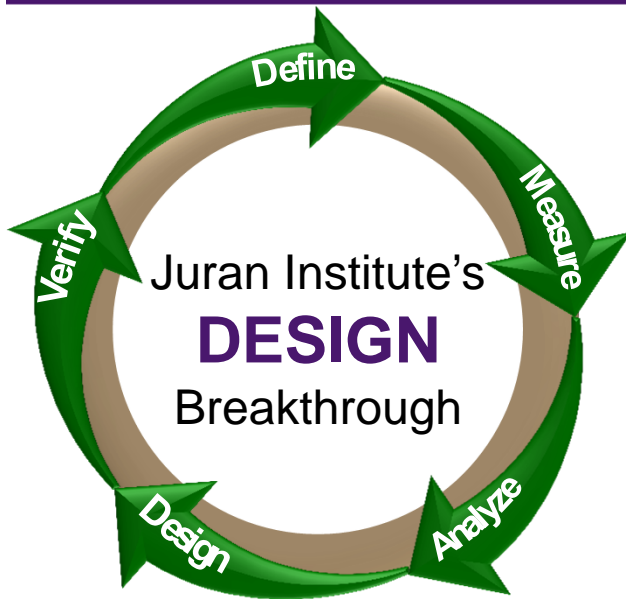




The Source for Quality

Scheduling and Registration

(Using DMADV: Define-Measure-Analyze-Design-Verify)



**Connecticut
Children's**
MEDICAL CENTER

Context: IT Strategic Plan & Vision

- Connecticut Children's 2008 – 2012 Strategic Plan prompted the need to develop an IT Strategic Plan
- Vision: Information Technology at Connecticut Children's is to support our organizational mission which is to be the medical center of choice in our region for families and providers seeking health care and treatment for infants, children and adolescents. Specifically:
 - We provide the highest quality of care in a safe, family-centered environment.
 - We attract and retain the best professionals throughout our organization.
 - We foster strong partnerships with our patients and families, referring providers and government community and business leaders.
 - We are recognized nationally for the growth in our research commitment and funding.
 - We provide outstanding education and training for health care professionals dedicated to children's health.

We will use information technology to become a fully integrated healthcare system, enabling the three essential elements of information, innovation and integration to lead the way to excellence in care, research and education

- Goal 1: By 2011, re-engineer processes which are critical to the implementation of enhanced technology systems and the patient/family experience.

Let's make sure our processes work before we automate them.

Context: Meaningful Use

- HITECH Act under the America Recovery and Reinvestment Act (ARRA) established a set of incentives and penalties for adoption of EHRs
- Providers will be required to demonstrate “meaningful use”
 - To improve quality, safety and efficiency, and reduce health disparities
 - Engage patients and families in their health care;
 - Improve care coordination;
 - Improve population and public health; and
 - Ensure adequate privacy and security of health information.

EHR & Process Redesign

*“...Efficiencies gained by redesigning workflow and processes pay dividends for years to come, and create an active, engaged culture among staff...
But, optimization is not a one-time event; once it starts, it truly never ends...”*
- CHiME CIO Guide for Implementing EHRs in the HITECH Era

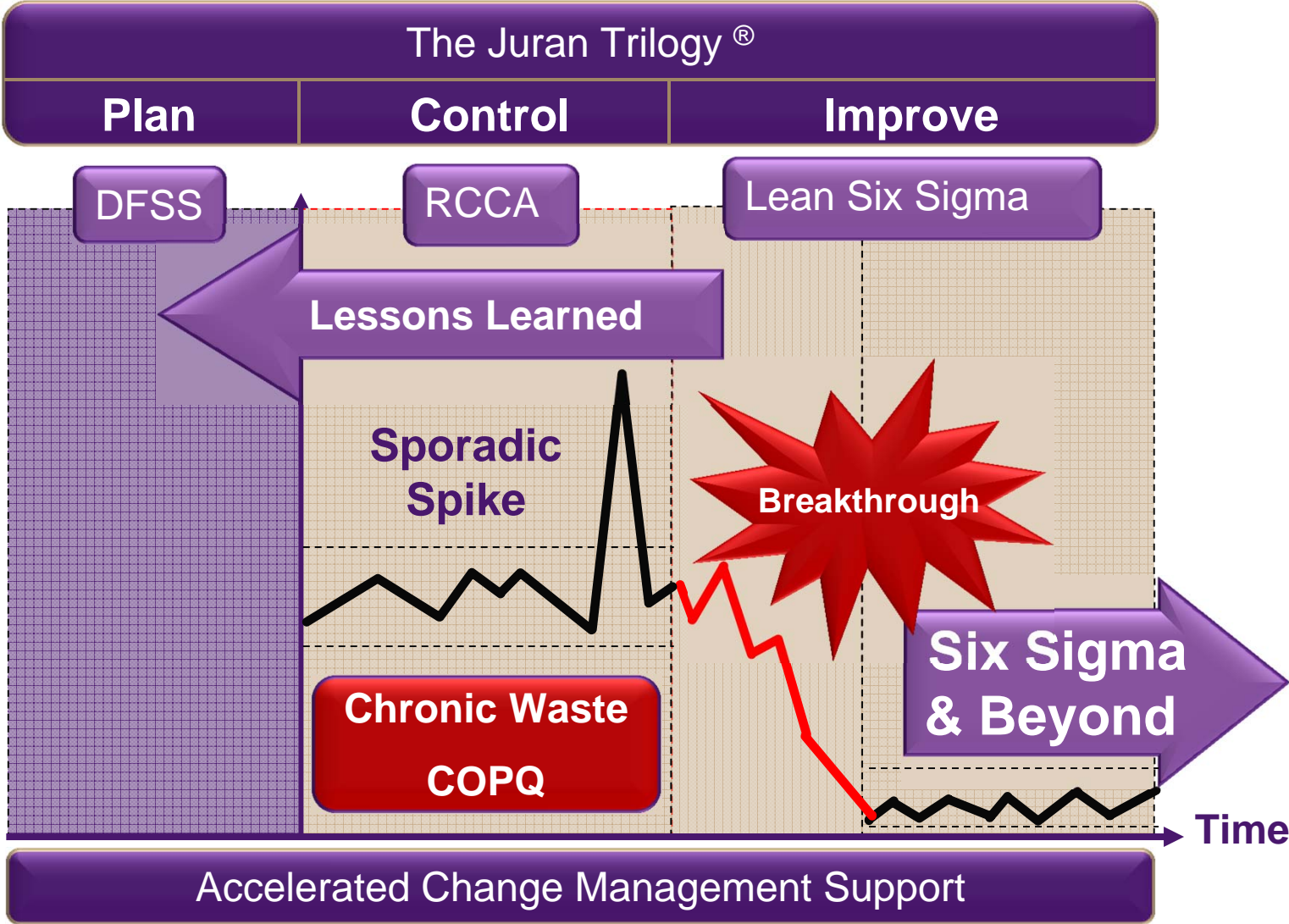
- Transforming processes prior to EMR build and installation saves time, money and allows optimal benefits of EMR functionality
- Suboptimal processes will create suboptimal results
- Key Guiding Principles:
 - Patient Safety
 - Quality in the Delivery of Patient Care
 - Efficiency
 - Patient and Family Centeredness
 - Timeliness
 - Redesigning all processes with the customer in mind
 - Optimizing value in the eyes of the patient/family

Process Redesign Projects

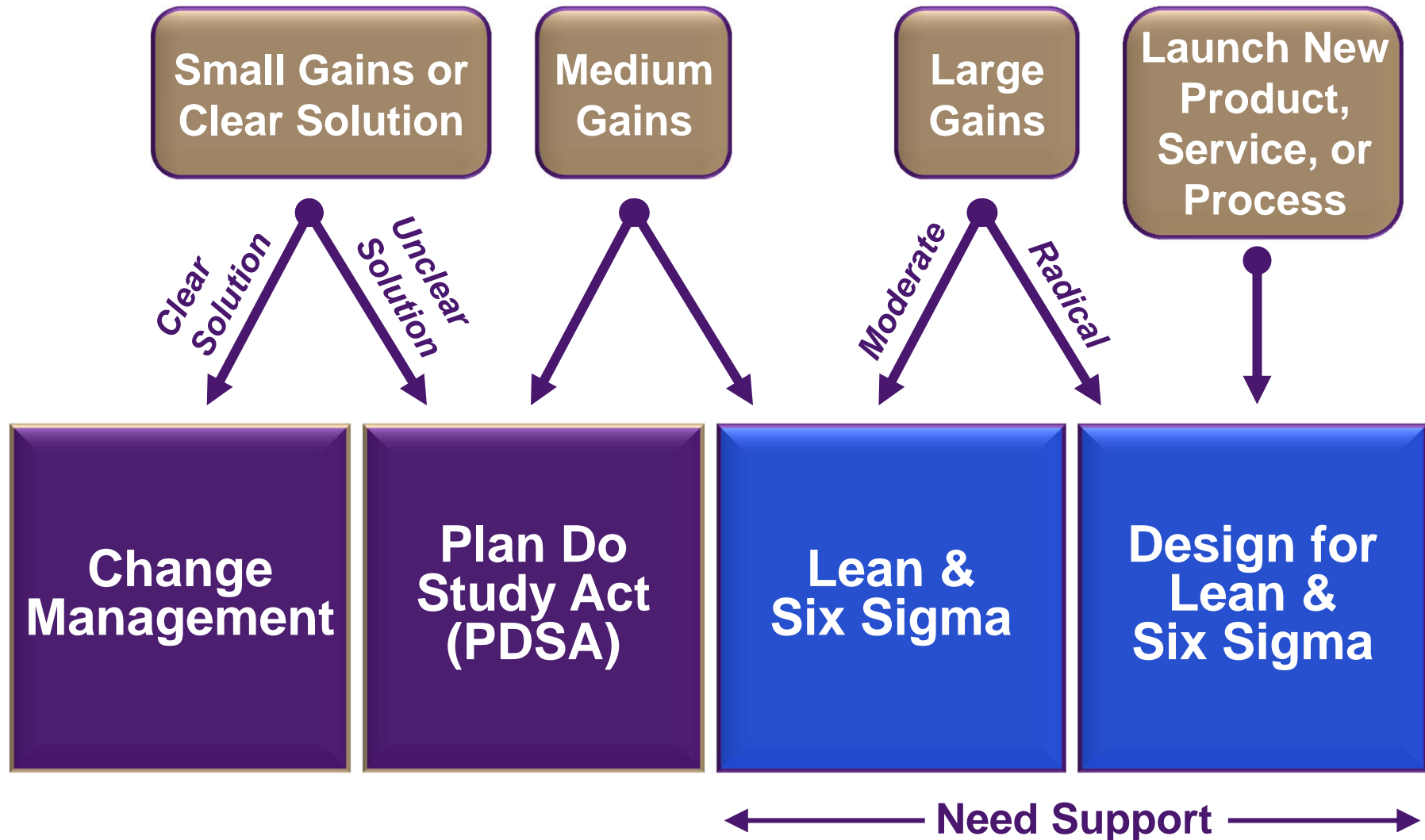
- **Phase 1**
 - Scheduling and Registration
 - Ambulatory Care
 - Medication Management
- **Phase 2**
 - Medical Record Management
- **Phase 3**
 - Surgical Services
 - Imaging Services
 - Inpatient Care



