



WORKSHOP ON TESTING AND VALIDATING  
THE STAFFING METHODOLOGY

**IMPLEMENTATION AND ANALYSIS I**

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## Introduction

B.S. in Biomedical Engineering  
(Boston University)

MBA from Babson College

Certified Clinical Engineer

Joined Masimo in 2017

Have worked in medical device  
industry and in the hospital  
setting, national and  
international

2015 Winner of the ACCE/HIMSS  
Excellence in Clinical  
Engineering and Information  
Technology Synergies Award

# Presentation Objective

- Tell my story
  - Cedars-Sinai Director of Clinical Engineering and Device Integration (CEDI)
  - July 2011 – June 2017
  - The Mission I accepted: Shape a department that can manage medical device systems that includes integration with the EHR and corporate clinical communication systems.

# Overview Of Cedars-Sinai in 2011



Established in 1902 and located in Los Angeles, California



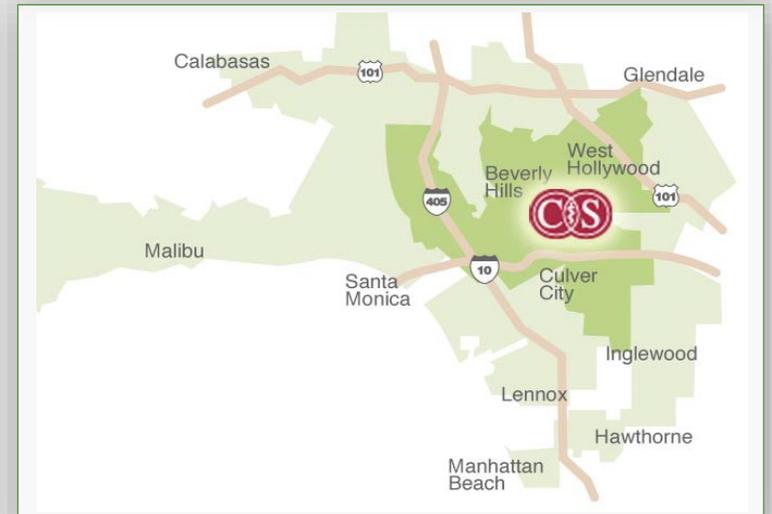
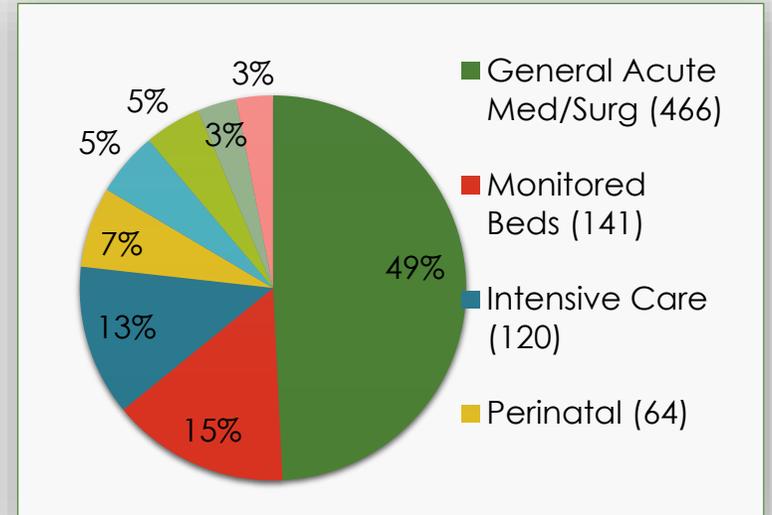
947 licensed beds, Level I Trauma Center



