

Patient-directed Discharges Among PWUD Hospitalized with Serious *S. aureus* Infections: *Outcomes & Opportunities for Improvement*

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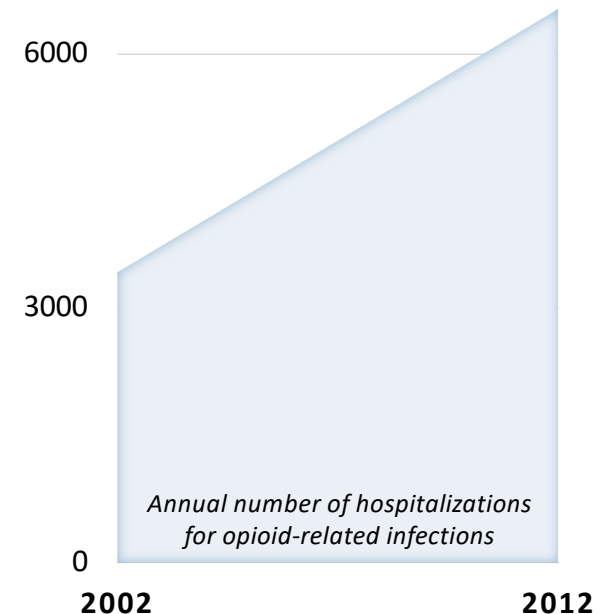
Virtual AMERSA 2020: October 7th, 2020

Disclosures

None

Background

- Along with rising rates of drug use and overdose, hospitalizations for drug use-associated infections have increased between 2 and 12-fold over ~10 years.
- *S. aureus* infections are common, morbid, and mortal, often requiring prolonged antibiotic treatment.
- Patient-directed discharges (PDD) may affect care in up to 1 in 3 hospitalizations for PWUD, which elevates risk of 30-day mortality.
- Gap: we lack outcomes data of PDD during *S. aureus* infection.



Objective: to compare one-year infection-related outcomes in PWUD with and without PDD during treatment for a serious *S. aureus* infection

Methods

Population:

Patients with *S. aureus* bacteremia, endocarditis, epidural abscess, and vertebral osteomyelitis at two large, urban academic hospitals between 2013 – 2018. Sample was limited to PWUD.

Data collection:

Structured chart review performed by AA with support from 3 IM residents. Mortality was ascertained via chart review and CA Electronic Death Record System.

Design:

Retrospective cohort study

Definitions:

PWUD: patients noted to have a history of “illicit” drug use (excluding alcohol, tobacco, and marijuana). Patient-directed discharge (PDD): discharge noted to be “against medical advice,” “AWOL,” etc.

Analysis:

Chi squared tests to compare groups, logistic regression to evaluate adjusted odds of one-year recurrence and mortality

Methods: Patient Selection

ZSFG & UCSF Infection Control Databases queried for + *S. Aureus* cultures collected from sterile sites in patients hospitalized between 2013 – 2018.

Hospitalizations matched to ICD-9, ICD-10 codes for bacteremia, endocarditis, vertebral osteomyelitis, epidural abscess

Hospitalizations NOT matched to ICD-9, ICD-10 codes, but with + *S. aureus* BLOOD cultures

After excluding patients *without* a history of drug use, patients under age 18, and patients who died or transitioned to hospice while hospitalized:

UCSF Sample:
N = 184

ZSFG Sample
N = 156

Total
N = 340

RESULTS

Demographic Characteristics Stratified by Patient-Directed Discharge

	<i>Was discharge patient-directed?</i>		<i>P value</i>
	Yes <i>n=80</i>	No <i>n=260</i>	
Age (median, IQR)	44 (33-52)	52 (42-58)	<0.001
Male sex (% , n)	63% (50)	73% (189)	0.08
Race/ethnicity			0.27
<i>White</i>	64% (51)	57% (149)	
<i>Black/African American</i>	16% (13)	22% (57)	
<i>Hispanic/Latinx</i>	8% (6)	14% (35)	
<i>Asian/Pacific Islander</i>	4% (3)	2% (5)	
<i>Other</i>	9% (7)	5% (14)	
Experiencing homelessness (% , n)	59% (47)	31% (81)	<0.001
<i>Street</i>	36% (29)	17% (43)	
<i>Staying with friends, in vehicle, etc.</i>	23% (18)	15% (38)	
HIV positive (% , n)	26% (21)	17% (43)	0.03
Any mental health condition (% , n)	38% (30)	34% (89)	0.59

