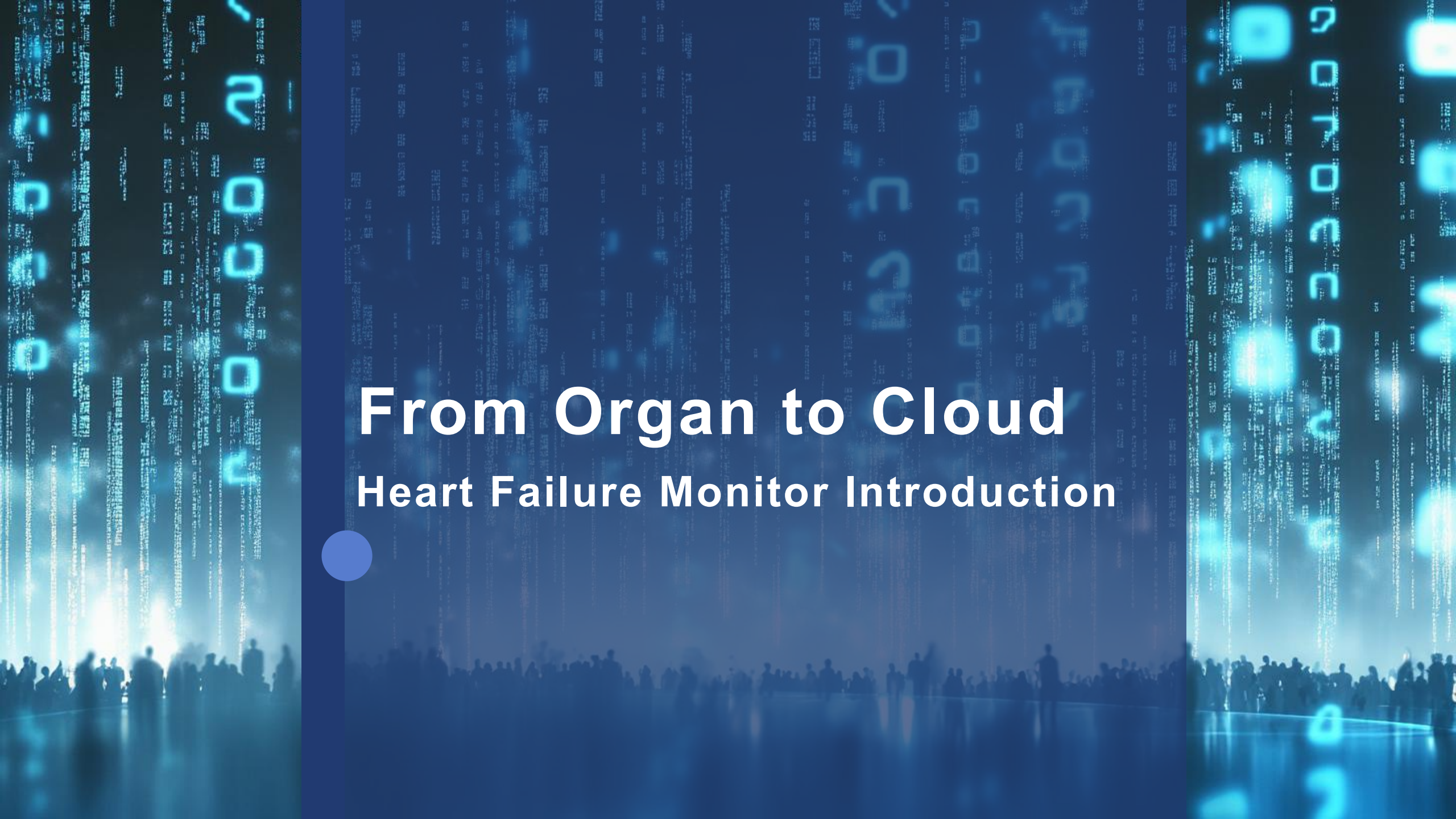


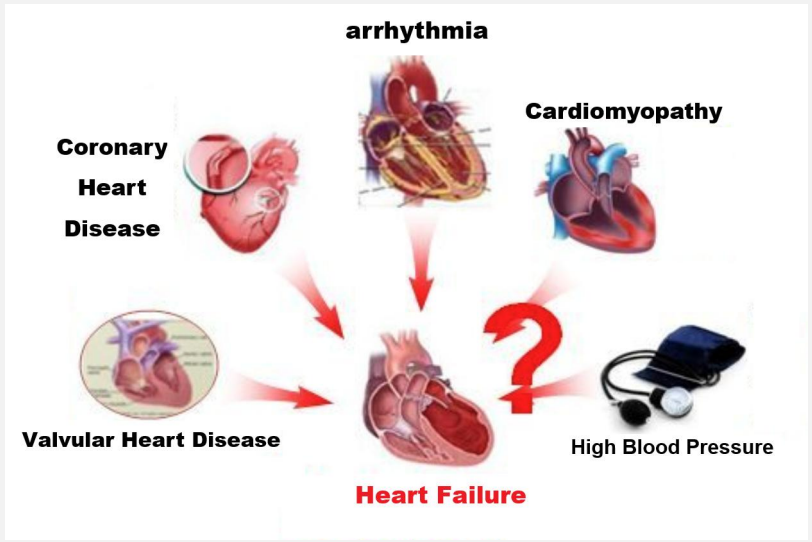
From Organ to Cloud

Heart Failure Monitor Introduction

Background

Unmet Needs: Reducing Mortality & Hospitalization Rate

Extremely High Hospitalization and Mortality Rates

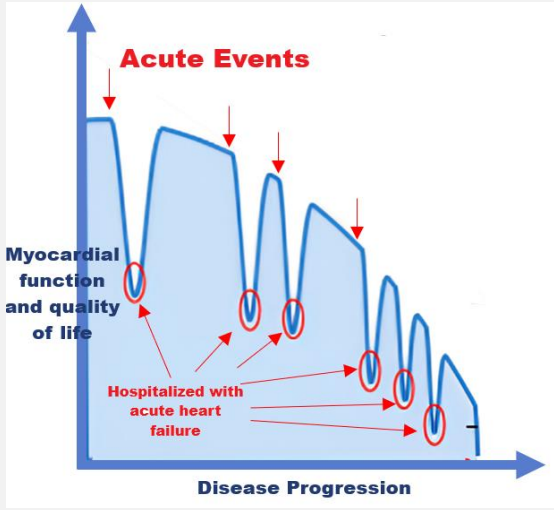


5-year survival rate: 50% (lower than many cancers)

Annual average hospitalization frequency per patient: 3.3

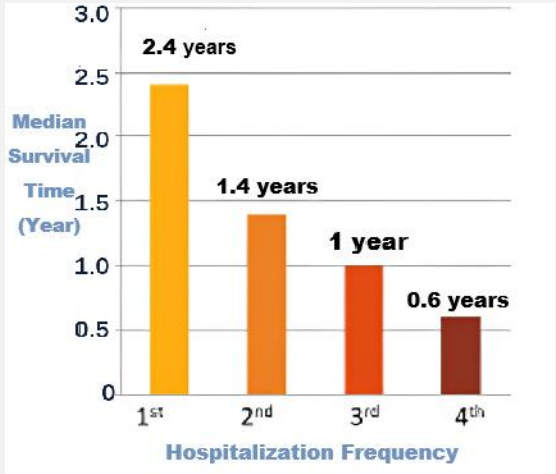
Annual per-patient hospitalization cost in China: ¥29,746

Hospitalisation



- Acute heart failure attacks can be caused by multiple factors
- Typically require hospitalization
- After each acute attack, cardiac function deteriorates further

