

Intravenous Drug Use Endocarditis

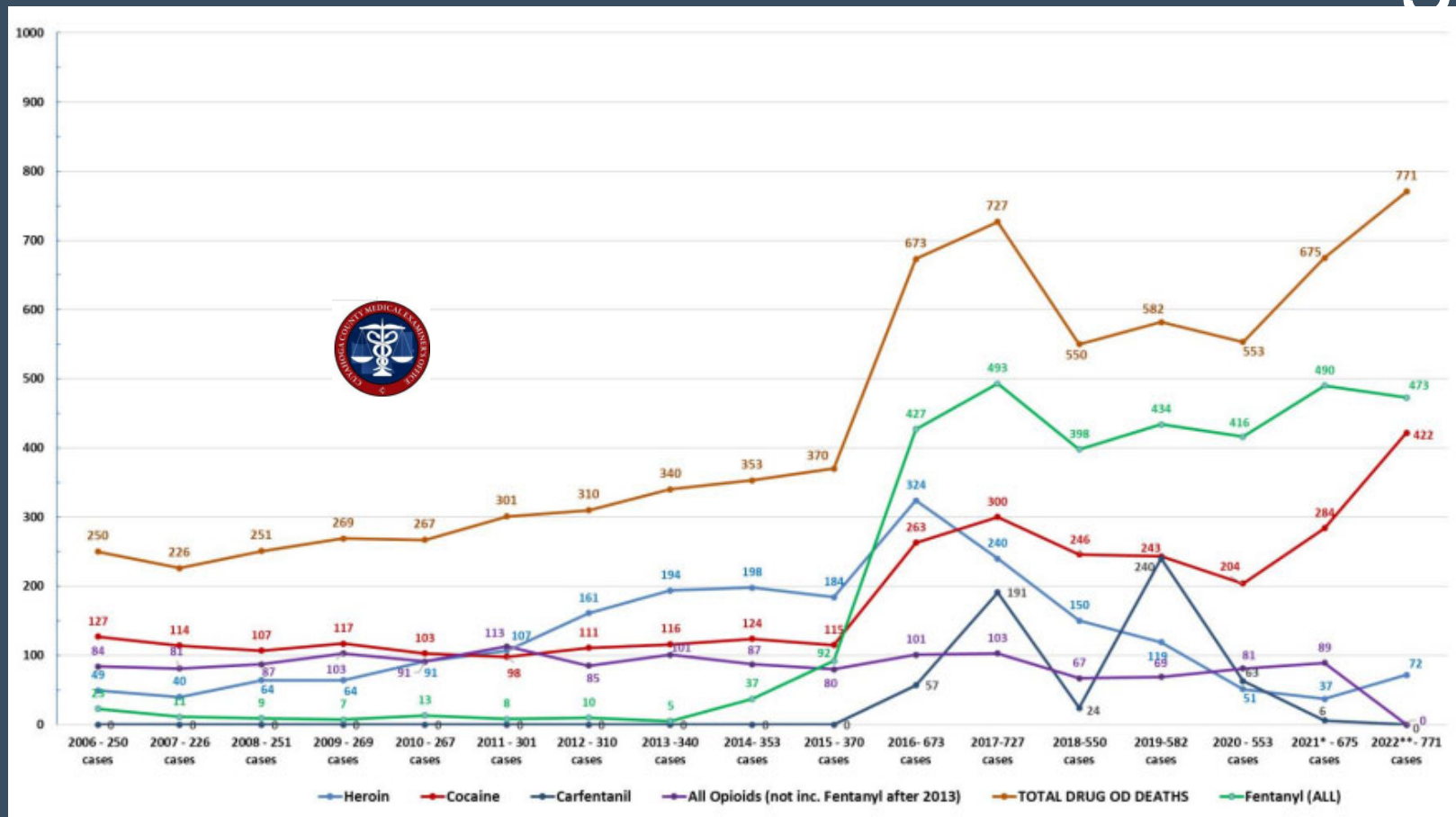
Ohio Society of Addiction Medicine
October 7, 2022



Objectives

- Discuss the epidemiology of serious infections among patients with IDU
- Demonstrate how OPAT and its role in addressing serious infections can create barriers to IDU treatment.
- Discuss how different models of IDU treatment in the setting of OPAT can improve outcomes.

