

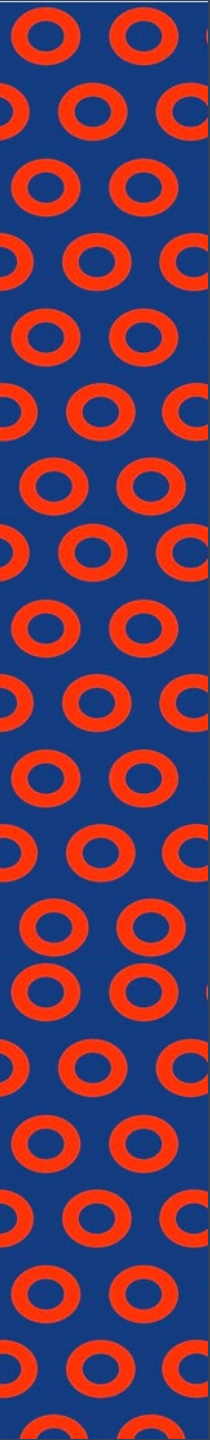
Infectious Diseases Associated with Injection Drug Use: Our fight too!

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Disclosures.

- Consultant for Boston Health Care for the Homeless



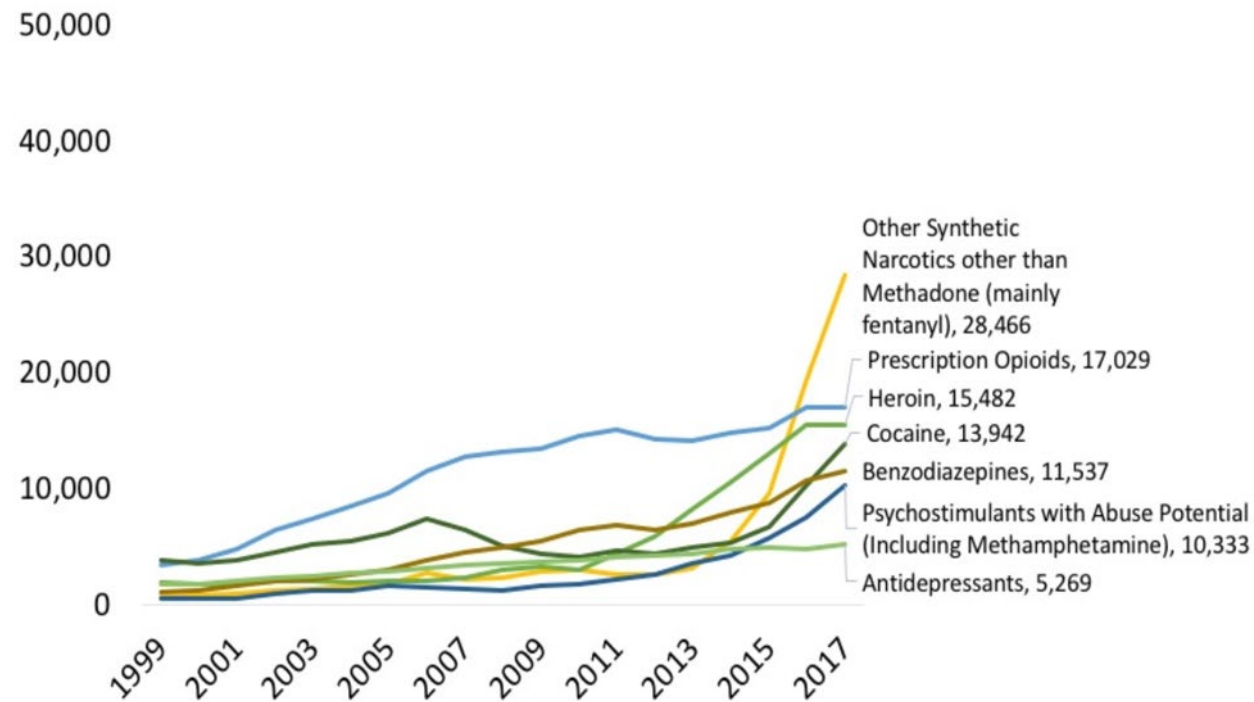
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Overdose crisis continues to expand and evolve.

National Drug Overdose Deaths Number Among All Ages, 1999-2017



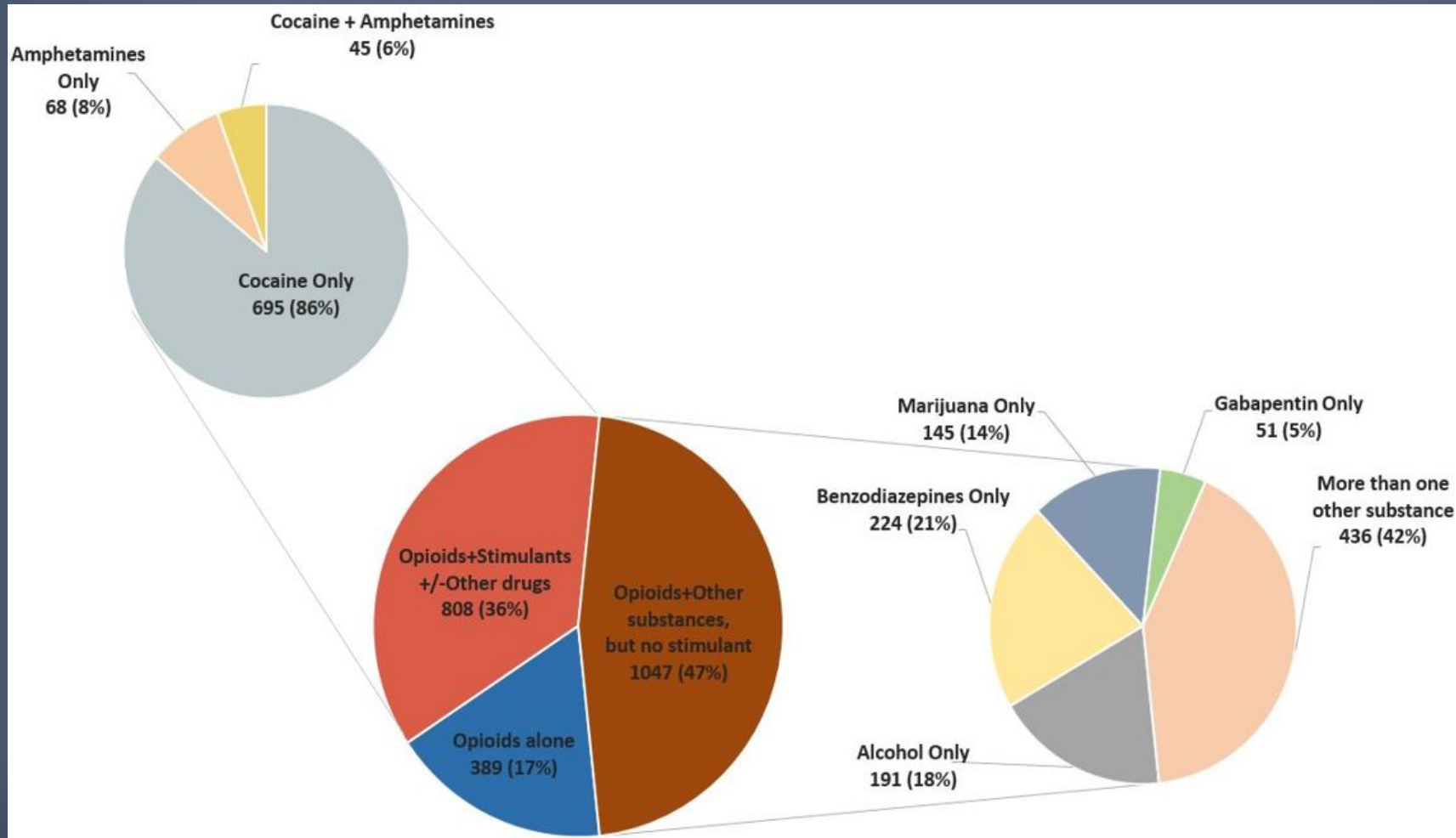
Source: : Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018



Among the 445 opioid-related overdose deaths in 2019 in MA where a toxicology screen was also available, 410 of them (92%) had a positive screen result for fentanyl.

