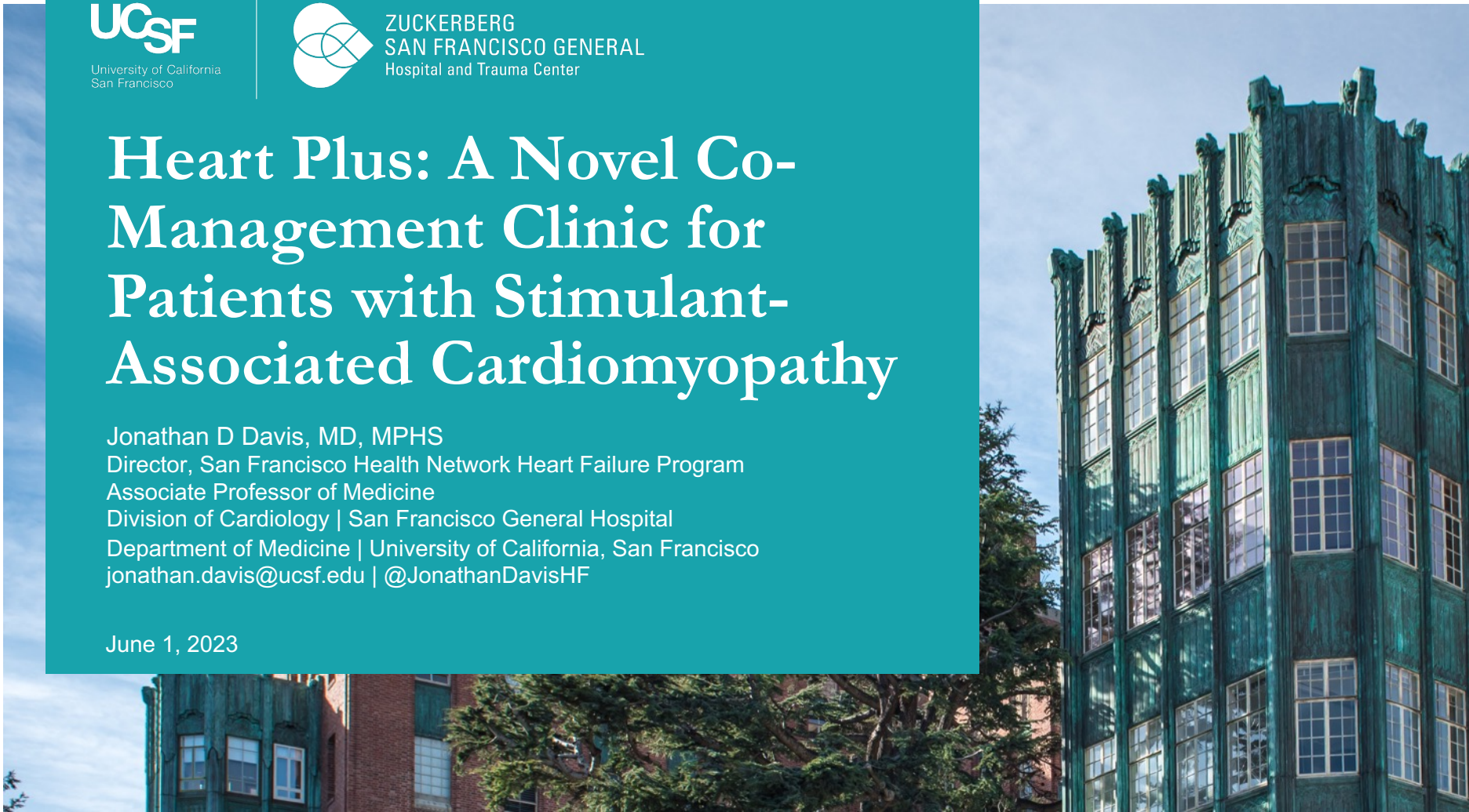
UCSF
University of California
San Francisco

ZUCKERBERG
SAN FRANCISCO GENERAL
Hospital and Trauma Center

Heart Plus: A Novel Co-Management Clinic for Patients with Stimulant-Associated Cardiomyopathy