Primary service area includes 3.3 million people



Community support groups representing more than 16,000 individuals

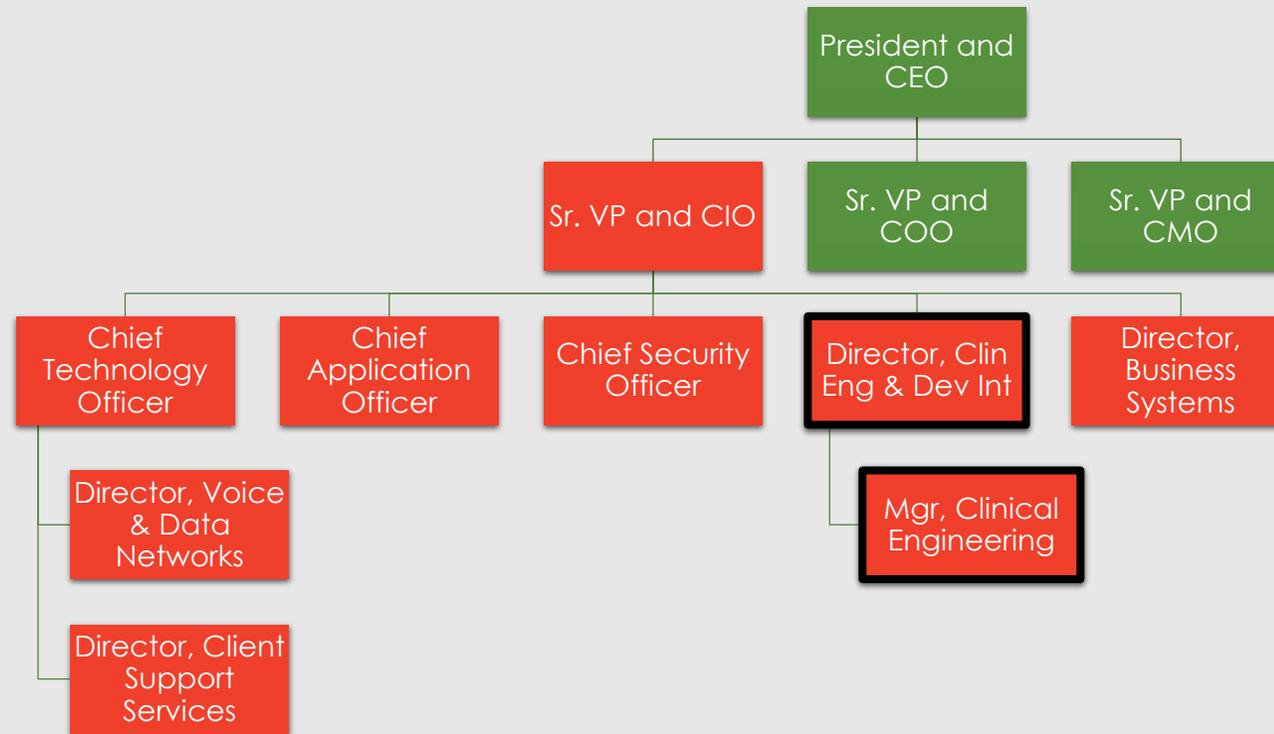


# Overview Of Cedars-Sinai in 2011

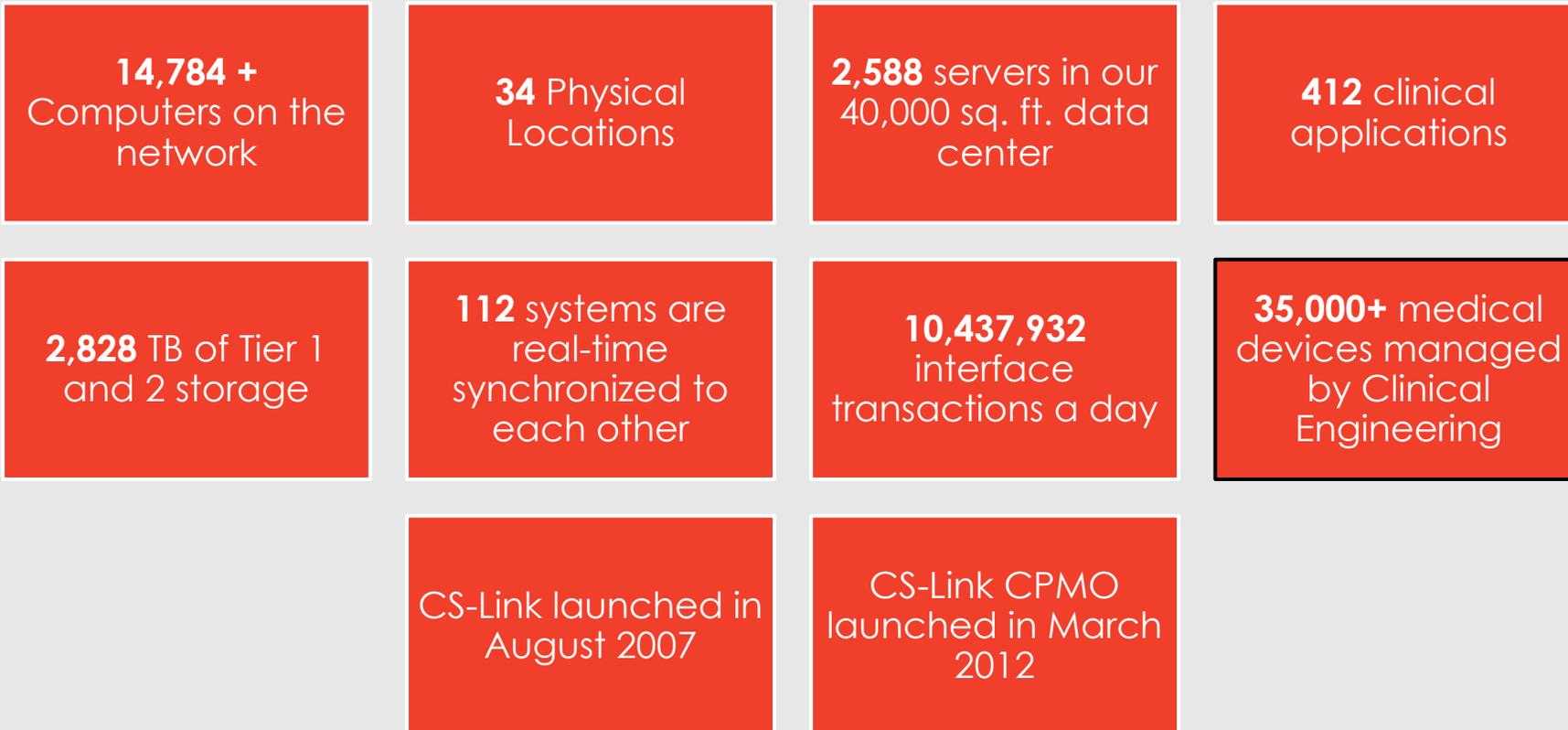


- On average, every day we served:
  - 233 Emergency Department Patients
  - 76 Emergency Department Inpatient Admissions
  - >735 Inpatients
  - 18 OB Deliveries
  - 120 Operative Procedures
  - 44 CVIC/E.P. procedures
  - 4 Level 1 Trauma Patients
  - 25 Acute Rehab patients
  - >1400 Outpatients Visits and Procedures

# Cedars-Sinai Medical Center Summarized Organization Chart, July 2011



# Caring for Our Technology in 2011



# Strategic Objectives Driving Change

## Centralize Technology Management

- Current State: Clinical Operations Departments (Surgery, Anesthesia, Nursing, etc...) each controlled budget, procurement, implementation and management of technical systems in their respective areas
  - Enterprise Information Services (EIS) departments were solely "break/fix" support; no strategic planning
- Desired State: EIS, including Clinical Engineering, to take more strategic role in enterprise-wide planning and execution of technology roadmap

