

The Congenital
Heart Collaborative

University Hospitals
Rainbow Babies & Children's
Nationwide Children's Hospital

State of the Art Pediatric Cardiology



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Background

Pediatric cardiac care is not luxury treatment

It is lifesaving care deserved by all

Increasing access to pediatric cardiac care is an achievable goal

It will save children's lives



Background

1950-1970's

Survive

1980's-2000

Improved survival

2000's-

Prevention

Neurologic outcome

Quality



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Fetal cardiac intervention

James Strainic, MD
Rainbow Babies and Children's Hospital
University Hospital Cleveland Medical
Center
2/23/17



Candidate for fetal intervention

Unequivocal AS (vs aortic atresia)

LV long-axis Z score >-2

Threshold score ≥ 4 (≥ 4 of the following)

LV long-axis Z score >0

LV short-axis Z score >0

Aortic annulus Z score >-3.5

MV annulus Z score >-2

MR or AS maximum systolic gradient ≥ 20 mm Hg

Pre-procedure: Aortic valve orifice



Pre-procedure: LV function



Intervention



Intervention



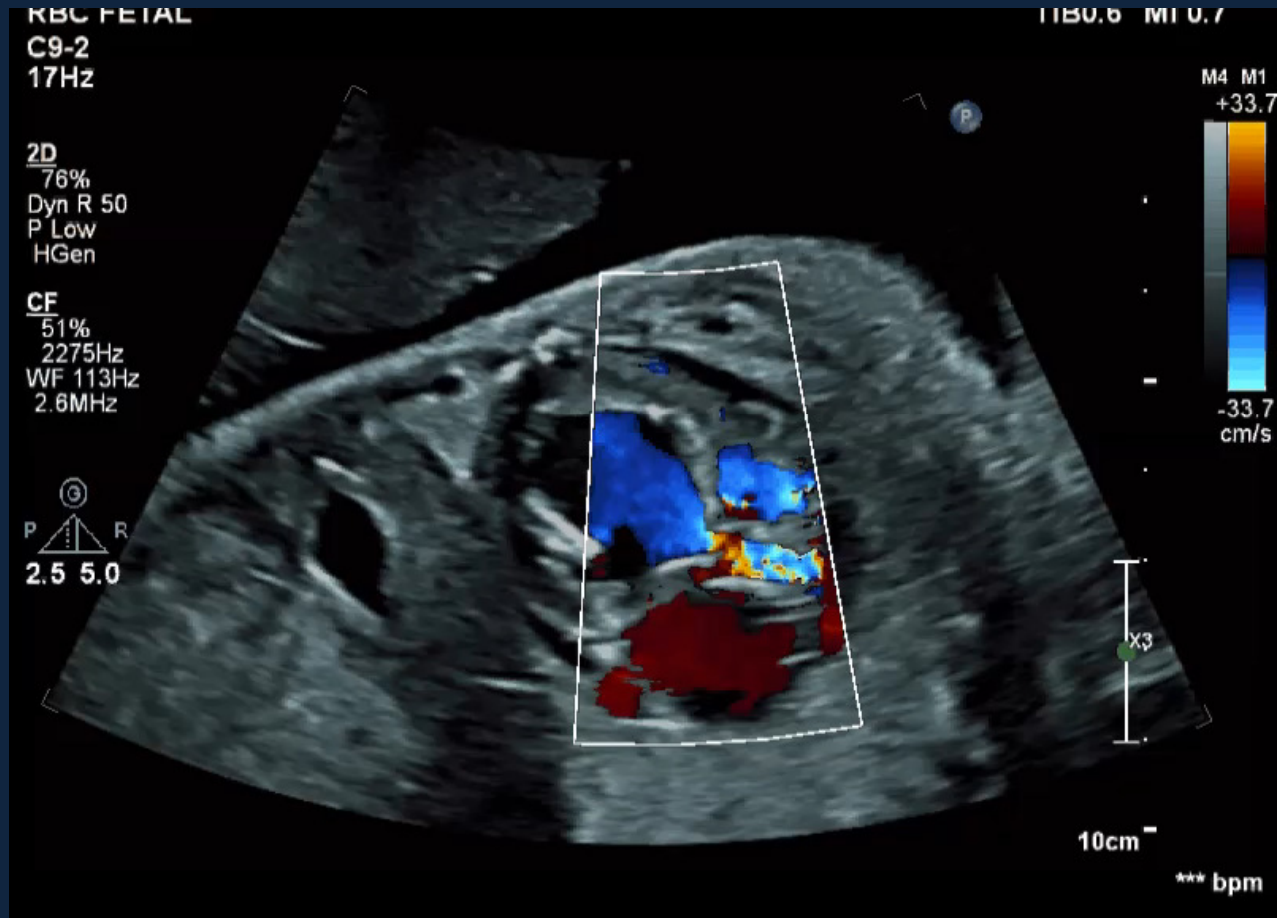
Intervention



Post procedure



Post procedure

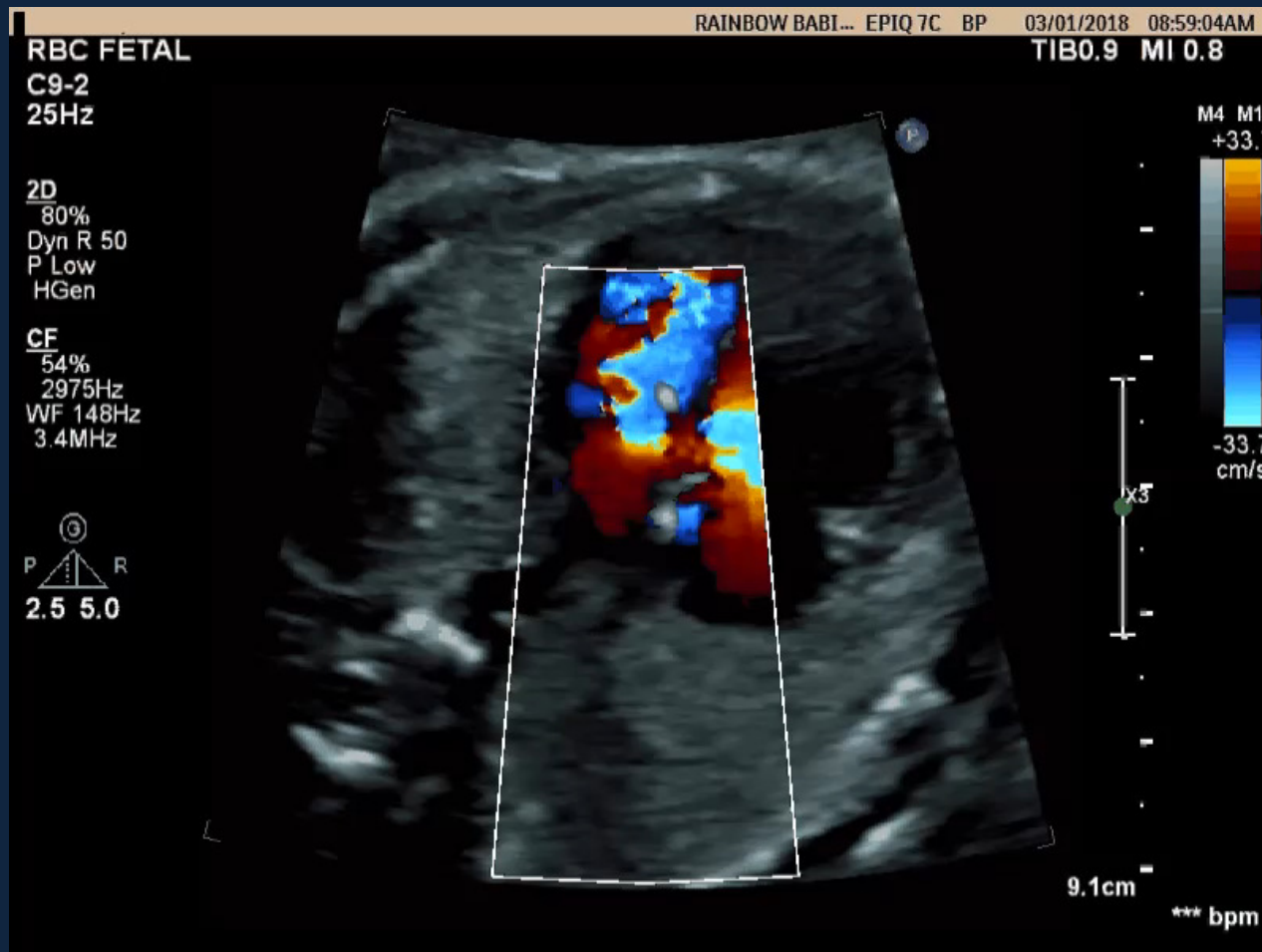


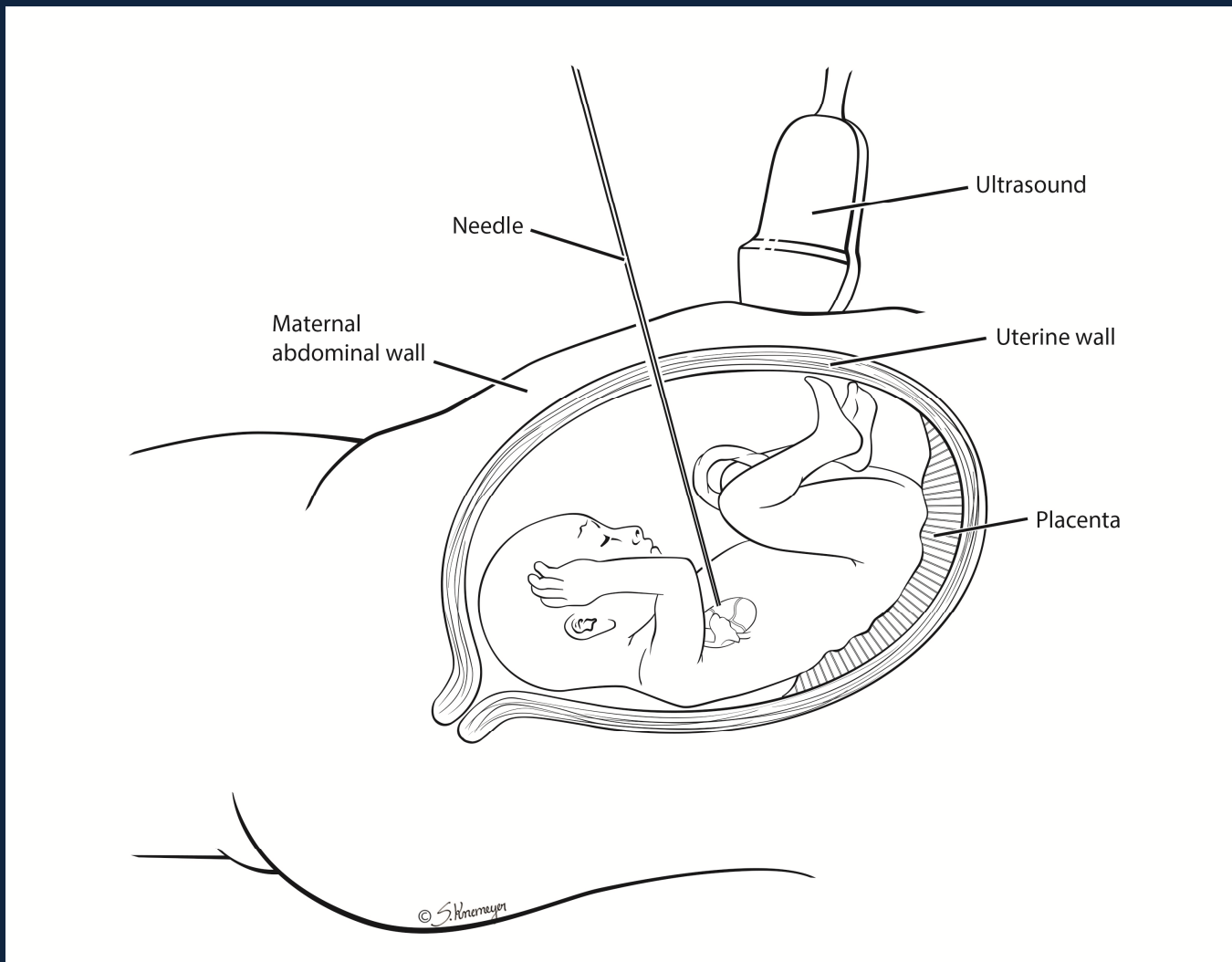
- Intervention at 24 1/7 weeks gestation