Jonathan D Davis, MD, MPHS
Director, San Francisco Health Network Heart Failure Program
Associate Professor of Medicine
Division of Cardiology | San Francisco General Hospital
Department of Medicine | University of California, San Francisco
jonathan.davis@ucsf.edu | @JonathanDavisHF

June 1, 2023



Disclosures

- **None**

Learning Objectives

- **Increase understanding of challenges patients with co-occurring stimulant use and heart failure face in receiving health care**
- **Understand the impact of a multidisciplinary co-management approach to treating this patient population**
- **Appreciate the use of this model to treat other comorbid patient populations**

Background

Which of the following is true:

A. **Patients with stimulant-associated cardiomyopathy are at higher risk of dying than those with non-stimulant-associated cardiomyopathy**
B. **There is stigma associated with stimulant use that often negatively biases providers, further widening the gap in the care relationship.**
C. **Reduction in stimulant use improves cardiac function and reduces hospital admissions in patients**
D. **All of the above**

People with stimulant-associated cardiomyopathy (SA-CMP)

Compared to matched controls:

- **Higher rates of mortality and acute care utilization (e.g., Emergency Department visits, hospital admissions)**
- **Lower rates of consistent outpatient care engagement**

Methamphetamine Effect	Cardiotoxicity
Myocardial Toxicity	Cardiomyopathy
	Malignant arrythmias
Tachycardia, hypertension	Malignant HTN
	Coronary vasospasm
	Acute myocardial infarction
	Aortic dissection
Pulmonary arterial hypertension	Right heart failure
	Dysrhythmias
Neurotransmitter depletion	Sudden Cardiac death
Intravenous drug injection	Infective endocarditis

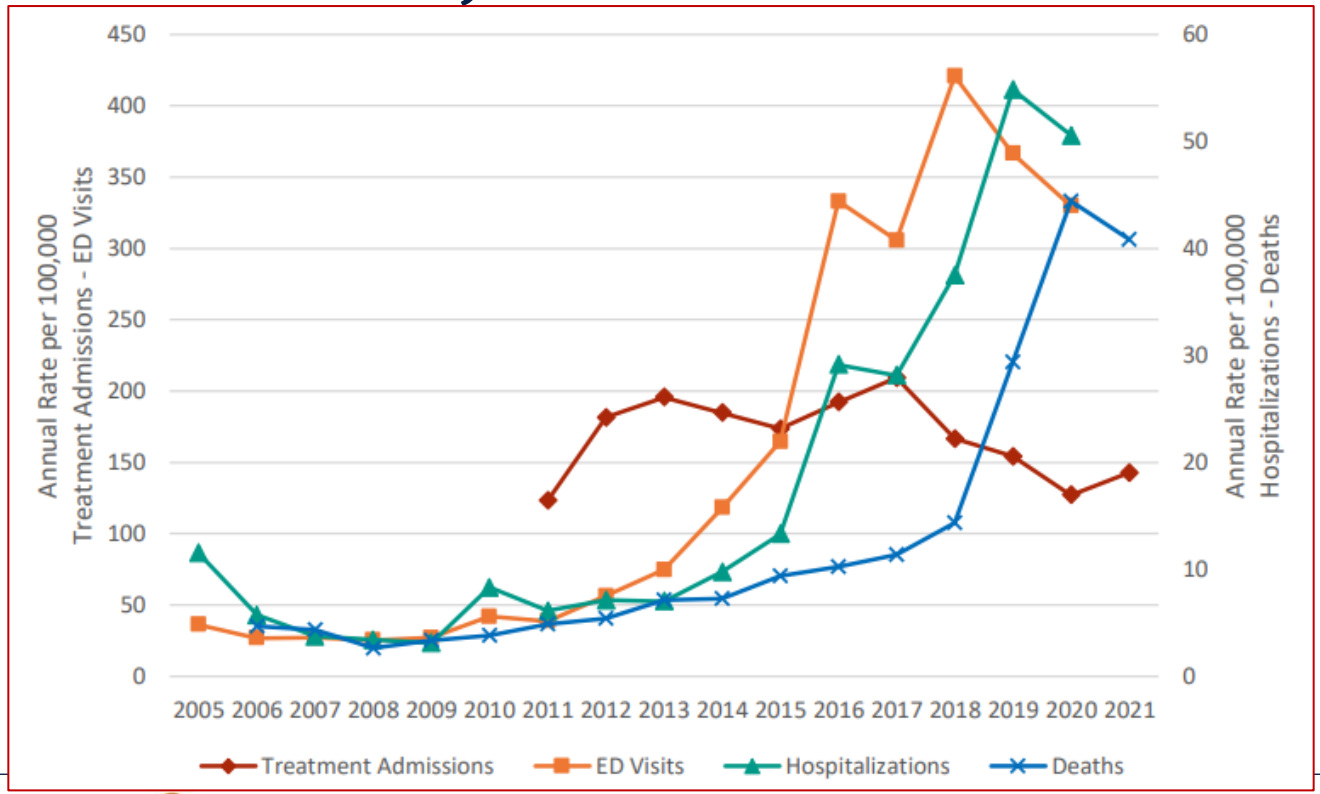
Modified from Paratz et al. Heart Lung Circ. 2016

