

Clinical Safety & Effectiveness Cohort # 8

1



IMPROVING THE TIMELINESS OF PARACENTESIS: IMPACT OF A PROCEDURE TEAM



CENTER FOR PATIENT SAFETY & HEALTH POLICY

UT HEALTH SCIENCE CENTER™

SAN ANTONIO

Educating for Quality Improvement & Patient Safety

Making Cancer History®



FINANCIAL DISCLOSURE



Patricia Wathen, MD has no relevant financial relationships with commercial interests to disclose.

Deborah Kendall-Gallagher, RN, JD, PhD has no relevant financial relationships with commercial interests to disclose.



The Team



- **CSE Participants:**

- Patricia I. Wathen MD – School of Medicine, Dept of Medicine
- Deborah Kendall Gallagher RN, JD, PHD – School of Nursing

- **Team Members:**

- Phoebe King MD – Chief Resident, Internal Medicine
- Megan Freeman MD – Internal Medicine Resident
- John Vizquete MS IV – Medical Student
- Jamie Kohn – Research Specialist

Special thanks to David Dooley MD, Michelle Ryerson, John Walker, Amjed Baghdadi, Raj Seghal MD, David Schmit MD, George Crawford MD and the residents rotating on the Patient Safety/Procedure Service



Background: Educational goals



- Internal Medicine residents frequently perform invasive bedside procedures such as paracentesis (removal of fluid from the abdomen)
- The Internal Medicine residency at UTHSCSA has used simulation to standardize procedural training for the past two years
- Challenge
 - To bring standardization in training and supervision to the bedside
 - To incorporate bedside ultrasound in procedure training



Procedure team: PS/QI in action



- Veteran's Administration funded a chief resident position specifically to promote training in Patient Safety/Quality improvement
- Our proposal included having the PSQI resident supervise a 'procedure team' to train first year residents how to safely perform invasive procedures
- Studying the impact of the procedure team will help determine the effectiveness of this approach



PS2: studying the impact



- **Our project: to investigate the effect of the procedure team on the timeliness of paracentesis in patients admitted to Internal Medicine ward teams.**

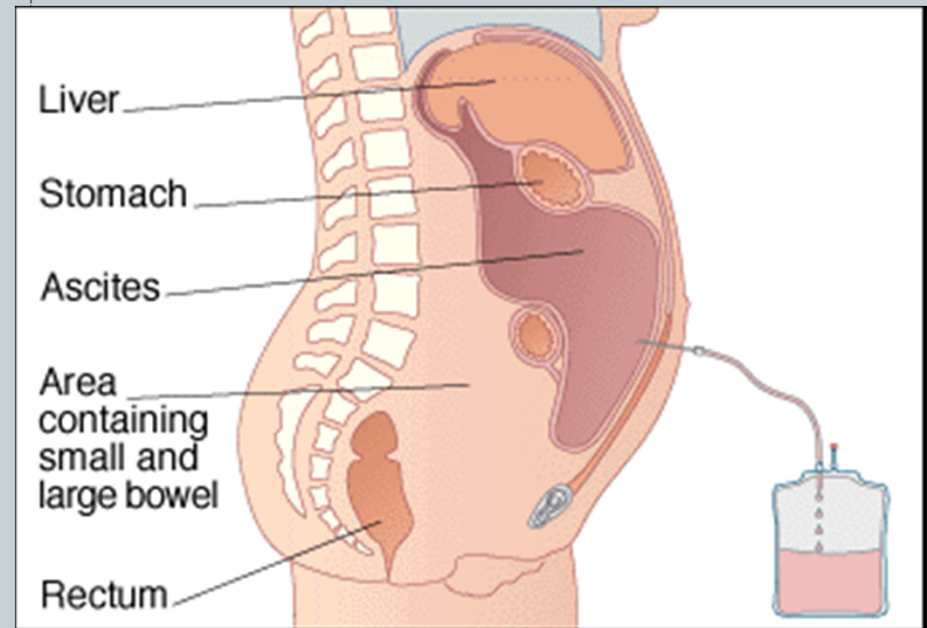
Paracentesis: A commonly performed procedure



- Ascites, an abnormal accumulation of fluid in the abdomen, is a common diagnosis on admission to the Internal Medicine service at the Audie Murphy VA Hospital and University Hospital
- Current guidelines support diagnostic paracentesis (removing fluid from the abdomen) to analyze the fluid for infection and other conditions.
- Patients often require removal of larger amounts of fluid (therapeutic paracentesis) to relieve symptoms such as abdominal pain and respiratory distress.

Paracentesis: A commonly performed procedure

- Over 500 paracenteses are performed annually at the AMVAH and the University Hospital, the majority on Internal Medicine services.

