Implementing the Four "Pillars of Therapy" into Practice: a Pharmacist-led Guideline Directed Medical Therapy (GDMT) Program for Heart Failure with Reduced Ejection Fraction (HFrEF)

Nichole Melody, BS, PharmD, BCPS
Northwestern Medicine/Bluhm Cardiovascular Institute
Ambulatory Cardiology Pharmacist

Imran Khan, PharmD
Northwestern Medicine Physician Network
Ambulatory Pharmacy Care Management

September 22, 2023

Disclosures

Nichole (Nikki) Melody reports:

- **Nothing to disclose**

Imran Khan reports:

- **Nothing to disclose**

Objectives

1. Apply the 2022 AHA/ACC/HFSA heart failure (HF) guideline recommendations for Heart Failure with Reduced Ejection Fraction (HFrEF) that advise patients should receive the four “pillars of therapy” including beta blockers, renin-angiotensin-aldosterone system inhibitors (ACEi/ARB/ARNI), mineralocorticoid receptor antagonists (MRA), and sodium-glucose co-transporter 2 inhibitors (SGLT2i) at appropriate doses into clinical practice

2. Formulate a collaborative practice agreement and create a pharmacist-led guideline directed medical therapy (GDMT) program for HFrEF in ambulatory care

3. Use process and outcomes measures to demonstrate pharmacist value in a pharmacist-led medication adjusted to target clinic for HFrEF

Epidemiology

- **6.2 millions** adults (**2.4%** of population) in U.S. with HF

- **809,000** HF hospitalizations annually
- **1,932,000** outpatient office visits with HF as primary diagnosis annually
- **$30.7 billion** in costs related to HF

- 1-year mortality of **29%**
- 5-year mortality of **50%**

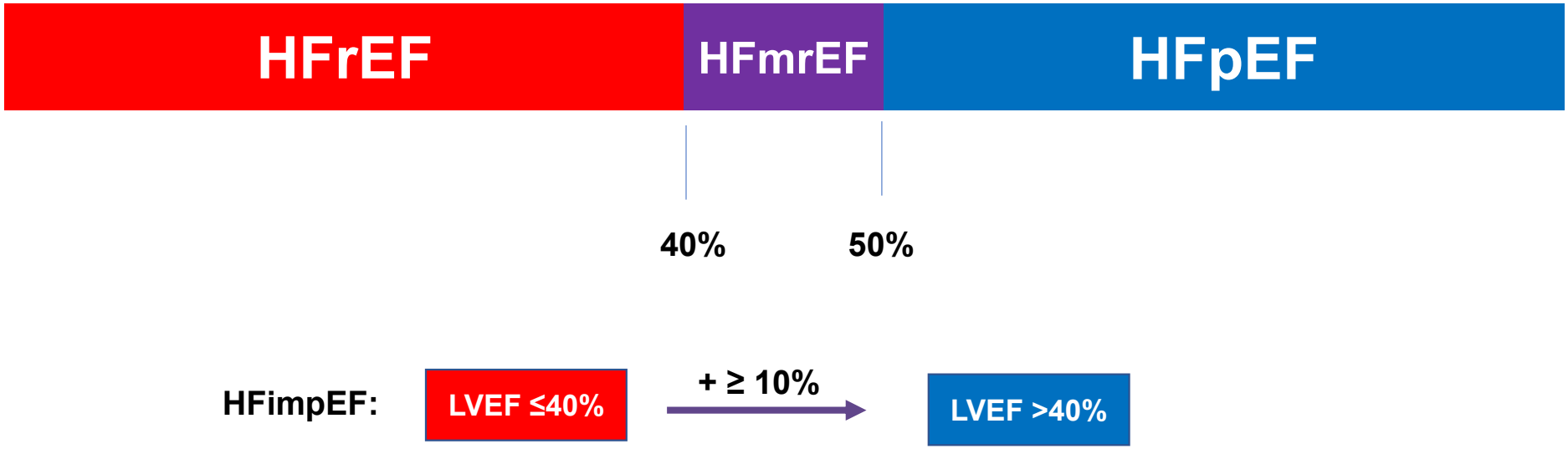
Prevalence

Healthcare Utilization

Mortality

Virani S et al. *Circulation*. 2020; E139-595.

Subtypes of Heart Failure



HFmrEF = Heart Failure with Midrange Ejection Fraction
HFpEF = Heart Failure with Preserved Ejection Fraction
HFimpEF = Heart Failure with Improved Ejection Fraction

Bozkurt B et al. *J Card Fail*. 2021; 27(4): 387-413.

Treatment of Stage C Heart Failure

PUFA: polyunsaturated fatty acids
*For patients self-identified as African American

First-Line Therapies

FOUR PILLARS

- ARNi/ACEi/ARB (1)
- Beta Blocker (1)
- MRA (1)
- SGLT2i (1)

→ Morbidity, Mortality, Hospitalizations

- Diuresis as needed (1)

→ Symptoms, Worsening HF

Additional Therapies

- Hydralazine-nitrates* (1) → Morbidity, Mortality, Hospitalizations
- Ivabradine (2a)
- Vericiguat (2b)
- Digoxin (2b)

→ Hospitalizations

- PUFA (2b) → Mortality, Hospitalizations
- Potassium Binders (2b) → Facilitate use of RASS inhibitors

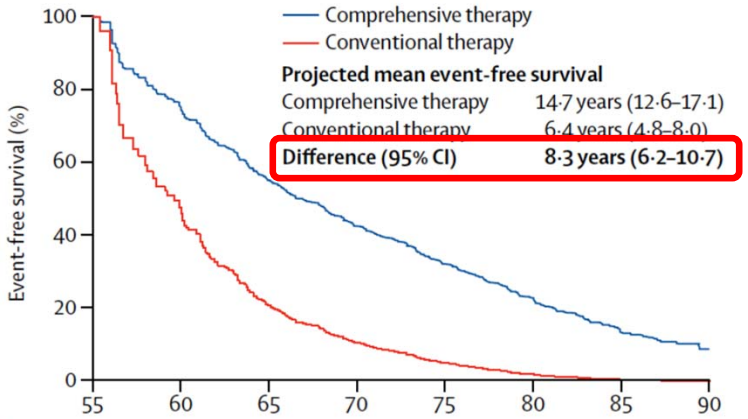
Heidenreich PA, et al. Circulation. 2022;145:e895-e1032.

Additional Benefit of Four Pillars Compared to Conventional Therapy

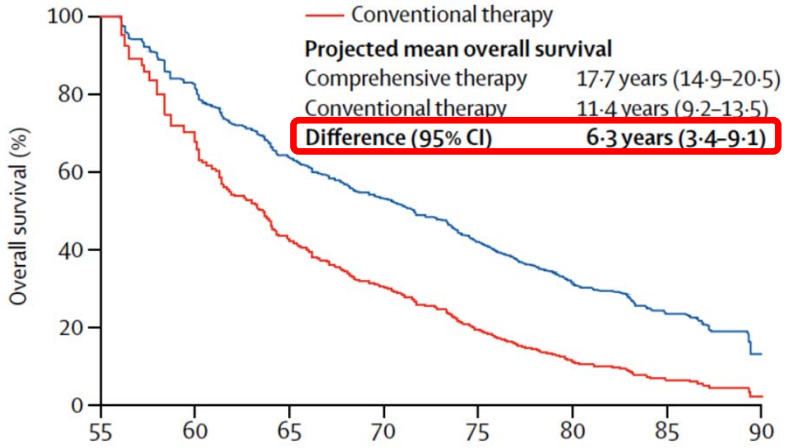
Treatment

— Comprehensive therapy (ARNi+ BB + MRA + SGLT2i)
— Conventional therapy (ACEi/ARB + BB)

CV death or hospitalization for HF for patients starting at 55 years



Overall survival for patients starting at 55 years



Vaduganathan M, et al. Lancet. 2020; 396:121-128.

079 - Imran, Nikki - Implementing the Four Pillars into Practice

Visual settings | Edit

When poll is active respond at **PollEv.com/ichp** Send **ichp** to **22333**

1. Most patients with heart failure are taking a medication from each of the four classes of guideline directed medical therapy to help treat their disease.

