



# Validating a Scalable Heart Failure Model: Operational and Financial Results from an 8-Week Pilot:



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Nothing to disclose



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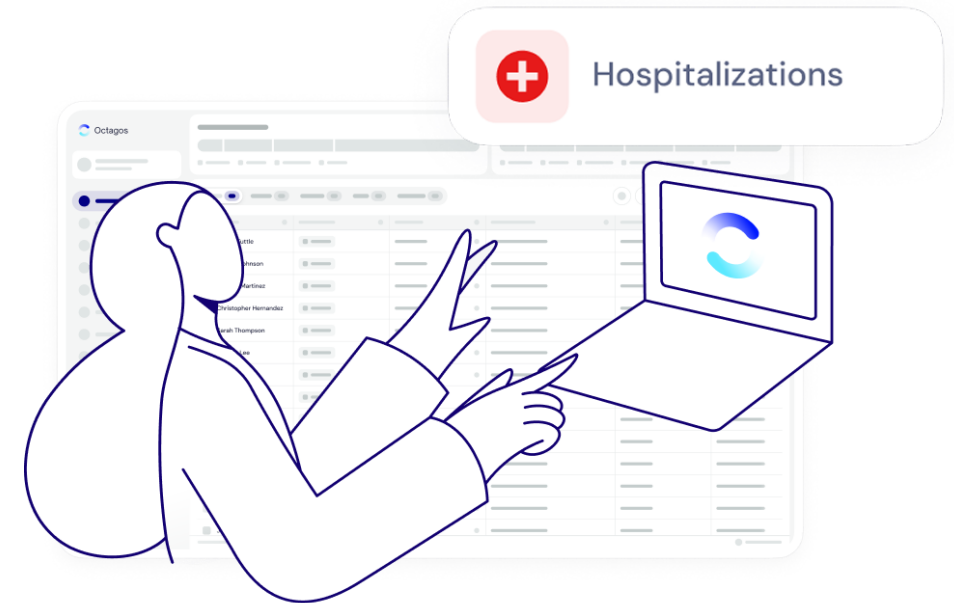
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# Heart Failure is Surging, Are We Ready?

By 2030, it's projected that heart failure will increase by about 46%, affecting over 8 million people aged 18 and older in the U.S. alone.<sup>1</sup>

## Heart Failure is the Leading Hospitalization Driver

- Heart failure is the leading cause of hospitalization in older adults, accounting for over 1.1 million hospitalizations annually in the US.<sup>2</sup>
- Hospital readmission rates for HF patients within 30 days post-discharge hover around 20–25%.<sup>3</sup>
- The estimated direct medical costs of HF-related hospitalizations will grow from \$21 billion in 2022 to nearly \$53 billion by 2030.<sup>4</sup>



# Heart Failure Remote Monitoring



## Early Detection

Identify worsening heart failure early and intervene weeks before symptoms. Detects warning signs up to 30-days before decompensation.



## Fewer Hospitalizations

Reduce 30-day readmissions and ER visits – lower hospitalization risk by 25%, resulting in 1 in 4 fewer hospital stays.



## Better Engagement

Personalized, remote care improves adherence



## CMS and Carrier Reimbursement

CPT 93297 is CMS, and privately reimbursable and recommended as reasonable by HRS guidelines, billed on a 31-day cycle.



## Strong ROI

100 patients can generate ~\$64K annually and avoid ~\$150K in hospitalization costs.



## Future-ready Workflows

Build a CIED-specific workflow now to power future innovation and scale.



# What does HRS say about HF Monitoring?

Customizing alerts for HF features should be part of a standard clinic workflow, and care teams should feel comfortable knowing that managing CIEDs specifically for HF symptoms is considered reasonable.

Class 1	"In patients with CIEDs on RM, it is recommended that alert parameters be customized to clinical indications." <sup>11</sup>
Class 2a	"In patients with CIEDs on RM, it is reasonable to remotely monitor HF diagnostics to detect incident HF and/or progression." <sup>11</sup>
Expert Consensus Statement	"CIEDs are currently able to monitor several parameters such as heart rate and rhythm, daily activity, and transthoracic impedance for estimating fluid status that can help to identify the patient's clinical status. RM-based risk stratification of HF patients can indicate the possibility of clinical decompensation. A recent meta-analysis of three randomized controlled trials (TRUST, ECOST, and IN-TIME) demonstrated improved survival and a reduced composite endpoint of all-cause mortality or HF hospitalizations with RM." <sup>11</sup>

# Penn Presby

## Organizational profile and baseline monitoring model

### Snapshot

**365**

inpatient beds

**6 + 6**

EP physicians and HF physicians

**13+**

advanced practice providers across EP and HF

**1 APP**

dedicated to remote monitoring 5 days per week

More than 5,500 device patients were remotely monitored, yet only 18 patients were actively enrolled in a defined heart failure protocol at baseline.



