ASCO's Quality Training Program

A multidisciplinary effort to decrease time from admission to chemotherapy on an inpatient oncology unit

University of Virginia Health System
January 2017

QUALITY TRAINING PROGRAM™

UNIVERSITY of VIRGINIA HEALTH SYSTEM

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Team Members

Role	Name	Job Function
Project Sponsor	Michael Keng, MD	Oversees the role of team leader; inpatient oncology unit medical director; liaison with the inpatient hematology/ oncology unit
Team Leader & Facilitator	Louise Man, MD	Primary data collection; core team member for project direction. Facilitate team meetings; delegate and coordinate individual team members' role
Core Team Member	Jeremy Sen, PharmD, BCOP	Data collection; core team member for project direction; heme/ onc clinical pharmacist; pharmacy representative
Core Team Member	Jeanne Cahan, BSN, RN	Data collection; core team member for project direction; hematology/oncology/ stem cell transplant; nurse representative
Other Team Member	Kathlene DeGregory, PharmD, BCOP	Pharmacy clinical coordinator for heme/ onc and stem cell transplant; pharmacy representative
Other Team Member	Tanya Thomas, BSN, RN, OCN	Inpatient oncology unit assistant nurse manager; nurse representative; liaison with the inpatient hematology/ oncology unit
Other Team Member	Elizabeth Daniels, RN, MSN	Inpatient oncology unit nurse manager; nurse representative; liaison with the inpatient hematology/ oncology unit
Other Team Member	Lisa Huntsinger, RN, MSN, CCRN	Inpatient oncology unit nursing director; nurse representative; liaison with the inpatient hematology/ oncology unit
Other Team Member	Erin McLoughlin, MD	Chief internal medicine resident; medical housestaff representative
Other Team Member	Mark Smolkin, MS	Statistician
QTP Improvement Coach	Amy Guthrie, RN	Provides remote support to the team regarding the science of quality improvement and participation in the QTP.

Institutional Overview

Catchment area: Northern VA, central VA, western VA, eastern WV, eastern TN

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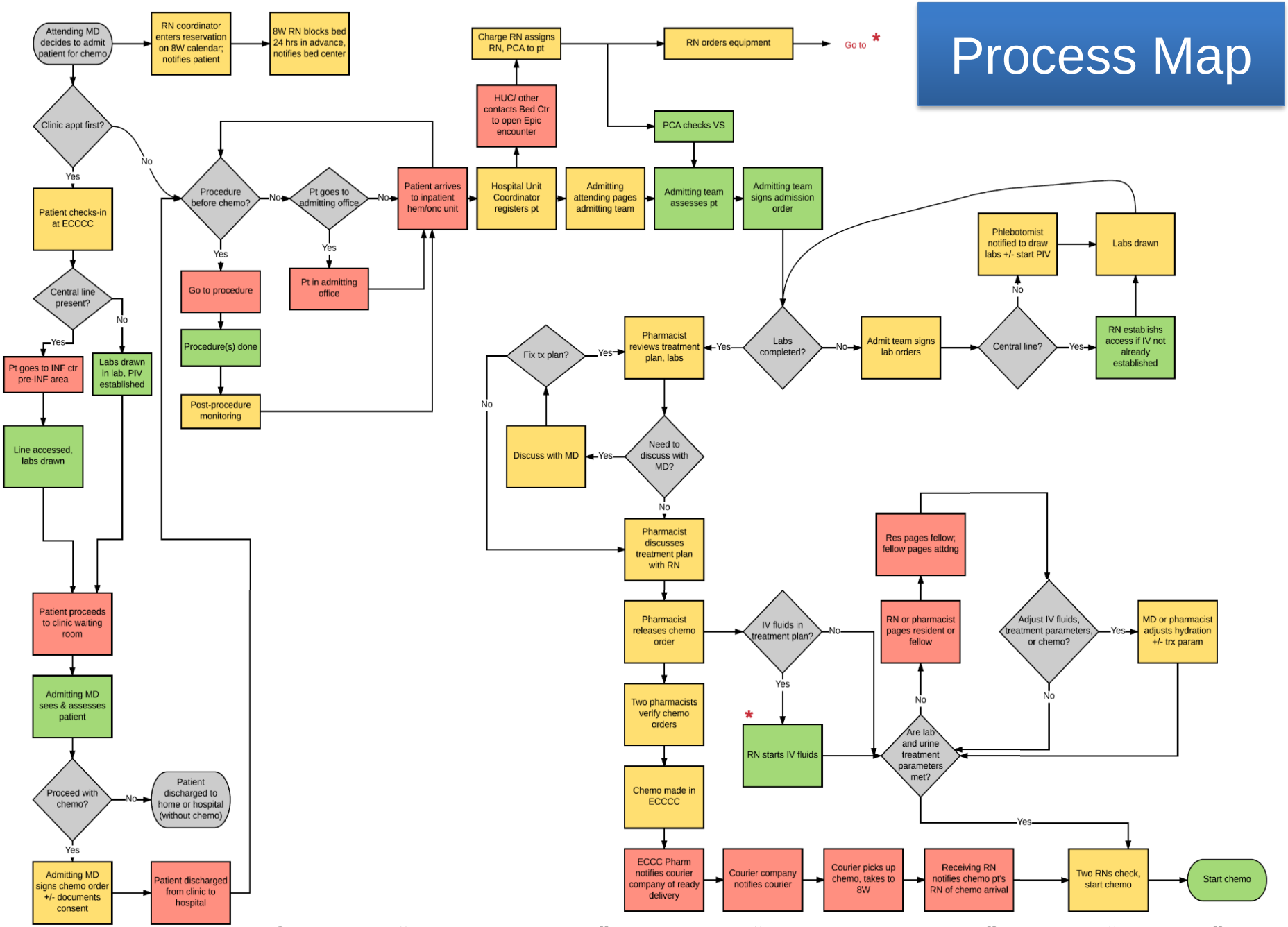
Problem Statement

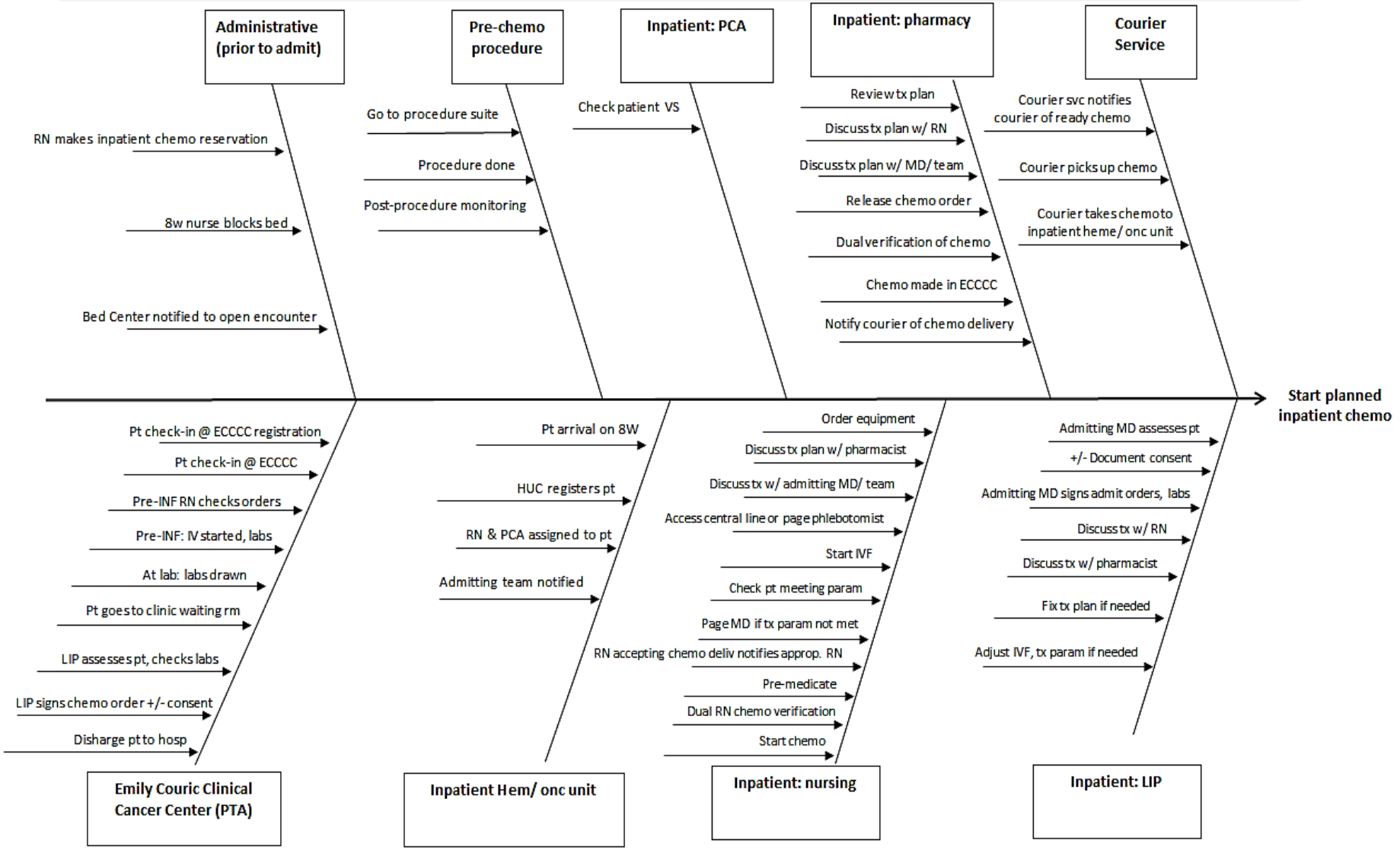
Many oncology patients at the University of Virginia are admitted for scheduled inpatient chemotherapy (chemo) administration for established diagnoses. These patients frequently experience delays in starting chemo after their arrival on the inpatient oncology unit. Delays are made known by patient complaints and also directly observed by physicians, nurses, and clinical pharmacists. These delays negatively impact healthcare resource utilization, length of stay, and may delay other patients' admissions.