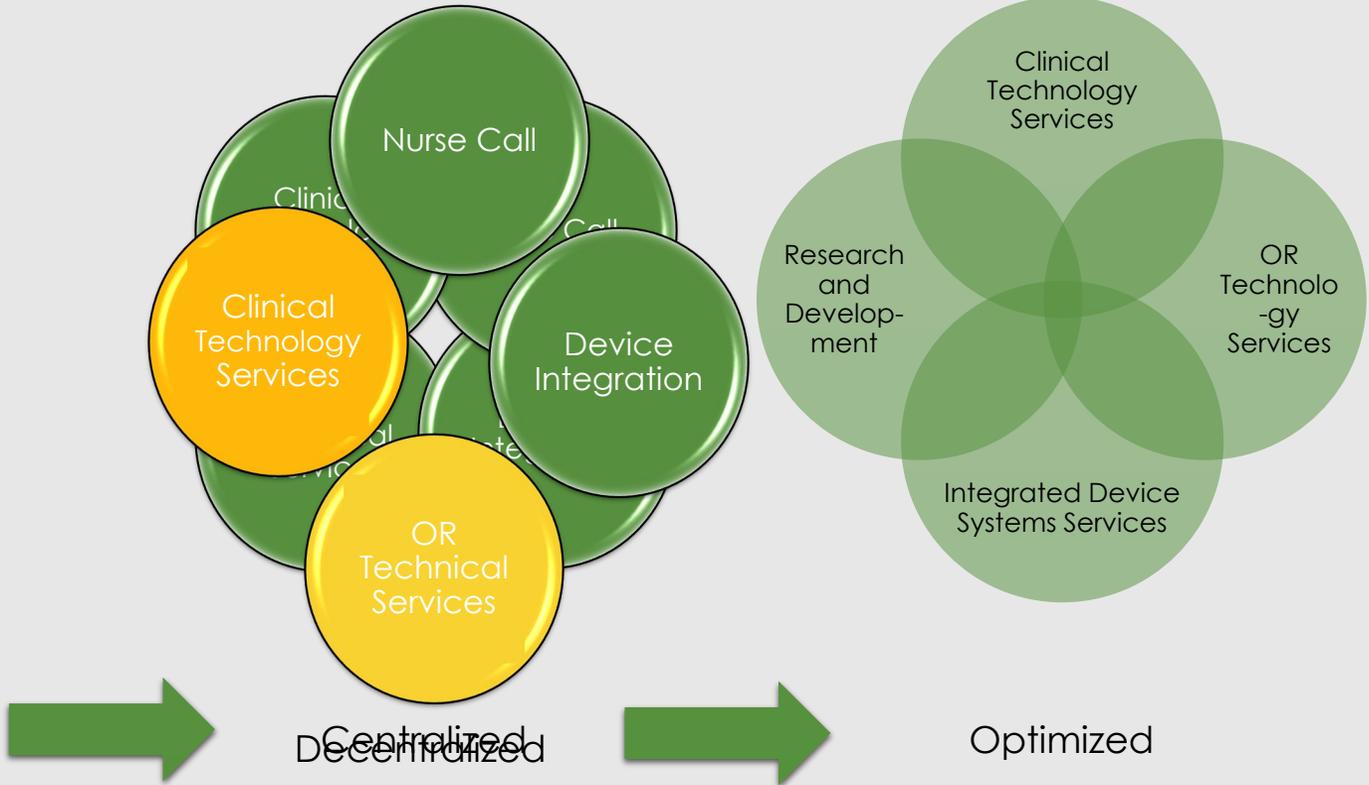
## Consolidate Clinical Applications

- Replace with appropriate modules/features available in EPIC
- Reduce financial commitment to several different vendors and consolidate redundancies in support and system administration staffing

## Upgrade or Replace obsolete medical device systems

- Nurse Call System(s) 10+ years past obsolescence and failing regularly
- Radiology and OR systems were obsolete AND posed IT security risks.
- Clinical Communication tools (mobile phones) used cellular technology and were costing a fortune for very little return on investment