**PDD group:
homelessness
more likely,
though ~40%
housed in SRO
or apt/house.**

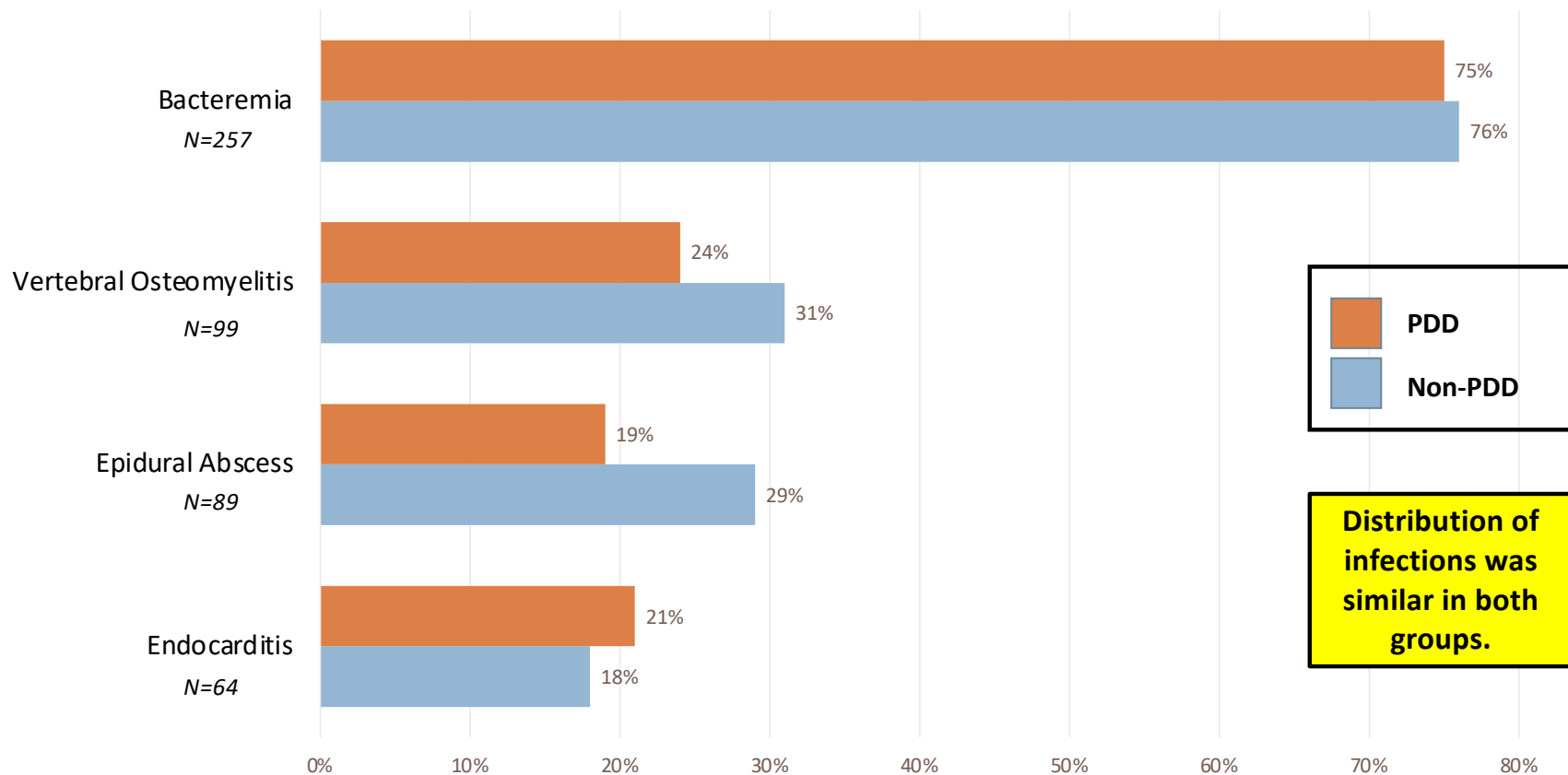
Substance Use Characteristics Stratified by Patient-Directed Discharge