Cuyahoga County Overdose Deaths 2006-2022 Most Common Drugs



Increased Hospital Admissions related to Opioid Use Disorder

- Infective endocarditis
- Osteomyelitis
- Septic arthritis
- Epidural abscess

Ronan MV, Herzig SJ :Hospitalizations related to opioid abuse/dependence and associated serious infections increased sharply, 2002-12. Health Aff (Millwood) 2016; 35(5):832-837

Reason for restrictions on patients with IDU on OPAT

- Out of fear over the possibility that patients with IDU might utilize the intravenous (IV) catheter to inject illicit substances
 - Recurrence (relapse/re-infection)
 - New local or systemic infections
 - Overdose

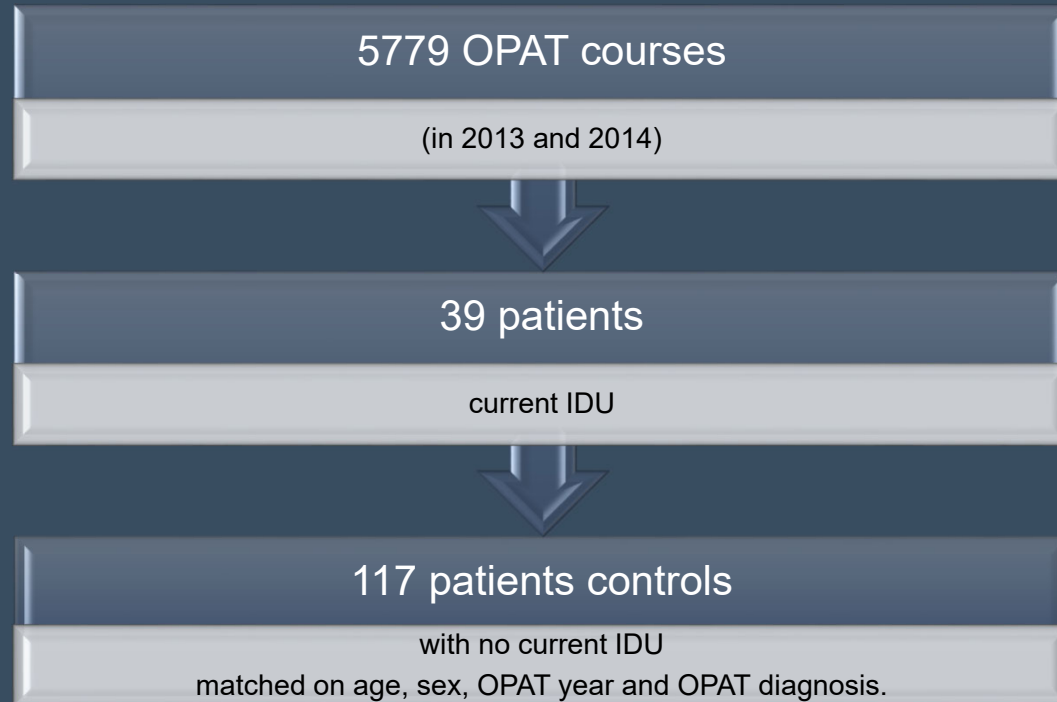
Hypothesis

- If patients with IDU misuse their vascular catheters during OPAT, one might expect more vascular access complications and less favorable treatment outcomes among patients with current IDU compared to those who do not currently inject drugs.

Setting and Study Design

- Study type: retrospective cohort
- Study Population: patients treated for various infections at the Cleveland Clinic main campus who were discharged from the hospital with OPAT
- Approved by the Institutional Review Board at the Cleveland Clinic.

