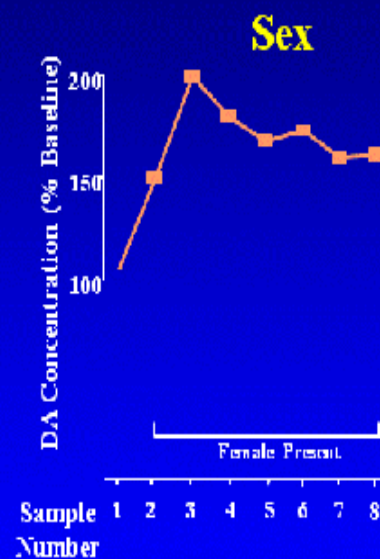
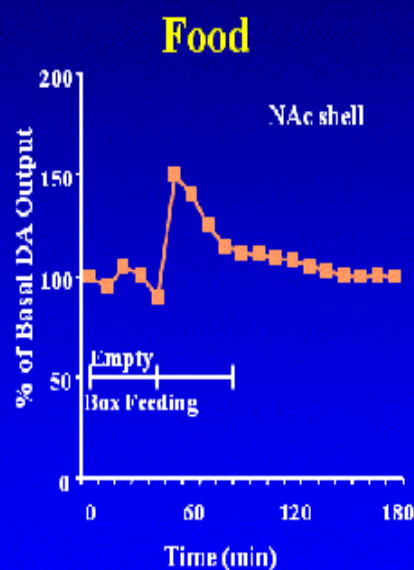


Dr. John Martin Harlow

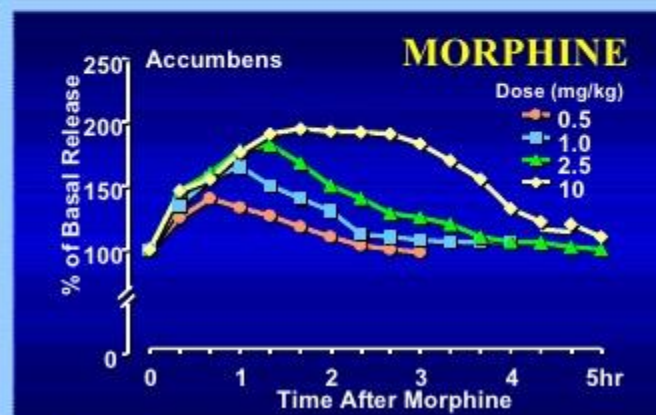
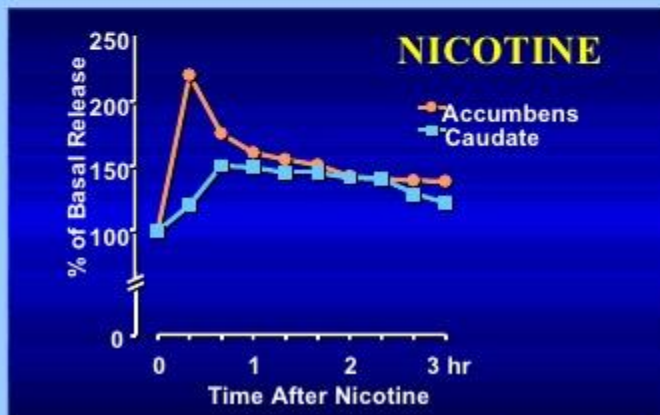
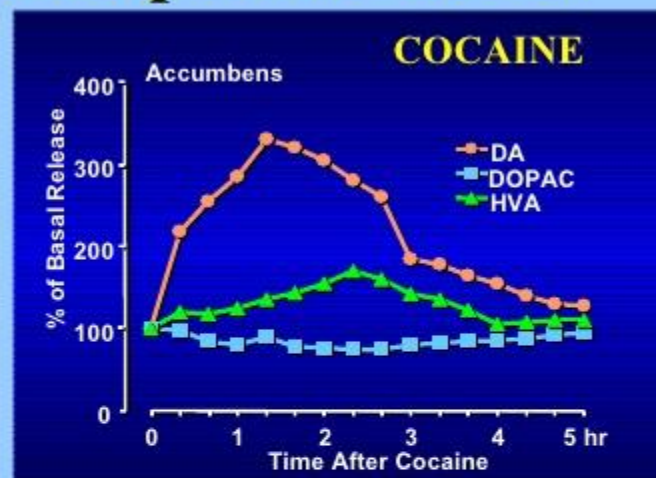
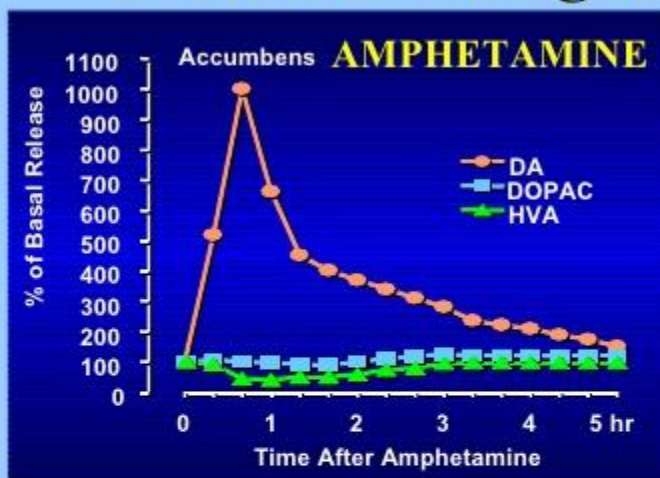
September 13th, 1850