Mortality Rate

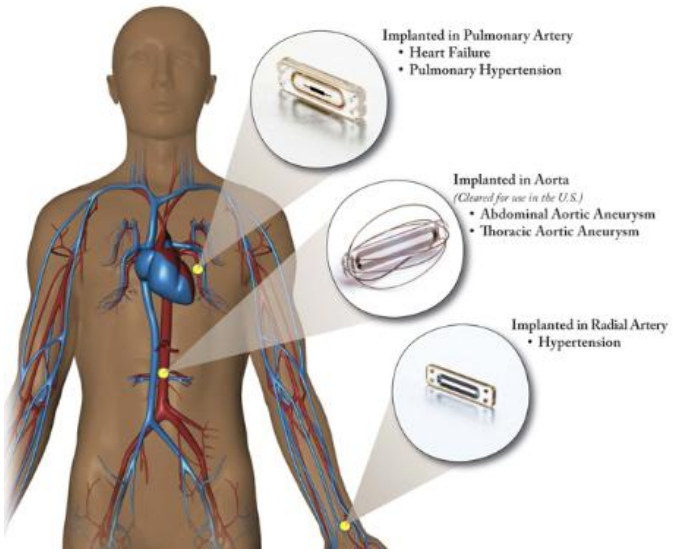


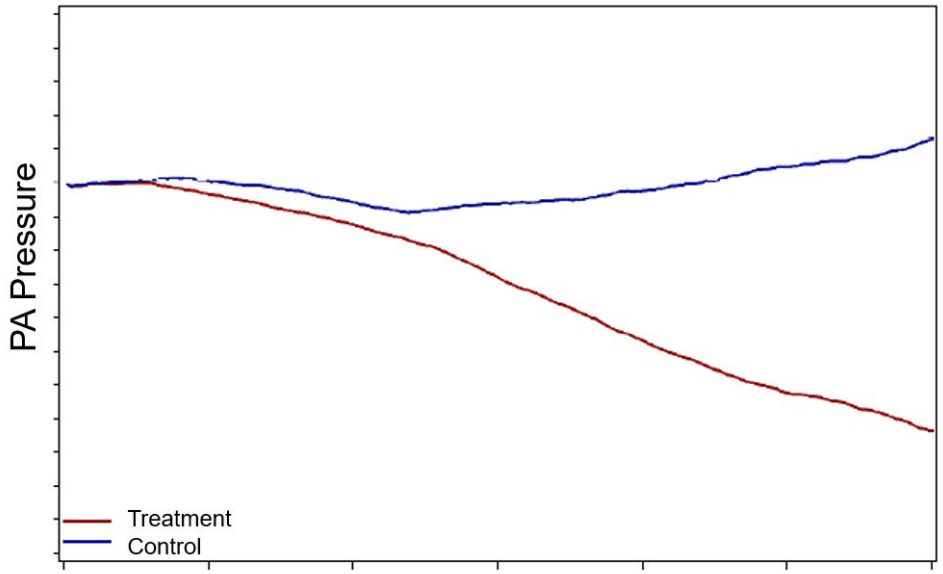
- More hospitalizations = Shorter survival
- Mortality correlates with rehospitalization rater
- 30-day all-cause rehospitalization rate: 25%
- 6-month all-cause rehospitalization rate: 50%

Can we predict heart failure attacks in advance for early intervention?

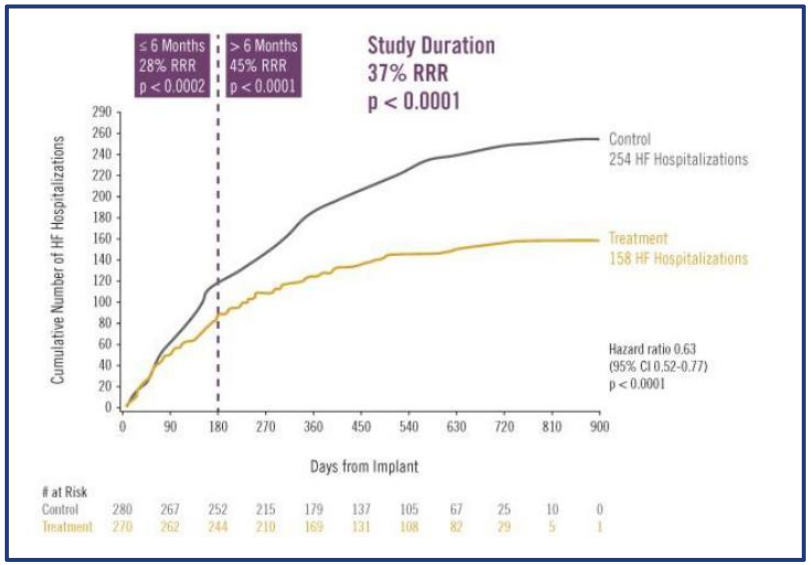
Referencec: *2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure*

