

Harnessing Tech For GDMT Optimization And Readmission Reduction

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Heart Failure Summit

Cleveland Clinic CME

6/6/2025



HF Summit | Objectives For Today

1. Leveraging EHR For Tracking Health System GDMT Performance

- a. EHR-Based Registries
- b. GDMT Score

2. EHR-Based Interventions for GDMT Optimization

- a. Clinician-Directed Alerting
- b. Activation of Multidisciplinary Teams
- c. RPM and EHR-Integrated Tools

3. Care Model Implementation (Acute Heart Failure)

- a. Standardized Identification
- b. Automation of Follow-up and Triage of Risk

4. AI Automation of Chart Review (Next Frontier of EHR Tools)

- a. Beyond Structured Data, Value Add?

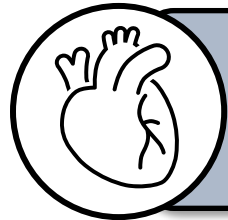


HF Summit | Growing Evidence, Yet Poor Implementation of GDMT

Initiation of ARNI + Beta Blocker + MRA + SGLT2i



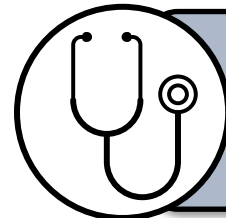
Improvement in health status



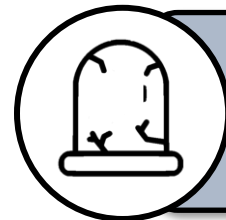
Improvement in LVEF



Reduction in HF hospitalization



Reduction in HF re-hospitalization



Reduction in mortality

HF Summit | Measuring Comprehensive GDMT → Score Weights

Guideline-Directed Medical Therapy (GDMT) Score Schema*

Class	Class	≥50% max dose	<50% max dose	None
ACEi/ARB	50% dosing and evidence-based therapy included: Lisinopril 20 mg Losartan 50 mg	2	1	0
ARNi	Sacubitril-Valsartan any dose	2	2	0
Beta-Blocker	50% target dosing of evidence-based therapy Carvedilol 12.5 mg BID Metoprolol XL 100 mg daily Bisoprolol 5mg daily	2	1	0
MRA	Spironolactone any dose Eplerenone any dose	2	2	0
SGLT2i	Dapagliflozin any dose Empagliflozin any dose	2	2	0
HYD ISDN	Isosorbide dinitrate Hydralazine (must be on both agents at any dose for credit)	1	1	0

Key Notes

- Optimal score ≥8

HF Summit | Higher GDMT Scores Associated with Improved Survival and Decreased Hospitalization Rates

Guideline-Directed Medical Therapy (GDMT) Score Schema*

CHF Admits	CHF ED Visits	Last EF	EF Date	Lowest EF ¹	GDMT Score	ACE	ARB	ARNi	Beta Blocker	Aldost. Antag	SGLT2i	HYN/ISDN	Diuretic	Last HR	Last BP	Ct
...	...	20 %	11/02/2021	12 %	2	---	---	---	✓	---	---	---	---	61	74/0	2
1	...	15 %	11/01/2021	12 %	2	---	---	✓	---	---	---	---	✓	68	156/63	2
...	...	20 %	01/14/2020	12 %	4	---	✓	---	✓	✓	---	---	✓	107	86/0	0
1	1	11 %	06/23/2021	11 %	8	---	---	✓	✓	✓	---	---	✓	76	115/68	0
...	...	22 %	03/08/2021	11 %	7	---	---	✓	✓	✓	---	---	---	70	136/78	2
3	2	15 %	11/07/2021	10 %	3	✓	✓	---	---	✓	---	---	✓	87	90/55	0
...	...	40 %	10/28/2021	10 %	5	---	---	✓	✓	---	---	---	✓	67	110/81	0
...	...	10 %	10/20/2021	10 %	8	---	---	---	---	---	---	---	---	61	129/56	0
...	...	13 %	01/28/2021	10 %	8	---	---	---	---	---	---	---	---	77	119/81	0
...	...	22 %	12/29/2020	10 %	8	---	---	---	---	---	---	---	---	87	105/77	2
...	...	56 %	07/12/2021	10 %	1	---	---	---	---	---	---	---	---	106	122/78	0
1	...	24 %	12/22/2020	10 %	1	---	---	---	---	---	---	---	---	73	84/0	0
...	...	10 %	11/05/2021	10 %	4	---	---	---	---	---	---	---	---	72/0	0	
...	...	14 %	07/28/2021	10 %	7	---	---	---	---	---	---	---	---	74	76/50	2
...	...	15 %	05/05/2021	10 %	5	---	---	---	---	---	---	---	---	59	80/0	2
...	...	17 %	01/29/2021	10 %	3	---	---	---	---	---	---	---	---	87/57	0	
...	5	---	---	---	---	---	---	---	---	93	125/71	0

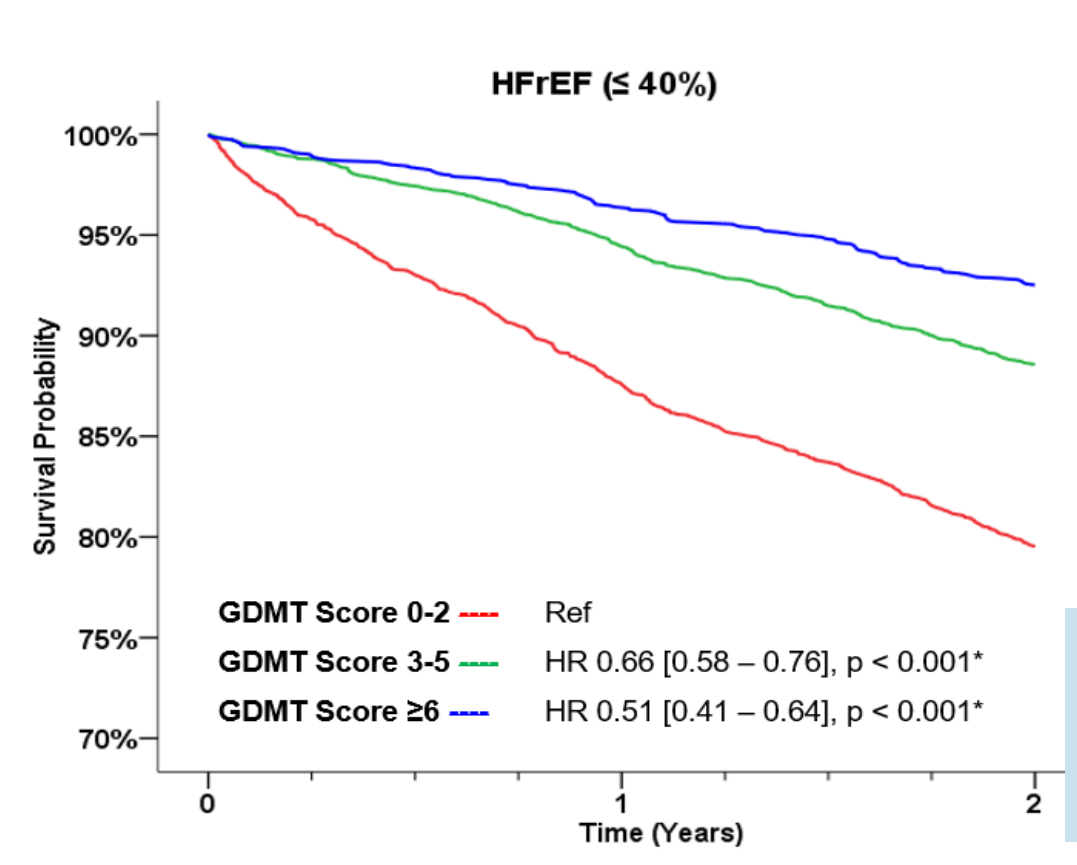
8 GDMT Score
Displays GDMT Score for CHF Patients

