

Improving the hospital-to-home transition: a pharmacist-run post-discharge clinic and other efforts



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Outline

- What factors affect heart failure (HF) readmissions and how to predict them?
- Southeast Michigan “See You in 7” Hospital Collaborative
- Ann Arbor VA HF post-discharge clinic structure and preliminary outcomes
- Future directions/questions

Hospital-to-Home (H2H) Initiative

- **Goal:** To reduce 30 day, all-cause, risk standardized readmission rates for patients discharged with cardiac conditions
- H2H focuses on 3 evidence-based areas for improvement:
 - 1. Early post-discharge follow-up
 - 2. Post-discharge medication management
 - 3. Signs and symptoms
- The H2H project provides a central clearinghouse of information and tools and a listserv for discussion
- Now part of ACC Quality Improvement for Institutions program

Early follow-up and HF outcomes

Table 3. Rates of Mortality, Readmission, and Mortality or Readmission at 30 Days by Quartile of Hospital Rate of Early Follow-up

Variable	Percentage Rate of Early Follow-up by Quartile, No. (%)				P Value
	1 (<32.4)	2 (32.4-37.9)	3 (38.3-44.5)	4 (>44.5)	
No. of patients	7081	8662	7812	6581	
Event, 30 d					
Mortality ^a	353 (5.0)	417 (4.8)	352 (4.5)	297 (4.5)	.44
Readmission ^b	1658 (23.3)	1787 (20.5)	1606 (20.5)	1377 (20.9)	<.001
Mortality or readmission ^a	1849 (26.1)	2015 (23.3)	1813 (23.2)	1544 (23.5)	<.001

^aBased on proportion of events.

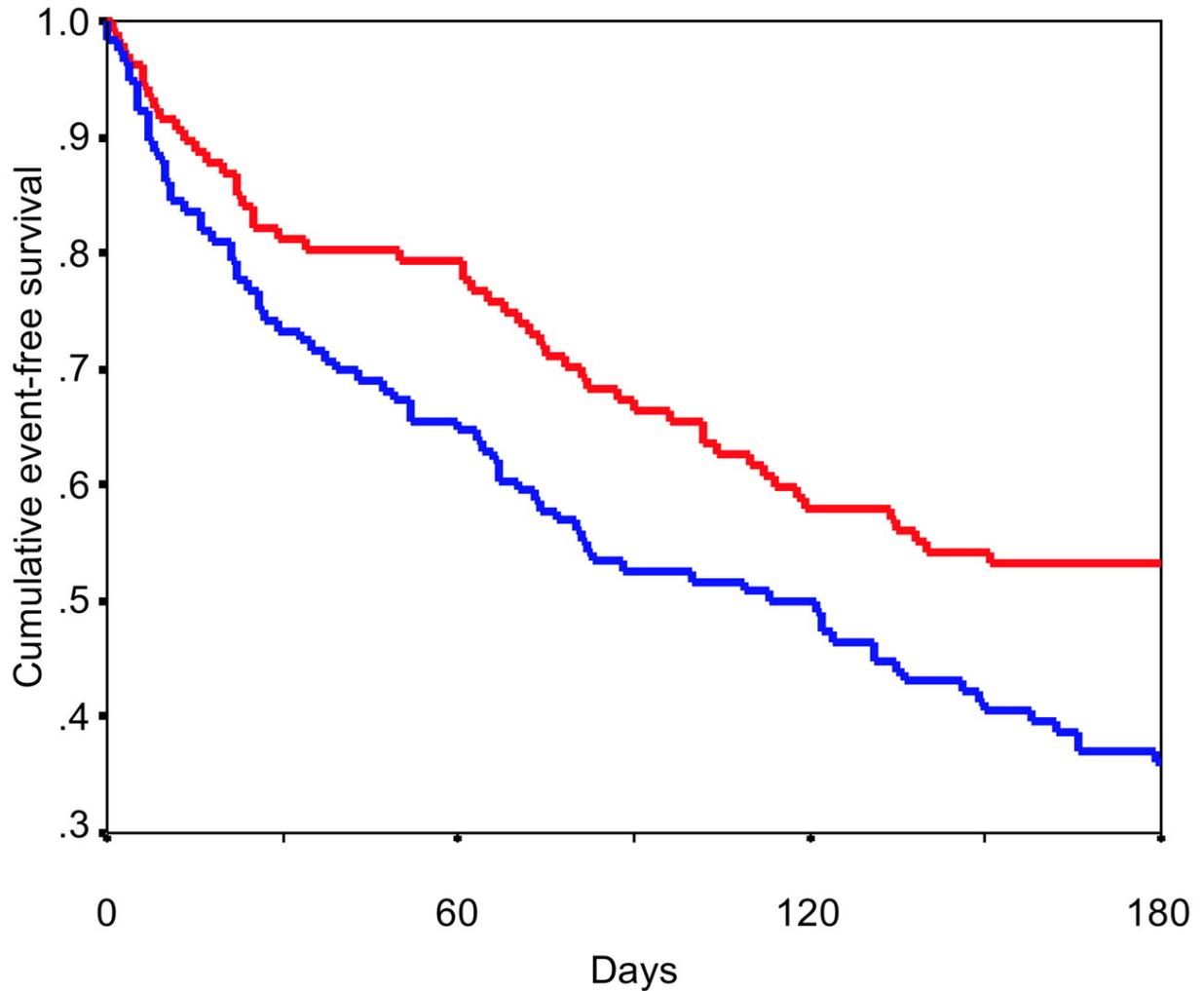
^bBased on cumulative incidence function.

