Improving Surgery First Cases of the Day On-Time Starts

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Background

- The Perioperative Service Improvement Project Committee was established with the goal to improve efficiency of perioperative services.
- Initial efforts focused on improving first case on-time starts due to the effect on several other OR metrics.
  - **OR Utilization:** if and when we can get future cases started
  - **Staff Utilization:** long hours and inconsistent schedule
  - **Overtime Requirements:** longer hours and shifted schedules

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Strategy and Vision at Children's

- **Vision for the Future:**
  "To be an indispensible pediatric delivery system for East Tennessee focused on providing Ideal Patient Care"
- **Strategy:** Expand lean process methodologies and adopt adaptive design concepts to drive ideal patient care.
  - Move from project base to culture change
  - Guide staff to Ideal Patient Care

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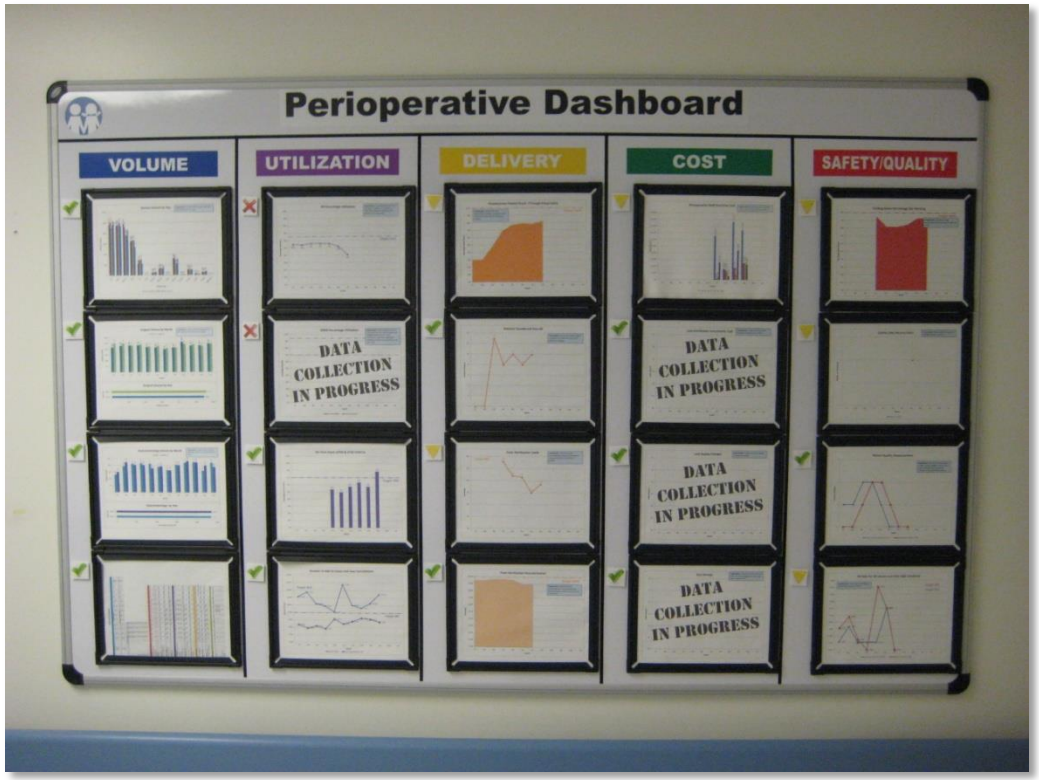
Hoshin Kanri Deployment

- **Metric Board Management:** Display used to communicate performance metrics, gaps, and measurements on operation performance.



- Management of Strategic Plan
- Daily/Weekly Management

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On-Time Start A3

A3 Problem Solving

Title: Surgery First Case of the Day On-Time Starts

Date: 11/15/11 **Owner(s):** Isaac Mitchell, Barb Barr

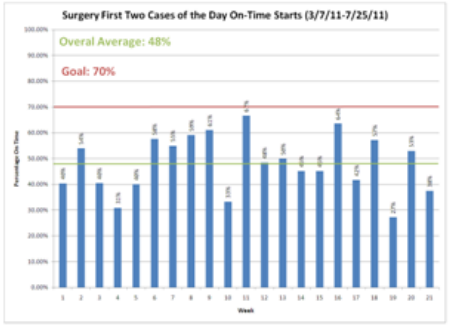
Background

The Perioperative Service Improvement Project Committee was established in December 2009 with the goal to improve efficiency of perioperative services. The team established the following key performance measures for success: first case on-time starts, OR utilization and same day case cancellation. Initial efforts focused on improving first case on-time starts due to the effect on several other OR metrics. They are as follows:

- OR Utilization: if and when we can get future cases started
- Overtime Requirements: longer hours and shifted schedules
- Staff Utilization: long hours and inconsistent schedule
- Patient Satisfaction: decreased delays and improve overall hospital experience
- Physician Satisfaction: decreased downtime resulting in a better satisfaction among following surgeons.

Current Situation

On-time starts are measured for the first two cases of the day in each OR. Currently the average on-time start is **48%.** On-time starts are recorded when that patient's wheels enter the operating room. There is also a 5 minute leeway in defining start time due to clock variability throughout the hospital. This data is currently collected by the Scrub Nurse.



Goal

Our goals is to improve on-time starts to **70%** and understand the true root cause of late starts.

Analysis

Survey for Patient Flow Timing: The survey will be filled out by the patient's family for the first two cases of the day in each OR to better understand the timing of patient flow in the perioperative process from the standpoint of the patient from admitting to the OR. Data will be collected for 6 months, analyzed and reviewed for improvement opportunities on a weekly basis.

Cost of Late Starts: Determine the cost of late starts. Include labor, charges, reimbursements and opportunity cost.

