HMS Sepsis

Pat Posa RN, BSN, MSA, CCRN, FAAN
Quality and Safety Program Manager, HMS Sepsis Initiative
University of Michigan

HMS
MICHIGAN HOSPITAL
MEDICINE SAFETY CONSORTIUM

Goals and Objectives

- Introduction to the Michigan Hospital Medicine Safety Consortium (HMS)

- Why Sepsis

- HMS Sepsis Bundles

- Peri-Discharge Bundle—what is the evidence?

- Share performance data on HMS Sepsis discharge measure

MICHIGAN HOSPITAL MEDICINE SAFETY CONSORTIUM

VALUED PARTNER

- One of 24 Collaborative Quality Initiatives in Michigan
- Funded by Blue Cross Blue Shield of Michigan
- Coordinating Center at Michigan Medicine
- Up to 2 Data Abstractors at each hospital (69 total sites)
- Eligible Michigan hospitals are required to participate
- Participating hospitals are of diverse sizes and types
- Participants at each site are multi-disciplinary
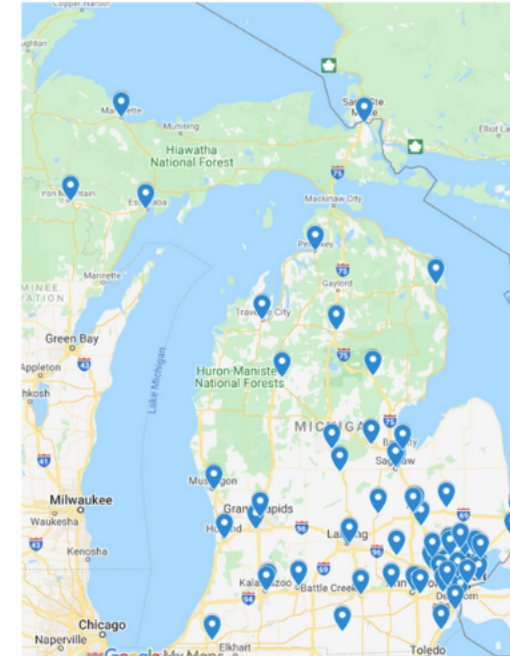
HMS GOAL

Improve the quality of care for hospitalized medical patients who are at risk for adverse events

HOW DOES HMS IMPROVE CARE?

Robust data reporting

Best-practice sharing

Facilitated implementation of best practices

Pay-for-Performance & Value Based Reimbursement

Current HMS Quality Initiatives

PICC/Midline

Performance Goals:

- Reduce short-term PICC use (<5 days)
- Minimize multi-lumen PICC use (non-ICU)
- Reduce use of PICCs in patients with CKD
- Reduce use of triple lumen PICC use in critical care and oncology patients
- Reduce short-term PICC use (<5 days) in oncology patients

Resources:

- Tiered Quality Improvement Strategy
- Toolkit

Antimicrobial Use

Performance Goals:

- Do not treat uncomplicated CAP for greater than 5 days
- Do not test for or treat asymptomatic bacteriuria
- Reduce inappropriate broad-spectrum antibiotic use in uncomplicated CAP patients

Resources:

- Tiered Quality Improvement Strategy
- Toolkit

Sepsis

Performance Goals:

- Increase antibiotic delivery within 3 hours for patients with sepsis and hypotension
- Increase discharge/post-discharge care coordination

Resources:

- Tiered Quality Improvement Strategy
- Toolkit

SEPSIS TEAM

Scott Flanders, MD
Program Director

Hallie Prescott, MD, MSc
Sepsis Physician Lead

Jakob McSparron, MD
QI Consultant & Sepsis Expert

Elizabeth McLaughlin, MS, RN
Program Manager

Tawny Czilok, MHI, RN
Assistant Program Manager

Pat Posa, RN, BSN, CCRN
Quality & Patient Safety Program Manager

Abigail West, MSN, APRN
QA Coordinator: Sepsis Co-Lead

Harsh Bhanderi, MS
Sepsis Database Analyst

Megan Heath, PhD
Statistician Lead

Emily Walzl, MS
Statistician Intermediate

Why Sepsis?

Why Did HMS Focus On Sepsis?

Sepsis is **common**

1.7 million hospitalizations, more than heart attack and stroke combined[1]

2.5 million hospitalizations related to sepsis in 2021 (AHRQ report to Congress, 2024)

Sepsis is **deadly**

350,000 deaths, 33-50% of all hospital deaths[2,3]

Sepsis is **costly**

Most costly cause of hospitalization ($38 billion in 2020; 52 billion in 2021)

1-Rhee, et al. JAMA, 2017.
2-Liu, et al. JAMA, 2014.
3-Rhee, et al. JAMA Network Open, 2019.

Sepsis is a Major Driver of Morbidity

3-fold increase in mod-severe cognitive impairment[1]

1-2 new functional limitations (ADLs)[1]

Increased risk for re-hospitalization[2] (recurrent infection/sepsis, acute kidney injury, and aspiration)

Half with psychological symptoms[3]

Post-acute mortality[4]

Only 55% of previously employed patients return to work within 6 months[5]

1-Iwashyna, *et al. JAMA*, 2010.
2-Prescott, *et al. JAMA*, 2015.
3-Bienvenu, *et al. Intensive Care Med*, 2018.
4-Prescott, *et al. BMJ*, 2016.
5-McPeake, *et al. AnnalsATS*, 2019.

Hospital Readmission is Common

Hospital Readmission and Healthcare Utilization Following Sepsis in Community Settings

Vincent Liu, MD, MS[1*], Xingye Lei, PhD, MA[2], Hallie C. Prescott, MD[3], Patricia Kipnis, PhD[1,2], Theodore J. Iwashyna, MD, PhD[3,4], Gabriel J. Escobar, MD[1]

Frequency, Cost, and Risk Factors of Readmissions Among Severe Sepsis Survivors*

Andrew J. Goodwin, MD, MSCR[1]; David A. Rice, MD[1]; Kit N. Simpson, DrPH[2]; Dee W. Ford, MD, MSCR[1]

Rehospitalizations Following Sepsis: Common and Costly*

Dong W. Chang, MD, MS[1]; Chi-Hong Tseng, PhD[2]; Martin F. Shapiro, MD, PhD[2]

Readmission Diagnoses After Hospitalization for Severe Sepsis and Other Acute Medical Conditions

Hallie C. Prescott, MD, MSc, Kenneth M. Langa, MD, PhD
Theodore J. Iwashyna, MD, PhD

Epidemiology and Predictors of 30-Day Readmission in Patients With Sepsis

Shruti K. Gadre, MD; Mahek Shah, MD; Eduardo Mireles-Cabodevila, MD; Brijesh Patel, DO; and Abhijit Duggal, MD

Post–Acute Care Use and Hospital Readmission after Sepsis

Tiffanie K. Jones[1,2], Barry D. Fuchs[1,2], Dylan S. Small[3,4], Scott D. Halpern[1,2,4,5,6], Asaf Hanish[7], Craig A. Umscheid[1,4,5,7], Charles A. Baillie[5], Meeta Prasad Kerlin[1,2,4,5], David F. Gaieski[8], and Mark E. Mikkelsen[1,2,5]

Unplanned Readmissions After Hospitalization for Severe Sepsis at Academic Medical Center–Affiliated Hospitals

John P. Donnelly, MSPH[1,2,3]; Samuel F. Hohmann, PhD, MS-HSM[4,5]; Henry E. Wang, MD, MS[1]

Prescot, et al. JAMA. 2015
Liu, et al. *J Hosp Med*. 2014.
Gadre, et al Chest. 2019
Jones, et al. *AnnalsATS*. 2015.

Donnelly, et al. *Crit Care Med*. 2015.
Goodwin, et al. *Crit Care Med*. 2015.
Chang, *et al. Crit Care Med*. 2015.

