Effectiveness of a Chair Model in a Tertiary Academic Emergency Deptartment

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UT HOUSTON MEDICAL SCHOOL

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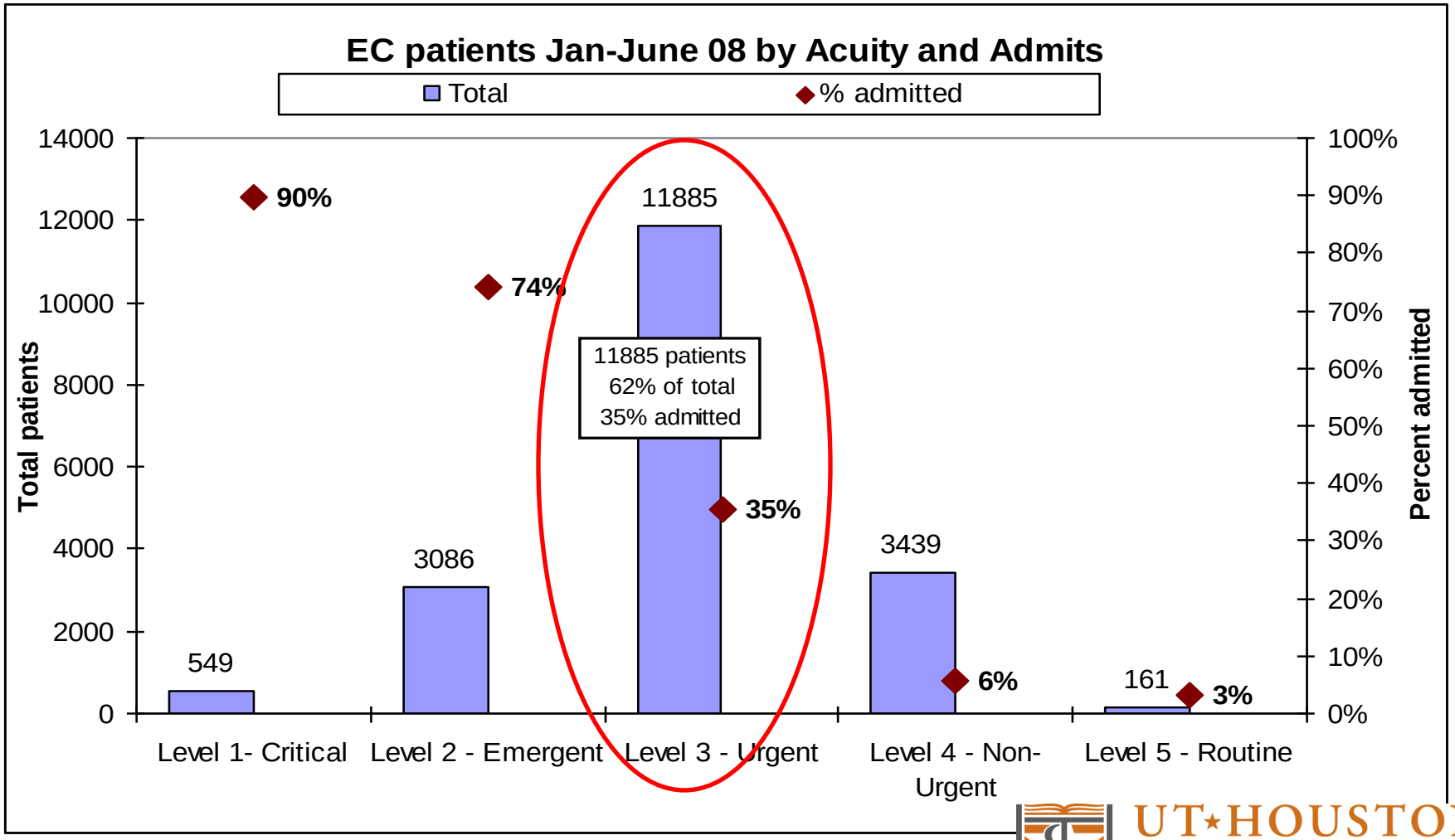
Variability, Error and the ED

- Only Unit with no predefined limits
- Maximal variation at the point of entry
  - All ages
  - All conditions
  - Any acuity
  - Unscheduled
  - All hours
- Variation creates unit with greatest instability
- Instability places a tremendous demand on process control to minimize error

Engineering Order within Chaos

- Identify the variables that drive ED workflow
- Design interventions to improve process control for these variables
- Measure improvement in outcomes that determine quality and safety in the ED