Process Map



Green = “value added.” Yellow = “value enabling.” Red = “waste.”

Cause & Effect Diagram



Measures

- Baseline patient population: 340 planned inpatient chemo encounters between Jan. and Dec. 2015
- Calculation methodology: 100 randomly selected encounters
- Excluded:
  - Patients who did not receive chemo
  - Patients receiving IL-2, octreotide, induction for acute leukemia, stem cell transplantation, or patients on clinical trials for treatment

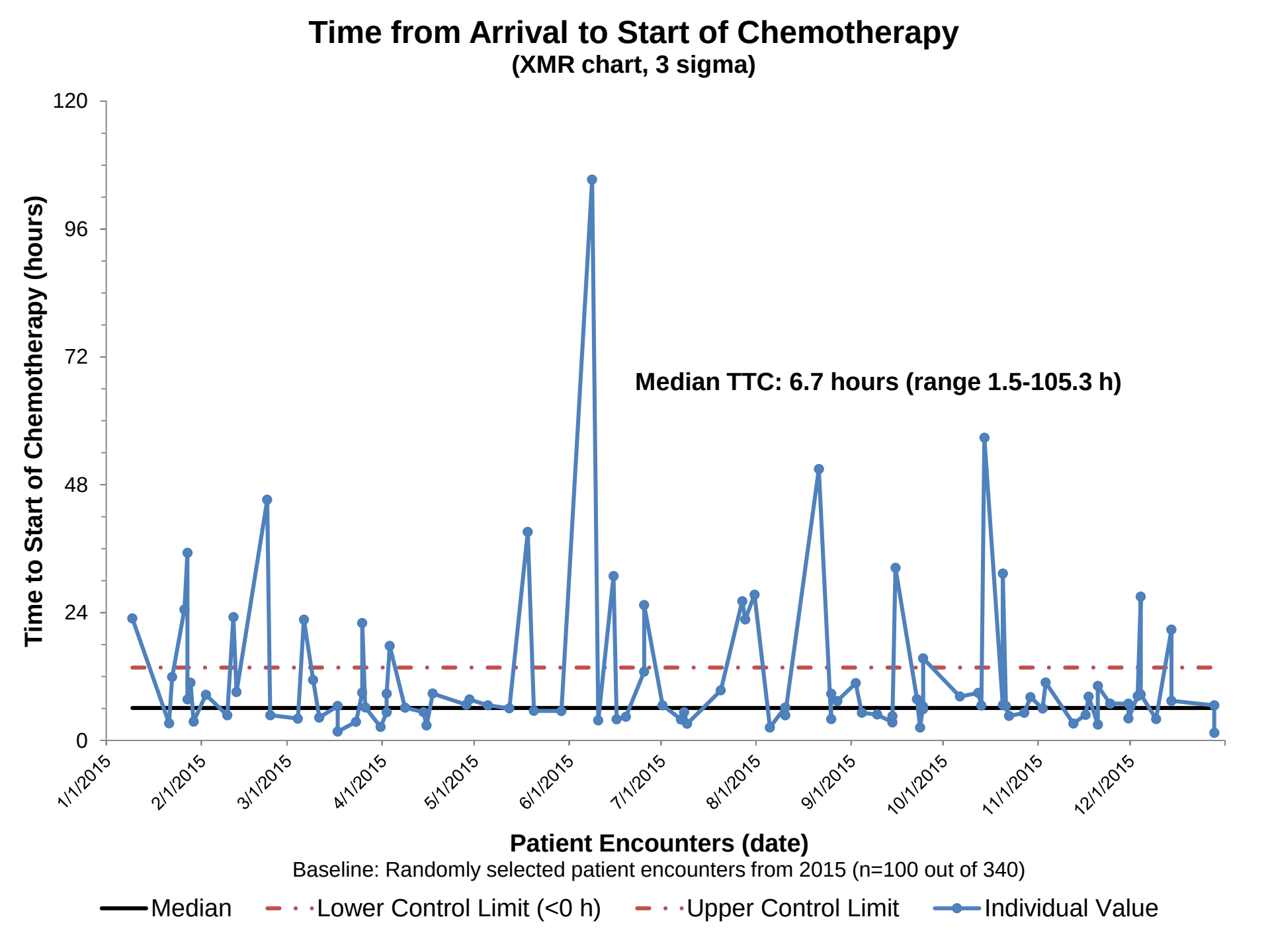
- Median time to chemo (TTC) for these encounters was 6.7 hours

- Limitations in data quality: Retrospective; sample size could have been larger

Baseline Data

Data collected for each encounter

- MRN, age, sex, race, zip code
- Hematologic/ oncologic diagnosis
- Primary oncologist
- Admission date
- Time of pre-admission clinic appointment (if applicable)
- Chemotherapy (chemo) regimen
- Chemo regimen cycle number
- Isolation requirement (Y/N)
- Admitting service: resident, heme fellow, onc fellow, Neuro-Onc
- Time of patient arrival on floor
- Pre-admission procedure required? If so, what procedures?
- Time of last pre-chemo procedure completion
- Time of admit order signature
- Time of first inpatient vital signs
- Time of lab order, collection, and result
- Time of chemo order signature and release
- Time of IVF start
- Time of first pre-medication
- Time of meeting urine output ± urine pH parameters (if applicable)
- Time of chemo start
- Chemo issue after start (e.g., reaction)?
- Was chemo was sped up (Y/N)?
- Discharge date and time
- Hospital length of stay
- Oncology unit census on the day of chemo start
- Number of chemo nurses on shift at the time of chemo start


Time from Arrival to Start of Chemotherapy
(XMR chart, 3 sigma)
Time to Start of Chemotherapy (hours)
120
96
72
48
24
0
Median TTC: 6.7 hours (range 1.5-105.3 h)
1/1/2015
2/1/2015
3/1/2015
4/1/2015
5/1/2015
6/1/2015
7/1/2015
8/1/2015
9/1/2015
10/1/2015
11/1/2015
12/1/2015
Patient Encounters (date)
Baseline: Randomly selected patient encounters from 2015 (n=100 out of 340)
Median
Lower Control Limit (<0 h)
Upper Control Limit
Individual Value

Aim Statement

Aim: Decrease the time to chemotherapy initiation (TTC) by 30% from baseline. There are no national standards on TTC, so a goal decreased of 30% was felt to be logical and appropriate.

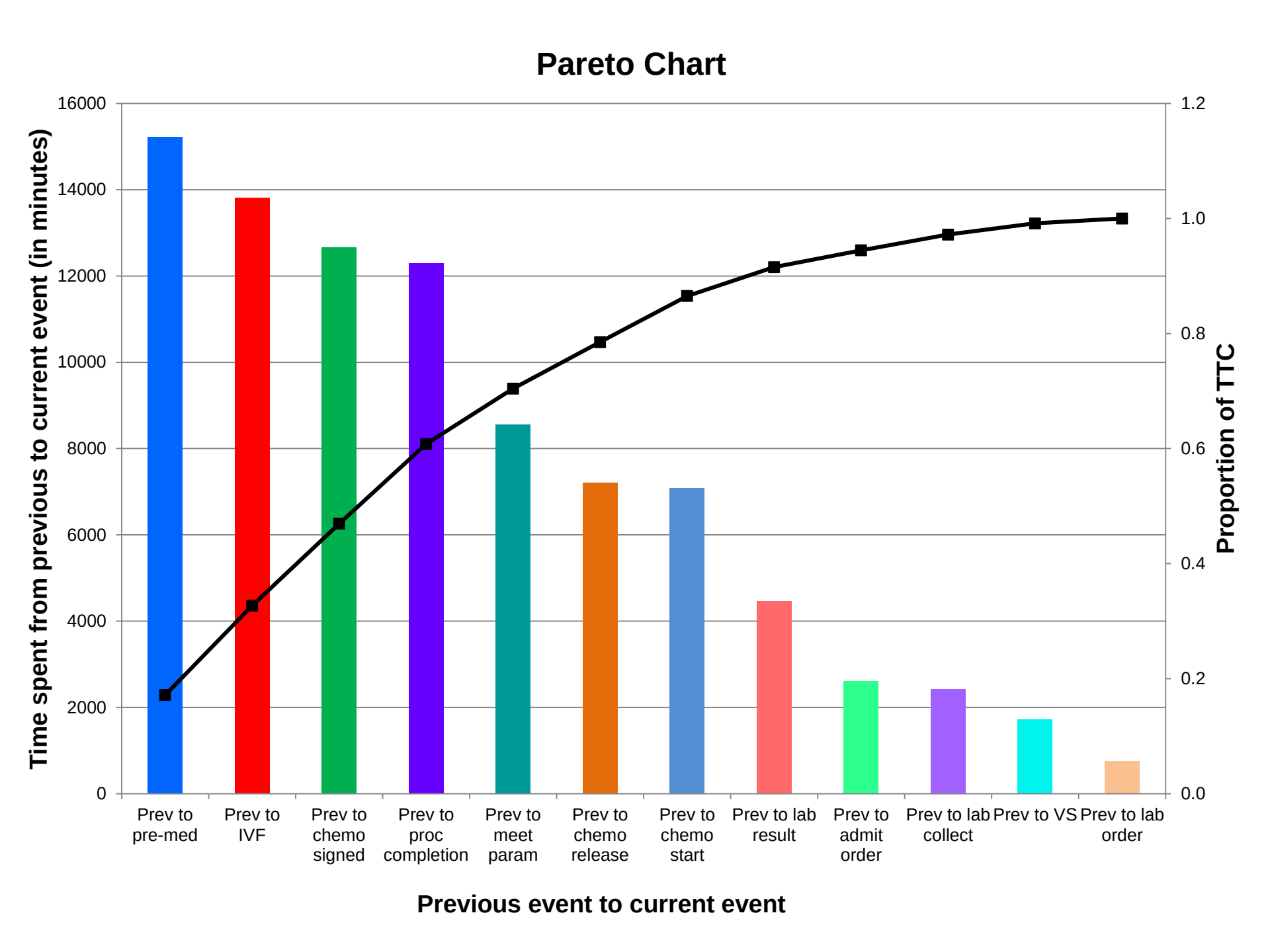
Specific: Decrease by 30% from baseline

Measurable: Median time (in hours) between the time of patient arrival to the inpatient heme/onc unit and the start of chemo