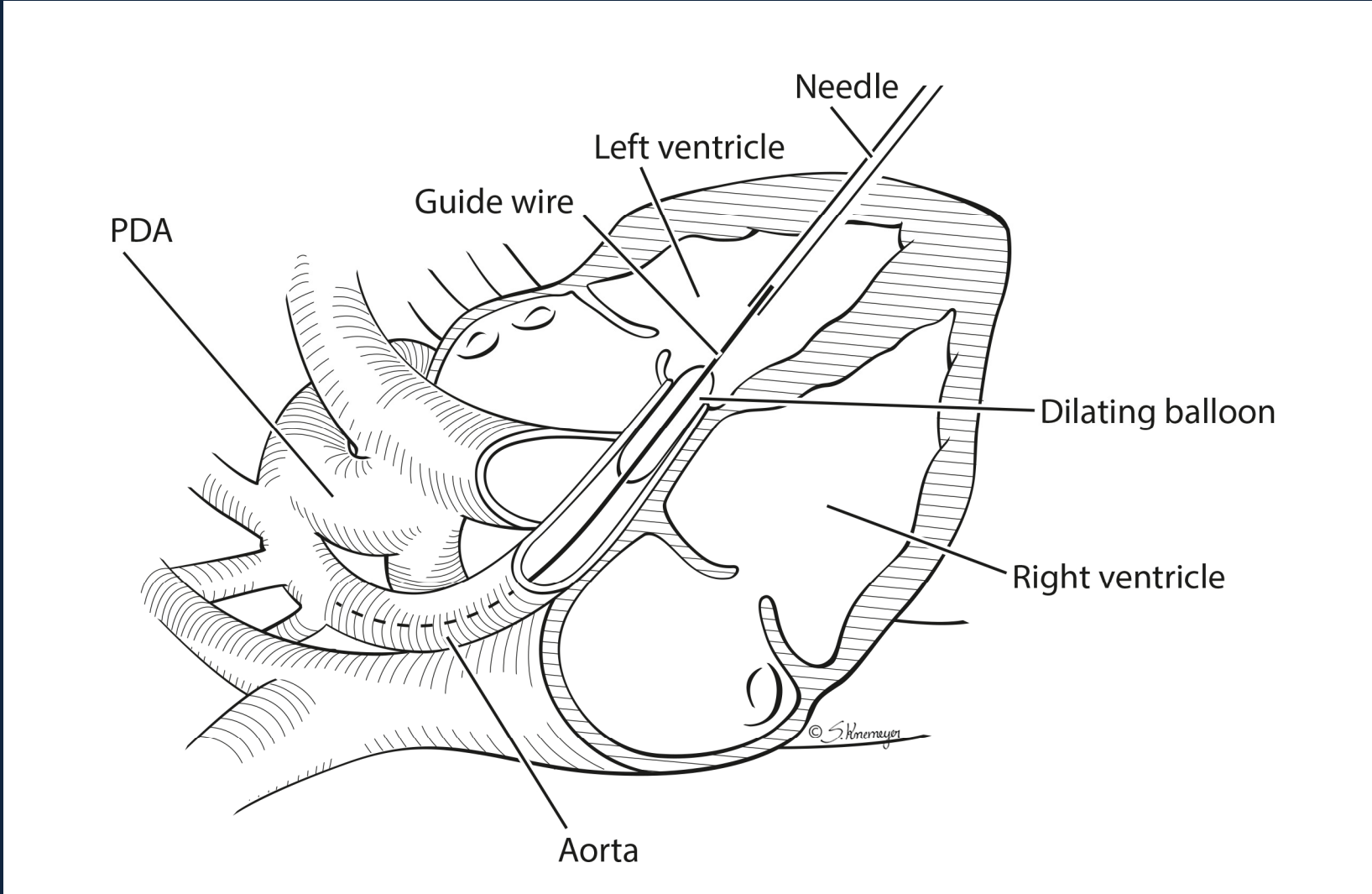














RBC FETAL

TIB0.2 MI 1.0

C5-1
55Hz
RS

M4

2D
51%
Dyn R 50
P Low
HPen



13cm

*** bpm



RBC FETAL

C5-1
40Hz
RS

2D
44%
Dyn R 48
P Low
HPen

TIB0.2 MI 1.0

M4



14cm' *** bpm

RBC FETAL

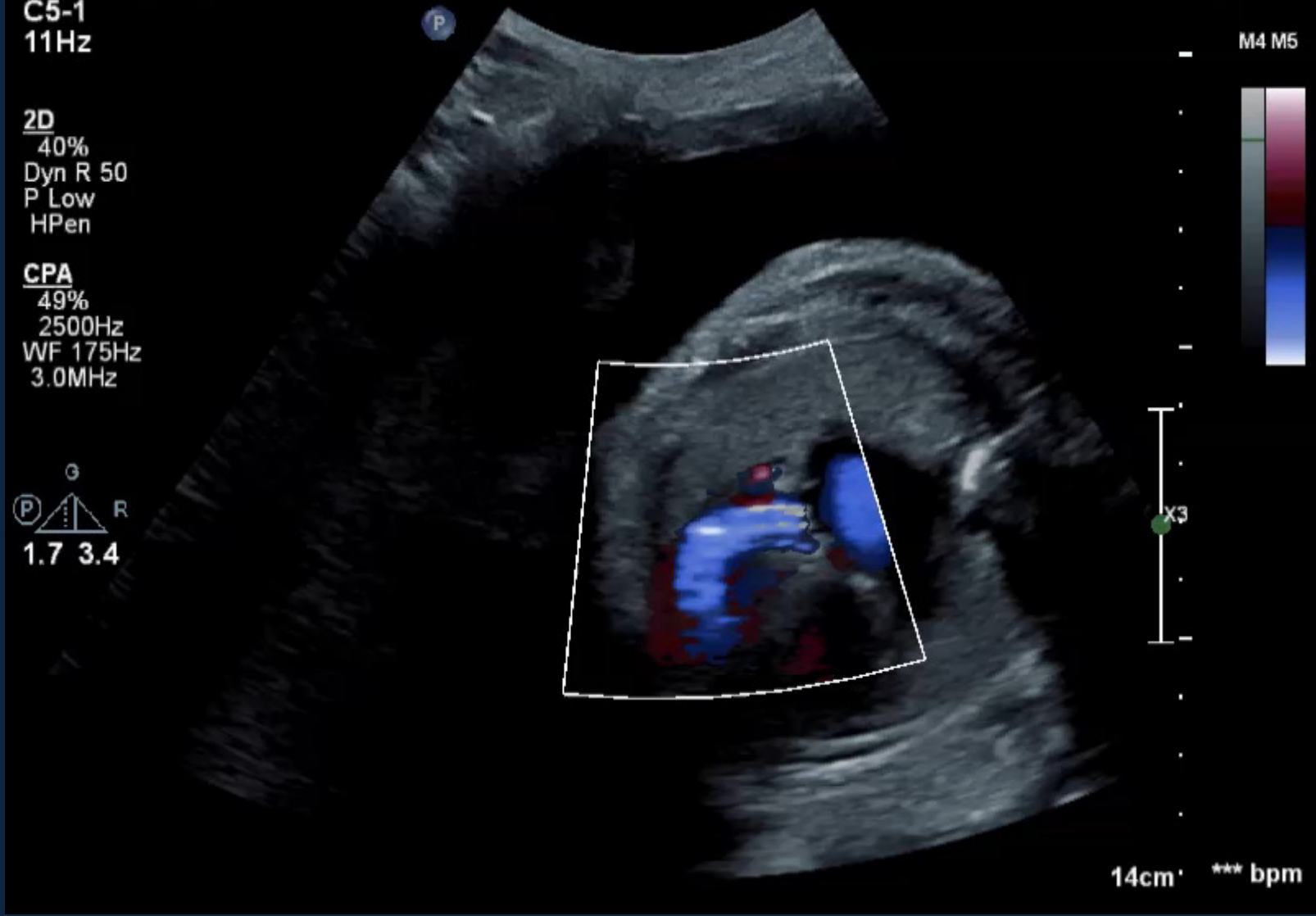
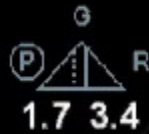
C5-1
11Hz