0

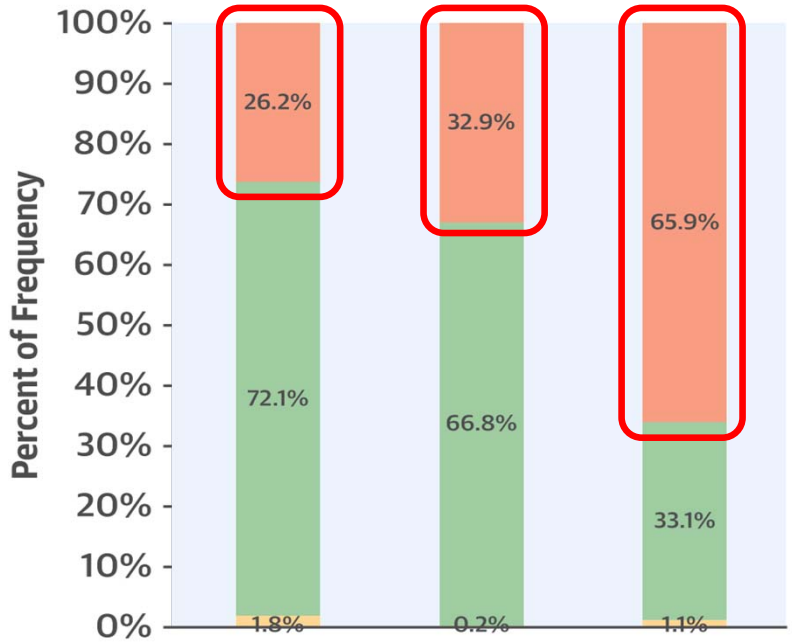
0%	0%
True	False

Gaps/Barriers to Implementation of Guideline Directed Medical Therapy

What is the Quality Gap?

CHAMP-HF Registry

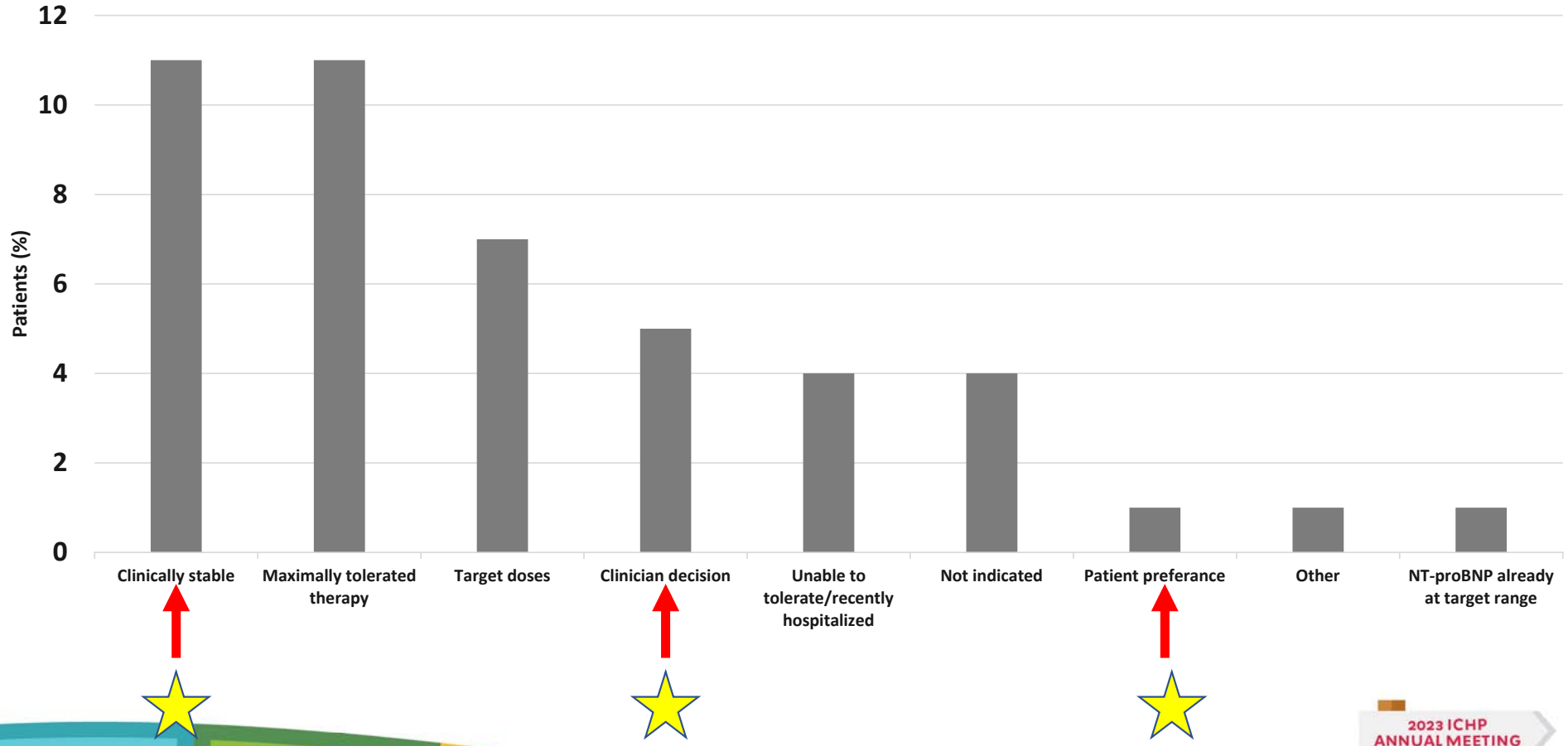
- ***Only 22.1%*** prescribed ACEi/ARB/ARNI, BB, and MRA
- ***Only 1.1%*** prescribed target doses of all classes
- **<2%** of patients had a documented contraindication to any specific therapy



	ACEI/ARB/ ARNI	Beta-Blocker	MRA
Without Contraindication and Not Treated	920	1159	2317
Treated	2536	2351	1163
With Contraindication	62	8	38

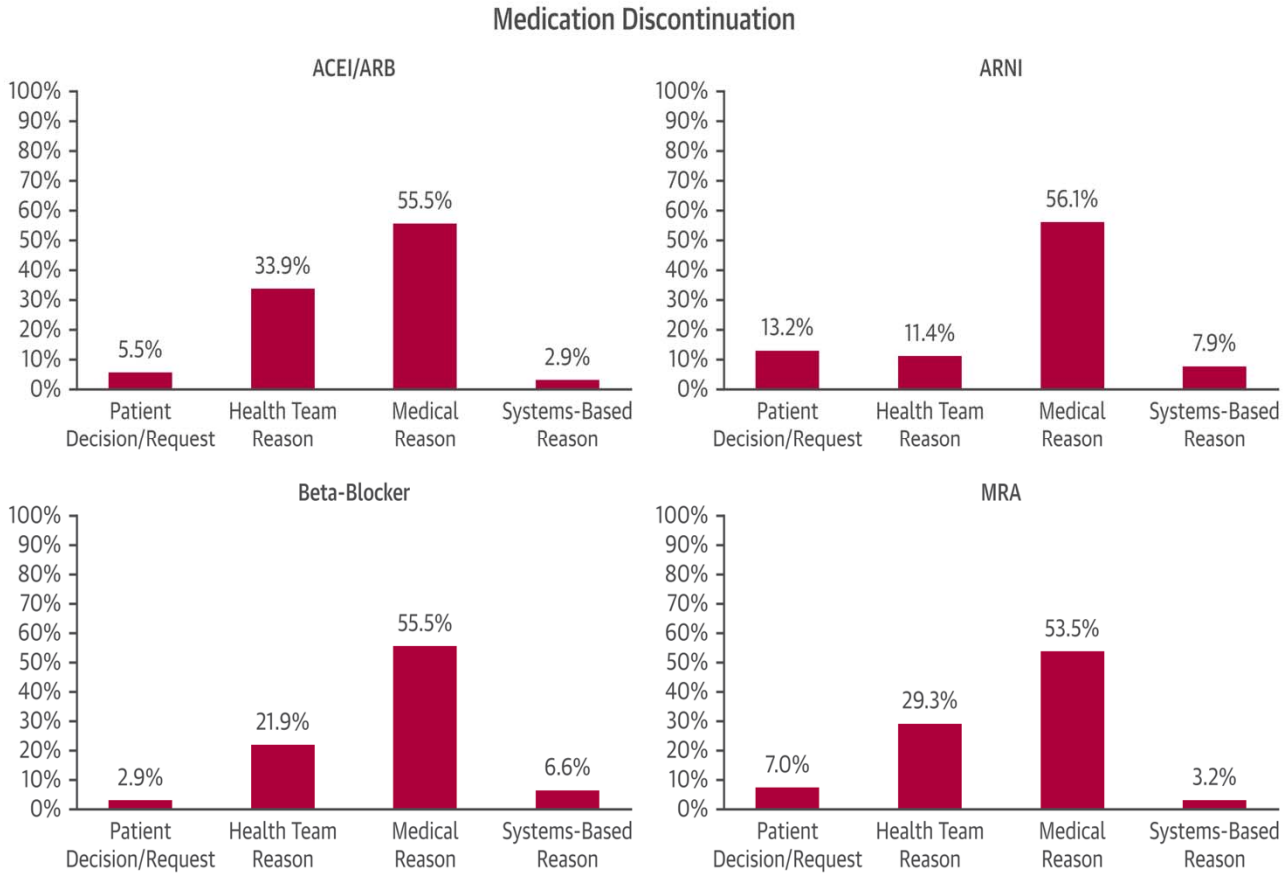
Greene S et al. *JACC.* 2018; 72: 351-66.