High Rates of Readmission for Sepsis Inpatient Stays

Exhibit 4.3. Rate of Sepsis Inpatient Stays with a Readmission for Any Cause, 2021
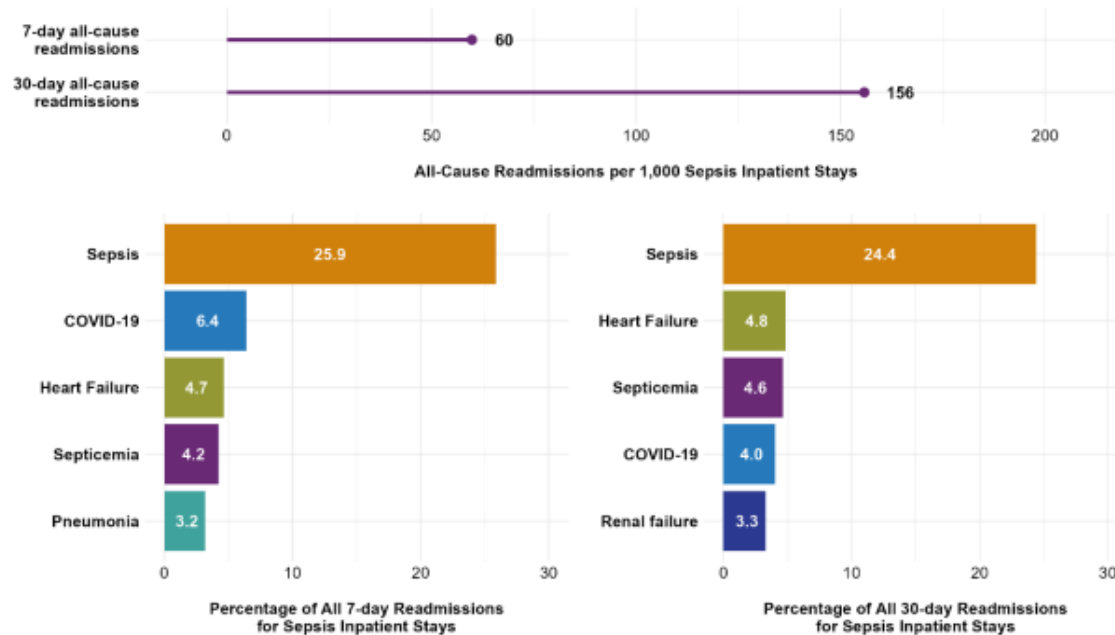
Notes: Sepsis was the reason for the stay (principal diagnosis). The "Septicemia" category represents records that have a principal diagnosis at the readmission of a sepsis infection, but no indication of organ dysfunction (required for the identification of sepsis for nonmaternal adult and maternal sepsis stays). See Appendix C, Clinical Coding for Sepsis, for criteria. See Appendix D, Background on Measures, Characteristics, and Calculations, for definitions. See Appendix Table E.4.5 for supporting information.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases, 23 States with HCUP Revisit Data Elements, 2021

Patients hospitalized with sepsis have readmission rates comparable to those for congestive heart failure, acute myocardial infarction, pneumonia, and chronic obstructive pulmonary disease.

In 2021, about **16 % of sepsis inpatient stays** (156 all-cause readmissions per 1,000 sepsis inpatient stays) resulted in the patient being **readmitted to hospitals within 30 days of discharge**

HMS Sepsis 30-day readmission rate: 18.3% (11.2020-6.2024)

An Assessment of Sepsis in the United States and Its Burden on Hospital Care | Agency for Healthcare Research and Quality (ahrq.gov)

HMS Sepsis

- The HMS Sepsis Initiative was launched in 2021 and fully implemented in all 69 member hospitals in early 2023.

- We work to reduce both short-term mortality and long-term morbidity of sepsis throughout the state of Michigan (and beyond) through audit and feedback, education, facilitated implementation of best practices, and sharing of successes and challenges between our hospitals.

- We focus broadly on sepsis care from initial presentation through post-hospital follow-up. Our work is informed by a detailed sepsis registry including patient-reported outcomes collected 90 days post-discharge.

What Does HMS Sepsis Measure?

Structures
(Biannual Survey)

Policies
Protocol
Services
Staffing

Processes
(Chart abstraction)

30 processes, 4 bundles
Early sepsis care
Ongoing sepsis care
ICU to floor transition
Peri-discharge

Outcomes
(Chart abstraction, Data linkage, & phone survey)

Mortality (90 days post-discharge)
Re-hospitalization
New disability (WHO scale)
Return to work
Financial toxicity

HMS Sepsis Bundle Elements

Early Sepsis Bundle

- Initial lactate resulted within 3 hours of arrival to hospital/ED
- Repeat lactate resulted within 4 hours of first lactate (if elevated)
- Blood culture collected within 3 hours of arrival (non-viral sepsis)
- Blood culture collected before antibiotic administration
- Antibiotic delivered within 5 hours of hospital/ED arrival (3 hours if hypotensive) for non viral sepsis
- ≥ 30 ml/kg ideal body weight (IBW) fluid within 6 hours if indicated
- Receipt of vasopressors within 6 hours for persistent hypotension

Additional Sepsis Elements

- Use of norepinephrine as first-line vasopressor
- ≥ 30 ml/kg IBW fluid within 2 hours of vasopressor initiation
- Use of adjunctive steroids in septic shock
- Use of balanced solutions over other fluids
- Antibiotics delivered in recommended sequence
- Initial antibiotic delivered within 1 hour of order
- Lung protective ventilation strategy used

ICU/Floor Transition of Care Elements

- Temporary CVC removal prior to transfer out of ICU
- Temporary CVC removal or documentation of need to keep prior to transfer out of ICU
- Urinary catheter removal prior to transfer out of ICU
- Urinary catheter removal or documentation of need to keep prior to transfer out of ICU
- Communication of volume status at ICU transfer
- Communication of antibiotic plan at ICU transfer
- Discontinuation or non-use of controlled substances at ICU transfer
- Delirium assessment at ICU transfer and in ward

Recovery Sepsis Elements

- **Baseline functional status was assessed (≥ 4 I/ADLs documented)**
- **PT/OT Consultation**
- **Appropriate continuation of medications on discharge**
- **Appropriate discontinuation/non-use of controlled substances on discharge**
- **Assessment of care goals**
- **Hospital contact provided for issues post-discharge**
- **Scheduled for PCP follow-up within 2 weeks**
- **Post-discharge care coordination**
- **Discharge Composite Measure**

Peri-discharge Management Literature

Surviving Sepsis Campaign statements

Pre-Discharge:

- Goals of care discussion within 72 hours
- Referral to peer support
- Formal handoff ICU to ward
- Screen for social/economic support
- Written and verbal sepsis education

At Discharge:

- Medication reconciliation at ICU & hospital discharge
- Written and verbal discharge summary covering sepsis and common post-sepsis impairments

Post-Discharge:

- Follow-up with clinicians able to support and manage new and long-term sequelae
- Assessment for physical, cognitive, and emotional problems after discharge
- Referral to physical rehabilitation programs

The RED Program:

Patients: 749 English-speaking hospitalized adults at a single urban, academic hospital

Intervention:
Nurse discharge advocates provided the following:

1. Arranged follow-up appointments

2. Confirmed medication reconciliation

3. Conducted patient education with an individualized instruction booklet that was sent to the primary care provider

Clinical pharmacist called patient 2-4 days after discharge to reinforce the discharge plan and review medications

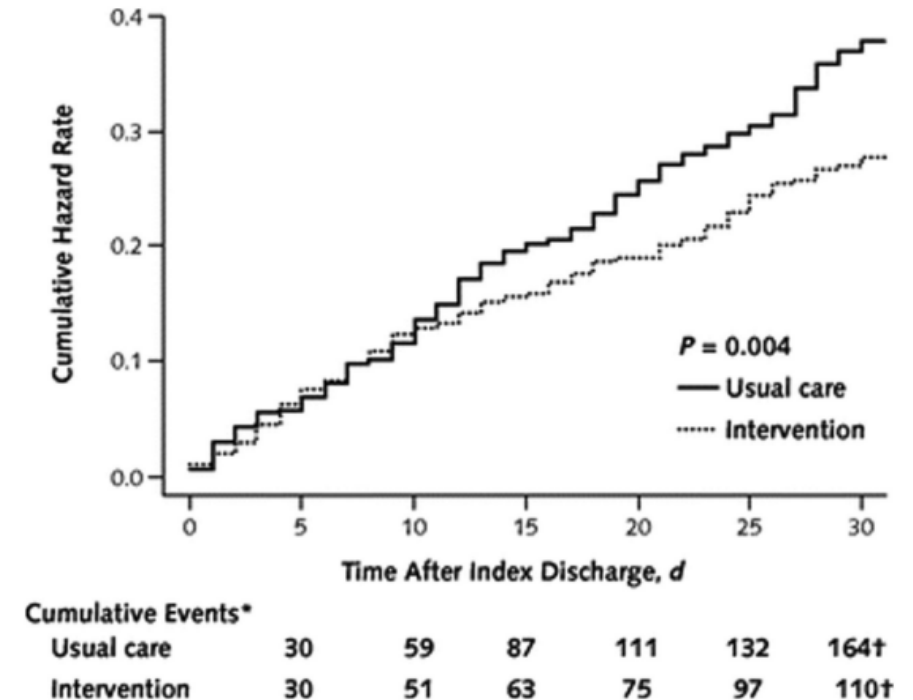Jack, et al., *Ann of Internal Med*, Feb. 2009

The RED Program Results:

Participants in intervention group had a lower rate of hospital utilization than those receiving usual care (0.314 vs 0.451 visit per person per month. Incidence rate ratio 0.695 (95% CI, 0.515 to 0.937; **p=0.009**)

The RED program successfully reduced hospital utilization, improved patient self perceived preparation for discharge, and increased PCP follow-up.