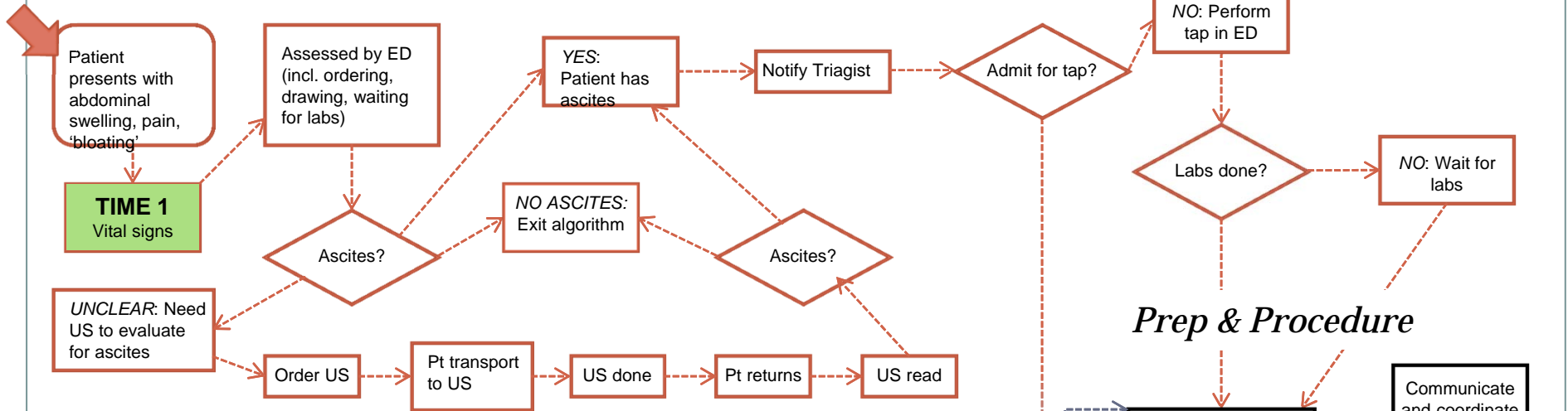


Steps to Paracentesis

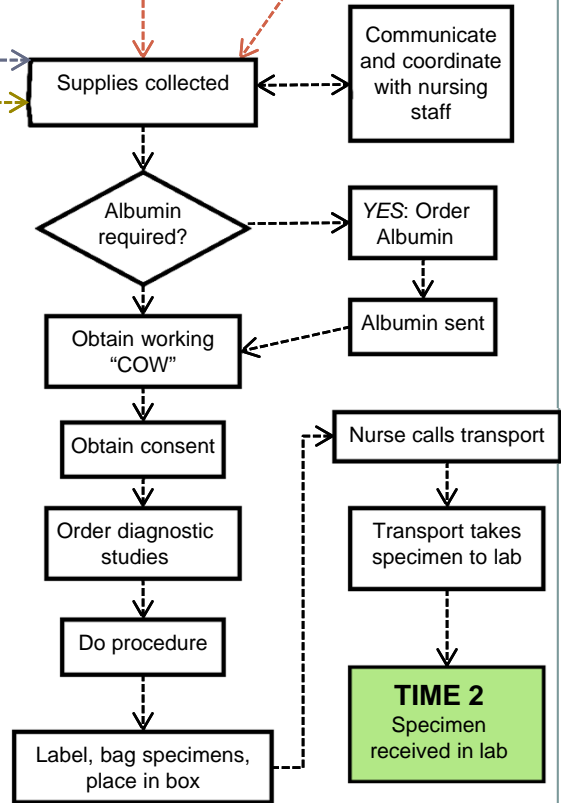


- The patient usually presents to a clinic visit or ED with abdominal distension
- The patient is admitted to an internal medicine service for paracentesis
- The admitting team performs the paracentesis
 - May be supervised by an attending or a resident who has performed ≥ 5 paracenteses
 - The patient may be sent to radiology for ultrasound ‘marking’ to locate site of fluid
 - See Flow Chart for specific steps to procedure