2D

40%
Dyn R 50
P Low
HPen

CPA

49%
2500Hz
WF 175Hz
3.0MHz



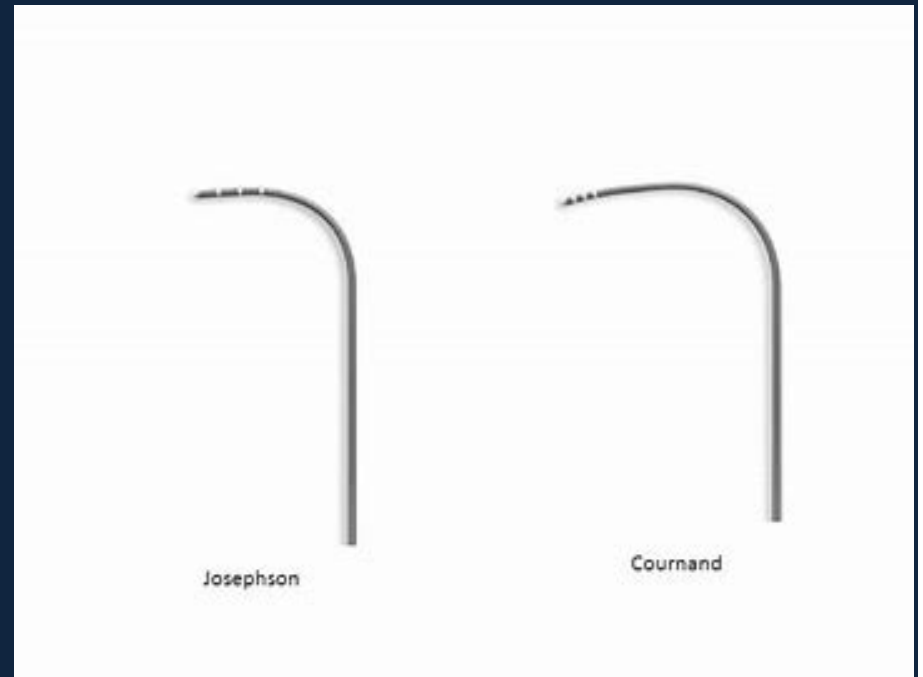


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The Future

Electrophysiology



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The Future

Electrophysiology



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Cardiac 3D Mapping System

Navigation

- 3D Display of Conventional EP Catheters within the Thorax

Modeling

- Create Surfaces that Model the Anatomic Structures of the Heart
- Register Navigational Field to CT/MRI Based Models

Mapping

- Recorded Cardiac Electrical Activity as Waveform Traces
- Collect Electrical Data and Display it on the Model Surfaces as Different Types of Maps



VantageView™ System

imaging solution with
optimal integrated viewing of
equipment in lab

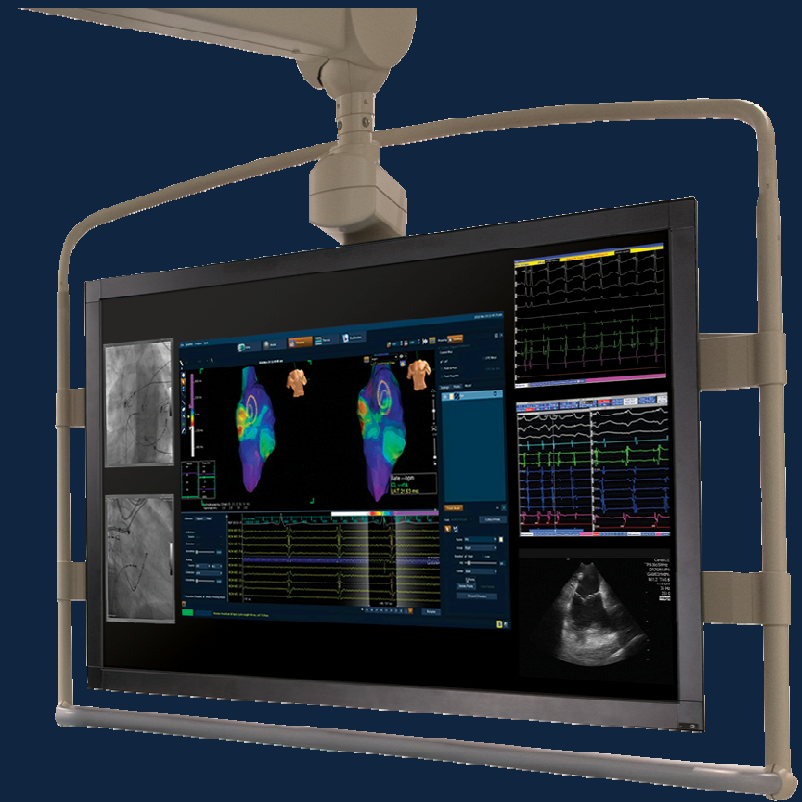
58" Quad HD Monitor

Choice of 8, 12, 16 inputs

Displays up to 8 images
simultaneously

3840 x 2160 pixel
resolution

“Presets” for up to 8 users



VantageView™ System

Maintains native aspect ratio from input so image definition remains unchanged when resized



Control Room Monitors



User Touch Panel

- Specific user presets to maximize workflow
- “On the fly” manipulation of screens for enhanced flexibility