In 2007, the National Quality Forum Consensus Standards Maintenance committee identified hospital discharge as a critical area for improvement. The resulting National Quality Forum "Safe Practice" was based largely on the principles of the RED program

$P = 0.004$
— Usual care
······ Intervention

Cumulative Events*						
Usual care	30	59	87	111	132	164†
Intervention	30	51	63	75	97	110†

Jack, et al., *Ann of Internal Med*, Feb. 2009

AHRQ's Project RED: Re-Engineered Discharge

RED consists of 12 reinforcing actions that hospitals undertake during and after the patient's hospital stay to ensure a smooth and effective transition at discharge

Components of the RED

1. Ascertain need for and obtain language assistance.
2. Make appointments for followup care (e.g., medical appointments, postdischarge tests/labs).
3. Plan for the followup of results from tests or labs that are pending at discharge.
4. Organize postdischarge outpatient services and medical equipment.
5. Identify the correct medicines and a plan for the patient to obtain them.
6. Reconcile the discharge plan with national guidelines.
7. Teach a written discharge plan the patient can understand.
8. Educate the patient about his or her diagnosis and medicines.
9. Review with the patient what to do if a problem arises.
10. Assess the degree of the patient's understanding of the discharge plan.
11. Expedite transmission of the discharge summary to clinicians accepting care of the patient.
12. Provide telephone reinforcement of the discharge plan.

Re-Engineered Discharge (RED) Toolkit | Agency for Healthcare Research and Quality (ahrq.gov)

A 2020 stakeholder engagement study was conducted to determine patient and family priorities for research and QI in hospital medicine.

"Who to call with questions after discharge" was identified as a top priority of patients, families, and caregivers.

Harrison et. al, Journal of Hospital Medicine 2020

Patients: 691 patients hospitalized with sepsis at 3 hospitals

Intervention: Sepsis transition and recovery program (STAR program)

"To promote care planning and self-management, proactive follow-up, and patient, provider, and community engagement during care transitions after sepsis."

Components of program:

- Discharge playbook (who to contact with questions)
- Virtual follow-up within 48 hours (medications) and within 72 hours (symptoms)
- Referral to PCP follow-up

Comparator: Usual care

Outcome: 30-day mortality or readmission

Taylor, *et al. Critical Care Medicine*, 2022.
Kowalkowski, *et al. AJRCCM*, 2022.

Update: IMPACTS trial outcomes

Outcome	STAR Program	Usual Care	p
30 post-discharge:			
Mortality or readmission	28.7%	33.3%	0.18
Mortality or readmission (among hospital survivors)	25.2%	30.3%	0.02
12 months post-discharge			
Mortality or readmission	65.0%	72.2%	<0.05

Taylor, *et al. Critical Care Medicine*, 2022.
Kowalkowski, *et al. AJRCCM*, 2022.

HMS Peri-discharge Measures Data

Recovery Bundle : HMS Data (All Time)

Bundle Element	N / Eligible	Overall (%)
Baseline functional status assessed	30980/37348	82.9%
PT/OT consulted	8093/15387	52.6%
Appropriate continuation of medications on discharge	12476/14128	88.3%
Appropriate stopping of controlled meds on discharge	19846/20111	98.7%
Assessment of Care Goals	9334/18091	51.6%
Hospital contact information for issues post-discharge	6907/20111	34.3%
Scheduled for PCP follow-up within 2 weeks	4559/20111	22.7%
Post-discharge care coordination	9702/20111	48.2%
≥ 1 of 3 above discharge measures	**14628/20111**	**72.7%**
Met all eligible bundle elements	8627/37348	23.1%

Discharge Care Coordination Composite Measure: Q3 2024 Data

Among patients discharged to a home-like setting, how many received a hospital contact for issues post-discharge?

Collaborative Wide Average = 36.5%

Among patients discharged to a home-like setting, how many had a PCP/Specialist follow-up appointment scheduled within 2 weeks time at discharge?
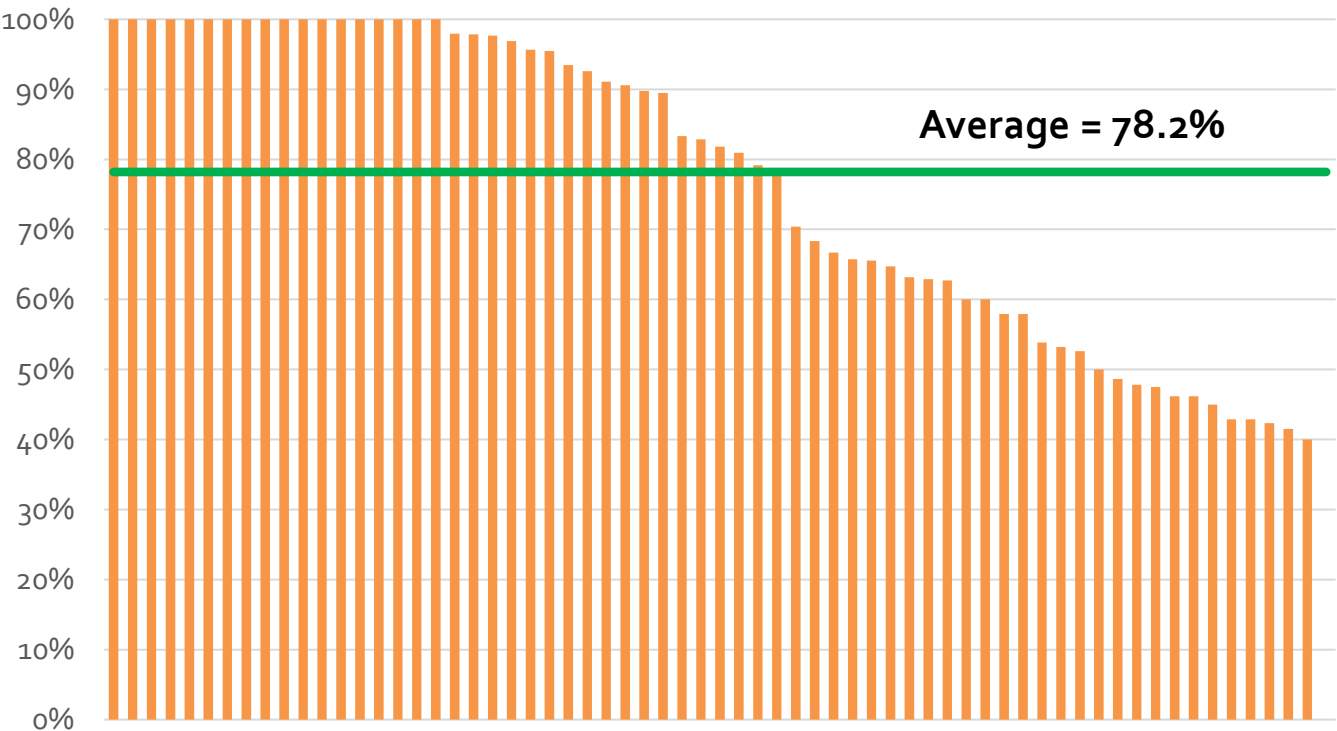
Collaborative Wide Average = 31.7%

Among patients discharged to a home-like setting, how many received a post-discharge phone call*?

Collaborative Wide Average = 57.5%

Of patients Discharged to a Home-Like Setting, how many **received at least 1 of 3** discharge/post-discharge coordination of care measures?