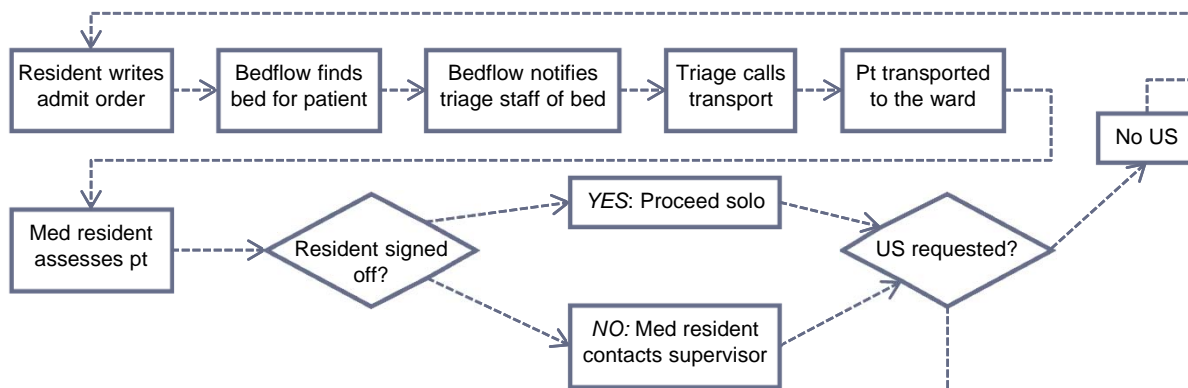
Pre-Admission—ED/Clinic



Prep & Procedure



Post-Admission—Medicine Service



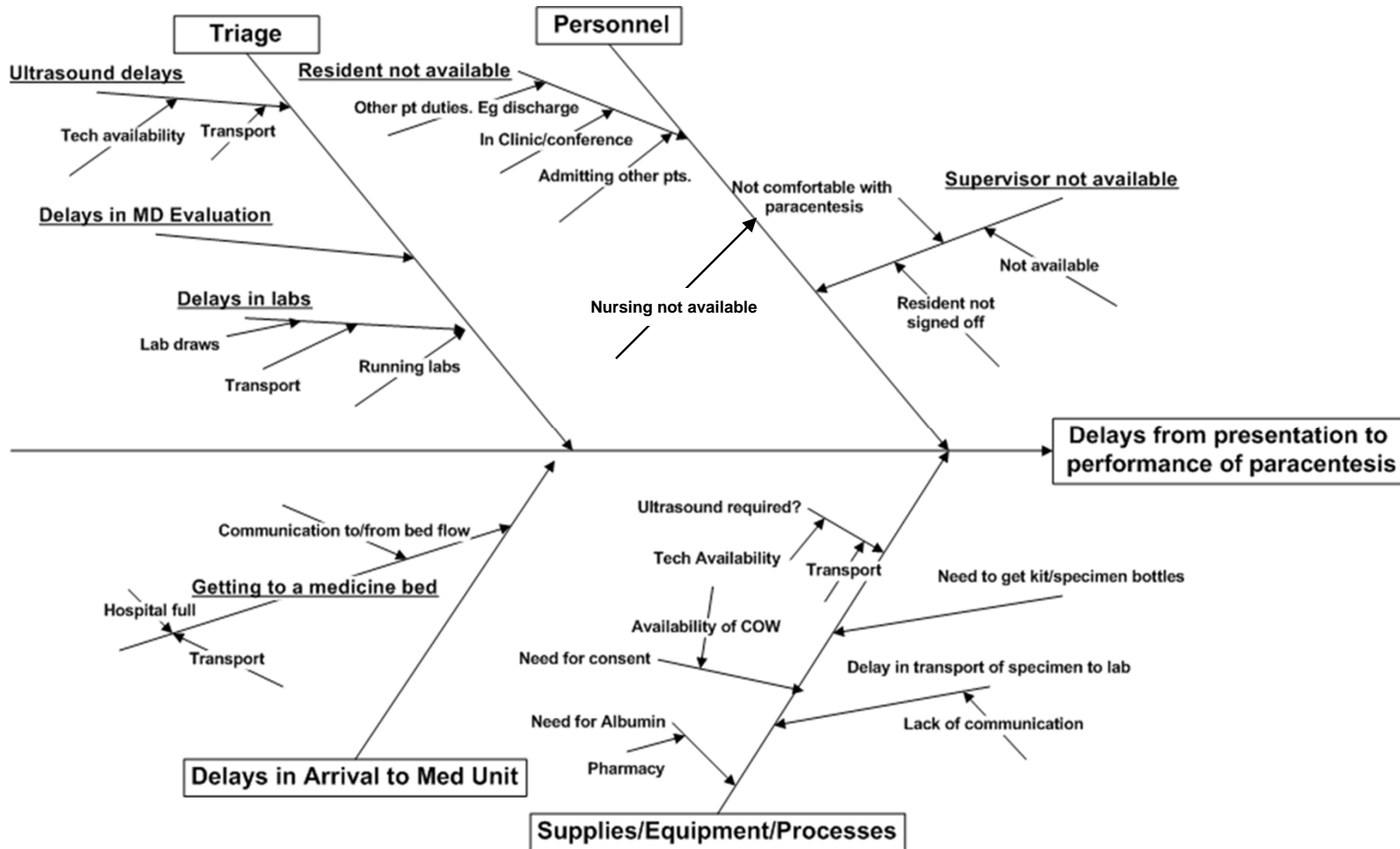
Transport/US



Problems with Usual Care Noted Prior to Implementation of Procedure Team

- **Delays**
 - The procedure is often postponed while the admitting team performs other urgent tasks
 - Need for ultrasound marking may delay procedure
- **Technique**
 - Standard of care is bedside ultrasound immediately prior to the procedure, as location of fluid may shift after ultrasound marking
- **Training and supervision**
 - Residents are “signed off” to supervise paracentesis after performing 5 procedures. Is this enough?
 - Determination of competency to perform a procedure should not be based on a number, but on objectively observed competency

Problems with usual care



'Usual' practice vs. Procedure team



'Usual' practice

- Ward team performs procedure
- Supervision by attending or 'experienced' resident
- Sonomarking performed by radiology, or procedure done without ultrasound

Procedure team

- Procedure team performs procedures (available 8 am-4 pm weekdays)
- Supervised by PSQI chief resident
- Bedside ultrasound by procedure team