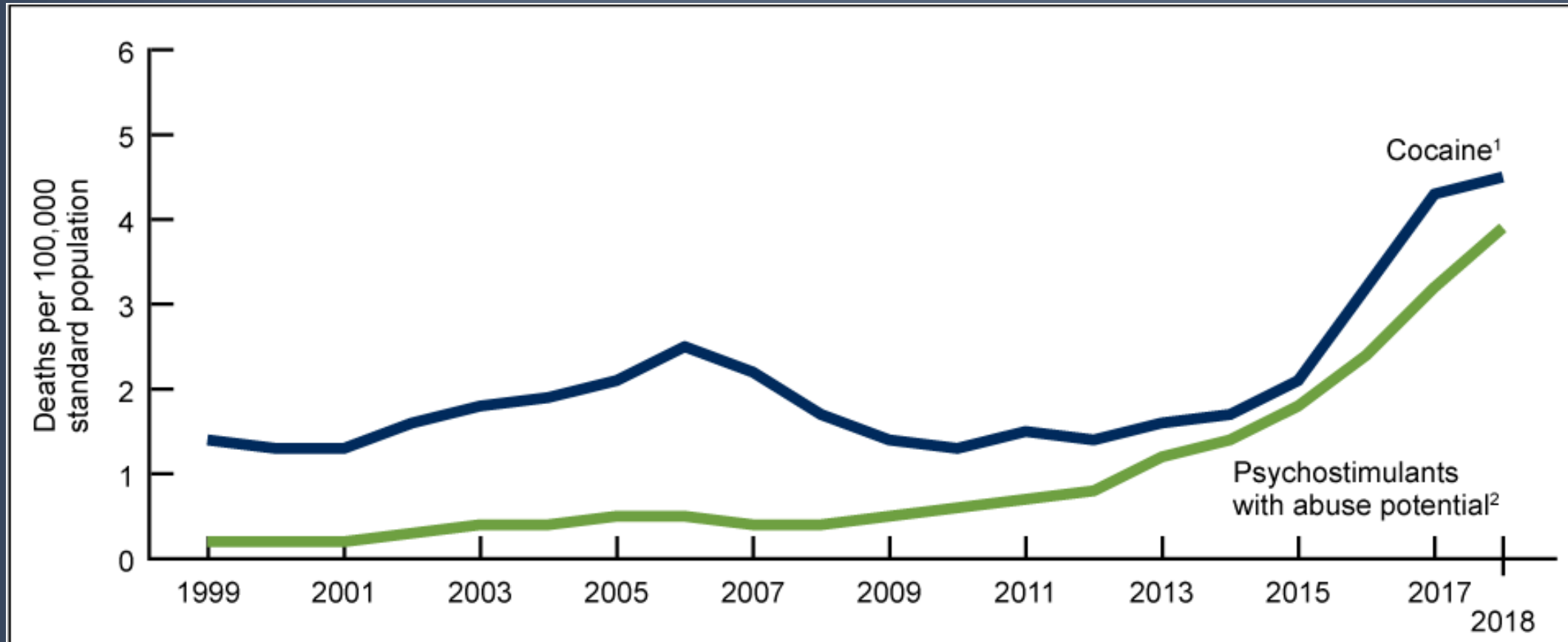


Polysubstance use is the rule, not the exception.



Reproduced from *Barocas et al. DAD. 2019*

Stimulant-related deaths in US.



Increasingly stimulants and fentanyl.

Rank	Cocaine	Methamphetamine	Heroin	Fentanyl
1	Maryland (14.6%)	Arkansas (28.7%)	Washington (6.3%)	Kentucky (16.2%)
2	Maine (13.8%)	Iowa (20.8%)	New Mexico (6.0%)	Ohio (13.6%)
3	Ohio (12.2%)	Washington (20.7%)	Alaska (4.9%)	Maryland (13.0%)
4	Virginia (10.7%)	Kentucky (20.3%)	Kentucky (4.0%)	Maine (10.1%)
5	North Carolina (10.0%)	Minnesota (16.5%)	Utah (3.2%)	New Hampshire (9.6%)
6	Louisiana (7.3%)	New Mexico (15.5%)	Virginia (3.1%)	Illinois (8.6%)
7	Kentucky (7.1%)	Alaska (13.5%)	Nevada (3.0%)	Virginia (8.3%)
8	Illinois (6.2%)	Montana (12.3%)	Ohio (2.7%)	Arizona (4.1%)
9	Wisconsin (5.3%)	Missouri (10.5%)	Oregon (2.6%)	New Mexico (3.4%)
10	New Mexico (5.3%)	Idaho (9.8%)	California (2.5%)	Louisiana (3.3%)

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What does this fentanyl/stimulant use mean?

- Fentanyl has a shorter half-life than heroin and prescription opioids
- Cocaine also has a short half-life
- Can be co-administered (e.g., goofballs, speedballs) or as contaminants
- Leading to increased injection frequency