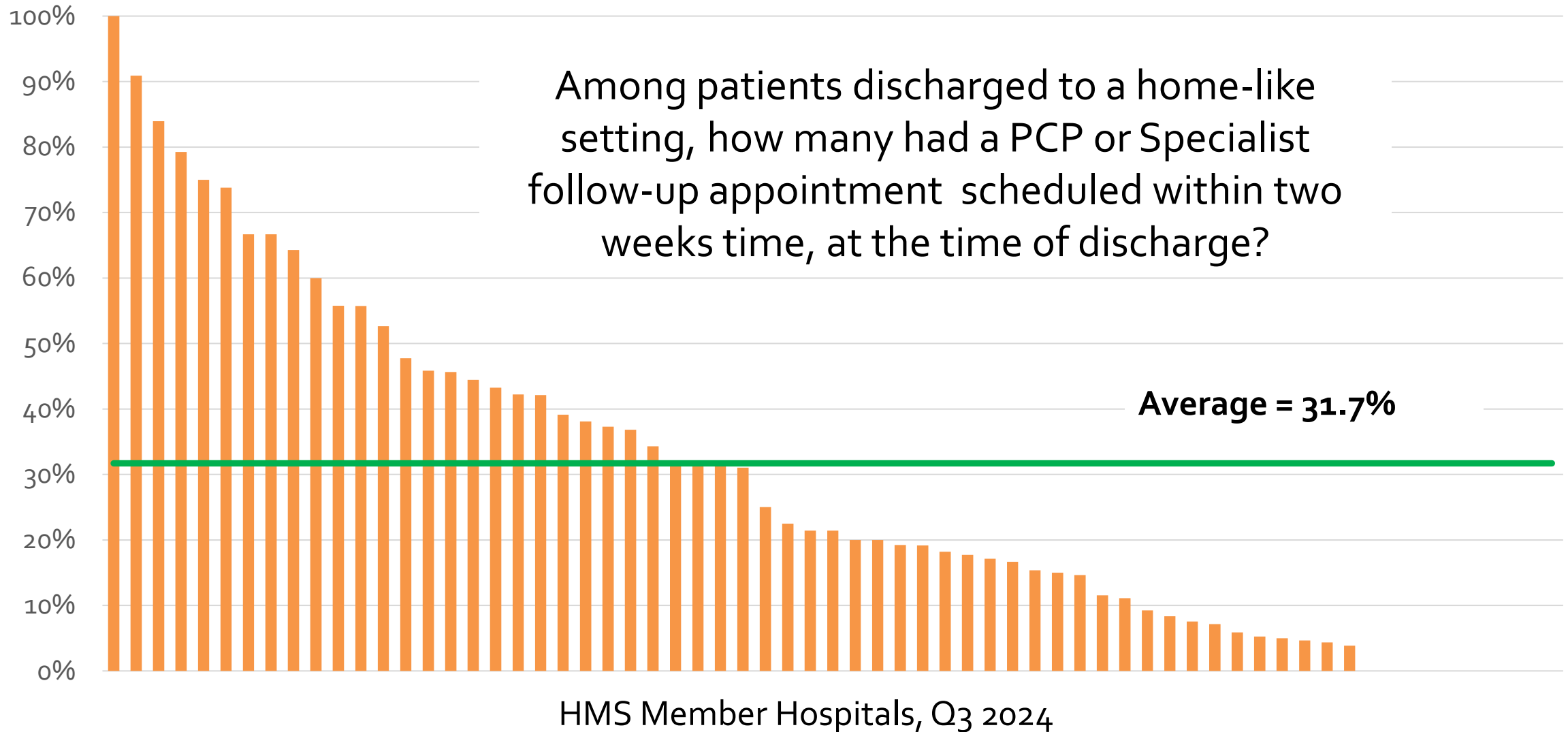**Average = 78.2%**

HMS Member Hospitals, Q3 2024

Hospital Contact Provided at Discharge

Among patients discharged to a home-like setting, how many received
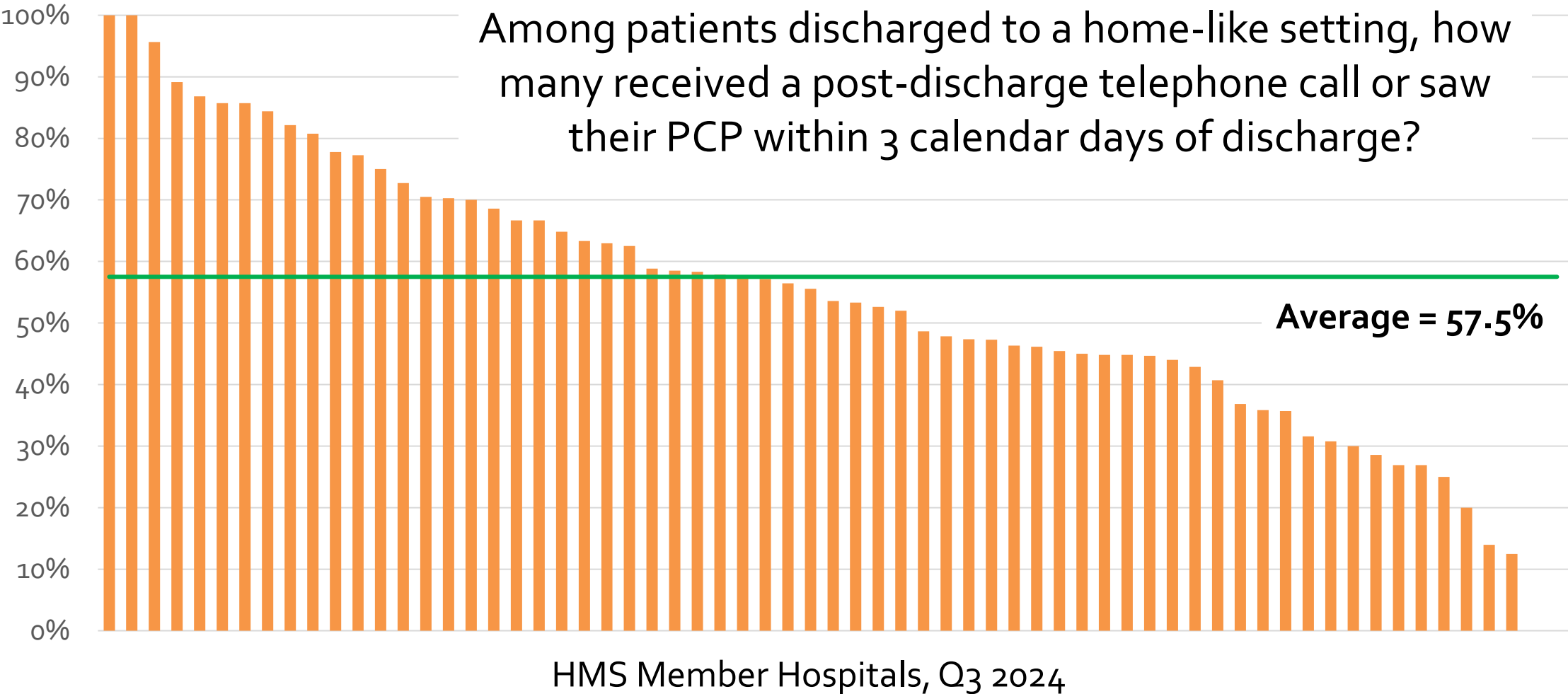a hospital contact for issues post-discharge?

Average = 36.5%

Hospital Contact Provided   911/Unknown/None   Outpatient Care Team

HMS Fall QI Survey Results

Post-Discharge Telephone Call in 3 Days

Among patients discharged to a home-like setting, how many received a post-discharge telephone call or saw their PCP within 3 calendar days of discharge?