Reasons for Not Titrating Medical Therapy



Fiuzat M et al. *JAMA Cardiol.* 2020; 5(7): 757-64.

Challenges to Medical Therapy



Patient decision/request:

- Cost
- Side effects
- Other

Health team reason:

- Switch to other therapy
- Provider preference

Medical reason:

- Adverse effects
- Worsening or new symptoms
- Not tolerated
- Patient improved

Systems-based reason:

- Formulary change
- Insurance change
- Other

Greene S et al. *JACC*. 2019; 73: 2365-83.

What Are the Reasons for Lack of Treatment?

- Lack of provider's time/appointment availability
- *Medication side effects/tolerability/pill burden* ★
- HF regimen complexity
- *Unfavorable prognostic factors (severe NYHA functional class, age, renal insufficiency, lower systolic BP)* ★
- *Lack of financial assistance/cost* ★
- Lack of trust (Patient hesitation to try and titrate new medications)
- Transitions in care between different care settings

Polling Question #2 Case

56 y/o female in clinic with a history of diabetes type II, hypertension and newly diagnosed Stage C NYHA class II heart failure with reduced ejection fraction (EF 27%). Her medications include lisinopril 2.5mg daily, amlodipine 5mg daily, metoprolol tartrate 25mg twice daily, metformin 1,000mg twice daily. BP: 143/78 mmHg, HR 79 bmp. Recent BMP showed a potassium level of 4.2 mmol/L and a serum creatinine of 0.92 mg/dL (at baseline).

What is a reasonable next step in optimization of therapy?

079 - Imran, Nikki - Implementing the Four Pillars into Practice

Visual settings | Edit

When poll is active respond at **PollEv.com/ichp** Send **ichp** to **22333**

2. What is a reasonable next step in optimization of therapy?

0

0%	0%	0%	0%
Change metoprolol tartrate to metoprolol succinate 25mg XL daily	Stop lisinopril x 36 hours. Add sacubitril/valsartan(24mg/26mg) 1 tab twice daily	Increase amlodipine to 10mg daily	Ask her to work on lifestyle modifications (low sodium diet) first and return to clinic in 3 months

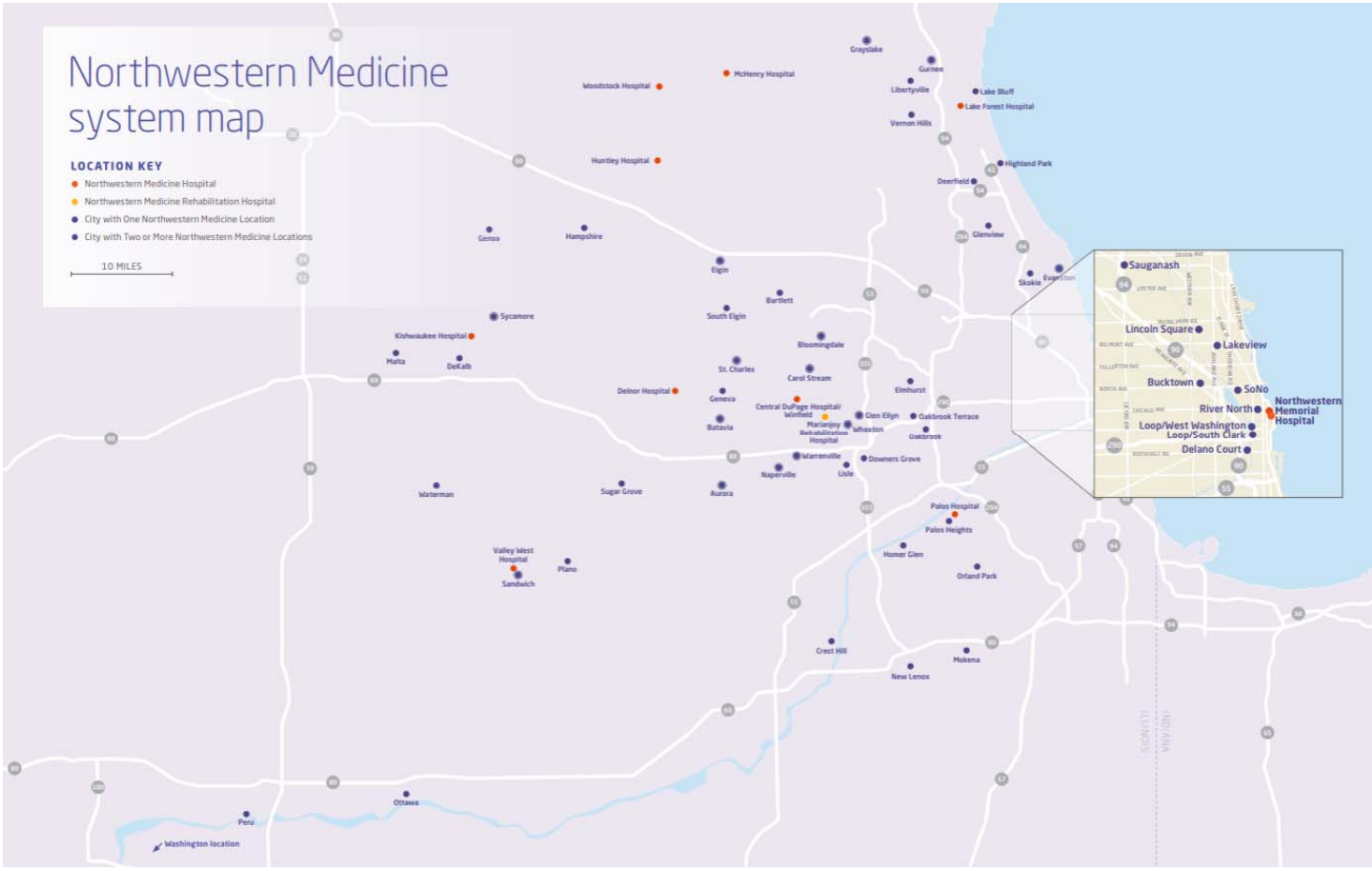
Medication Adjusted to Target Pharmacist Clinic (MAT) at Northwestern Medicine

Northwestern Medicine Hospitals and Other Key Locations

13 Hospitals

- Ann & Robert Lurie Children's Hospital of Chicago
- **Central DuPage Hospital**
- **Delnor Hospital**
- Huntley Hospital
- **Kishwaukee Hospital**
- **Lake Forest Hospital**
- Marianjoy Rehabilitation Hospital
- McHenry Hospital
- **Northwestern Memorial Hospital**
- NM Palos Hospital
- NM Prentice Women's Hospital
- Valley West Hospital
- Woodstock Hospital

531 Outpatient Facilities
74 Primary Care Practices
25 Immediate Care Centers



Timeline of Northwestern Imbedded Pharmacists for Heart Failure Medication Titration

Bluhm Cardiovascular Institute = BCVI

2019

Creation of a **Central Region pharmacist** imbedded in the cardiology clinic to optimize heart failure guideline directed medical therapy