Table 4. Unadjusted and Adjusted Relationships Between Early Physician Follow-up by Quartile and 30-Day All-Cause Readmission^a

Model 4: 14-d follow-up with a physician				
Quartile	Unadjusted	Adjusted	Unadjusted	Adjusted
1 (<56.6)	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
2 (56.6-64.5)	0.88 (0.80-0.97)	.01	0.89 (0.81-0.97)	.01
3 (64.6-70.0)	0.87 (0.78-0.97)	.009	0.90 (0.81-1.00)	.04
4 (>70.0)	0.87 (0.79-0.96)	.004	0.93 (0.84-1.02)	.13

Figure 3. Event-free survival defined as time to first hospitalization or death for control (blue) and education (red) subjects.

- 223 inpatients with HFrEF (EF \leq 40%)
- Randomized to usual care and instructions vs. 1 hour of RN-directed education
- Self-care practices (daily weights, diet, exercise) improved

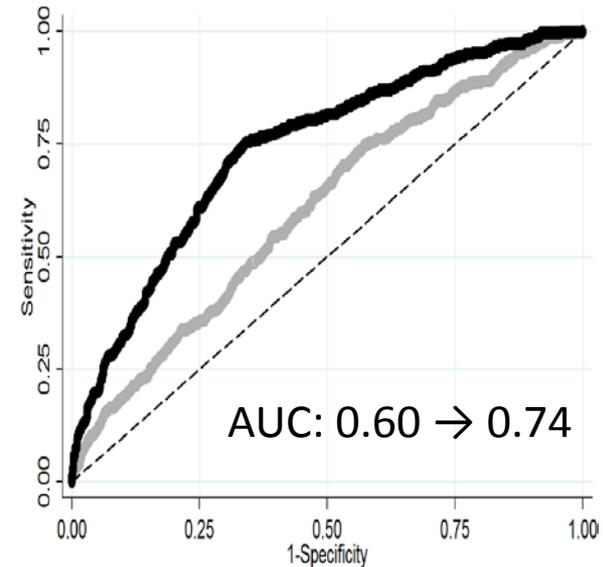


Risk stratification for readmission in HF patients

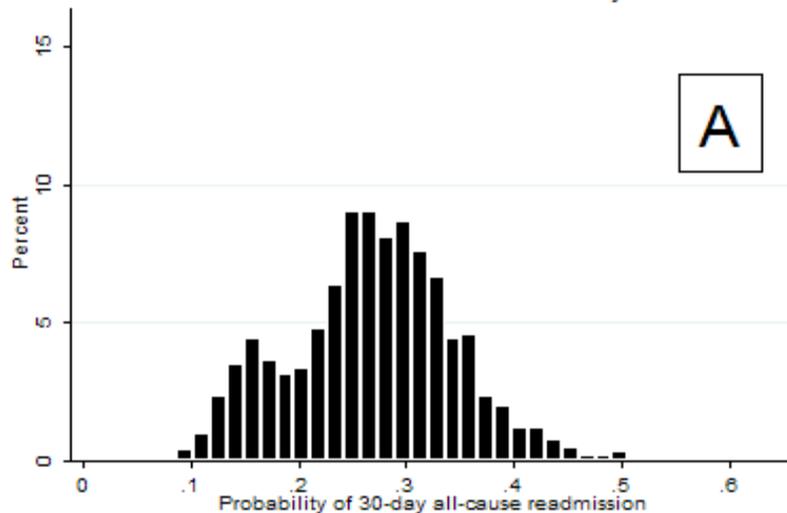
- LACE model:
 - Length of stay, Acuity of admission, Charlson comorbidity score, ER visits during past 6 months
 - Most (>75%) HF patients flagged as 'high-risk'
 - C-statistic 0.59-0.61
- CMS risk model:
 - Administrative data-based (37 variables) model
 - Chart-based model (similar performance) available at <http://readmissionscore.org>
 - C-statistic 0.58-0.61

What predicts readmissions in HF patients?