	<i>Was discharge patient-directed?</i>		<i>P value</i>
	Yes <i>n=80</i>	No <i>n=260</i>	
Route: Injection drug use (% , n)	83% (66)	67% (175)	0.03
Route: Only non-injection drug use (% , n)	9% (7)	17% (45)	
Route: Not specified (% , n)	9% (7)	15% (40)	
Recent drug use (<1 mo) (% , n)	94% (75)	65% (169)	<0.001
Drug type			
<i>Heroin</i>	64% (51)	50% (131)	0.04
<i>Any opioid</i>	69% (55)	54% (140)	0.02
<i>Methamphetamine</i>	61% (49)	47% (122)	0.03
<i>Cocaine</i>	30% (24)	39% (101)	0.15
<i>Opioid + stimulant</i>	49% (39)	35% (92)	0.03
Pt-reported MOUD prior to admission	27% (15/55)	45% (63/140)	0.03
Risky alcohol use or alcohol use disorder	13% (10)	21% (55)	0.18

**PDD group:
opioid + meth
use more
common**

**PDD group:
fewer on
MOUD PTA**

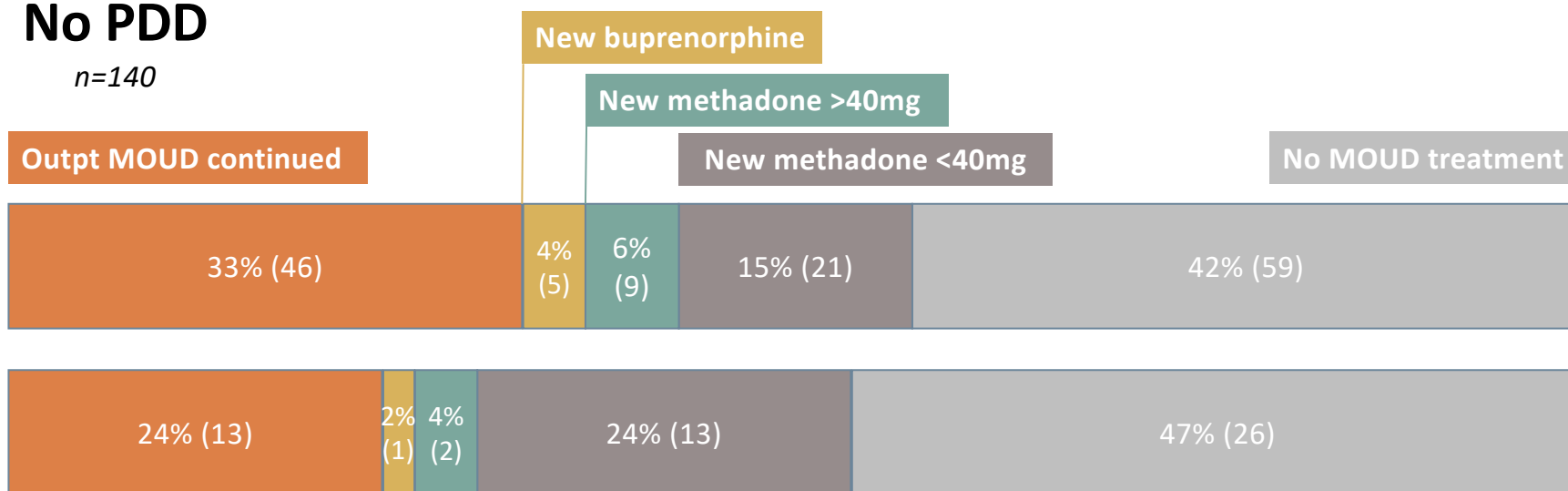
Distribution of *S. aureus* Infections Stratified by Patient-directed Discharge



Inpatient MOUD for persons using opioids, no PDD vs. PDD

No PDD

n=140



PDD

n=55

Lower proportion treatment dose MOUD in PDD group.