Rising Prevalence

- **In California, methamphetamine-associated admissions increased 600%, from 1.2% of all hospitalizations in 2008 to 8% in 2018.**
- **Patients with SA-CMP having almost 4 times the odds of 30-day HF readmission compared to HF from non-SA-CMP etiologies (OR 3.62, 95% CI 1.40 to 9.38).**

Zhao SX, et al. Circ: Cardiovascular Quality and Outcomes. 2021;14(7)
Carter J, et al. AMERSA 41st Annual Conference. 2017

Rate of Methamphetamine Health Indicators in SF, 2005-2021



Substance Use Trends in San Francisco Through 2021. Available at: https://sf.gov/sites/default/files/2022-10/Substance_Use_Report_SF_2021_FINAL.pdf

Barriers

- **The exact pathophysiology and incidence are unknown**
- **Continued stimulant use drives disease progression and impedes medical care engagement**
- **There are limited effective treatment options to reduce use.**

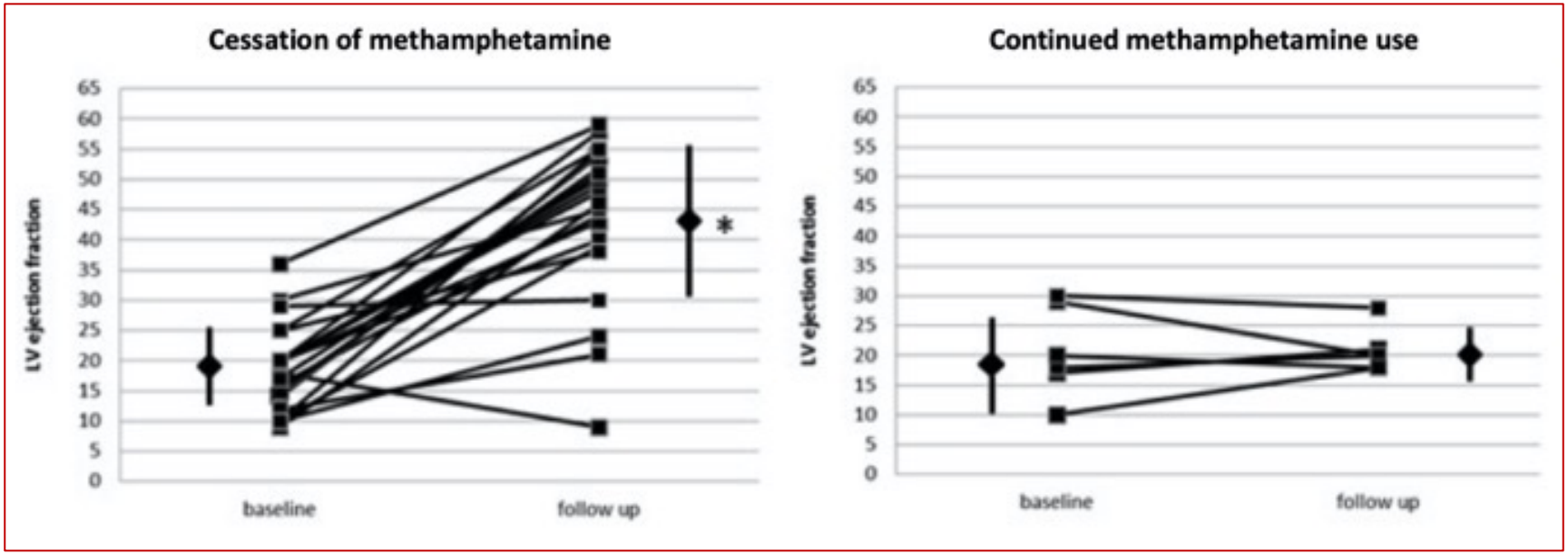
Social Determinants and Other Barriers

- **Co-occurring mental health disease**
- **Other substance use**
- **Social determinant of health (SDOH) challenges**
  - **e.g., expensive/insufficient housing options, income-generation limited by pre-employment screens, working multiple jobs**

Treatment Options

- **Use of guideline-directed medical therapy (GDMT) for patients with HF with reduced ejection fraction (HFrEF) improves outcomes but is frequently suboptimal.**
- **No FDA-approved medications for stimulant use disorder exist**
- **Contingency management (CM) is a highly effective behavioral treatment that reinforces a target behavior through a reward-based system.**

Cessation Associated with Improvement



Schürer S, et al. JACC Heart Fail. 2017 Jun;5(6):435-445.

Cessation Associated with Improvement

Outcome	Continued Use	Abstinence	Significance	Abstinence is associated with…
Ejection Fraction	19%	43%	**p <0.001**	A stronger heart
% patients meeting primary endpoint*	57%	17%	**p = 0.037**	Better clinical outcomes