Natural Rewards Elevate Dopamine Levels

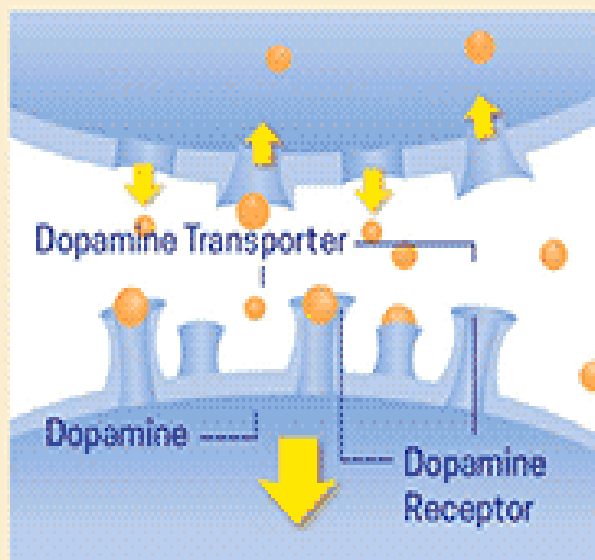


Effects of Drugs on Dopamine Levels

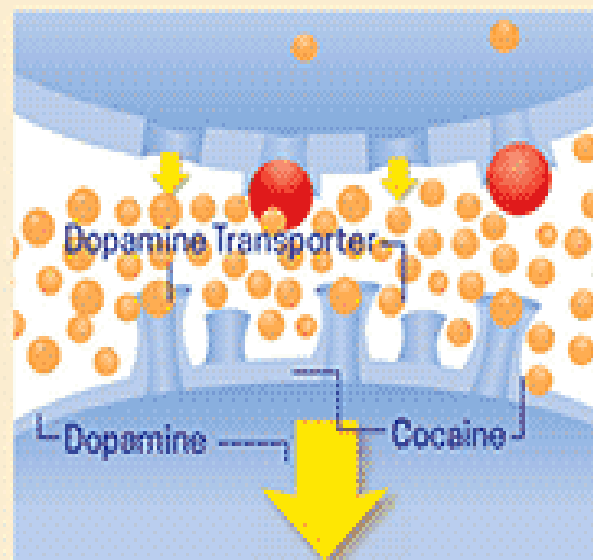


Source: Di Chiara and Imparato

How drugs can increase dopamine



While eating food

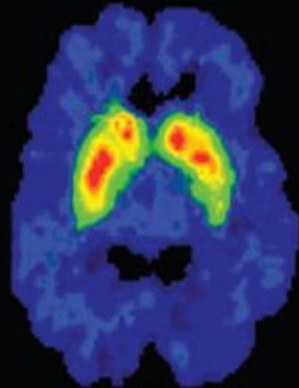


While using cocaine

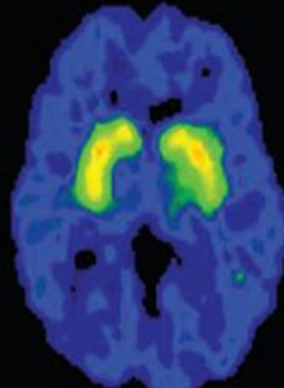
Typically, dopamine increases in response to natural rewards such as food. When cocaine is taken, dopamine increases are exaggerated, and communication is denied.

Our Brains Do Recover

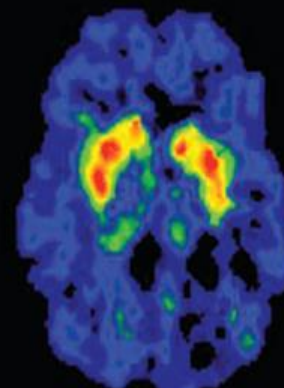
BRAIN RECOVERY WITH PROLONGED ABSTINENCE



HEALTHY
CONTROL



1 MONTH OF
ABSTINENCE



14 MONTHS OF
ABSTINENCE

Pharmacologic strategies for addiction

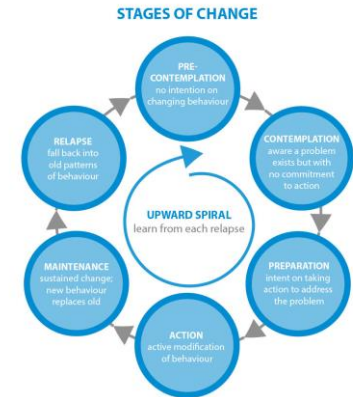
- **Agonists** - Nicotine Replacement for tobacco, Methadone for opiates
- **Antagonists** – Naltrexone (Vivitrol)
- **Partial Agonists** – Varenicline (Chantix) for tobacco, Buprenorphine (Subutex) for opioids