Recommendations

i) First cases of the day should never have to wait for a room. As a countermeasure the schedule given to OPS earlier at 05:15 to ensure rooms are set up and ready for patients arriving from Registration. **Potential Time Savings = 19 minutes**

ii) First cases of the day should never have to wait for a Nurse in the Holding Room. As a countermeasure we will have the OR Nurse go directly to the Holding Room and have the Surgical Technician prepare the room for surgery. **Potential Time Savings = 12 minutes**

iii) The patient spend a long amount of time in OPS include several non-value added activates. Team members identified the Versed dosage and wasting process as a non-value added activity. As a countermeasure the team worked with Pharmacy and Anesthesia to create orders for unit doses based on patient weight. This eliminated the waste process and witness process completely. **Potential Time Savings per Patient = 10 minutes**

Phase 2:

i) CRNA's working with OPS staff on 4th Floor to set patient priority based on the OPS Surgery Schedule to ensure top priority patients are send to OR at the correct time.

ii) Can we determine a method to prevent duplication of patient history between 4th floor Nursing and CRNA's to further reduce time in OPS?

Iii) Reduce Anesthesia waiting in OPS, Reduce Surgeon waiting time in Holding Room

Financial Cost to Run OR:

Cost to Run One Operating Room

Actual Cost per Hour		Opportunity Cost per Hour	
Labor	$164	Labor	$53
* 1 Rn Staff Nurse		* 1 Processing Room Technician	
* 1 Surgical Tech Certified		* 1 PCA	
* 1/Rn Rn Shift Leader		* 1 Processing Room Aid	
* 1 CRNA		Potential OR overtime labor cost	$246
* 1/3rd Anesthesiologist Time		Average lost revenue per case	$670
Room charges	$1,010		
Total Actual Cost	$1,174	Total Opportunity Cost	$969
		Grand Total OR Cost per Hour =	$2,144
		Grand Total OR Cost per Minute =	$36

Plan

By implementing these three recommendations we can reach our 1:30 minute window to help meet our goal of 70% on-time starts

Current Total Time	1 hr 43 min
- OPS Wait Time	-19 min
- Holding Room Wait Time	-12 min
- Versed Dosage Waste	-10 min
New Total Process Time	**1 hr 2 min**

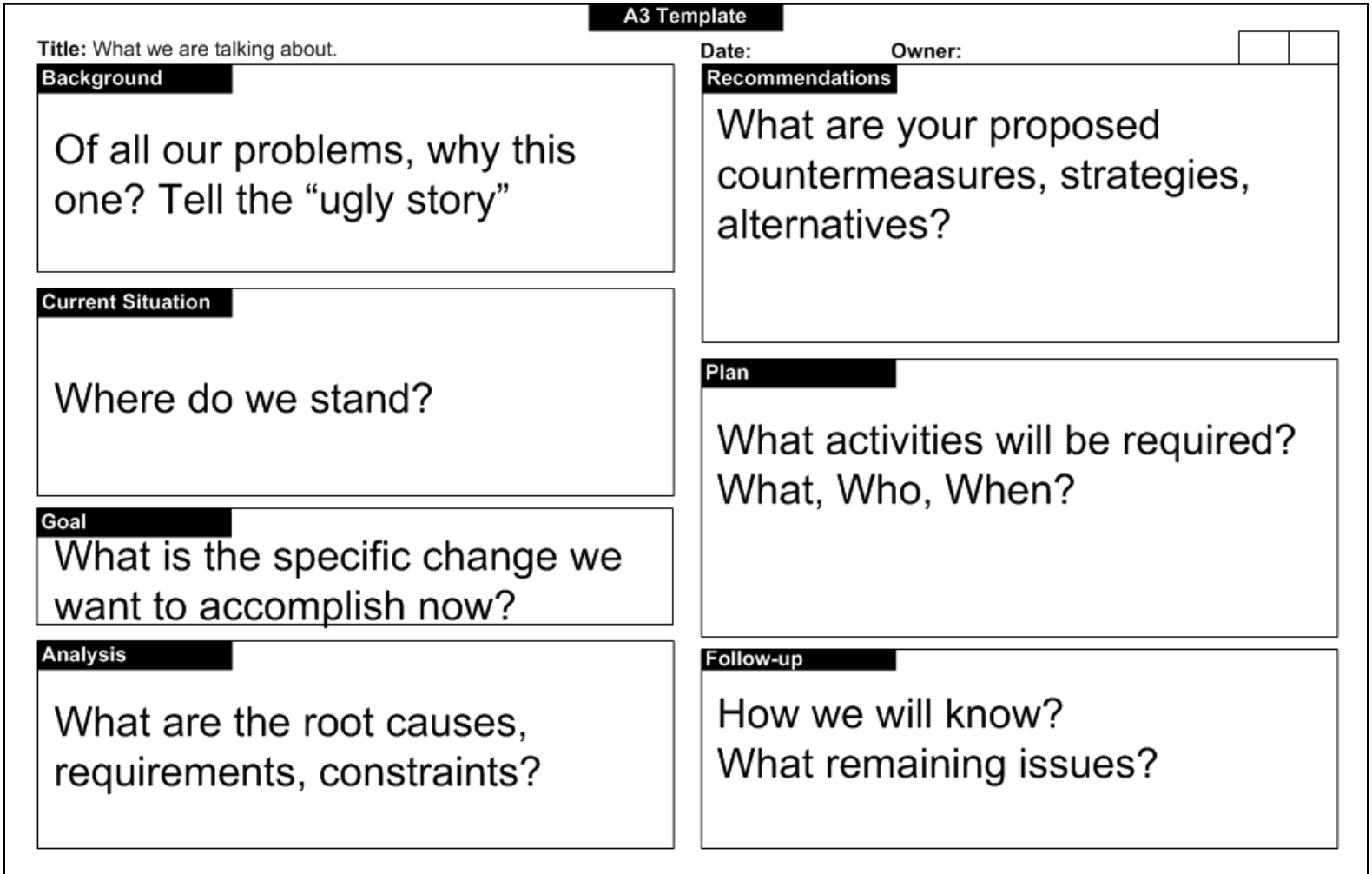
40% Reduction in Total Time!

Follow-up

After implementing these 3 changes we will re-measure on-time starts for a 2 month period to see their actual affect on the process.