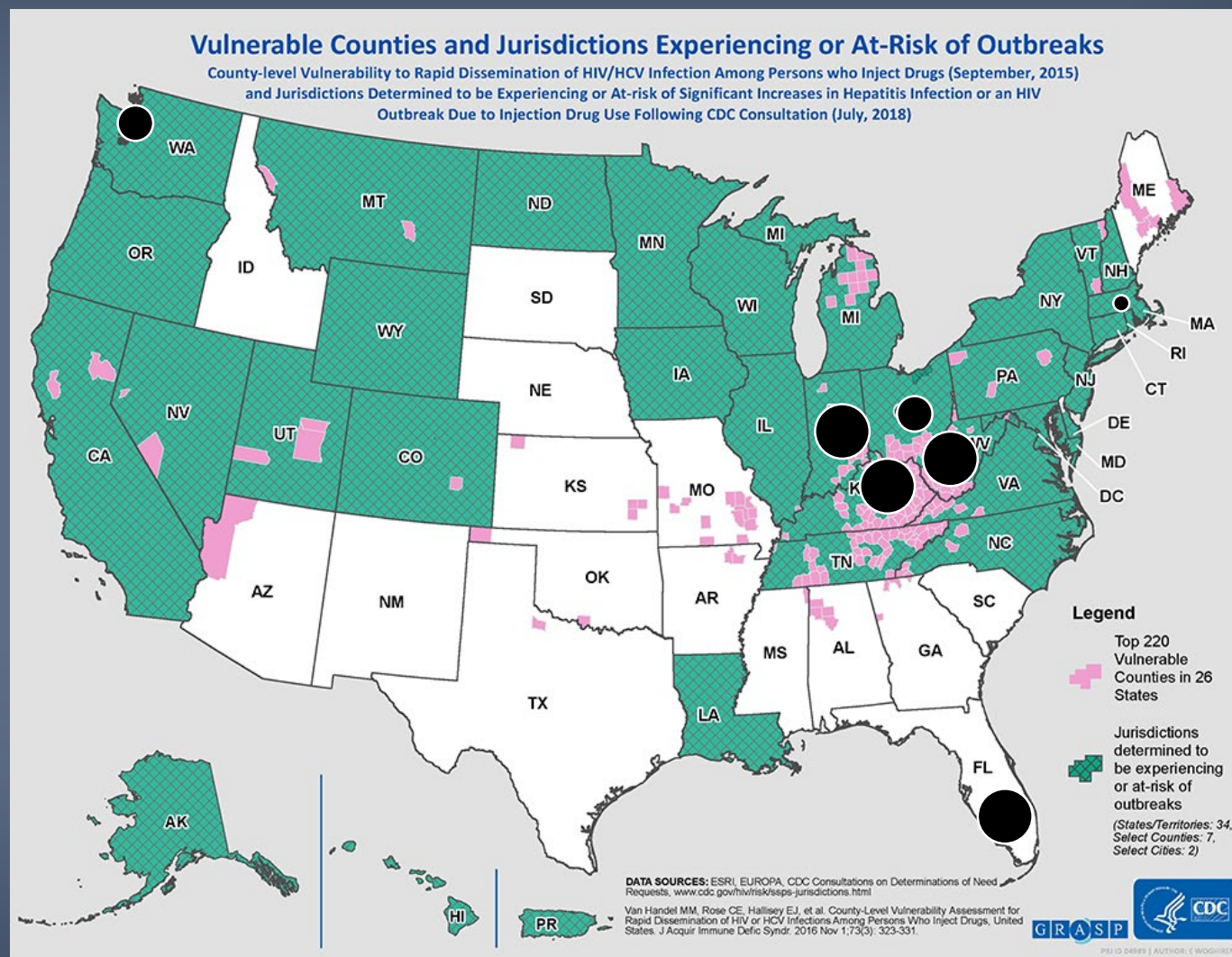
What does this fentanyl/stimulant use mean?

- Increased injection frequency is tied to other high risk injection practices
- Sharing or reusing injection equipment: needles, syringes, cookers, cottons, water
- Not cleaning one's skin prior to injection
- The result...?



HIV.

- 10% new HIV cases among PWID
- 1 in 26 women/1 in 42 men who inject
- New HIV outbreaks continue to emerge
- In Massachusetts-Lowell, Lawrence, and Boston and in Kentucky, specifically