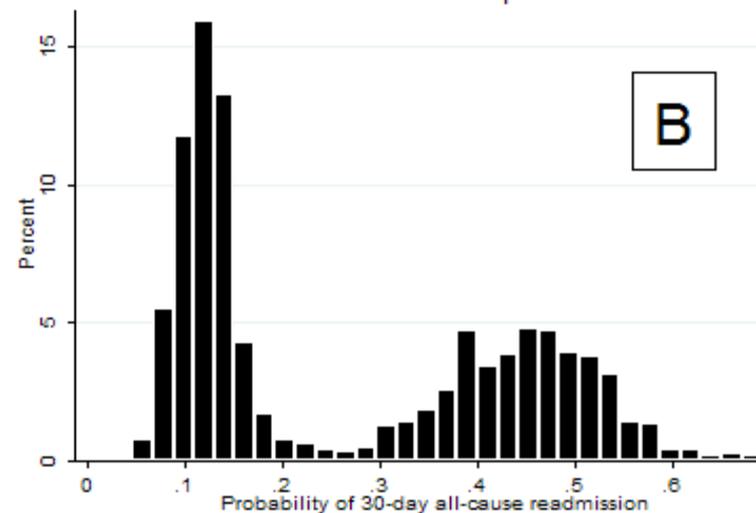
- 1764 Medicare patients hospitalized for HF and surviving to discharge
- CMS chart-based model with low discrimination for all-cause 30-day readmission
- Adding variable of all-cause admissions within prior 12 months (0, 1, or ≥ 2) markedly improved discrimination of CMS model



CMS readmission model only



CMS readmission model + prior admissions

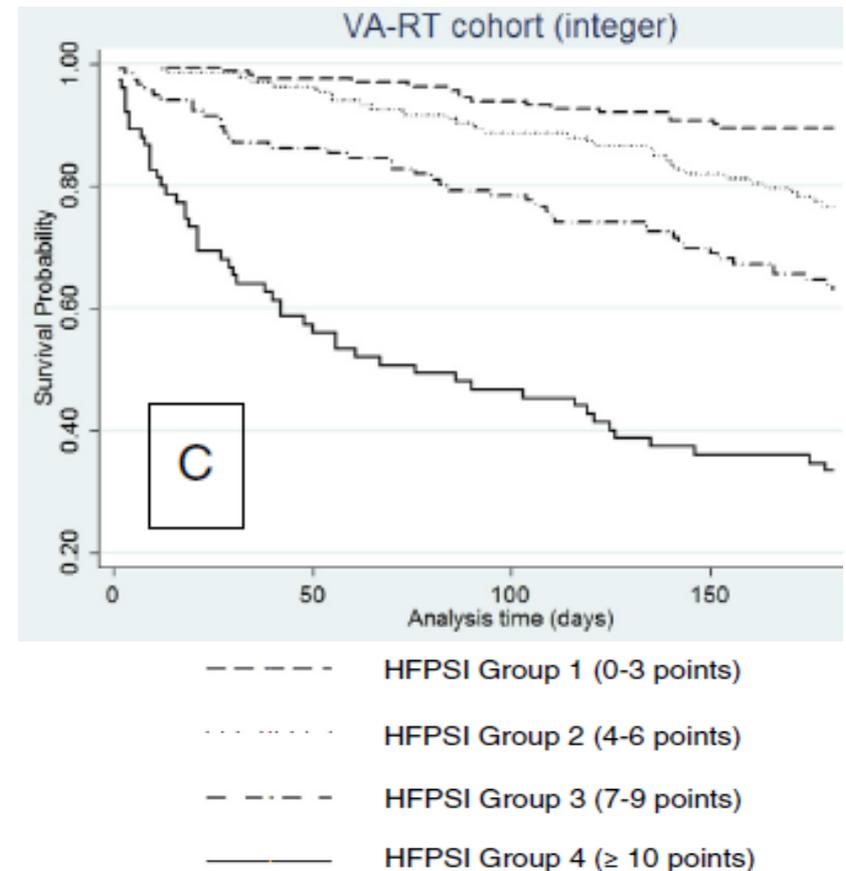


Risk stratification in HF outpatients

- Heart Failure Patient Severity Index (HFPSI) for 6-month risk of death or all-cause hospitalization derived at University of Michigan in 1536 HF clinic patients
- Integer score developed at UM, validated at Ann Arbor VA in 486 HF clinic patients
- 6-month risk of death/all-cause admission in HFPSI Group 1 vs. 4: 12% vs 79%