Non-pharmacologic strategies



Self-help groups (12 step program)



Motivational Interviewing techniques



Traditional types of talk therapy and counseling

Alcohol Impairment



MALE ALCOHOL IMPAIRMENT CHART

APPROXIMATE BLOOD ALCOHOL PERCENTAGE

DRINKS	BODY WEIGHT IN POUNDS										IMPAIRMENT BEGINS DRIVING SKILLS AFFECTED POSSIBLE CRIMINAL PENALTIES LEGALLY INTOXICATED CRIMINAL PENALTIES
	140	160	180	200	220	240	260	280	300	320	
1	.04	.04	.03	.02	.02	.02	.02	.01	.01	.01	
2	.09	.07	.06	.05	.04	.04	.03	.03	.02	.02	
3	.13	.11	.09	.08	.07	.06	.05	.04	.04	.03	
4	.18	.15	.12	.10	.09	.08	.07	.06	.05	.04	
5	.22	.18	.15	.13	.11	.10	.08	.07	.06	.05	
6	.26	.22	.18	.16	.13	.12	.10	.09	.07	.06	
7	.30	.26	.21	.18	.16	.14	.12	.10	.09	.08	
8	.35	.29	.24	.21	.18	.16	.13	.12	.10	.09	
9	.40	.33	.27	.24	.20	.17	.15	.13	.11	.10	
10	.43	.36	.31	.26	.22	.19	.17	.14	.12	.11	

Your body can get rid of one drink per hour.
Each 1.5 oz. of 80 proof liquor, 12 oz. of beer or 5 oz. of table wine = 1 drink.

FEMALE ALCOHOL IMPAIRMENT CHART

APPROXIMATE BLOOD ALCOHOL PERCENTAGE

DRINKS	BODY WEIGHT IN POUNDS								IMPAIRMENT BEGINS DRIVING SKILLS AFFECTED POSSIBLE CRIMINAL PENALTIES LEGALLY INTOXICATED CRIMINAL PENALTIES
	100	120	140	160	180	200	220	230	
1	.04	.03	.03	.02	.02	.02	.01	.01	
2	.09	.07	.05	.04	.04	.03	.03	.02	
3	.13	.10	.08	.06	.05	.04	.04	.03	
4	.17	.13	.11	.09	.07	.06	.05	.04	
5	.22	.17	.13	.11	.09	.07	.06	.05	
6	.26	.20	.16	.13	.11	.09	.07	.06	
7	.30	.24	.19	.15	.13	.10	.08	.07	
8	.35	.27	.22	.18	.14	.12	.10	.08	
9	.40	.31	.24	.20	.16	.13	.11	.10	
10	.44	.39	.31	.22	.18	.15	.12	.11	

Your body can get rid of one drink per hour.
Each 1.5 oz. of 80 proof liquor, 12 oz. of beer or 5 oz. of table wine = 1 drink.

Screening Assessment Tool

To reduce the risk of harm from alcohol, **men and women** should **drink no more than 10 standard drinks** per week and **4 standard drinks in one day**

Table 6. CAGE Screen For Alcohol Abuse.

C = "Have you ever felt you should **Cut** down on your drinking?"

A = "Have people **Annoyed** you by criticizing your drinking?"

G = "Have you ever felt bad or **Guilty** about your drinking?"

E = "Have you ever had a drink as an **Eye-opener** first thing in the morning to steady your nerves or help a hangover?"

Yes to two or more: probable alcohol abuse

Source: Mayfield D, McLeod G, Hall P. The CAGE questionnaire: validation of a new alcoholism screening instrument. *Am J Psychiatry* 1974 Oct;131(10):1121-1123.

Criteria for alcohol use disorder



- Drinking more, or longer than intended
- Tried to cut down or stop and couldn't
- Spending a lot of time drinking/hungover
- So bad you couldn't think of anything else
- Causing family, job, school troubles
- Continue despite trouble, family/friends
- Given up other activities enjoyed
- Placing you in danger (unsafe sex)
- Continued even though making you sick
- Developing tolerance
- Withdrawal

Alcohol Misuse



88,000 deaths/year (US)

2.5 million years of potential life lost (YPLL) each year in the United States

Shortening the lives of those who died by an average of 30 years.

1 in 10 deaths among working-age adults aged 20-64 years.