Results



Comorbid Substance Use Disorders

| Category | Item | Active IDU group (n=39) | Control group (n=117) | P-value |
|----------------|--------------------------|----------------------------|--------------------------|---------|
| Types of Drugs | Heroin Use | 38 (97) | 11 (9) | < 0.01 |
| | Other Opioids Use | 12 (31) | 7 (6) | < 0.01 |
| | Alcohol Dependence/Abuse | 7 (18) | 9 (8) | 0.13 |
| | Cocaine Use | 28 (72) | 12 (10) | < 0.01 |
| | Cannabis Use | 29 (74) | 32 (27) | < 0.01 |
| | Other Drug Use | 12 (31) | 10 (9) | < 0.01 |

Type of Infections

| Category | Item | Current IDU group (n=39) | Control group (n=117) | <i>P</i> -value |
|----------------------------------|-----------------------------------|-----------------------------|--------------------------|-----------------|
| Primary infection requiring OPAT | Cardiovascular infections | 29 (74) | 84 (72) | 0.96 |
| | Bone and joint infections | 6 (15) | 22 (19) | |
| | Central nervous system infections | 3 (8) | 8 (7) | |
| | Skin and soft tissue infections | 1 (3) | 3 (3) | |

IDU Behavior

| Category | Item | Current IDU group (n=39) | Control group (n=117) | <i>P</i> -value |
|---------------------------------|-----------------|-----------------------------|--------------------------|-----------------|
| Drug Use other than current IDU | Current Non-IDU | 28 (72) | 19 (16) | < 0.01 |
| | Past IDU | 37 (95) | 14 (12) | < 0.01 |
| | Past Non-IDU | 31(79) | 36 (31) | < 0.01 |

Disposition

| Category | Item | Current IDU group (n=39) | Control group (n=117) | <i>P</i> -value |
|-------------|--------------------------|-----------------------------|--------------------------|-----------------|
| Disposition | Home | 6 (15) | 86 (74) | < 0.01 |
| | Skilled Nursing Facility | 32 (82) | 30 (26) | |
| | Unknown | 1 (3) | 1 (1) | |

Outcomes

| Events | Active IDU group | Control Group | OR (95% CI) | P-value |
|-----------------------------------|------------------|---------------|-----------------------|---------|
| Line infection | 1 (0.03) | 2 (0.02) | 1.51 (0.07 - 16.23) | 0.74 |
| Treatment failure | 3 (0.08) | 11 (0.09) | 0.8 (0.17 - 2.74) | 0.75 |
| Infection relapse | 2 (0.05) | 11 (0.09) | 0.52 (0.08 - 2.06) | 0.41 |
| Hospital readmission | 5 (0.13) | 24 (0.21) | 0.57 (0.18 - 1.51) | 0.29 |
| Death within three months of OPAT | 4 (0.1) | 7 (0.06) | 1.8 (0.45 - 6.31) | 0.37 |


Conclusion

- Patients with current IDU did not have less favorable OPAT-related outcomes compared to those without current IDU.
 - Small sample size
 - Difference in the disposition
- We could not draw conclusions about the safety of OPAT at home for patients with current IDU.
 - Very small number of patients with current IDU treated at home
 - Future research should focus on assessing safety of home disposition for IDUs on OPAT.



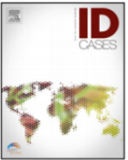
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Case report

The cost of a recalcitrant intravenous drug user with serial cases of endocarditis: Need for guidelines to improve the continuum of care

 CrossMark

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ABSTRACT

We report a case of an intravenous drug user (IVDU) patient who had 4 episodes of endocarditis within a 2-year time period in rural Georgia. The institutional cost was approximately \$380,000. The lack of an established transitional care plan for IVDUs to outpatient care is a common phenomenon at institutions. Guidelines are essential to optimize the quality of care rendered to IVDUs with such infections, to assist providers in utilizing limited resources, and to limit the cost to the institutions.