Critical Variable – Triage Level 3



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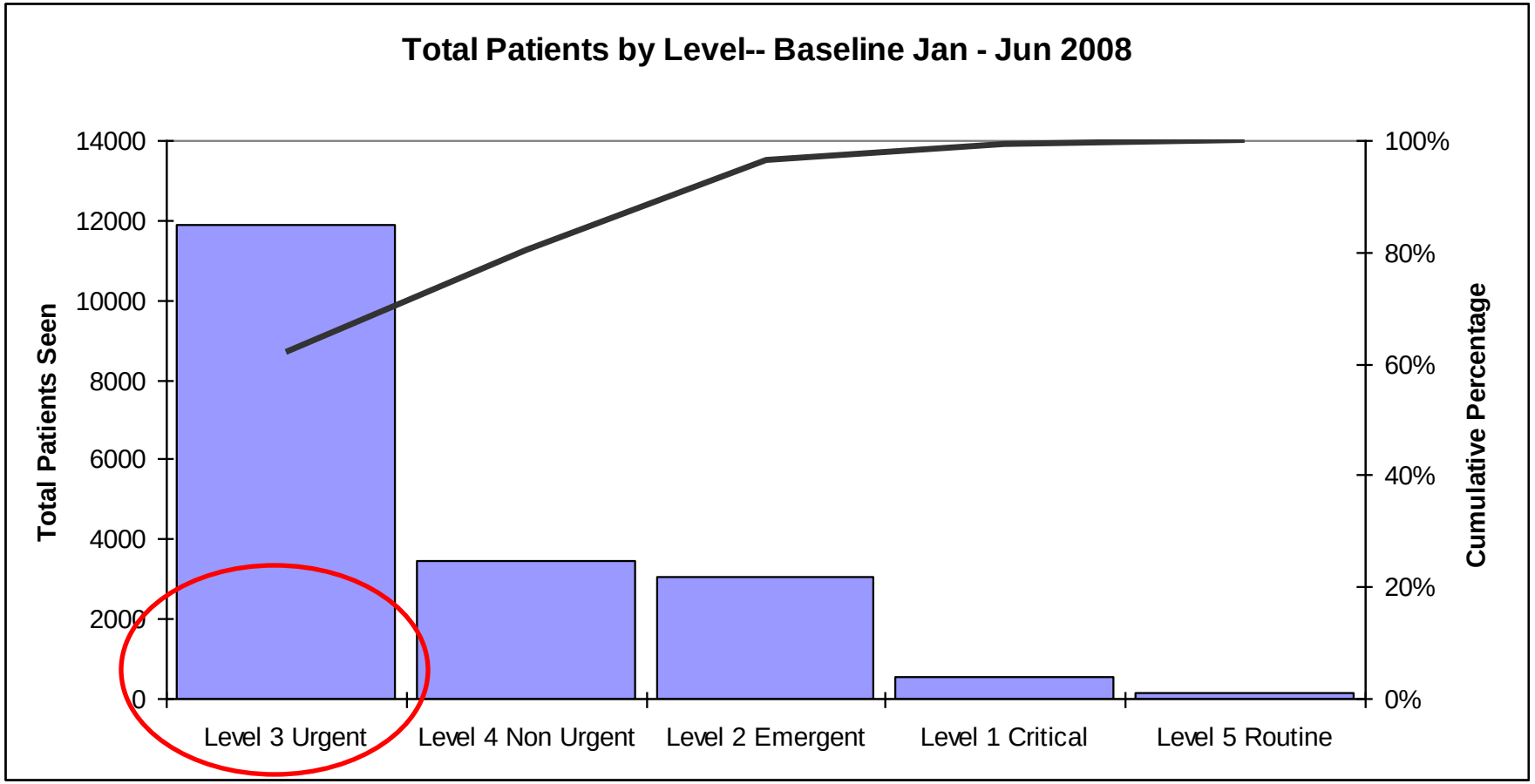
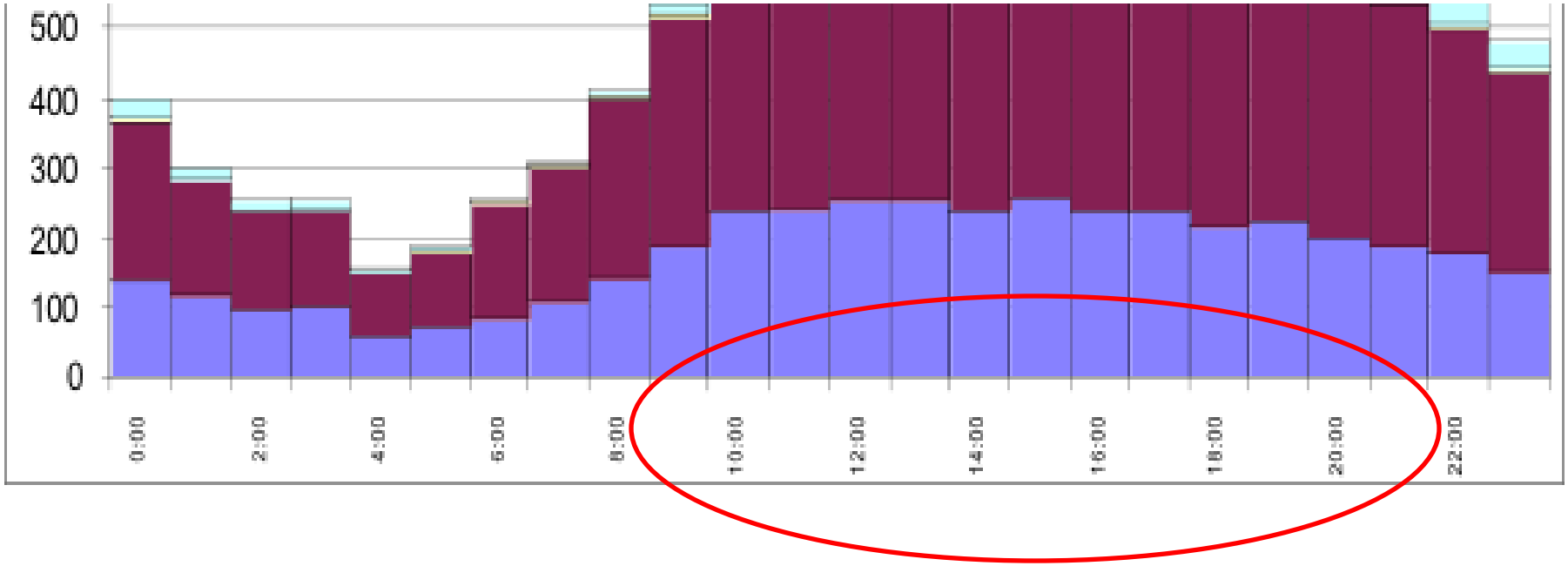
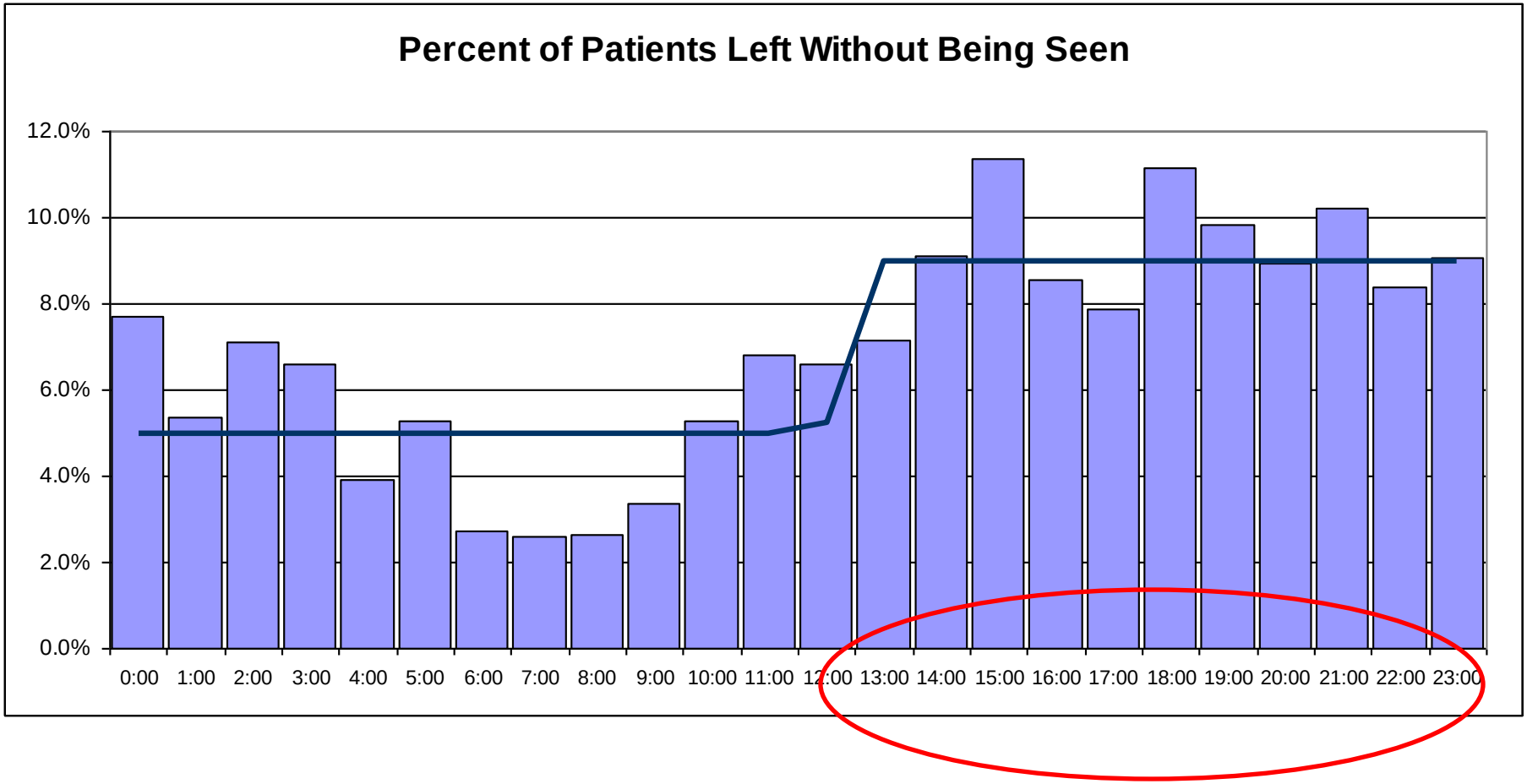