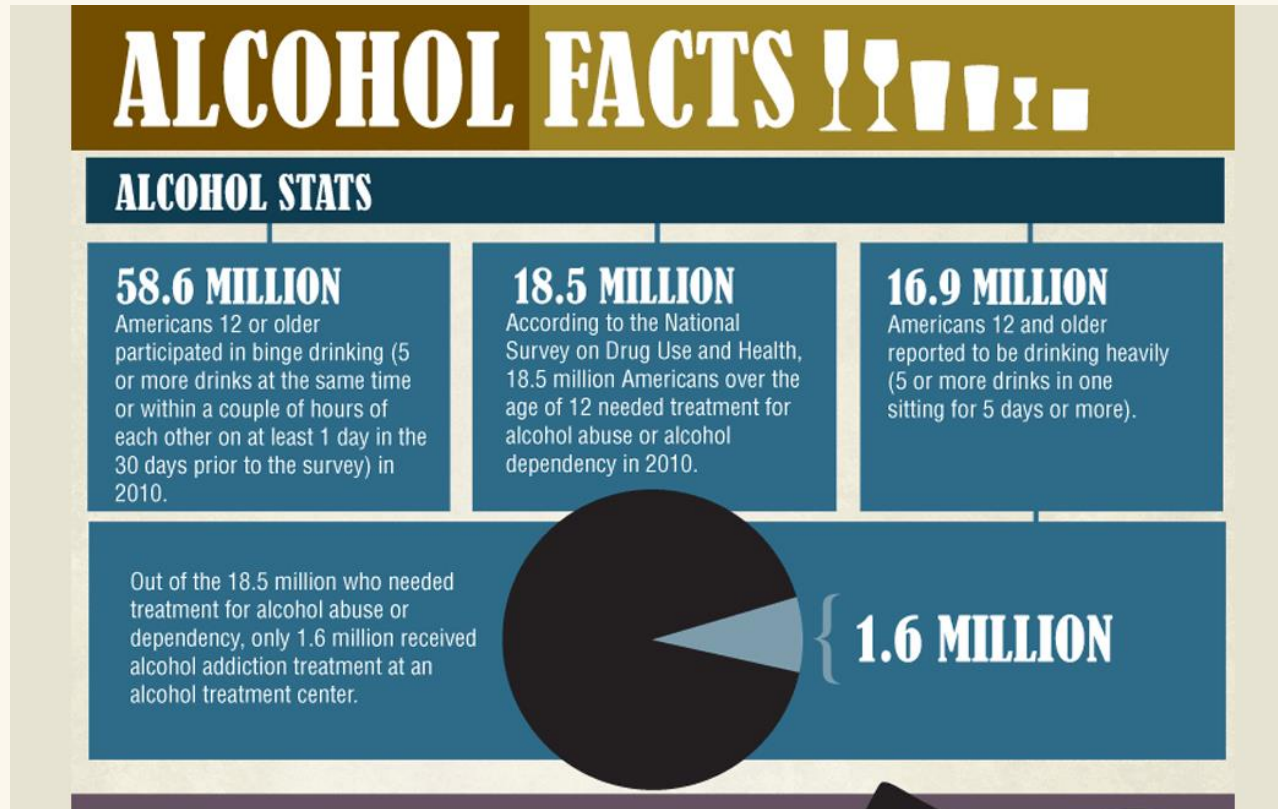
Costs of excessive alcohol consumption in 2010 were estimated at \$249 billion

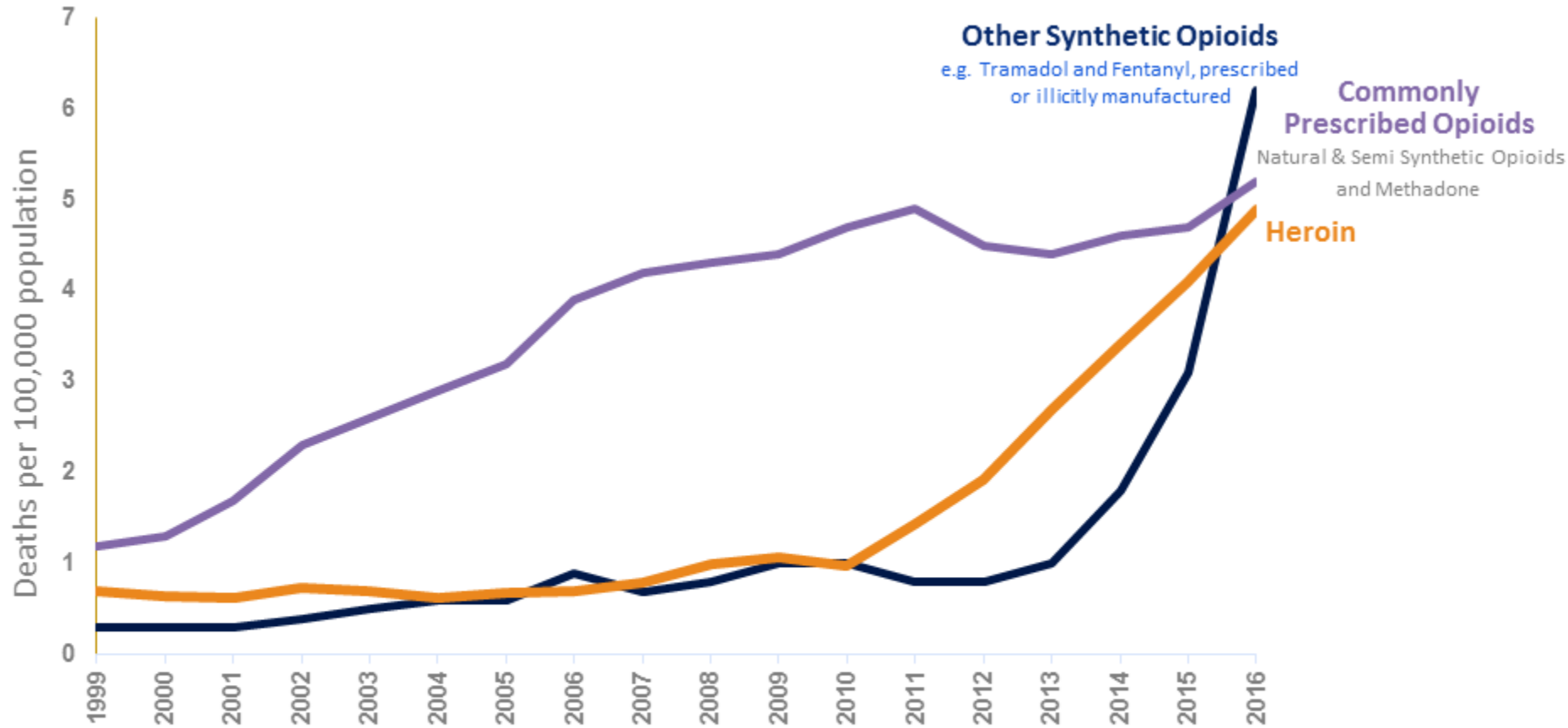
How Common is Addiction?