People are at risk for more than HIV

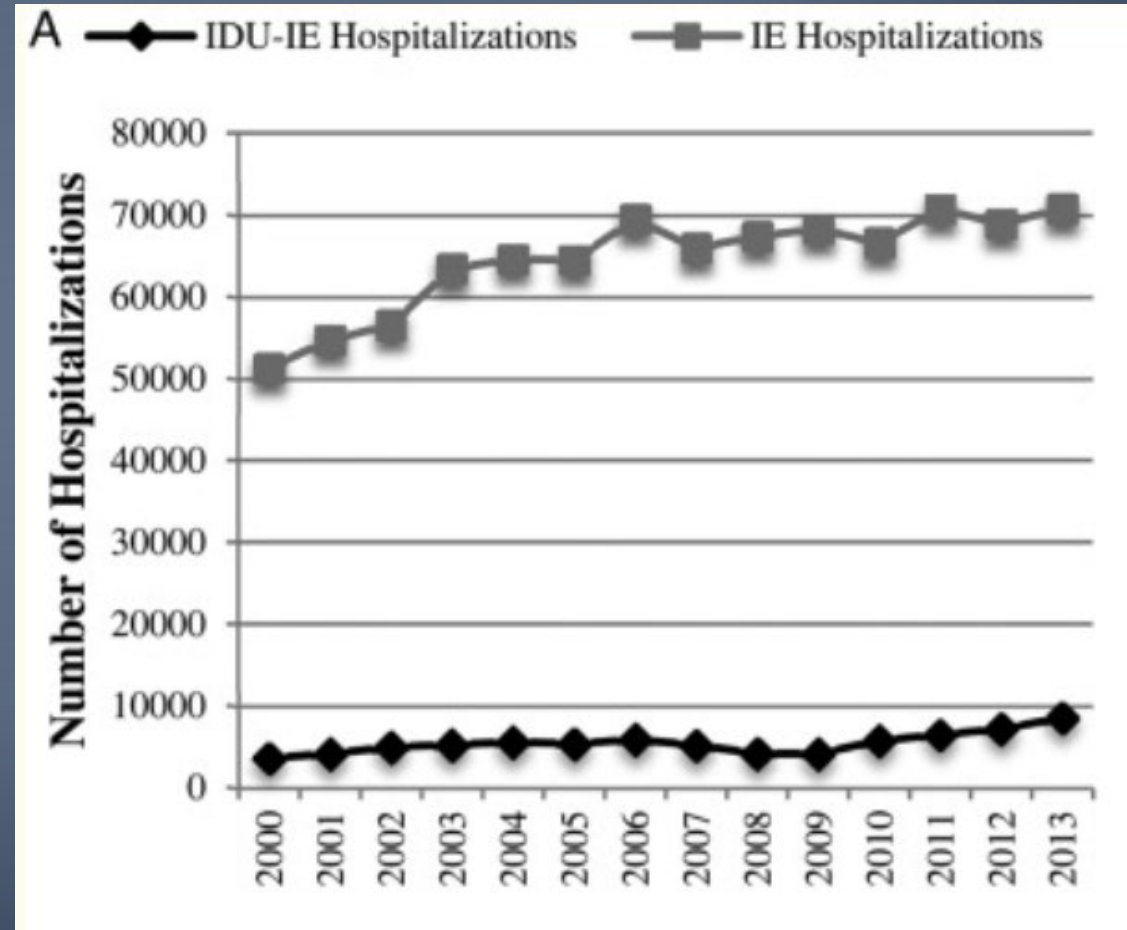




Bacterial and fungal infections related to drug use dominate my clinical service

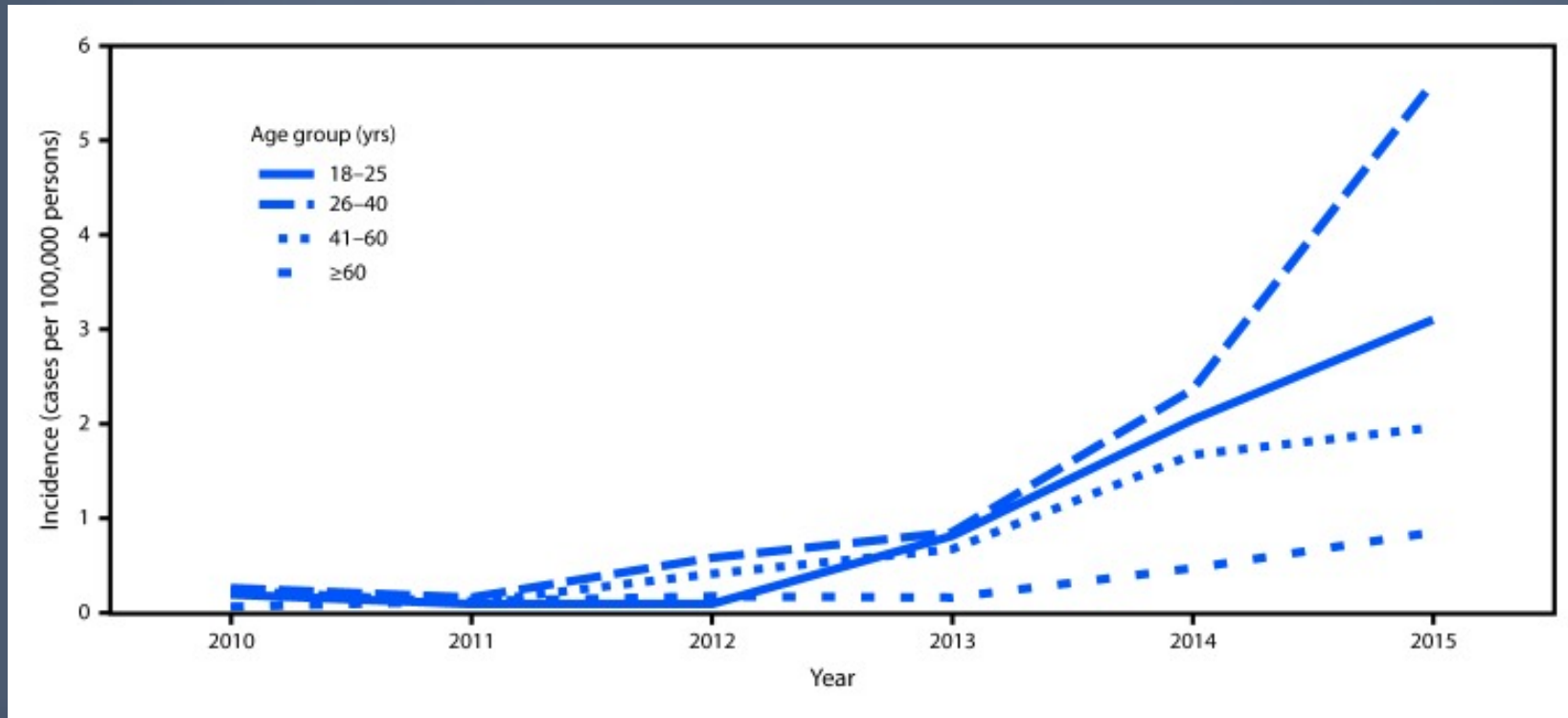
Endocarditis among PWID is increasing.

- Proportion of IE hospitalizations from IDU-IE increased from 7% to 12.1% between 2000 and 2013.
- Significant increase in the percentages of IDU-IE hospitalizations among 15- to 34-year-olds (27.1%–42.0%)



Endocarditis on the rise.

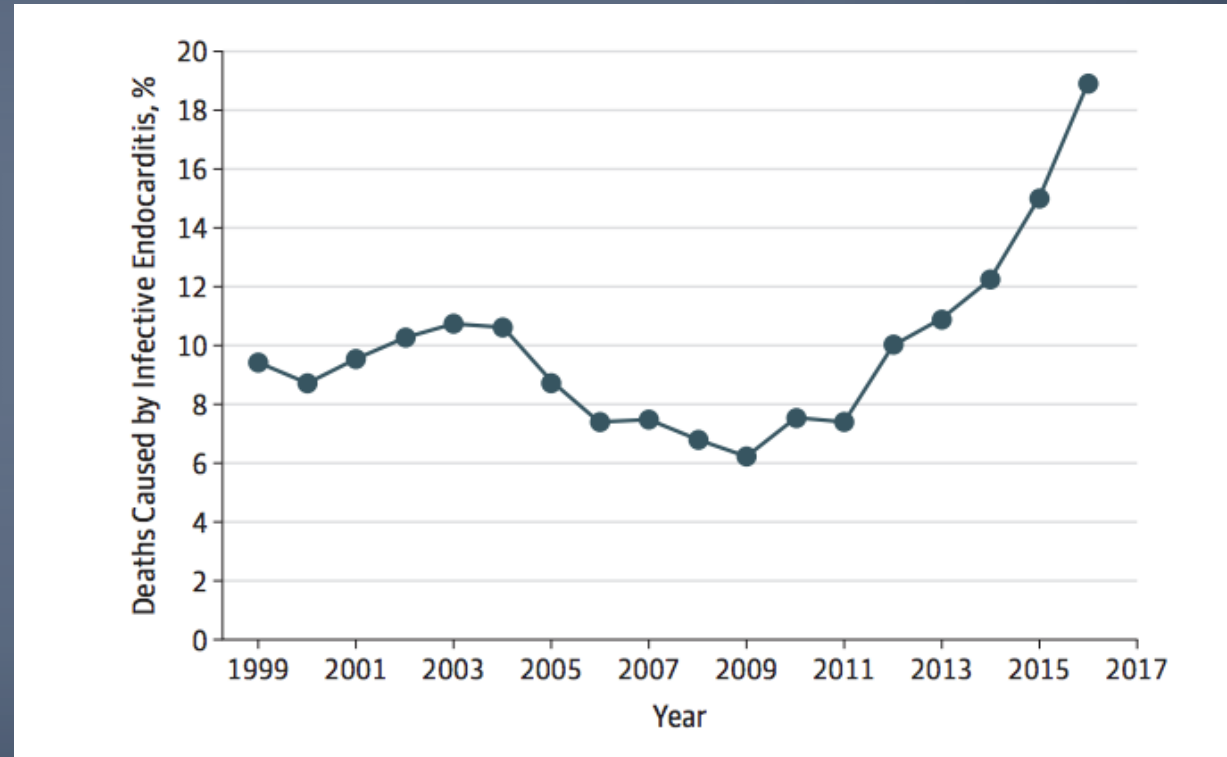
- Hospitalizations for injection-related infective endocarditis increased twelve-fold between 2010 and 2015



Incidence of hospital discharge diagnoses of drug dependence-associated endocarditis, by age group — North Carolina, 2010–2015