A3 Thinking

- A3 is a template for structured problem solving. Based on PDCA.



"A3 Thinking"

- Template for structured problem solving
- "A3" is just a paper size (11" x 17")
- Entire plan on one sheet of paper
- Anyone should be able to understand it
- It should be visual and extremely concise
- What is important is not the format, but the process and thinking behind it

A3 Benefits

- A standard communication tool to make it easier to understand each other and build consensus
- In encourages PDCA (Plan, Do, Check, Adjust) problem solving
- 5S for information
- It leads to effective solutions based on facts and data

Problem Solving at the Bedside

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Current Situation

- On-time starts are measured for the first two cases of the day in each OR.
- Based on survey findings the average on-time start is **48%.**
- Start time is recorded when that patient's wheels enter the operating room.
  - There is also a 5 minute leeway in defining start time due to clock variability throughout the hospital. This data is currently collected by the OR Nurse.

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Goals of the Project

1. Improve first cases of the day on-time starts to **70%.**
2. Understand the true root cause of late starts.
3. Reduce and eliminate all non-value added activates in the perioperative process.

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Analysis

- Create a survey to better understand the timing of patient flow in the perioperative process.
- Filled out by the patient's family.
- Data collected for the first two cases of the day in each OR .
- Data collected for 5 months, analyzed and reviewed for improvement opportunities on a weekly basis.
- Direct Observation: Time Studies

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Direct Observation

Time Study Form

Location: Surgery Process Flow
Observer: Isaac Mitchell
Observed Patient: Kandence K.

Date: 5/7/2011
Start Time: 6:00
End Time: 8:51

			Non Value Added?	
Clock Time	Task	Task Time	NVA Needed	NVA Not Needed
6:00	Patient schedule arrival time	0:28		Y
6:28	Register patient	0:05	Y	
6:33	Transport to 4th Floor OPS	0:01	Y	
6:34	Patient Waits on 4th Floor OPS	0:09		Y
6:43	PCA Assessment	0:09		
6:52	Transport to 4th Floor Room	0:01	Y	
6:53	RN History	0:03		
6:56	CRNA History	0:06		
7:02	RN History	0:03		
7:05	RN Gets Meds	0:04		Y
7:09	RN Give Meds	0:01		
7:10	Patient Waits	0:02		Y
7:12	Transported to Holding Room	0:03	Y	
7:15	Wait in Holding Room	0:03		Y
7:18	Anesthesia History in Holding Room	0:09		
7:27	Wait in Holding Room	0:11		Y
7:38	Surgeon Reviews Procedure with Patient sent	0:02		
7:40	Patient to OR	0:16	Y	
7:56	Surgeon Reviews Surgery Family	0:15		
8:11	Family Transported to 4th Floor	0:03	Y	
8:14	PCA Gets Vitals	0:04		
8:18	Wait in 4th Floor Room	0:22		
8:40	RN gets Discharge Orders	0:02	Y	
8:42	PCA Takes Vitals	0:02		
8:44	Wait for Transport Out of Hospital	0:07		Y
8:51	TOTAL TIME	2:51	0:31	1:04

Total Time	**2:51**
Non Value Added Needed:	**0:31**
Non Value Added Not Needed:	**1:04**
Value Added Time:	**1:16**
Percentage Non-Value Added Time:	**56%**

Patient Process Survey

Surgery Process Research Survey

East Tennessee Children's Hospital

Purpose: East Tennessee Children's Hospital would like your help. Our goal is to provide a better experience for our patients and families.

Instructions:

1. Please fill in the time for each step listed below. There is a clock on the clip board for you to use.
2. Return the form and clipboard to the holding room nurse on the 6th floor.

Thank you for your help to improve your surgery experience at East Tennessee Children's Hospital.

	What time did you and your child check in to the hospital?	Clock Time
	When did you enter the admitting booth?	Clock Time
	What time did you get to the 4th floor?	Clock Time
	When did you get to your room on the 4th floor?	Clock Time
	When did the Anesthesia Provider see your child in your room?	Clock Time
	When did you and your child get to the 6th floor Holding Room?	Clock Time
	What time did the Anesthesia Provider see your child in the Holding Room?	Clock Time
	When did the nurse from Surgery see you in the Holding Room?	Clock Time
	What time did Surgeon see your child the Holding Room? (Not all patients will see the surgeon depending on the case type.)	Clock Time
	What time did your child leave the Holding Room to go to the Operating Room?	Clock Time

The information collected on this form will be used for research. Filling out and returning this form constitutes consent to participate in research. Your name will not be used. Participation is voluntary.

For Research Use Only: Date:_____ Surgery Time:_____ Surgeon: _____# ___ Pages for Day: ___