Alcohol use disorder impacts 10% of the GENERAL PUBLIC

Drug use disorder impacts 5% of the GENERAL PUBLIC





Wave 1: Rise in Prescription Opioid Overdose Deaths

Wave 2: Rise in Heroin Overdose Deaths

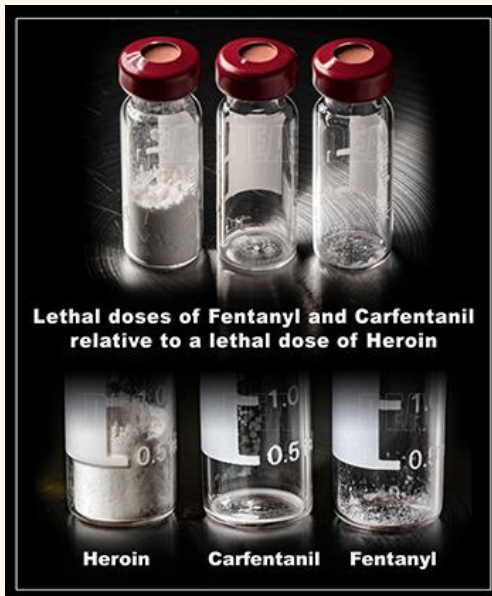
Wave 3: Rise in Synthetic Opioid Overdose Deaths

Fentanyl Potencies

Fentanyl is a synthetic opiate that is 50x more potent than heroin.
Fentanyl is 100x more potent than morphine.

Sufentanil is 5-10x more potent than Fentanyl.

Carfentanil is 10,000 X more potent than morphine and 100x more potent than fentanyl.



THE OPIOID EPIDEMIC BY THE NUMBERS

2016 and 2017 Data



130+

People died every day from
opioid-related drug overdoses³
(estimated)



11.4 m

People misused
prescription opioids¹



42,249

People died from
overdosing on opioids²



2.1 million

People had an opioid use
disorder¹



886,000

People used heroin¹



81,000

People used heroin
for the first time¹



2 million

People misused prescription
opioids for the first time¹



17,087

Deaths attributed to
overdosing on commonly
prescribed opioids²



15,469

Deaths attributed to
overdosing on heroin²



19,413

Deaths attributed to
overdosing on synthetic
opioids other than
methadone²

SOURCES

1. 2017 National Survey on Drug Use and Health, Mortality in the United States, 2016
2. NCHS Data Brief No. 293, December 2017
3. NCHS, National Vital Statistics System. Estimates for 2017 and 2018 are based on provisional data.



ADDICTION IS A TREATABLE CONDITION

Alcoholic Anonymous



- Most influential self help group in the world
- Helped more people stop drinking than medicine, psychology, and psychiatry combined
- Over 2 million members
- Alcoholism is a disease, No cure, total abstinence
- Attend daily meetings
- Get a sponsor