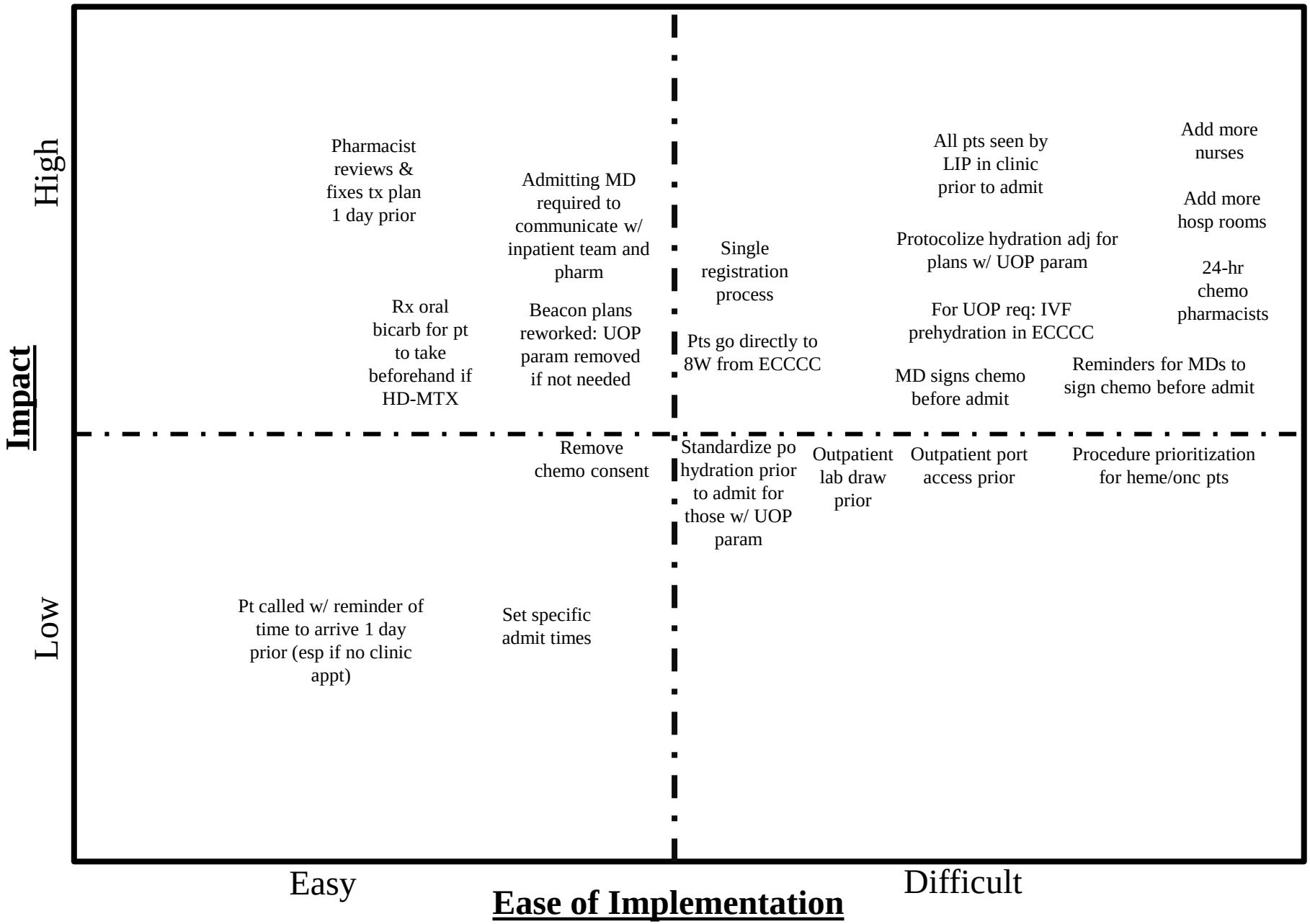
Attainable: Felt to be logical and appropriate

Relevant: Patient satisfaction, utilization of healthcare resources

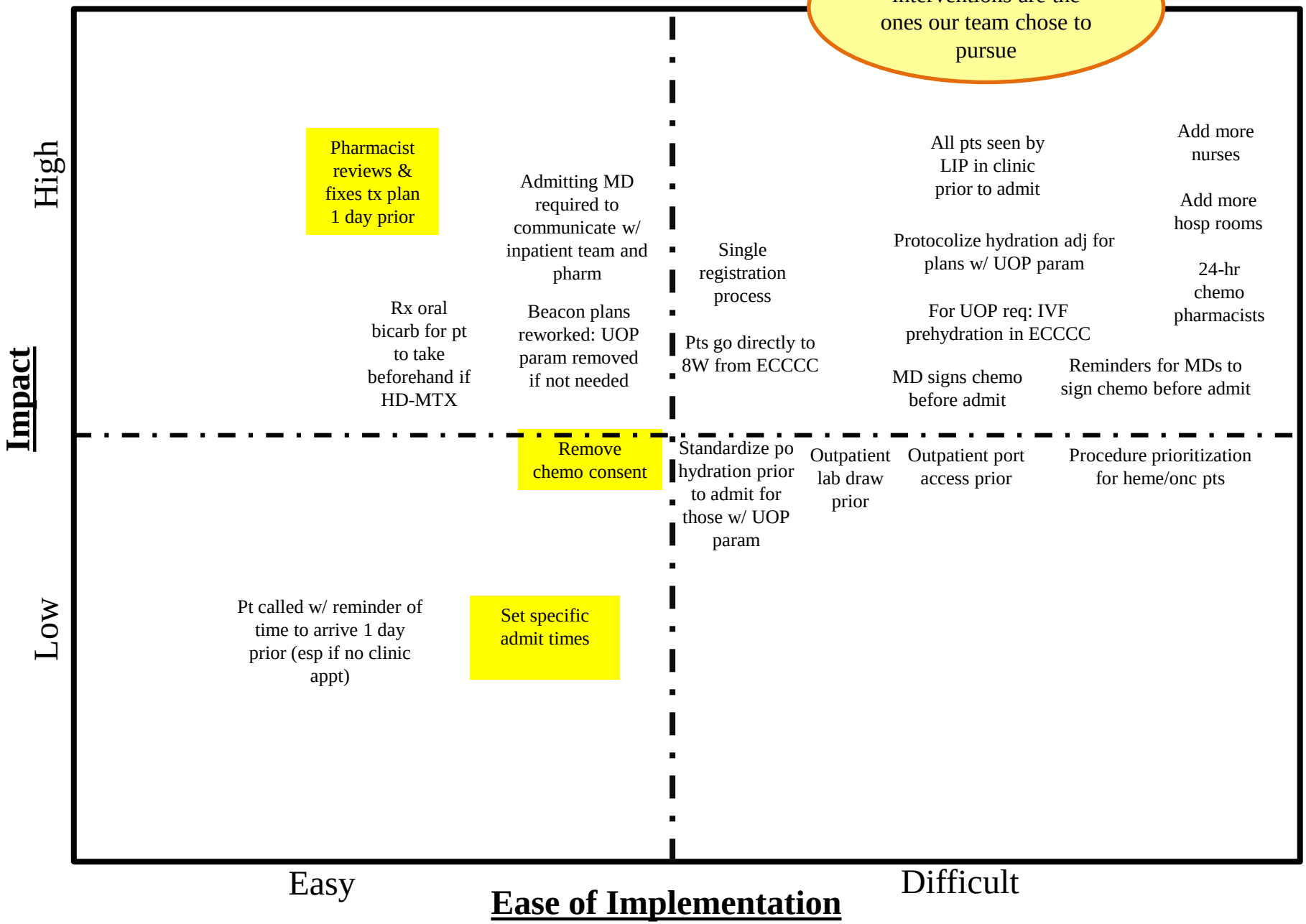
Time bound: By June 2017


Pareto Chart
Time spent from previous to current event (in minutes)
Proportion of TTC
Previous event to current event
16000
14000
12000
10000
8000
6000
4000
2000
0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Prev to pre-med
Prev to IVF
Prev to chemo signed
Prev to proc completion
Prev to meet param
Prev to chemo release
Prev to chemo start
Prev to lab result
Prev to admit order
Prev to lab collect
Prev to VS
Prev to lab order