Report – Week 21

Surgery Process Research Survey Report

at a collected for the first two schedule cases of the day in each

		Total	3/7/11 Week 1	3/14/2011 Week 2	3/21/11 Week 3	3/28/2011 Week4	4/4/11 Week 5	4/11/2011 Week 6	4/18/11 Week7	4/25/2011 Week 8	5/2/11 Week 9	5/9/2011 Week 10	5/16/11 Week 11	5/23/2011 Week 12	5/30/11 Week 13	6/6/2011 Week 14	6/13/11 Week 15	6/20/2011 Week 16	6/27/11 Week 17	7/4/2011 Week 18	7/11/11 Week 19	7/18/2011 Week 20	7/25/11 Week21
1)	Did the patient show up on time (1.5 hrs before scheduled start time)?																						
	-Percentage On Time	72.32%	65.96%	72.00%	69.05%	66.67%	70.00%	66.67%	85.00%	72.73%	83.33%	83.33%	53.33%	78.79%	83.33%	74.19%	74.19%	54.55%	70.83%	71.43%	100.00%	82.35%	50.00%
	-Late Average	0:14	0:15	0:13	0:07	0:13	0:14	0:12	0:13	0:15	0:04	0:34	0:14	0:34	0:08	0:08	0:15	0:06	0:22	0:21	None	0:04	0:12
	-Late Standard Deviation (Variation)	0:21	0:13	0:15	0:07	0:13	0:13	0:20	0:14	0:09	0:02	0:41	0:23	1:05	0:05	0:07	0:11	0:02	0:37	0:20	None	0:05	0:14
	-Early Average	0:20	0:23	0:20	0:19	0:19	0:22	0:19	0:22	0:12	0:13	0:17	0:20	0:30	0:27	0:17	0:14	0:15	0:19	0:29	0:12	0:29	0:18
	-Early Standard Deviation (Variation)	0:24	0:25	0:21	0:25	0:20	0:24	0:15	0:23	0:14	0:12	0:10	0:25	0:57	0:26	0:16	0:11	0:13	0:17	0:17	0:10	0:27	0:17
2)	How long did the patient wait for an Admitting booth?																						
	-Average Time	0:05	0:04	0:04	0:06	0:08	0:08	0:06	0:06	0:08	0:05	0:07	0:03	0:04	0:10	0:04	0:05	0:05	0:05	0:02	0:02	0:08	0:05
	-Standard Deviation (Variation)	0:06	0:04	0:11	0:07	0:06	0:06	0:05	0:06	0:09	0:05	0:06	0:04	0:04	0:09	0:04	0:05	0:06	0:05	0:02	0:02	0:04	0:04
3)	How long did the patient wait for an room in OPS?																						
	-Average Time	0:19	0:23	0:17	0:25	0:18	0:17	0:19	0:13	0:18	0:16	0:13	0:14	0:18	0:18	0:26	0:16	0:14	0:16	0:16	0:16	0:21	0:34
	-Standard Deviation (Variation)	0:20	0:13	0:07	1:08	0:08	0:07	0:07	0:06	0:07	0:06	0:07	0:04	0:08	0:07	0:11	0:09	0:04	0:07	0:11	0:08	0:09	0:13
4)	How long did the patient wait for Anesthesia in OPS?																						
	-Average Time	0:11	0:11	0:14	0:11	0:11	0:08	0:12	0:15	0:14	0:06	0:14	0:14	0:14	0:15	0:08	0:10	0:19	0:09	0:05	0:03	0:11	0:03
	-Standard Deviation (Variation)	0:13	0:14	0:17	0:10	0:12	0:09	0:11	0:12	0:15	0:06	0:17	0:20	0:11	0:16	0:09	0:11	0:11	0:11	0:07	0:03	0:20	0:02
5)	How long did the patient spend in OPS?																						
	-Average Time	0:56	0:57	0:55	0:54	0:52	0:55	0:46	1:17	0:48	0:49	1:14	0:51	0:50	0:58	1:06	0:54	0:57	0:52	0:52	0:59	1:00	1:29
	-Standard Deviation (Variation)	0:39	0:35	0:29	0:29	0:24	0:36	0:22	0:50	0:20	0:22	0:57	0:19	0:19	0:21	1:35	0:25	0:23	0:21	0:31	0:25	0:52	2:32
6)	How long did the patient wait for Anesthesia in the Holding Room?																						
	-Average Time	0:06	0:06	0:05	0:05	0:07	0:06	0:08	0:07	0:07	0:04	0:14	0:05	0:06	0:05	0:09	0:08	0:07	0:06	0:05	0:04	0:06	0:03
	-Standard Deviation (Variation)	0:06	0:06	0:05	0:04	0:06	0:05	0:05	0:07	0:06	0:03	0:12	0:05	0:04	0:05	0:08	0:06	0:05	0:06	0:06	0:03	0:04	0:01
7)	How long did the patient wait for an OR Nurse in the Holding Room?																						
	-Average Time	0:13	0:10	0:08	0:14	0:16	0:12	0:12	0:11	0:13	0:09	0:25	0:09	0:12	0:12	0:16	0:10	0:11	0:42	0:08	0:11	0:10	0:13
	-Standard Deviation (Variation)	0:25	0:13	0:06	0:24	0:19	0:09	0:12	0:08	0:14	0:06	0:17	0:07	0:09	0:09	0:15	0:08	0:09	1:36	0:10	0:12	0:11	0:10
8)	How long did the patient wait for a Surgeon in the Holding Room?																						
	-Average Time	0:19	0:18	0:10	0:24	0:12	0:14	0:10	0:49	0:16	0:17	0:19	0:14	0:17	0:12	0:27	0:16	0:11	1:14	0:14	0:27	0:09	0:00
	-Standard Deviation (Variation)	0:42	0:23	0:07	0:27	0:09	0:09	0:06	1:49	0:12	0:11	0:17	0:08	0:09	0:11	0:20	0:11	0:08	1:36	0:13	0:21	0:07	0:00
9)	How long did the patient spend in the Holding Room?																						
	-Average Time	0:24	0:25	0:27	0:27	0:21	0:19	0:18	0:19	0:20	0:19	0:31	0:33	0:22	0:17	0:26	0:20	0:15	0:49	0:17	0:28	0:20	0:23
	-Standard Deviation (Variation)	0:38	0:34	1:02	0:31	0:18	0:11	0:12	0:15	0:14	0:11	0:20	1:07	0:14	0:12	0:24	0:12	0:10	1:35	0:14	0:22	0:09	0:10
10)	What was the total time spent from Registration to the OR																						
	-Average Time	1:44	1:52	1:39	1:49	1:40	1:36	1:33	2:06	1:34	1:34	2:08	1:30	1:39	1:45	1:49	1:41	1:32	1:44	1:52	1:57	1:55	1:35
	-Standard Deviation (Variation)	0:35	0:57	0:41	0:58	0:38	0:39	0:39	1:05	0:47	0:38	1:05	0:39	0:25	0:46	0:48	0:43	0:48	0:50	0:58	0:55	1:04	0:34
11)	Did the surgery start at the scheduled time?																						
	-Percentage On Time	48.03%	40.43%	54.00%	40.48%	30.95%	40.00%	57.58%	55.00%	59.09%	61.11%	33.33%	66.67%	48.48%	50.00%	45.16%	45.16%	63.64%	41.67%	57.14%	27.27%	52.94%	37.50%
	-Late Average	0:23	0:33	0:12	0:20	0:20	0:15	0:15	0:49	0:27	0:15	1:03	0:21	0:23	0:17	0:28	0:18	0:09	0:16	0:23	0:28	0:46	0:13
	-Late Standard Deviation (Variation)	0:36	1:01	0:15	0:27	0:27	0:12	0:13	0:52	0:26	0:09	1:01	0:22	0:47	0:19	0:39	0:34	0:11	0:24	0:38	0:32	0:57	0:11
	-Early Average	0:15	0:07	0:09	0:09	0:17	0:28	0:11	0:07	0:11	0:09	0:15	0:18	0:32	0:31	0:08	0:06	0:04	0:10	0:12	0:19	0:29	0:12
	-Early Standard Deviation (Variation)	0:23	0:09	0:11	0:09	0:19	0:29	0:13	0:07	0:09	0:09	0:15	0:24	1:08	0:27	0:12	0:05	0:02	0:09	0:07	0:12	0:33	0:12