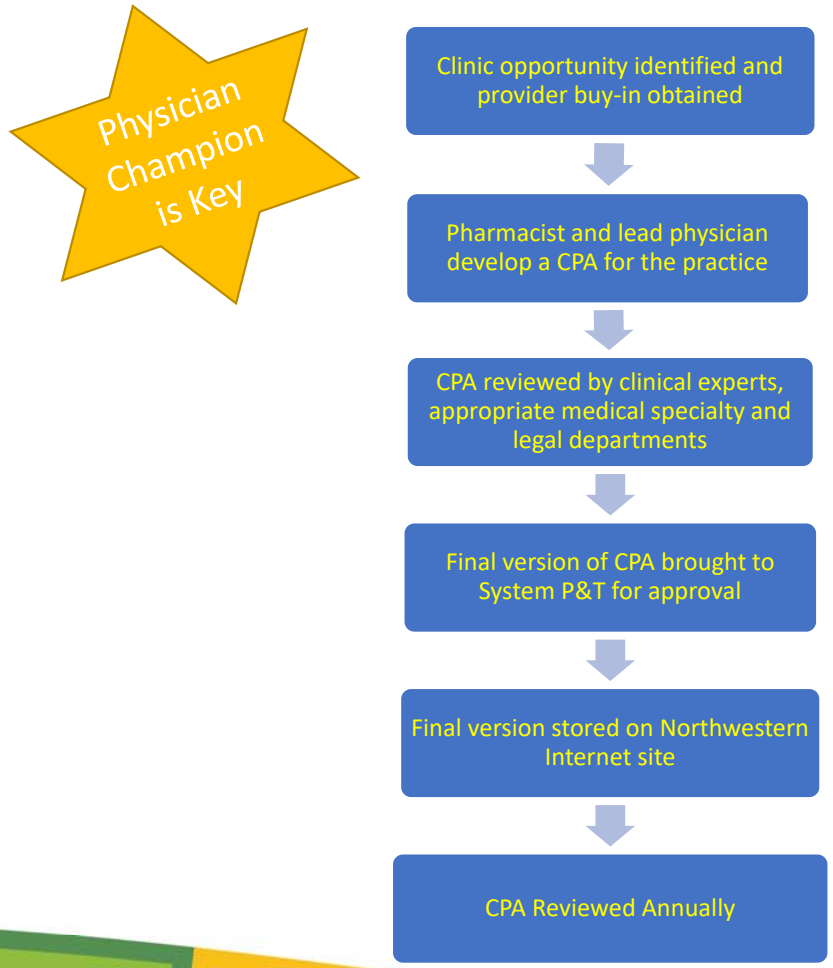
2021

Expansion of a pharmacist in the **West Region** to optimize guideline directed medical therapy for heart failure

2022

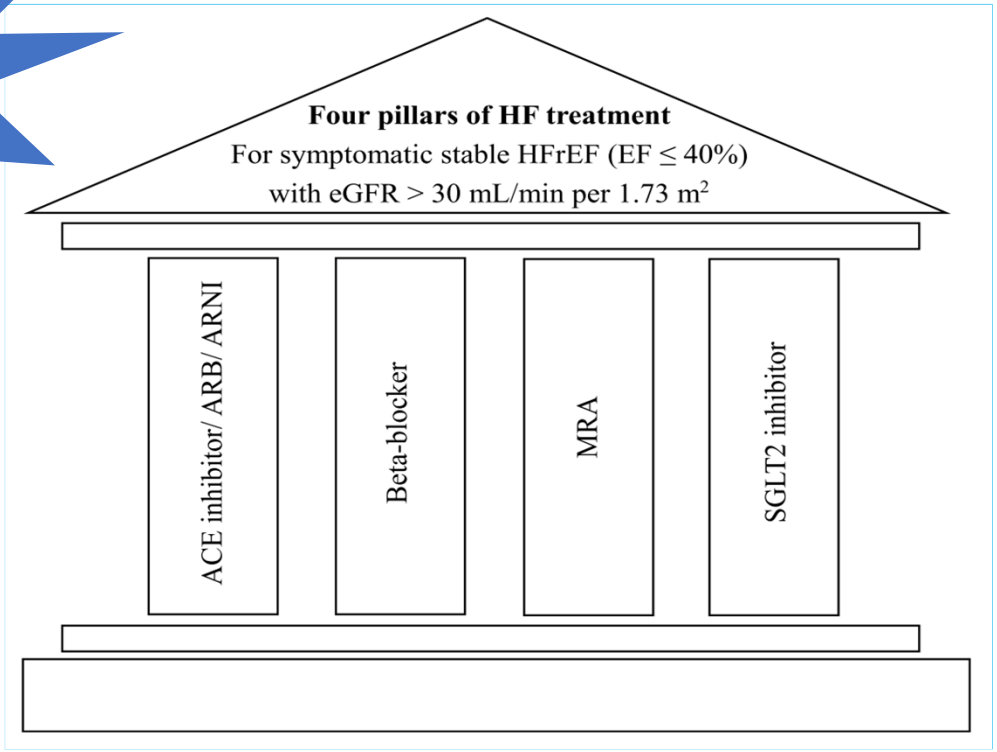
Expansion of a pharmacist in the **North Region** to optimize guideline directed medical therapy for heart failure

Collaborative Practice Agreement (CPA) Pathway



Pharmacist Medication Adjusted to Target (MAT) Clinic

Get patients on guideline directed medical therapies and improve heart function!



Patient Case

39 y/o **Burmese speaking** male with past medical history of hyperlipidemia presented to ED for acute onset shortness of breath on 2/13/2023. He was started on carvedilol x 1 dose which was stopped for low blood pressure.

- **Chest Xray:** enlarged cardiac silhouette and pulmonary edema
- **BNP:** 455 pg/mL
- **ECHO:** moderately dilated left ventricle (LV) with LVEF 15%, abnormal LV strain (-7.32%), stage III diastolic dysfunction, moderately enlarged left atrium
- **Basic Metabolic Panel:** Scr: 1.45 mg/dL (unclear baseline) BUN: 13 mg/dL, Na: 139 mmol/L, K: 3.5 mmol/L, Glucose: 113 mg/dL
- **Hgb A1c:** 6.3%
- **Home Cardiac Medications:** atorvastatin 20mg nightly

✓ **2/15/23:** Heart failure team consulted, metoprolol succinate 25mg XL daily and spironolactone 25mg daily initiated
✓ **2/22/23:** Nurse practitioner hospital discharge appointment. Increased metoprolol to 37.5mg XL daily. Referred to pharmacist medication adjusted to target clinic
✓ **3/8/23:** First pharmacist medication adjusted to target clinic appointment. **Provided blood pressure cuff to start checking vitals at home.**

Pharmacist Medication Adjusted to Target (MAT) Clinic

Target Population

- HFrEF (EF ≤40%)
- NYHA Class I-III, Stage B or C
- Recent visit with cardiology provider (if recently discharged)

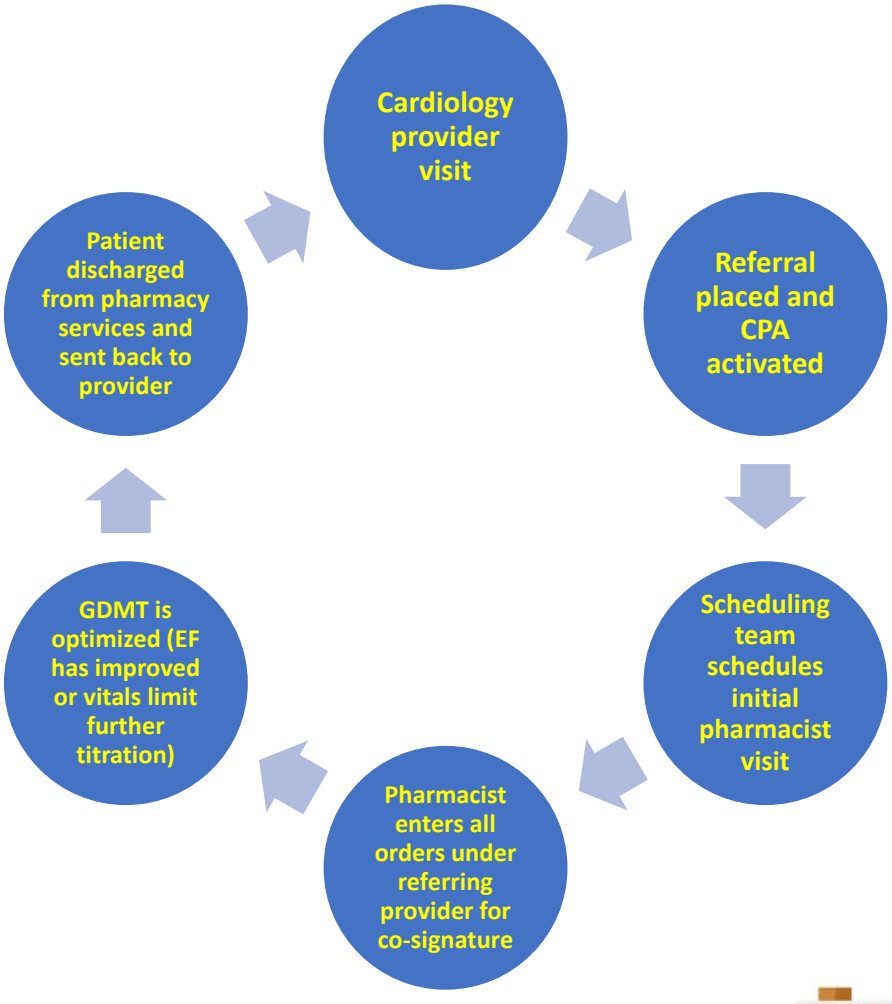
Referral

- Signed collaborative practice agreement (CPA) with pharmacist and cardiologist
- Cardiologist or nurse practitioner refers to pharmacist after visit in clinic
- Consult sent through EPIC Pharmacy Referral Entry