Low Risk

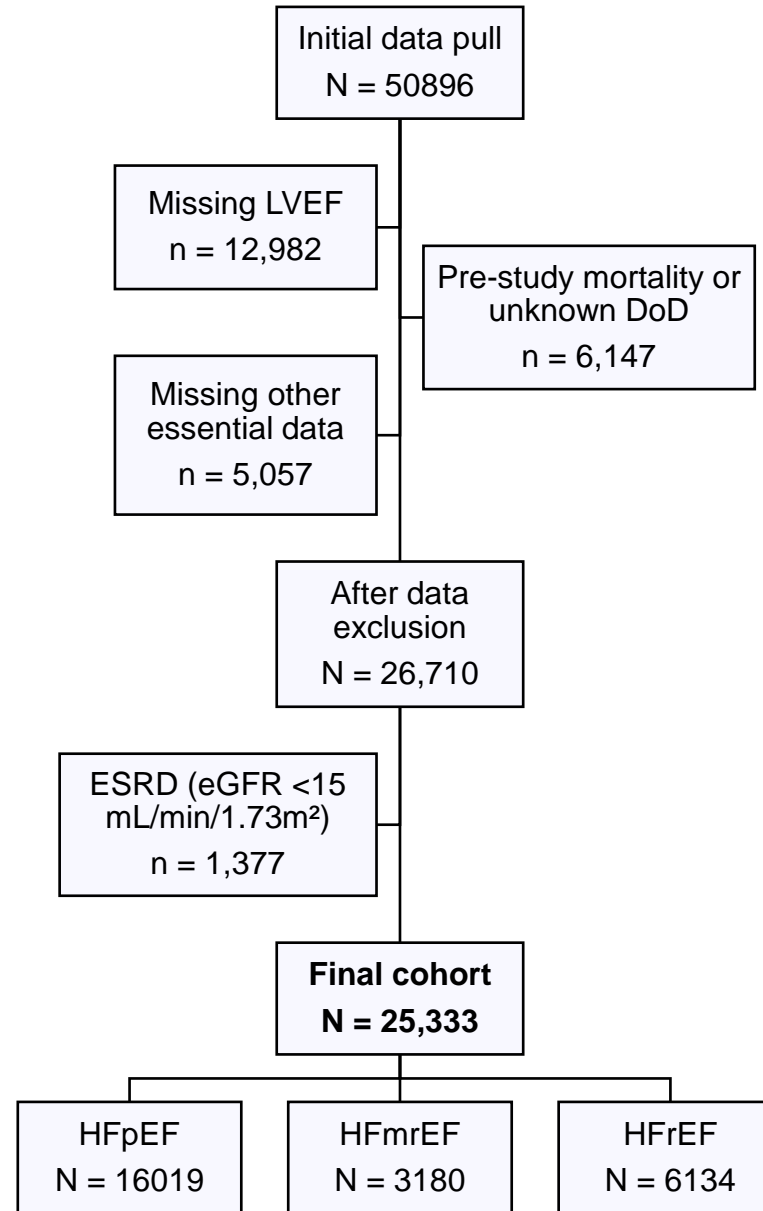
Factor	Value
Beta Blocker (Weight Adjusted)	2
ACEi/ARB	0
ARNi	2
MRA	2
SGLT2i	2
HYN ISDN	0

+ Points for Evidence-based use of Medications (ARNi/ACEi, beta-blocker, MRA), SGLT-2i initiation and achieving Target Dosing

Higher Scores Associated with Improved Survival Lower Scores Associated w Death + Hospitalization