% of patients with mod-severe heart failure symptoms**	33%	4.8%	p = 0.115	?Improved heart failure symptoms

*Primary Endpoint: Composite of death, nonfatal stroke, heart failure readmission
**NYHA Class 3 or 4

Schürer S, et al. JACC Heart Fail. 2017 Jun;5(6):435-445.

Contingency Management (CM)

	Add Something	Remove Something
Increase a behavior	Positive Reinforcement	Negative Reinforcement
Decrease a behavior	Positive Punishment	Negative Punishment

Principles of Successful CM Programs

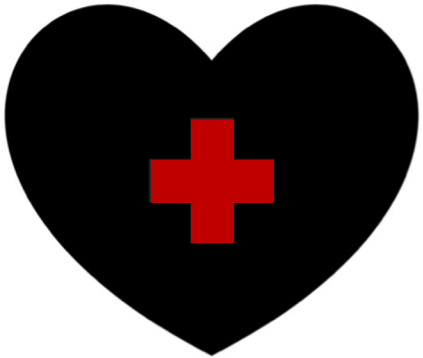
Incentives should be:

- **Based on objective evidence of a targeted behavior**
  - **Point of care urine drug screen (POC UDS)**
- **Delivered frequently**
- **Delivered soon after the occurrence of the targeted behavior**
- **Of sufficient magnitude**
- **Reliably and consistently delivered over time**

- **The Need:** To meaningfully partner with this population to address the medical, substance, and SDOH challenges they face.

- **The Plan:** Develop an intervention to engage patients with SA-CMP and to empower them to manage their substance use and cardiovascular conditions.

Heart Plus Clinic



Heart Plus Clinic

Addiction medicine/cardiology co-management clinic with contingency management for patients with methamphetamine associated cardiomyopathy

Aims

- **Increase engagement in Heart Failure Clinic**
- **Increase access to evidence-based treatments for stimulant use and heart failure**
- **Help patients decrease or discontinue stimulant use as guided by their goals**
- **Promote teamwork and collaboration across specialties**

Four Primary Goals

1. Increase outpatient care engagement
2. Decrease acute care utilization
3. Reduce stimulant use
4. Improve usage of guideline directed medical therapy for heart failure

★If patients could be more stable clinically, then the hope was to better connect them to resources to address social determinant of health issues.