High proportion in both groups (>40%) who received no MOUD.

Treatment Completion, Readmission, and Mortality in PDD vs. Non-PDD

Table 3: Outcomes (Unadjusted Proportions)

	PDD <i>n=80</i>	No PDD <i>n=260</i>	<i>P value</i>
Completed antibiotic treatment	11% (9)	89% (230)	<0.001
30-day readmission due to ongoing or recurrent infection	49% (39)	13% (33)	<0.001
One-year readmission for ongoing or recurrent infection	51% (41)	21% (54)	<0.001
One-year mortality	13% (10)	10% (27)	0.03

Treatment Completion, Readmission, and Mortality in PDD vs. Non-PDD

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Adjusted odds of one-year readmission for infection & mortality in PDD vs. non-PDD

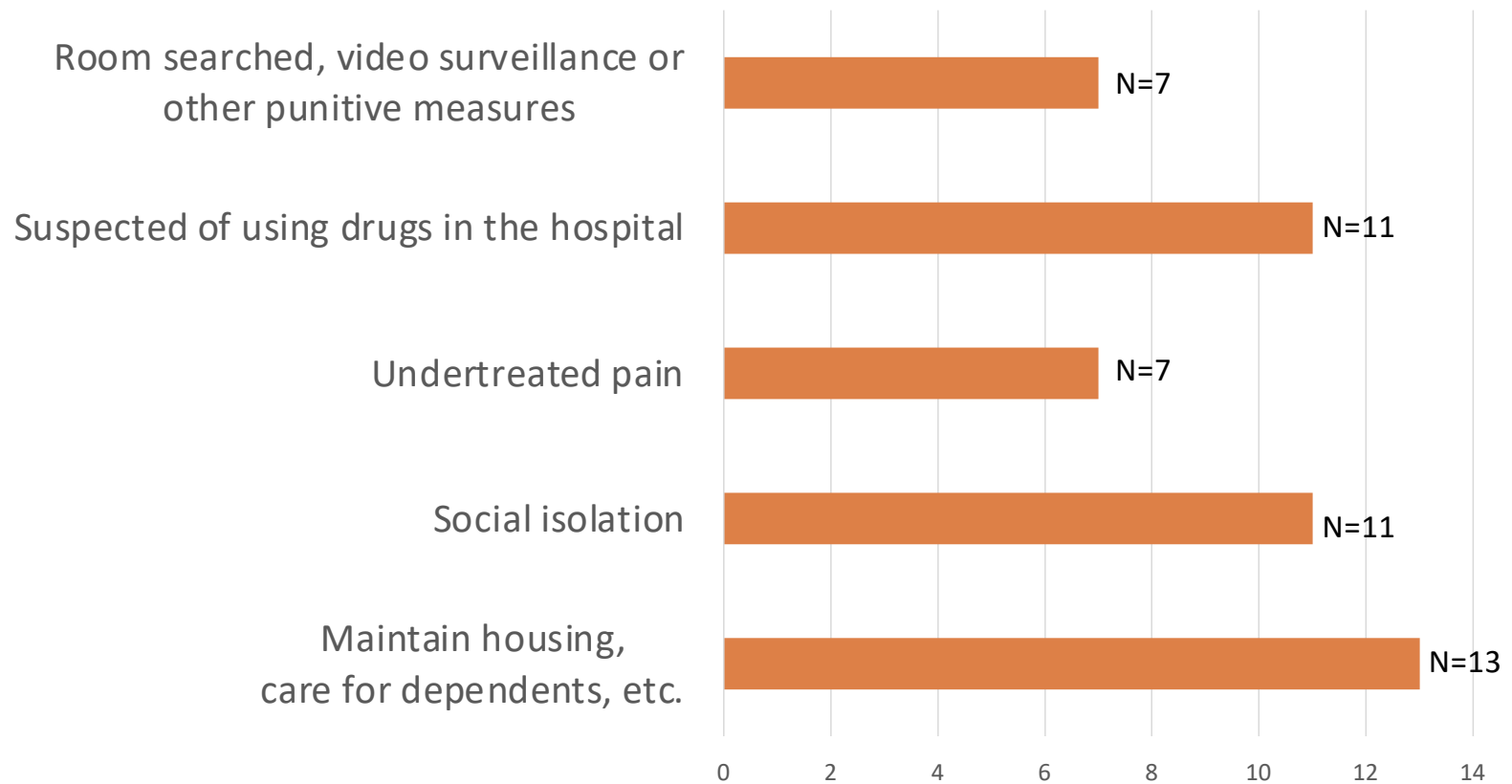
Odds of readmission for ongoing or recurrent infection 1 year after discharge in PDD vs. non-PDD