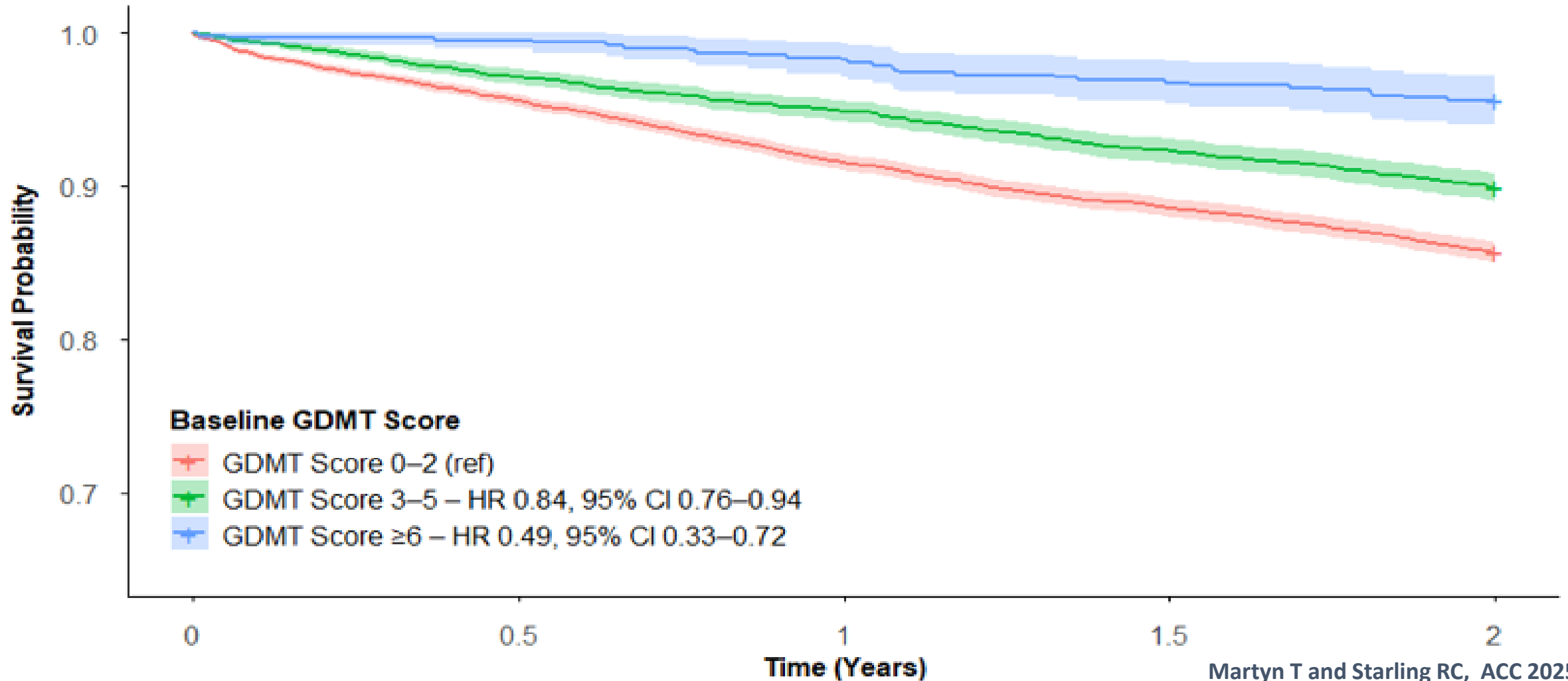


HF Summit | Curated EHR-Based Registry Across 300 Clinics in OH/FL

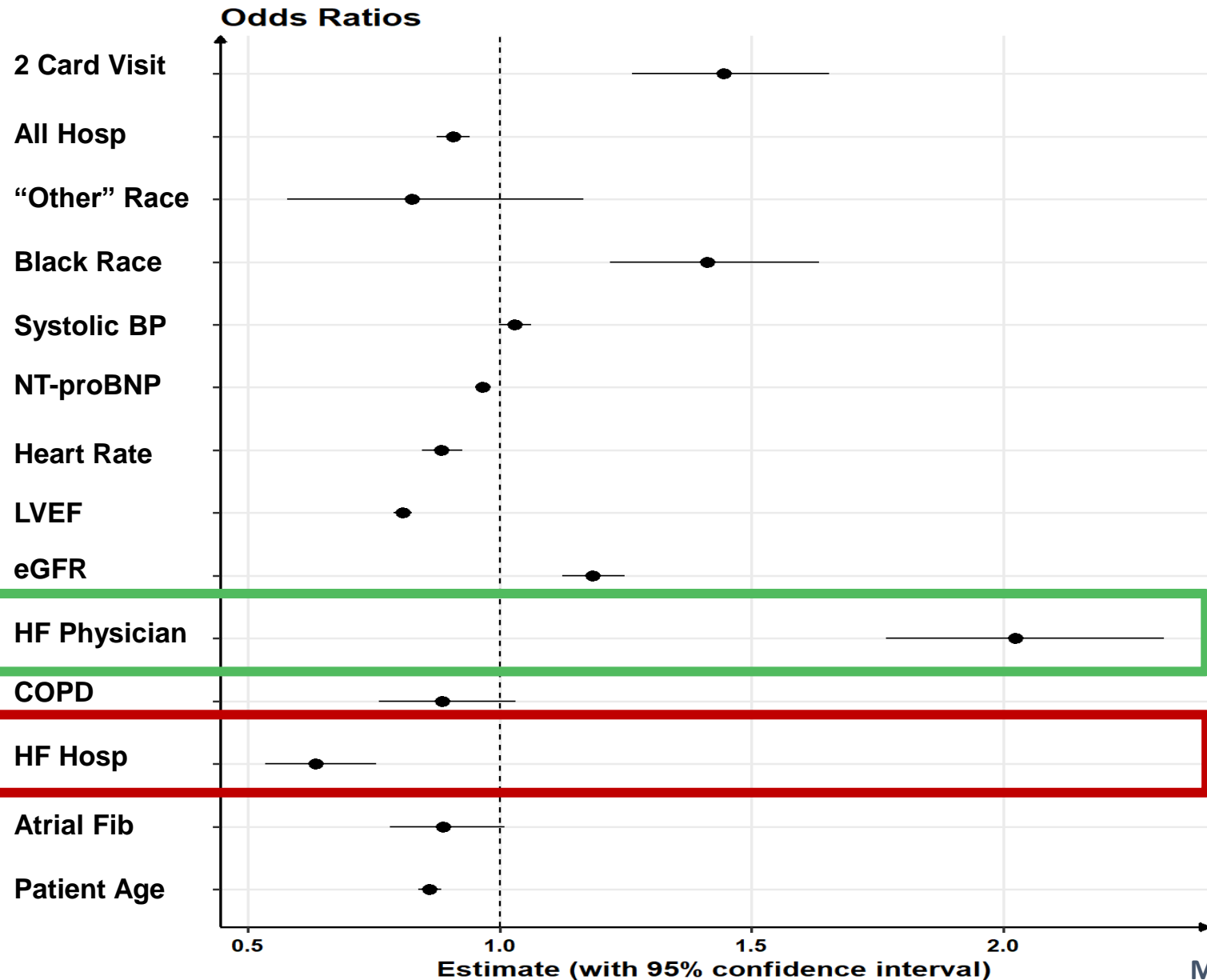


HF Summit | Higher GDMT Scores Associated with Improved Survival in HFpEF + HFmrEF