### At baseline

- Heart failure diagnostics were reviewed inside EP-centric device workflows.
- CardioMEMS monitoring established an initial foundation for only 18 patients.
- Staffing stayed flat even as clinically relevant alert volume increased.

*Part of the University of Pennsylvania Health System*

# The Operational Challenge

Actionable HF signals were visible, but there was no standardized path to act

## Before the pilot



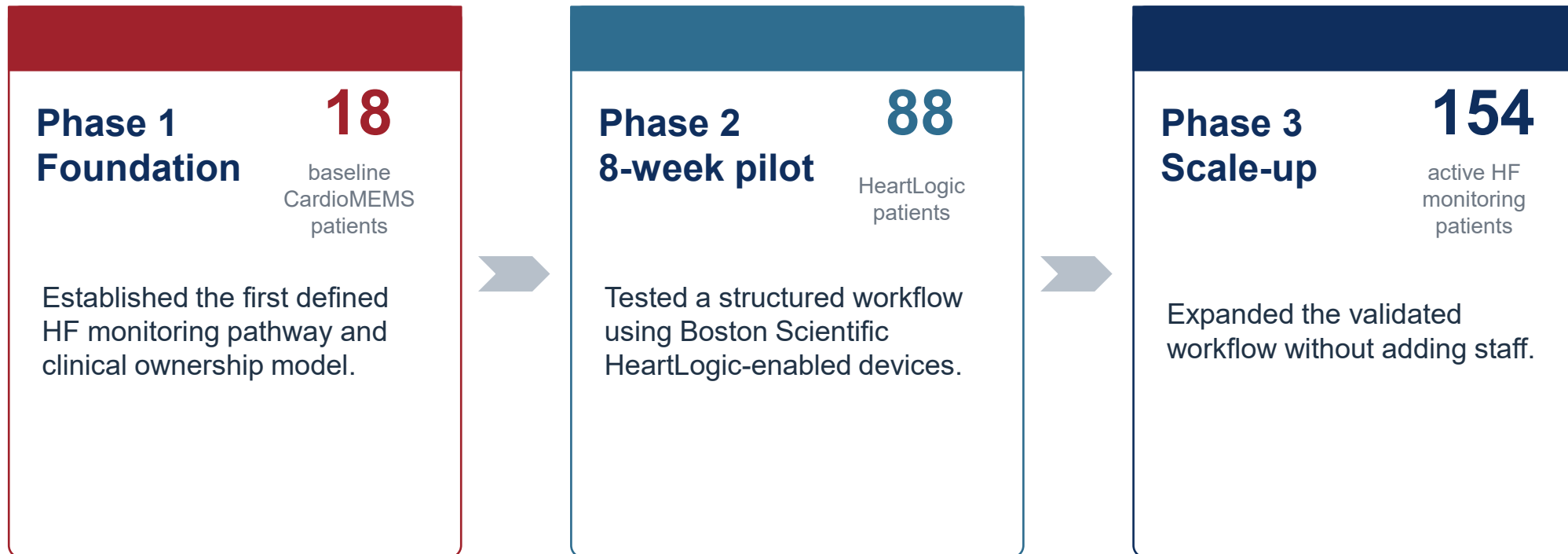
## Why it did not scale

- Rising alert volume without additional staffing
- Increasing time spent on routine, non-actionable transmissions
- No defined symptom screening, documentation, or escalation pathway
- Limited scalability across eligible HF patients

*“We kept seeing these numbers and thinking, what do we do about this? We had information that was actionable, but no structured way to use it.”*