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The cost of a recalcitrant intravenous drug user with serial cases of endocarditis: Need for guidelines to improve the continuum of care

- Case of a single 45y.o. woman with four episodes of endocarditis in two years
- Seven total related hospitalizations
 - One mitral valve replacement
- Pt declined addiction treatment programs, or was denied by the programs due to her medical conditions
 - Residential programs
 - Methadone Maintenance

The cost of a recalcitrant intravenous drug user with serial cases of endocarditis: Need for guidelines to improve the continuum of care

- Psychiatry recommended entire course of IV antibiotic therapy to occur in hospital
 - Psych involved in five out of seven hospitalizations
 - Authors judged no compliance with psych recommendations
 - Pt left AMA two out of the seven admissions

The cost of a recalcitrant intravenous drug user with serial cases of endocarditis: Need for guidelines to improve the continuum of care

- Institutional cost \$380,000
 - Patient was uninsured
 - Cost did not include provider fees and cardiothoracic surgery costs
 - Eventually lost to follow-up
- No availability of buprenorphine MAT
- Cited lack of established transitional care plan for SUD treatment to outpatient care

Other Reports

- PWID with IE suffer 10x mortality and reoperation recurrence vs. non-PWID IE at 3-6 months after surgery

Shrestha NK, Jue J, Hussain ST, et al. Injection Drug Use and Outcomes After Surgical Intervention for Infective Endocarditis. *Ann Thorac Surg.* 2015 Sep;100(3):875–82.

- SUD treatment important to prevent SUD relapse, death and reinfection

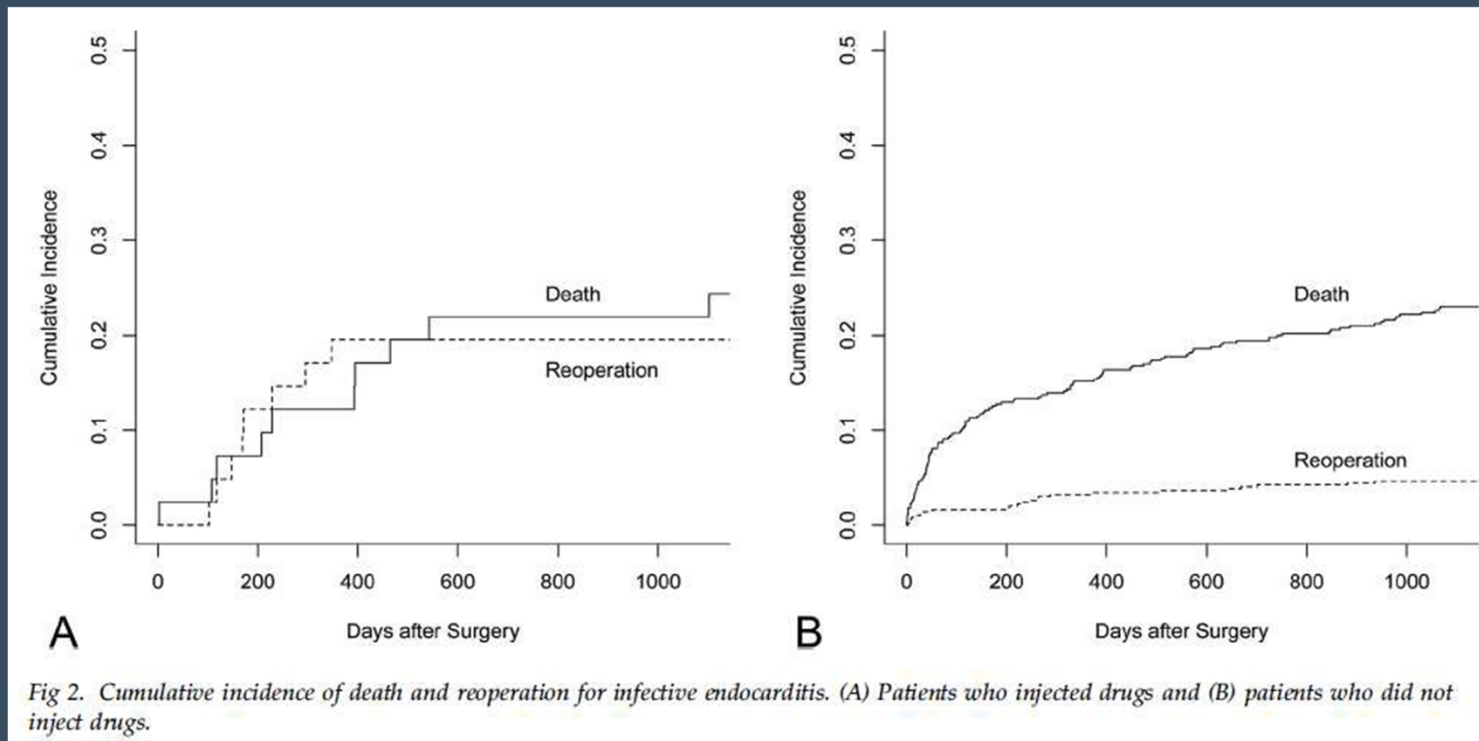
Elbatarny M, Bahji A, Bisleri G, Hamilton A. Management of endocarditis among persons who inject drugs: A narrative review of surgical and psychiatric approaches and controversies. *Gen Hosp Psychiatry.* 2019 Apr;57:44–9.