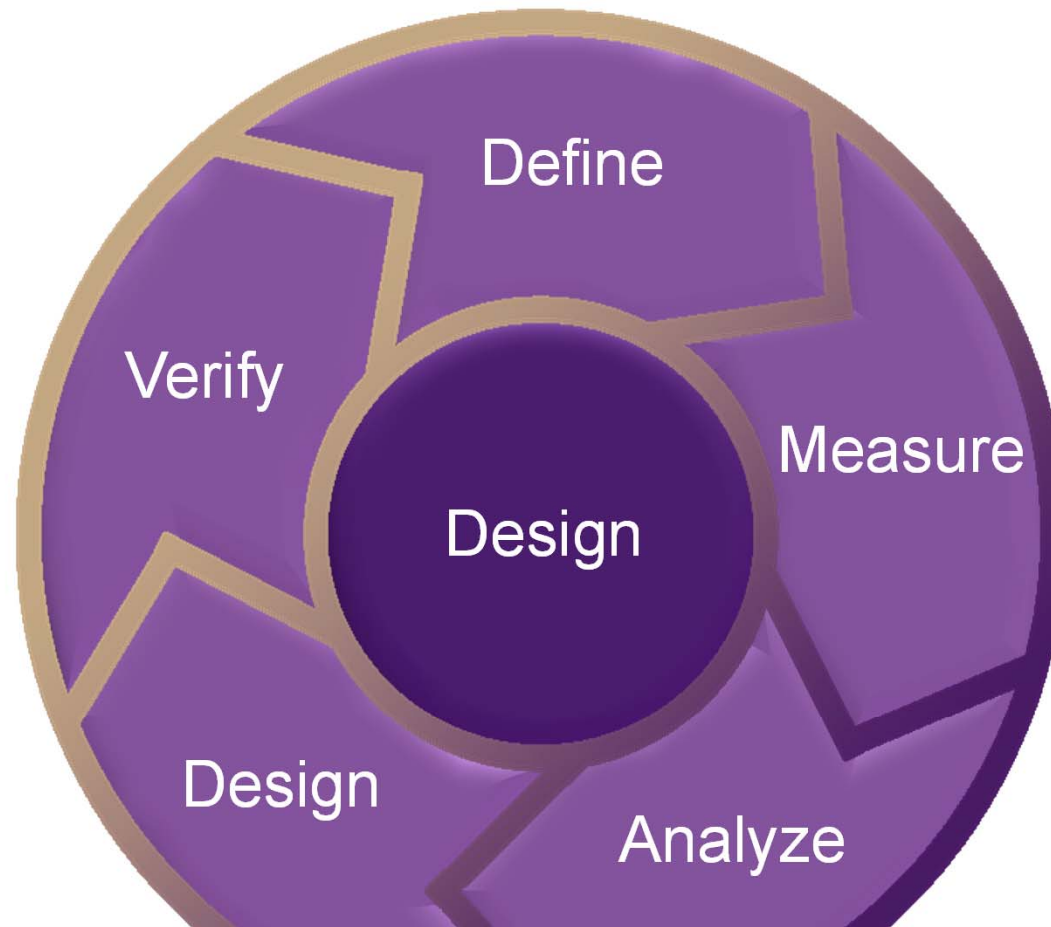
How to Think About Lean Six Sigma Toolbox



Some Projects Need Support



DFLSS: Design for Lean Six Sigma



A Common Methodology to Design

DMADV

Define
Measure
Analyze
Design
Verify



Define Phase: Key Deliverables



Project Charter

Problem Statement: Currently at Connecticut Children's, the scheduling and registration of patients occurs at different locations with different information systems across the enterprise. The lack of integration of information systems creates inefficiencies due to complex work flows and resource management, rework and errors associated with transcribing patient information from one system to the other, gaps in automated insurance verification, variation in performance due to lack of standardized processes, gaps in performance measures, and manual hand-offs. Specifically ending in FY 2010:

1. Accuracy of registration information in the ED is 80%
2. Accuracy of registration information non-ED is 93%
3. Insurance verification in the ED is 99%
4. Insurance verification non-ED is 98%
5. % of New Patient Scheduled (Appointment) within 30 Days is 80%
6. Duplicate Medical Records created is 612 (SMS) and Duplicate Accounts created is 667 (IDX)
7. Overall Eligibility Denials is 1.7%
8. Patient Satisfaction (PG 3rd Qtr.) Ease of Scheduling is 86.5

Project Charter

Goal Statement: To redesign the scheduling and registration processes in order to achieve the following by 12/31/2011:

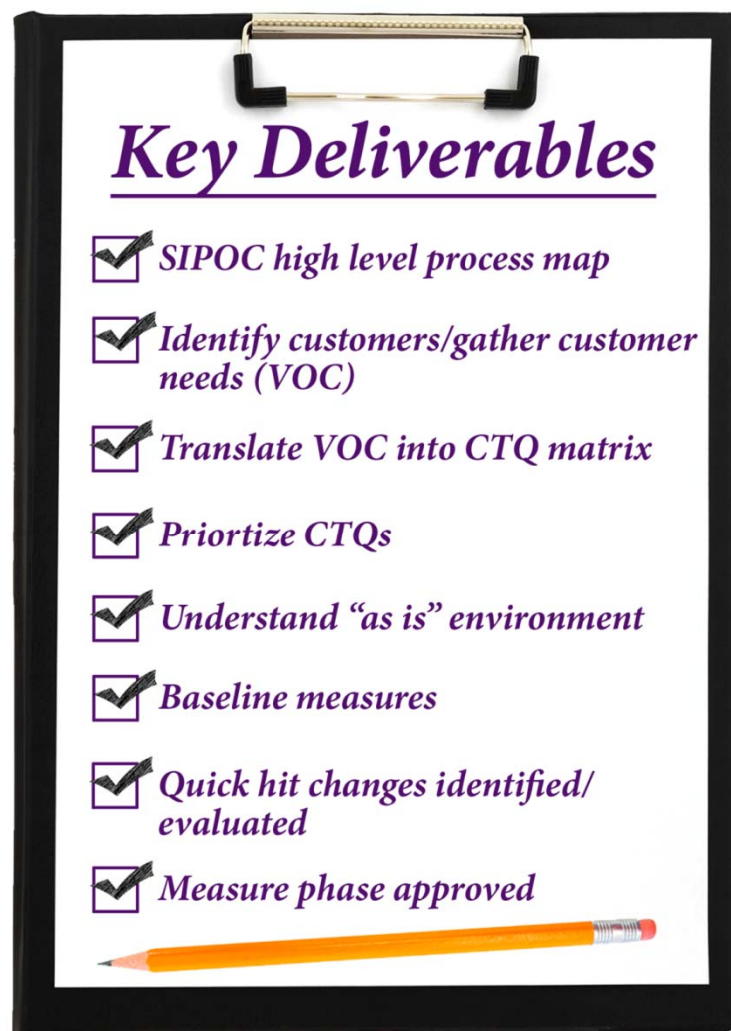
1. Increase the accuracy of registration information in the ED from 80% to >95%
2. Increase the accuracy of registration information non-ED from 93% to >95%
3. Increase the insurance verification from 99% to 100%
4. Increase the insurance verification from 98% to 100%.
5. New Patient Scheduled within 30 Days from 80% to 99%
6. Reduce Duplicate Medical Records from 612 (SMS) and Duplicate Accounts from 667 to (IDX) by 50%.
7. Reduce Overall Eligibility Denials from 1.7% to <1.0%
8. Increase Patient Satisfaction (PG 3rd Qtr) Ease of Scheduling from 89.5 to 92.0

DMADV

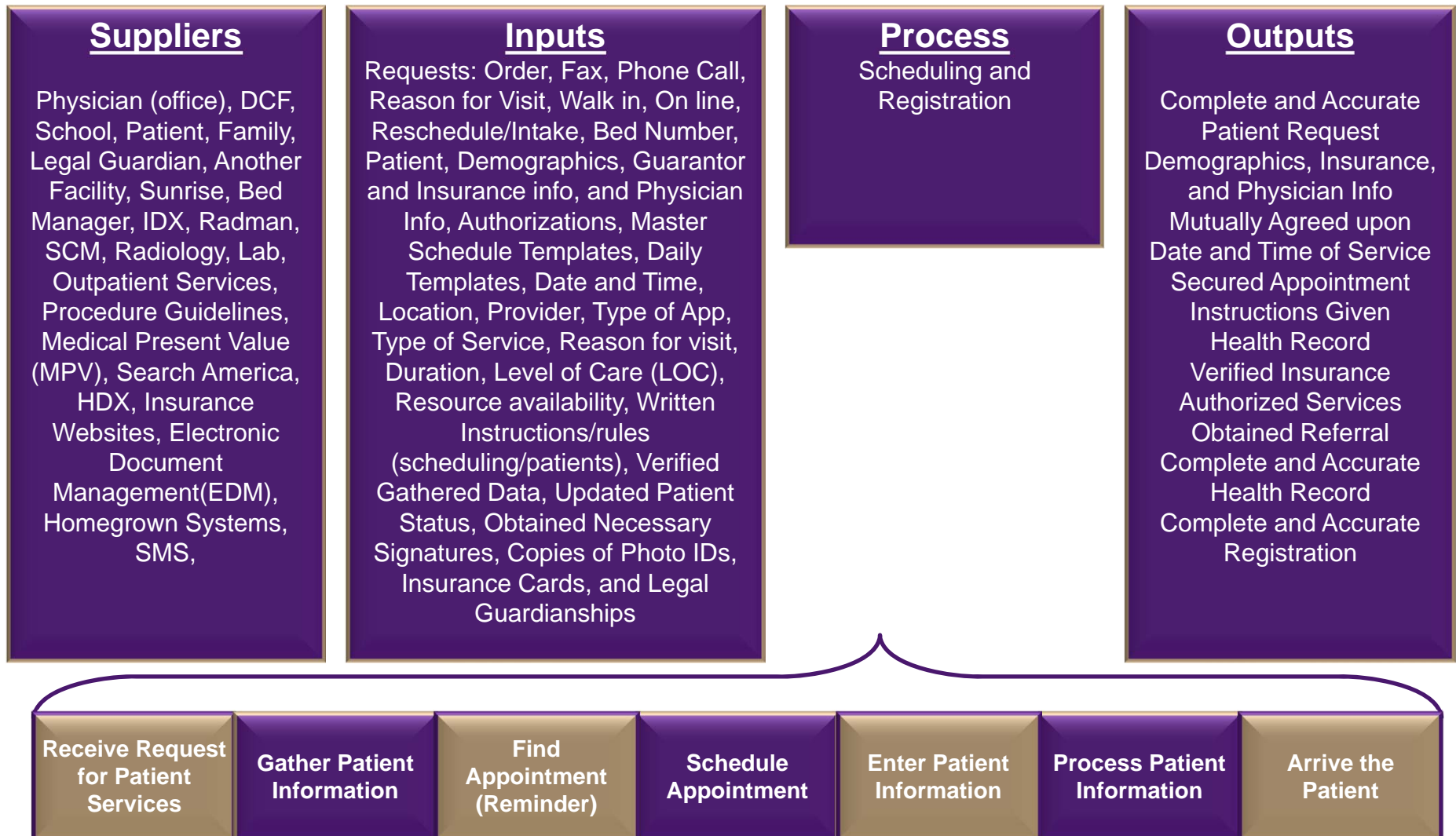
Define
Measure
Analyze
Design
Verify



Measure: Key Deliverables



SIPOC: High-Level Process Map



Identify List of Customers

CUSTOMER LIST
Ancillaries schedulers (Respiratory Nutrition, cardiology,)
Another Facility
Billing
DCF,
Finance
Health Information Management
Healthcare Access (HCA Associates)
Infusion Centers
Legal Guardian,
Med Specialties - Med Assistants and Receptionists
Patient/Family,
Physician (office),
Primary Care - Medical Receptionists, RNs, Practice Associates
Providers of Care
Radiology
Scheduler
School,
Sleep Lab -
Surg Specialties - Med Assistants and Receptionists
Therapies - Medical Receptionists
Inpatient Unit
Utilization Manager