AIM Statement



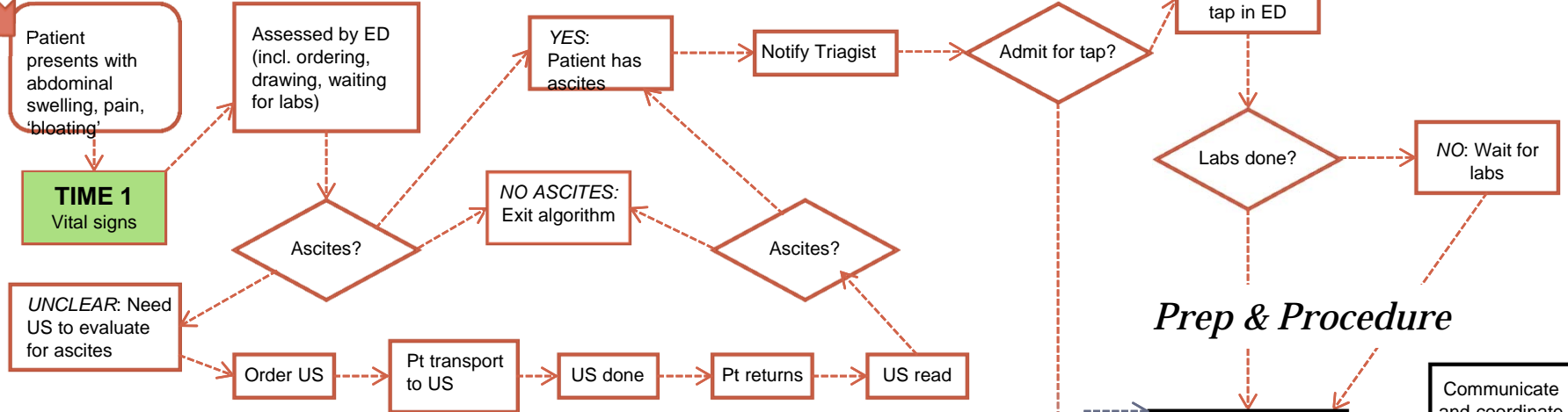
- To reduce the time from presentation with ascites to receipt of ascites specimen in the lab by 20% by Sept 15, 2011.

Methods

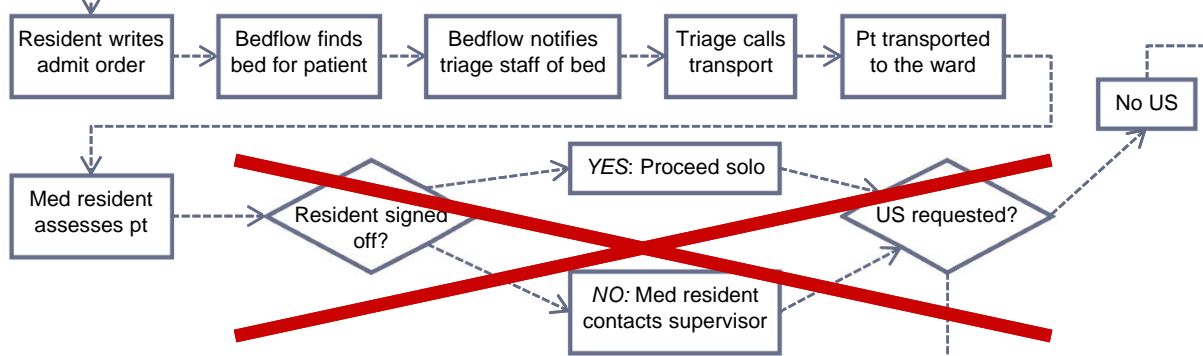


- **Quality Framework for project: Institute of Medicine's six domains of quality (Safe, Timely, Efficient, Effective, Equitable, & Patient-Centered [STEEP])**
- **IRB approval – educational projects conducted within the CS&E course deemed exempt**
- **Initial Step – Created flow diagram based on retrospective data from sample of 10 paracentesis charts**