Inspiration from Abbott's Success: Pressure Sensor System & Clinical Trial Results





Long-term reduction in atrial pressure



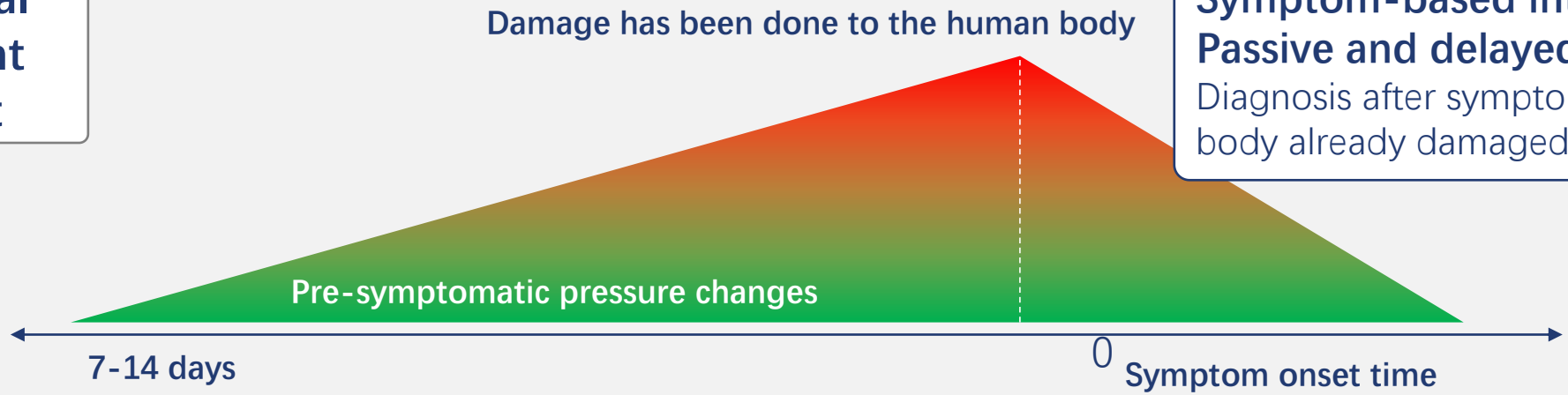
Reduced acute heart failure attack

- **Sensors lower pulmonary artery pressure over time**
- **Abbott's annual heart failure revenue: $1.1B+**

Abraham WT,et al. Lancet,2011.