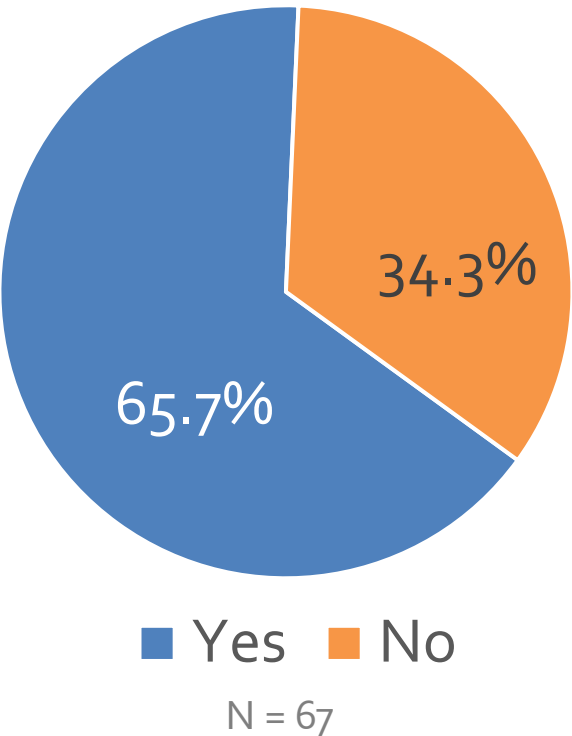**Average = 57.5%**

HMS Member Hospitals, Q3 2024

Current State of Discharge Coordination in Michigan
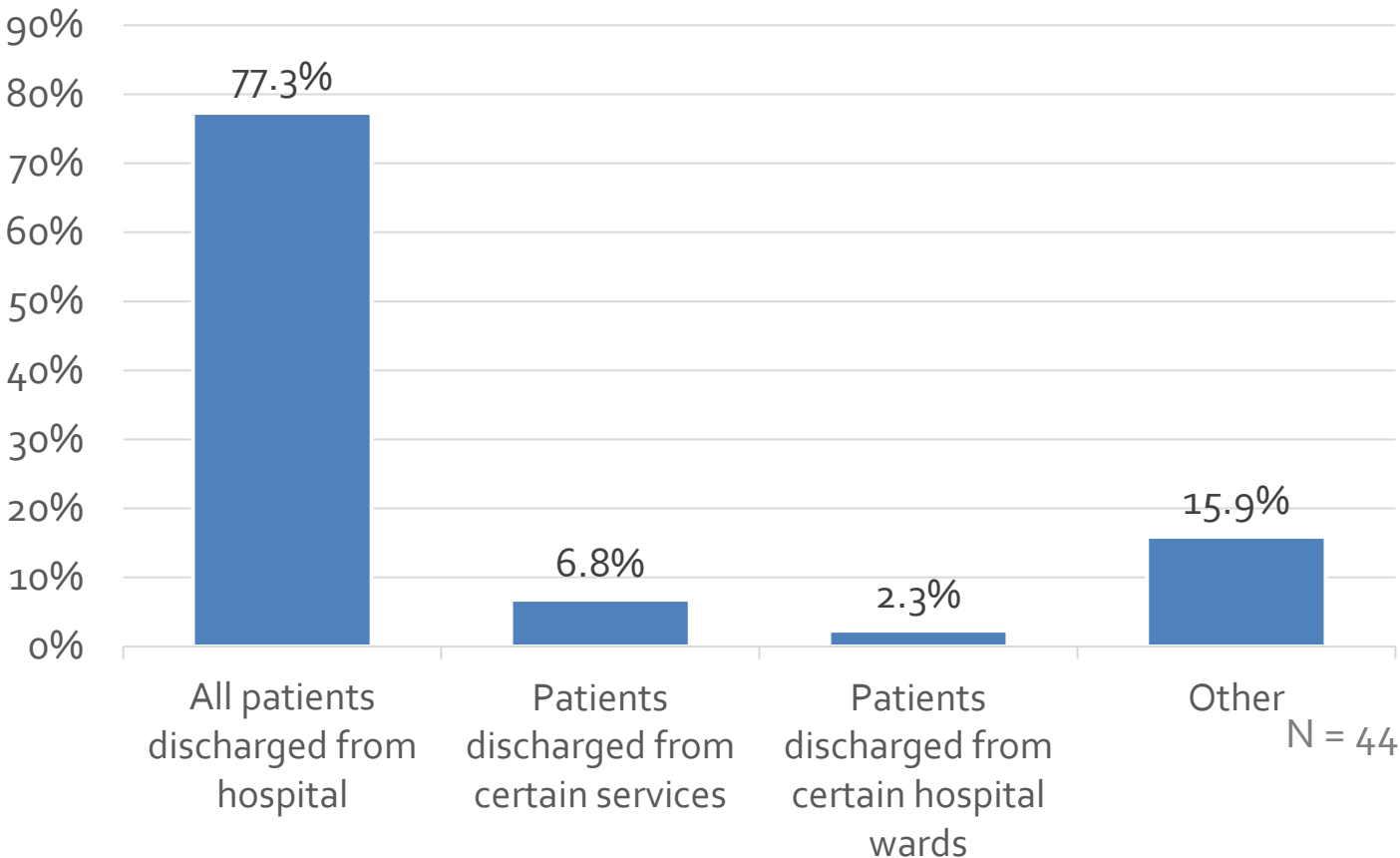**Source:** HMS Fall 2023 QI Survey

Hospital Contact Provided at Discharge

Our hospital has a mechanism for patients to contact hospital providers for issues post-discharge:

- 65.7% Yes
- 34.3% No

N = 67

Which patients are provided a hospital contact number at discharge?

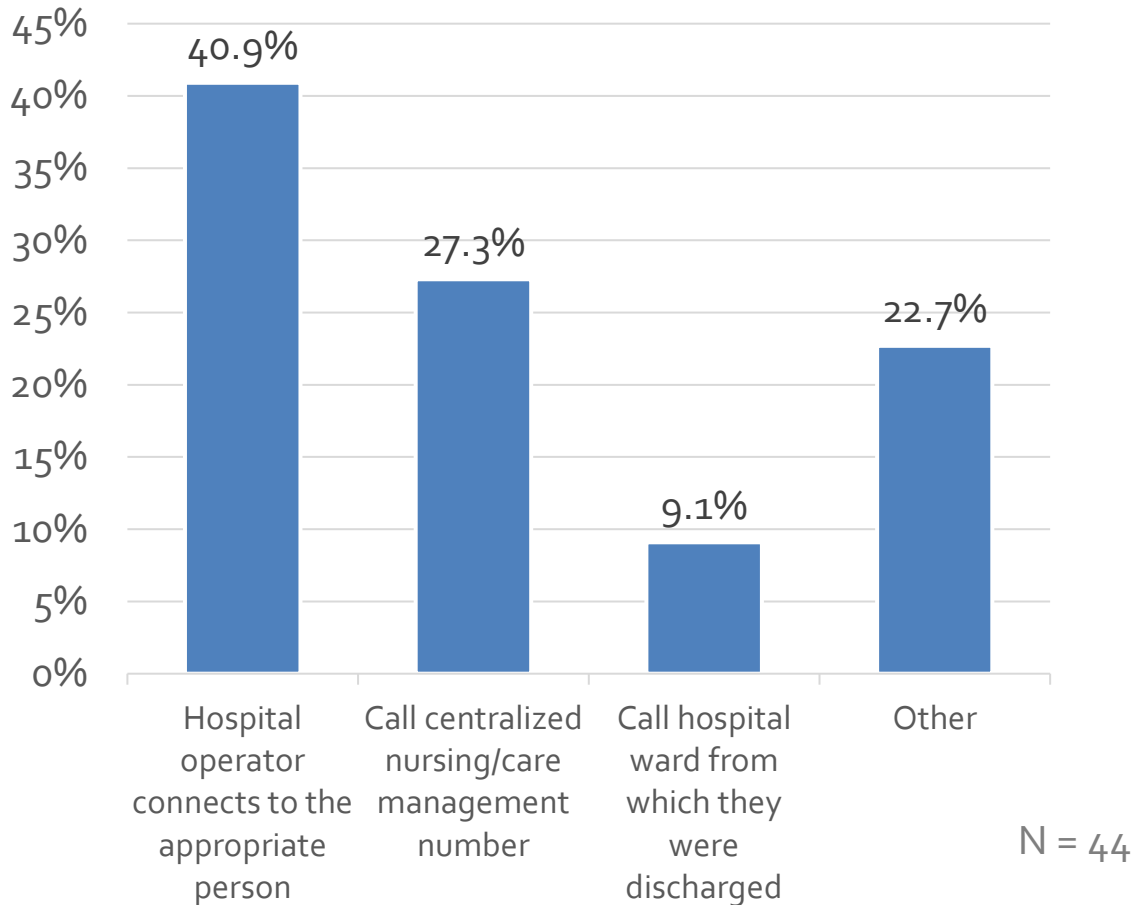| Category	Percentage
All patients discharged from hospital	77.3%
Patients discharged from certain services	6.8%
Patients discharged from certain hospital wards	2.3%
Other	15.9%

N = 44

Current State of Discharge Coordination in Michigan
Source: HMS Fall 2023 QI Survey

Hospital Contact Provided at Discharge

How do patients contact their hospital provider?