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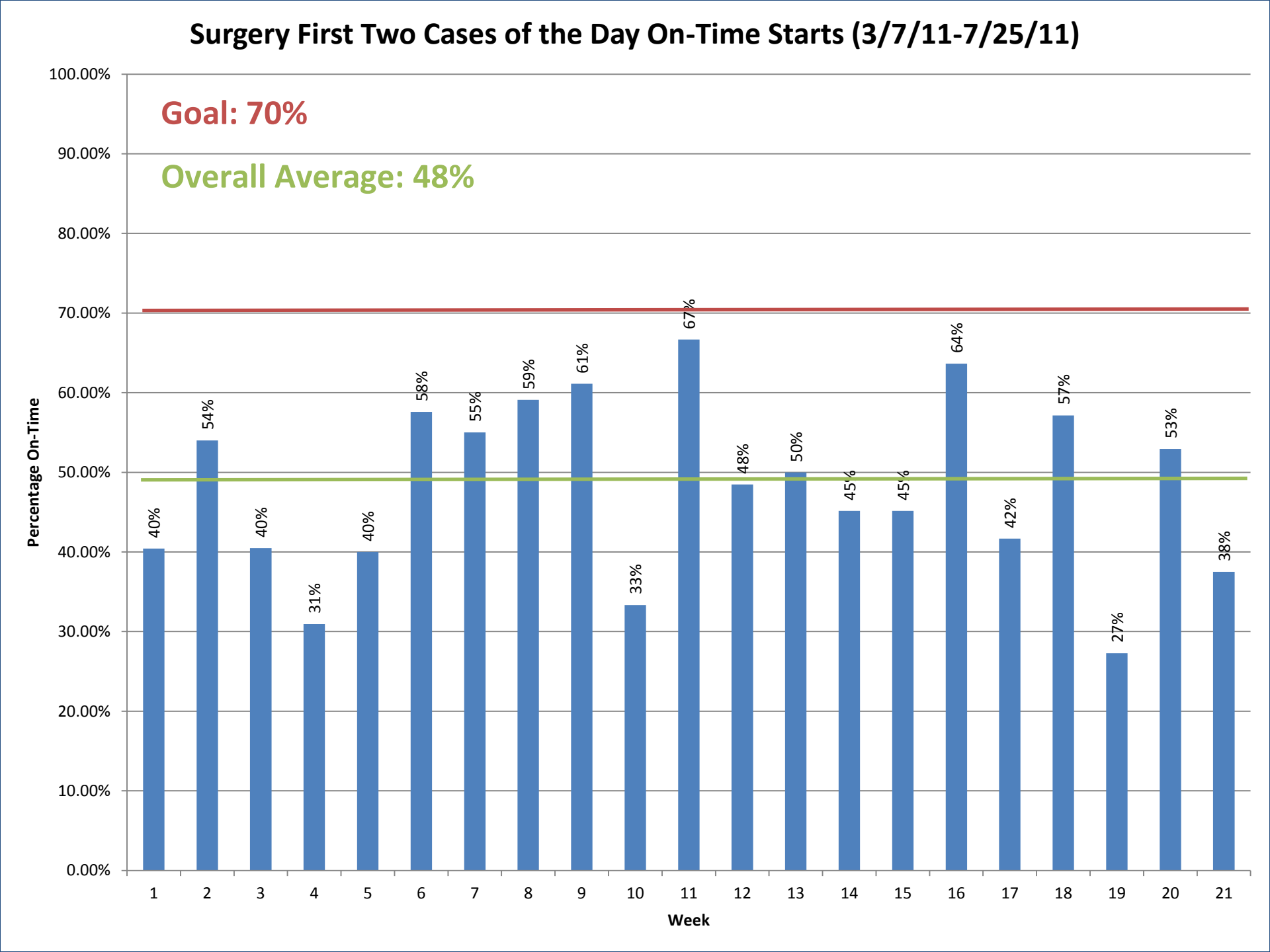
Report: Averages and Standard Deviation

1. Did the patient show up on time (1.5 hrs before scheduled start time)?
   - 73% On-time
2. How long did the patient wait for an Admitting booth?
   - Average = 0:05 Standard Deviation = 0:06
3. How long did the patient wait for an room in OPS?
   - Average = 0:19 Standard Deviation = 0:20
4. How long did the patient wait for Anesthesia in OPS?
   - Average = 0:11 Standard Deviation = 0:13
5. How long did the patient spend in OPS?
   - Average = 0:56 Standard Deviation = 0:39
6. How long did the patient wait for Anesthesia in the Holding Room?
   - Average = 0:06 Standard Deviation = 0:06
7. How long did the patient wait for an OR Nurse in the Holding Room?
   - Average = 0:13 Standard Deviation = 0:25
8. How long did the patient wait for a Surgeon in the Holding Room?
   - Average = 0:19 Standard Deviation = 0:42
9. How long did the patient spend in the Holding Room?
   - Average = 0:24 Standard Deviation = 0:38
10. What was the total time spent from Registration to the OR?
    - Average = 1:44 Standard Deviation = 0:35
11. Did the surgery start at the scheduled time?
    - 48% On-time