Critical Variable – Time of Day

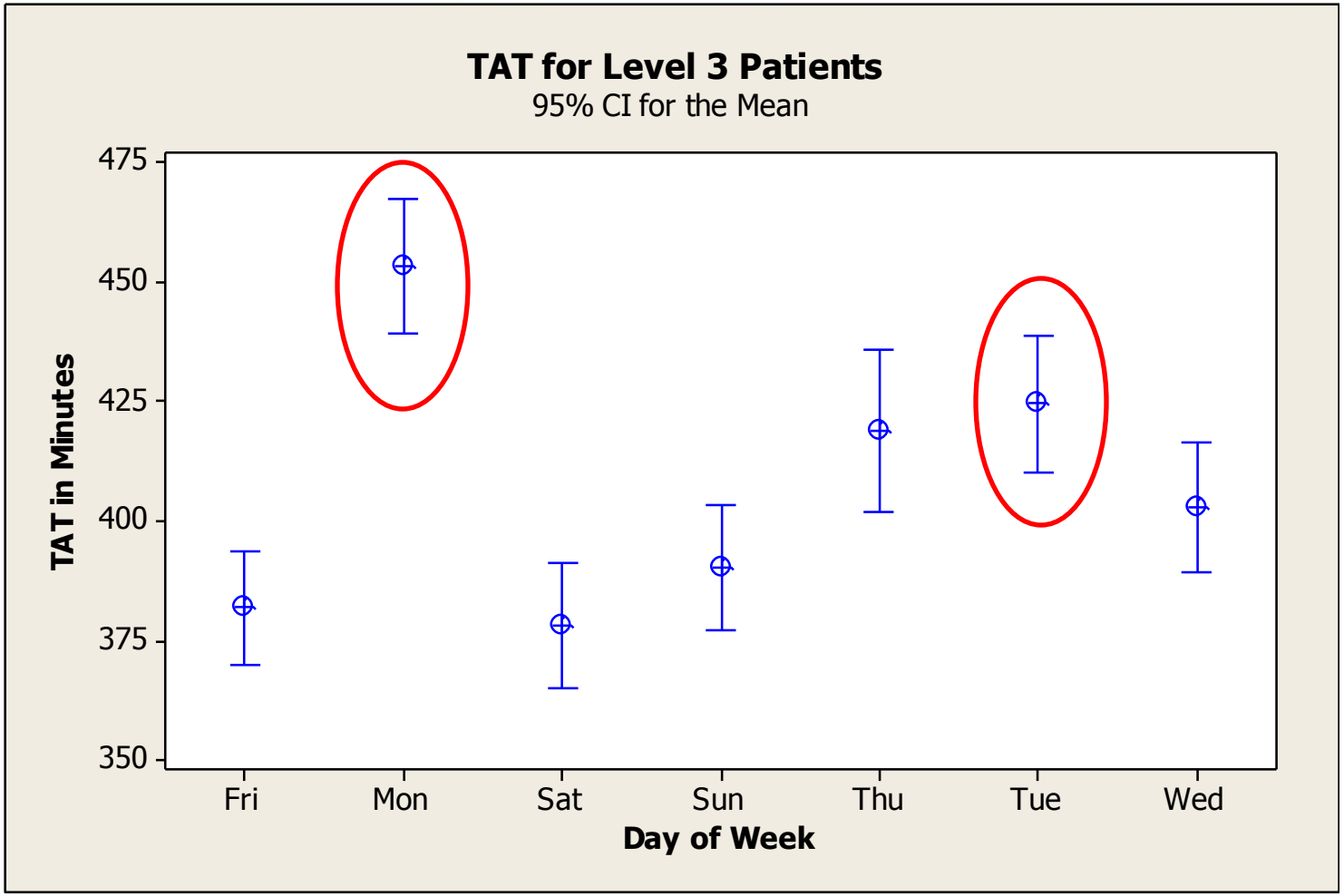


Focus for Chair Unit
•Level 3 Triage Urgent
•1:00 – 7:00 PM

Critical Variable – Time of Day



Critical Variable - Day of Week



Critical Variables for Project Focus

- Level 3 patients
- Operate unit from 1 PM to 7 PM
- On Monday and Tuesday

Interventions to Improve Process Control

- Challenge 2 typical ED operational assumptions
  - ED Fast-track Models focus on ***Level 4 and 5***
  - ***All*** patients require beds for the entirety or majority of their care

Interventions to Improve Process Control

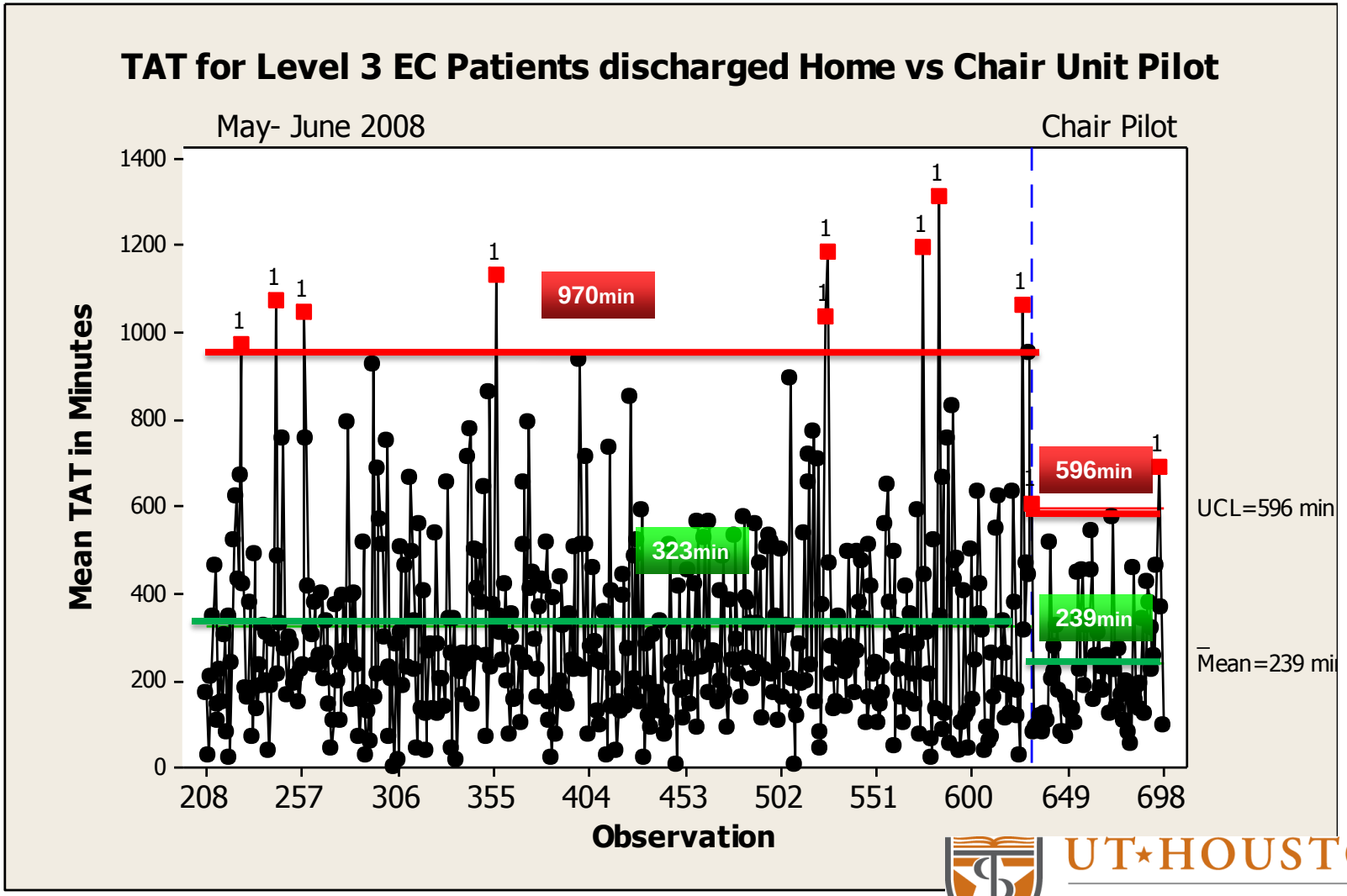
- A **6**-station chair unit was set up to treat ***level 3 patients*** with any complaint deemed amenable to seated care
- unit piloted during the month of September 2008 on ***Mondays and Tuesdays*** from ***1:00 pm-7:00 pm***