Priority Matrix



Priority Matrix



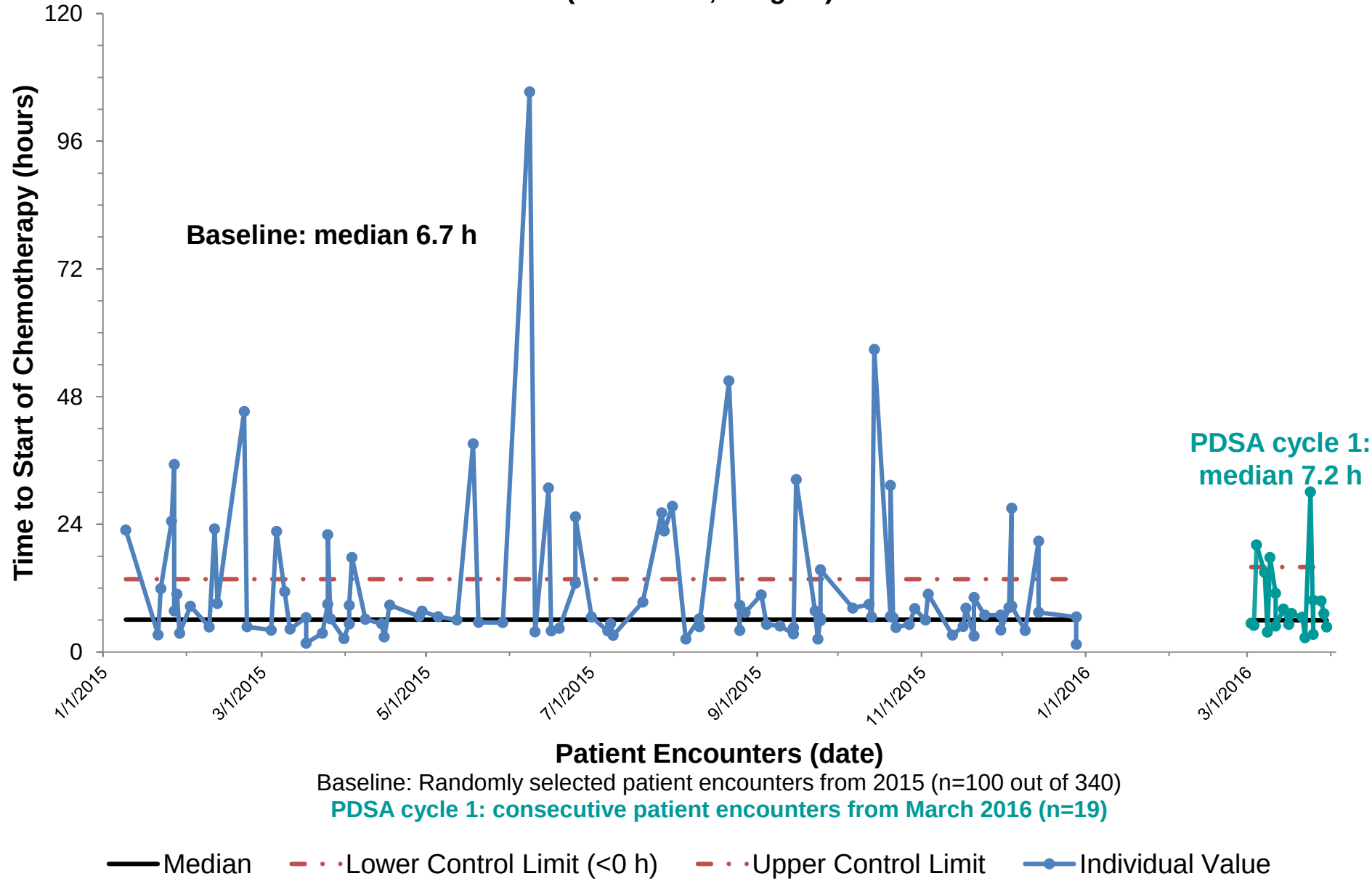
PDSA Plan (Tests of Change)

Date of PDSA Cycle	Description of Intervention	Results	Action Steps
1. Chemo consent reform Effective 1/18/16 PDSA cycle dates: 10/10-11/4/16	**- Chemotherapy consent process was reformed to reflect Virginia state law** **- Previous state: paper consent required. Frequently misplaced and/ or not scanned into EMR and would delay starting chemo** **- New electronic documentation done; searchable** **- Team sampled admissions for month of March 2016**		

PDSA #1: Change Data

Time from Arrival to Start of Chemotherapy

(XMR chart, 3 sigma)



Baseline: Randomly selected patient encounters from 2015 (n=100 out of 340)

PDSA cycle 1: consecutive patient encounters from March 2016 (n=19)

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Set times for arrival	- Reservation calendar used to reserve beds for admission lists specific times for pts to arrive - Took effect on 1/14/16	- Beds were not available at the set scheduled times. - Intervention was not enforced	Arrival times are still not enforced

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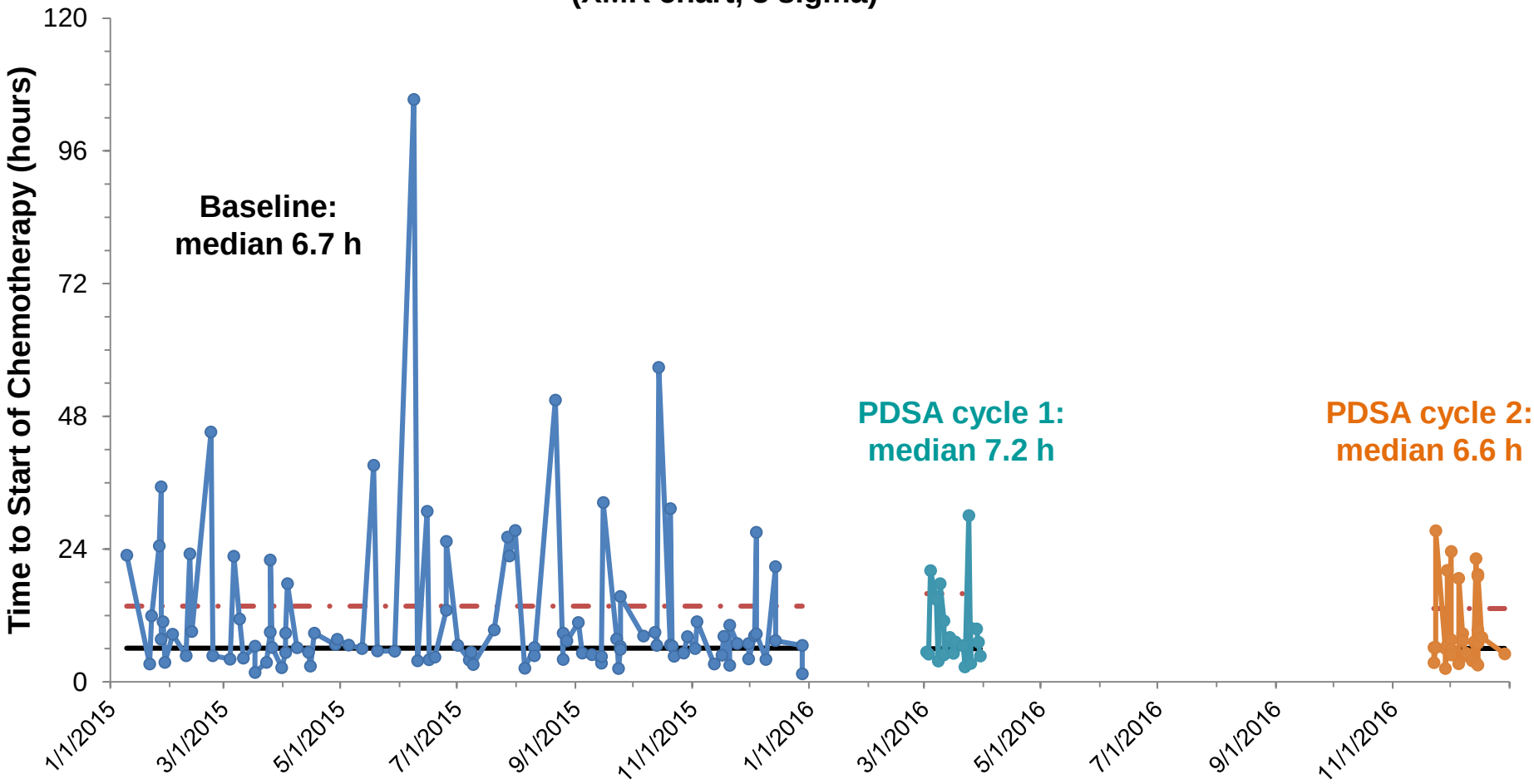
2. Pharmacist pre-review of treatment plans PDSA cycle dates: 11/22/16-present	**- Clinical pharmacist reviews treatment plan 1 business day prior to planned patient arrival** **- Standardized checklist used for each review**		

PDSA #2: Change Data

Time from Arrival to Start of Chemotherapy

(XMR chart, 3 sigma)



Baseline: Randomly selected patient encounters from 2015 (n=100 out of 340)

PDSA cycle 1: consec patient encounters from March 2016 (n=19)

PDSA cycle 2: consec patient encounters from 11/22-12/30/16 (n=30)

Median — Lower Control Limit (<0 h) — Upper Control Limit — Individual Value

PDSA #2: Change Data

- ~90% pre-review rate
- 2 instances where pre-review revealed the patients did not need to be admitted.
  - Hospital bed reservations were cancelled
- 2 instances where pre-review revealed need for custom creation of chemo treatment plans
  - Custom plans were built one day prior to admission

PDSA Plan (Tests of Change)

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2. Pharmacist pre-review of treatment plans PDSA cycle dates: 11/22/16-present	**- Clinical pharmacist reviews treatment plan 1 business day prior to planned patient arrival** **- Standardized checklist used for each review**	**N=30 (11/22-12/30/16)** **Median TTC 6.6 h**	**TBD (ongoing)**