	OR (95% CI)
Unadjusted	5.4 (3.0 – 9.6)
Adjusted for age, race/ethnicity, Charlson Comorbidity score	5.4 (2.9 – 10.0)
Adjusted for age, race/ethnicity, Charlson Comorbidity score, and housing status	3.8 (2.1 – 6.7)

Odds of mortality 1 year after discharge in PDD vs. non-PDD

	OR (95% CI)
Unadjusted	1.2 (0.6 – 2.7)
Adjusted for age, race/ethnicity, Charlson Comorbidity score	1.4 (0.6 – 3.2)
Adjusted for age, race/ethnicity, Charlson Comorbidity score, and housing status	1.4 (0.6 – 3.2)

5 most frequently documented reasons for PDD



Frequently documented reasons for PDD: chart review excerpt

MD note from hospital:

“Initially refuses to discuss her hospitalization...
her reason for wanting to leave: her son is being
taken care of by her mother, and they are currently
in SF but will be leaving [town] tonight and
she wants to stop them.”

PDD reason: Care for dependents

Possible solution: Alternative antibiotic plan? Home IV antibiotics vs. PO antibiotics?

Frequently documented reasons for patient-directed discharge

MD note from SNF:

"Patient spent much of day complaining about pain... He is complaining of pain in his neck where he has the osteomyelitis. Explained to patient the nature of what he had and how it was self induced. The first time he seemed to listen..."

PDD reason: undertreated pain or substance use disorder, stigma

Possible solution: more support for inpatient/acute care treatment of SUD and pain in PWUD

Frequently documented reasons for patient-directed discharge

MD note from hospital:

“There is a concern that pt used amphetamines while in hospital, but search of room yielded no concerning items. As husband was visiting prior to episode, he is no longer allowed to visit ... She is very upset about this entire ordeal, and threatened to leave AMA, though husband pleads w her not... Pt responds well to sympathy from providers and may help her stay in hospital for remainder of IV antibiotics... Could compromise to allow short supervised visits along with risk management and nursing supervisors, as this is the only way pt will stay to completion of her required 6 weeks of IV antibiotics.”

PDD reason: stigmatizing hospital policies and ineffective caring environment

Possible solution: policy change, culture change, addiction medicine consult services

Limitations

- Frequently documented reasons for patient-directed discharge relied on the primary team's report and was not qualitative research done exploring patient's perspective.
- Our data collection spanned 2013 – 2018, prior to the existence of an Addiction Medicine consult service at one of our hospitals, fentanyl arrival in San Francisco, and the more widespread uptake of buprenorphine prescribing among generalists.
- As such, there were small numbers of patients who received buprenorphine, may not be generalizable to current practice environments.

Conclusions

- Pts with PDD during *S. aureus* infection treatment had **~4x increased odds of requiring readmission for ongoing treatment or recurrent infection.**
- Pts with PDD during *S. aureus* infection treatment had trend toward increased odds of mortality at one year following discharge.
- **Opportunities for improvement:**
 1. Improve access to home-based or shelter-based antibiotic therapy and better tailor antibiotic plan to patients' needs.
 2. Better initiate and maintain OUD treatment.
 3. Develop inpatient management tools for methamphetamine use disorder.
 4. Improve the experience of hospitalization with more supportive, patient centered care.