Process Oriented Outcomes

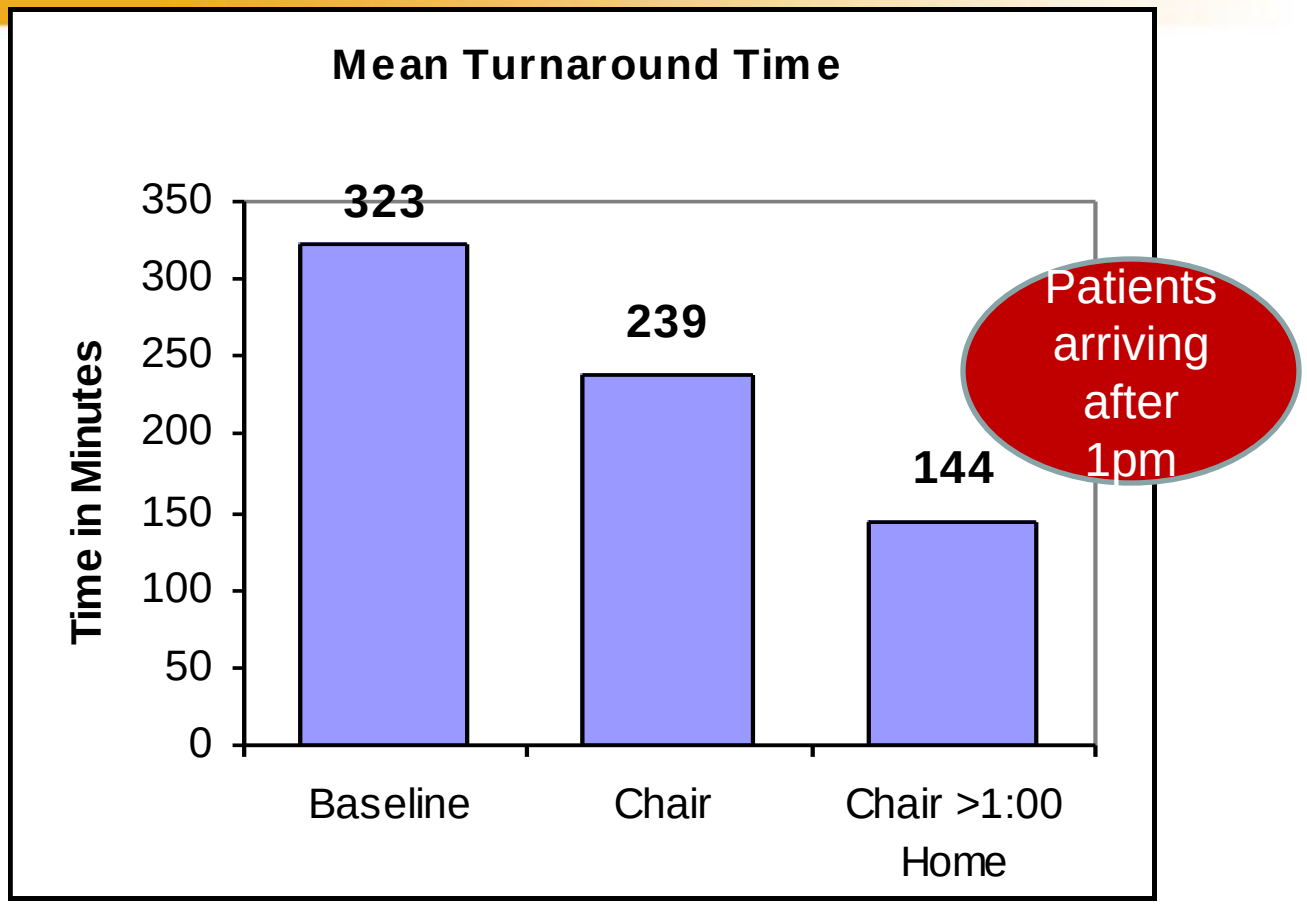
Primary measures of success included:

- Reduced total turnaround time (in minutes)
- Reduced time from patient arrival to MD contact (in minutes)
- Reduced number of patients who leave without being seen
- Improved patient satisfaction (as measured with an internal survey)