Cleveland Clinic and Opioid related Cardiac Surgeries

| Year | Proportion with IDU |
|-------------|---------------------|
| 2007 - 2012 | 7.7% |
| 2013 | 11.6% |
| 2014 | 16.2% |
| 2015 | 20.8% |
| 2016 | 24.5% |
| 2017 | 30.8% |

Data courtesy of James Witten, MD

CTS re-operations Secondary to Opioids



How Can We Improve?

- Increase Buprenorphine MAT availability
 - Cost of this should be viewed in light of total cost per case of care.
- Ensure that case management occurs as patients transition through levels of care
 - Cost <<< OHS
- Use SUD counseling to encourage treatment retention
 - Cost<<<OHS

Treatment of Opioid Use D/O

“A Bundled Model of Care”

- “We treat both problems...or neither.”
 - Gosta Pettersson, MD
 - Steve Gordon, Chair ID
 - David Stroom, Medical Director ADRC
 - Alice Kim, ID physician and Select JV lead
 - Leo Pozuelo, Head C/L Psychiatry
 - Sue Rehm, Tom Fraser, Nabin Shrestha, ID
 - Raphael Silver, Center for Connected Care
 - Paul Ford, Bioethics

Treatment of Opioid Use D/O

“A Bundled Model of Care”

- Prerequisites:
 - A team capable of assessing for OUD and starting MAT treatment
 - Consultation Liaison Psychiatry with DATA Waiver
 - Relationship with LTACH for continued IV antibiotic Rx and physical rehabilitation
 - Select Medical

Creation of MOSAIC

A multidisciplinary approach to care for patients admitted to Cleveland Clinic with infective endocarditis secondary to opioid use disorder



Treatment of Opioid Use D/O

“A Bundled Model of Care”

- Addiction Treatment Caregivers integrated with LTACH to provide necessary services
 - Urine toxicology Medical Review
 - Buprenorphine adjustment and Prior Auth for discharge Rx
 - 12-step education and facilitation counseling
 - Identification and treatment of co-occurring psychiatric disorders
 - LTACH discharge planning