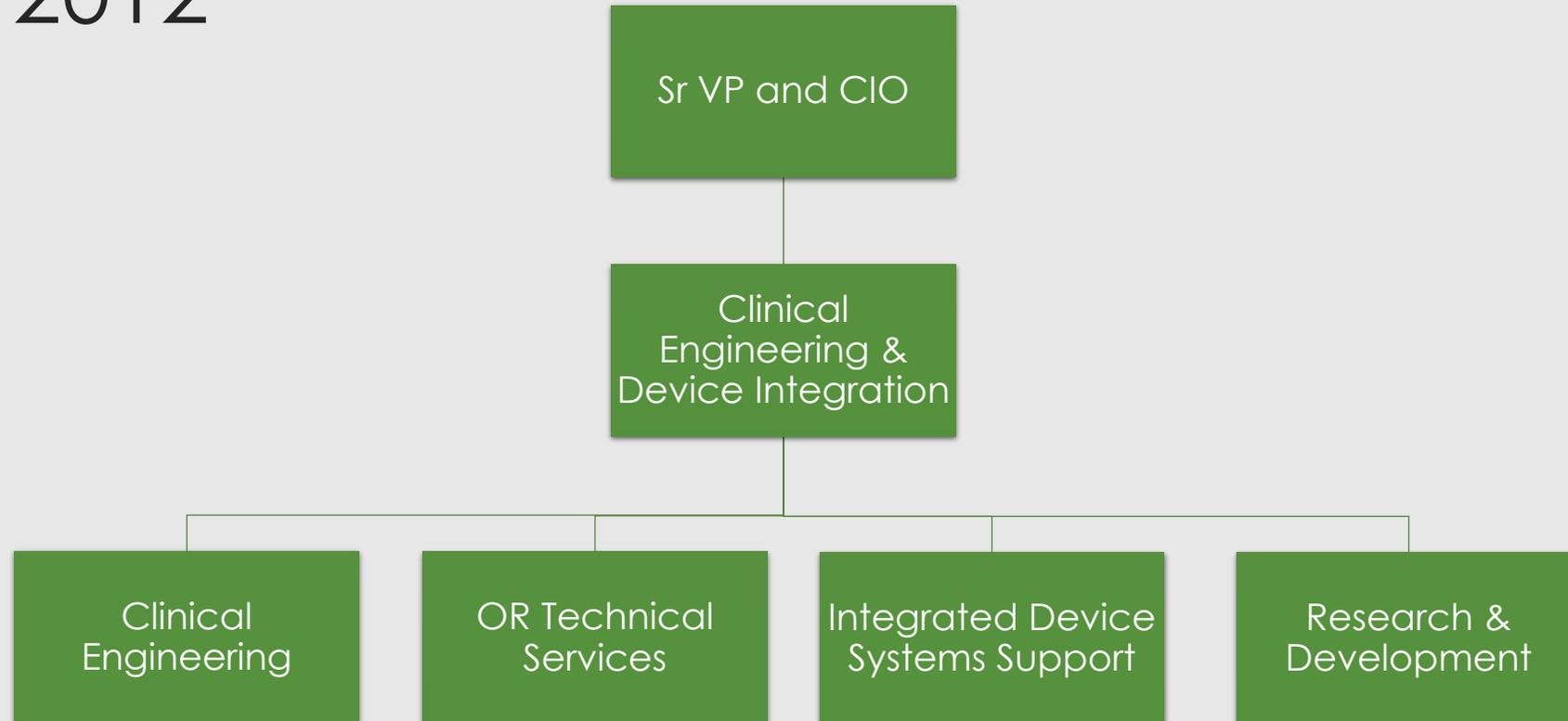
# Clinical Engineering & Device Integration