Translate VOC to Key Issues/Needs

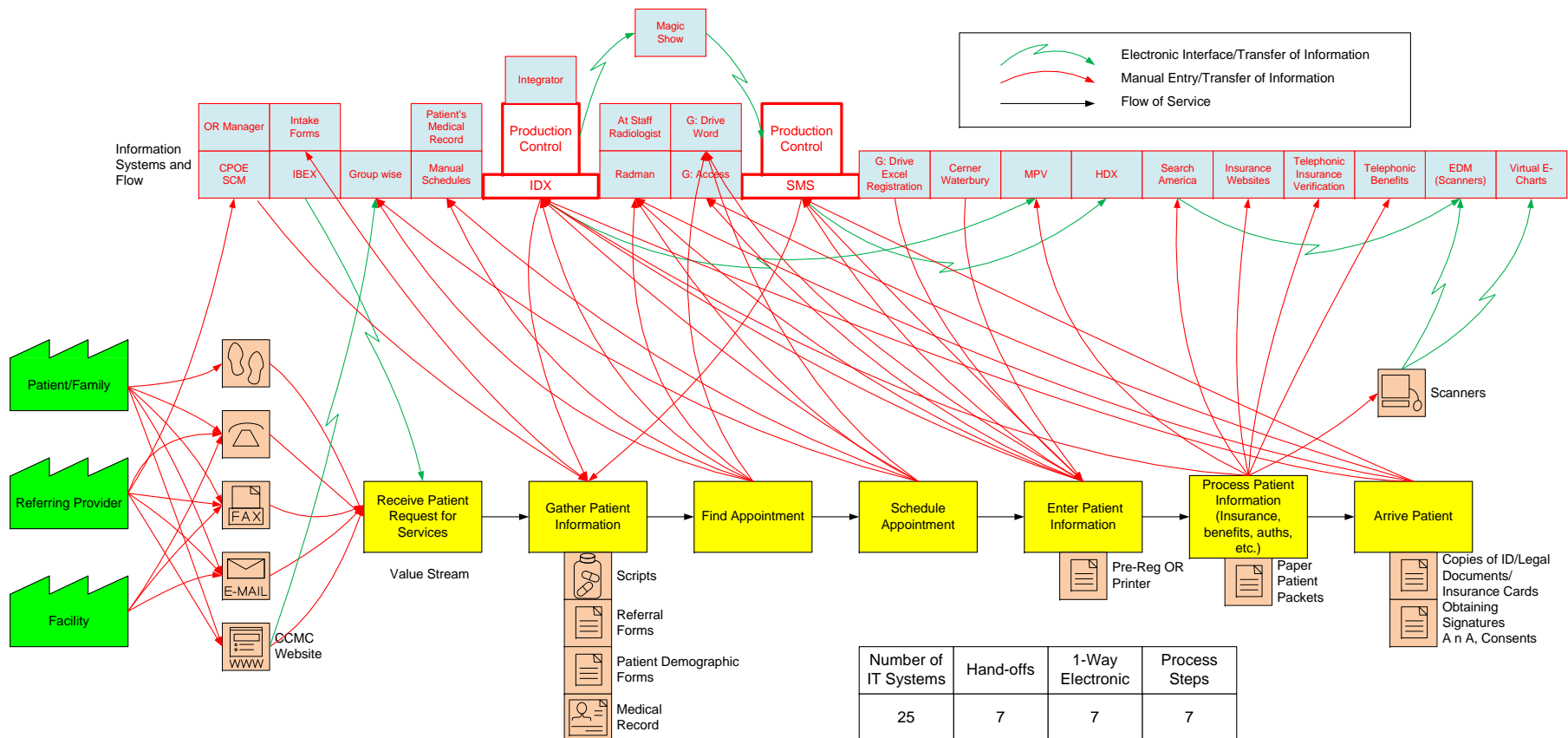
TRANSLATE VOICE OF THE CUSTOMER TO KEY ISSUES/NEEDS	
VOC Response	Key Issues (Needs)
Ability to flag complex patients so that they can be scheduled with extra time	Ability to flag patient specific considerations
I would like to see outside physicians connected somehow to send electronic script instead of faxed one you can hardly read.	Ability of outside provider groups to send electronic referrals/requests
patients often come to fluoro not knowing what kind of exam and what the exam involves, the doctors' offices are not educating their patients	Access to important information for patients.
No access to scheduling/registration after hours - if I talk to a pt in the evening and want them seen the next day, I can't give them an appt	Access to scheduling/registration processes for patients
I think that we could be more efficient in our evaluations if we received more patient information (ie. patient forms of past medical information, etc) in advance, this would decrease parent interview time and allow for improved quality	Access to the patient's complete medical record
technology that provides updates and most accurate personal information of patients to all areas of the hospital	Access to the patient's complete medical record
updated information from clinics	Access to the patient's complete medical record
Physical environment--accessibility for patients in wheelchairs	Accessibility for special needs patients
pertinent patient history to accommodate disabilities or added services (interpreter)	Accessibility for special needs patients
scanner to scan the pre-cert logs into EDM	Availability of necessary equipment/supplies
Scanners and e-sign to work accurately	Availability of necessary equipment/supplies
slive Pockets for the wall	Availability of necessary equipment/supplies
Technology is rapidly changing due to the fact that a large portion of my responsibilities are dependent upon computer, phone, etc. My ability to stay current with the ever advancing technology would definitely improve my performance	Availability of technology to enhance job performance
a computer that is already on so all you have to do is open idx and type in a password (i.e. Floor COW)	Availability of technology to enhance job performance
a COW to check insurance Auth before referring families to the front desk (Not always in the chart-insurance auth)	Availability of technology to enhance job performance
A scheduling system that is easy to use, whether making an appointment for a patient or inputting schedules into the system.	Availability of technology to enhance job performance
access to maintaining our own schedule	Availability of technology to enhance job performance
access to more insurance sites non mpv	Availability of technology to enhance job performance

Final List of CTQs

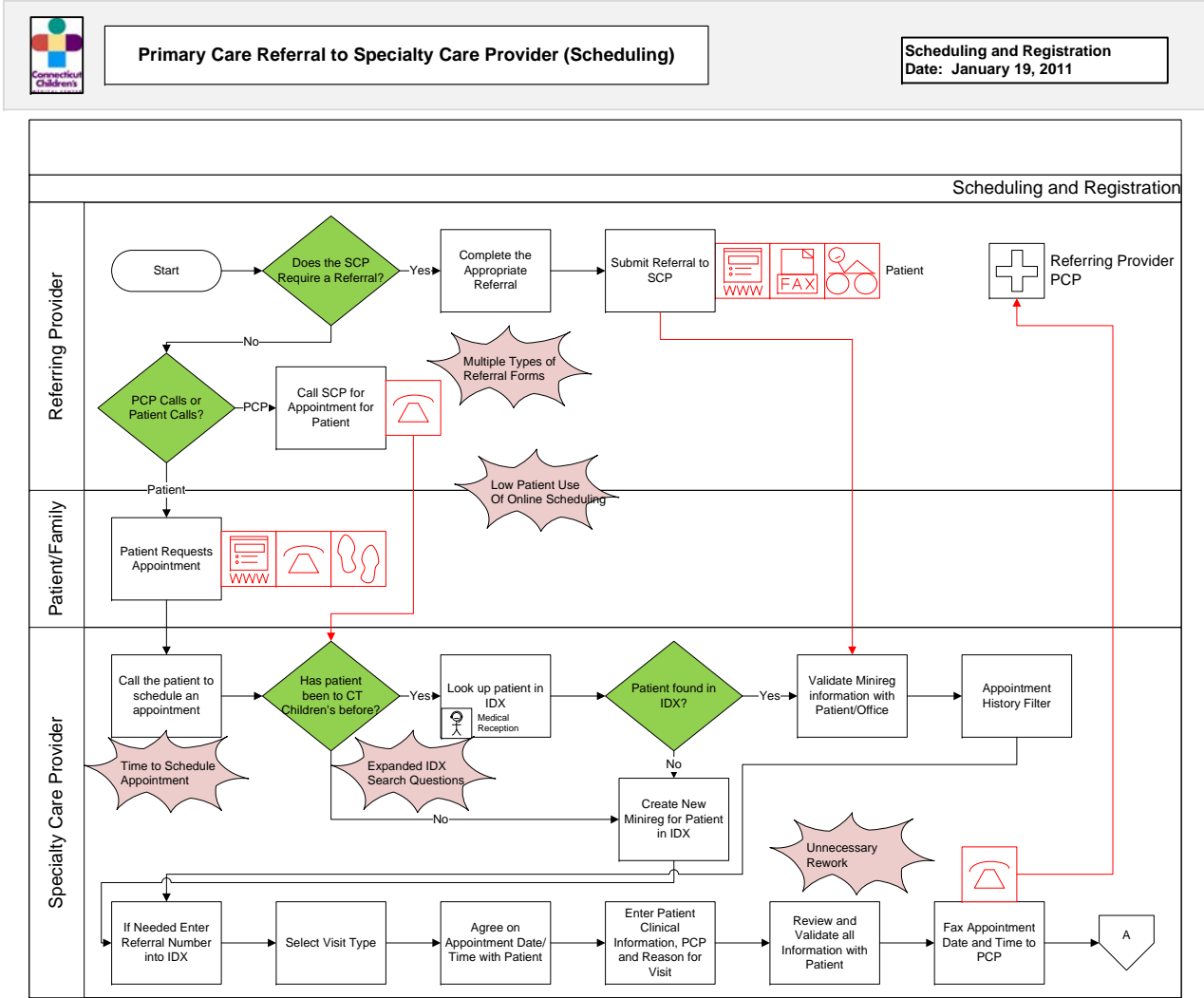
Scheduling and Registration Critical to Quality Measures	
1	Number of options available to patients to access the system.
2	Number of information systems required to access patient's complete medical record.
3	Registration/scheduling accuracy.
4	Complete, accurate and legible request for patient services.
5	Patient satisfaction with scheduling/registration processes.
6	Eligibility denials.
7	Number of handoffs required to schedule/register one patient.
8	Number of information systems required to register one patient or schedule an appointment.
9	Duplicate Medical Records/Accounts
10	Time from referral submitted to the time the patient has secured an appointment.
11	Complete preregistration prior to check in.
12	Authorization obtained prior to appointment.

Conceptual Model/Value Stream Map

Connecticut Children's Current State Scheduling and Registration High Level Process Map (Level 3)



Current State Detailed Process Maps



Process Opportunity Final List

PROCESS OPPORTUNITY FINAL LIST		
Ref #	Process Step	Process Opportunity
1	Receive Request for Patient Services	Multiple Ways for Patient to Request Appointments That Work
2	Receive Request for Patient Services	Low Patient Use of Online Appointments
3	Schedule Appointment	Create Duplicate IDX Account
4	Enter Patient Information	View SMS for MR#
5	Enter Patient Information	Timing of IDX-SMS for Registration (No System of Truth)
6	Process Patient Information	Lack of Communication Between HCA and Reg/Ref
7	Enter Patient Information	Variation in Department HCA Processes
8	Enter Patient Information	Cashier's Office Manually Enter Report Criteria
9	Enter Patient Information	Potential to Create Duplicate Medical Record #'s
10	Process Patient Information	Variation in How to Handle Self-Pay Patients

**103 Total
Process
Opportunities
Identified**

DMADV

Define
Measure
Analyze
Design
Verify



Future State Functions

Function	What this means
Receive Patient Request for Services	A formal request for services is submitted by patient/referring provider and received by a scheduler.
Gather Patient Information	All information required to schedule an appointment and complete a registration is obtained from the patient.
Enter Patient Information	All information required to schedule an appointment and complete a registration is entered into the system.
Find Appointment	An appointment both available and agreeable to the patient is identified in the scheduling system.
Schedule Appointment	The appointment date/time and appropriate patient information is entered in the system.
Process Patient Information	The insurance information provided by the patient is verified and any necessary referrals and/or authorizations are obtained.
Arrive Patient and Collect Copay	Once the patient arrives for service, the patient is arrived in the system and the appropriate copay is collected.