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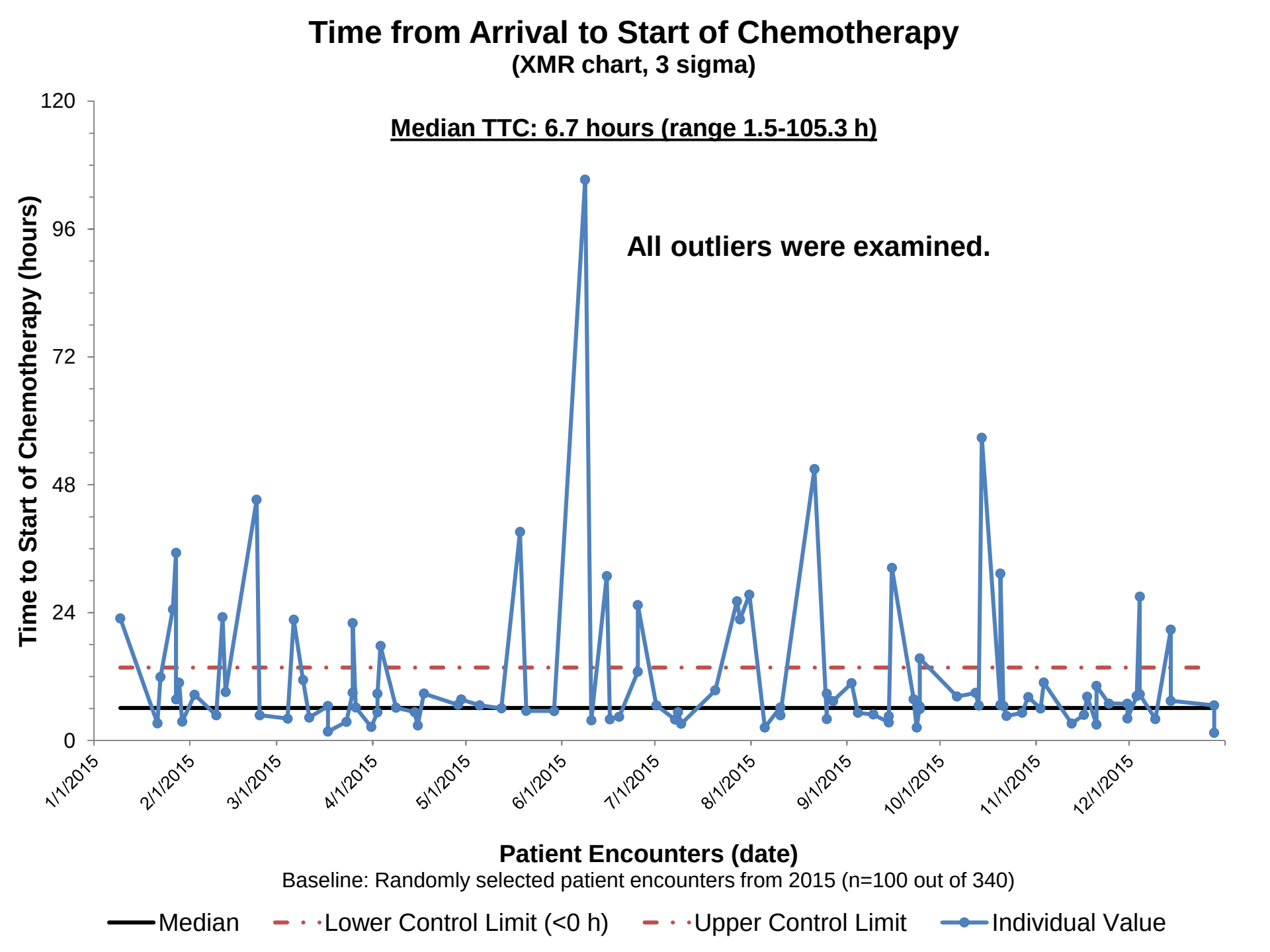
Discussion

- XMR charts show there are many outliers in baseline population

- Many variations in:
  - Sequence of events prior to chemo start: procedures, consults, clinic appointments
  - Chemo regimen
  - Parameter requirements (e.g., urine output)


Time from Arrival to Start of Chemotherapy
(XMR chart, 3 sigma)
Median TTC: 6.7 hours (range 1.5-105.3 h)
All outliers were examined.
Time to Start of Chemotherapy (hours)
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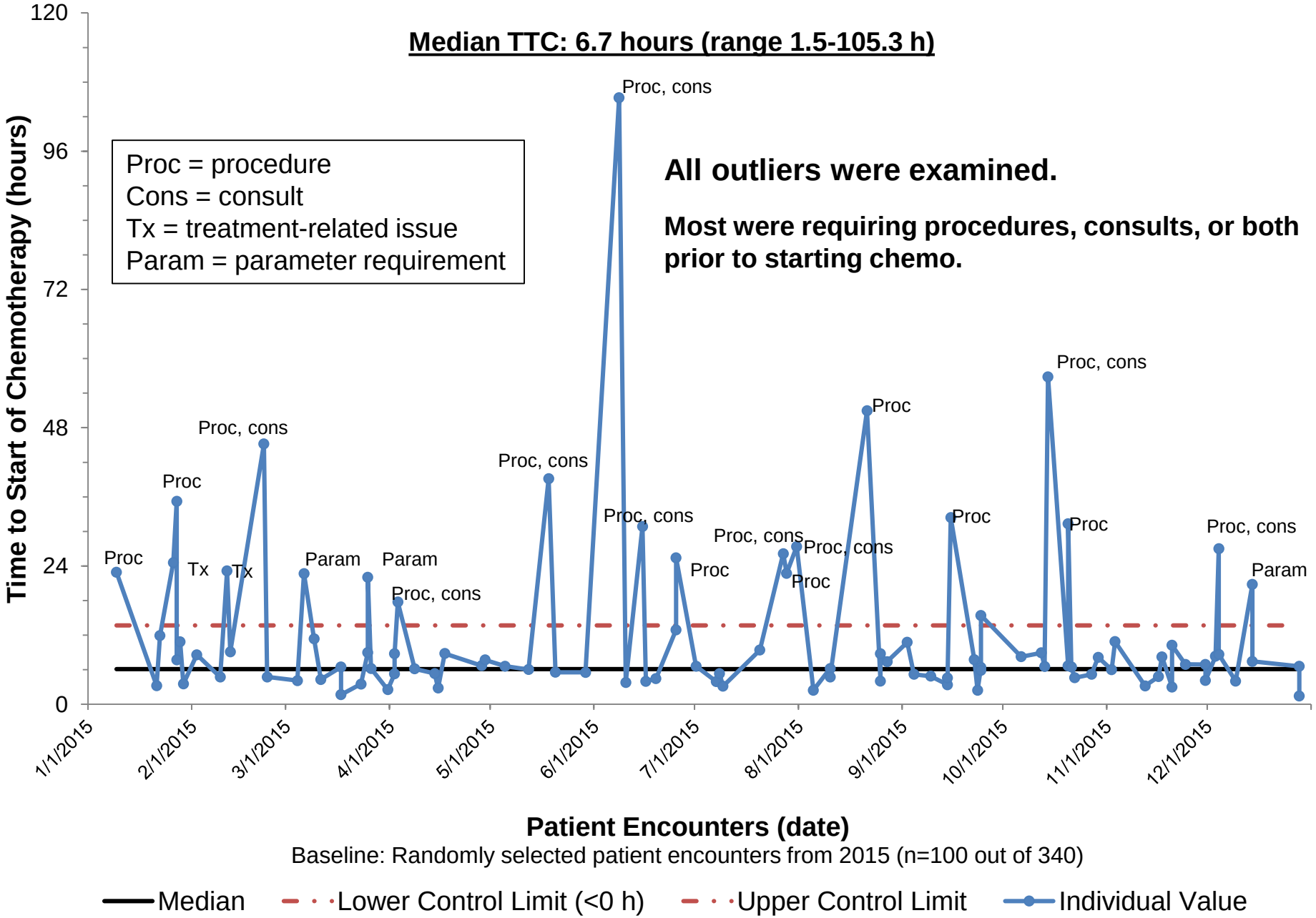
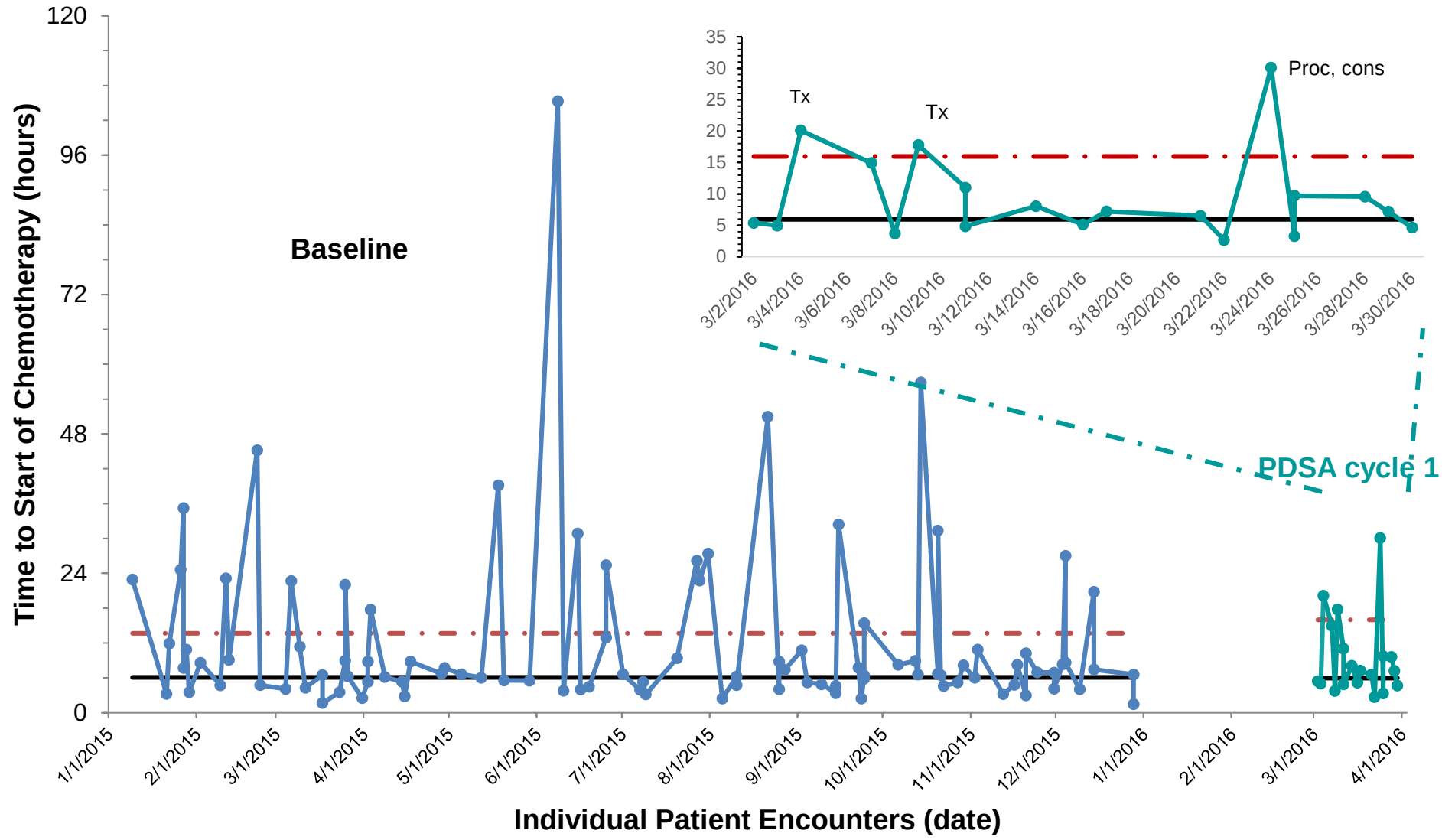