Integrated EP Lab™

Designed for operational efficiencies

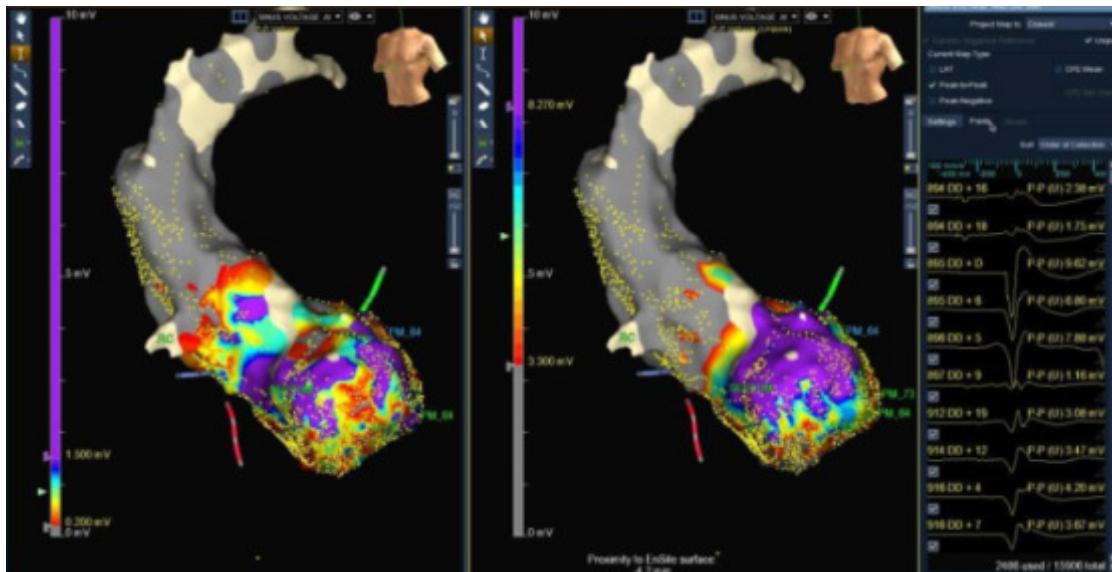
Designed to streamline workflow



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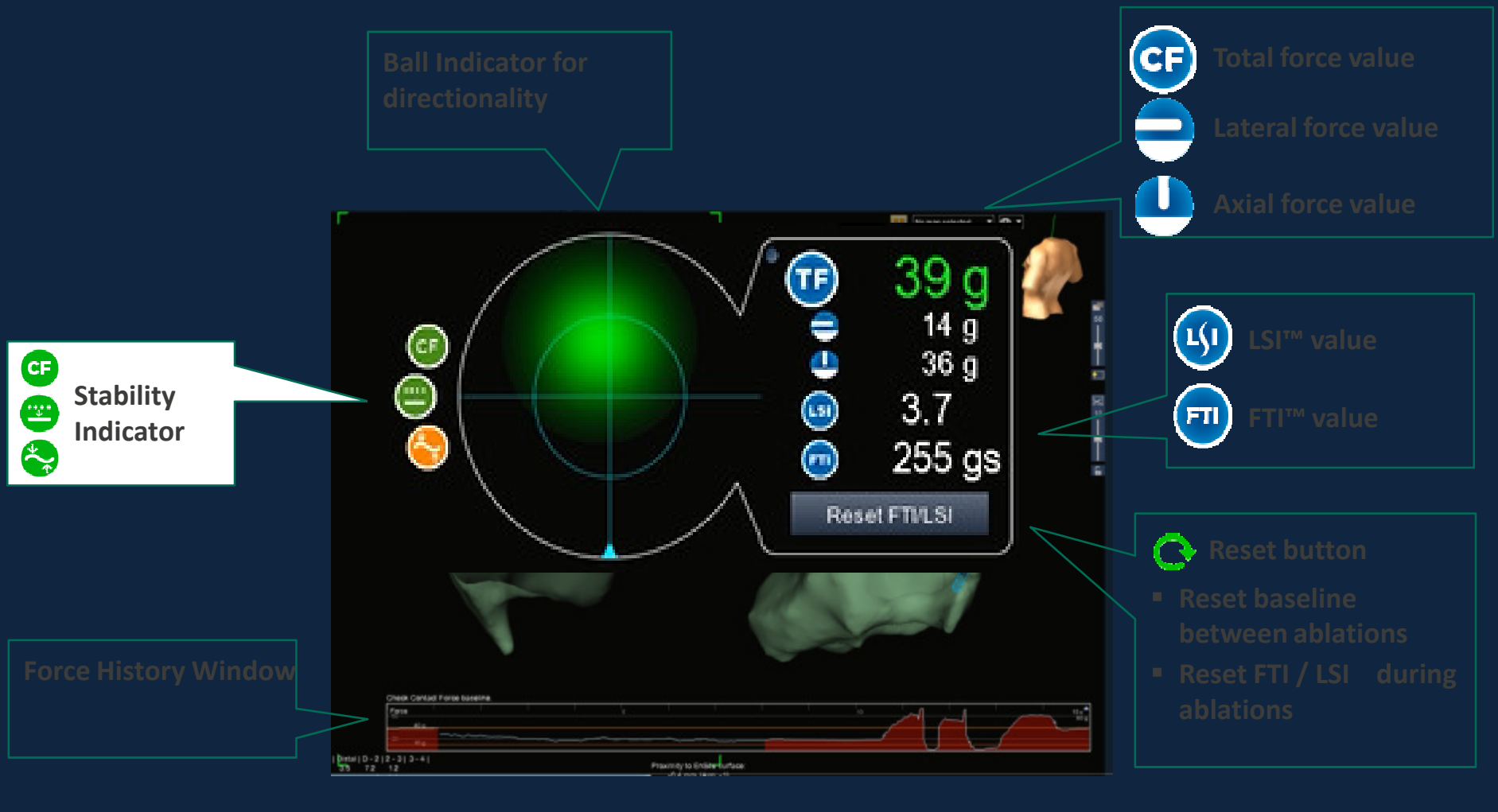
Simultaneously view and collect data from 132 electrodes.



**13 minute acquisition time yields 2,486 used voltage mapping points in sinus rhythm
with a non-proprietary duo-decapolar catheter**

Integrated Contact Force Display

The user interface captures all Contact Force information at a glance.