Treatment of Opioid Use D/O

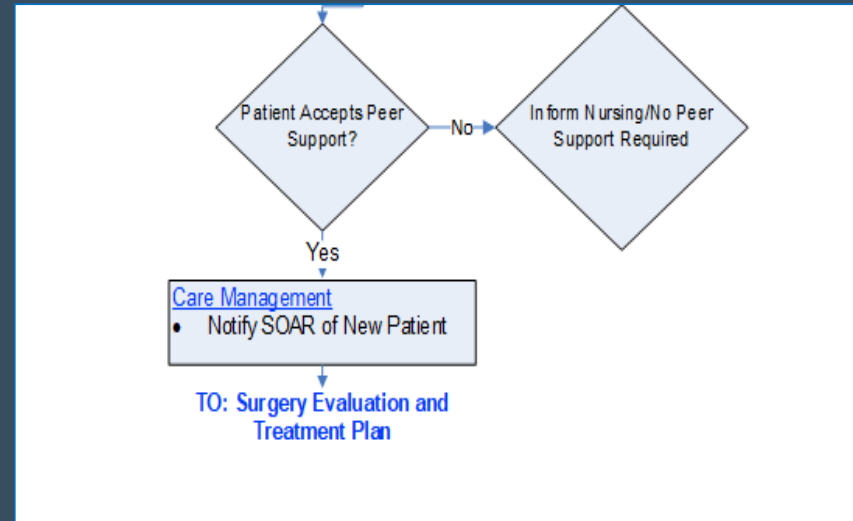
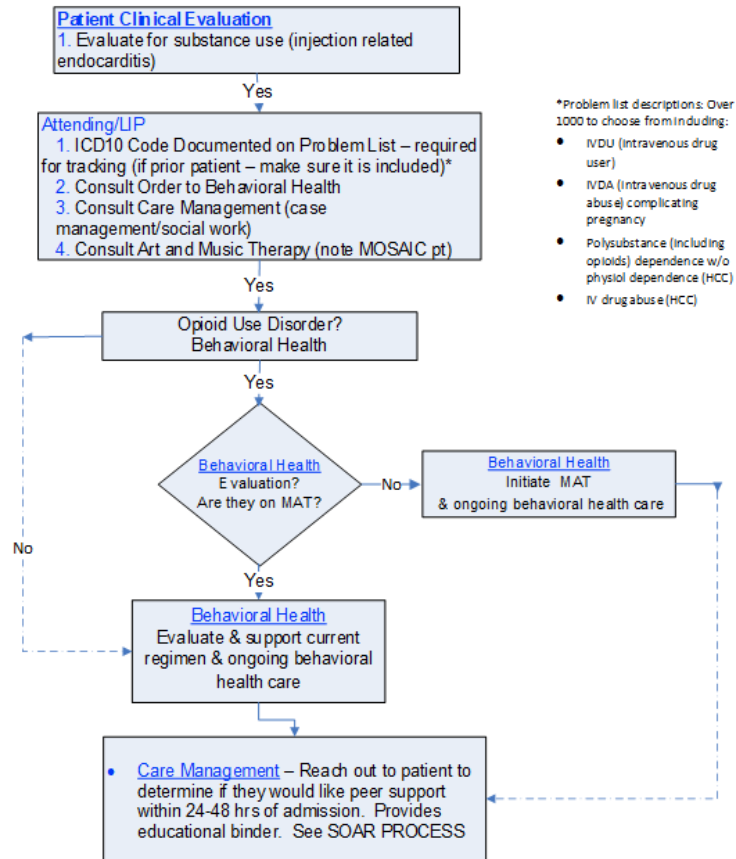
“A Bundled Model of Care”

- Regular interaction between ID, Care Management, LTACH team, C/L Psychiatry and Addiction Treatment Caregiver makes successful treatment of both conditions possible



Creation of Protocols...