Best Practice Research

Best Practices for Functions			
	List of Functions (prioritized)	Best Practices	Source
1	Receive/Submit Request for Patient Services (Referral, Order Requisition, Verbal Referral/Request)	One phone number, limited fax from clinics (Full Cerner)	LCMC
2	Find and Select Time of Service (Appointment) Agreeable to the Patient/Family	Upgraded phone system	LCMC
3	Schedule the Time of Service (Appointment) in the System	Centralized Scheduling (Outpatient Ancillary and Hospital-Based Clinics - 32 total and 3500 appointments/month)	LCMC
4	Gather Patient Information (Demographics, Time of Service, Insurance Information, Provider, PCP)	90% goal for preregistration, online preregistration	LCMC
5	Enter Patient Information into the System (Demographics, Time of Service, Insurance Information, Provider, PCP)		LCMC
6	Process and Verify Patient Information (Insurance, Authorizations and Benefits)	Centralized Preregistration (10 FTE, 10 in departments during slow time, Referrals/Authorization/Orders (2 FTE)	LCMC
7	Arrive the Patient into the System and Collect Copay	Kiosks (E-Consent, Insurance via credit), Arrival and Copay in the department, Centralized Arrival/Copay (10 in)	LCMC
8	Receive/Submit Request for Patient Services (Referral, Order Requisition, Verbal Referral/Request)		CCMC
9	Find and Select Time of Service (Appointment) Agreeable to the Patient/Family		CCMC
10	Schedule the Time of Service (Appointment) in the System		CCMC
11	Gather Patient Information (Demographics, Time of Service, Insurance Information, Provider, PCP)		CCMC
12	Enter Patient Information into the System (Demographics, Time of Service, Insurance Information, Provider, PCP)		CCMC
13	Process and Verify Patient Information (Insurance, Authorizations and Benefits)	Decentralized registrations for processing insurance referrals and authorizations in the departments.	CCMC
14	Arrive the Patient into the System and Collect Copay	Arrival and copay done at check in.	CCMC

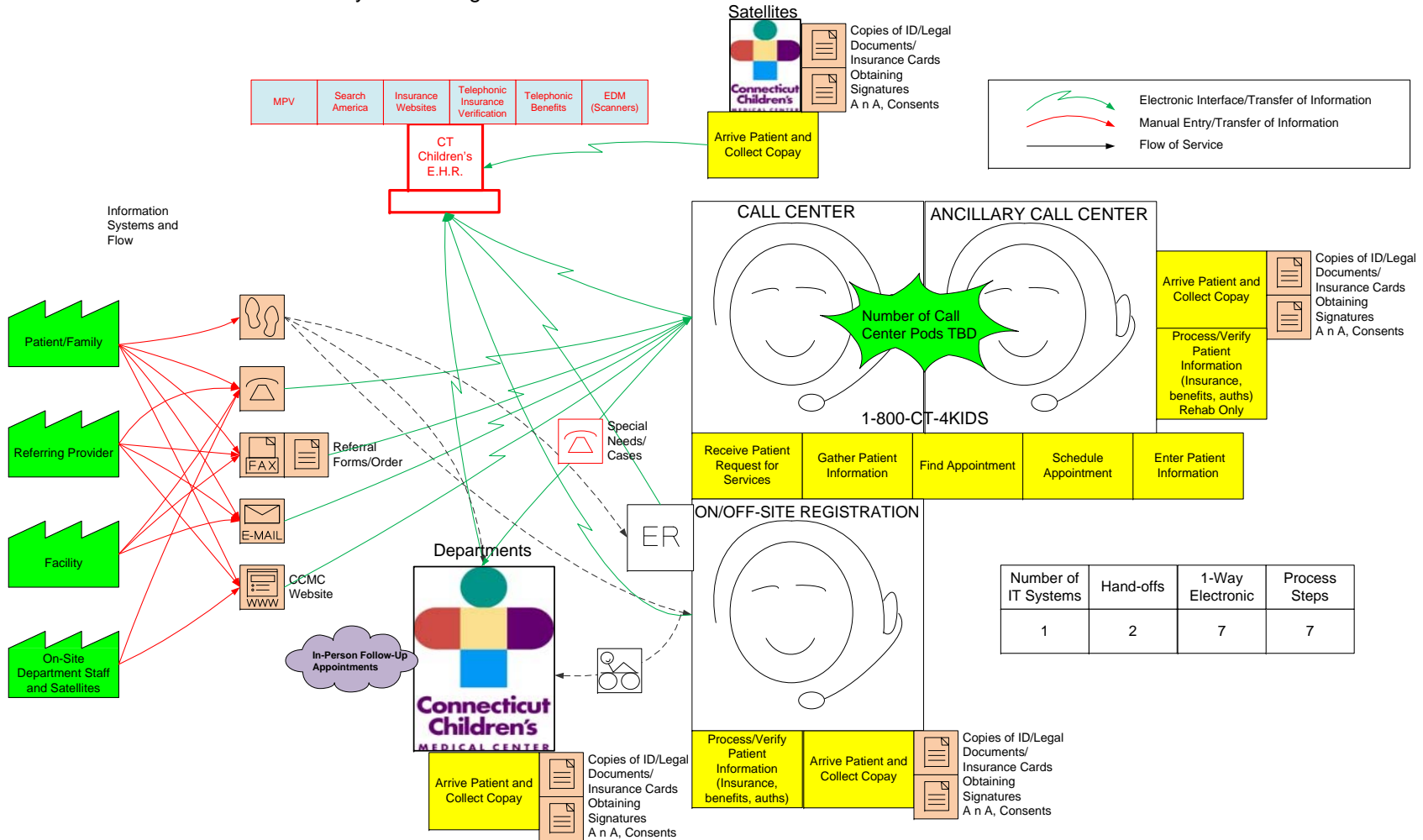
The team spoke with three hospitals that have implemented a version of centralized scheduling to help identify best practices for functions.

Evaluation of High Level Design Alternatives

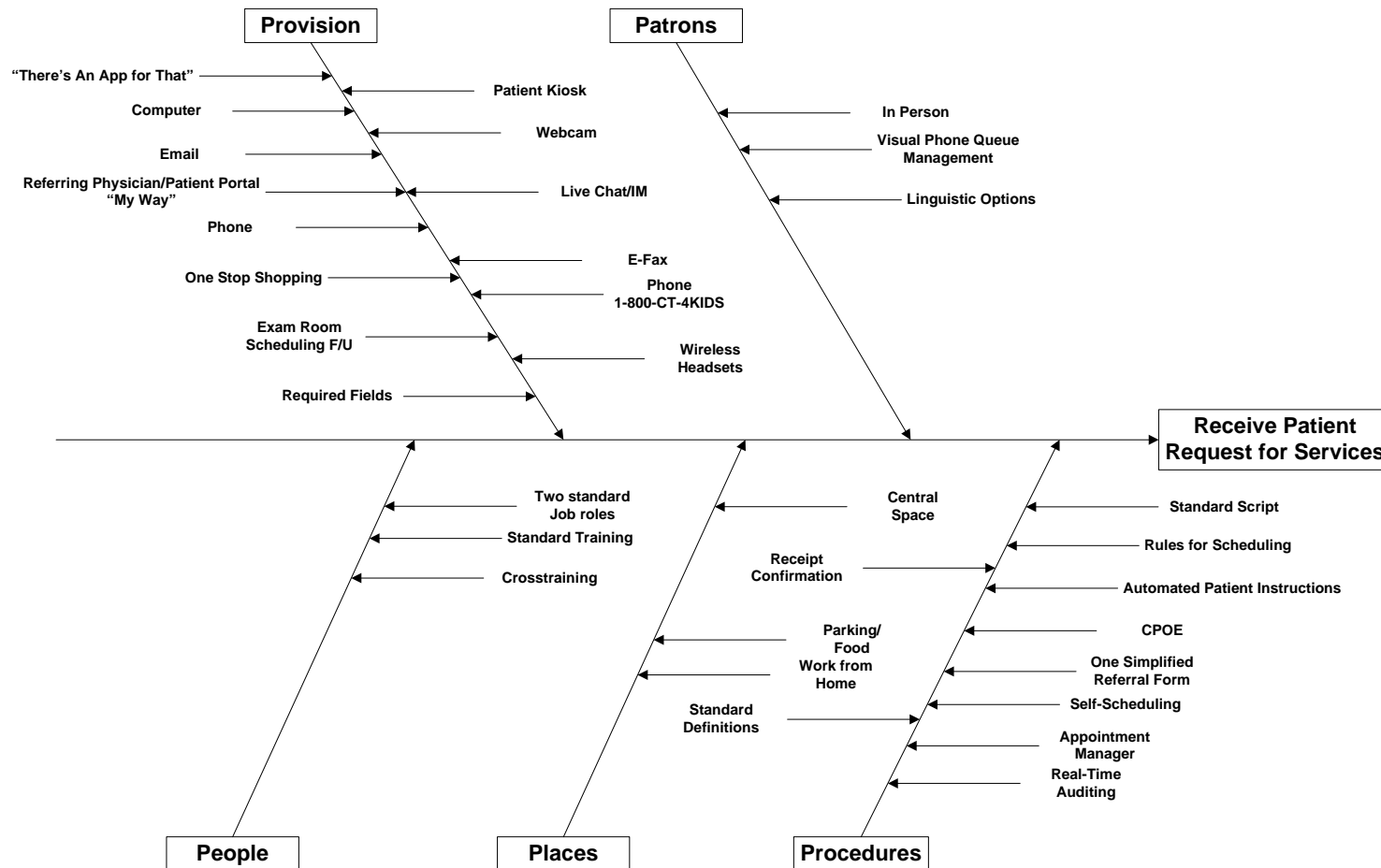
High Level Design	Description	Risk Assessment Acceptance Score	Risk Assessment Technical Quality Score	Pugh Concept Score	Total
1	Total Centralized	128	137	15	2
2	Total Centralized (On/Off-Site Call Center)	118	139	15	3
3	Centralized Scheduling/Decentralized Registration	117	145	7	4
4	Total Decentralized	71	165	1	6
5	Centralized Scheduling (Off-site)/Centralized Registration (On-site)	128	137	15	2
6	Decentralized Scheduling/Centralized Registration	52	165	11	5
7	Centralized Scheduling/Centralized Ancillary/Centralized Registration	108	113	17	1

Recommended High Level Design Alternative

Scheduling and Registration High Level Design Alternative 7 – Centralized Scheduling/Centralized Registration/
Centralized Ancillary Scheduling



Brainstorm Design Features by Function



Design Feature Categorization

Feature Categorization				
#	Features	Definition	Enhanced / Enabled / Independent	[Difficulty to Implement]
1	Seamless Flow of Information	Patient information entered once will auto populate into the appropriate fields for all other applications.	Enabled	Hard
2	One Time Data Entry	Patient information entered once will auto populate into the appropriate fields for all other applications.	Enabled	Hard
3	Standard Training	Develop and provide standard training for all scheduling and registration roles.	Independent	Moderate
4	Cross-Training	Develop and provide cross-training for all scheduling and registration roles.	Independent	Hard
5	Standard Scheduling Work Flows	Develop and provide standard scheduling work flows.	Independent	Moderate
6	Two Standard Job Roles	Develop and provide two standard job roles for scheduling and registration.	Independent	Easy
7	Connectivity	Acceptable connectivity between applications.	Enabled	Hard
8	One Stop Shopping	All scheduling and registration processes to schedule an appointment and complete registration in one phone call.	Enhanced	Hard

Each design feature prioritized into 1 of 3 categories, EHR Enabled, EHR Enhanced and EHR Independent and on difficulty to implement.