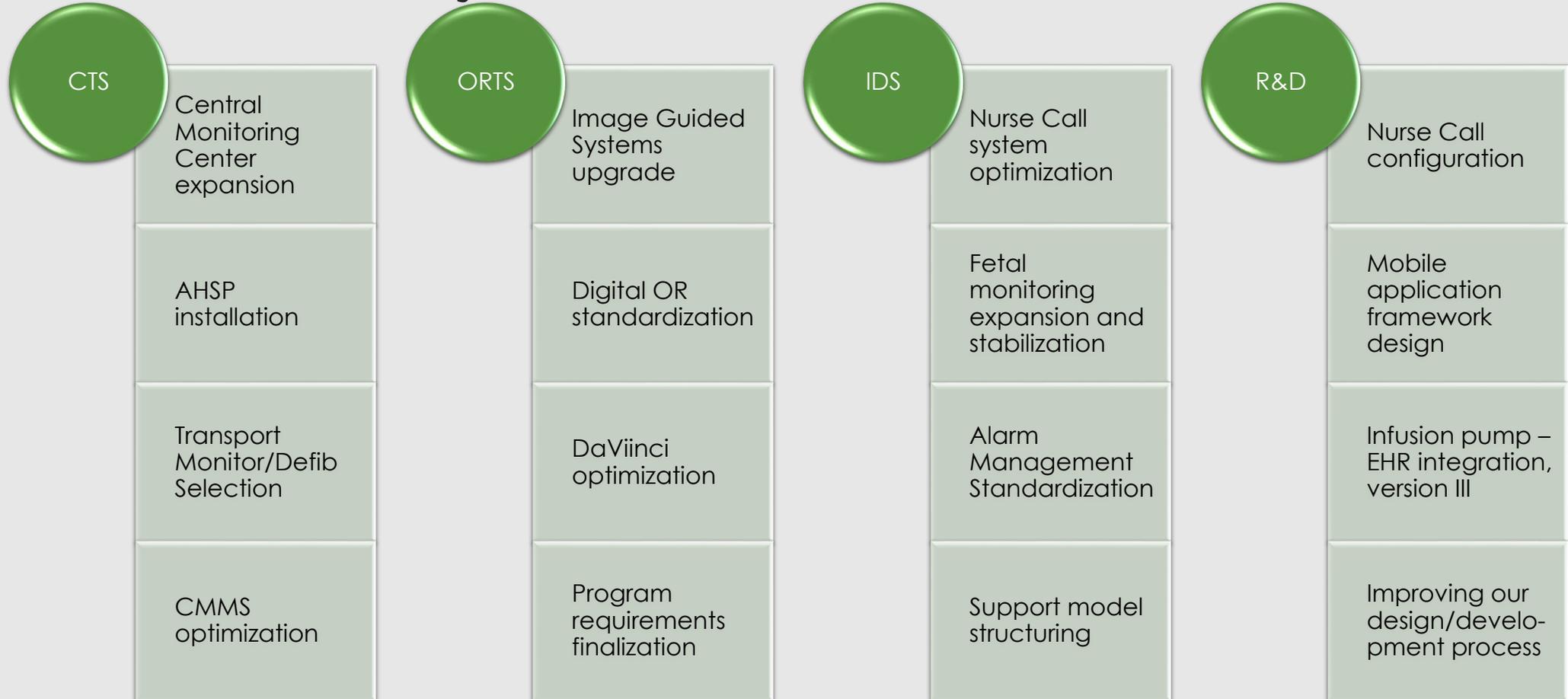
# Clinical Engineering & Device Integration

## Cedars-Sinai Health System

July 2012



# Clinical Engineering & Device Integration Tasks and Projects, FY2013



# Cedars-Sinai after 2016

## Not All Our Heroes Practice Medicine



From the HIMSS Analytics Press Release:

*"Cedars-Sinai is one of the most fully deployed and automated facilities we have encountered in the HIMSS Analytics Stage 7 program. With all of their progress on device integration, including fully integrated smart pumps, Cedars-Sinai has approached a new level of patient safety, even among stage 7 facilities."*