PDSA #1: Change Data

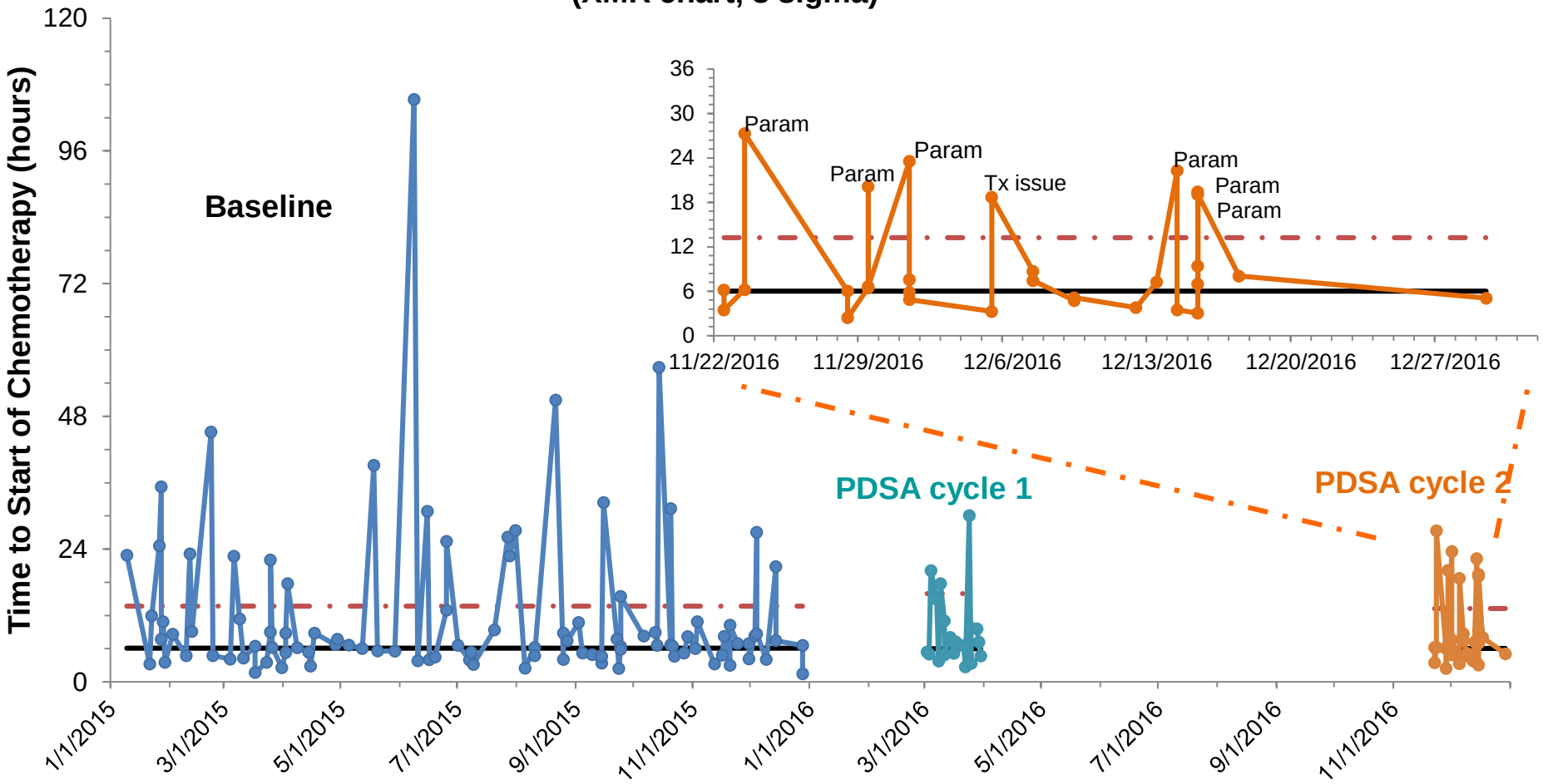
Time from Arrival to Start of Chemotherapy



PDSA #2: Change Data

Time from Arrival to Start of Chemotherapy

(XMR chart, 3 sigma)



Patient Encounters (date)

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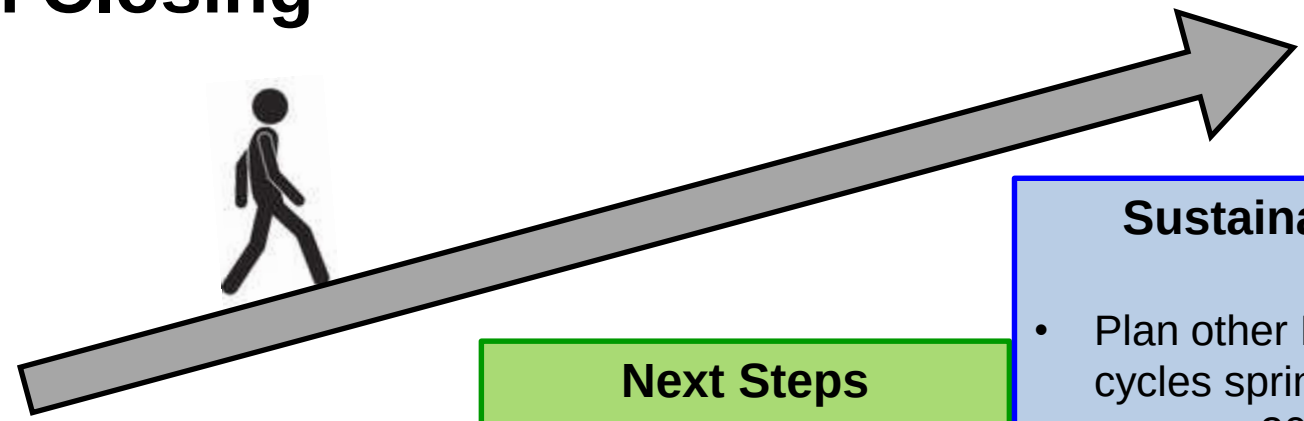
In Closing



Conclusions

- Qualitative and quantitative tools showed us where “problem areas” were (or were not)
- Did not meet aim of decreasing TTC by 30%

Next Steps

- PDSA cycles targeting patient encounters requiring urine parameters
- Patients skipping admission office step in process map
- Pre-admission clinic visits: exam, labs, chemo signature

Sustainability

- Plan other PDSA cycles spring and summer 2017
- Regularly update to UVA Medical Center Medication Usage Safety & Informatics Subcommittee and Cancer Center leadership