Final Design Feature List

Final Design Features List				
#	Features	Definition	Enhanced / Enabled / Independent	[Difficulty to Implement]
1	Standard Training	Develop and provide standard training for all scheduling and registration job roles.	Independent	Moderate
2	Cross-Training	Develop and provide standard training that allows any staff member to perform both scheduling and registration functions.	Independent	Hard
3	Standard Scheduling/Registration Work Flows	Develop and provide standard work flows for call center and registration job roles.	Independent	Moderate
4	Two Standard Job Roles	Call center staff standard job description, policies and work flows. Registration staff standard job description and work flows.	Independent	Easy
5	Standard Script			
7	Repeat Back			
9	Webcam	allows see a scheduling appointment customer service needs.	dependent	Easy

A total of 96 design features were identified for Phase 1 (Pre-EHR) or Phase 2 (Intra-EHR) implementation.

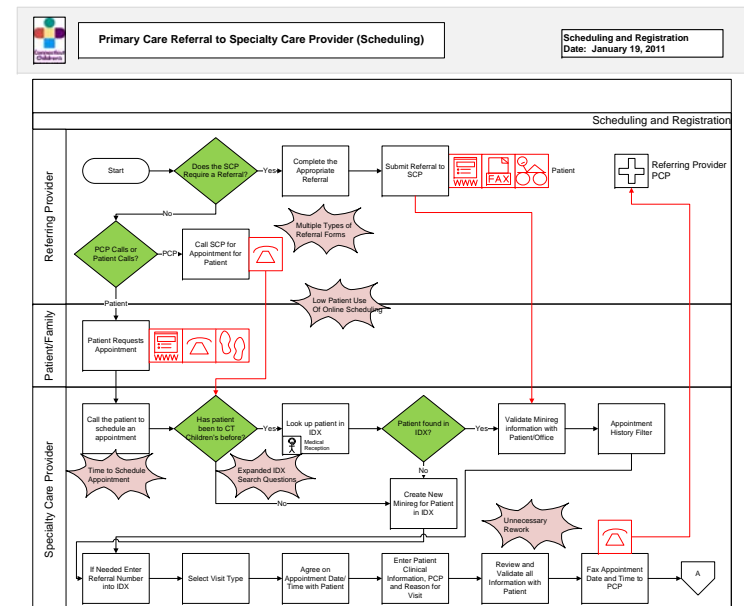
DMADV

Define
Measure
Analyze
Design
Verify



Detail Design Deliverables

- Detail Process Maps
- Standard Work and Policies and Procedures
- Human Resources Plan
- Information Technology Plan
- Facilities Plan
- Equipment and Supply Plan
- Service Level Agreements
- Process Control Plan
- Communication Plan
- Updated Customer Design Scorecard
- Pilot/Small Test of Change Planning and Implementation
- Detail Design Evaluation
- Develop Design Verification Kit/Design Kit
- Design Feature Requirements Checklist



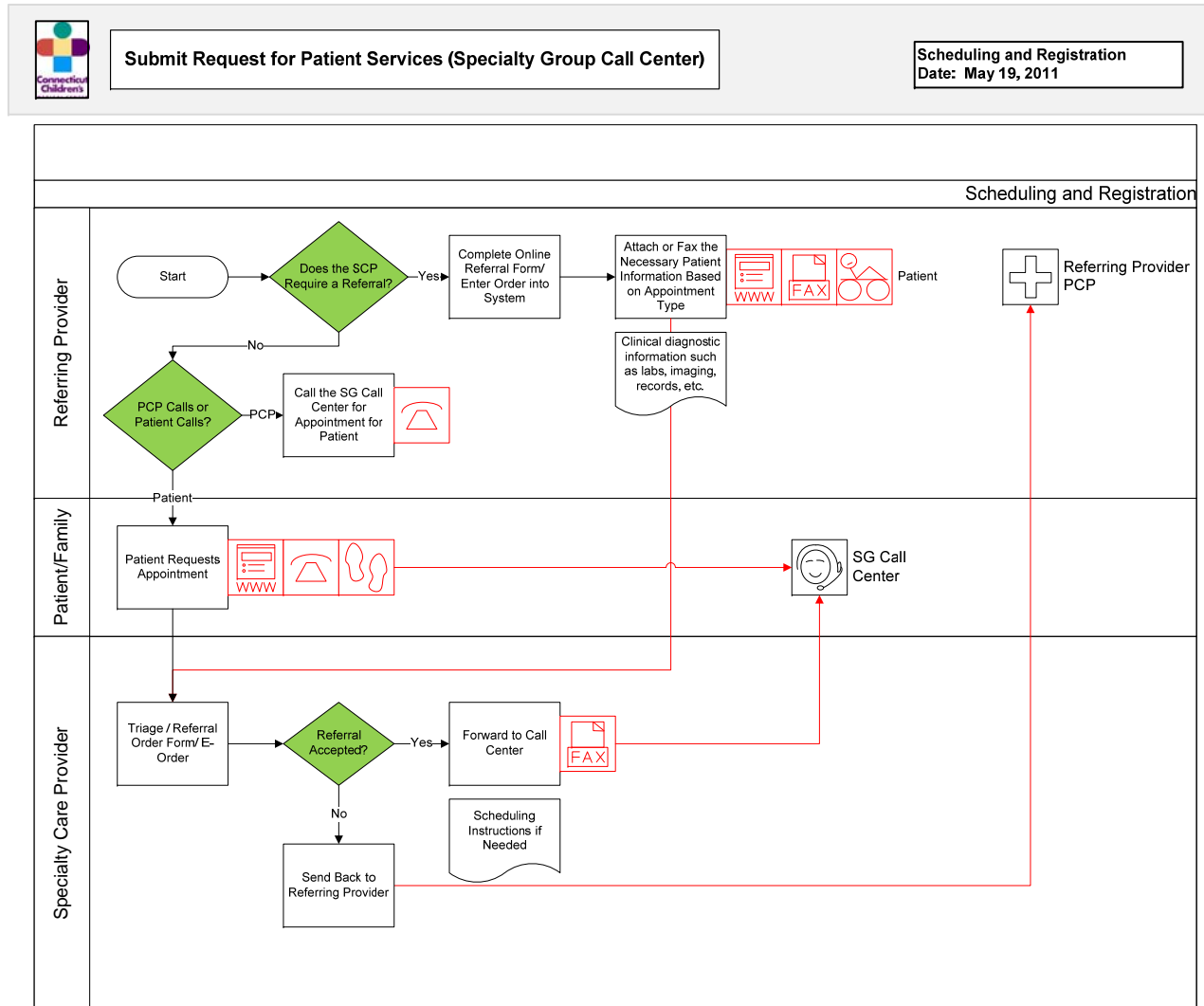
1. Call Center Scheduling

2. Centralized Registration

1. Call Center Scheduling

- Job Descriptions Completed for Scheduler I, II and III
- Standard Work Scheduling Script Completed
- Pilot Planning – June 7, 2011
 - Pilot departments include Ear, Nose and Throat, Audiology and Hematology/Oncology
 - Estimated (5) five schedulers
 - Training guides in development and training scheduled for the week of 5/30/11
 - Call center to be set up in conference room A/B to include (5) computers, (5) phone ACD, and fax

Submit Request for Special Group Services



Call Center 1-Day Pilot

Key Actions:

- ✓ Completed Job Descriptions for Scheduler I, II and III
- ✓ Developed Standard Work Scheduling Scripts and Training Guides
- ✓ Developed Books of Scheduling Rules per Department
- ✓ Included Departments: ENT, Audiology, and Hematology/Oncology
- ✓ Estimated (5) five schedulers
- ✓ Set-up Call Center in Conference Room A/B with (5) computers, (5) phone ACD, and fax



Measuring Success

- **Scheduling Accuracy:**
 - Percent of patients scheduled with the correct appointment type and provider
- **Percent of Call Volume in Call Center:**
 - Percent of total patients scheduled that are scheduled in the call center
- **Time to Schedule (Cycle Time):**
 - Total time spent on the phone and entering necessary information into the system
- **Patient/Family Satisfaction:**
 - Survey scores to each question



Call Center Week-long Pilot

Week-long Pilot Goals:

- Further develop and test concept; validate concept with data collection
- Key questions tested in pilot:
 1. Can we include more practices in the pilot?
 2. Can we maintain or exceed our results over a longer period?

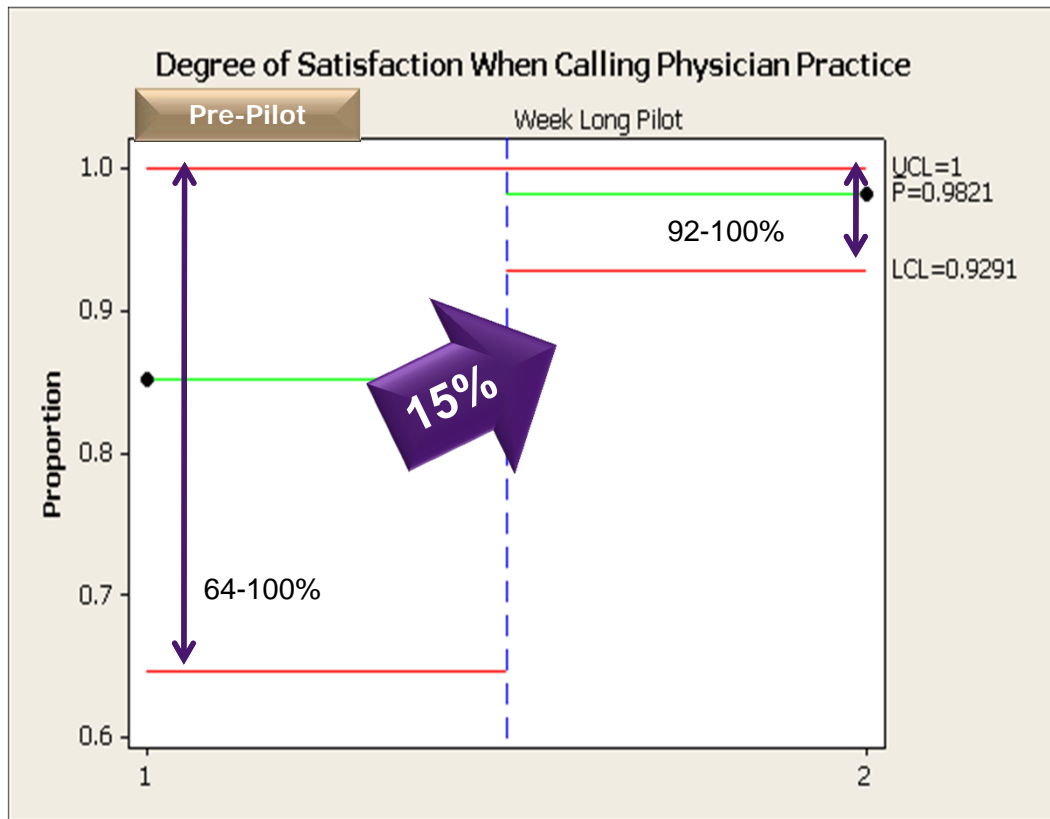
Key Actions:

- ✓ Expanded scope to include ENT, Audiology, EEG, Neurology and Hematology/Oncology
- ✓ Developed Standard Work Scheduling Scripts and Training Guides
- ✓ Developed Books of Scheduling Rules per Department
- ✓ Included same number (5) five schedulers (most from 1st pilot)
- ✓ Set-up Call Center in Conference Room A/B with (5) computers, (5) phone ACD, and fax

Summary of Results

Measure	Pre-Pilot	One Day Pilot	Week Long Pilot
Scheduling Accuracy	N/A	88%	96%
# Appointments	N/A	108	509
Call Volume Handled	N/A	50%	54%
Avg. Call Time	N/A	3 minutes 44 seconds	2 minutes 33 seconds
Overall Satisfaction	48%	70.6	74.5%
Patient/Family Perception Time Spent >5 minutes	33.3%	26.5%	24.6%
Ability to Accommodate Needs	88.9%	100%	93.4%
Scheduler Was Knowledgeable (% Extremely)	50%	55.9%	73%
Degree of Helpfulness of Scheduler (% Very Helpful)	48%	55.9%	75%
Patient/Family Satisfied With Process Time	63%	76.5%	67%
Patient/Family Satisfied With Calling Physician Practice	85%	97%	98%

Call Center Survey Results



Conclusions:

1. 98% of Patient/Families reported they were “**Satisfied With the Experience**” when calling the physician practice (up from 85% during the pre-pilot and 97% during the 1-day Pilot)
2. 15% improvement was achieved as well as more consistent, predictable /consistent responses

2. Centralized Registration

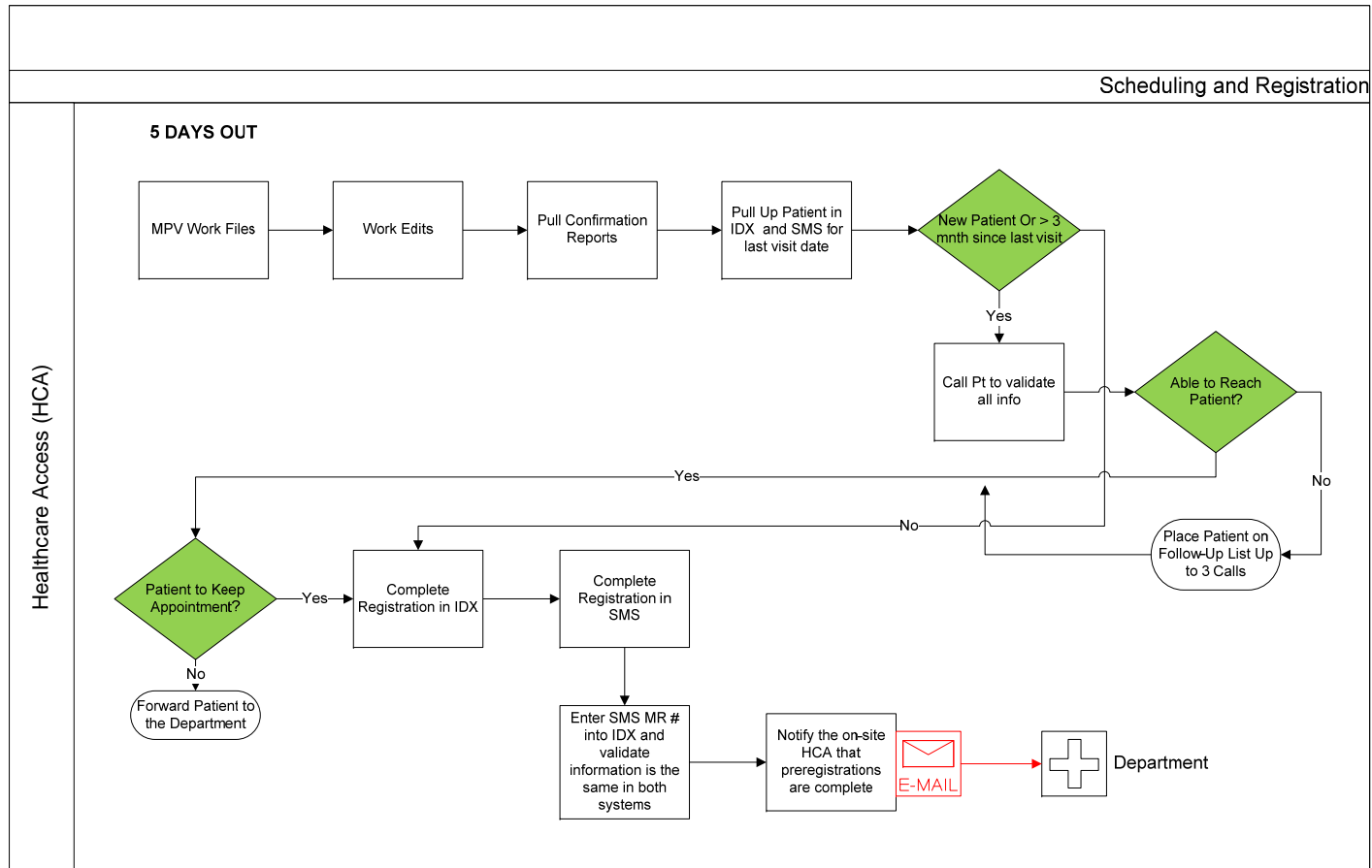
- Job Descriptions Completed for HCA I, II and III
- Standard Work Scheduling Script Completed
- Policies and Procedures in Process
- Pilot - Started May 9, 2011
 - Pilot departments include Ear, Nose and Throat, Audiology and Hematology/Oncology, Emergency Department
 - 4 HCA/Registration Referral Staff
 - Training completed for pilot staff. Training for expansion on-going
 - Utilizing space at 60 Hartland Street
 - Next steps to analyze design scorecard data from pilot and determine staffing needs for expansion

Healthcare Access (Centralized Registration)




Healthcare Access (Process Patient Information)

Scheduling and Registration
Date: May 19, 2011



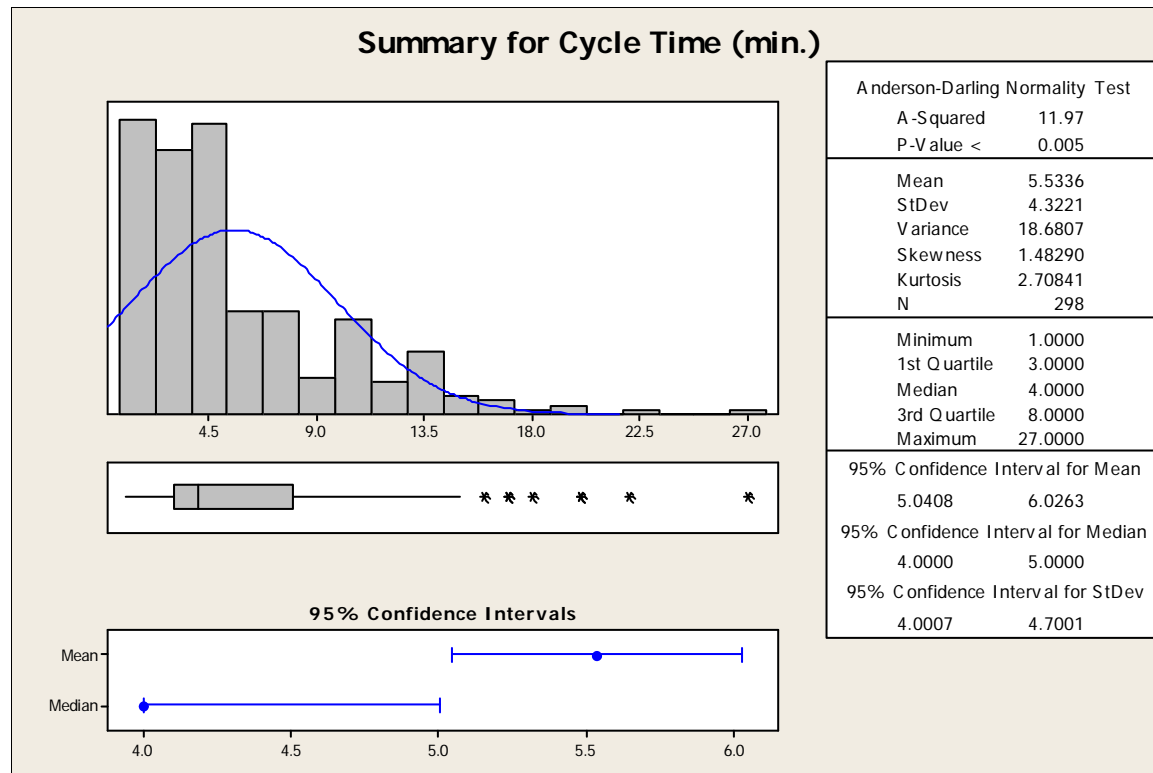
Centralized Registration Design Scorecard

- Percent of Patients Called for Preregistration
- Time to Preregister (Cycle Time) – Total time spent on one patient preregistration
- Registration Accuracy – Total number of “cross-outs” returned to HCA
- Percent of Patients with a completed registration prior to arrival



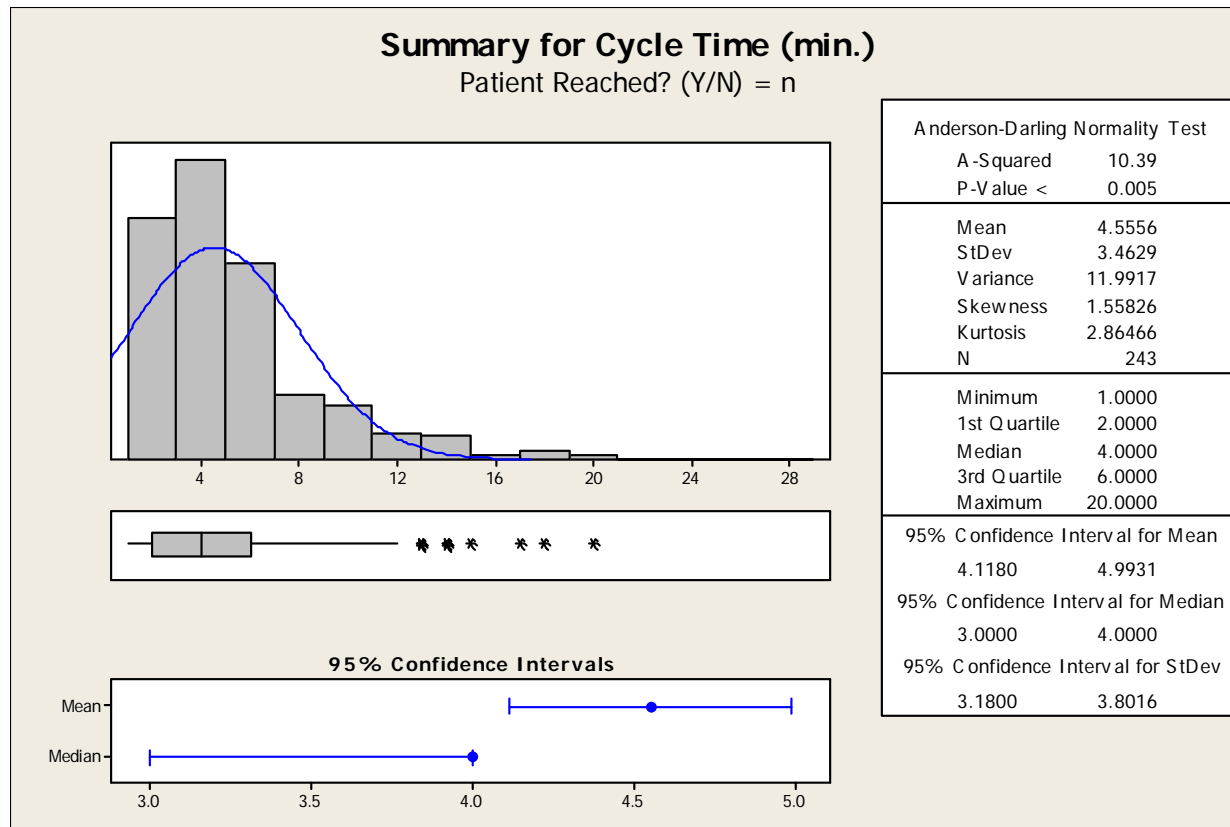
**Baseline measurements in Process.
To be measured during the pilot for
detail design evaluation.**