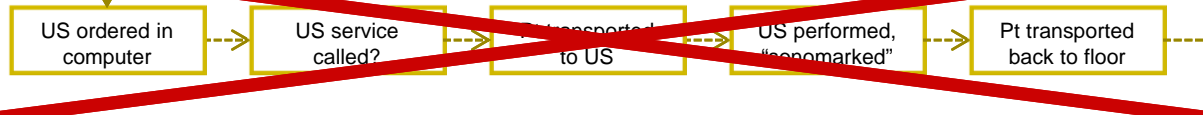
Pre-Admission—ED/Clinic



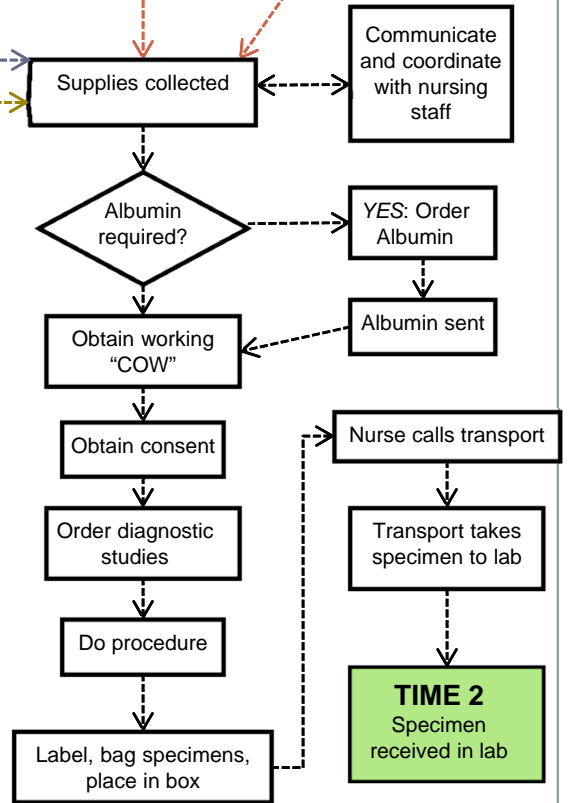
Post-Admission—Medicine Service



Transport/US



Prep & Procedure



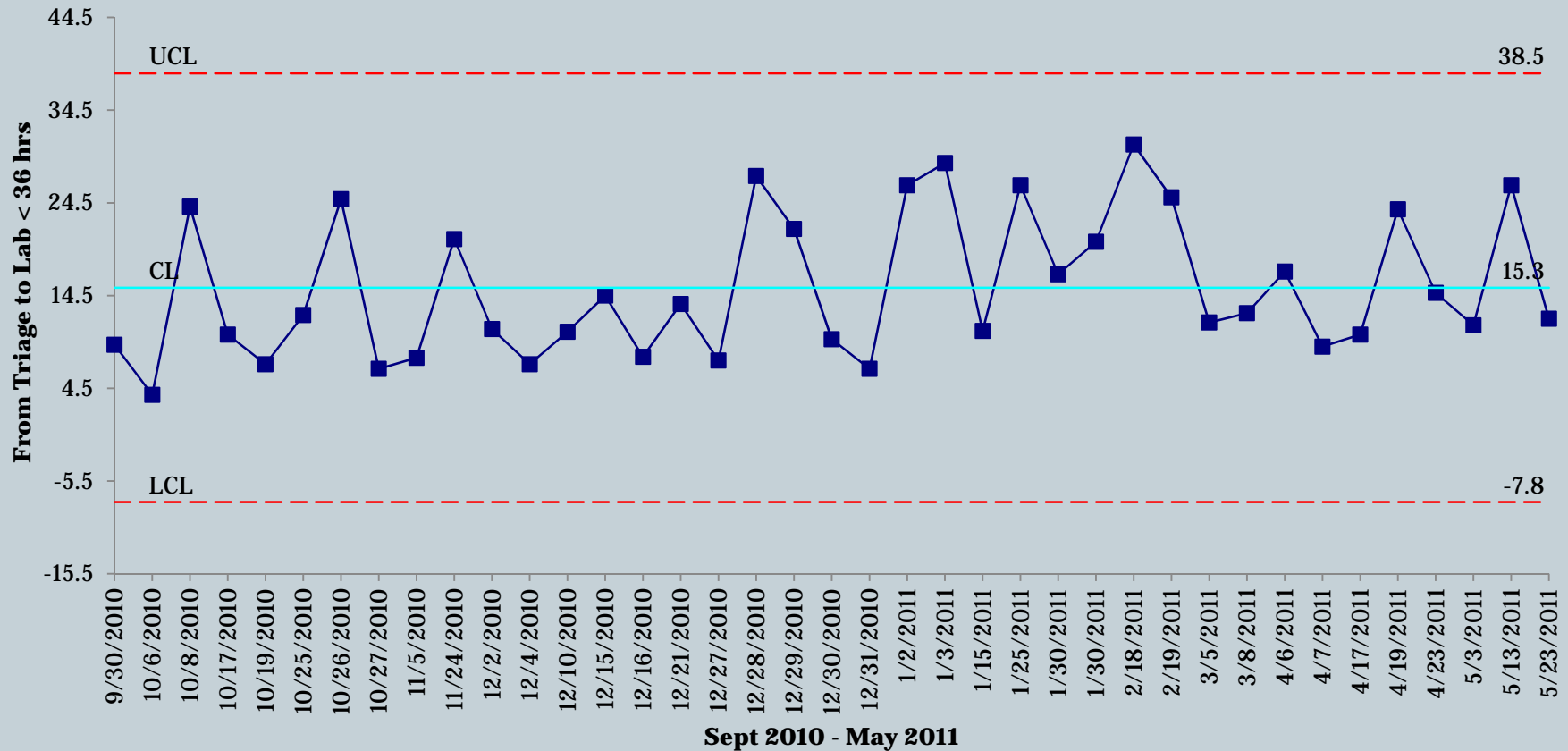
Data Collection



- **Population of Interest**
 - Patients admitted to Internal Medicine service (IM) at the VA or UHS with a procedure code for paracentesis
 - Exclusions
 - ✦ ICU patients
 - ✦ Patients who had paracentesis performed > 36 hours after admission (VA: n=2, UHS: n=1)
- **Data Sources**
 - Chart review (flow chart and pre-implementation)
 - Administrative (pre-implementation)
 - Procedure Team logs (pre- and post-procedure)
- **Variables** (red = variables included in analysis)
 - **Time of initial presentation (ER, clinic)** [vital signs]
 - Time of initial evaluation by IM [hospitalist note]
 - Time of procedure [procedure note]
 - **Time specimen received in lab** [lab log]
 - Percentage of patients US “sonomarked” [chart note]
 - Service ordering US (ED vs. IM) [chart note]
- **Time Period**
 - Baseline
 - ✦ VA (9/2010-6/2011— n=39) UHS (3/2011-6/2011— n=48)
 - Post-implementation (complete data available)
 - ✦ VA (7/2011-8/2011— n=7) UHS (7/2011-8/2011— n = 11)