- Hospital operator connects to the appropriate person: 40.9%
- Call centralized nursing/care management number: 27.3%
- Call hospital ward from which they were discharged: 9.1%
- Other: 22.7%

N = 44

Which staff are available to answer questions?

- On-call physician: 56.8%
- Centralized care manager: 45.5%
- Service-specific care manager: 34.1%
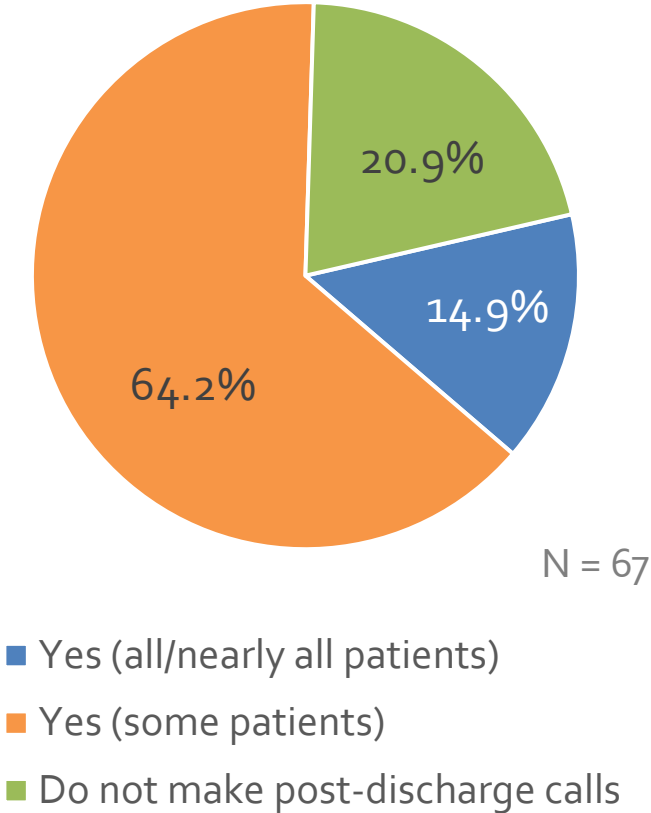- Other: 52.3%

N = 44
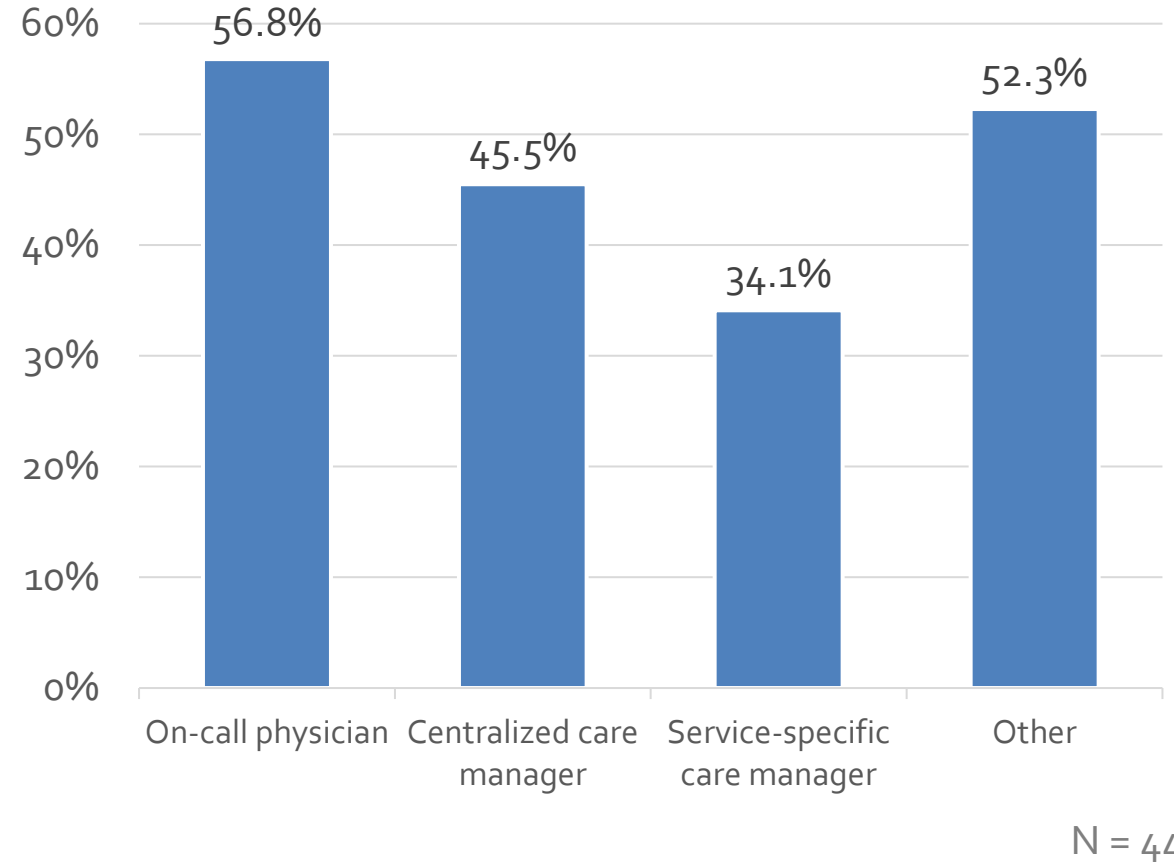
Current State of Discharge Coordination in Michigan
Source: HMS Fall 2023 QI Survey

Post-Discharge Telephone Call

Does your hospital make post-discharge calls within 3 days of discharge?

- 20.9%
- 14.9%
- 64.2%

N = 67

- ■ Yes (all/nearly all patients)
- ■ Yes (some patients)
- ■ Do not make post-discharge calls

Which patients are selected for follow-up calls?

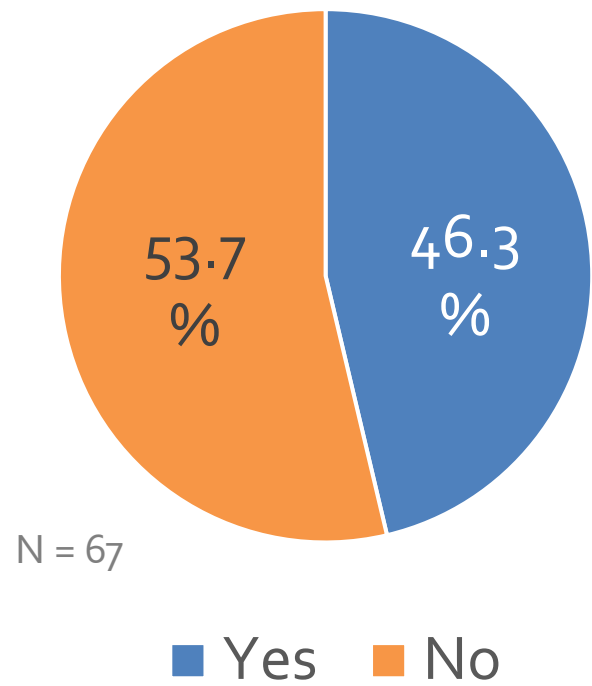| Category	Percent
Patients discharged with certain diagnoses	44.2%
Patients discharged from certain services	37.2%
Patients deemed high-risk for readmission	34.9%
Patients discharged to certain locations	30.2%
Patients who receive outpatient care within system	23.3%
Patients with certain healthcare insurers	18.6%
Other	14.0%