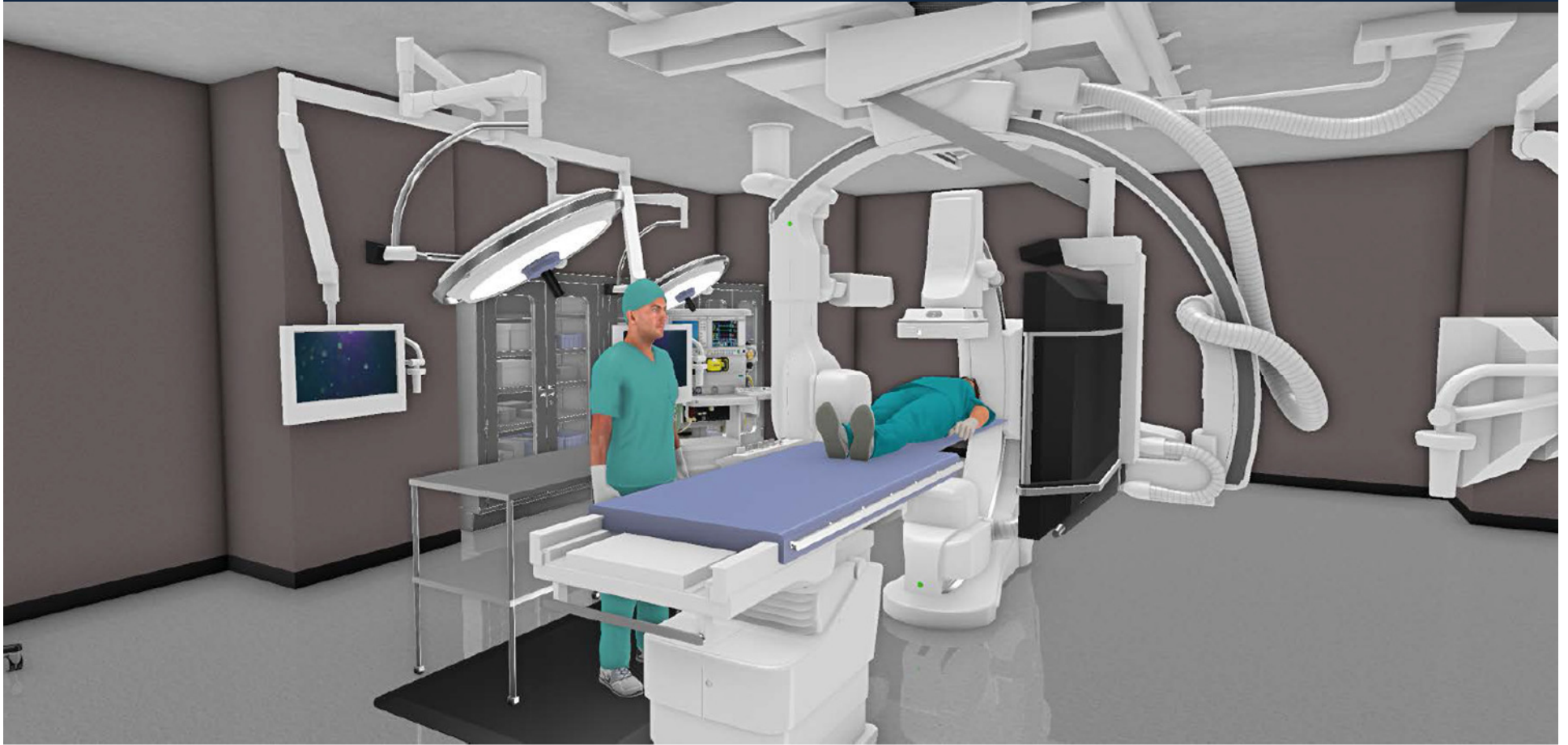
The Future Cath lab



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New Cath Labs



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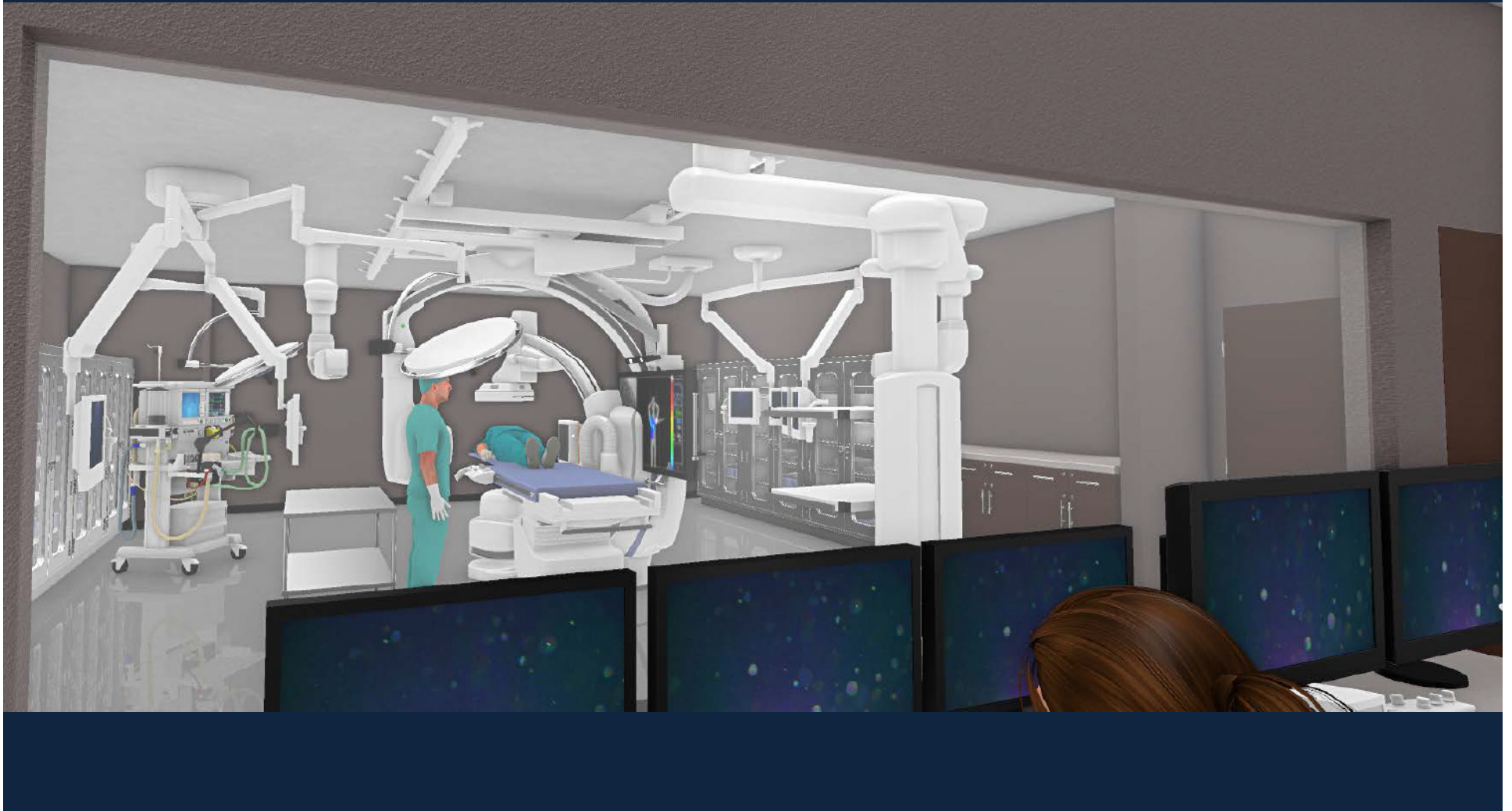
New Cath Labs



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New Cath Labs



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The Future Cath lab

Transcatheter Pulmonary Valve Replacement



The Future Cath lab

Percutaneous PDA closure in ELBW infants

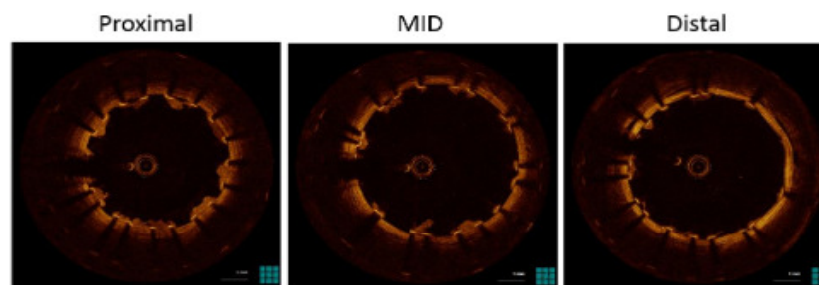


The Future Cath lab

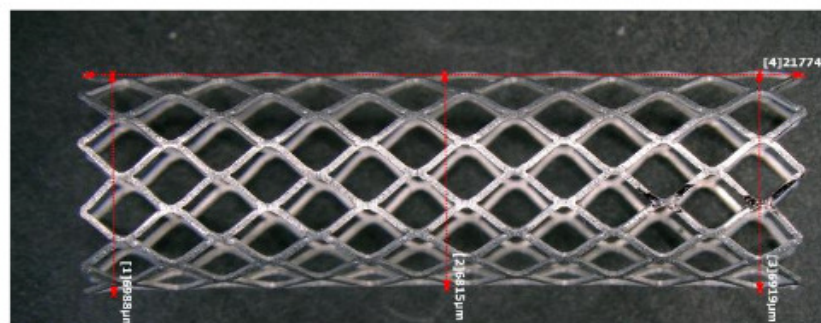
Zinc Bioresorbable Stent (ZBS)



Angiograms of iliac artery ZBS at 150 days post implant (orange arrow)



Representative OCT images of the ZBS at 150 days post implant in a swine external iliac artery