Services

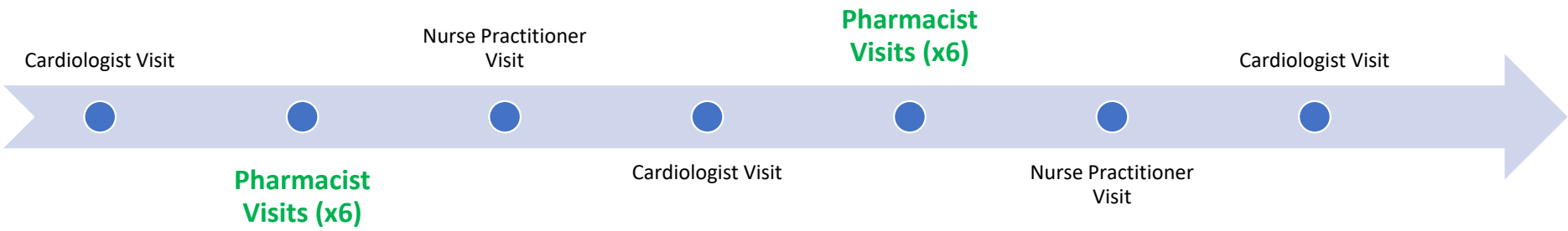
- In-person visit or tele-health visit every 2 weeks
- Dose initiation/titration per approved outlining **G**uideline-**D**irected **M**edical **T**herapy (**GDMT**) therapies
- Follow up (vitals, volume status, lab results, symptoms)
- Traditional pharmacy services – medication reconciliation, financial support/cost, counseling on side effects, dosing, etc.

Medication Adjusted to Target Pathway



Patient Visit Schedule

Potential to offload physician schedule



- Nurse practitioner in person visit every 3 months **(4 times per year)**
- Cardiologist in person visit every 6 months **(twice per year)**
- Pharmacist **every 2 weeks** in between either via telehealth or in person

Titration Protocol

Medications Available for Pharmacist Titration
Angiotensin converting enzyme inhibitors (ACEi)
Angiotensin II receptor blockers (ARB)
Angiotensin receptor-neprilysin inhibitor (ARNi)
Beta Blockers (BB)
Mineralocorticoid Receptor Antagonists (MRAs)
Hydralazine
Isosorbide
Diuretics (loop, thiazide)
Digoxin
Medications for Adverse Effects [e.g., patiromer (Veltassa®) for hyperkalemia]
Sodium-glucose cotransporter-2 inhibitors (SGLT2i)

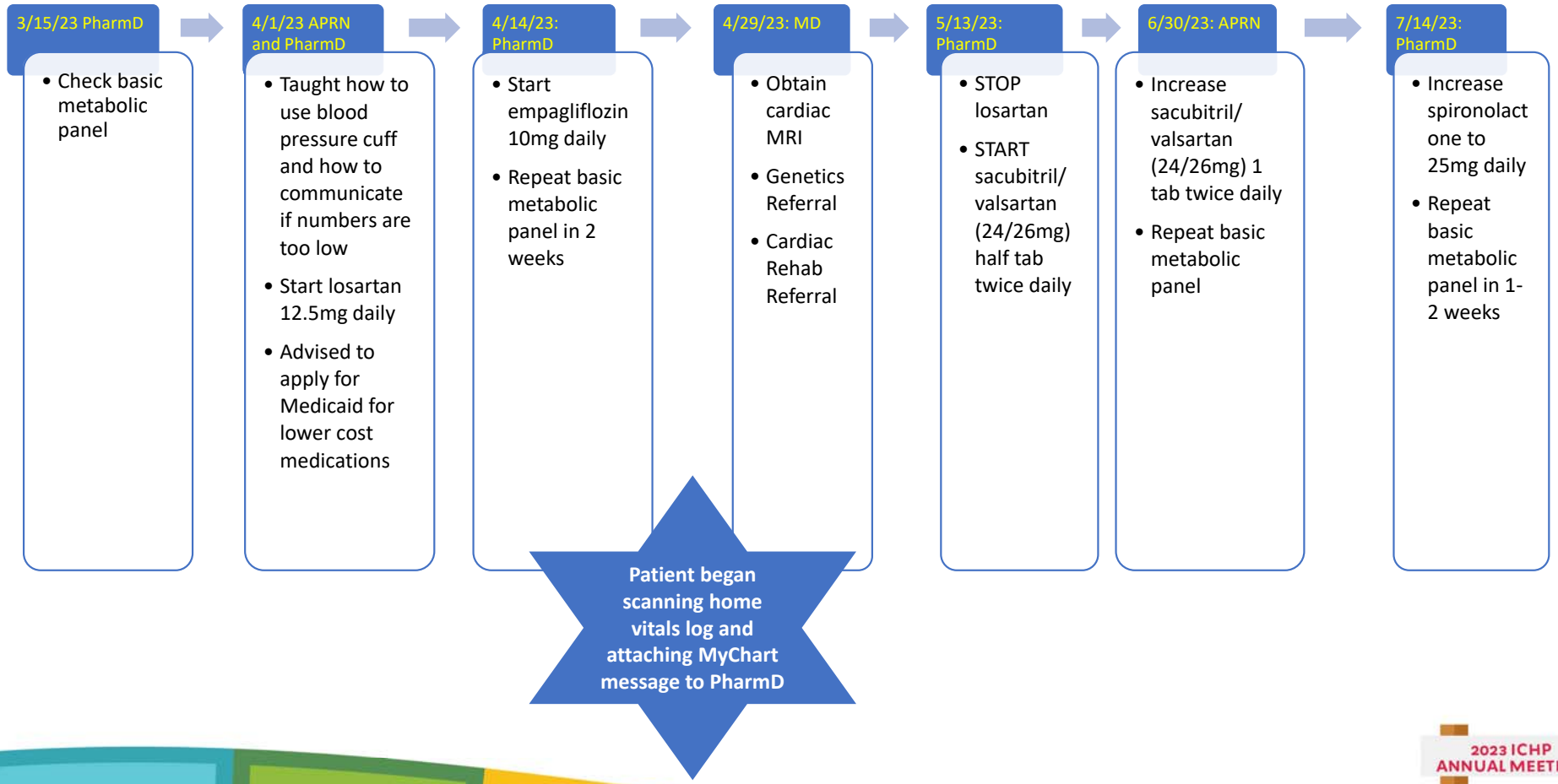
Laboratory Work Available for Ordering
Basic metabolic panel
Comprehensive Metabolic Panel (if LFT monitoring needed)
Magnesium
Digoxin levels
BNP/NT proBNP
As further directed by referring provider

Excluded Medication Titration Patients

- Class IV Symptoms
- Systolic blood pressure <85 mmHg
- Sodium <130 mmol/L
- Potassium >5.5 mmol/L

During a visit, if more complicated care is required there is a backup system in place for the pharmacist to escalate care

Patient Case: Continued



Patient Case #3: Continued

8/1/22 cMRI: Ejection Fraction IMPROVED to 45%. Life Vest Discontinued

Previous Heart Failure Medications (prior to admission):

Beta Blocker: None

ACE/ARB/ARNI: None

MRA: None

SGLT2 inhibitor: None

Diuretic: None

Current Heart Failure Medications:

Beta Blocker: metoprolol succinate 37.5mg XL daily

ACE/ARB/ARNI: sacubitril/valsartan 24/26mg twice daily

MRA: spironolactone 25mg daily

SGLT2 inhibitor: empagliflozin 10mg daily

Diuretic: None

Keys to Success

- Physician Champion!!
- A few “wins” in the beginning
- Multidisciplinary approach
  - PCP, Cardiologists, Advance Practice Providers, Nurses, Pharmacists
- Frequent pharmacist touch points (in-between APN/MD visits)
- Flexibility/hybrid scheduling
  - Utilize patient MyChart messaging and telehealth/telephone visits

Patient Medallia® Scores for Pharmacist MAT Clinic

- Medallia® is the post-visit patient satisfaction measurement tool used in the ambulatory space by NM.
- 99 surveys completed by patients (Jan-July 2023)
- Likelihood to recommend (LTR) score of **97.97%**
- The **Heart Failure Pharmacist** is in the **top quartile** of all Northwestern West Region BCVI providers!

079 - Imran, Nikki - Implementing the Four Pillars into Practice

Visual settings | Edit

When poll is active respond at **PollEv.com/ichp** Send **ichp** to **22333**

3. My practice currently has EPIC reports in place to measure ambulatory pharmacist outcomes.

0

Yes	No
0%	0%

Measuring Heart Failure Pharmacist Titration Clinic Outcomes

Why is Measuring Healthcare Outcomes Important?