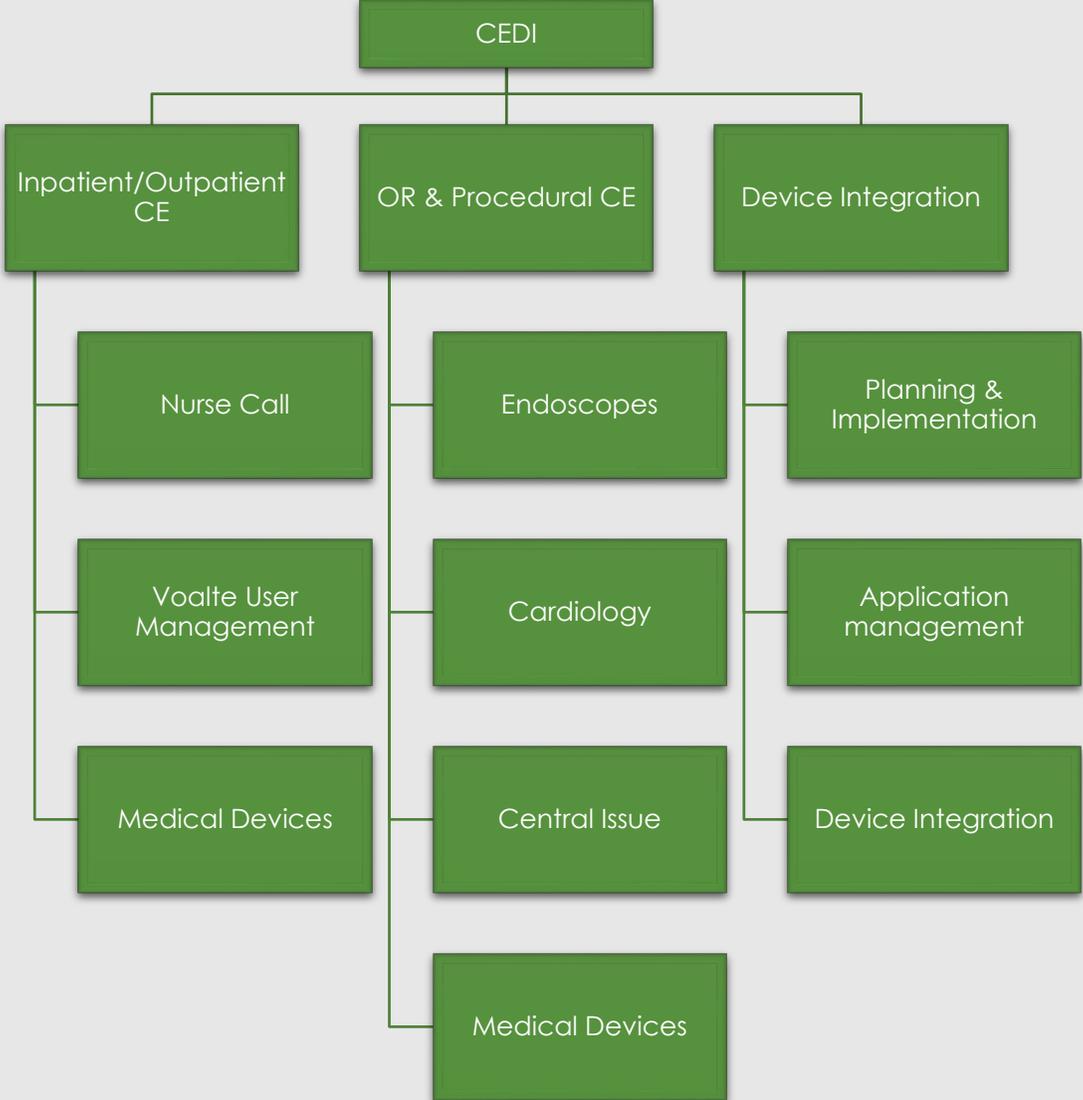
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-John Hoyt, executive vice president of HIMSS Analytics

# Clinical Engineering & Device Integration at Cedars-Sinai



In close collaboration with clinicians, administrators, and other technology groups, Clinical Engineering and Device Integration promotes quality patient care through the appropriate and safe use of medical device technology.

# Functional Organization Chart



## Job Family Descriptions

Job Family	Description	Exempt/Non-Exempt	% "Hands On"	% Administrative
BMET, IGS Tech	Provides 1 <sup>st</sup> Tier technical support, including repairs, maintenance. IGS Tech also provides system/patient set up for specific OR procedures	NE	100%	
Clinical Systems Engineers	Provides 2 <sup>nd</sup> Tier technical support. Installs/implements technology, manages upgrades/recalls/optimization. Rounds in clinical areas to ensure proper use of equipment.	E	85%	15%
Project Managers	Develops scope, budget, and implementation timeline for assigned projects. Coordinates with other teams for project management alignment (COOL Team, Nursing, etc)	E	30%	70%
Management	Implements and monitors the Cedars Medical Equipment Management Plan, which can include medical devices and medical device systems.	E	10%	90%