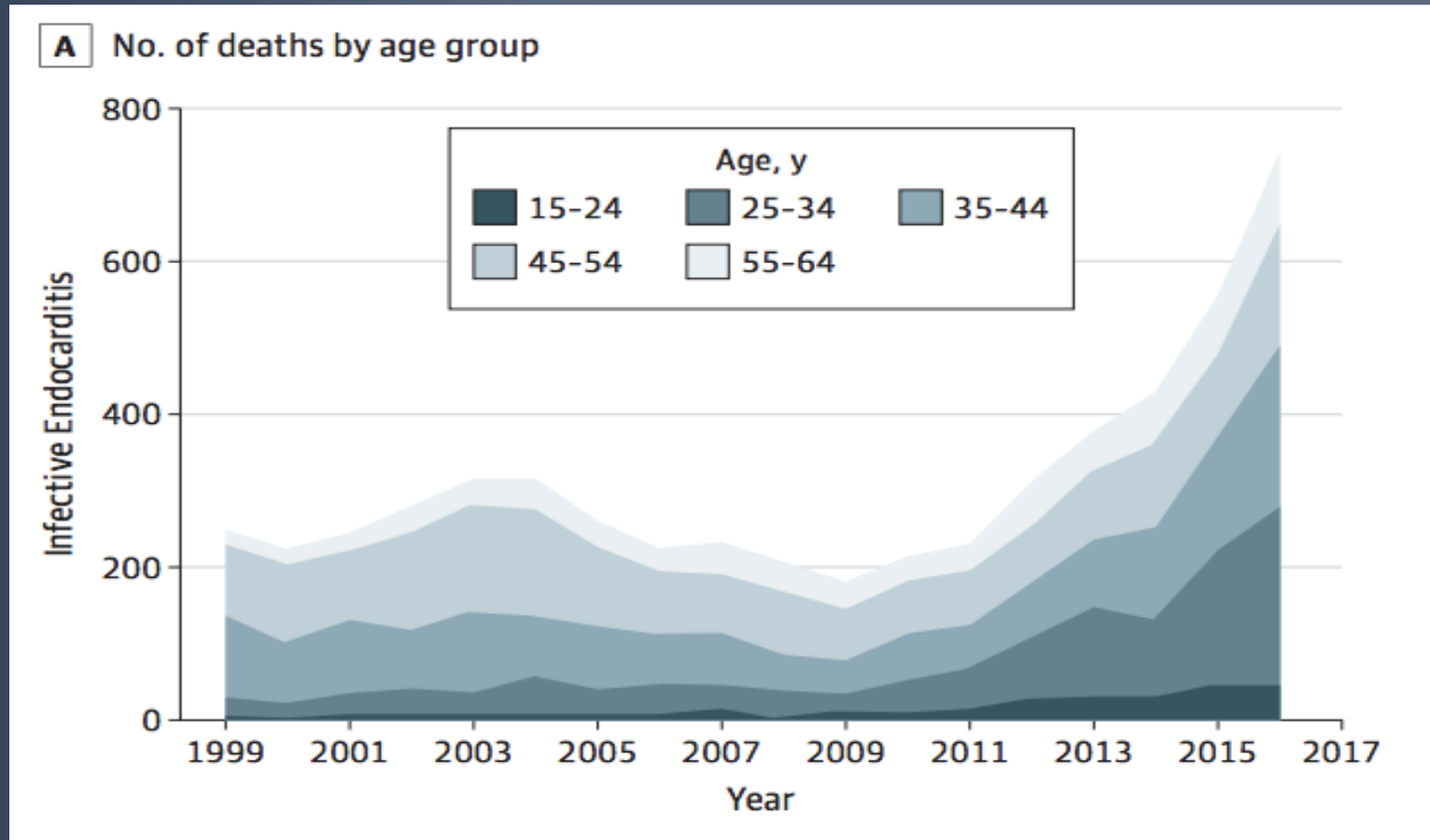
Mortality from endocarditis among PWID is increasing.

- Between 1999 and 2016, >55,000 deaths from endocarditis in the US
 - 10% occurred in PWID
 - 9% in 1999 to 19% in 2016
 - Mortality among PWID increased 3 fold
 - Mortality among non-PWID increased 1.5-fold



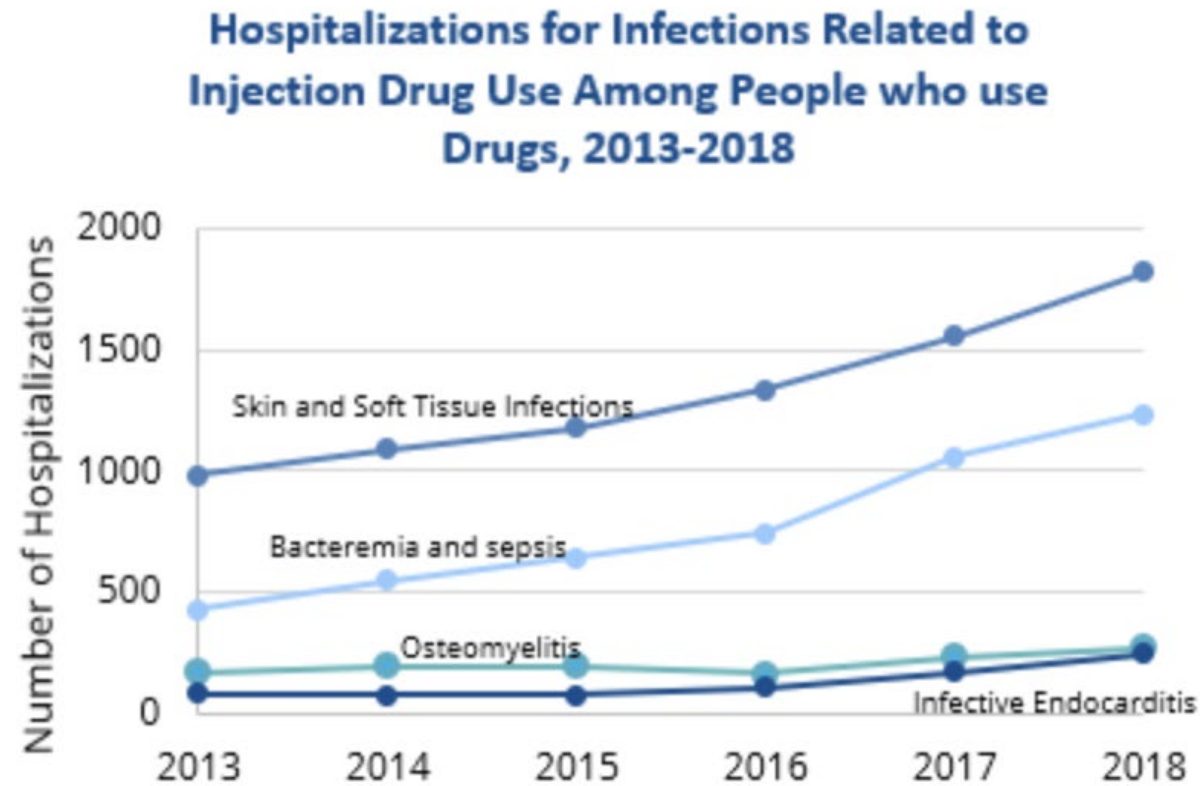
Mortality from endocarditis.

Endocarditis mortality among PWID by age group (1999-2016)



The proportion of people <35 who died of IE rose from 12.4% in 1999 to 37.4% in 2016

Infections among PWID in the fentanyl era.



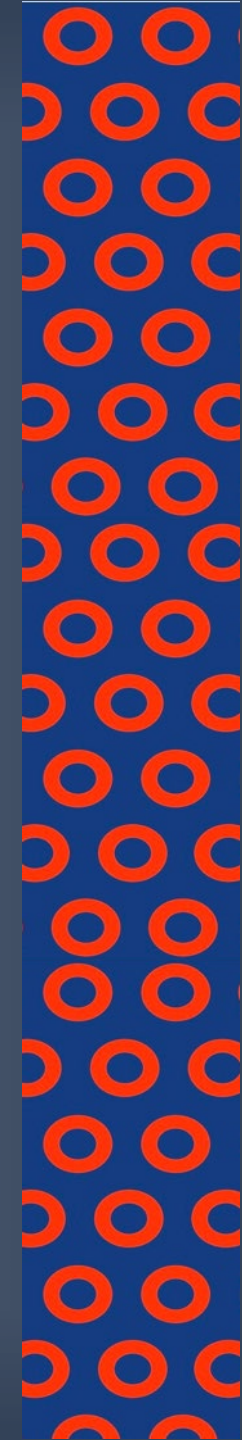
Source: Pennsylvania Health Care Cost Containment Council, 2013–2018



The frightening landscape of IDU-related infections.