The Team – 1/2

- **Addiction Care Team inpatient navigator**
  - **Receives the inpatient referrals, contacts patients, teaches them about Heart Plus, and, if interested, continues phone contact with them until the start of Heart Plus.**
- **Addiction Medicine providers**
- **Cardiology providers**

The Team – 2/2

- **Outpatient care navigator**
  - Helps with ongoing patient navigation and appointment reminders
- **Research team members**
  - IRB approval and data collection and analysis
- **Clinic and departmental leadership**
  - Allocated clinic space, clerical support for building schedule templates, medical assistants, and clinic storage space

Inclusion Criteria

- Heart failure (HF) with ejection fraction <40%) due to stimulant use disorder (per DSM criteria)
- HF hospitalization in the last six months
- Interest in reducing or discontinuing stimulant use.
- Eligible to receive care in the San Francisco Health Network (SFHN)
  - 1 in 8 San Franciscans (~110,000 people)
  - No private insurance

Exclusion Criteria

- **Lacking a telephone**
- **Residing in a skilled nursing facility or a residential treatment program.**

Recruitment

- **Outpatient providers could refer**
- **Most patients recruited during an admission for worsening HF**
- **The addiction team member called or visited patients for screening and scheduled their intake visit**

Two 12-week Heart Plus Sessions

- **2021 Cohort**
  - Recruited patients from September of 2020 to February 2021
  - Conducted the Heart Plus pilot from March to June 2021 (“2021 Cohort”).
- **2022 Cohort**
  - Recruited patients from September of 2021 to February 2022
  - Conducted Heart Plus from March to June 2022

Twice-weekly Clinic Structure

- **Each visit included vital signs, a focused cardiovascular exam, and an optional POC UDS**
- **At each visit, an Addiction Medicine physician met with patients to discuss substance use, symptoms, and medication adherence and to provide CM**
- **The cardiologist saw patients every week for medication management and more regularly as needed.**

CM and the Fishbowl

500 Slips of Paper

- 50%: Written affirmations, e.g., “Way to Go!” “Keep it up!”
- 42%: Safeway Grocery Store $5 gift card
- 8%: Safeway Grocery Store $10 gift card
- 0.2%: Safeway Grocery Store $100 gift card

First Visit

- Warm welcome (with snacks!)
- Meet Addiction & Cardiology providers
- Describe Heart Plus program
- Priming Draw: draw from the fishbowl as many times as needed to win a prize

CM Schedule and Costs

- 1st visit: one priming draw
- 2nd visit: 2 attendance draw + 1 draw for neg Utox
- 3rd visit: 3 attendance draw + 2 draw for neg utox, etc.
  - Max out at 10 draws (5 for attendance, 5 for utox)

- Cost:
  - Perfect attendance, Utox all negative: $615/patient (average)
  - 50% attendance: $307/patient
  - 10 patient pilot assuming 50% attendance: $3070 in gift cards

Visit Number	Date	Utox Draws	Attendance Draws	Total Draws at Visit	Earnings at Visit	Earnings to Date
1	1/3/22	--	Priming draw	--	$5	$5
2	No show	--	--	--	--	$5
3	1/10/22	Declined	1	1	$0	$5
4	No show	--	--	--	--	$5
5	1/18/22	Declined	1	1	$10	$15
6	1/20/22	Declined	2	2	$0	$15
7	No show	--	--			
8	No show	--	--			
9	1/31/22	Declined	1			
10	2/3/22	0	2			
11	2/7/22	Declined	3			
12	EXCUSED	--	--			
13	2/14/22	Declined	4			
14	2/17/22	1	5			
15	2/22/22	0	5			
16	EXCUSED	--	--			
17	2/28/22	Declined	5			
18						
19						
20						
21						
22						
23						
24						