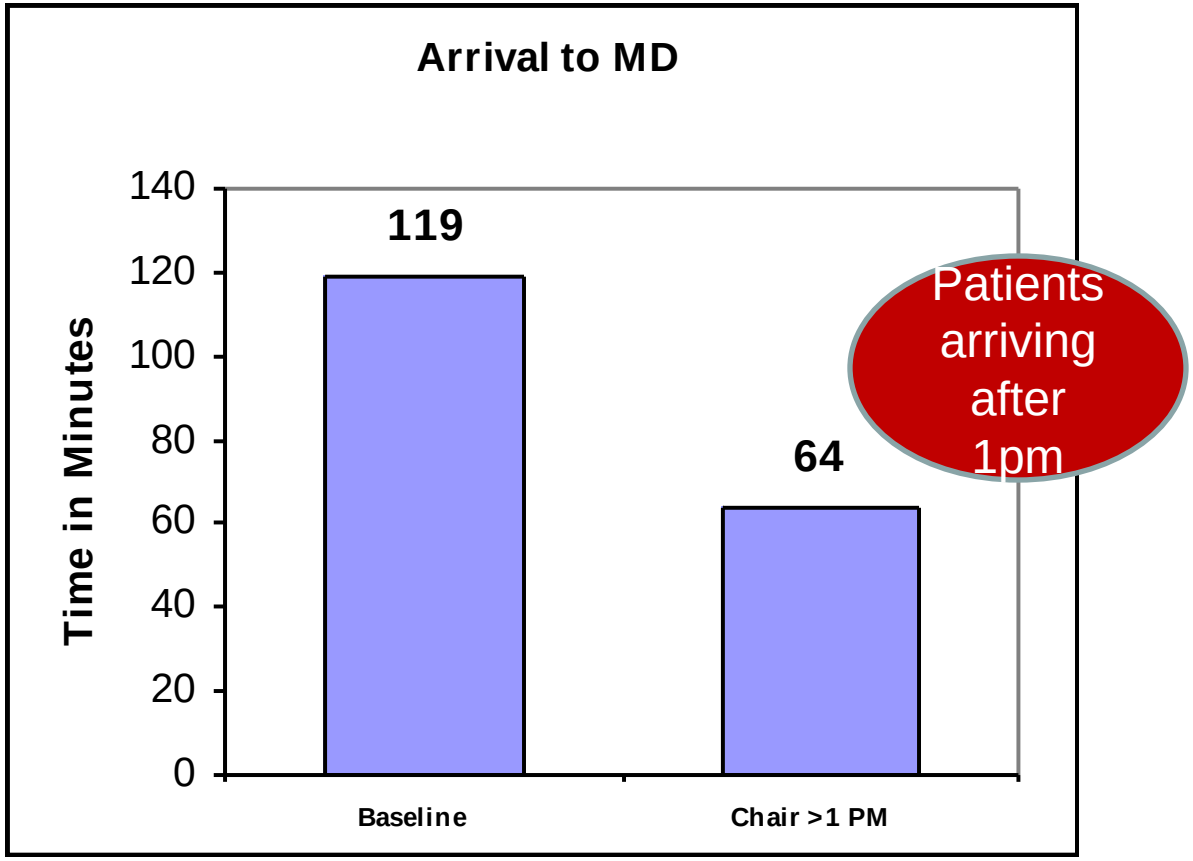
Results – Mean TAT



Results – Mean TAT



Results – Mean Arrival to MD



Other Outcomes

- Patients who left without being seen decreased from ***9% to 0%*** for patients who arrived during the “chair unit” hours of operation.
- Patient satisfaction was ***98%*** for those treated in the unit
- potential revenue gain of ***$23,500 per month*** or ***$280,000 per year*** based on decrease in patients leaving without being seen and operation of 2 days per week between the hours of 1:00 and 7:00 PM