Surgery First Two Cases of the Day On-Time Starts (3/7/11-7/25/11)
Goal: 70%
Overall Average: 48%
Percentage On-Time
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
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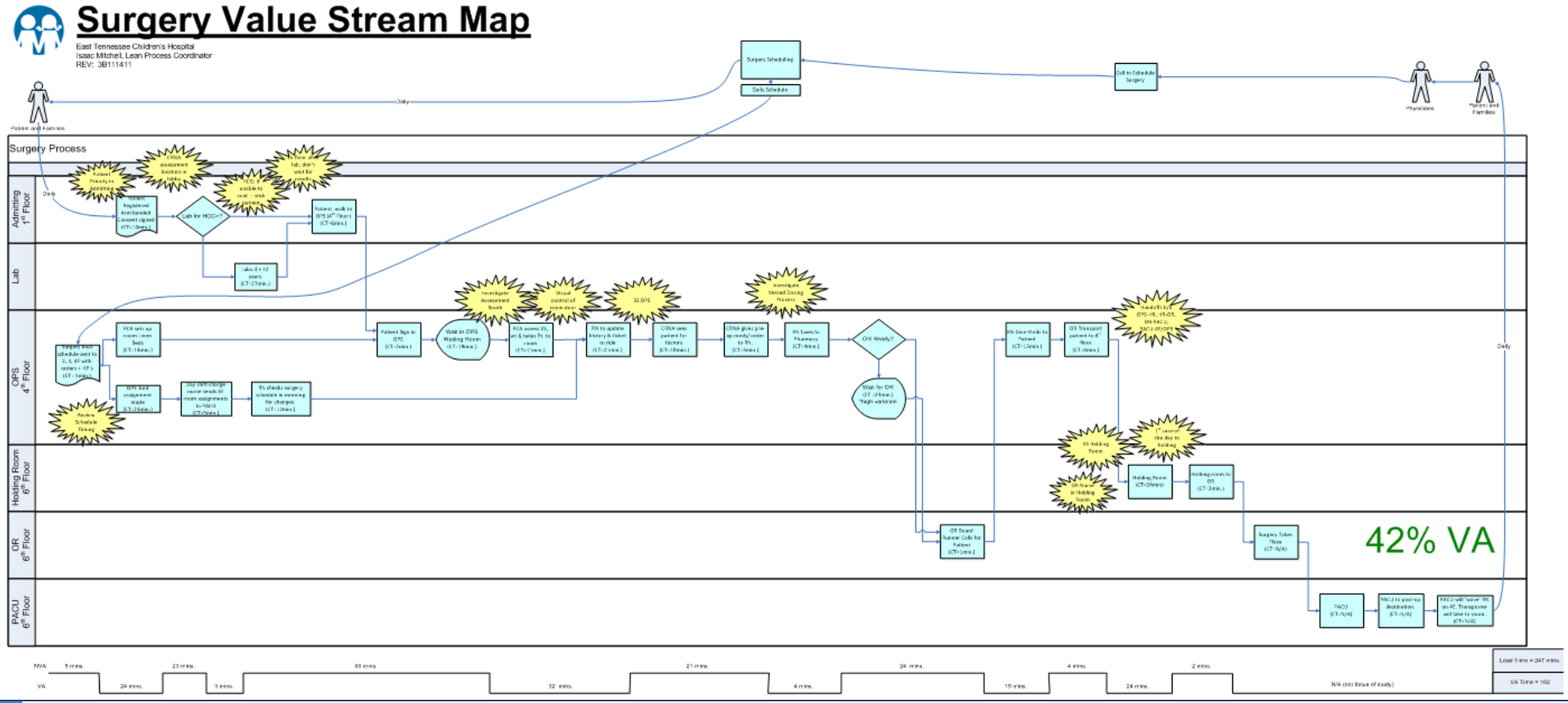
Week

Value Stream Map
Current State



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Gap Analyses & Focus Areas

1. Why does the first case of the day patient have to wait for a room in OPS?
   - Current Average Wait Time = 19 min.
2. Why does the first case of the day patient have to wait for a OR nurse in the holding room?
   - Current Average Wait Time = 13 min.
3. How long does the first case of the day patient spend in OPS?
   - Current Average Wait Time = 56 min.
4. Total Time from Registration to OR
   - Current Average Time = 1 hr 44 min.
   - We ask our patient to arrive at the hospital 1hr 30 min. ahead of time

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Recommendations

1. Why does the first case of the day patient have to wait for a room in OPS?
   - First cases of the day should never have to wait for a room.
   - Countermeasure:
     - Schedule given to OPS earlier at 05:15 in ensure rooms are set up and ready for patients arriving from Registration.
     - Analyze assessment room usage to meet patient demand
   - **Potential Time Savings = 19 minutes**

Recommendations

2. Why does the first case of the day patient have to wait for a OR nurse in the Holding Room?
   - First cases of the day should never have to wait for a Nurse in the Holding Room
   - Countermeasure: Reevaluate the OR Nurse morning routine. Have the OR Nurse go directly to the Holding Room and have the Surgical Technician prepare the room for surgery.
   - **Potential Time Savings = 13 minutes**

Recommendations

3. How long does the first case of the day patient spend in OPS?
   - Look for non-value added activates, waste or barriers in the process to reduce the time for patient in OPS.
   - Team members identified the Versed dosage and wasting process as a non-value added activity.
   - Countermeasure: Team worked with Pharmacy and Anesthesia to create orders for unit doses based on patient weight. This eliminated the waste process and witness process completely.
   - **Potential Time Savings per Patient = 10 minutes**