# Program Design and Phased Rollout

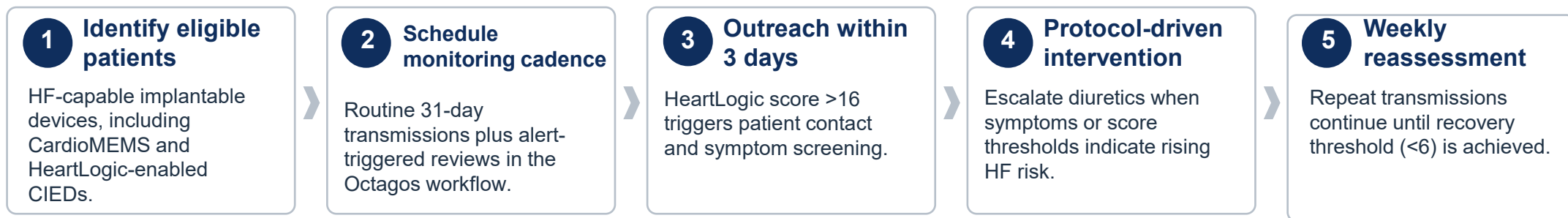
PPMC and Octagos operationalized HF monitoring in stages



**Operational proof of concept: 78 HeartLogic alerts were identified during the pilot, and 72 of 78 alerts (92%) resulted in patient outreach within three days.**

# Structured HF Workflow

A repeatable pathway turned device diagnostics into timely patient outreach and intervention



## Symptom screening prompts

- New or worsening dyspnea, leg swelling, weight gain, or fatigue?
- Any recent ill health or other medical issue that could explain the change?

## Documentation standard

Telephone encounter templates, defined routing to HF physicians, and weekly repeat review until alert recovery.

# HeartLogic Operating Rules

Standardized thresholds kept outreach, intervention, and follow-up consistent

## Alert threshold ladder

**HeartLogic >16** Call patient and screen for symptoms within three days.

**16-20 + no symptoms** Document call and continue weekly reassessment.

**>20** Follow diuretic protocol regardless of symptoms.

**Repeat alert** Escalate again if score is flat/rising; third week can trigger visit.

**Recovery <6** Return patient to routine monitoring cadence.

## Protocol-driven intervention

### Diuretic protocol summary

- Initial intervention: double the oral diuretic dose for 2 days; if at dose limit, dose metolazone 5 mg once.
- Week 2: reassess volume status; if still overloaded, repeat escalation and check electrolytes, renal function, and magnesium.
- Week 3: if volume overload persists, review with APP/MD and arrange additional evaluation.

**Principle: repeat transmissions were reviewed weekly until the patient returned below the recovery threshold.**

# Pilot Results in Eight Weeks

The workflow translated alerts into timely outreach without increasing staffing

**88**

patients in the HeartLogic cohort

**78**

HeartLogic alerts identified

**72 / 78**

alerts with outreach within three days (92%)

**12.5**

minutes per actionable alert

**154**

routine HF transmissions during the pilot

**92%**

outreach achieved within 3 days

**Total RN/APP time**

**16 hours 10 minutes**

Care teams spent less time reviewing routine transmissions and more time managing elevated-risk patients.

**Reimbursement opportunity**

**~\$10,590**

Estimated Medicare opportunity tied to 154 routine HF transmissions during the pilot period.

# From Reactive Review to Proactive HF Management

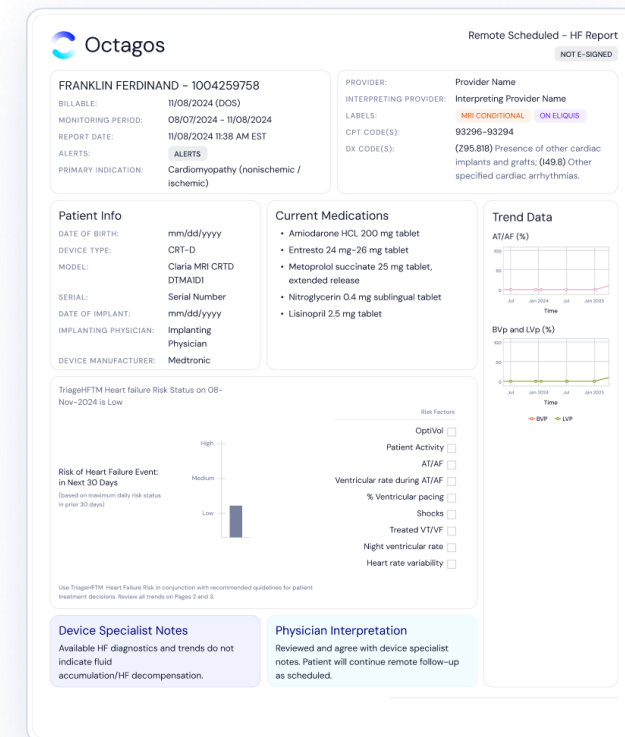
Clinicians shifted from waiting for symptoms to acting on rising risk earlier

## Before

- HF diagnostics were reviewed inside routine EP transmissions.
- Care teams often relied on patients to call once symptoms developed.
- Response timing and escalation varied across cases.