Thank you

ASCO QTP
Amy Guthrie

Mike Keng

Kathy Degregory
Tanya Thomas
Liz Daniels
Lisa Huntsinger
Erin McLoughlin

Our patients

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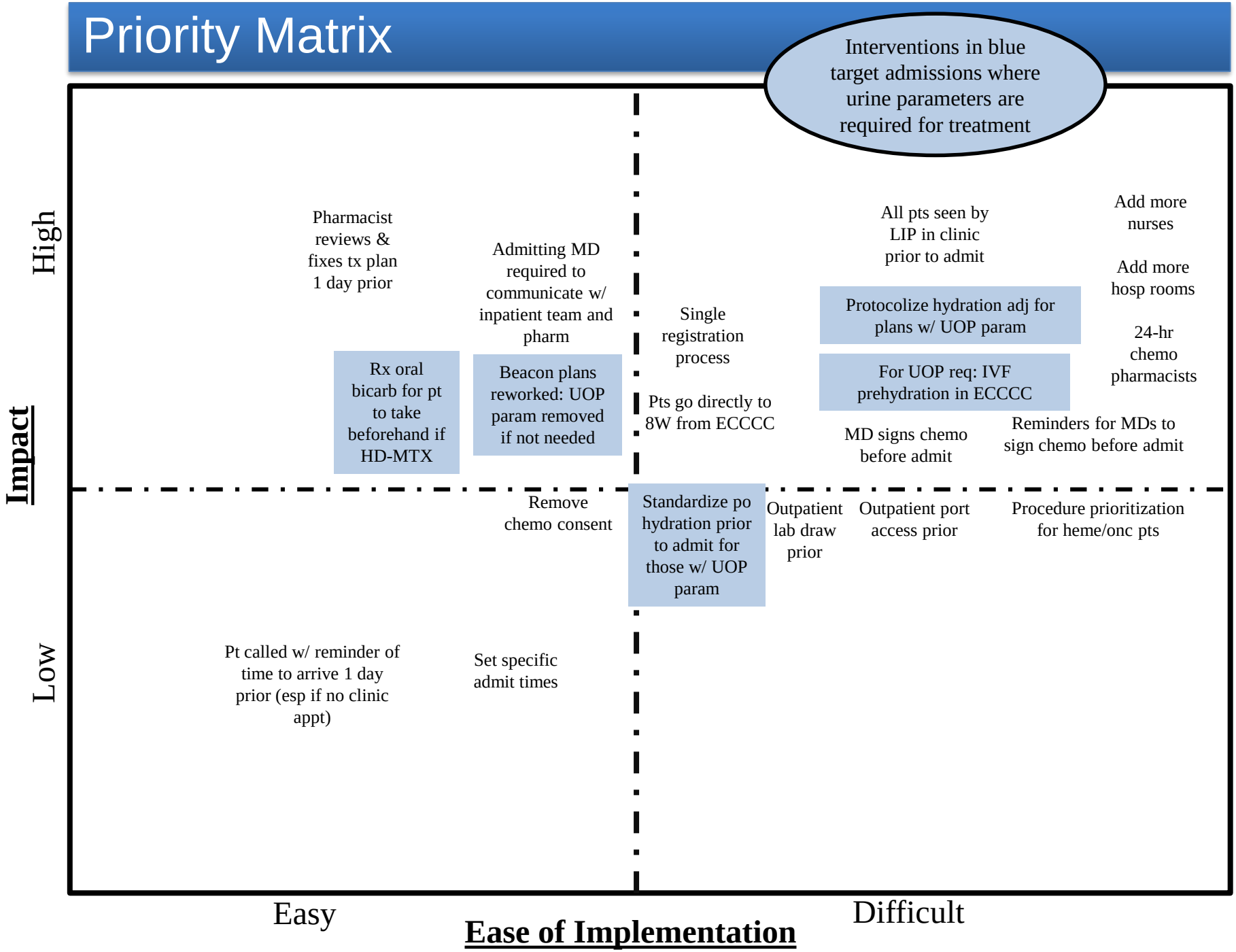
Appendix Slides

Priority Matrix



Other Baseline Findings

- No chronological variation of TTC
- Patients (pts) with pre-admission outpatient appointments started chemo **2.4 h** earlier
- Pts with labs collected and resulted by the time of their arrival started chemo **2 h** earlier
- Pts with chemo orders signed before admission started chemo more than **1 h** earlier
- Pts without urine parameter requirements started chemo **3 h** earlier
- Pts admitted to the resident service started chemo roughly **5 h** later than those admitted to the fellow chemo services
- Pts arriving on the oncology unit between 1-5 PM started chemo ~**4 h** before those arriving before 1 PM or after 5 PM
- Pts needing any procedures done before chemo started **>9 h** after those not requiring any procedures
- Ratio of patients: chemo nurses did not appear related to TTC

PDSA #1: Materials Developed

Risk vs Benefit "Smartphrase"
Date _____

_____ and his caregivers were provided with information regarding treatment with the _____ regimen including the following medication(s): _____ .

We discussed the potential benefits of therapy, side effects, and toxicities. Potential risks associated with not receiving treatment were also discussed. The patient and his care giver had the opportunity to have their questions answered and demonstrated understanding of the information discussed.
_____ , MD

PDSA #2: Materials Developed

Pharmacy pre-review checklist:

Pharmacist name _____

Attending name _____ (± nurse navigator name if applicable)

Date called _____

[ ] Any changes made to admission date or plan? (Bed reservation still necessary?)

[ ] Any changes made to chemo regimen or doses?

[ ] If direct admission, is it signed?

[ ] If intrathecal chemo ordered in treatment plan, is encounter with neuroradiology set up?

[ ] Were changes made to treatment parameters? (For example, were urine output parameters or pregnancy tests removed?)

[ ] If WBC growth factor is needed, where will it be received?

- [ ] EC4 Infusion
- [ ] EC4 Retail
- [ ] Local physician office: _____
- [ ] G-CSF not required

Baseline

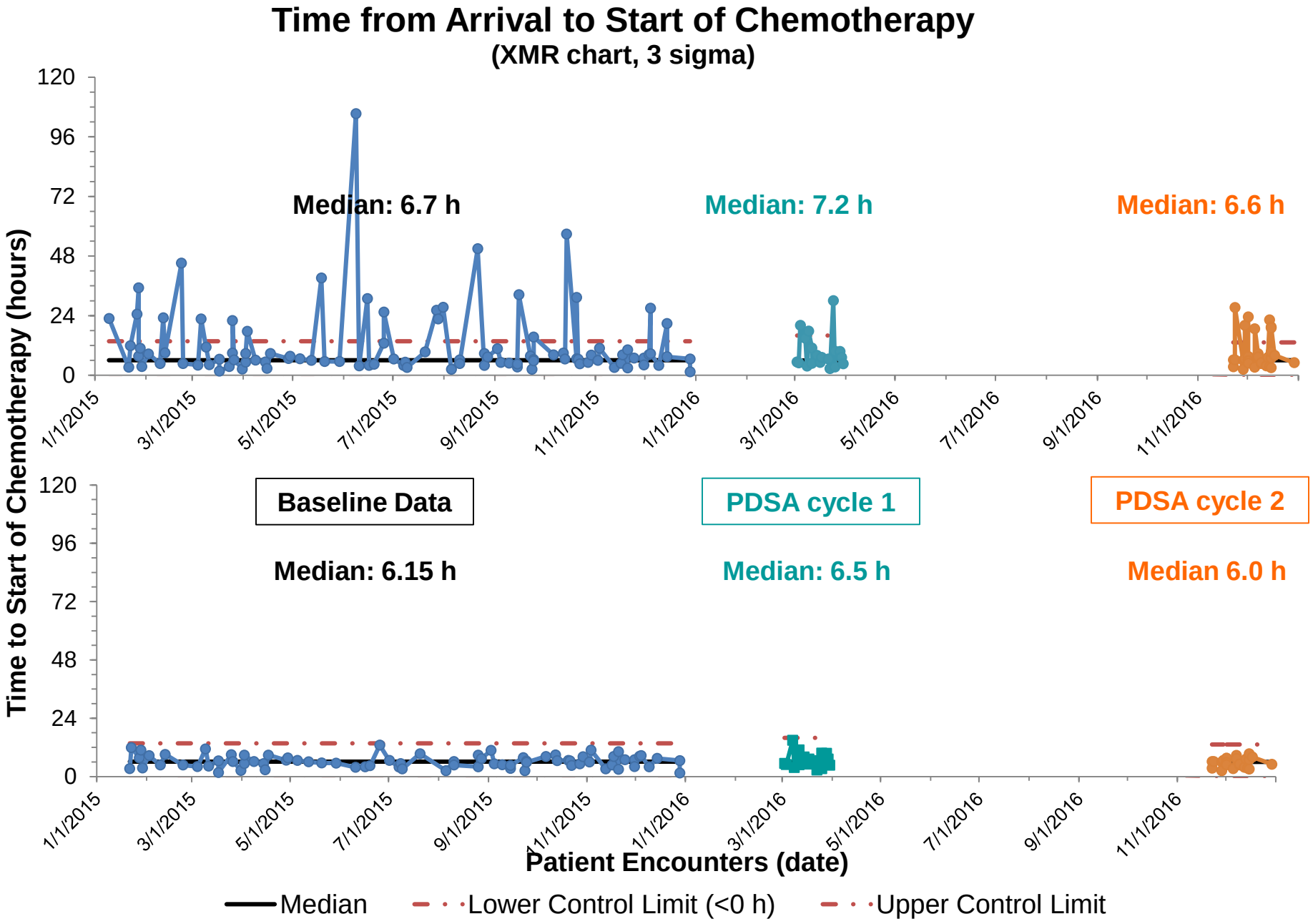
TTC	Event
22.92	Doc #7. 3:30 PM appt. Needed PFTs and x-ray done; last procedure done at 9 PM. Chemo orders signed next AM. Had UOP parameters to meet as well.
24.60	Doc #7. Carbo/ Taxol #1 needing desensitization.
35.25	Doc #4. Getting cycle #3 Ifos/ Adria. Needed x-ray, completed at 1:45 PM. Had UOP parameters. Started chemo shortly after midnight.
23.15	Doc #8. First-time horse ATG. Had to do test dose first and then actual ATG administration the following AM.
45.18	Doc #7. Pt arrival at 6:30 PM. Xray done at 10:30pm. Chemo orders (Cis/ Adria) were signed 2 days after admit. Consult needed.
22.68	Doc #4. Cycle 3 HD-MTX. Patient arrived. Almost 3 hours to place admit order. Patient met UOP + urine pH parameters next AM.
22.05	Doc #7. Cycle 1 of AIM. Had 3 pm clinic appt; arrived to floor 5 pm. Chemo order signed next AM, but patient met parameters before chemo signed.
17.75	Doc #7. Cycle 3 of Adria/ cis/ etop. No clinic appt. Had port placemt 1st before arrival to floor at 4:30 PM. Chemo signed before admit. Need MFM consult before starting chemo. Pre-med and chemo started next AM.
39.15	Doc #4. Cycle 1 of ifos/ etoposide. No appt. Patient arrived at 12 PM. Port HD#1, PET HD#2. Sperm bank attempt and ortho cons for cauda equine. Had RT on HD1 and HD2. Chemo started on hospital day 3 in the AM.
105.28	Doc #7. Etop only. Needed dialysis. No appt. Chemo not signed unti HD4.
30.85	Doc #10. Waldenstrom's. Needed Nephrology consult, HD line, PLEX, then start treatment.
25.42	Doc #10. Pt had 1 pm clinic appt. Cycle 1 of EPOCH (no R). Needed tunneled line placed before starting chemo. Chemo not released until 22 hours after procedure completed?
26.15	Doc #6, admitted for autologous SCT. Should have been excluded from data collection. Admitted for hydration on HD#1, then needed dialysis on HD#2 before chemo given.
22.73	Doc #8. HyperCVAD B1. 2:15 pm appt. Floor @ 4pm. Needed PIC, which was done following AM. Chemo signed before proc done.
27.38	Doc #7. Cycle 3 VDC. Needed dialysis before chemo. Orders were released into wrong EMR encounter.
50.95	Doc #2. No appt. EPOCH-R 1. Arrived 6pm. Echo on afternoon of day #2. Chemo sig before admit. Chemo released AM of day #3.
32.42	Doc #7. Cycle 5 VDC. Needed x-ray and MUGA. Last procedure done on AM of HD#2. Still didn't start chemo until 9 PM on HD#2.
15.43	Doc #13. Cycle 2 of R-MPV. Elevated lactate. Chemo held; work-up done.
56.85	Doc #7. Cycle 6 ifos/ etop. Needed dialysis, diagnostic paracentesis, and work-up for nausea before starting chemo.
31.33	Doc #13. Cycle 2 R-MPV. Need PEG and NG tube placement; finished HD#2 at 4 PM. Starting chemo evening of HD#2.
27.02	Doc #7. Etop. No appt. 1:30 pm. Dialysis needed. Chemo signed 12 noon, released 3:40 pm. Chemo not started until hosp day #2 @ 3pm.
20.83	Doc #4. Getting Cycle 3 HD-MTX . Clinic appt @ 2:30 pm; arrival to floor. 3:40 pm. Admit order 4:20 pm. Met UOP and urine pH param on HD#2 in AM.