Versed Dosage

MALE

Age	9m	12m	15m	18m	21m	2y	3y	4y	5y	6y	7y	8y	9y	10y	11y	12+
Weight (kg)	9.2	10.4	11.2	11.8	12.2	13	14	16	18	20	23	26	29	32	36	41
Dose (mg)	4	5	5	5	6	6	7	8	(4+5)	10	(6+5)	(6+7)	(7+7)	(2X8)	(10+8)	(2x10)
Dose (mg/kg)	0.43	0.48	0.45	0.42	0.49	0.46	0.50	0.50	0.50	0.50	0.48	0.50	0.48	0.50	0.50	0.49

FEMALE

Age	9m	12m	15m	18m	21m	2y	3y	4y	5y	6y	7y	8y	9y	10y	11y	12+
Weight (kg)	8.6	9.6	10.4	11	11.6	12	14	16	18	20	23	25.5	29	33	37	42
Dose (mg)	4.5	5	5	5.5	6	6	7	8	9	10	11.5	12.7	14.5	16.5	18.5	20
Dose (mg/kg)	0.52	0.52	0.48	0.50	0.52	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.48

Midazolam dosing given pre-operatively will be based on the 50th weight percentile for all children at or above the 50th percentile.
These weights are the 50th percentile in kg. All doses are in milligrams based on 0.5 mg/kg. Use the lowest age until the child reacheds the next birthday.
Maximum possible dose is 20 mg.

- Six sizes of prefilled syringes
  - 4mg, 5mg, 6mg, 7 mg, 8mg, 10mg
- Pharmacy to source prefilled syringes
- Substitution protocol, to override non standard dose

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Standard Order Sets

Revised 8/11
Rev Rx: 8/11

East Tennessee Children's Hospital
Knoxville, Tennessee

Allergies:

ANESTHESIA PRE-OPERATIVE ORDERS

Patient_____ Weight_____ Date Taken_____

Do Not Use Abbreviations: **All Chemo Drugs** (spell out drug name), **MS, MSO4, MgSO4** (spell out drug name), **TAC** (spell out drug name), **ug** (use mcg), **U, u, IU** (write unit or international unit), **QD or QOD** (write out every day or every other day), **x#d** (for days or doses, write out), **trailing zero after decimal point, no zero before decimal point, no word write-over corrections.**

Date/Time	PHYSICIAN'S ORDERS
☐	**Pre-op Dose Ordered**
☐ ☐	**Midazolam:** Dose per standard dose protocol (see Midazolam Pre Op Standard Dosing Policy/Protocol, or, _____mg (up to 0.5 mg/kg, not to exceed the dose for the 50th weight percentile with a maximum dose of 20 mg) PO 30 minutes prior to scheduled OR time or when called. Give IV (clear) midazolam PO if patient is having an EGD.
☐	**Atropine:** _____mg (up to 0.02 mg/kg, minimum 0.1 mg, maximum dose 0.4 mg) PO or IV 30 minutes prior to scheduled OR time or when called. Give if surgery is within oral cavity.
☐	**If having BMT surgery ONLY:** **Acetaminophen liquid**: _____mg (up to 15 mg/kg, not to exceed 1000mg) PO. Mix with above .IV midazolam and give PO.
☐	**Glycopyrrolate:** 2 mg tablet PO administered with midazolam preop. Give if surgery is within oral cavity.
☐	**Midazolam:** _____mg. (up to 0.05mg/kg) I.V. ☐ **Holding room** ☐ **On floor**
	Patients with history of Asthma/RAD:
☐	**Albuterol**: 2 puffs (180 mcg total) via holding chamber with a mouth piece **or** 3 puffs via holding chamber with a face mask.
☐	**Levalbuterol**: 2 puffs (90 mcg total) using appropriate delivery technique. **Only use for patients with heart disease or allergy to albuterol.**
☐	Call Respiratory Therapy to administer albuterol 2.5 mg (0.5 ml) in 2 ml NS via aerosol nebulizer if MDI contraindicated or upon parental/caregiver request.
	OTHER:
	For Unscheduled or Emergency Surgery:
☐	Start IV and administer Normal Saline to infuse at 10 ml/kg/hour.
☐	**Metoclopramide:** _____mg (up to 0.15 mg/kg, not to exceed 10 mg maximum dose) IV as soon as possible.
☐	**Ranitidine:** _____mg (up to 0.5 mg/kg, not to exceed 50 mg maximum dose) IV as soon as possible.

PHYSICIAN Signature:_____

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ORDPN

Hospital Policy

EAST TENNESSEE CHILDREN'S HOSPITAL

Department: Clinical
Unit/Division:
Policy No.:
Page :
Effective Date:
Revised:

TITLE: MIDAZOLAM ORAL LIQUID PRE OP STANDARD DOSING PROTOCOL

PURPOSE: To allow for the safe and effective dosing of oral midazolam in pre op by using approved standardized doses that require the use of one or no more than two prefilled syringes in combination to reach the specified dose, eliminating the need for a second nurse to witness waste.

SCOPE: Pharmacy, Nursing, Anesthesia

POLICY:

Oral midazolam prefilled syringes will be provided to OPS by Pharmacy in six prefilled syringe sizes (4 mg, 5 mg, 6 mg, 7 mg, 8 mg, and 10 mg). Midazolam dosing given pre-operatively will be based on the 50th weight percentile for all children at or above the 50th percentile.

These weights are the 50th percentile in kg. All doses are in milligrams based on 0.5 mg/kg. Use the lowest age until the child reaches the next birthday.

Dosing will be accomplished by using one or no more than two of the prefilled syringes in a combination to reach the standardized dose per the table below.