AA was started by 2 men in 1935



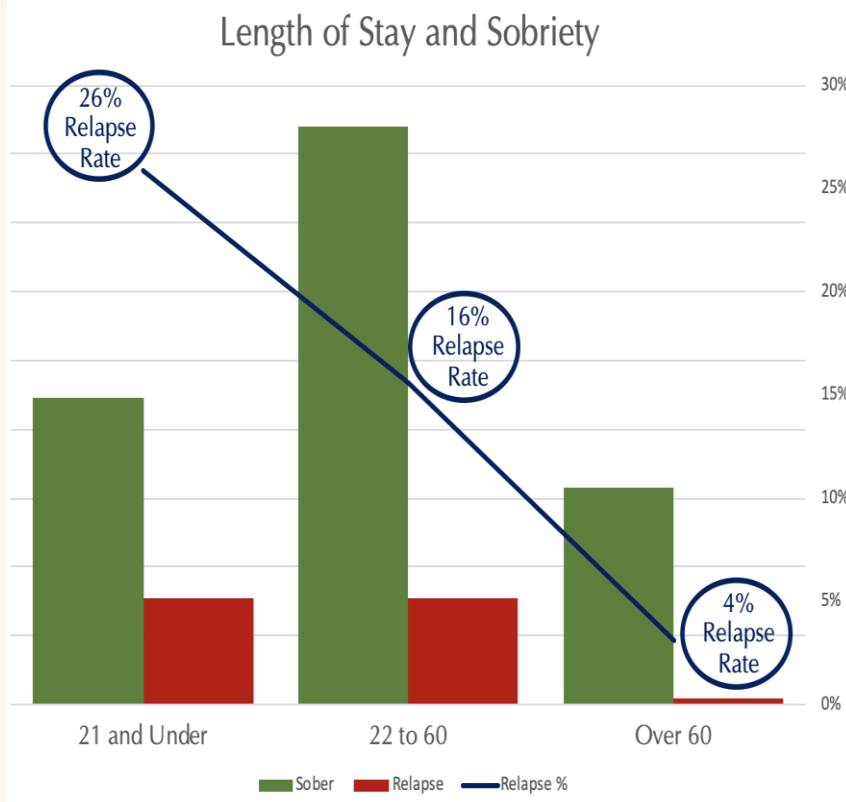
The Twelve Steps

OF ALCOHOLICS ANONYMOUS

- 1 WE ADMITTED WE WERE POWERLESS OVER ALCOHOL - THAT OUR LIVES HAD BECOME UNMANAGEABLE.
- 2 CAME TO BELIEVE THAT A POWER GREATER THAN OURSELVES COULD RESTORE US TO SANITY.
- 3 MADE A DECISION TO TURN OUR WILL AND OUR LIVES OVER TO THE CARE OF GOD AS WE UNDERSTOOD HIM..
- 4 MADE A SEARCHING AND FEARLESS MORAL INVENTORY OF OURSELVES.
- 5 ADMITTED TO GOD, TO OURSELVES, AND TO ANOTHER HUMAN BEING THE EXACT NATURE OF OUR WRONGS.
- 6 WERE ENTIRELY READY TO HAVE GOD REMOVE ALL THESE DEFECTS OF CHARACTER.
- 7 HUMBLY ASKED HIM TO REMOVE OUR SHORTCOMINGS.
- 8 MADE A LIST OF ALL PERSONS WE HAD HARMED, AND BECAME WILLING TO MAKE AMENDS TO THEM ALL.
- 9 MADE DIRECT AMENDS TO SUCH PEOPLE WHEREVER POSSIBLE, EXCEPT WHEN TO DO SO WOULD INJURE THEM OR OTHERS.
- 10 CONTINUED TO TAKE PERSONAL INVENTORY AND WHEN WE WERE WRONG PROMPTLY ADMITTED IT.
- 11 SOUGHT THROUGH PRAYER AND MEDITATION TO IMPROVE OUR CONSCIOUS CONTACT WITH GOD AS WE UNDERSTOOD HIM - PRAYING ONLY FOR KNOWLEDGE OF HIS WILL FOR US AND THE POWER TO CARRY THAT OUT.
- 12 HAVING HAD A SPIRITUAL AWAKENING AS THE RESULT OF THESE STEPS WE TRIED TO CARRY THIS MESSAGE TO ALCOHOLICS, AND TO PRACTICE THESE PRINCIPLES IN ALL OUR AFFAIRS.

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Treatment Outcomes



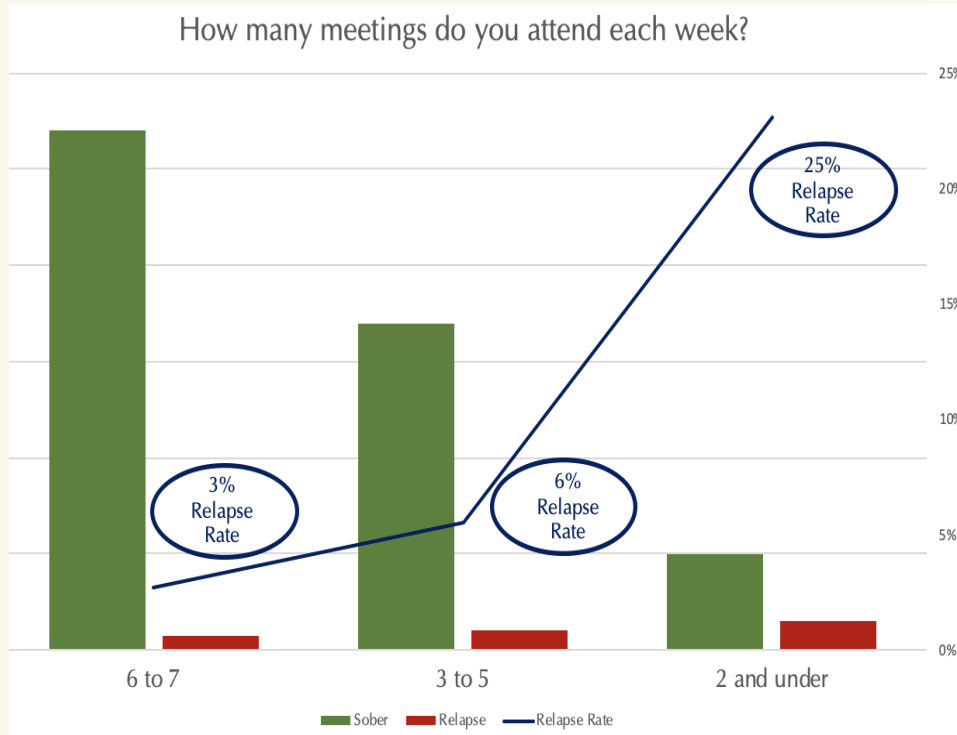
Most High Watch guests stay between 22 and 60 days.