On-Going Work: The LBJ Experience

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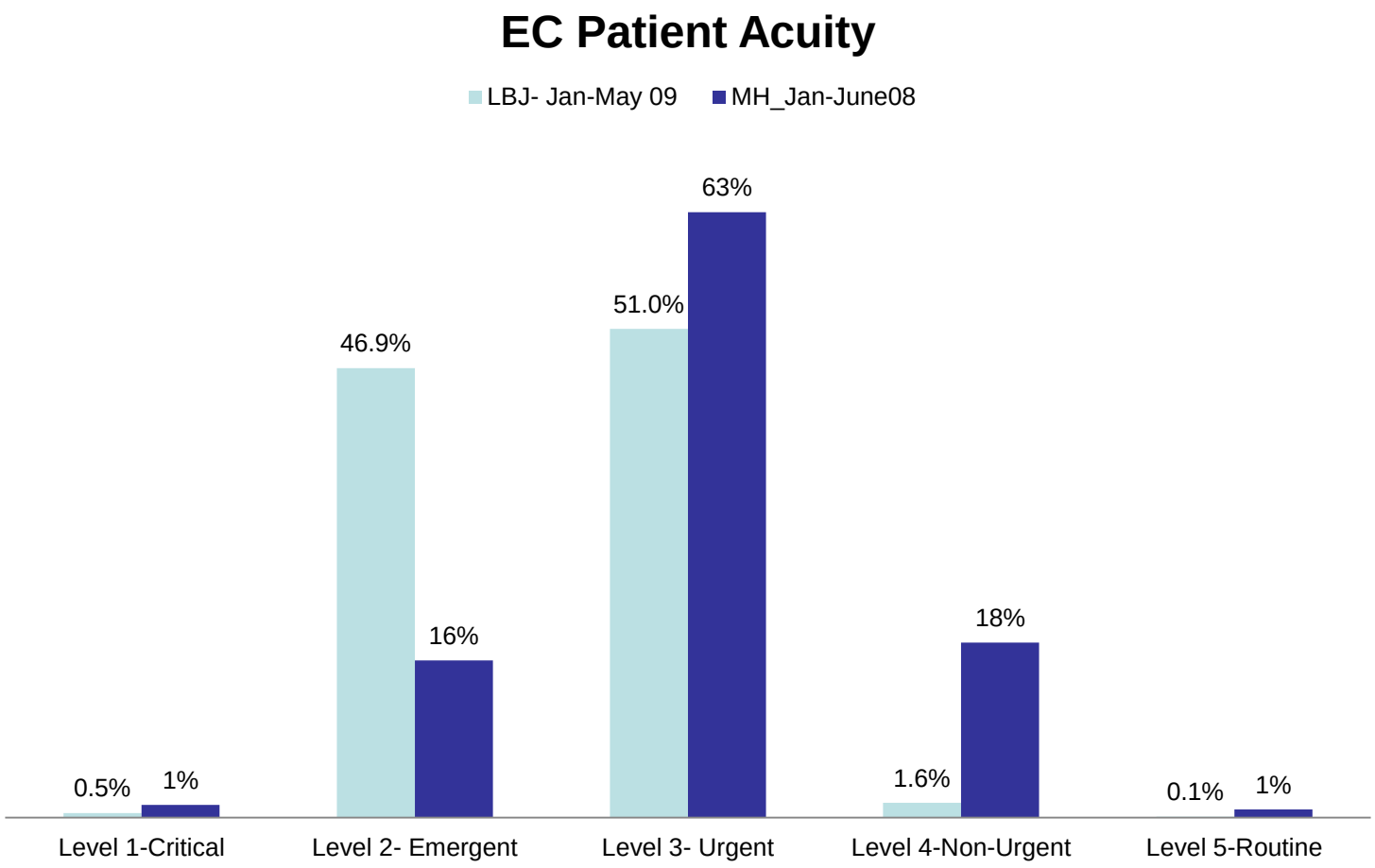
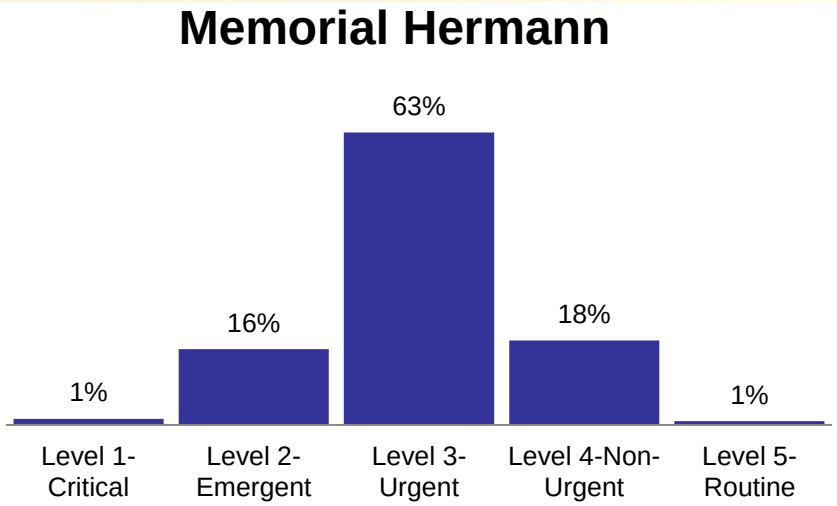
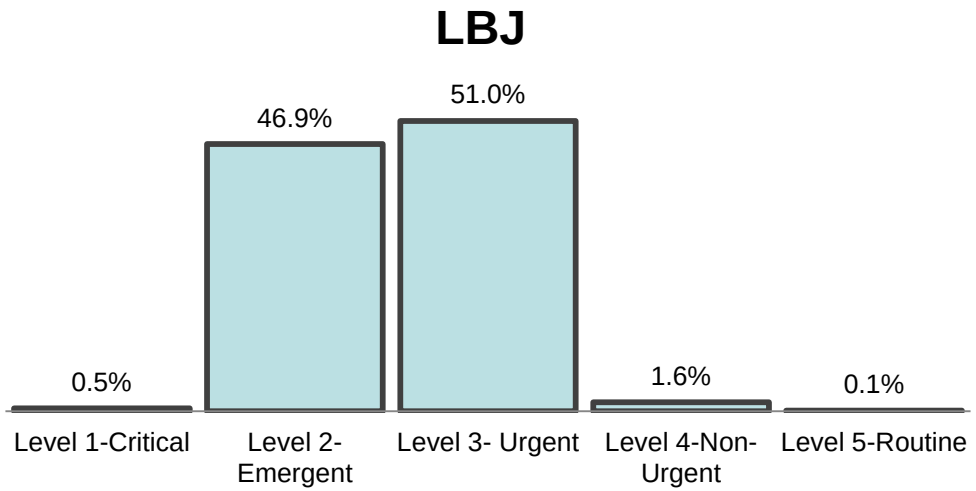
- 100 per day capacity ED seeing 200 patients
- Triage process distorted by up-triaging or triage drift
- ED supersaturated with illegitimate level “2”s
- ED practice behavior changes due to pressure
- Inappropriate admissions fill inpatient beds
- Lose ED beds to admission holds
- Increase ED LOS, inappropriate discharges
- Self perpetuating safety hazard