Overall Survival in HFpEF Patients



HF Systems | Factors Associated with Higher GDMT Scores



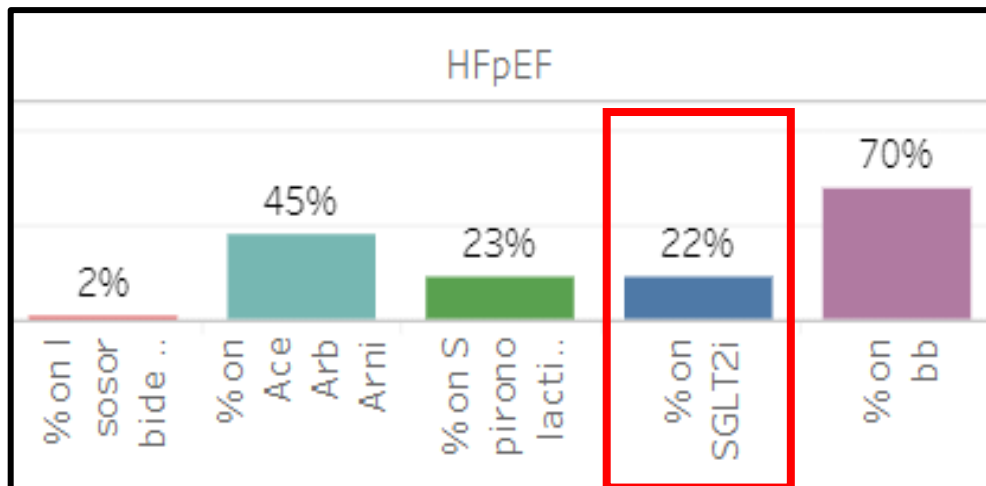
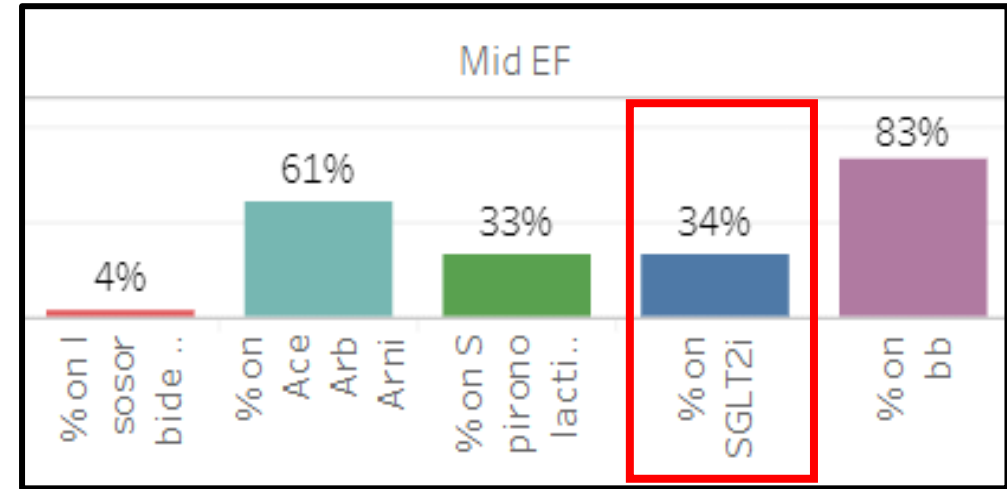
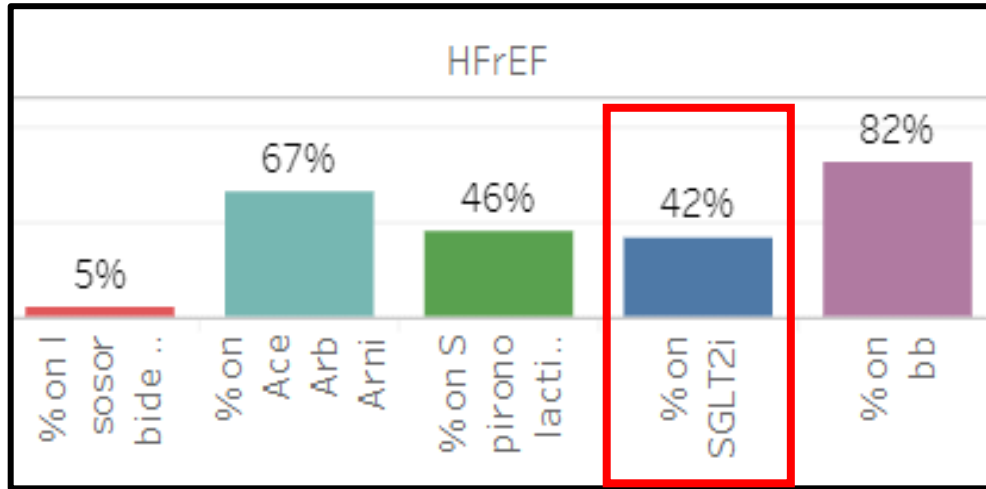
↓ **GDMT Score**

Older age, higher NT-proBNP, recent hospitalization (All-cause and HF)

↑ **GDMT Score**

Encounter with HF Physician, 2 or more cardiology visits over prior 12 mos, higher eGFR, Black race*

HF Summit | Collaborative Care Model Scales Improvement



May-Sept 2024

SGLT2i Prescribing	HFrEF	HFpEF/mrEF
CCF 2022	18%	4%
National Benchmark (2024)	22%	8%
CCF 2024	52%	39%

Martyn T et.al, Journal Cardiac Failure, 2024

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3. Care Model Implementation (Acute Heart Failure)

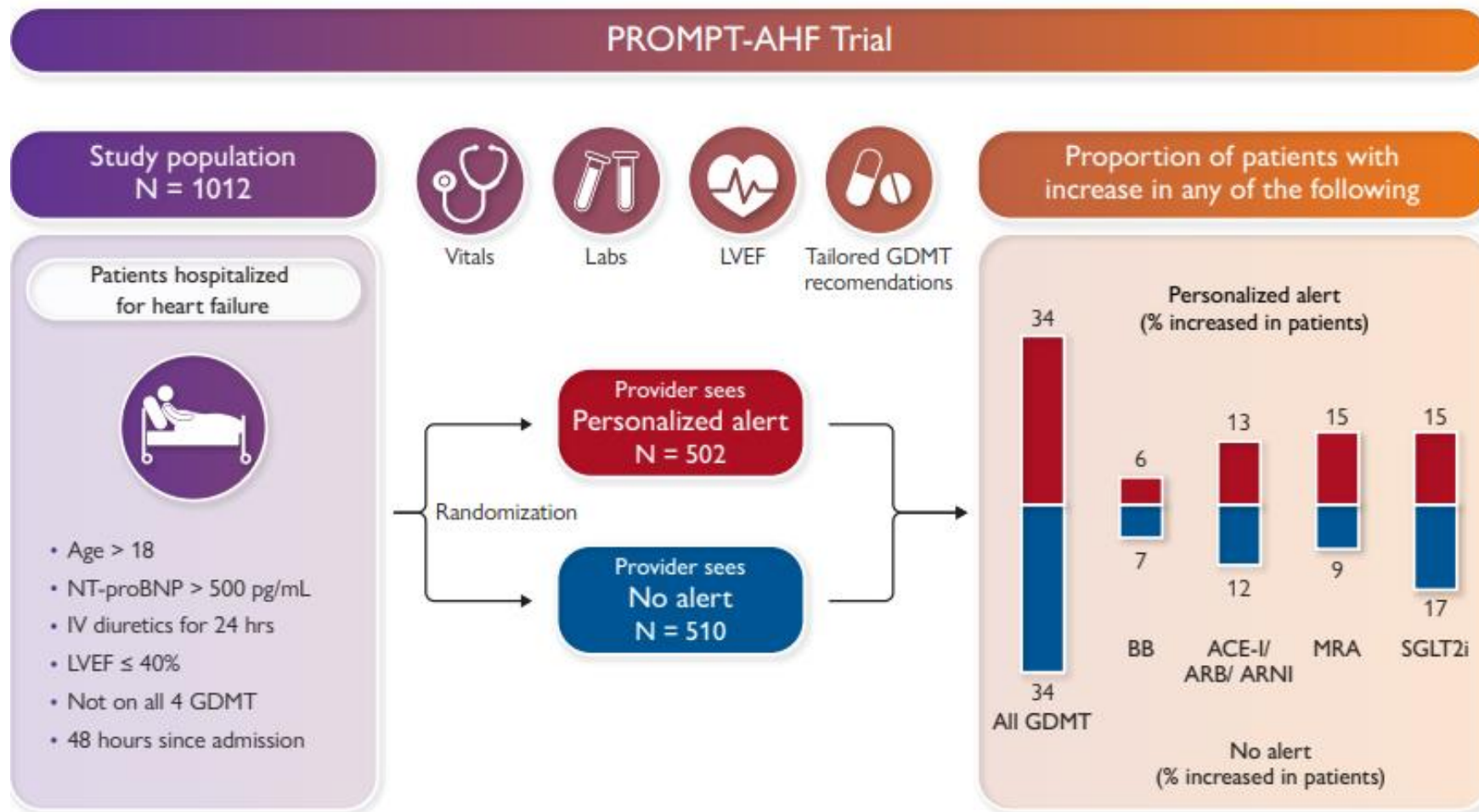
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4. AI Automation of Chart Review (Next Frontier of EHR Tools)

- a. Beyond Structured Data, Value Add?