Visit Number	Date	Utox Draws	Attendance Draws	Total Draws at Visit	Earnings at Visit	Earnings to Date
1	1/3/22	--	Priming draw	--	$5	$5
2	1/6/22	1	2	3	$10	$15
3	1/10/22	2	3	5	0	$15
4	1/13/22	3	4	7	$30	$45
5	1/18/22	4	5	9	$35	$80
6	1/20/22	5	5	10	$30	$110
7	1/24/22	5	5	10	$30	$140
8	1/27/22	5	5	10	$35	$175
9	1/31/22	5	5	10	$20	$195
10	2/3/22	5	5	10	$40	$235
11	EXCUSED	--	---	--	--	$235
12	2/10/22	5	5	10	$20	$255
13	2/14/22	5	5	10	$55	$310
14	2/17/22	5	5	10	$20	$330
15	2/22/22	5	5	10	$30	$360
16	EXCUSED	--	--	--	--	$360
17	2/28/22	5	5	10	$40	$400
18						
19						
20						
21						
22						
23						
24						

CM Rules

- **Unexcused absence → draws return to 1 for attendance and utox**
- **Reactive utox or decline → reset to 1**

Results

2021 Cohort Demographics

- **38 patients met criteria/referred; 17 reachable by phone**
  - **COVID-19: ½ appointments in person, ½ via phone**
  - **12 attended first visit**
    - **3 attended only intake**
    - **9 continued after first visit (1 attended all available visits)**
- **83% marginally housed**
- **75% used methamphetamine, 25% used cocaine**

Leyde S, et al. Journal of Addiction Medicine, In Print

2021 Cohort Demographics, cont.

- **92% male, 50% Black, 33% Asian, 17% white**
- **Mean age: 56 years**
- **Median EF: 29%**

Leyde S, et al. Journal of Addiction Medicine, In Print

2021 Cohort Results

- **Median clinic show rate = 80%**
- **Median telephone show rate = 50%**
- **ALL participants reported reduced use**
  - **1 maintained abstinence during clinic period**
  - **Majority declined urine drug testing during in person visits**
- **Total earnings: range: $5-$400, median $147.50**

Leyde S, et al. Journal of Addiction Medicine, In Print

2021 Cohort Quantitative Results

Theme 1: Non-stigmatized care facilitated hopefulness

"…to have a people who give a damn, and don't judge you, because of what you do or your lifestyle, that's a miracle and a blessing in itself…And to see people give a damn, it's like wait a minute. They care so much about me, maybe I should care about me." (Participant A)

Theme 2: Patient-Provider relationship was essential

"When [my doctor] pops up behind the glass, and she acknowledges that I'm here, that I'm present. It always feels good inside that I have a person that's rooting for me all the steps of the way… and that always feels good, to have somebody that's walking with you through the darkness." (Participant D)

Theme 3: Heart Plus changed participants' view of their health and drug use

"When I came here, I noticed that "Oh, I don't crave that much. Today I'm clean. I'm supposed to be getting high." You know, this is not me, right? I noticed that my using is fading away. Hopefully it'll be for good." (Participant B)

Leyde S, et al. Journal of Addiction Medicine, In Print

2022 Cohort

- **Fifteen eligible patients were referred, and nine attended at least two visits.**
- **All 9 patients were men; 56% were Black, 22% Filipinx, and 22% White**
- **Mean age of 58 years (±SD 6.6).**
- **They attended a median of 15 out of 19 possible visits and earned a median of $265.**