- Demonstrate value!
- Improve the patient care experience.
- Improve the health of populations.
- Reduce the per capita cost of healthcare.
- Reduce clinician and staff burnout.
- Marketplace differentiator for patients, clinicians and payers.

Khan, I. *Evaluating the Effectiveness of an Embedded Pharmacist on Diabetes Control in a Primary Care Practice*. Presented at ICHP Annual Meeting on September 17, 2022

Gaps in Medication-Related Care Identified

- Lack of providers/time to titrate/start heart failure guideline directed medical therapy (GDMT) and perform in-between office visit patient follow up.
- Lack of cardiology pharmacist representation on multidisciplinary inpatient heart failure rounds.
- Lack of pharmacist support for medication-related issues post-discharge (non-compliance, lack of education, cost).
- Limited pharmacy/medication support for the cardiology clinic (physicians, APNs, nurses, MA's).

All of the above may contribute to HF related 30-day readmission rates, hospitalizations, and ED visits.

CARDIOLOGY AMBULATORY PHARMACY: HEART FAILURE RESULTS

Care Team Start From Date: 1/1/2021

Care Team Start To Date: 7/23/2023

Pharmacist on Care Team: MELODY, NICHOLE K.

Department Name: All

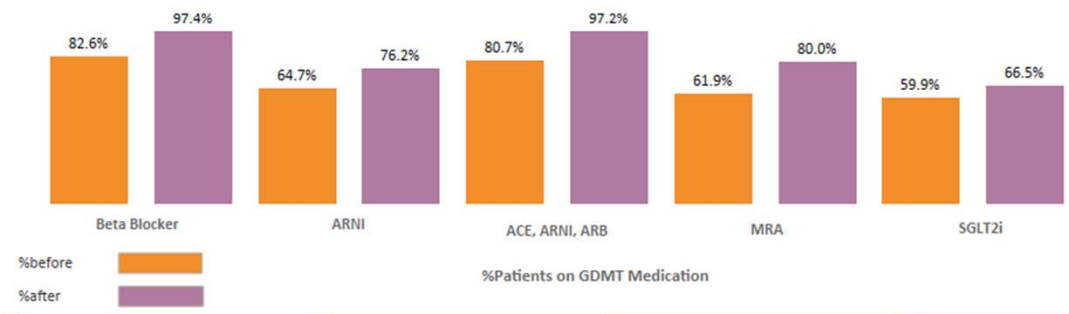
Plan Name: All

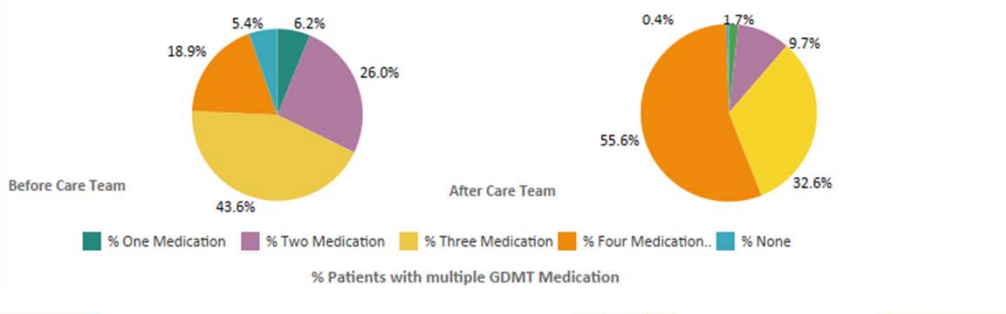
Payor Name: All

Ethnicity Group & Race: All

Total Patients	Total Touch Points	Total Touch Points Per Patient	Patients with EF Improvement
466	23,516	50	206

	ED Visits (Decrease is good)			Preventable ED Visits (Decrease is good)			Hospital Visits (Decrease is good)			Preventable Hospital Visits (Decrease is good)			Infusion Center Visits (Decrease is good)			HFrEF recovered with LV (Increase is good)			Vaccination (Greater is good)		
	-58.6%			-81.1%			-56.1%			-78.0%			263.6%			214.3%					
	ED Before Care ..	ED After Care ..		Prev ED Before	Prev ED After		Hospital Before Care Team	Hospital After Care Team		Prev Hospital Before	Prev Hospital After		PTC Visit Before Care Team	PTC Visit After Care Team		HFrEF Before Care Team	HFrEF After Care Team		Covid	FLU	PNA
MELODY, NICHOLE K.	488	202	-58.6%	127	24	-81.1%	408	179	-56.1%	309	68	-78.0%	44	160	263.6%	42	132	214.3%	1.7%	39.7%	15.5%





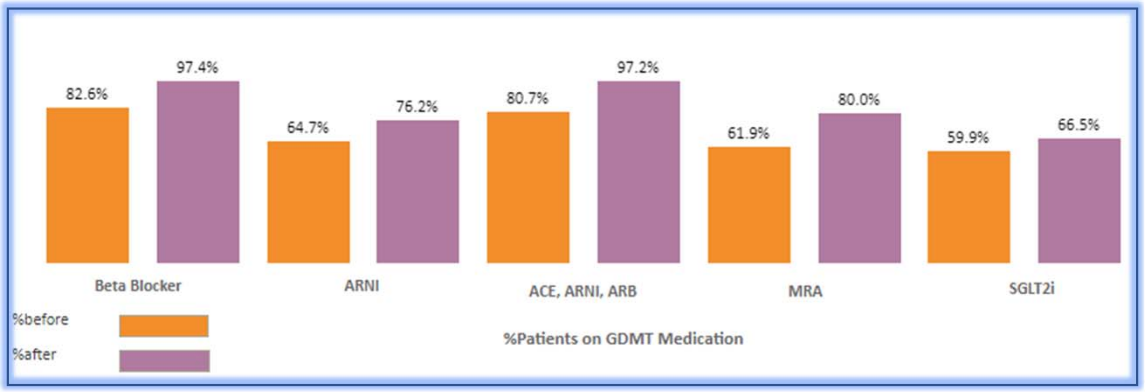
Heart Failure Pharmacist Outcomes - Summary

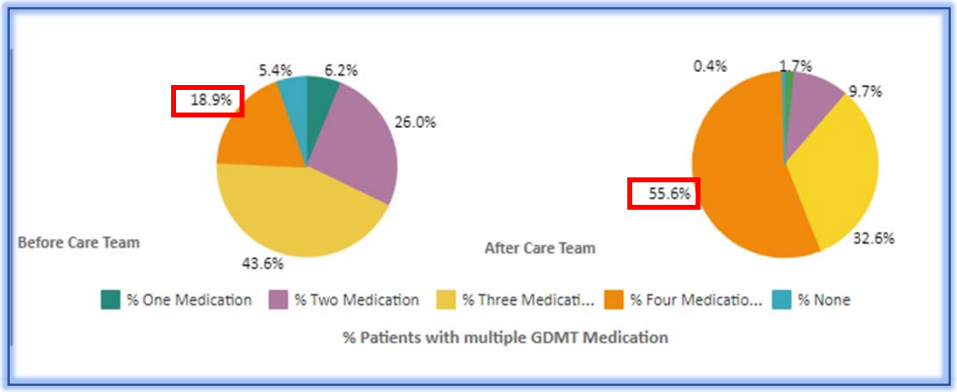
January 2021 – July 2023

Total Patients	Total Touch Points	Total Touch Points Per Patient	Patients with EF Improvement
466	23,516	50	206