Implantable Stress-signal-guided Concept for Heart Failure

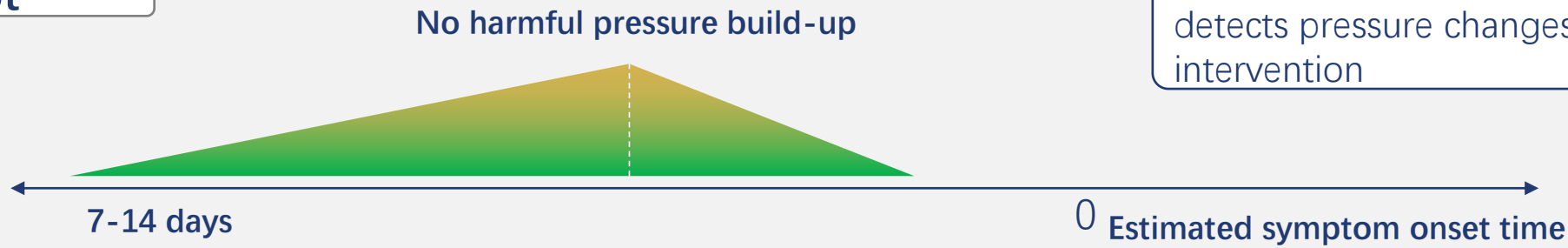
Traditional Treatment Concept



Symptom-based intervention: Passive and delayed

Diagnosis after symptoms appear, body already damaged

Pressure Signal-Guided Treatment Concept



Pre-symptomatic intervention: Active and actionable

Real-time remote monitoring detects pressure changes for early intervention

Lancet：Pressure-guided management reduces hospitalizations by 39% and mortality by 47%.

Reference: Abraham WT, et al. Lancet, 2011

From Organ to Cloud: How the Pressure Monitoring System Works?

Implantable Sensor

implanted in the body by injection or intervention.

Wearable Reader

Patient uses it at home daily.

Management back-stage

Data wirelessly transmitted to monitoring platform with AI prediction.