## New Job Roles

Added Project Management and Clinical Systems Engineer job descriptions

- Project Management to align with ITIL project management structures
- Clinical Systems Engineer to add needed IT knowledge to team

# FY16 Statistics for CEDI: Medical Devices

Measure	3Q 2015	4Q 2015	1Q 2016	2Q 2016
Devices Maintained	25,187	25,422	24,179	26,496
Devices maintained/Staff Bed	27.41	27.54	27.32	29.94
Total Service Orders Completed	8,607	6,538	11,552	10,763
PM Orders/Total Service Orders	.58	.43	.63	.64
Repairs/Total Service Orders	.11	.32	.18	.17
Projects, Recalls, Incoming, Incident investigations/Total Service Orders	.31	.25	.19	.19
Total Expense (adjusted for area wage index)	\$2,370,108.83	\$3,284,503.76	\$2,908,655.74	\$3,980,079.17

# Snapshot of CSMC Medical Device Connectivity

## **Cardiology**

- 35 EKG carts are wireless
- Orders/results for cath lab hemodynamic systems
- Ambulatory blood pressure system integrated (PDF report uploaded)
- Pacemaker reporting system integrated (PDF report uploaded)

## **Fetal monitoring**

- 24 Fetal monitors (LDR + Prenatal Clinic) interfaced with fetal monitoring system, then to EHR
- Additional integration with smartphone application for near-real time remote monitoring

## **Alarms/Alerts**

- Nurse Call alarms/patient requests– sent to smartphones
- Pulse Oximetry and some cardiac monitoring – sent to smartphones
- Medical Device (“aux”) jack in each room for technologies not ready for network connectivity (i.e. chair exit alarm devices)
- Tele monitor based alarms managed through central monitoring, filtered

# Snapshot of CSMC Medical Device Connectivity

## Infusion Pumps

- 1523 Infusion pump brains wirelessly communicate
  - Within infusion pump system: used to push datasets and download logs
  - With EHR: bidirectional interface; order goes to pump, flow rate and volume goes to patient chart

## Patient Monitoring

- ~255 telemetry patients' data imported to EHR (288 max – will increase in 2016)
- 690 multi-parameter monitoring devices imported to EHR
- 120 terminal servers in critical care areas for connection to ventilators, urimeters, CCO monitors, BIS monitors, etc..
- 85 anesthesia machine 'systems'
- Mobile vital signs collection – data validated instantly
- Wireless pulse oximetry devices with integration to alarm management and EHR

# Communication Project Overview

- Goal –Deploy iPhones with clinical communications application to all of Inpatient nursing by July 2012
  - Then-current flip phones were being discontinued by vendor

Current number of Clinical User IDs	401 5	Current number of phones deployed	1300
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	May 2012	Jun 2012	Jul 2012	May 2014	Jun 2014	Jul 2014
Phones Deployed	600	800	800	1300	1300	1300
Completed Calls	56,894	74,929	83,450	209,532	204,171	214,556
Alarm Message	NA	NA	NA	404,093	425,376	594,404
Text Messages	139,360	159,552	163,404	251,442	264,387	250,625



# Closing Thoughts

- CEDI at Cedars-Sinai was created to address the need for consolidation and strategic management of clinical technology assets.
  - Job roles often found in traditional HIT Application teams were added to support expedited project timelines
  - Provided opportunity to align several clinical technologies that have symbiotic relationships.
    - Nurse Call, Clinical Communication, Patient Monitoring systems all intersect with Clinical Alarm Management
    - Surgical Robots, Image-guided surgery systems, endoscopy all play role in digital imaging in the OR
    - IV pumps, electron medicine administration systems can be integrated for automation
  - Service and license agreements all rebuilt with cost reduction and risk sharing goals with vendors
- Complexities with clinical technology continue to increase, creating an opportunity to define new roles and relationships with other departments
- Support for medical devices and medical device systems is moving away from traditional “break/fix”.
  - Critical thinking at the systems level is necessary. One needs the ability to “follow the data” through the entire path.



THANK YOU!

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