Table III. Integer HFPSI score

Variable	Point score
Starting score	0
BUN (mg/dL)	
21-34	+1
35-50	+2
>50	+3
BNP (pg/mL)	
>55 (log BNP >4)	+2
>148 (log BNP >5)	+3
>403 (log BNP >6)	+5
Diabetes (any type)	+1
Atrial fibrillation/flutter	+1
NYHA class III	+1
NYHA class IV	+2
Prior hospitalizations	
Within 1 mo	+5
Within 2-6 mo	+2



Southeast Michigan SY7 Collaborative

- Formed by Greater Detroit Area Health Council, Michigan Chapter of ACC, MPRO (Michigan QIO)
- 32 Southeast Michigan hospitals invited to participate, 11 accepted (10 private-sector hospitals and Ann Arbor VA)
- One-year collaborative effort focused on increasing 7-day follow up rates post-hospital discharge and reducing 30-day all-cause readmission for patients discharged from HF hospitalization
- Collaborating hospitals used the toolkit developed for the Hospital-to-Home (H2H) Early Follow-Up "See You in 7" Challenge
- 4 quarterly in-person meetings, 8 webinars, 5 assignments



Michigan
CHAPTER

Southeast Michigan “See You in 7” Hospital Collaborative: What to Expect

Focus	Methods/Tools	Meetings
<u>Pre-Implementation</u> May - July	ACC Online Initial Assessment; ACC “See You in 7” Toolkit; Selection of “See You in 7” Process Measures; Analysis of where hospital is, where it should be, and how to get there	Kickoff Meeting; 2 Conference Calls/Webinars
<u>Test Intervention</u> Aug - Jan	Plan for Improvement; Pre-Implementation Data Submission; Collaborative hospitals to share best practices, barriers; Quarterly Progress Reports	2 Quarterly Meetings; 4 Conference Calls/Webinars
<u>Evaluation</u> Feb - April	Data collected will be evaluated; Lessons learned to be shared; Quarterly Progress Report Post-Implementation Data Submission	2 Conference Calls/Webinars; 1 Quarterly Meeting

Hospital-to-Home "See you in 7" Metrics

- **Heart failure patients are identified prior to discharge and risk of readmission is determined.**
- **Follow-up visit appointment within 7 days is scheduled and documented in the medical record.**
- **Patient is provided with follow-up documentation which includes: appointment card and educational materials about heart failure**

- **Possible barriers to keeping the appointment are identified in advance, addressed, and documented in the medical record.**
- **Patient arrives at appointment within 7 days of discharge from hospital.**
- **Discharge summary (including summary of hospitalization, updated medication list) available to follow-up clinician.**

Southeast Michigan "See You in 7" Hospital Collaborative: Selected Process Measures

Please fill out this form and e-mail it to

The Process

Measure cells have been filled in for your convenience. Please delete the rows containing Process Measures you are not selecting as a focus for the Collaborative.

Selected Process Measure	Why your hospital chose this Process Measure	Barriers to improvement encountered previously
Identifying heart failure patients prior to discharge	Sometimes the main HF provider is not made aware of admit, which impairs appropriate follow-up Educational, risk stratification, and rapid follow-up initiatives would be improved with early identification of HF inpatients	No automated method of identifying HF patients Changing resident/attending teams aren't aware of HF resources Which staff member reviews the admission data? Who is notified?
Scheduling and documenting a follow-up visit with a cardiologist or primary care practitioner that takes place within 7 days after discharge	Poor performance on 7-day post-discharge appointment measure (mean time to follow-up is 21-23 days)	Primary care and general cardiology often too busy to see patients within 7 days Changing resident/attending teams not aware of HF resources
Providing the patient with documentation of the scheduled appointment	(will occur as part of discharge summary if above issues addressed)	
Identifying and addressing barriers to keeping the appointment	Patients have wide variety of challenges attending appointments	Transportation challenges for pts. Appointment not made prior to discharge
Working to ensure that the patient arrives at the appointment within 7 days of discharge	High no-show rate for first appointment	Primary care nurses who contact the patient post-discharge may not be aware of or mention appointment Barriers to making appointment not identified before discharge
Making the discharge summary available to the follow-up health care provider	(is currently provided to primary care provider directly; is part of the EMR and will be available to any treating provider at follow-up if it is completed)	Rarely, discharging resident does not complete in a timely manner, and it's unavailable at the follow-up appointment