- A growing proportion of IDU-related infections are the result of antibiotic resistant organisms.
 - *Staph aureus* is the most common organism in IE
 - MRSA infections have more than doubled in this population in recent years
- As of June 2019, there were only 42 new antibiotics in clinical development with the potential to treat serious bacterial infections, none of which indicated for IE







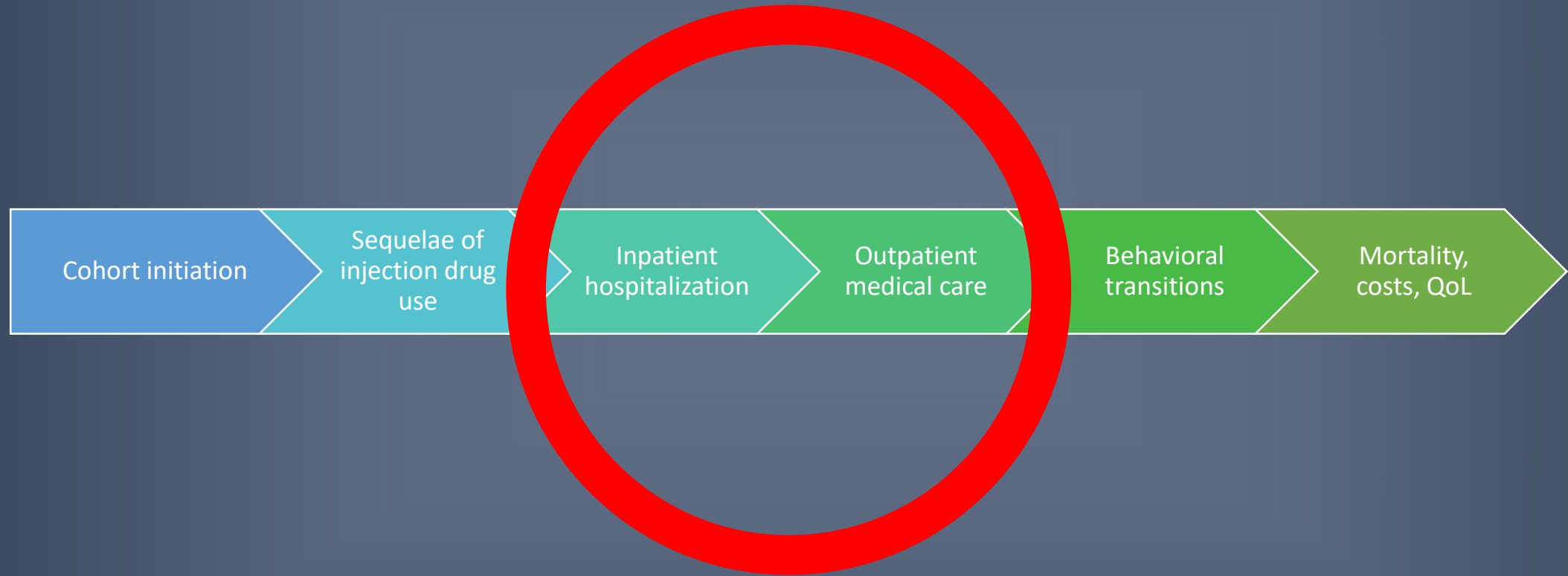
Where is this syndemic headed?

- Reducing Infections Related to Drug Use Cost-Effectiveness (REDUCE) Model
 - Monte Carlo microsimulation model that simulates the natural history of injection opioid use in the U.S
 - Projects endocarditis and SSTI mortality among persons who inject opioids according to injection behavior profile
 - Injection behavior profile = injection frequency (high, low, and no current) + injection practices (sharing injection equipment and using sterile injection technique)

Structure of ReDUCE.



Structure of ReDUCE.




Inpatient hospitalization module.

<u>Hospital-based service</u>	<u>SDU for which service applies (eligibility)</u>	<u>Effect in the model</u>
Addiction consult service	OD, SSTI, IE, combination	Change (increase) probability of linkage to outpatient addiction care*
Initiation/continuation_ of MOUD (e.g., buprenorphine)	OD, SSTI, IE, combination	change probability of linkage to outpatient MOUD. Change probability of transitioning between injection frequency states. See treatment effect description below.
Overdose education, naloxone distribution (OEND)	OD, SSTI, IE, combination	Decrease proportion of fatal overdose for X subsequent cycles
Skin cleaning education	OD, SSTI, IE, combination	Decrease probability of unclean injection for X subsequent cycles after end of hospitalization
Clean needle distribution	OD, SSTI, IE, combination	Decrease probability of reuse needles for X subsequent cycles after end of hospitalization
ID consult	SSTI and/or IE	Decrease in-hospital mortality from IE or SSTI during active infection; Allows to access (if available, with offer/accept) OPAT
OPAT	SSTI and/or IE	Decrease hospital length of stay



ReDUCE Preliminary analyses.