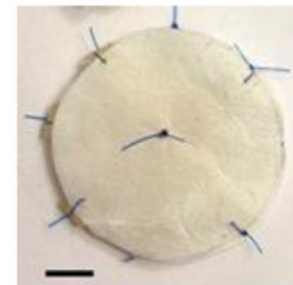
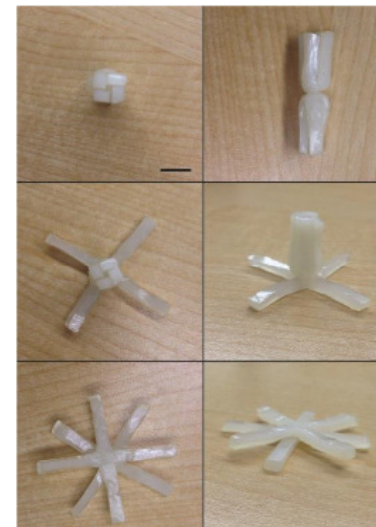


Optical microscope picture of a 25mm ZBS following expansion on a 6mm balloon

The Future Cath lab

PGD Bioresorbable ASD Occluder

- Poly(glycerol dodecanoate) (PGD)
 - Novel bioresorbable, temperature sensitive, shape memory polymer
 - Serves as frame and retention apparatus
- Small Intestinal submucosa (SIS)
(Cook Biotech Inc.)
 - Biodegradable, collagen-based extracellular matrix material
 - SIS patches provide immediate occlusion and base for endothelialization





Quality Projects



Goal: To ensure safe, transparent, and informed care from the cardiac operating room to the CTICU.

Objectives:

Communicate accurate information to entire care team for consistent postoperative management

Actively engage bedside nurse in hand-off

Eliminate multiple decision paths that lead to fragmented care

Track compliance with handoff as component of STS database

“Process Measures”

OR TO CTICU HAND-OFF

KEY DRIVERS

INTERVENTIONS

GLOBAL AIM

To ensure safe, transparent, and informed transition of care from the cardiac operating room to the CTICU

SMART AIM

Achieve 100% reliability in cardiac OR to CTICU interdisciplinary patient hand-off in compliance with the SAFER Protocol and STS best practice by 12/1/2016

Knowledgeable Team Members

Confident and Engaged Staff

Standardized discipline-specific tools

Available supporting literature

Identified Metrics

- Identify RN champion in CTICU
- Role model process
- Hold initial staff meetings
- Educate all team members
- Hold annual in-services for CTICU nursing staff
- Investigate use of LMS

- Develop OR to CTICU RN report tool
- Develop OR to CTICU provider report tool
- Conduct periodic re-evaluation of tools
- Involve CTICU staff in development and evaluation of RN tool

- Real-time feedback to staff

- Define location for SAFER Protocol RB&C Policy No. [redacted] and STS Quality Standards

- Develop standard measures of patient outcome within the first 48 hours post-op (vent times, hemodynamic stability, length of stay, re-intubation, infection, use of blood products)