N = 43
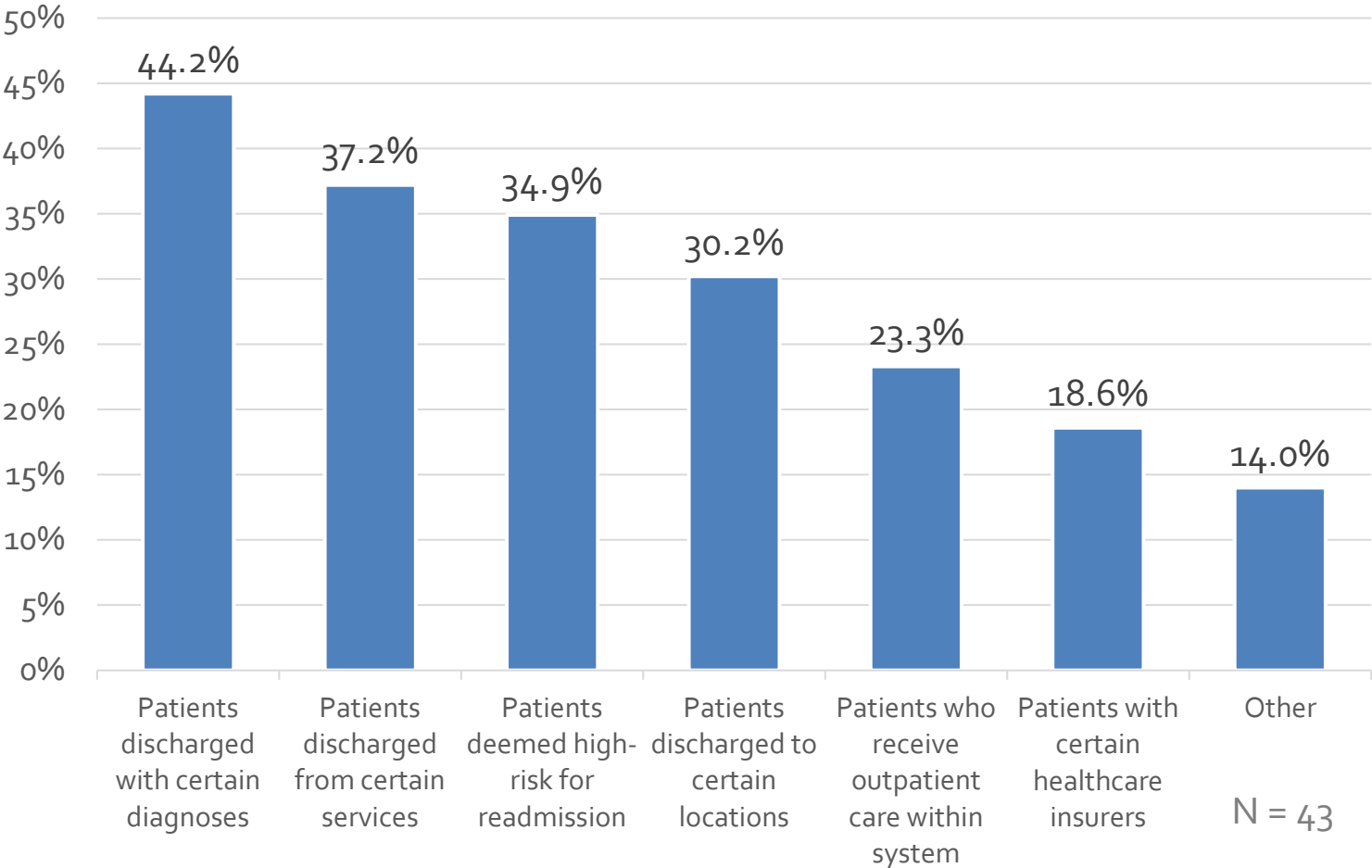
Current State of Discharge Coordination in Michigan
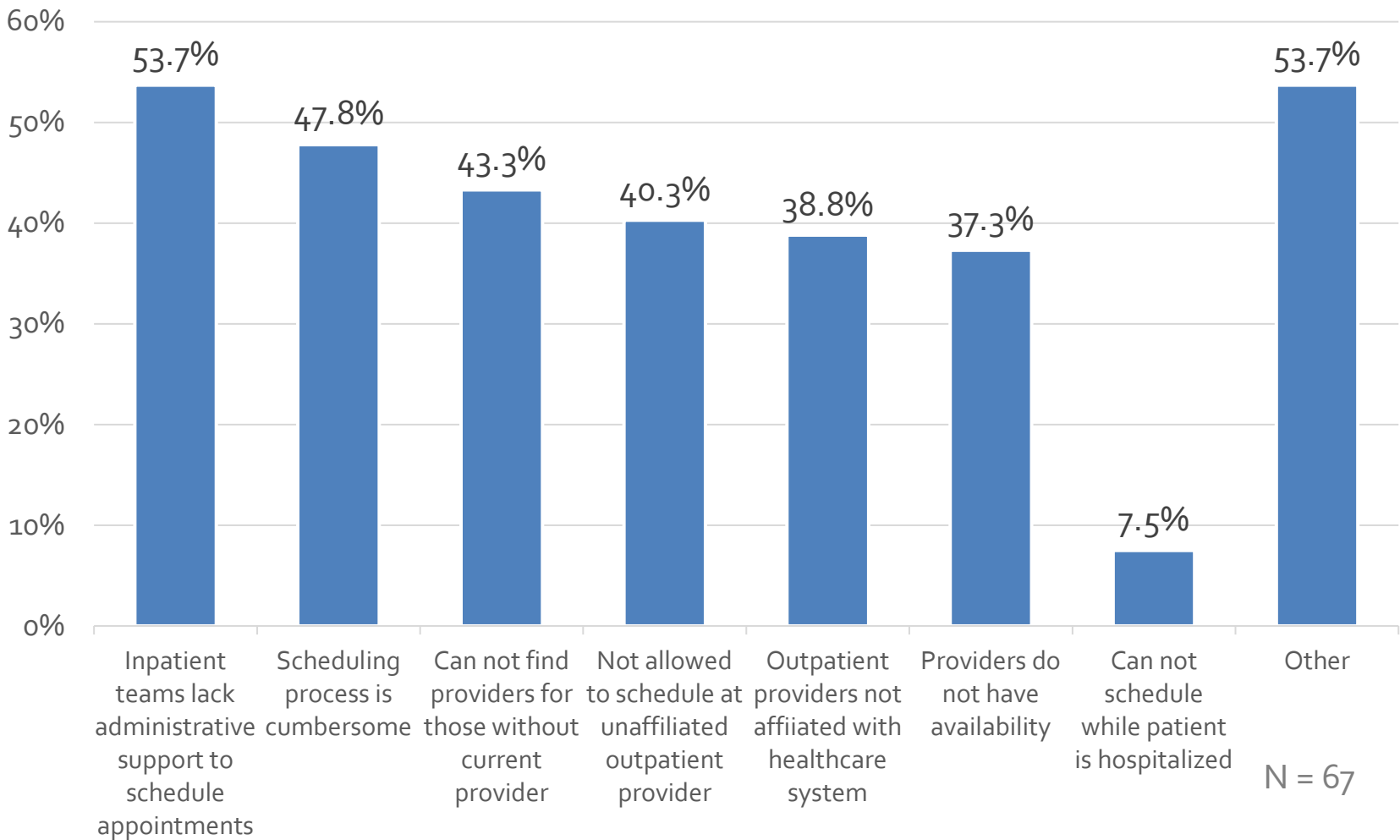**Source:** HMS Fall 2023 QI Survey

Scheduling Follow-Up Appointments

Does your hospital have a mechanism for ensuring follow-up visits are scheduled upon discharge from the hospital?

53.7% (No)
46.3% (Yes)

N = 67

■ Yes   ■ No

What are your hospital's key barriers to scheduling outpatient follow-up visits?