## After

- Standard thresholds prioritized the patients most likely to deteriorate.
- Medication changes, education, and escalation happened earlier in the course of decompensation.
- HF risk became clearly visible through summaries, trends, and structured documentation.



*“Before this program, we were relying on patients to reach out once they developed symptoms. Now we can identify patients early, adjust medications, and actively manage them before they deteriorate.”*

# Why the Model Scaled Without New Staff

Shared ownership and a “two-brain” review model improved focus and confidence

## EP + HF alignment

- Multidisciplinary working group: EP physicians, HF physicians, nurses, APPs, and administrative leadership.
- Joint decisions on thresholds, outreach scripts, diuretic protocol, documentation, and referral triggers.
- Regular review meetings to identify high-risk patients not yet enrolled.



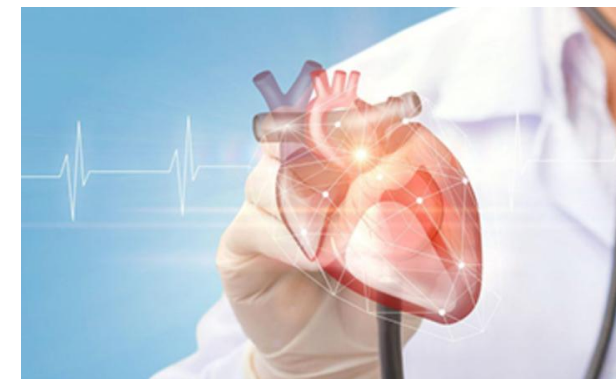
## Two-Brain Approach™

Atlas AI™  
triage



IBHRE-certified  
clinical device  
specialist review

Only clinically meaningful alerts were escalated to EP and HF teams.



## Result

Clinicians practiced at the top of their license while preserving clinical oversight and safety.

# Operational and Financial Headroom

The validated workflow opened a larger scale opportunity for PPMC

**154**

actively monitored HF patients after pilot validation

**436**

identified actionable HF population

**904**

devices capable of generating HF diagnostics

**CPT 93297 + G2066**

31-day billing alignment supports long-term sustainability

## Device inventory opportunity



326 Boston Scientific HeartLogic-capable

578 Medtronic TriageHF-capable

- Continue identifying high-risk patients who are not yet enrolled.
- Integrate Medtronic TriageHF-enabled devices into the workflow.
- Maintain regular EP–HF–Octagos program reviews to troubleshoot and expand.

# Takeaways for Other Cardiology Programs

Seeded Q&A themes for a scalable HF monitoring framework

## 1 | How did PPMC absorb more alert volume without new staff?

- Standardized thresholds focused staff on the alerts most likely to matter.
- AI-assisted triage and certified review filtered routine transmissions before clinic review.
- Weekly repeat transmissions replaced ad hoc follow-up.

## 2 | What metrics mattered most to leadership?

- Enrollment growth from 18 baseline patients to 154 actively monitored HF patients.
- 92% outreach within three days for actionable alerts.
- 12.5 minutes per actionable alert and ~\$10,590 eight-week reimbursement opportunity.

## 3 | What advice helps align EP monitoring with HF management?

- Create shared clinical ownership across EP and HF before launch.
- Define outreach scripts, escalation rules, and documentation templates upfront.
- Use a joint review forum to identify high-risk patients who are not yet enrolled.

# A Structured Workflow That Brings HF Risk Into Focus

- Patients enrolled in HF monitoring:
  - Identify early
  - Actively manage medications
- Patients NOT already enrolled in HF monitoring:
  - Detect rising HF risk across all device reports
  - Patients with elevated HF diagnostics:
    - Generate letter to referring providers
    - Offer urgent appointment with HF specialist within 7 days
- Systematically surface HF data in a workflow that many teams overlook.

## Elevated HF Diagnostics



# Closing

PPMC established a repeatable path from device-derived HF diagnostics to proactive care

## What the case study demonstrates

- Existing device data can be operationalized into earlier, protocol-driven intervention.
- Clinical responsiveness, prioritization, and billing alignment can improve without workforce expansion.
- A shared EP–HF workflow creates a scalable foundation for broader HF monitoring.

*“Being proactive builds trust with patients because they know we’re keeping a close eye on them.”*



# Q&A