Michigan SY7 Collaborative: Evaluation

- Pre-specified in the collaborating hospitals (CH):
 - Rates of 7-day post-hospital discharge follow up
 - Unadjusted 30-day all-cause readmission rate
- Additional analysis:
 - 7-day follow-up rates, unadjusted and risk-standardized all-cause 30-day readmissions in CH and Michigan non-participating hospitals (NPH)
 - Comparison of above rates in CH and 1:1 matched NPH
 - Medicare payments (inpatient + 30 days outpatient) in CH and NPH

Michigan SY7 Collaborative: Follow-up Results

Table. 7- and 14-day follow-up rates in collaborating and non-participating hospitals

Rates	CH		NPH	
	Pre-intervention	Intervention	Pre-intervention	Intervention
<i>Post-discharge follow-up</i>				
7dFU †	31.1%	34.4%***	30.2%	32.6%***
14dFU †	47.2%	50%***	46.3%	47.9%***

Note: *** p < .001

Michigan SY7 Collaborative: Readmissions

Table. Follow-up and 30-day readmission rates in collaborating and non-participating hospitals

Rates	CH		NPH	
	Pre-intervention	Intervention	Pre-intervention	Intervention
<i>Overall 30-day readmission</i>				
Unadjusted 30-day readmission †	29.0%	27.3%***	26.4%	25.8%**
Mean 30-day RSRR §	31.1%	28.5%***	26.7%	26.1%*
Weighted 30-day RSRR †	30.7%	28.2%	28.5%	27.4%
<i>Inter-group comparison</i>				
Pre-post Δ mean RSRR ¥	0.0259		0.0065*	

Note: *p < .05; ** p< .01; *** p < .001; † for χ^2 comparison; § for 2-sample t-test comparison; ¥ for 2-sample t-test comparison

Michigan SY7 Collaborative: Matched Results

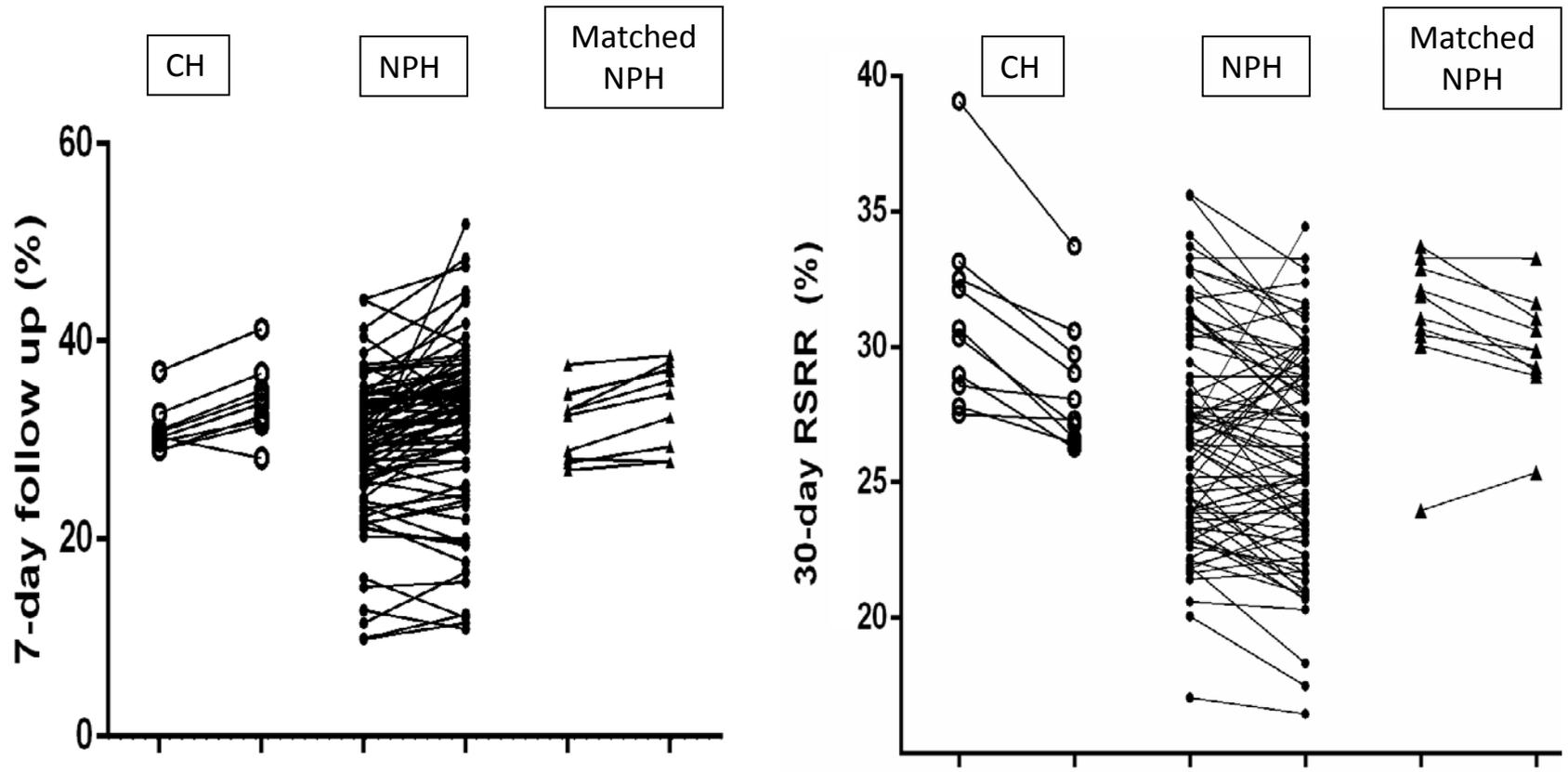
Table. Follow-up and 30-day readmission rates in collaborating and matched non-participating hospitals