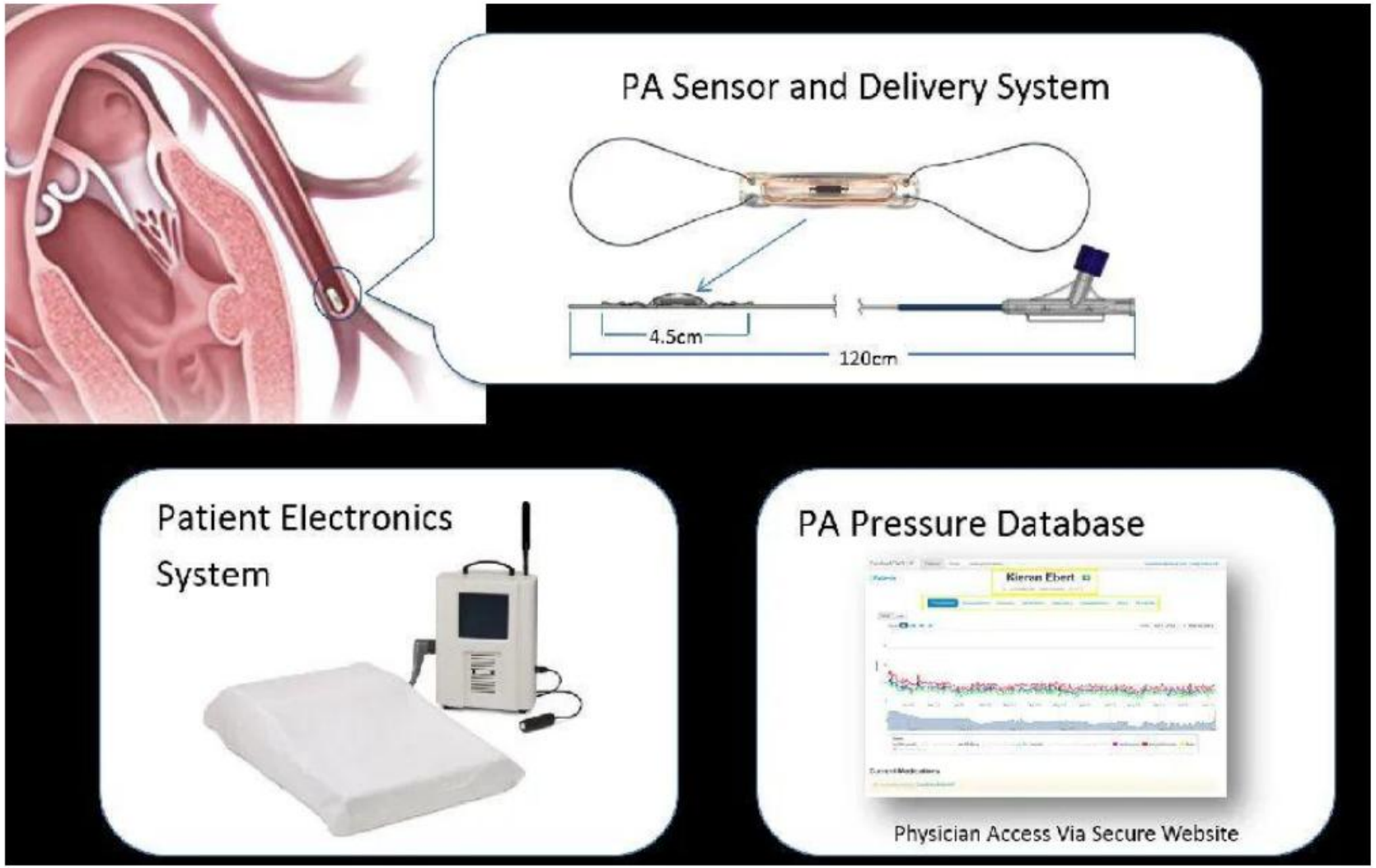
Communication

Clinicians review data and contact patients as needed.

Implantable pressure signals to guide glaucoma or heart failure diagnostic procedures

Heart Failure Product Benchmarking

Benchmark Product 1: CardioMEMS



2017: Abbott acquired CardioMEMS for $375M,Current annual heart failure revenue: $1.1B+

Benchmark Product 2: Endotronix Cordella PA Pressure System

2024: Edwards Lifesciences acquired Endotronix for $600M upfront + $75M milestones

Current Progress

Prototype development in process

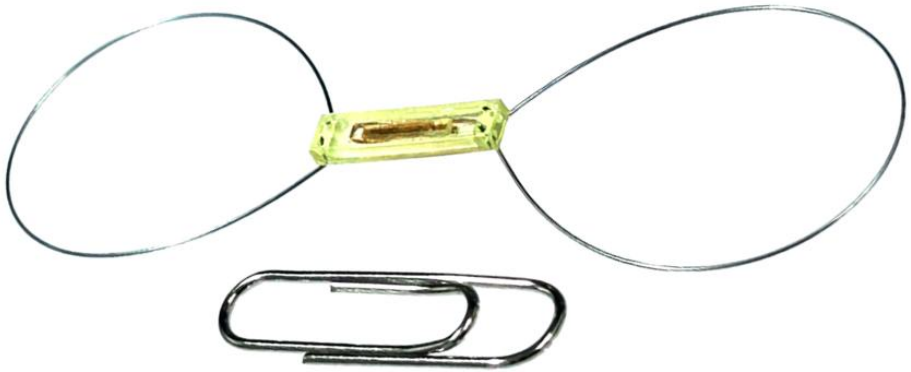
Prototype development in process

Principle

The sensors are implanted in the atrial wall through an intervention and read atrial pressures through an external wearable device that intervenes when indications of deterioration are present.

Demand

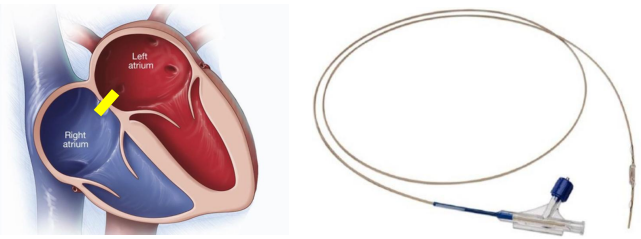
33% of patients with heart failure are readmitted to hospital within 90 days of discharge and are at increased risk of loss of myocardial function and death, and we aim to enable earlier intervention by providing the earliest indication for hospitalization.