Azari, S… Davis, JD. Manuscript submitted

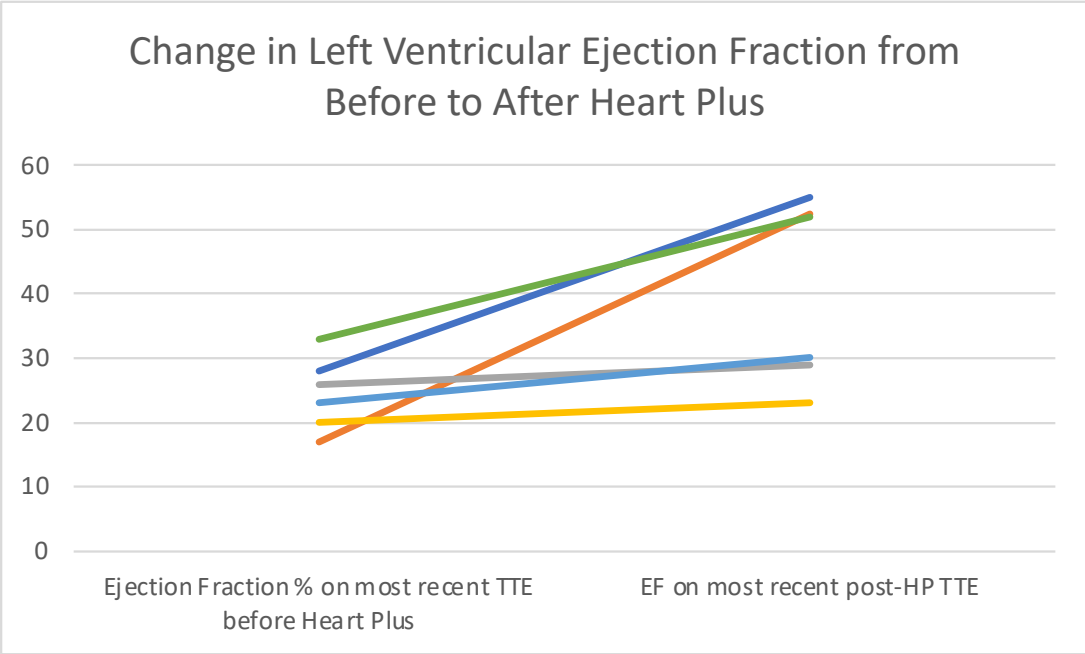
2022 Cohort Results, cont.

- **Trend towards improvement in BNP (735 pg/mL at baseline, 173pg/mL post-program, p=0.21).**
- **6 patients on maximum tolerated GDMT by the end**
- **3 patients sustained stimulant cessation, confirmed by UDS.**

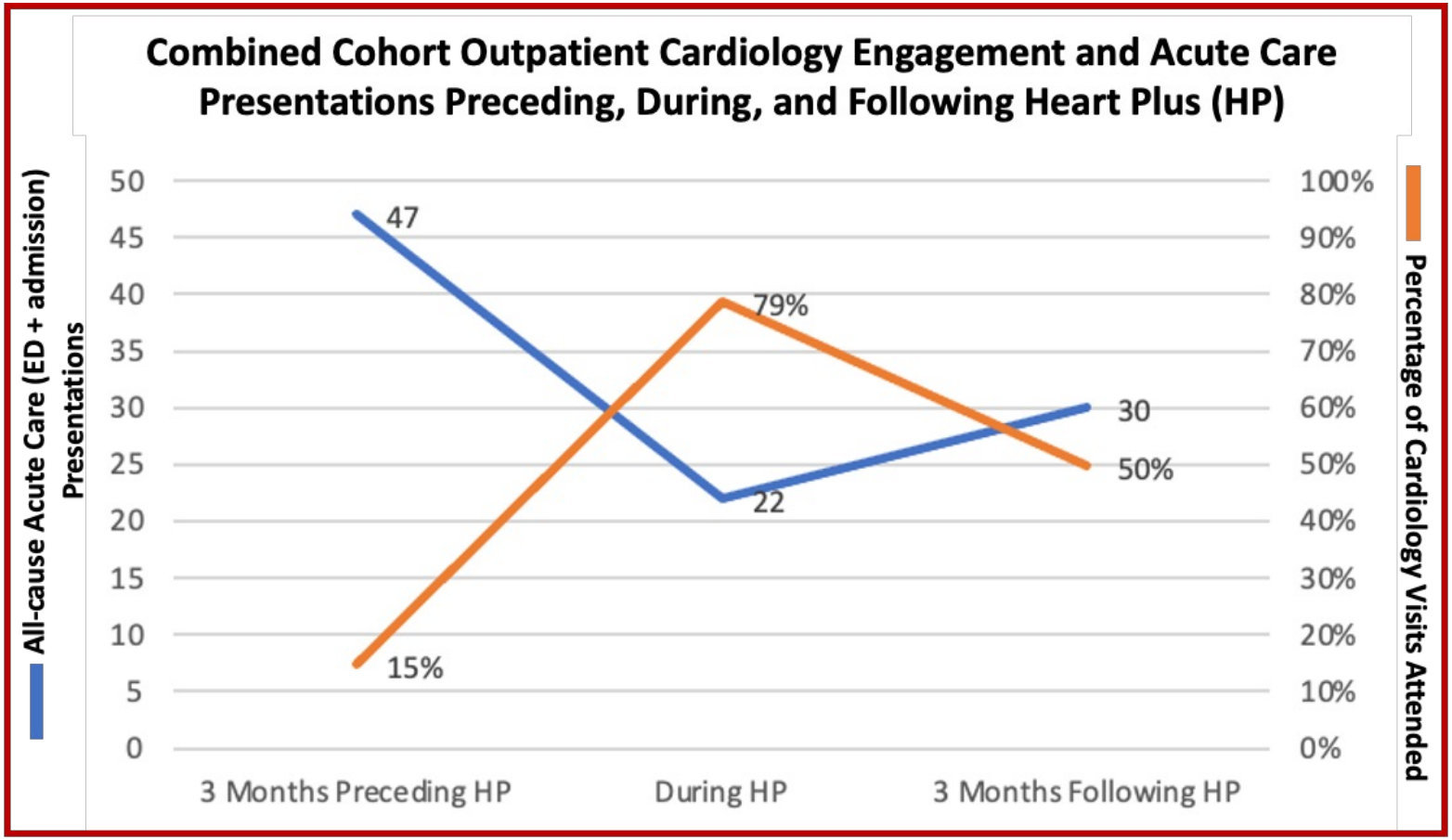
Azari, S… Davis, JD. Manuscript submitted