Rates	CH		Matched NPH	
	Pre-intervention	Intervention	Pre-intervention	Intervention
<i>Post-discharge follow-up</i>				
7dFU †	31.1%	34.4%***	31.5%	33.8%***
14dFU †	47.2%	50%***	47.3%	48.7%**
<i>Overall 30-day readmission</i>				
Unadjust. 30-day readmission †	29.0%	27.3%***	29.8%	28.9%**
Mean 30-day RSRR §	31.1%	28.5%***	31.0%	29.9%
<i>Inter-group comparison</i>				
Pre-post Δ mean RSRR ¥	0.0259		0.0112*	

Note: *p < .05; ** p < .01; *** p < .001; † for χ^2 comparison; § for 2-sample t-test comparison; ¥ for 2-sample t-test comparison

Collaborating hospitals matched 1:1 via Blue Cross Blue Shield hospital peer group categories (region, similar size, teaching status, demographics, HF patient volume)

Michigan SY7 Collaborative: Results by Hospital



Michigan SY7 Collaborative: Follow-up vs. readmission

Rates	CH		Matched NPH	
	Pre-intervention	Intervention	Pre-intervention	Intervention
Mean RSRR, with 7dFU	31.1%	28.5%	31.0%	29.9%
Mean RSRR, without 7dFU	31.1%	28.5%	31.0%	29.9%
Mean RSRR, with 14dFU	31.1%	28.5%	31.0%	29.9%
Mean RSRR, without 14dFU	31.1%	28%	31.0%	29.9%

- Readmission rates were higher in patients with early follow-up
- After risk standardization with the CMS administrative data model, there was no relationship between 7- or 14-day follow-up and 30-day readmission rates

HF post-discharge clinic: structure

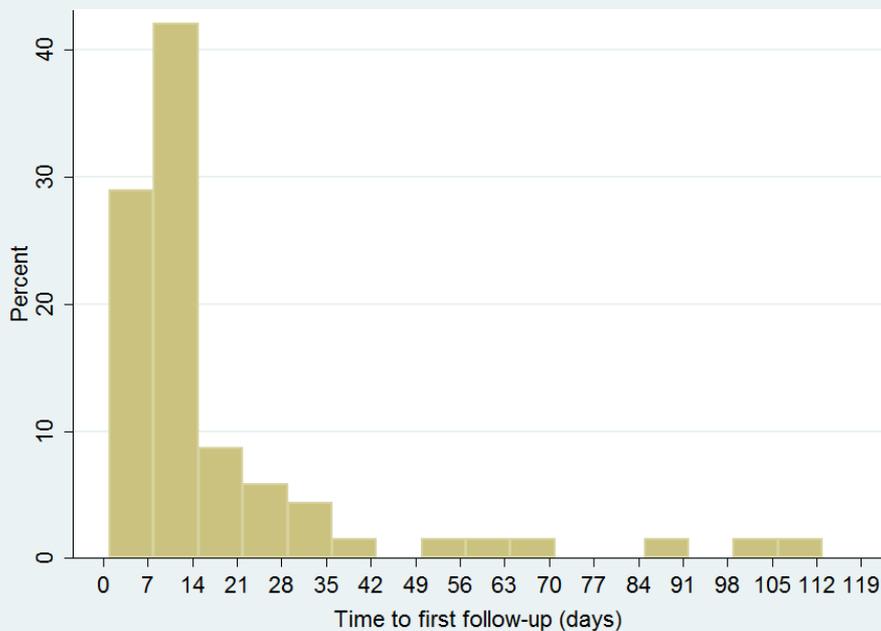
- Consult referral comes from inpatient team
- Cardiology pharmacist reviews request and schedules patients in once-weekly clinic
- Pharmacist primarily sees patient
 - Symptom update, assessment of regimen
 - Medication reconciliation and education (medications and self-care)
- Most patients are also examined by HF clinic provider, plan collaboratively determined
- Most patients are now initially seen by pharmacy student or resident (part of educational curriculum)