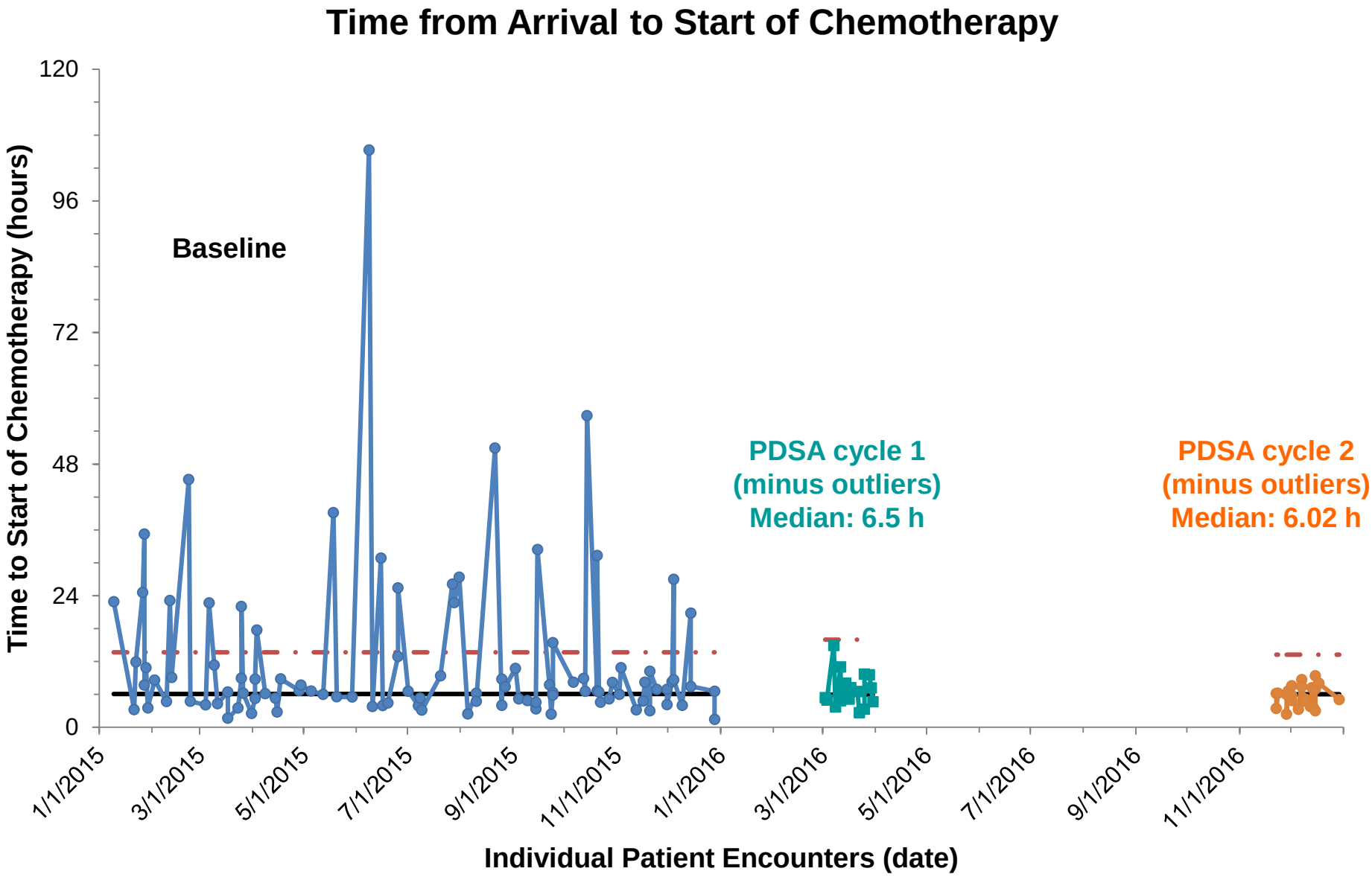
PDSA cycle 1

TTC	Event
20.12 hrs	Difficulty meeting methotrexate urine parameters
17.77 hrs	Patient met parameters 3/9/2016 at 19:48 but then the urine pH dropped to 6. Patient did not meet parameters again until 3/10/16 at 02:30.
30.08 hrs	Doc #7. Nephrology consult was necessary for the continuation of patient's regular dialysis prior to starting chemo. Then, patient went off thr unit to visit mother who was admitted to the hospital.

PDSA cycle 2

TTC	Event
27:18	Doc(s) #13. Patient getting R-MPV (no R or V). Had h/o hydration-induced SIADH. Oncology wanted Nephrology consult prior to starting chemo. 24-hour urine CrCl was desired before the start of HD-MTX.
20:08	Doc(s) #13. Patient getting R-MPV (no V). Patient had difficulty meeting treatment parameters (UOP and urine pH).
23:33	Doc(s) #13. Patient getting R-MPV (no R, P, or V). Patient difficulty meeting treatment parameters (UOP and urine pH). They followed an algorithm developed by a pharmacy resident for changes to hydration and/ or alkalinization but the patient still had difficulty meeting parameters.
18:42	Doc #4. Patient receiving cycle 1 of IGEV. Patient had h/o reaction to chemotherapy and significant anxiety. Therefore, pharmacy, doc, and patient agreed on overnight hydration and then starting chemo the following day (on hospital day #2).
22:17	Doc(s) #13. Patient getting R-MPV (no R or V). Patient had difficulty meeting treatment parameters (UOP and urine pH). Same patient as **23:33**.
19:26	Doc #10. Patient getting cycle 2 of HD-MTX. Met treatment parameters 12/15/16 PM but for some reason did not start until 12/16/16 AM.
19:05	Doc #8. Patient getting cycle 2 of HD-MTX as a part of HyperCVAD regimen. Patient had difficulty meeting treatment parameters (UOP and urine pH).


Time from Arrival to Start of Chemotherapy
(XMR chart, 3 sigma)
Median: 6.7 h
Median: 7.2 h
Median: 6.6 h
Baseline Data
PDSA cycle 1
PDSA cycle 2
Median: 6.15 h
Median: 6.5 h
Median 6.0 h
Time to Start of Chemotherapy (hours)
Patient Encounters (date)
Median
Lower Control Limit (<0 h)
Upper Control Limit


Time from Arrival to Start of Chemotherapy
Time to Start of Chemotherapy (hours)
120
96
72
48
24
0
Baseline
PDSA cycle 1
(minus outliers)
Median: 6.5 h
PDSA cycle 2
(minus outliers)
Median: 6.02 h
1/1/2015
3/1/2015
5/1/2015
7/1/2015
9/1/2015
11/1/2015
1/1/2016
3/1/2016
5/1/2016
7/1/2016
9/1/2016
11/1/2016
Individual Patient Encounters (date)