2022 Cohort Results, cont.

- **Pre- & post-program TTE available for 5 participants**
  - **median EF improved significantly from 23% to 52% (p=0.04)**



Azari, S… Davis, JD. Manuscript submitted



Azari, S… Davis, JD. Manuscript submitted

Summary and Next Steps

Key Observations

- **Increase in outpatient care engagement with concomitant reduction in acute care utilization**
- **Increase in GDMT usage with concomitant reduction in stimulant use.**

Key Observations, cont.

- **Patients were better able to engage with outpatient resources for SDOH, including case management, social work, and housing and food service programs once they achieved clinical stability.**
- **They were empowered to take control of their health and in knowing that health care providers cared about their wellbeing.**

Next Steps

- **This clinic model must be expanded!**
  - **Other cardiopulmonary complications of stimulant use such as pulmonary hypertension**
  - **Other substances, such as alcohol or opiates**
- **Our team is currently working on anchoring Heart Plus into the standard of care in our system**
- **Collaborators: UC Davis (launching pilot)**

Practical Tips at the Bedside

- Do not discuss a person's substance use in front of friends or family members without their consent
- Use strengths-based, person-first charting
- Find ways to affirm your patients
- Teach them about the good prognosis with treatment of their HF and their stimulant use disorder
- Reach out to ACT – we're here to help!

Learning Objectives

- Increase understanding of challenges patients with co-occurring stimulant use and heart failure face in receiving health care
- Understand the impact of a multidisciplinary co-management approach to treating this patient population
- Appreciate the use of this model to treat other comorbid patient populations

Acknowledgements

Special Thanks

- Soraya Azari, MD
- Sarah Leyde, MD
- Elizabeth Abbs, MD
- Stephen Matzat, MD
- Meredith Adamo, MD
- Autumn Kleinman
- Abby Fleeter
- Grace Lemke
- Leslie Suen, MD
- Lurit Bepo, MD
- RFPC (1M) Clinic Leadership and Staff

Thank you!

jonathan.davis@ucsf.edu
@JonathanDavisHF

Zuckerberg San Francisco General