HF post-discharge clinic: evaluation

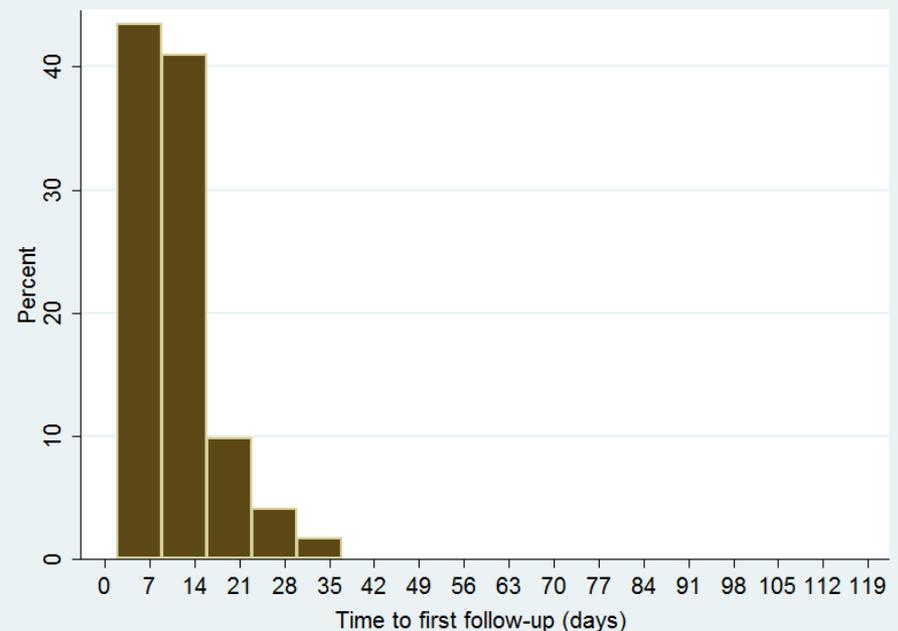
- 243 patients hospitalized for HF at AAVA (122 attended HF post-discharge clinic, 121 did not)
- Chart abstraction of data
 - Interventions performed at post-discharge clinic
 - Outcomes (readmissions and deaths)
- Outcomes of interest:
 - Improvement in early follow-up rates
 - 30-day all-cause readmission and mortality