PDSA

PDSA Cycle #1

Hand-off tool included all necessary information

Bedside nurses did not refrain from patient involvement during hand-off

Plan for re-education of nursing staff by PICU attending prior to next patient

No changes to hand-off tool required

PDSA Cycle #2

Bedside nurse paused for report; offered full attention to hand-off

All required information provided

No further revision to process necessary

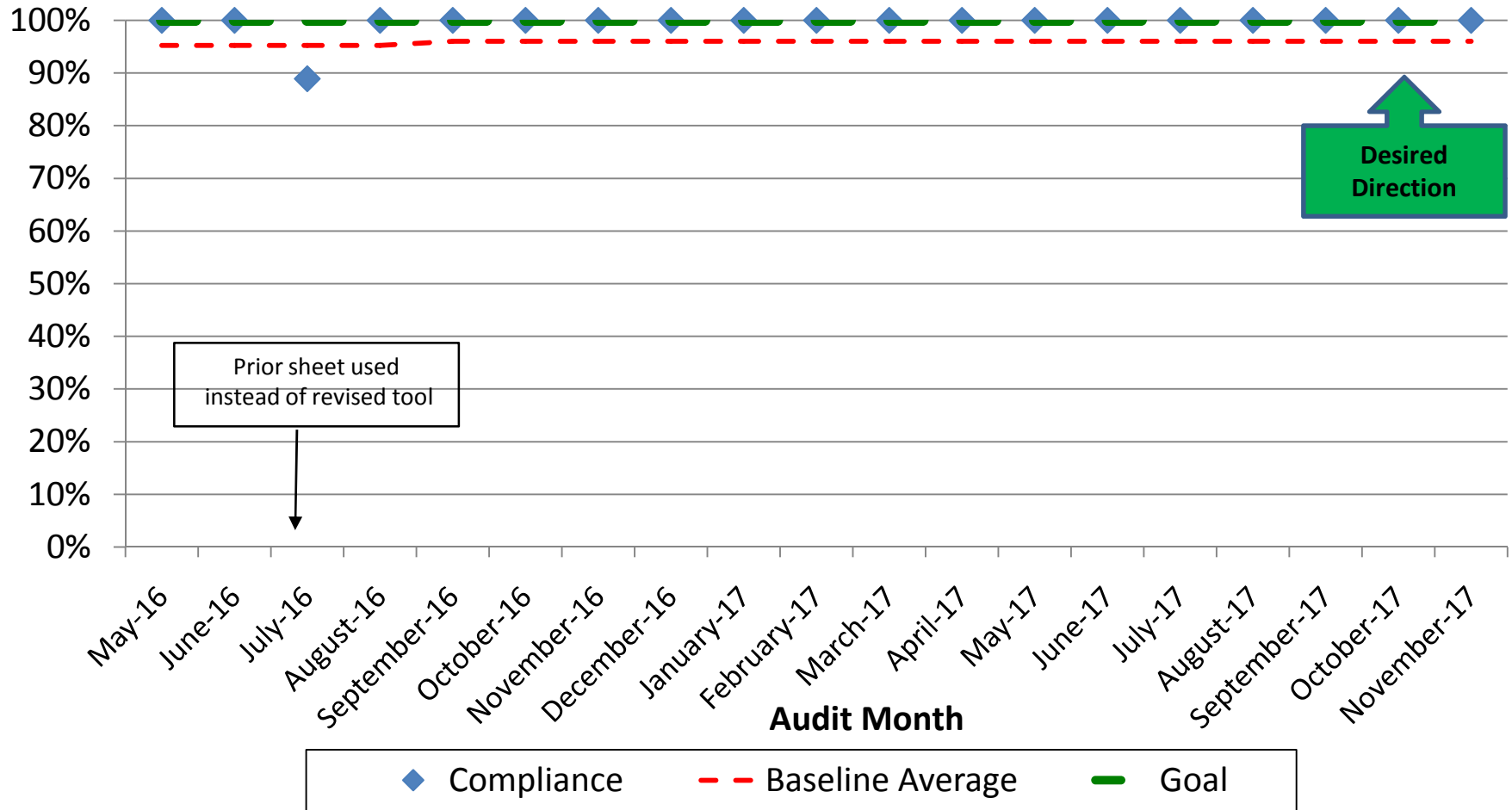
Plan for full implementation

Track compliance

Collect data

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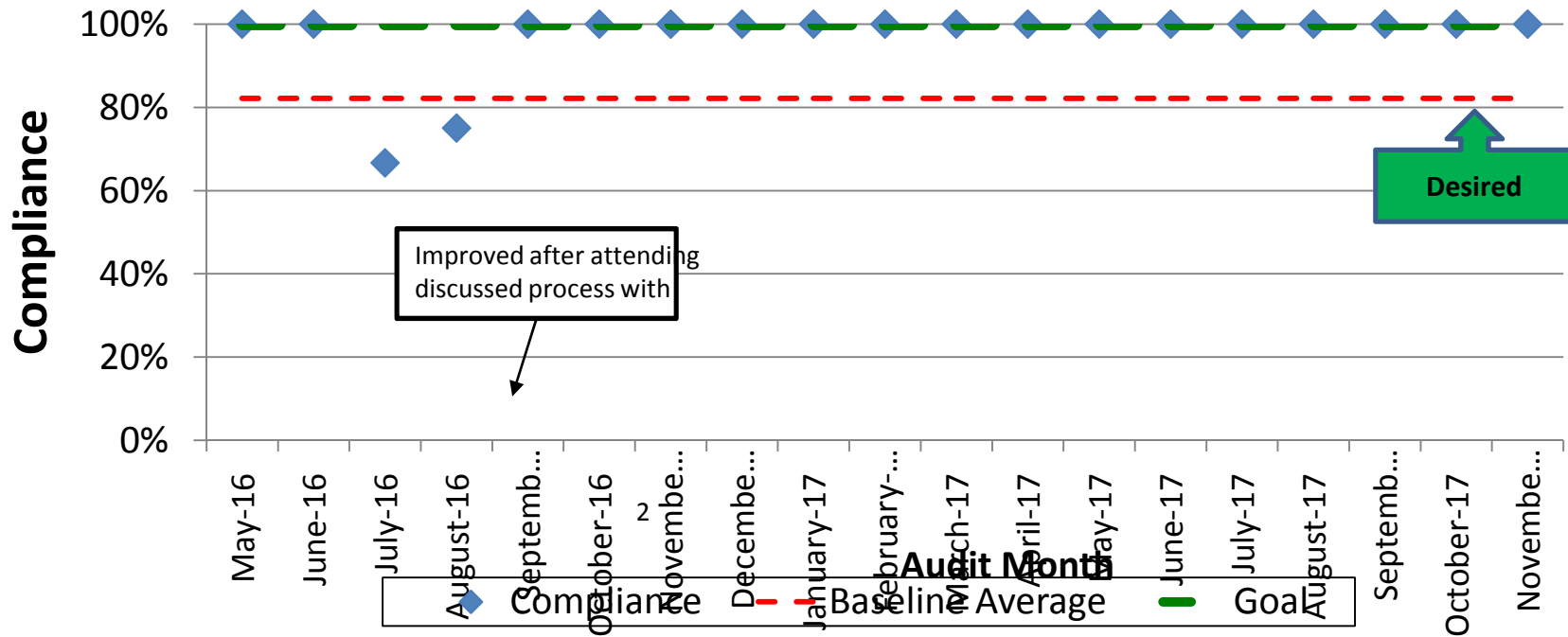
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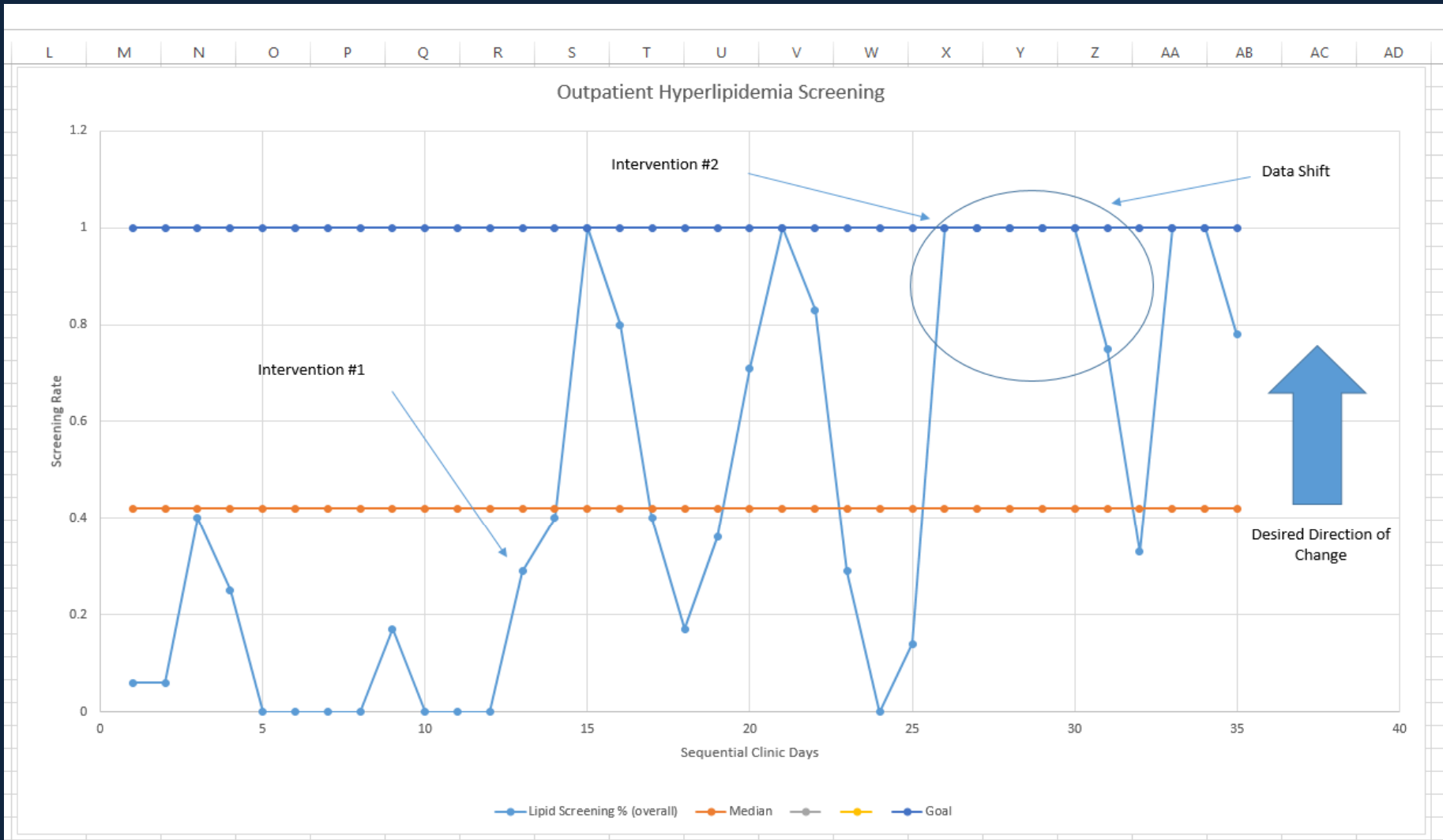


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Compliance with Bedside RN Full Engagement During Hand-Off from OR to CTICU





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THE FUTURE IS OURS