MALES

Age	9m	12m	15m	18m	21m	2y	3y	4y
Weight (kg)	9.2	10.4	11.2	11.8	12.2	13	14	16
Dose (mg)	4	5	5	5	6	6	7	8
Dose (mg/kg)	0.43	0.48	0.45	0.42	0.49	0.46	0.50	0.50

Age	5y	6y	7y	8y	9y	10y	11y	12+
Weight (kg)	18	20	23	26	29	32	36	41
Dose (mg)	(4+5)	10	(6+5)	(6+7)	(7+7)	(2X8)	(10+8)	(2x10)
Dose (mg/kg)	0.50	0.50	0.48	0.50	0.48	0.50	0.50	0.49

FEMALES

Age	9m	12m	15m	18m	21m	2y	3y	4y
Weight (kg)	8.6	9.6	10.4	11	11.6	12	14	16
Dose (mg)	4	5	5	5	6	6	7	8
Dose (mg/kg)	0.47	0.52	0.48	0.45	0.52	0.50	0.50	0.50

Recommendations

4. Total Time from Registration to OR
   - Current Average Time **1 hr 44 min.** but we ask our patient to arrive at the hospital **1hr 30 min.** ahead of time
   - We are behind from the start!
   - Do we ask our patients to come in earlier?
     - No! We create better processes!

Recommendations

- By implementing these three recommendations we can reach our 1:30 minute window

Current Total Time	1 hr 44 min
- OPS Wait Time	-19 min
- Holding Room Wait Time	-13 min
- Versed Dosage Waste	-10 min
New Total Process Time	**1 hr 2 min**

40% Reduction in Total Time

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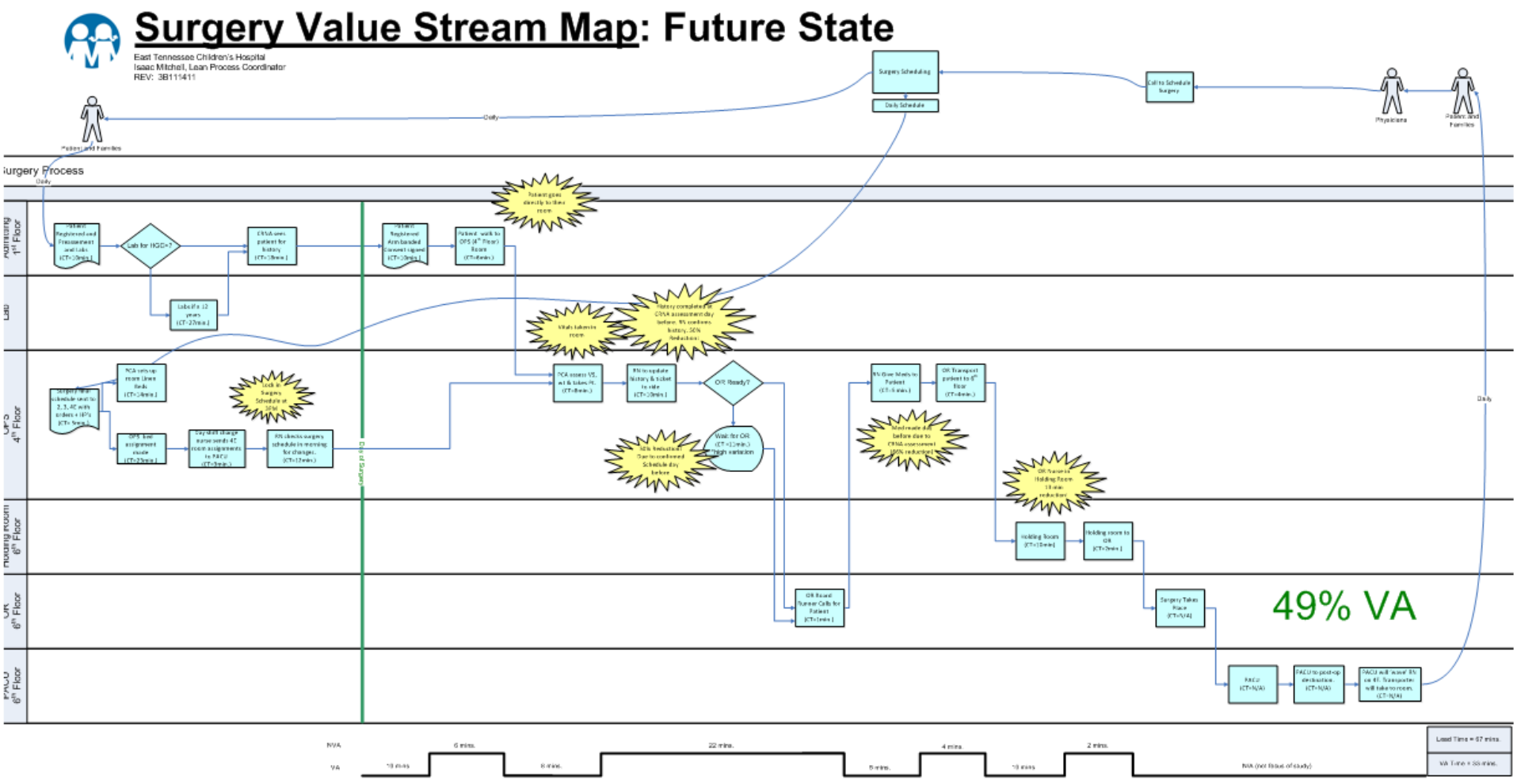
Plan and Follow-up

- **Plan:** Implement three recommendation
  1. Schedule given to OPS earlier
  2. OR Nurse go directly to the Holding Room
  3. Versed standard dosages
- **Follow-up:** Measure on-time starts after all recommendations are in place.
  - Survey begins 12/5/11
  - Are we reaching our 70% goal?

Next Steps

- Investigate the patient wait time for Surgeon in Holding Room.
  - Current Average Wait Time = 19 min.
- How long did the patient wait for Anesthesia in OPS?
  - Current Average Wait Time = 11 min.
- Investigate other non-value activities in OPS.
  - Can first cases of the day go directly to the Holding Room
- Expand A3 thinking to improve all case on-time starts

Value Stream Map
Future State



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Value Stream Map Changes

- **Percent Value Added Time:**
  - Current State: 42%
  - Future State: 49%
- **Value Added Time:**
  - Current State: 102minutes
  - Future State: 33 minute
- **Patient Lead Time:**
  - Current State: 247 minutes
  - Future State: 67 minutes
  - **115% Reduction**

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Question?

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