Heart Failure Pressure Sensor Prototype

- Continuous monitoring
- Early warning system
- Drift calibration
- Hypertension prediction

Implantation Method

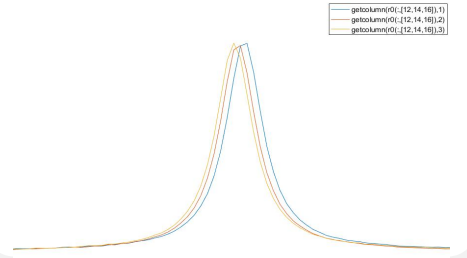


Inserted via angiography into left atrium/pulmonary artery

acquisition of signal

Shoulder-Mounted Pressure Reader

Test Results



Stable and repeatable responses

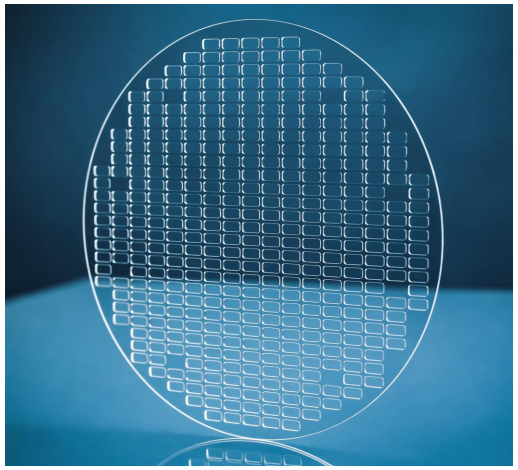
Core Breakthroughs

Achieved breakthroughs from:discrete, post-symptomatic,drift-prone to continuous monitoring,pre-symptomatic alerts and stable measurements.

Core Technology 1: Wafer-Level Micro-Nano Sensor Design

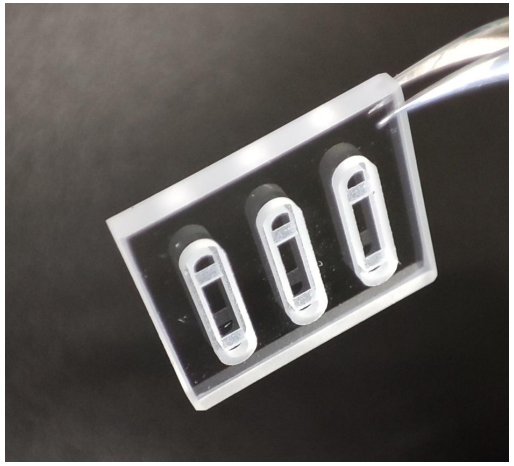
Clinical Value

Addressing manufacturing, reliability, and cost for implantable sensors; Combines medical device and semiconductor wafer-level technologies; Applications: glaucoma, translaminar pressure, heart failure monitoring.

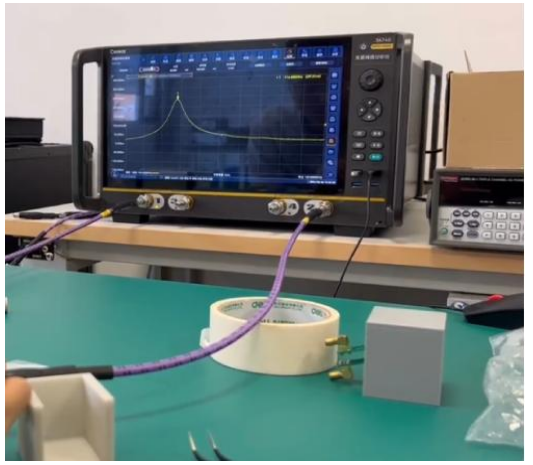


Resonant element design

Etching and welding



Cutting and calibration



Signal readout

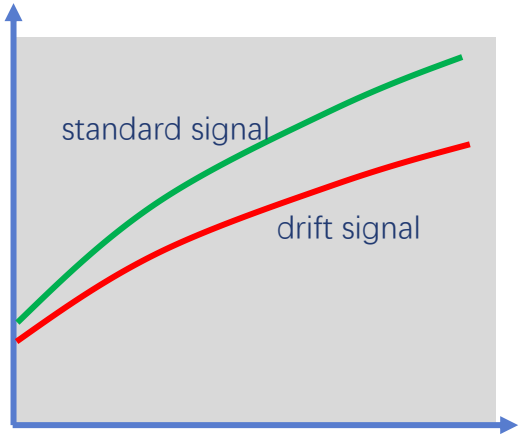
1. High-Q passive inductor fabrication — Ensure deep signal readability
2. High-reliability wafer-level glass welding — Ensures permanent implantability
3. Closed-space capacitance trimming — Ensure product consistency
4. pW-level weak signal detection — Ensure measurement accuracy