HF Summit | Provider Alerts in the Inpatient Setting; Not Effective



- **Population:** Patients with acute heart failure + IV diuretics + suboptimal GDMT score
- **Intervention:** Tailored GDMT provider BPA
- **Results:** No difference between alert v. no alert in prescribing of medications

HF Summit | GDMT Optimization Strategies

Clinician/Patient EHR Alerts

- EPIC-HF (messaging)
- PROMPT-HF (BPA)
- Better Care-HF (MRA → BPA or staff message)
- PROMPT-AHF (inpatient BPA)
- **Lower Cost, Scalable, Modest or No Impact**

EHR Activation of Teams

- STRONG-HF (algorithmic titration, frequent visits)
- IMPLEMENT-HF (virtual PharmD inpatient)
- DRIVE (GLP-1/SGLT2i education, PharmD, navigator)
- **Variable Costs, Dedicated Resources, Significant Impact**

HF Summit| EHR-Integrated Patient Monitoring

VITAL-HF

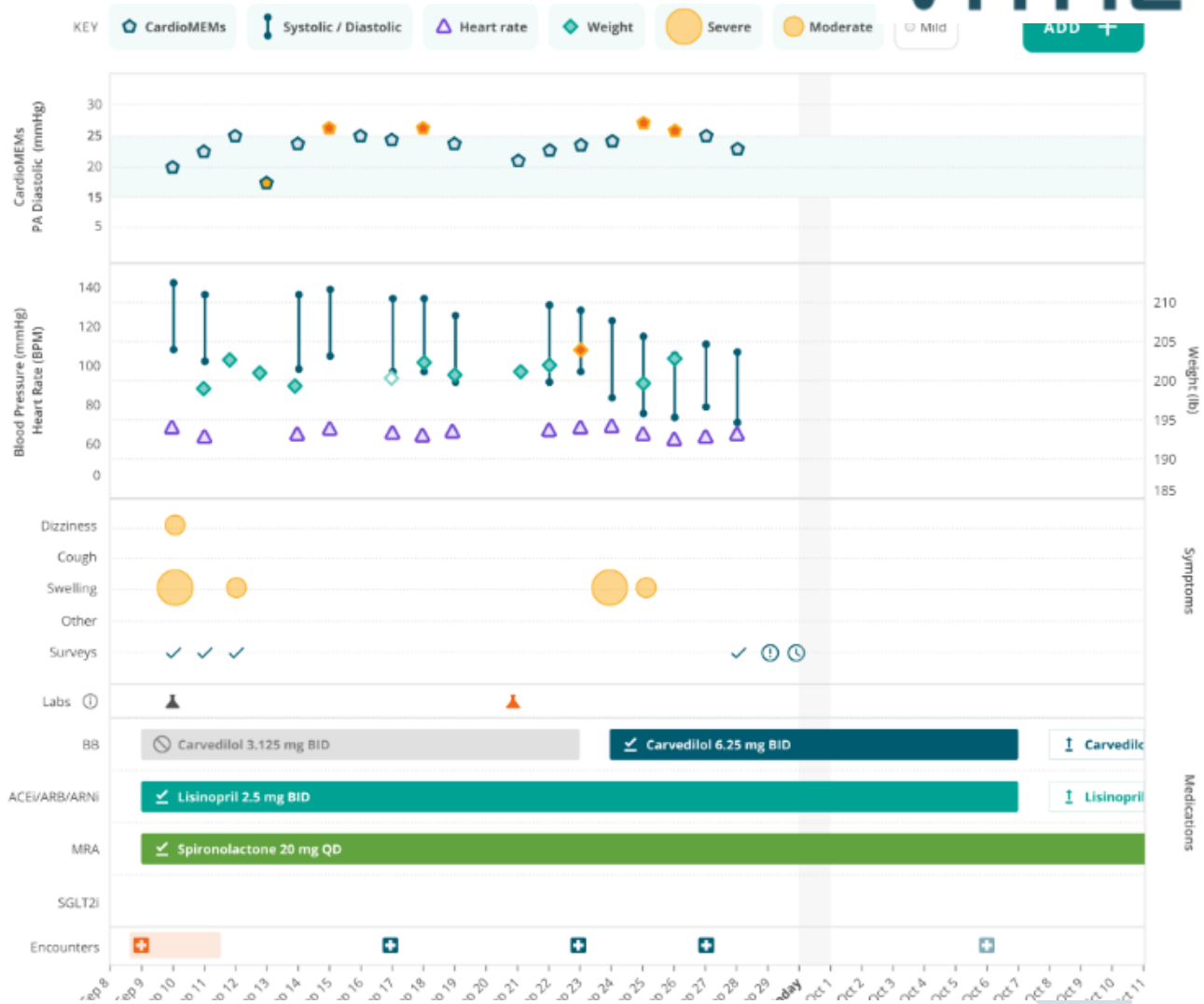
Storyboard includes:

Device data
from partners

Daily BP, HR & weight
from home devices

Symptoms
from patient

Medications & history
from EHR



Data can be useful, but challenges remain with tech-enablement and staffing

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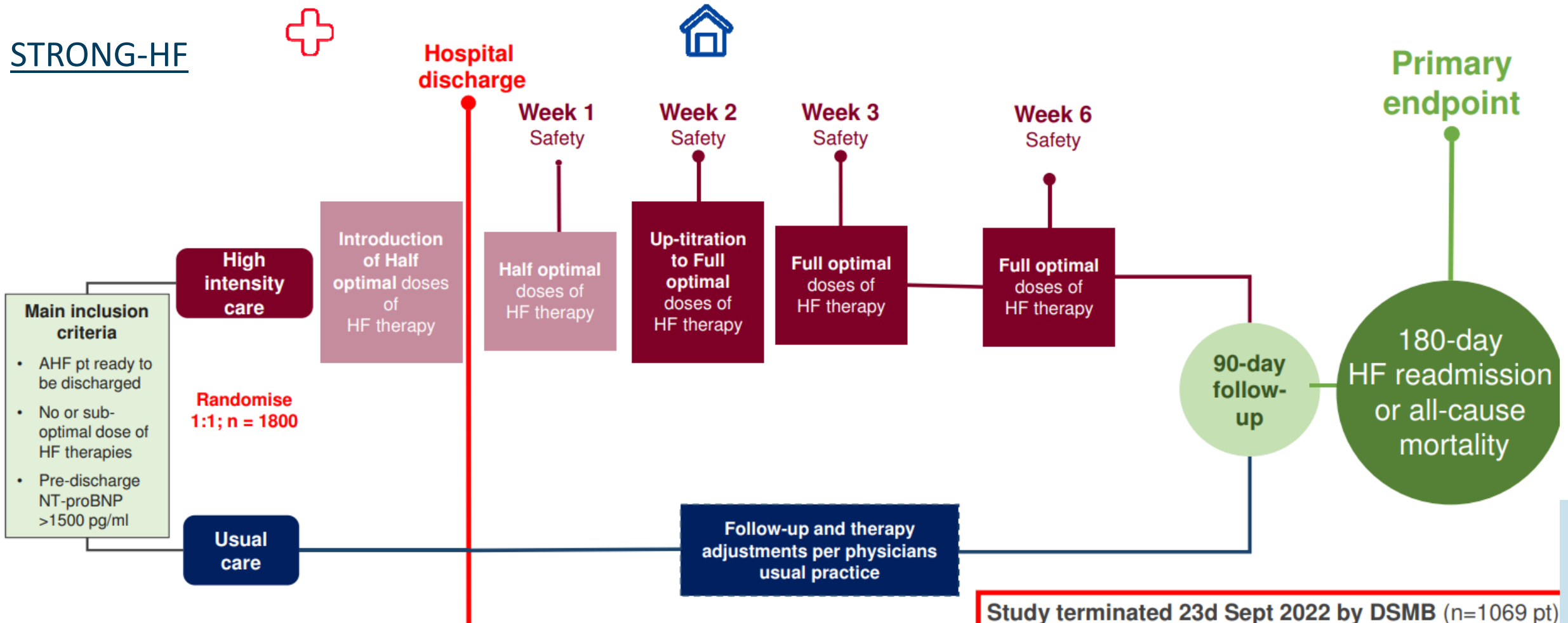
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- b. Automation of Follow-up and Triage of Risk
- c. Expanding Access

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HF Summit | Rapid GDMT Titration Reduces Readmissions and Mortality



HF therapy: combining ACEi/ARB/ARNi & BB & MRA
Safety = clinical exam & biology (NT-proBNP, K, Creat, hemoglobin)

HF Summit | Standardized Criteria; Real-Time HF Tracking at 23 Sites

1. Inpatient Patient Identification: HF Diagnosis + IV Diuretics + Non-Dialysis
2. Criteria for Auto-Advanced HF Referral: *LVEF < 30 + 2 HF Admissions*
3. Automated Follow-Up Order and Cadence: *APP + Cardiologist or HF Cards*

Indian River

☆ IR Heart Failure Patients 16 Patients Refreshed 1 minute ago Search All My Inpatie...

Age	Primary Cvg Payer	Admission Diagnosis	# IP Admits	Last EF	AMB GDMT Score	IP GDMT Score	Last BP	Last proBNP or BNP
72 year old	MEDICARE	Acute on chronic systolic (congestive) heart failure (HCC)...	3	20 %	7	7	180/...	>70,000
57 year old	AMBETTER	Heart failure (HCC)	1	9 %	1	3	126/82	24,226
64 year old	BCBS	Respiratory failure (HCC)	1	35 %	5	7	130/80	5,124
56 year old	—	Acute decompensated heart failure (HCC)	1	—	0	0	—	3,303
83 year old	MEDICARE	Acute hypoxemic respiratory failure (HCC)	4	60 %	2	2	102/60	4,591
61 year old	BCBS	Acute on chronic heart failure with preserved ejection fraction...	1	—	3	1	—	102

Main Campus

☆ MC Heart Failure Patients 142 Patients Refreshed just now Search All My Inpatie...

Age	Primary Cvg Payer	Admission Diagnosis	# IP Admits	Last EF	AMB GDMT Score	IP GDMT Score	Last BP	Last proBNP or BNP
68 year old	DEVOTED MEDICARE	Acute on chronic systolic congestive heart failure (HCC)...	5	46 %	2	2	122/66	5,384
59 year old	CIGNA	Acute decompensated heart failure (HCC)	1	55 %	1	1	—	5,347
65 year old	ANTHEM BLUE CROSS AND BLUE...	Septic shock (HCC)	1	66 %	3	1	116/61	1,238
88 year old	AETNA MEDICARE	Multifocal pneumonia	1	55 %	2	2	—	4,875
68 year old	MEDICARE	Gastrostomy tube dysfunction (HCC)	2	57 %	0	0	134/60	5,094
56 year old	ANTHEM	Febrile neutropenia	3	30 %	3	3	—	914

HF Summit | HF Logic Triggers Follow-up Order/Risk Stratification

4X Increase in Cardiovascular Medicine Follow-Up for HF with Automated Patient Identification and Follow-Up Order Prompting for Hospitalists

Follow Up Order	Post Discharge MRI Order	Schedule Notes	Covid Result	Discharge Order Expected Date	Primary Cvg Payer	30-Day Readmission Risk (%)	Heart Failure
Follow Up Appointment - Infectious Disease; 1 week, Follow Up Appointment - Cardiology; 1...	—	—	Vaccinated	—	MEDICARE	38%	—
Follow Up Appointment - FL PAMC; 1 week, Follow Up Appointment - Cardiology; 14-30 days, Heart...	—	—	Negative	3/6/2025	HUMANA MEDICARE	12%	♥
Follow Up Appointment - Neurology; 14-30 days, Follow Up Appointment - Infectious Disease; 14-30...	—	—	Vaccinated	—	MEDICARE	20%	—