Impact of HF post-discharge clinic on timing of follow-up at AAVA

Patients not attending HF post-discharge clinic

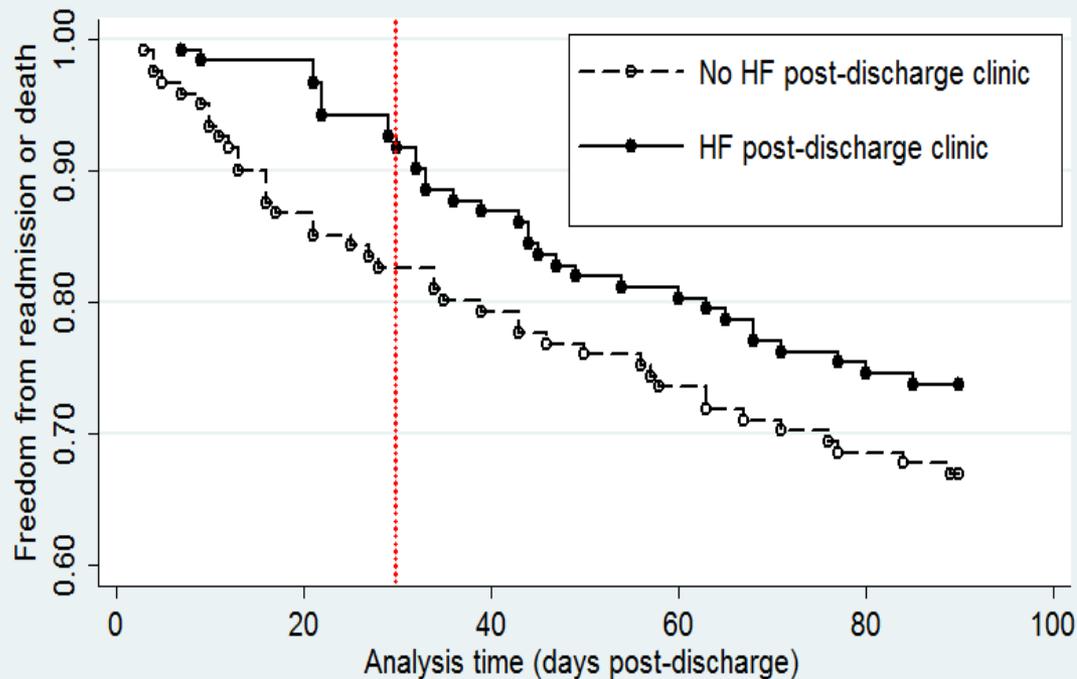


Patients attending HF post-discharge clinic



- Prior to post-discharge clinic, mean time to first follow-up 21-23 days
- Now 14±14 days, 11±6 days in those who attended HF post-discharge clinic and 17±20 in patients who did not ($p < .001$ for comparison)

Post-discharge HF clinic: outcomes



- Age, distance traveled, gender, race, comorbidities similar between groups
- LVEF slightly lower in HF clinic patients (35 ± 19 vs $40 \pm 19\%$, $p=.04$)
- > 90% HFPSI scores were Group 3 or 4
- Significantly more Group 4 HFPSI in post-discharge clinic pts (85 vs. 72%, $p=.01$)

Logistic regression analysis used to evaluate combined 30-day all-cause readmission and death in HF post-discharge vs. non-attenders, adjusted for highest-risk HFPSI score (Group 4 vs. Groups 1-3)

HF post-discharge clinic: OR 0.40 (95% CI 0.18-0.91, $p=.03$)

High-risk HFPSI score: OR 3.12 (95% CI 0.89-10.93, $p=.08$)

HF post-discharge clinic: interventions

Pharmacist interventions made at the pharmacist-managed HF post-discharge clinic (n=122)

Question	Freq	%
Drug interaction identified	5	4.1%
ADE/side effect identified	32	28.1%
Med added	51	41.8%
Med stopped	47	38.5%
Med held	10	8.2%
dose increase	38	31.2%
dose decrease	34	27.9%
change in med administration time	48	39.3%
refer to ancillary service	25	20.5%
BP cuff provided	12	9.8%
scale provided	4	3.3%
Fluid restriction	119	97.5%
Sodium restriction	120	98.4%
Patient counseling	120	98.4%

Transitions of care for HF: rotation for PGY-2 pharmacy resident

- Currently piloting a new clinical 4 week rotation for the Postgraduate Year 2 (PGY2) Cardiology Pharmacy Resident
- Target patients admitted for HF exacerbation as primary diagnosis, new diagnosis of HF, or secondary diagnosis with acute decompensation of other disease states.
- Aim to reduce readmission rates, days out of the hospital, and enhance education
- Improve communication with different services and patients

Transitions of care: responsibilities

Inpatient

- Perform Medication Reconciliation in ER or medicine floors
- Provide HF education that includes non-pharmacologic measures
- Attend multidisciplinary rounds
- Communicate recommendations to medicine service or cardiology consult service
- Comply with JCAHO measures (i.e. prescribe ACEI or ARB for HFrEF)
- Provide educational materials if necessary
- Provide counseling on medication changes and lifestyle modifications near discharge
- Communicate with teams about placing a HF post-discharge or HF clinic consult prior to discharge.

Ambulatory Care

- See patient in HF post-discharge clinic within 7-10 days
- Call patient if unable to be seen or cancels on day of appointment.
- Call or see the patient 1-2 weeks after HF post-discharge appointment unless seen in HF clinic.
- Call patient 2-4 weeks after previous phone call unless seen in HF clinic.

Future directions

- Assess 'real-time' utility of HFPSI prospectively
- Continue to track outcomes in HF post-discharge clinic, obtain missing data
- Assess impact of pharmacy-assisted transitions of care on patient knowledge and self-efficacy
- Two clinical trials:
 - GOURMET-HF: HF inpatients ≥ 65 randomly assigned to usual care vs. 30 days home-delivered low-sodium meals, primary outcome QOL (NIH/NIA R21-AG047939)
 - Get Going: HF inpatients ≥ 70 randomly assigned to usual care vs. adaptive pedometer, primary outcome average daily step count (funded AAIM/ASP)

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