Pre-Registration Cycle Time in Both Systems



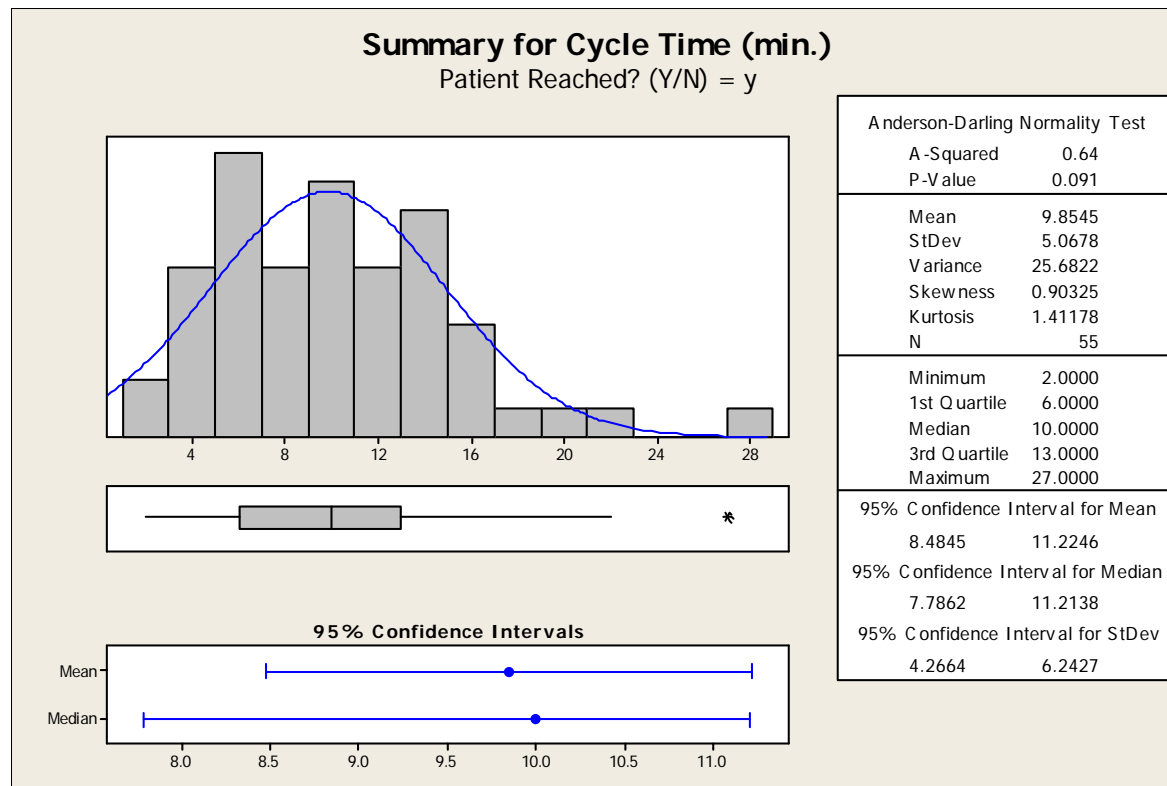
For 298 patients pre-registered, the median cycle time is between 4.0 minutes and 5.0 minutes at the 95% CI.

Patients Preregistered With No Phone Call



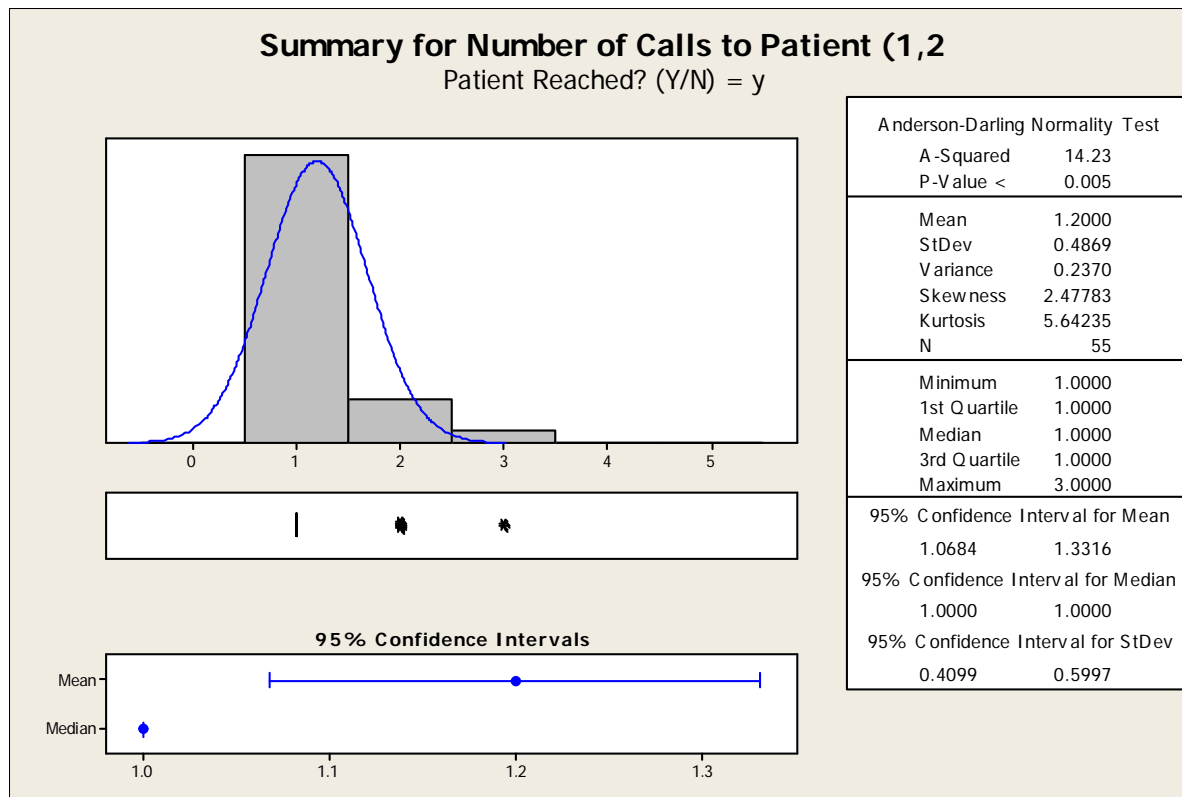
For 243 patients pre-registered *without* a phone call, the median cycle time is between 3.0 minutes and 4.0 minutes at the 95% CI.

Patients Preregistered Over the Phone



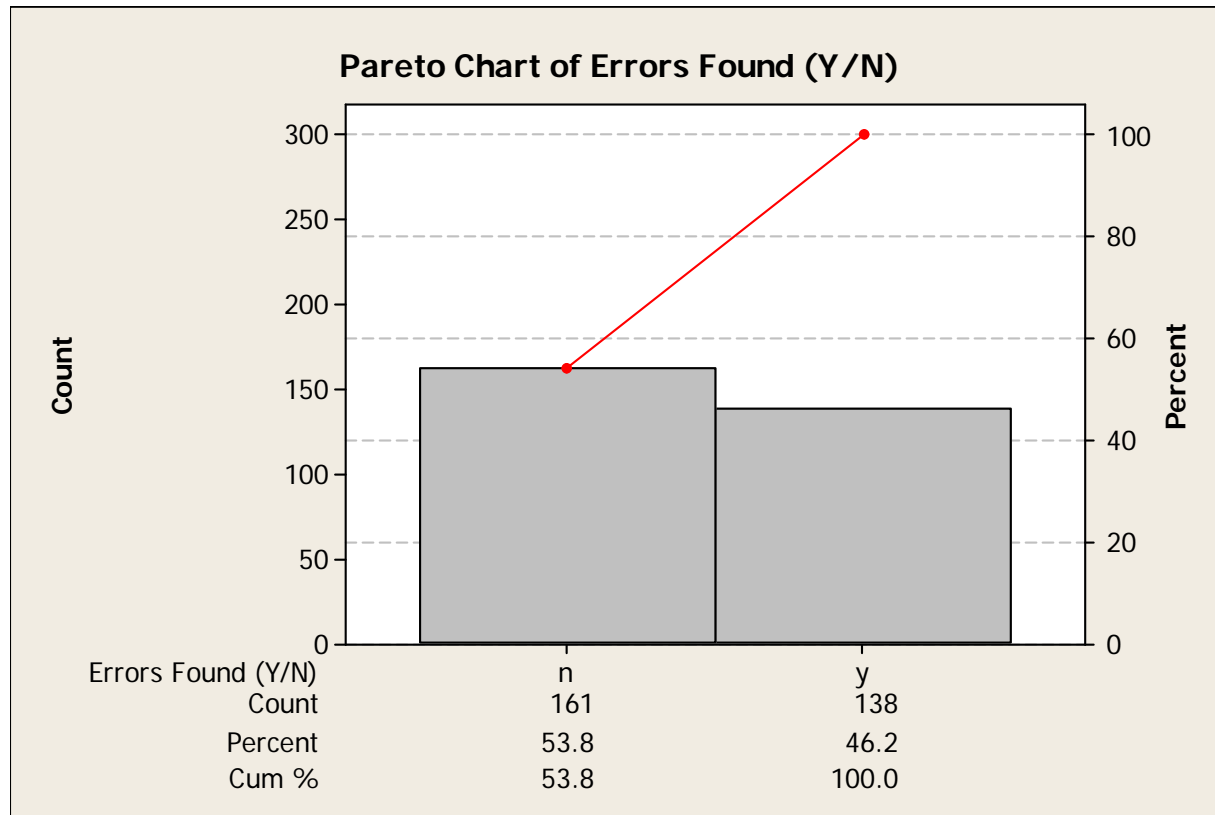
For 55 patients pre-registered *with* a phone call, the median cycle time is between 8.0 minutes and 11.0 minutes at the 95% CI.