Heart Failure Follow Up Appointment

Patient List Key



Acute HF



Advanced HF

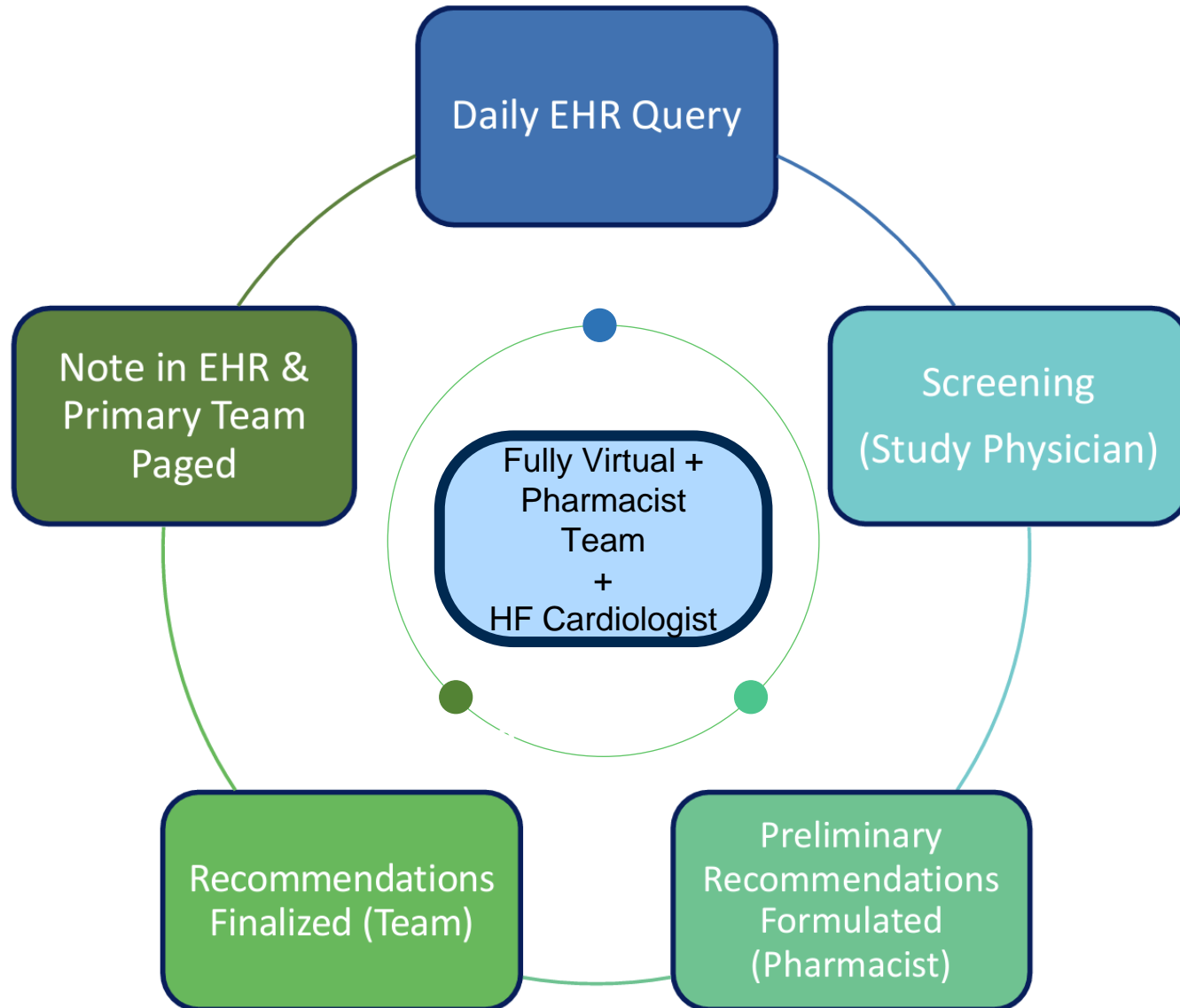
✓ Follow Up Appointment - Cardiology; 14-30 days



ONCE, today at 1515, For 1 occurrence

✓ Heart Failure Post-Acute Visit Follow up Appointment -APP

HF Summit | Adapting IMPLEMENT-HF Inpatient Virtual Titration Program to CCF



Virtual Consult Vs. Usual Care

Up-titrate to target doses

- Met primary end point of GDMT score delta, MRA and BB

CCF Implementation

- 77% acceptance rate of recommendations at CCF
- Minimal Cardiologist Involvement
- Price check on SGLT2i/ARNI
- Increased use of CCF Adherence and Home Delivery Pharmacies

HF Summit | EMR Templates to Incorporate GDMT Score

Guideline Directed Medical Therapy		
Most recent GDMT score: 6		
NYHA class 3. Marked limitation of physical activity. Less than ordinary physical activity leads to symptoms (moderate CHF).		
ACE/ARB/ARNI YES - ENTRESTO Tab - 24-26 mg	{HF GDMT MED ASSESSMENT:146050}	
Beta Blocker NO	{HF GDMT NOT TAKING REASON:146051}	Target dose achieved Dose titration in progress
Aldosterone antagonist YES - eplerenone - 25 mg	{HF GDMT MED ASSESSMENT:146050}	Target dose suboptimal - limited by renal function Target dose suboptimal - limited by hypotension
SGLT2i YES - empagliflozin - 10 mg	{HF GDMT MED ASSESSMENT:146050}	Target dose suboptimal - limited by hyperkalemia Target dose suboptimal - limited by bradycardia
Hydralazine/Isosorbide Dinitrate NO	{HF GDMT NOT TAKING REASON:146051}	Target dose suboptimal - limited by intolerance
Ivabradine NO	{HF GDMT NOT TAKING REASON:146051}	

Non-Cardiology Post-Discharge Clinics

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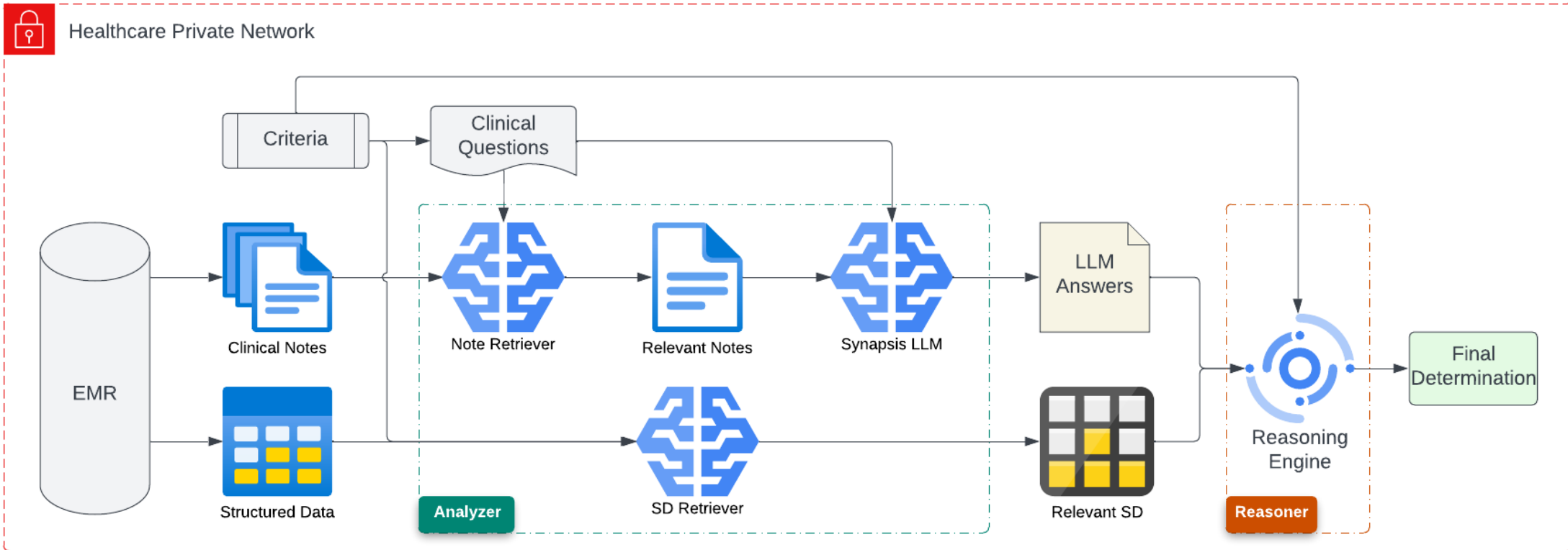
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HF Summit | Moving Beyond ICD Codes to Harness EMR

Role of LLMs and AI-Systems for Chart Review



HF Summit | Medically-Trained LLMs Provide Accurate Justifications

INC2: ATTR-CM confirmed diagnosis.