Heart Failure Pharmacist Outcomes – 4 Pillars

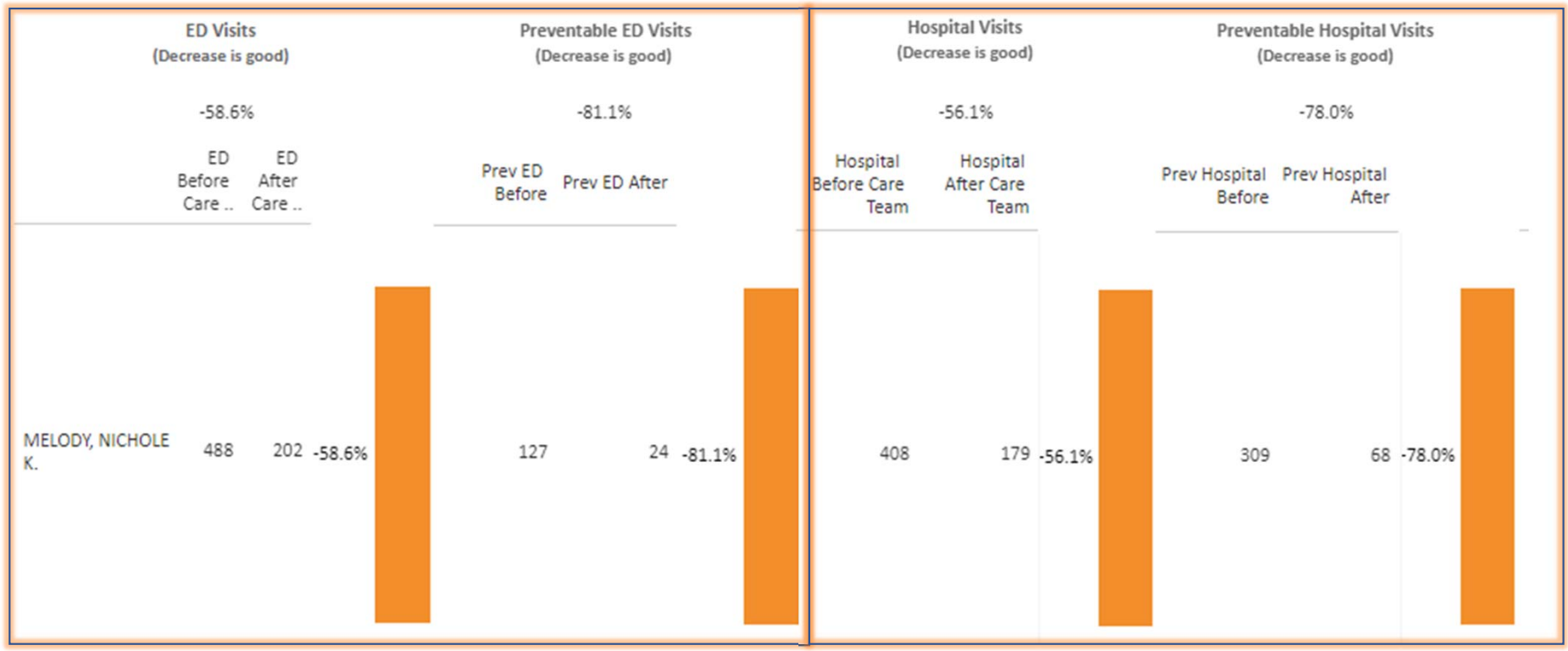
January 2021 – July 2023





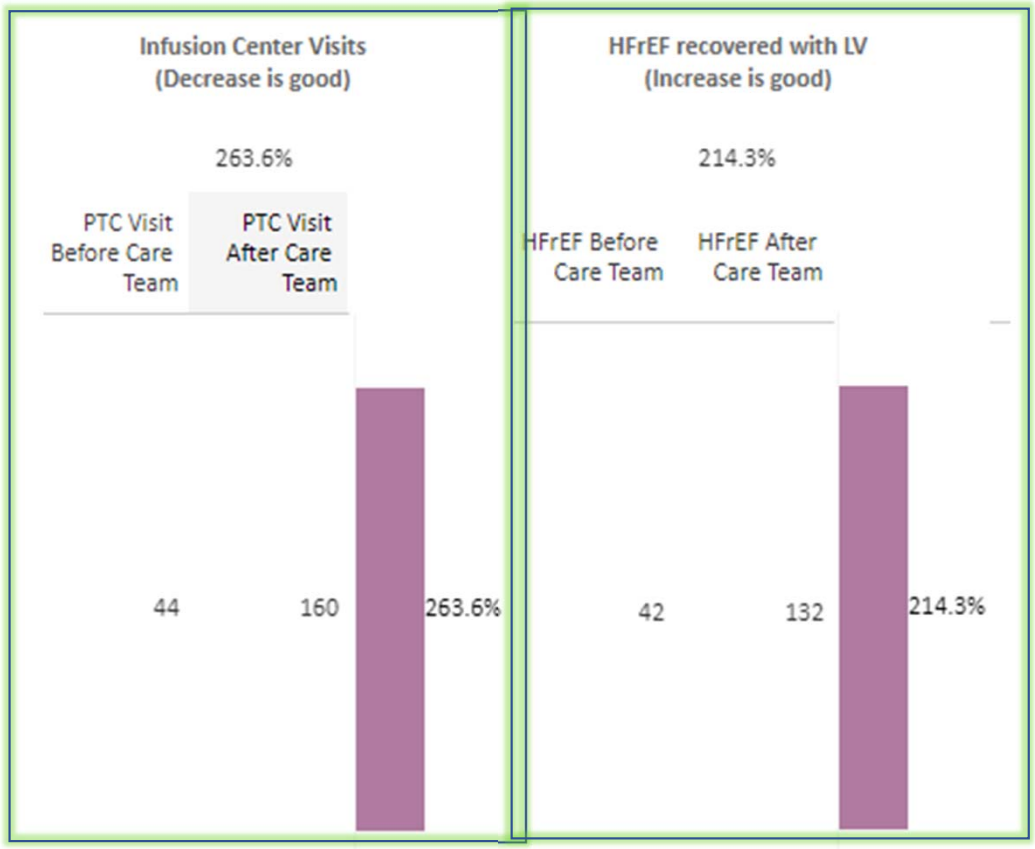
Heart Failure Pharmacist Outcomes – Acute Care Utilization

January 2021 – July 2023



Heart Failure Pharmacist Outcomes – Misc.

January 2021 – July 2023



Heart Failure Pharmacist Outcomes – Contact Frequency

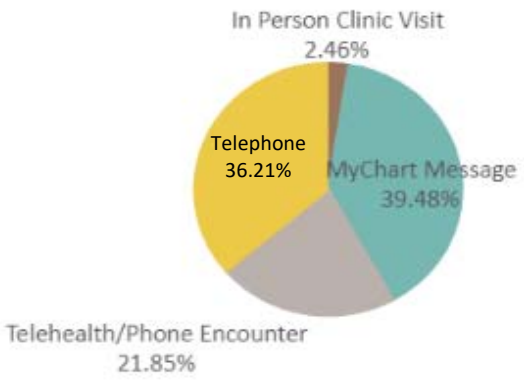
January 2021 – July 2023

Summary Statistics

Total Number of Contacts	Number of Unique Patients Contacted	Average Number of Contacts per Patient	Average Case Length *(in days)*
5,286	341	15.5	182.6