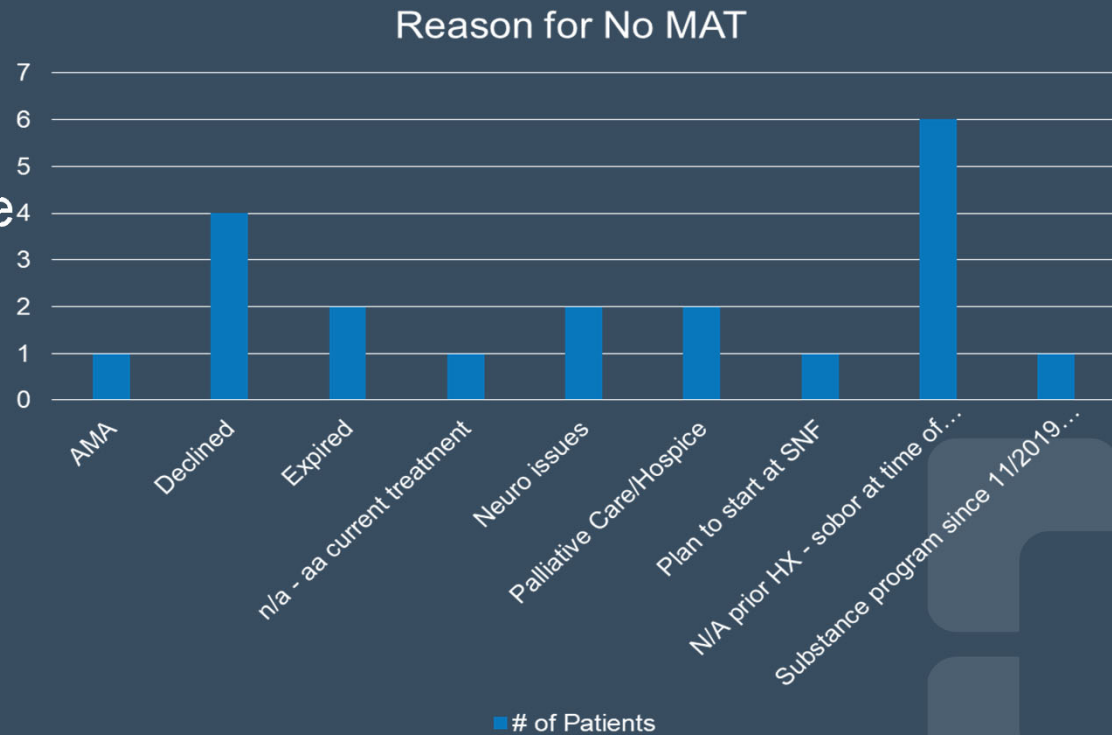
Infective Endocarditis – SUD Protocol Patient Management (MOSAIC program) - Intake



Medication Assisted Treatment

- N= 190
- 131 Opioid use only
- 56% had SOAR
- 85% had psych evaluation
- 80% had MAT at discharge

- Methadone: 9
- Buprenorphine 89
- NTX-XR 3



Injection Drug Use Relapse after Cardiac Surgery

- Single-Center, 1/2010 to 6/2020
- 227 PWID cases who had cardiac surgery for associated IE
- Heroin was most common drug injected (81%), followed by cocaine

Co-occurring Factors

- 25% homeless
- 66% criminal history
- 15% PTSD
- 52% depression
- 46% Anxiety d/os
- 21% ACEs
- 91% tobacco use
- 38% stroke/CVA
- 35% COPD
- 8.4% dialysis
- 31% CHF
- 7.1% Afib/Aflutter

History and demographics

- 52% history of prior medication-assisted treatment
- Mean age 36 +/-9.9 years
- 43% female
- 61% single, 15% divorced
- 68% with children
- 21% without HS/GED

Surgical Characteristics

- 29% had previous cardiac surgery for IE at an outside hospital
- 53% *S. Aureus*, 11% *S. Viridans*, 10% *Enterococcus*



Treatment Characteristics

- 64% saw psychiatry consult after surgery, prior to discharge
- 32% discharged on MAT
 - 82% of those with buprenorphine
 - 18% of those with methadone
- 30% d/c home, 65% to SNF
- 3.5% left AMA

SUD Treatment Characteristics

- 11% had IOP care available at SNF
- 7.5% enrolled in MOSAIC
- 4.4% enrolled in Peer Support



Relapse of IDU

- 99/227 relapsed IDU
- 38/99 had relapse of IE requiring reoperation
- 4/227 had cardiac reoperation unrelated to IDU, then had relapse after reoperation

Relapse of IDU

- 6 months 11%
- 12 months 27%
- 36 months 51%
- 60 months 68%
- Risk peaked at 9 mos, then settled at 17% per year after two years.

Survival

- Survival
- 6 months 90%
- 12 months 83%
- 36 months 62%
- 60 months 47%



Risk Factors for Relapse

- Younger age
- IV use of Heroin vs. other drugs
- No HS diploma




Future Study Plans

- Higher rates of MAT treatment
- Higher rates of psychiatry consultation
- Higher rates of Peer Support referral



Lessons Learned So Far

- “Treat both conditions or neither” means MAT OUD treatment
 - Starting MAT prior to LTACH transition is key
 - “Starting MAT” means treatment agreement signed with communication among team
- 



Cleveland Clinic

Every life deserves world class care.