Centrally confirmed diagnosis of ATTR-CM with either wild-type or variant TTR genotype based on evidence of cardiac amyloidosis by echocardiography or cMRI and one of the following: 1. Endomyocardial biopsy with confirmatory TTR amyloid typing by either immunohistochemistry or mass spectrometry OR 2. Grade 2 or 3 cardiac uptake on 99mTc scintigraphy (99mTc DPD, 99mTc PYP, or 99mTc HMDP) in the absence of monoclonal gammopathy OR 3. Grade 2 or 3

Date	Justification	Source
[Redacted]	[Redacted] has ATTR cardiac amyloid based on imaging and unremarkable AL labs. Genetic testing is negative indicating wild type. Currently on tafamidis.	Note
[Redacted]	<ul style="list-style-type: none"> • CONCLUSIONS: 1. Consistent with TTR amyloidosis: A semi-quantitative visual score of 2 or 3 or H/CL ratio > 1.25 • CARDIAC FINDINGS: PLANAR: Visual Comparison to Bone: Grade 3 = Uptake greater than rib uptake (positive for ATTR) Heart to Contralateral Lung Ratio 2.18 (A H/CL ratio greater than or equal to 1.25 after 3 hr. delay is consistent with ATTR Cardiac Amyloidosis.) SPECT: Uptake Pattern: Diffuse 	Note
-	E85.9 Amyloidosis, unspecified	ICD10 diagnosis of Amyloidosis
[Redacted]	tafamidis	Treatment with tafamidis

1. Note Text - LLM

2. Imaging Report - LLM

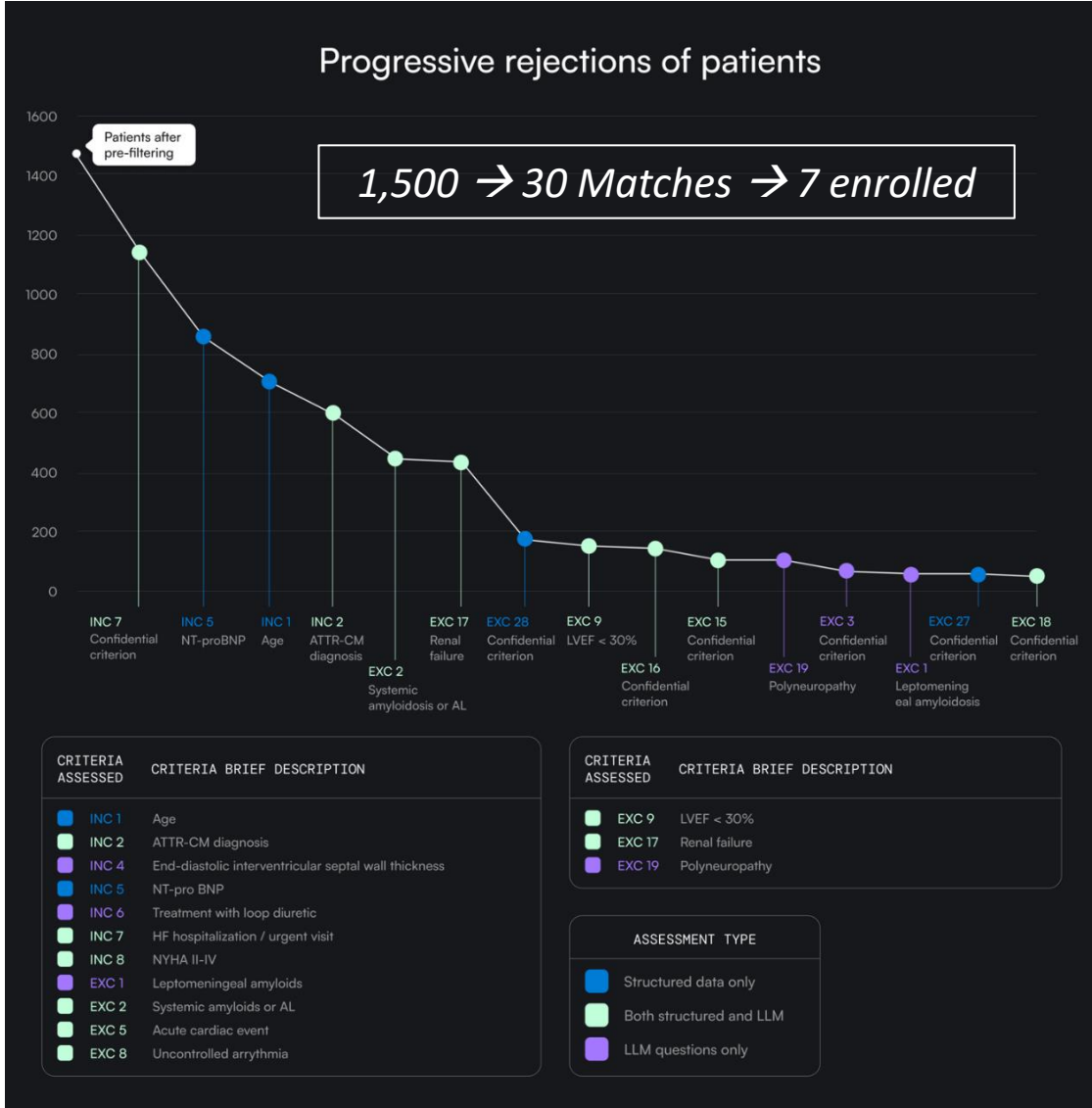
3. ICD- Code -Structured

4. Prescription Record – LLM + Structured

HF Summit | Use of Medically-Trained LLM To Find ATTR-CM Patients for DepleTTR Trial

Beyond Trials:

1. Implementation of Therapies
2. Quality Reporting
3. Operational



HF Summit | Takeaway Points

1. Curated EHR Registries for Health System Tracking and Improvement

- a. EHR-Based Registries (Track Performance and Identify Vulnerable Patients)
- b. Standardized GDMT Metrics (Score)

2. EHR-Based Interventions

- a. Clinician-Directed Alerting (Limited)
- b. Activation of Multidisciplinary Teams (Better)
- c. RPM and EHR-Integrated Tools (Data Coming)

3. Care Model Implementation (Acute Heart Failure)

- a. Standardized Identification
- b. Automation of Follow-up and Triage of Risk

4. AI Automation of Chart Review (Next Frontier of EHR Tools)

- a. Beyond Structured Data: Many Use Cases, but Need More Proof of Benefit
- b. Generative AI Notes Will Create More Unstructured Data In the EHR