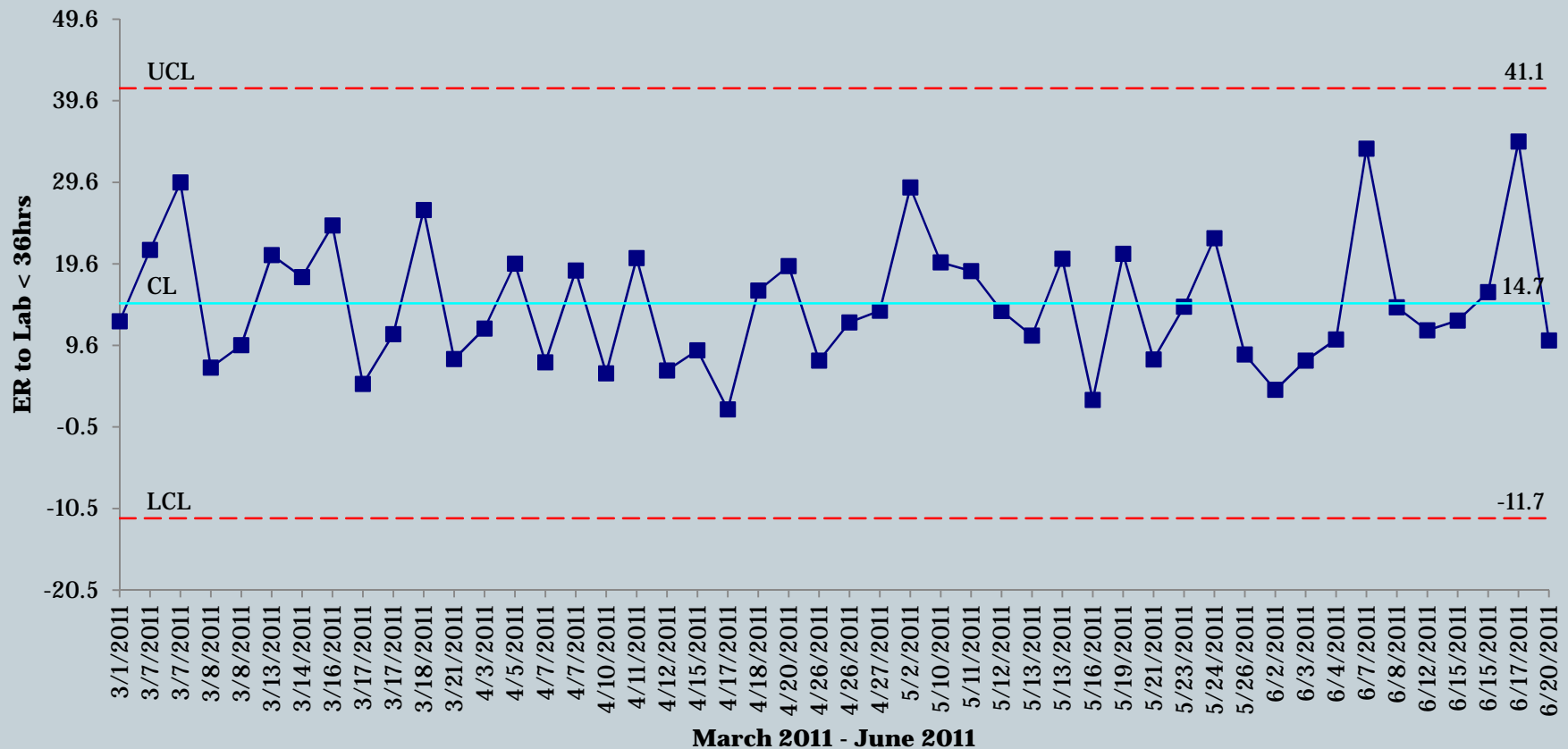
VAH: Baseline Time from arrival to lab: mean of **15.3 hrs** with mean range of **7.4 hrs**

Paracentesis (mean) From Triage to Lab < 36 hrs



UHS: Baseline Time from arrival to lab: mean of **14.7 hr** with mean range of **9.9 hrs**