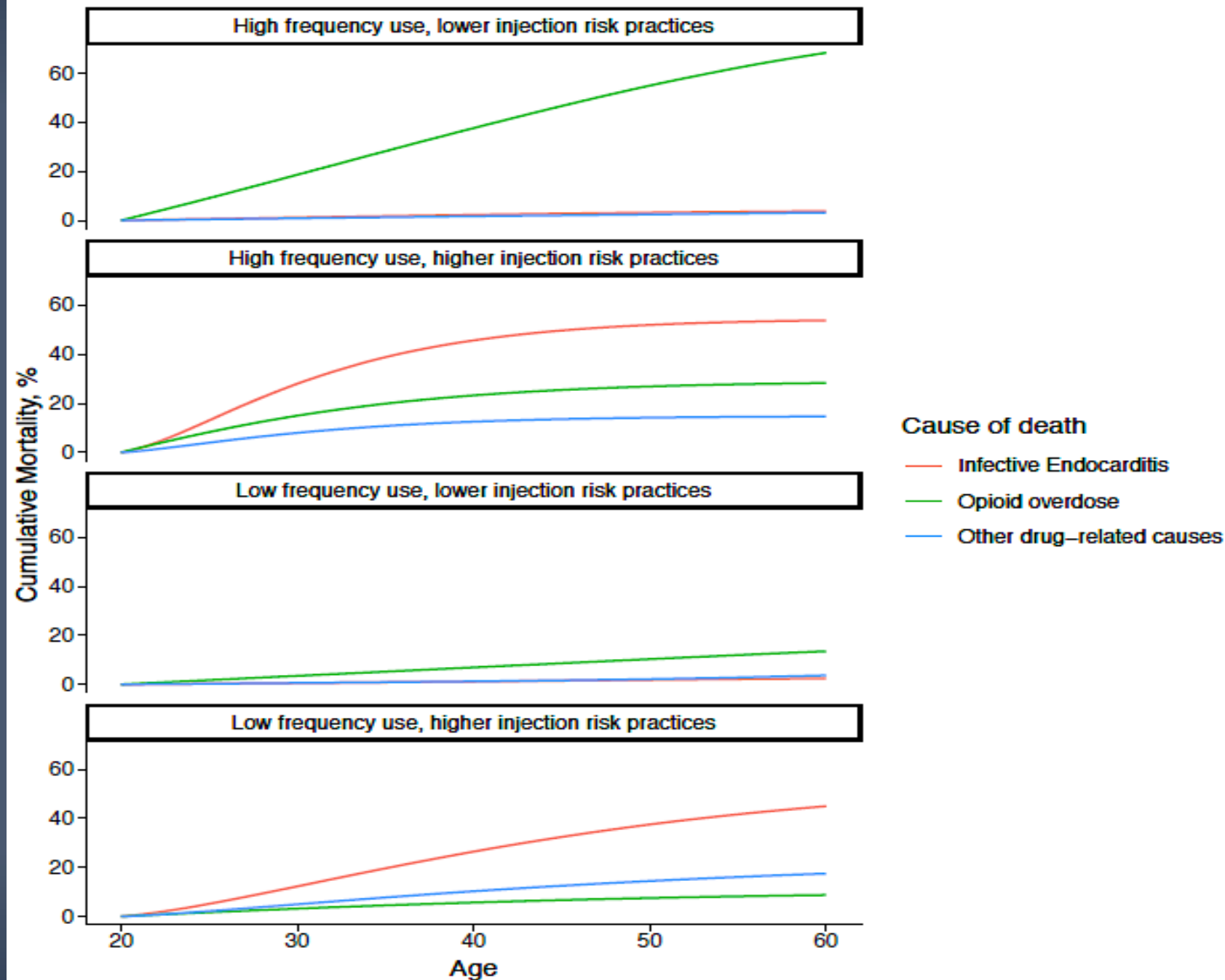
- Modeled cohorts of 1 million individuals of a particular injection behavior profile who entered the model at a specific age (e.g., 20 years)
 - The primary outcome was probability of death from injection-related endocarditis by age 60 years.
 - Combined the model-generated estimates with published data to project the total expected endocarditis deaths in the U.S.
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Probability of death from endocarditis.

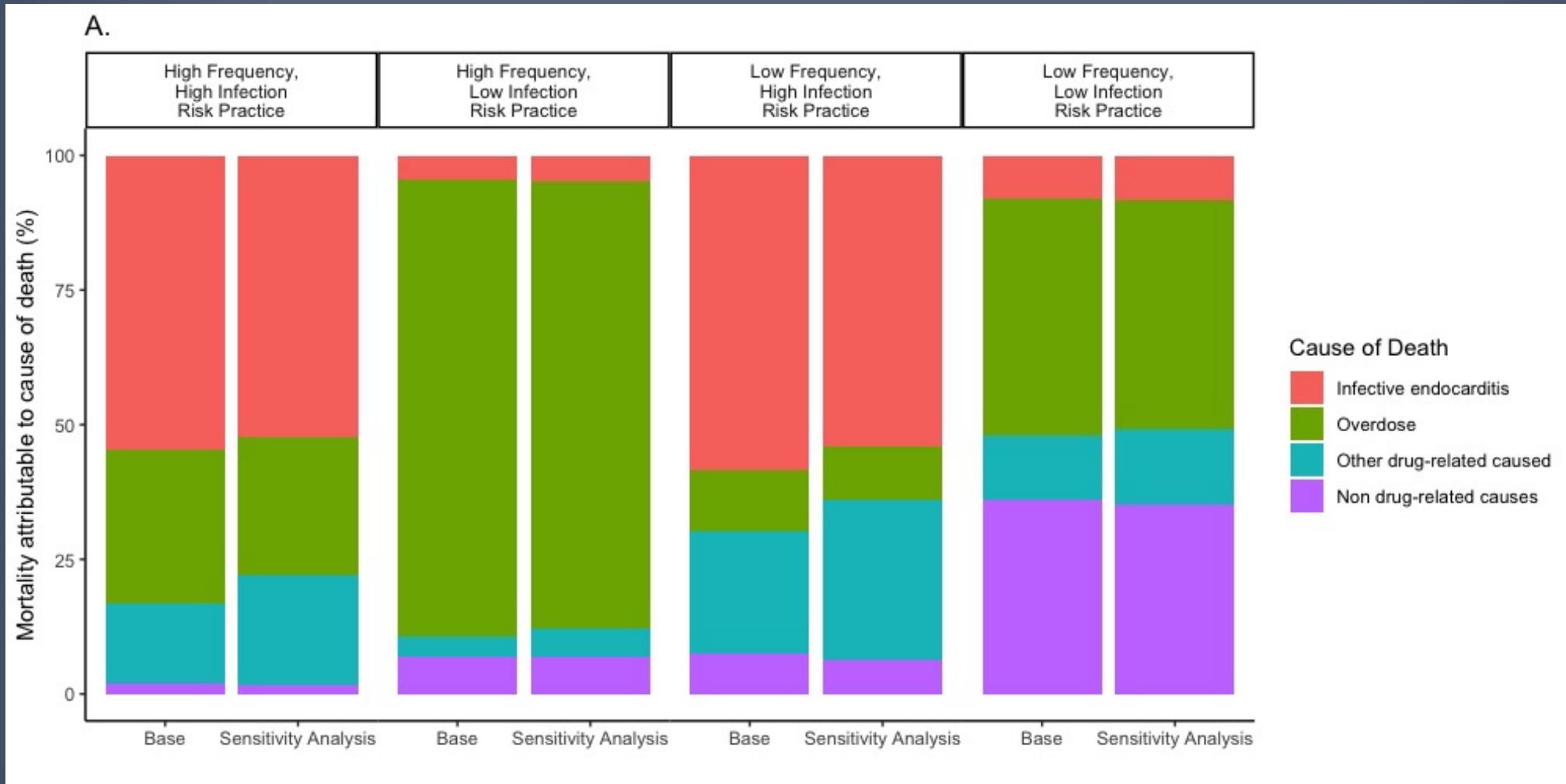
Model-generated IE cumulative mortality (%), by age at which injection drug use began and injection frequency and practices

Injection frequency and practices	Cumulative IE Mortality by Age 60 y, %					
	Began use at age 20		Began use at age 30		Began use at age 40	
	Female	Male	Female	Male	Female	Male
High frequency use, lower injection risk practices	3.8	3.8	3.1	3.1	2.2	2.2
High frequency use, higher injection risk practices	54.4	53.8	52.0	51.4	45.2	44.5
Low frequency use, lower injection risk practices	2.5	2.5	1.9	1.8	1.2	1.2
Low frequency use, higher injection risk practices	45.8	44.9	37.4	36.8	26.0	25.6

Cumulative mortality by cause among men beginning injection drug use at age 20



Rise of antibiotic resistant infections.





What does the future hold?


- The predicted population-level attributable fraction of 10-year mortality for endocarditis was 20%
- Assuming a prevalence of 2.6% of people who have ever injected opioids in the US, 257,800 people who inject opioids are expected to die from endocarditis by 2030.