Ensure stable, reliable, long-term implantation of pressure sensors in the human body

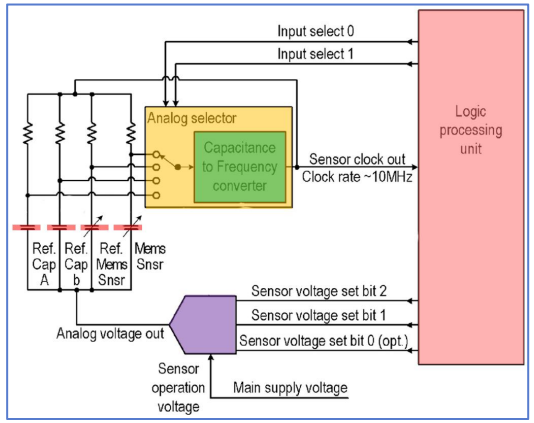
Core Technology 2: Anti-Drift & Pre-Symptomatic Prediction

Clinical Value

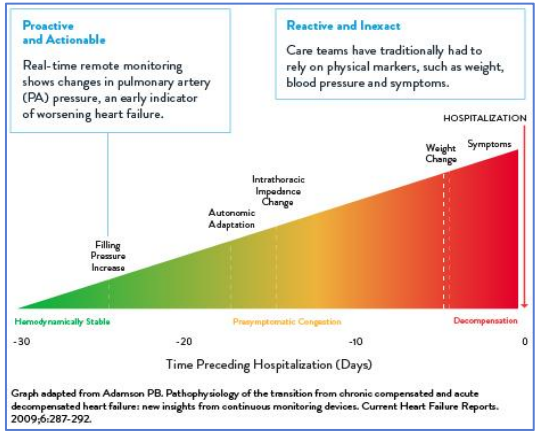
Patented self-calibration for long-term signal stability；AI-driven pre-symptomatic pressure prediction



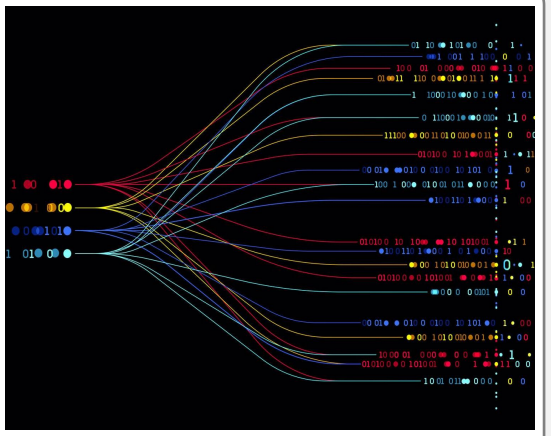
Anti-Drift Design



Monitoring System Hardware



Pre-symptomatic Characteristics



AI Prediction

1 Self-Calibration Design for Capacitive Sensors

Signal accuracy

2 Capacitance/Reference Capacitance Hardware Measurement Circuit

Signal accuracy

3 Changes in Pressure Indications before Acute Symptoms

Clinical value of the signal

4 AI Early Warning of Acute Symptoms

No damage to the human body

Ensure accurate pre-symptomatic data is available for physician patient management and disease intervention

Competitive Comparison

	CardioMEMS (Abbott)	Endotronix (Edwards)	Our Product	Breakthroughs
Continuous Monitoring	No	No	**Yes**	**Discrete → Continuous**
Anti-Drift Design	None	None	**Yes**	**Error-prone → Accurate**
Prediction Function	None	None	**Yes**	**Post-symptomatic → Pre-symptomatic**
Manufacturing Cost	Medium	High	**Low**	**Expensive → Affordable**

Thank You!