Paracentesis - Time from ER to Lab < 36hrs



Procedure Team Activity

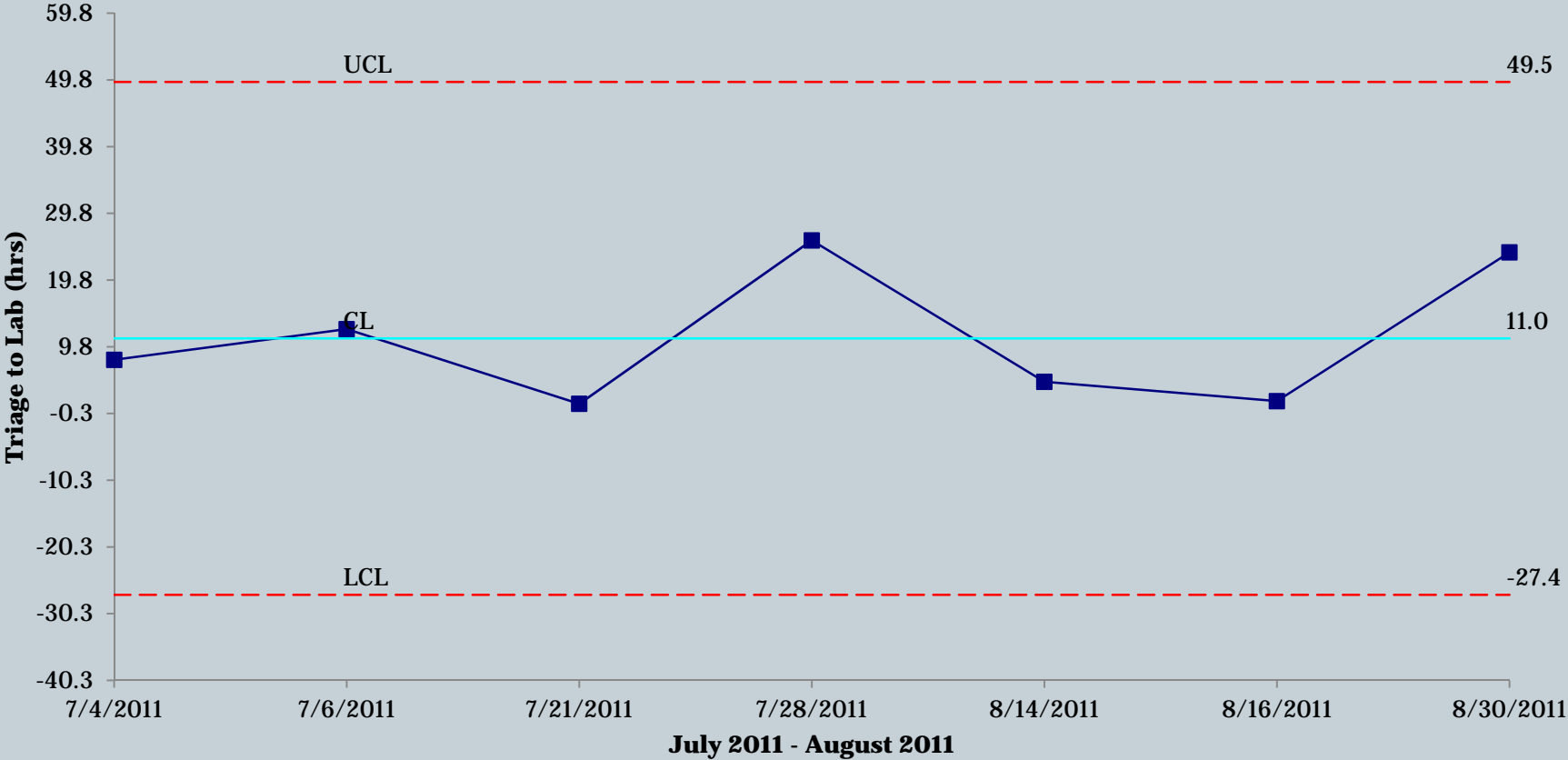


- **July/August 2011**
 - 62 paracentesis
 - ✦ 17 at VA (10 cases excluded, e.g. > 36 hrs, changed service, etc.)
 - ✦ 45 at UH (34 cases excluded, e.g. > 36 hrs, incomplete data, etc.)
- **Percentage of Internal Medicine Paracentesis Performed by Procedure Team**
 - VA Hospital: 41%
 - UH: estimated 43%
- **Additional procedures**
 - 18 lumbar punctures
 - 28 thoracenteses
 - 5 arthrocenteses

VAH: Post-implementation time from arrival to lab: mean of 11 hrs with mean range of 14.5 hrs