**What role can we have as ID
providers?**





Hospitalization is a unique opportunity
to both treat opioid use disorder and
prevent the infectious and other
medical complications of injection
opioid use





Hospitalization and access to MOUD

- Many participants were interested in starting MOUD in the hospital and felt that it improved the quality of care
 - “When I went to [another hospital], they did not have doctors who are allowed to prescribe that [suboxone] and I was out of luck. So then, here, I found [you] have a doctor who could prescribe me methadone or suboxone. That’s awesome. It may not be for everybody.”

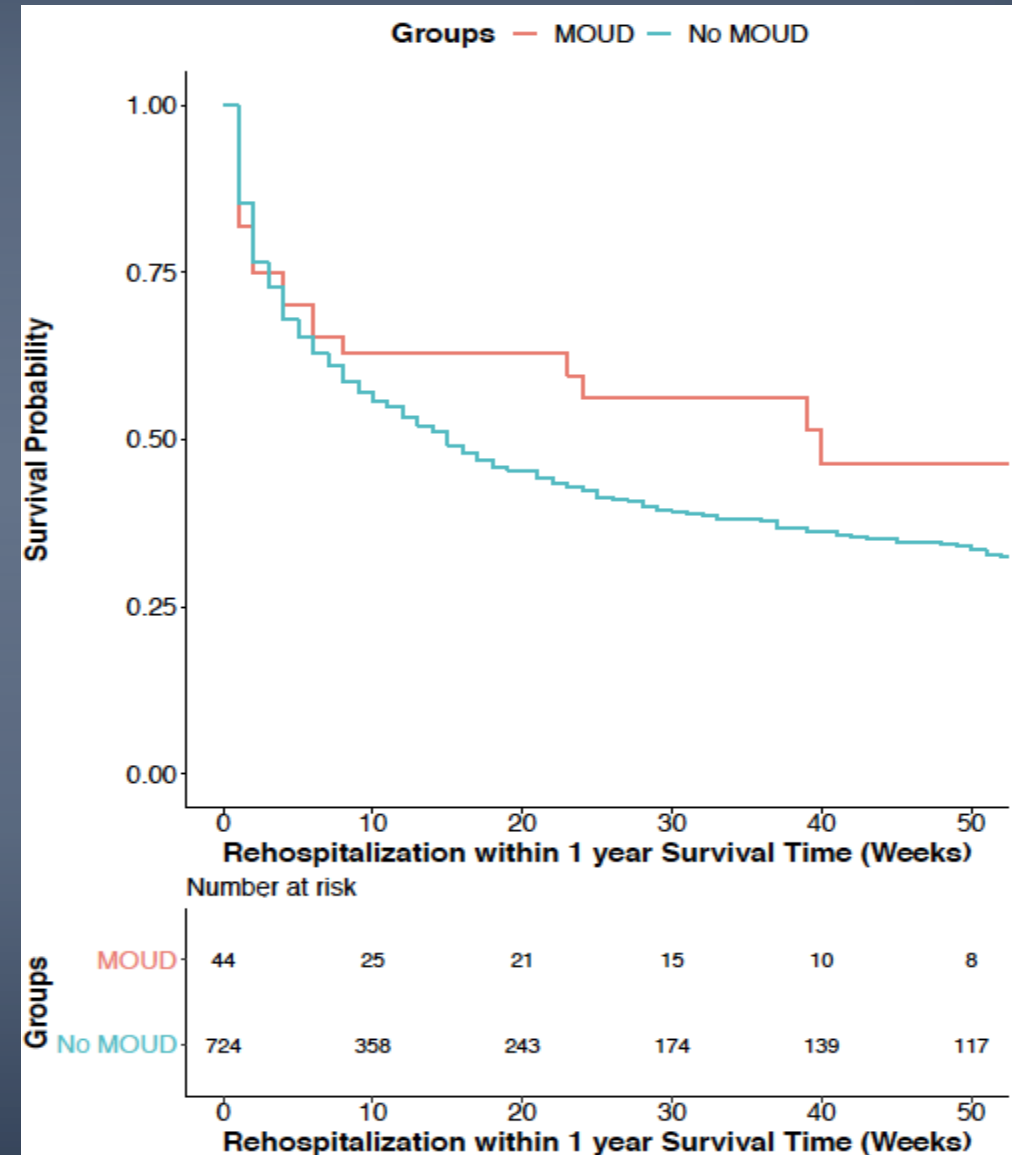


OPAT + BUP

- The average length of hospital stay for OPAT participants was 22.4 days compared to 45.9 for UC participants.
- All participants (100%) completed the recommended course of IV antibiotic therapy.
- For the 12 weeks posthospital discharge, the proportion of urine samples negative for illicit opioids was significantly greater in OPAT participants compared to UC participants
- Retention in outpatient treatment, measured by the proportion attending at least weekly outpatient physician visits, was similar in both groups
- OPAT participants reported no desire to inject in the indwelling catheter

MOUDs and Endocarditis

- MOUD within 30 days of discharge for endocarditis:
 - Decreased opioid-related overdose rates
 - Decreased one-year rehospitalization





MOUDs and SSTI

- The incidence of 30-day rehospitalization was higher in the MOUD group compared to no MOUD (35.9 vs 27.5 per 100 person-30 days)
- One-year SSTI recurrence was lower (10.3 vs 18.7 per 100 person-years).





A long way to go!

- Despite patient willingness and evidence of improved outcomes, treatment is uncommon
- Less than 6% of people received MOUDs in the 30 days following their index hospitalization for endocarditis
- Only 5.5% of people received MOUDs in the month following their index SSTI hospitalization





A long way to go!

- A study of ID physicians on the availability of addiction services and role of ID providers
- 22% reported that their hospitals provided a dedicated multidisciplinary addictions service.
- These respondents were significantly more likely to “agree/strongly agree” that ID physicians should actively manage SUD than were physicians whose facilities did not provide a dedicated service



Buprenorphine among ID providers

- Though nearly half of respondents felt that ID providers should actively manage SUD

Only 3% reported being waived to prescribe buprenorphine.



Beyond buprenorphine.

- Harm reduction is an approach to care that aims to nonjudgmentally determine where a person is with respect to motivation for behavior change and to offer them care to improve their health, starting at that point.





Beyond buprenorphine.

- Harm reduction services
 - access to sterile injection equipment
 - educated on safer injection practices (e.g., cleaning skin, using sterile water, heating cookers)
 - receive naloxone and overdose education.
- Implementation of harm reduction education in the hospital or helping patients to link to syringe service programs (SSPs) at discharge may help reduce the risk of repeat infections.





What we need.

- Low-barrier access to MOUD and harm reduction services
- Comprehensive inpatient treatment package
- Co-located treatment for SUD and drug use-associated infections





Little things.

- Do at least one of the following:
 - Carry naloxone
 - Distribute naloxone at your ID clinic/on your ID consult service
 - Make recommendations for harm reduction/MOUDs in your consult and clinic notes
 - Counsel patients regarding skin cleaning, not reusing equipment
 - Provide resources for safe injection technique
 - GET WAIVERED!



Closing thoughts.

- "When the history of AIDS and the global response is written, our most precious contribution may well be that, at a time of plague, we did not flee, we did not hide, we did not separate ourselves."

- Dr. Jonathan Mann (1998)