The longer guests stay, the more likely they are to be successful in their recovery. Guests who stay from 22 to 60 days relapse at a rate of 16%, compared to 26% of guests who stay 21 or fewer days.

Those who stay over 60 days relapse at a rate of only 4%.

Bottom Line: The longer one stays in treatment, the more likely they are for sustained recovery

Meetings Matter



If alumni go to five or more meetings each week, they do much better than those who attend fewer (or no) meetings.

Most High Watch guests attend six or more meetings each week after they leave.

Those guests relapse at a much lower rate than those who attend fewer than two meetings or none, at all.

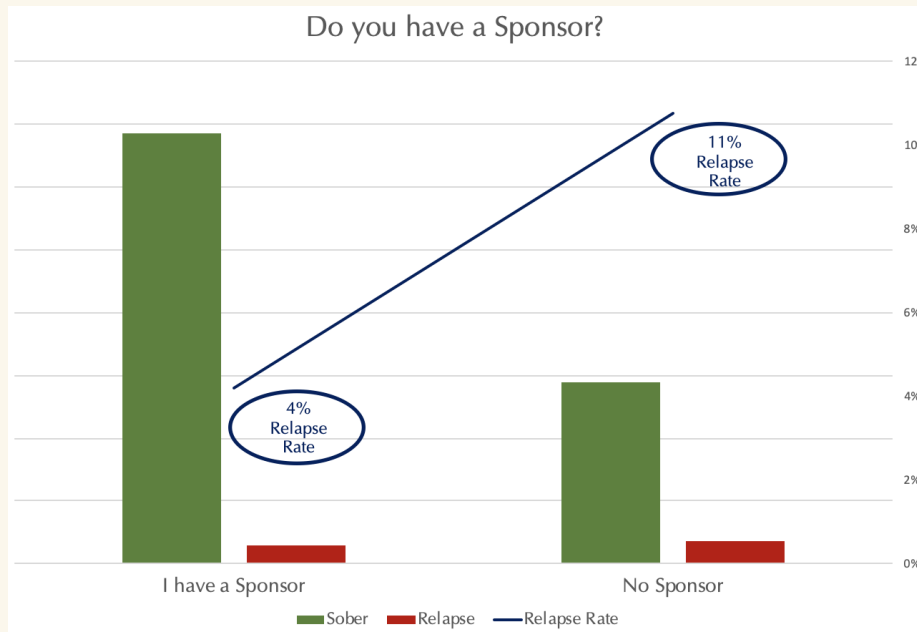
Alumni who regularly attend meetings relapse at a rate of 3% versus 25% for those who do not attend meetings.

*Results are based on a 2019 sample of 398 respondents and measure one-month recovery rates.

Get a Sponsor



A sponsor keeps you grounded in your recovery!

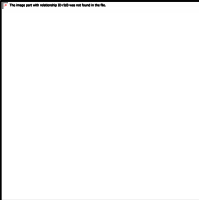


Most High Watch guests find a sponsor shortly after leaving High Watch.