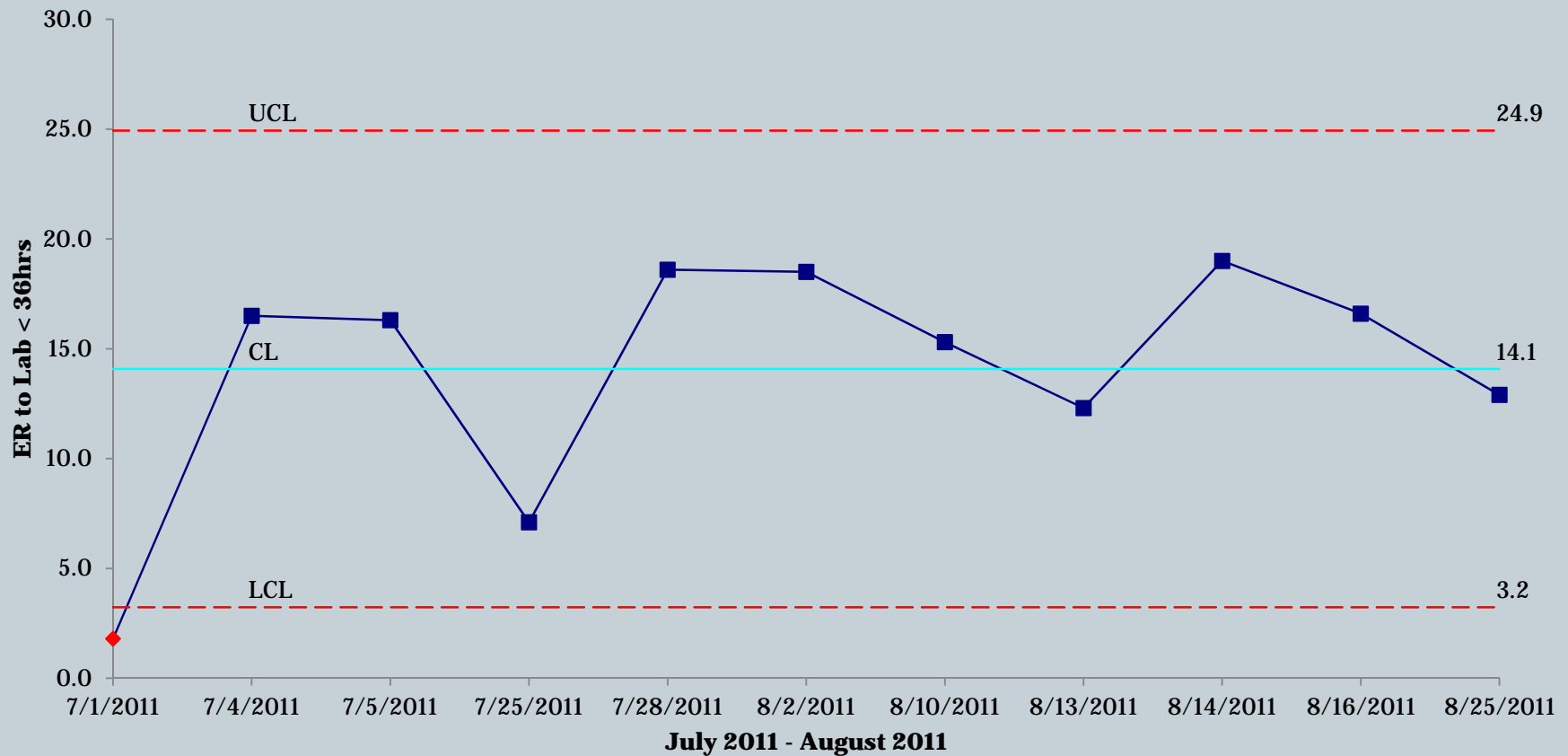


Paracentesis (Mean) Triage to Lab < 36 Hrs



UHS: Post-Implementation time from arrival to lab: mean of 14.1 hrs with mean range of 3.5 hrs

Paracentesis (mean) ER to Lab < 36hrs



Return on Investment



- **Assumptions**

- 27 bedside paracentesis procedures/month (average)
 - ✦ Replace location of sonograms from radiology to bedside: \$312 savings/per procedure (\$300/radiology, \$12/transport)
- 2 hour decrease in observation time per patient
 - ✦ For each patient, decrease observation time by 2 hours (\$58/hr, uncomplicated patient)
- Hospital reimbursement rate of 35%

- **Project Costs**

- Covered by Educational Costs
 - ✦ Annual cost of faculty: \$108,800
 - ✦ One time cost for portable sonogram machine: \$40,000

- **Annual Savings**

- 27 bedside paracentesis procedures/month = 324 procedures per year x \$312 = \$101,088
- 2 hour decrease in observation time per patient = 324 procedures x \$116 = \$37,584
- Total annual savings: \$101,088 + 37,584 = \$138,672

- **Cost savings over 3 years:** \$138,672 x 3 = **\$416,016** [varies by hospital reimbursement rate]

Discussion



- **Was Aim of 20% in reduction from time of presentation to receipt of specimen lab met?**
 - Unknown - Insufficient data to determine if decrease in time just normal variation or sustained decrease in time but trend encouraging
- **What specific component(s) of paracentesis process flow did procedure team impact?**
 - Results of decreased mean hrs but increased range suggest impact of procedure team influenced by myriad of factors. Subject of future research discussed by Dr. Wathen.
- **ROI**
 - Significant savings demonstrated
- **Limitations**
 - Data validity – accuracy, inconsistency admin/ chart
 - Unable to assess monthly range variation due to limited data

IOM Domains of Quality



- **Safety**
 - Improved training and supervision of residents in bedside procedures
 - Incorporates bedside ultrasound
- **Timeliness**
 - Team can perform procedures while ward team is busy with other duties
- **Efficient**
 - Bedside ultrasound vs. transport to radiology
 - Procedure team is working on improving consent process, availability of supplies
- **Effective**
 - Improved training may improve success rate for bedside procedures
- **Equitable**
 - Applying best practices across the healthcare system
- **Patient Centered**
 - More expeditious completion of procedures decreases patient discomfort and anxiety.
 - Research shows high levels of patient satisfaction with procedure teams.

Use of Bedside Ultrasound



- **Bedside Ultrasound is emerging as an important tool for invasive procedures**
 - Significantly reduces complications of Central Line placement and Thoracentesis
 - “Sonomarking” in Radiology department has not been shown to have the same benefits
- **For paracentesis bedside ultrasound improves procedure success rates**
- **‘Sonomarking’ still commonly performed prior to paracentesis**
 - At University Hospital, 100% of patients were ‘sonomarked’ prior to paracentesis
 - At VA 88% were ‘sonomarked’
 - Half of the ultrasounds were order by ED personnel

Future Directions



- **Dissemination of bedside ultrasound training**
 - Transition from sonomarking to bedside sono
 - Hospitalists to be trained in bedside ultrasound
 - All residents will be trained by 2013
- **Additional QI projects**
 - Examining how efficiency and effectiveness for paracentesis can be impacted at multiple points in the system
 - Examination of cost/benefit of dedicated NP to perform procedures at multiple sites within the system (outpatient clinic, ER) to reduce length of stay and admissions.