Acknowledgements

Co-authors & Contributors

Meredith Adamo
Stephenie Le
Jennifer Davis
Sarah Doernberg
Lisa Winston
Chip Chambers
Nancy Hills
Phillip Coffin
Vivek Jain
Michael Jula
Joan (Kim) Stanley

Fellowship Program

Paula Lum
Brian Schwartz

**Please contact me with
questions, comments, ideas, or to
collaborate!**

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Funding

Research in Addiction Medicine
Scholars (RAMS) Program
NIH/NIAID T32

References

1. **Ronan MV**, Herzig SJ. Hospitalizations related to opioid abuse/dependence and associated serious infections from 2002 to 2012. *Health Aff (Millwood)*. 2016;35(5):832-837. doi:10.1377/hlthaff.2015.1424
2. **Schranz AJ**, Fleischauer A, Chu VH, Wu L-T, Rosen DL. Trends in Drug Use–Associated Infective Endocarditis and Heart Valve Surgery, 2007 to 2017. *Annals of Internal Medicine*. 2018;170(1):31-40. doi:10.7326/M18-2124
3. **McCarthy NL**, Baggs J, See I, et al. Bacterial Infections Associated With Substance Use Disorders, Large Cohort of United States Hospitals, 2012–2017. *Clin Infect Dis*. doi:10.1093/cid/ciaa008
4. **Jackson KA**. Invasive Methicillin-Resistant *Staphylococcus aureus* Infections Among Persons Who Inject Drugs — Six Sites, 2005–2016. *MMWR Morb Mortal Wkly Rep*. 2018;67. doi:10.15585/mmwr.mm6722a2
5. **Suzuki J**, Robinson D, Mosquera M, et al. Impact of Medications for Opioid Use Disorder on Discharge Against Medical Advice Among People Who Inject Drugs Hospitalized for Infective Endocarditis. *The American Journal on Addictions*. 2020;29(2):155-159. doi:10.1111/ajad.13000
6. **Ti L**, Ti L. Leaving the Hospital Against Medical Advice Among People Who Use Illicit Drugs: A Systematic Review. *Am J Public Health*. 2015;105(12):e53-59. doi:10.2105/AJPH.2015.302885
7. **Glasgow JM**, Vaughn-Sarrazin M, Kaboli PJ. Leaving Against Medical Advice (AMA): Risk of 30-Day Mortality and Hospital Readmission. *J Gen Intern Med*. 2010;25(9):926-929. doi:10.1007/s11606-010-1371-4
8. **Solomon DA**, Price C, Johnson JAA, Montgomery MW, Martin B, Suzuki J. 767. Can Integration of Addiction Treatment Facilitate Safe Discharge on OPAT for Patients with Infectious Complications of Injection Drug Use? *Open Forum Infect Dis*. 2019;6(Suppl 2):S341-S342. doi:10.1093/ofid/ofz360.835
9. **Beieler A**, Magaret A, Zhou Y, Schleyer A, Wald A, Dhanireddy S. Outpatient Parenteral Antimicrobial Therapy in Vulnerable Populations—People Who Inject Drugs and the Homeless. *J Hosp Med*. 2019;14(2):105-109. doi:10.12788/jhm.3138
10. **Marks LR**, Munigala S, Warren DK, Liang SY, Schwarz ES, Durkin MJ. Addiction Medicine Consultations Reduce Readmission Rates for Patients With Serious Infections From Opioid Use Disorder. *Clin Infect Dis*. 2019;68(11):1935-1937. doi:10.1093/cid/ciy924
11. **Barocas JA**, Morgan JR, Wang J, McLoone D, Wurcel A, Stein MD. Outcomes Associated With Medications for Opioid Use Disorder Among Persons Hospitalized for Infective Endocarditis. *Clin Infect Dis*. doi:10.1093/cid/ciaa062