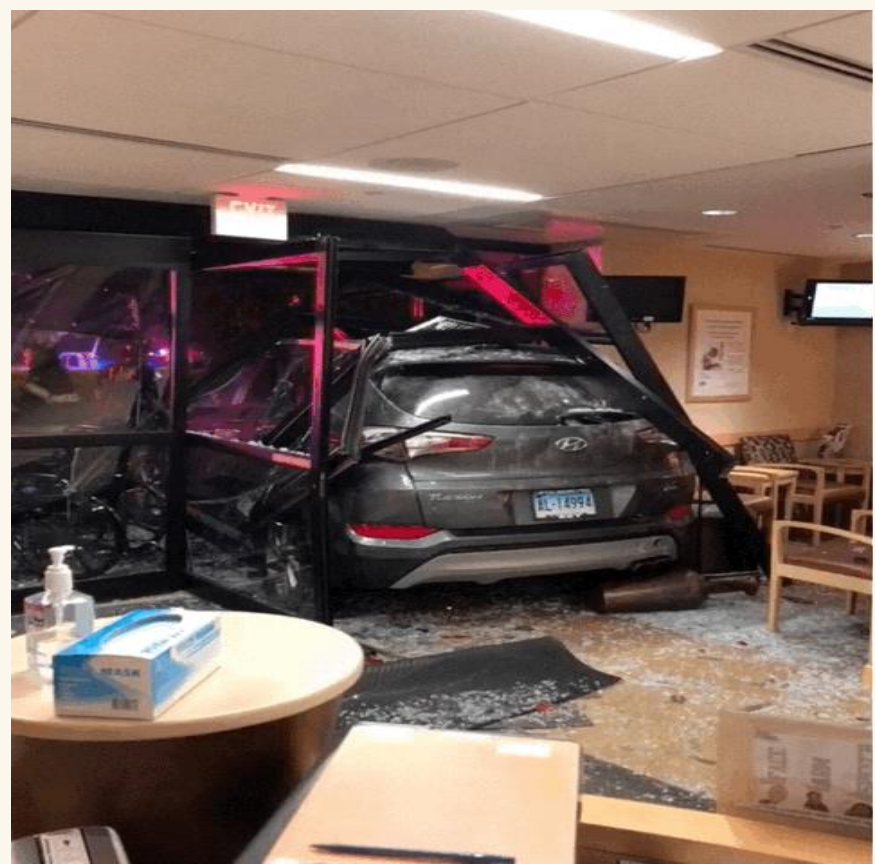
Those who do build a relationship with a sponsor relapse at a rate of 4% as compared to those alumni who do not find a sponsor. They relapse at nearly triple the rate of those who do.

*Results are based on a 2019 sample of 398 respondents and measure one-month recovery rates.

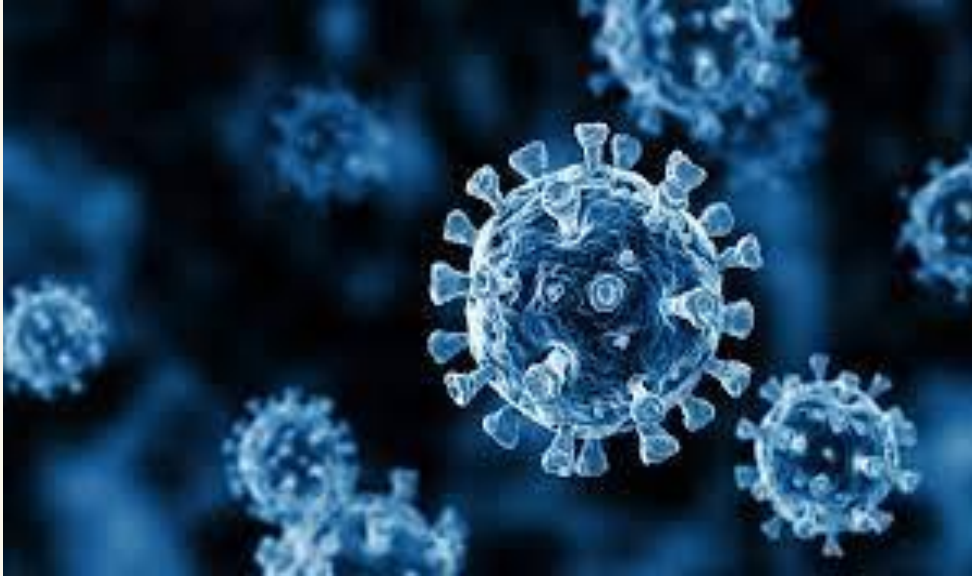




Otilie Lundgren
Fifth Victim of 2001
Anthrax Attacks



COVID-19 Unprecedented



Never done or known before

COVID-19 Panic



COVID-19

Fear
Lack of Support
Helpless
Unappreciated
Abandoned



“Everything rises and falls on leadership”

John C Maxwell

What worked and what didn't



Setting one	Setting two
Leadership –proactive, aggressive, lead by example	Out of sight
Relentless Pursuit of PPE, testing and diagnostics	Rationing of PPE, critical of non-essential use
Recognized and rewarded staff (battle pay) for front line courage	Pay cuts, signs
Allowed Eligible staff to work at home (Clinical telehealth)	Allowed Eligible staff to work at home (management)
Mandated staff vaccination at onset	Elective staff vaccination at onset
Set up vaccination center	Set up vaccination center
Applied for COVID Relief funds	Applied for COVID Relief funds

Case Reports > Healthcare (Basel). 2021 Jan 17;9(1):88. doi: 10.3390/healthcare9010088.

A Case Series: Successfully Preventing COVID-19 Outbreak in a Residential Community Setting at a Drug and Alcohol Addiction Treatment Center

Kenneth Hanton ¹, Douglas McHugh ¹, Gregory Boris ¹ ■

Affiliations + expand

PMID: 33477319 PMCID: PMC7829973 DOI: 10.3390/healthcare9010088

Free PMC article

 Full text links

 Cite

Wellness through Crisis



- Exercise
- Breathing - Palm Springs
- Gratitude
- Incantations



Objectives

- Provide an understanding of the neurobiology of addiction
- Present our experience in providing care and maintaining operations in the emergency department and residential treatment center through the pandemic
- Discuss the impact of COVID-19 on provider wellness and strategies for maintaining wellness

Questions ?