Category	Percentage
Inpatient teams lack administrative support to schedule appointments	53.7%
Scheduling process is cumbersome	47.8%
Can not find providers for those without current provider	43.3%
Not allowed to schedule at unaffiliated outpatient provider	40.3%
Outpatient providers not affiiated with healthcare system	38.8%
Providers do not have availability	37.3%
Can not schedule while patient is hospitalized	7.5%
Other	53.7%

N = 67

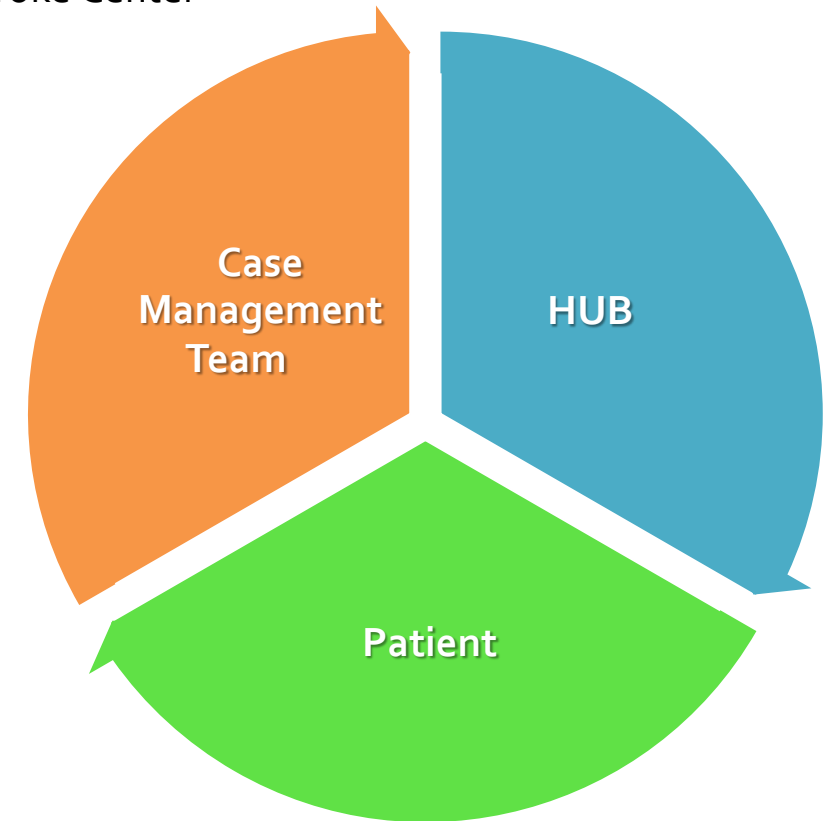# Henry Ford Macomb Discharge Process

Henry Ford Macomb Hospital, Clinton Township, MI

Community Hospital with 366 Inpatient Beds | Level 2 Trauma Center | Primary Stroke Center

Discharge to Home: Care Coordination Process

1. Case Management Team

- Case Manager receives a referral by the discharging hospital provider or bedside nurse

- Case Manager determines if patient needs help making PCP follow-up appointment

- If yes, patient is referred to the HUB

  - Case Manager indicates patient's PCP for the HUB

  - Case Manager ranks the patient's readmission risk (Low, Medium or High Risk)

    - Sepsis is categorized as High Risk for readmission

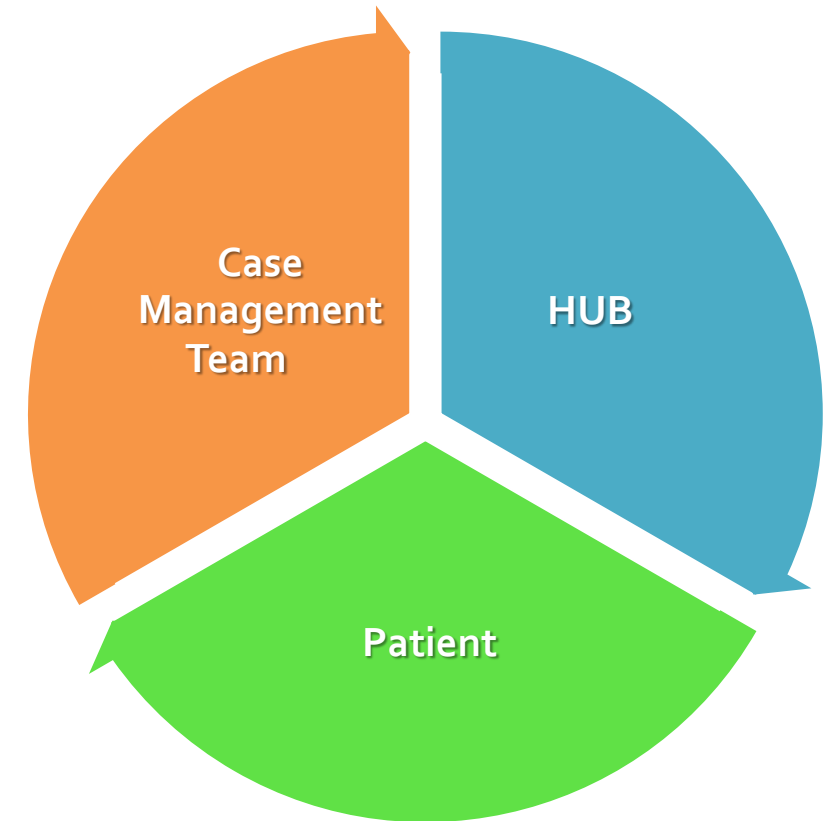# Henry Ford Macomb Discharge Process

Discharge to Home: Care Coordination Process

2. HUB – System-Wide Group of Population Health Coordinators

The HUB works with all of Henry Ford Health's southeast Michigan Hospitals to coordinate care for patients

- **HUB Coordinator is responsible for scheduling PCP follow-up appointment prior to discharge**
  - **If a patient is High Risk for readmission**, they will be scheduled for a follow-up appointment within **7 days of discharge.**
  - **If no established PCP**, HUB works with Case Management to identify one and establish care.
- **Schedules appointment and sends information directly to the patient**
  - **If unable to schedule prior to discharge**, HUB completes a phone call to the patient within 72 hours of discharge.

Henry Ford Macomb Discharge Process

Discharge to Home: Care Coordination Process

3. Patient

- **Information included in After Visit Summary:**
  - **Follow-up PCP appointment date and time** (if unable to schedule, instructions included stating patient needs to call PCP to make appointment)
  - **Hospital Contact Number for any issues post-discharge**
  - **Sepsis Education Guide** (includes information about warning signs for complications and when to seek medical care)

- **Follow Up Call received within 72 hours of discharge**
  - Only if HUB is unable to schedule a follow-up appointment within 7 days of discharge
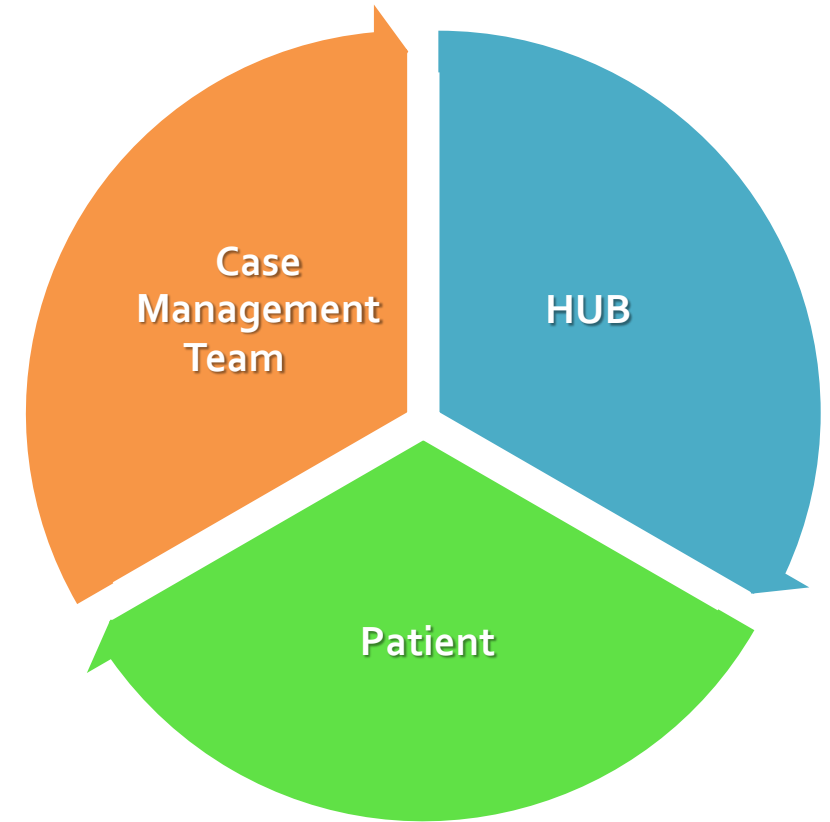
Current performance Q3 2024: 100% on composite measure

Peri-discharge management

Hospital contact, follow-up appointments, and post-discharge calls are associated with improved outcomes

→ We have an opportunity to improve peri-discharge coordination