Number of Calls Made for One Registration



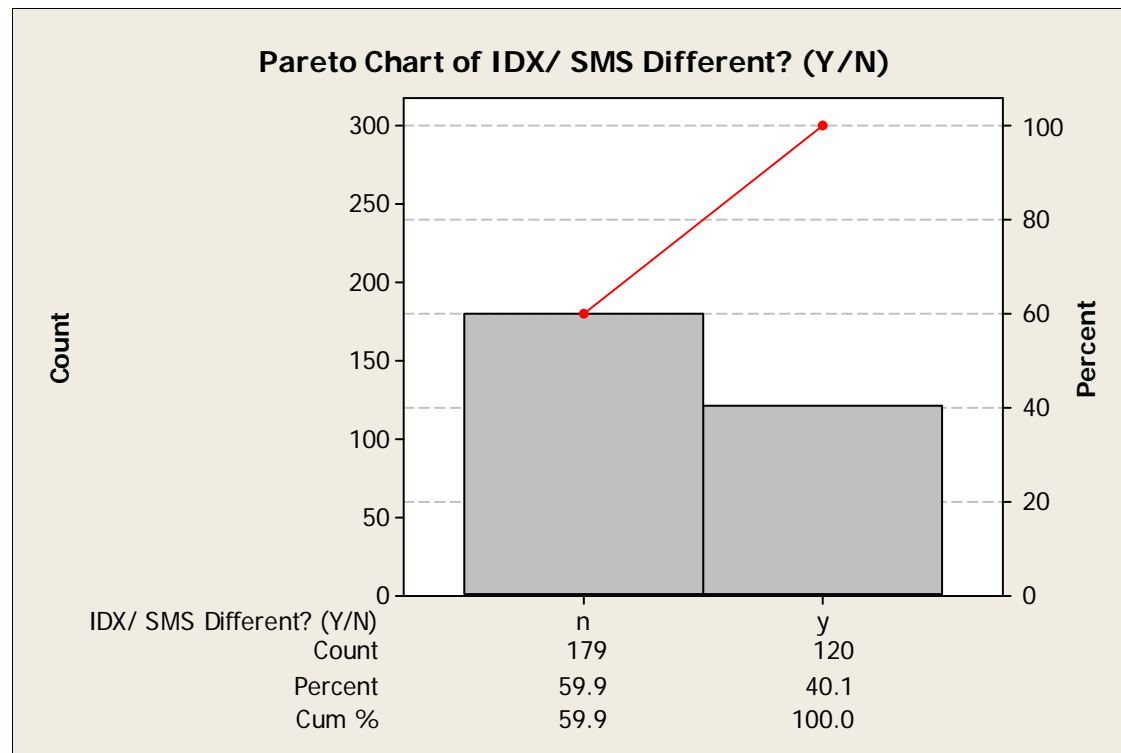
Of the 55 patients called during the pilot, the median number of calls placed to the patient was 1.000 at the 95% CI.

Errors Found in Either or Both Systems



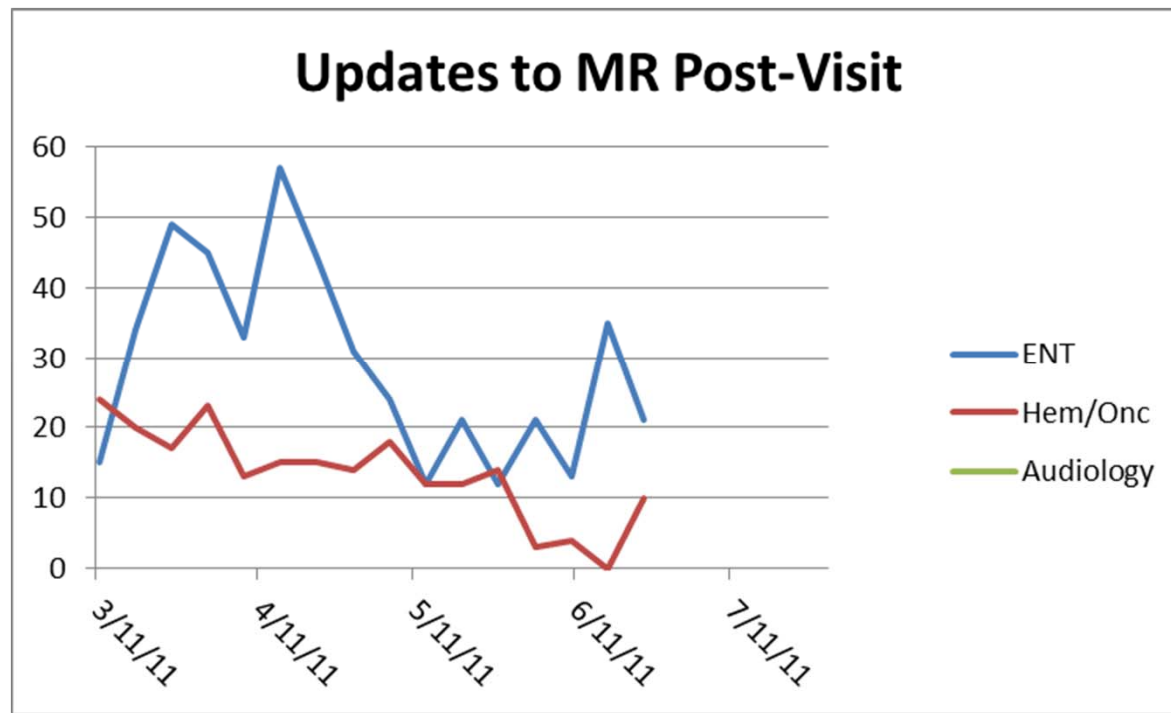
Of the 299 patients preregistered during the pilot, **46.2%** obtained an error in either or both IDX and SMS.

Do IDX and SMS Agree?



Of the 299 registrations performed during the pilot, **40.1%** had discrepancies in data completeness and/or accuracy between IDX and SMS.

Updates to Medical Records Post-Visit



Both ENT and Hem/Onc are showing a decreasing trend in the number of updates/cross-outs that have to be corrected in the medical record after the visit.

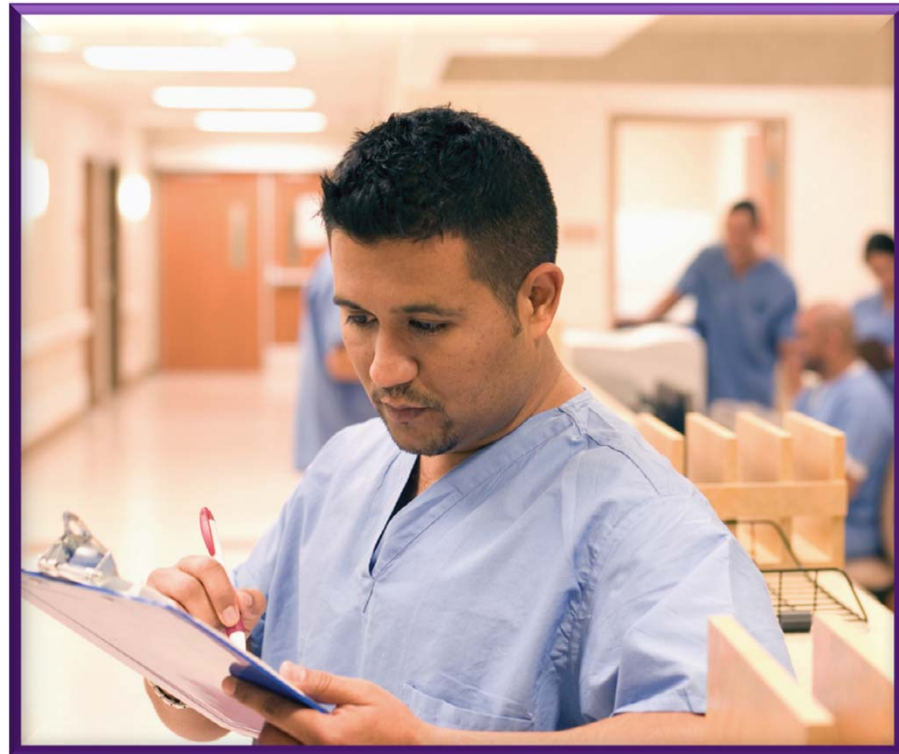
Potential Staffing Requirements for HCA

Department	Annual Volume Visits	Total Demand (Called Pts) Hrs	Total Demand (Blind) Hrs	Total Demand Hrs	Total Demand Hrs + 20%	Total Demand Weeks	Total Capacity (Hrs)
SG	112,582	9382	4691	14073		31	930
Radiology	21,398	1783	892	2675			
Total	133,980	11,165	5,583	16,748	20,097		
Total HCA Needed	18.0						
Total HCA Needed (20%)	21.6						

Based on a week sample of analysis (samples) for ENT, Audiology and Hem/Onc patients, HCA will need 18.0 registrars (not FTEs) to meet the annual demand of scheduled appointment registrations in both IDX and SMS. The calculation is based on 6 productive hours per day. With a 20% increase in volume or duties, HCA will need 21.6 registrars.

DMADV

Define
Measure
Analyze
Design
Verify



Design Verification Plan

Design Verification Test	Activity Description	Status	Completion Date	Owner
Call Center Scheduling	Finalize the departments that will be participating in the pilot.	Approval obtained for Hem/Onc and Audiology. Allen to schedule meeting with Scott Schoem to gain approval for ENT. Tollgate for approval from Project Champions to be scheduled.	✓	Allen S.
Call Center Scheduling	Finalize the total number and identify names for the call center schedulers for at least 5 days.	First estimate for total number of schedulers is (5). Wanda, Yazmin, (1) from Hem/Onc, (1) from Audiology, Leslie (Float) 6/7 only	✓	Linda K. (Audiology), Randy S. (Hem/Onc.)
Call Center Scheduling	Form a pilot planning group to include representation from the Scheduling and Registration team, pilot departments, and leadership.	Recommended membership includes a leader, Nancy Bruno, Alicia Black, Sally Derench, Randy Schwartz, Micheline Nollez (ad hoc), Steve Canzellerini, Lori Neu, identified schedulers.	✓	Randy S.
Call Center Scheduling	Form a pilot steering committee.	Recommended membership includes Allen Starkman, Brian Frawley, Scott Schoem (or designee), Nate Hagstrom, Karen or Deb, Barbara, leader.	5/13/11	Allen S.
Call Center Scheduling	Identify location for call center for 6/7 and beyond.	Recommended location is 282 Washington.	✓	Brian F.
Call Center Scheduling	Logistics for scheduler workstations to include phones, computers, supplies, etc.	Need to request Steve C. from Kelly for planning.	✓	Brian F.
Call Center Scheduling	Create job aids for Call Center Schedulers.	Wanda working on ENT job aid. Linda to get Audiology. Hem/Onc not started.	5/20/11	Pilot Planning Team
Call Center Scheduling	Provide training for Call Center Schedulers.	Planning in process. Meeting scheduled for 5/25/11 to plan with team.	6/6/11	Pilot Planning Team
Call Center Scheduling	Evaluate pilot based on process issues discovered and customer design scorecard.	Data collection plan in place for scorecard data.	6/10/11	Pilot Planning Team
Call Center Scheduling	Determine the duration and dates for continuation of the pilot.	Meeting to be scheduled	6/10/11	Pilot Planning Team
Centralized Registration	Analyze and report data from the pilot.	Data entry in process	5/27/11	Jonathan F.
Centralized Registration	Create the centralized registration department (space, staff, equipment, processes, policies and procedures).	Continue current pilot through 5/27/11 and determine the next departments.	9/30/11	Micheline N.
Centralized Registration	Review Manager/Assistant Manager job descriptions.	In process of being revised.	7/1/11	Micheline N.
Centralized Authorizations	Plan and implement the initial pilot.	In process	7/1/11	Micheline N. and Linda K.
Centralized Authorizations	Analyze and report data from the pilot.	Data entry in process	7/1/11	Micheline N.
Centralized Authorizations	Review job descriptions	Not Started	7/1/11	Micheline N.
Centralized Authorizations	Create the centralized authorization department (space, staff, equipment, processes, policies and procedures).	Not Started	9/30/11	Micheline N.

Thank You!