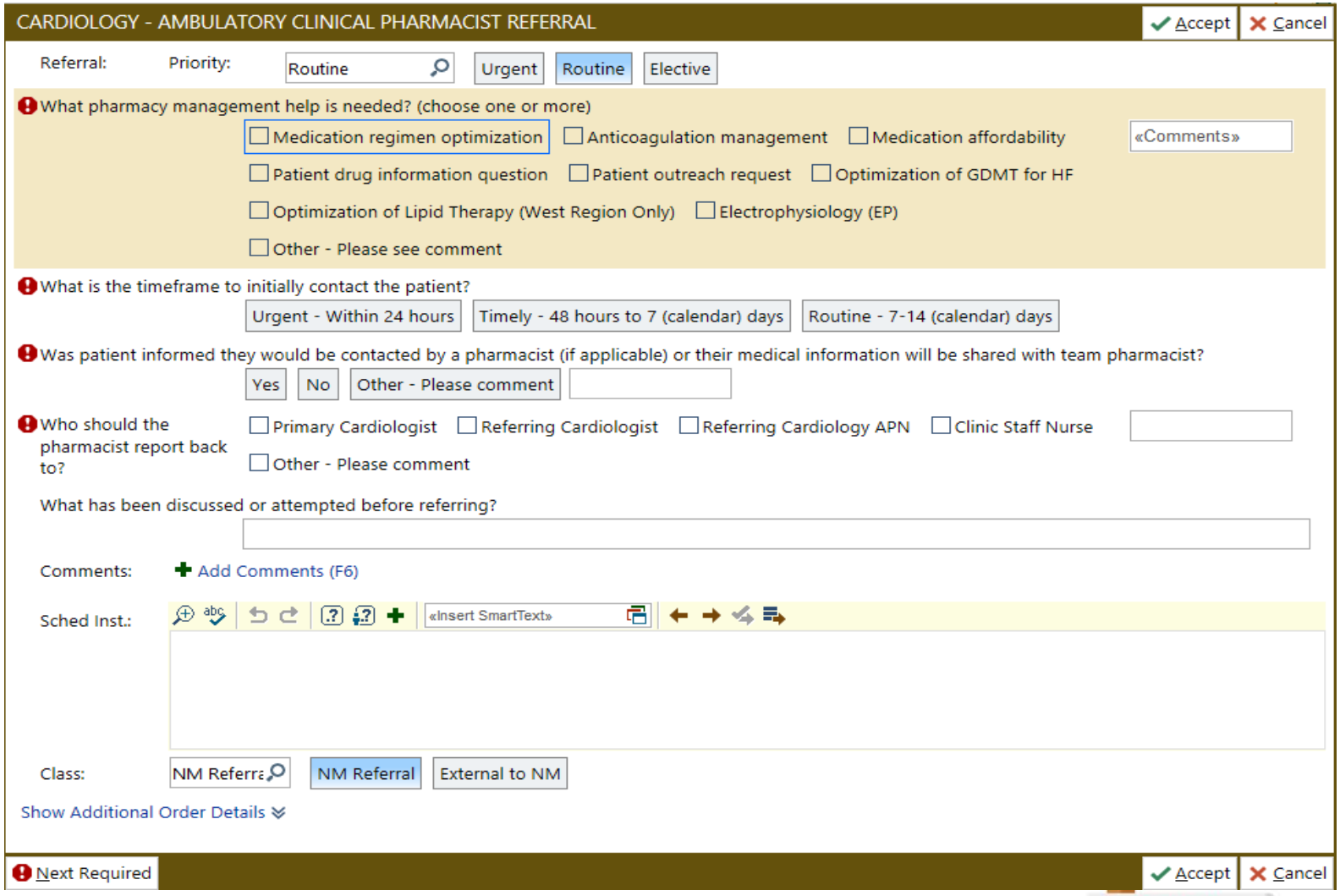
Volume by Contact Type

Contact Category	Total Number of Contacts	% of Total
In Person Clinic Visit	130	2.46%
MyChart Message	2,087	39.48%
Telehealth/Phone Encounter	1,155	21.85%
Telephone	1,914	36.21%
Grand Total	5,286	100.00%

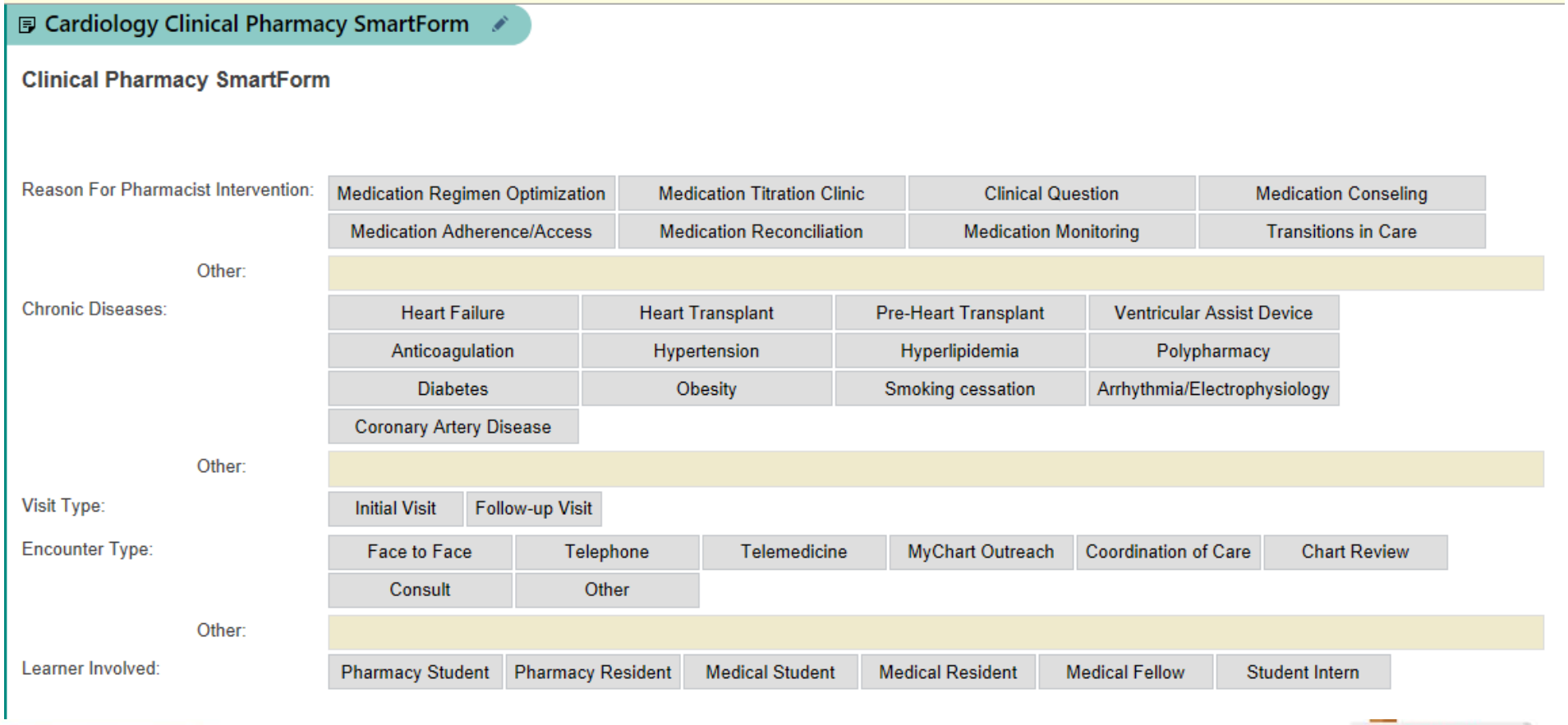


* *Clinic visit volume include outpatient appointments conducted through telehealth.*
* *Each mychart message is counted as a unique contact.*

REF 623
Cardiology



Cardiology Pharmacist Interventions - EPIC



Cardiology Pharmacist Interventions - EPIC

Patient Care Services

Education Provided:	Prescription medication	Dietary Supplement	Preventive Care	Adherence
	Insurance/Cost	OTC Product	Disease state	Lifestyle modification
	Smoking cessation	Anticoagulation monitoring	Immunosuppression monitoring	Medication administration
Other:				
Services Provided:	Blood Pressure/Heart Rate Check	Weight Check	Patient Assistance Program Application	
	Benefits Investigation	Prior Authorization	Copay Card Registration	
	Grant Assistance			
Type or Reason for Intervention:	Medication Selection	Additional Therapy Needed	Change in Dose Needed	Unnecessary Drug Therapy
	Therapeutic Duplication	Ineffective Medication	Adherence/Failure to Receive Drug	Drug Interaction
	Adverse Drug Reaction	Cost/Formulary Issue	Monitoring Needed	Immunization Needed
	Other			
Other:				
Total Number of Interventions:	1			
Quality Metrics:	Addition of medication to optimize HF	Adherence to anticoagulation		
	Titration of medication to optimize HF	Appropriate opportunistic infection prophylaxis dosing		
	Adherence to lipid lowering therapy	Appropriate opportunistic infection prophylaxis duration		
	Adherence to immunosuppression			
Total Time Spent:	0-15 minutes	16-30 minutes	31-45 minutes	46-60 minutes	>60 minutes

079 - Imran, Nikki - Implementing the Four Pillars into Practice

Visual settings | Edit

When poll is active respond at **PollEv.com/ichp** Send **ichp** to **22333**

4. Which one of the following was not mentioned as a possible contributor to HF related 30-day readmission rates, hospitalizations, and ED visits?

0

0%	0%	0%	0%
Lack of providers/time to titrate/start heart failure guideline directed medical therapy (GDMT) and perform in-between office visit patient follow up.	Lack of patients adhering to regularly scheduled cardiology	Lack of pharmacist support for medication related issues post-discharge (non-compliance, lack of education, cost)	Limited pharmacy/medication support for the cardiology clinic (physicians, APNs

Keys to Success

- Data, Data, Data!
  - Filters help dissect/analyze the data.
- Create reporting based on your organization's needs.
- Develop partnerships with key stakeholders.
- Automation makes your life easier!

Next Steps

- Growth of ambulatory cardiology pharmacy program/team based on physician/practice demand.
  - North Region BCVI Cardiology Pharmacist 1.0 FTE (Started 11/15/22)
- Medication access and affordability
  - ✓ Major NM Social Determinants of Health (SDoH) key focus area
  - ✓ Add pharmacy technician support
    - Increase volume of patients assisted in clinic (brand drug & patient assistance programs, grant/foundation support etc.)
    - Offload pharmacists and other clinicians to increase patient panel size – may decrease clinician non-productive time by 25-33%
- Optimize pharmacist's workflow to allow for maximum time dedicated to patient care
- Expansion of cardiology pharmacist's services to include other disease states
  - ✓ Dyslipidemia
  - ✓ Hypertension
- **Limiting Factor**
  - **Pharmacist billing for services limited to Level 1 Office Visit (CPT 99211)**

079 - Imran, Nikki - Implementing the Four Pillars into Practice

Moderate | Visual settings | Edit

When poll is active respond at **PollEv.com/ichp** Send **ichp** to **22333**

Questions?

0

Nobody has responded yet.

Hang tight! Responses are coming in.

Thank you!

"I'm going to refer you to a cardiologist."