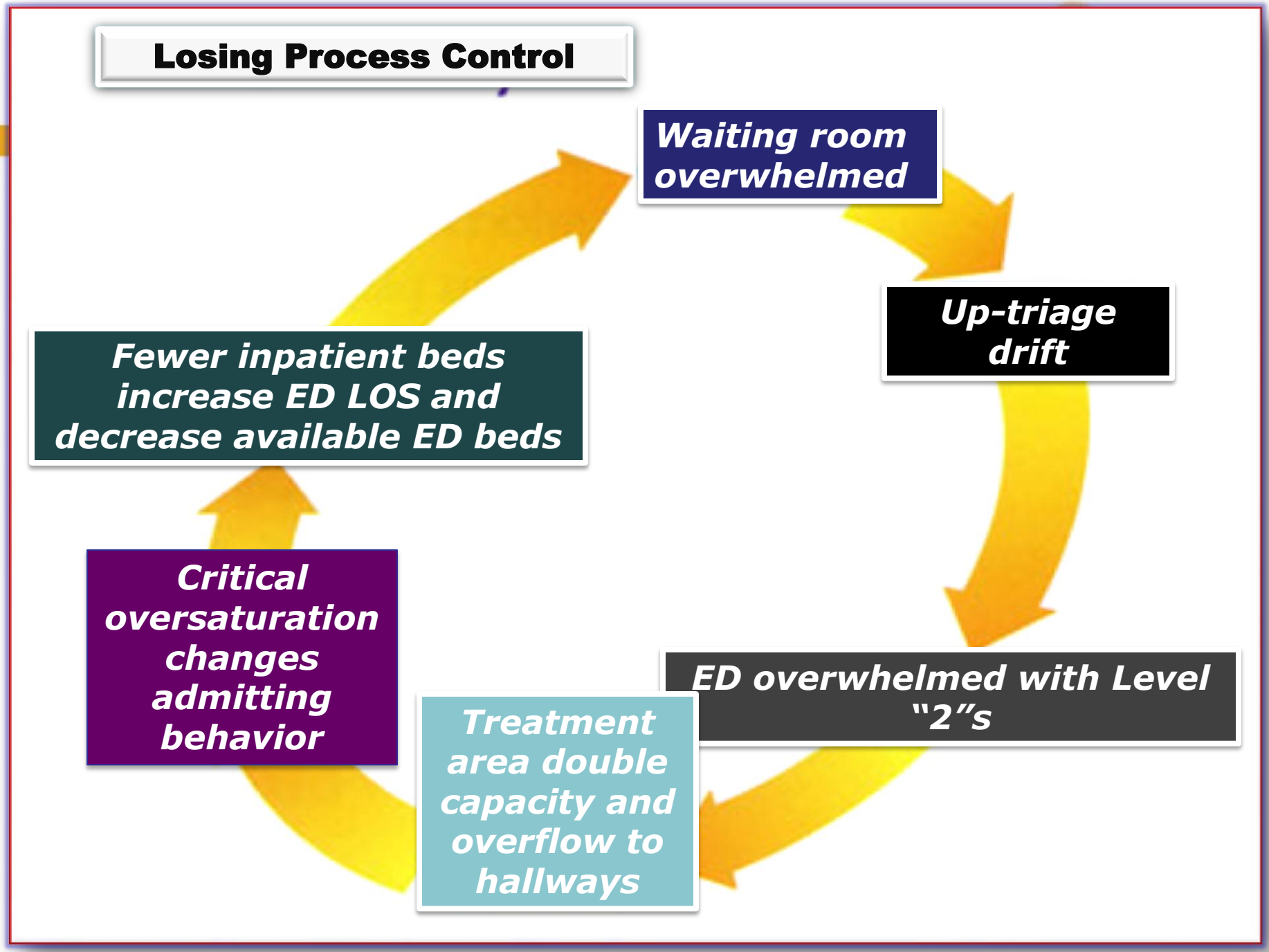
Up-Triage Drift



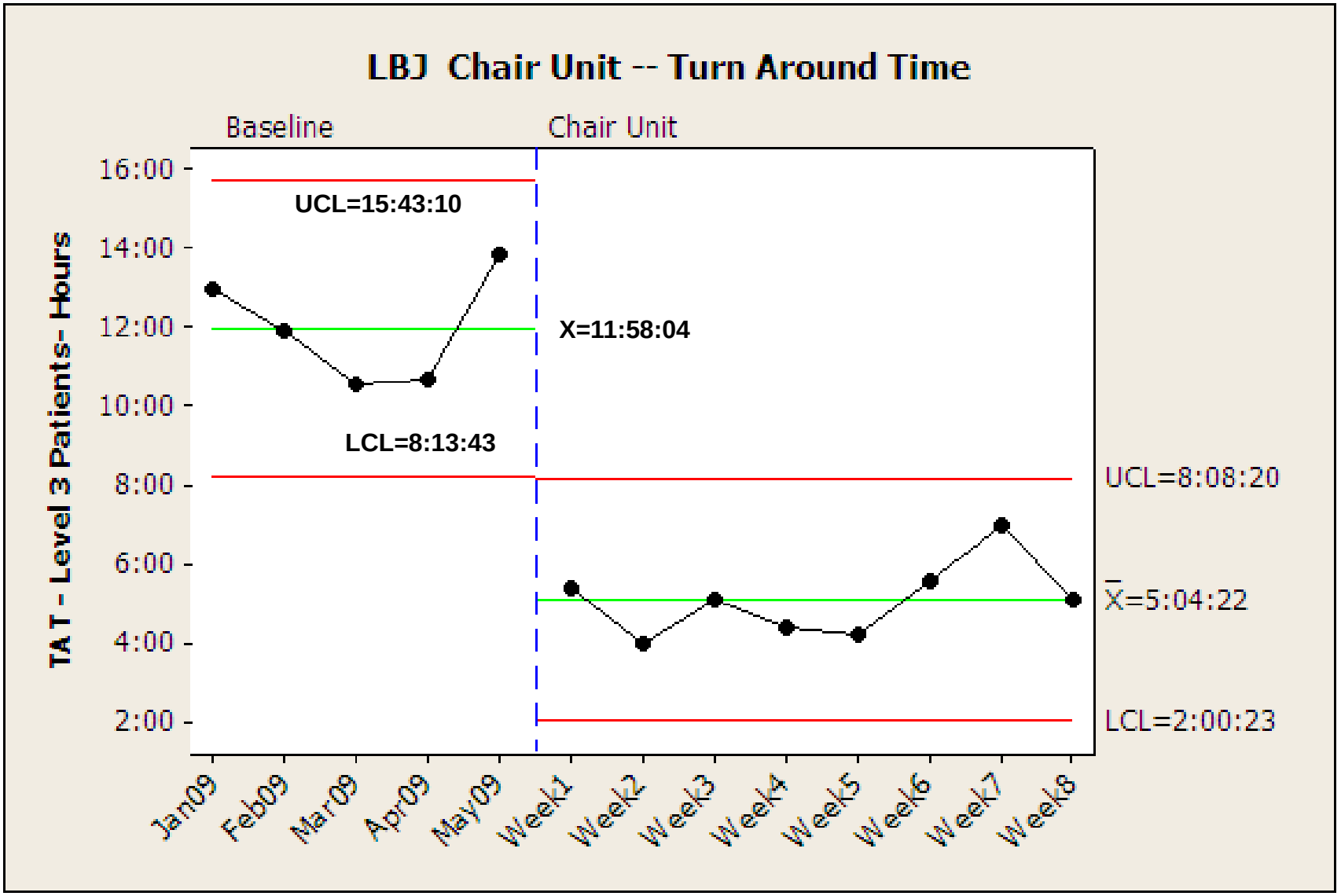
Up-Triage Drift






Losing Process Control
Waiting room overwhelmed
Up-triage drift
ED overwhelmed with Level "2"s
Treatment area double capacity and overflow to hallways
Critical oversaturation changes admitting behavior
Fewer inpatient beds increase ED LOS and decrease available ED beds

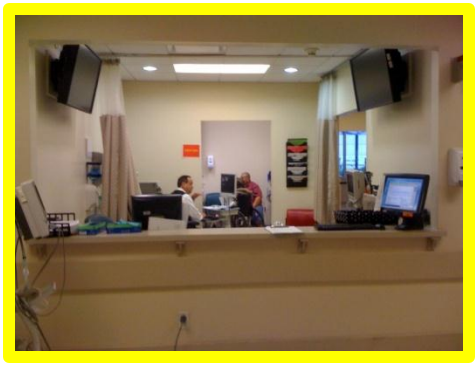
LBJ Results


LBJ Chair Unit -- Turn Around Time
Baseline
Chair Unit
TA T - Level 3 Patients- Hours
16:00
14:00
12:00
10:00
8:00
6:00
4:00
2:00
UCL=15:43:10
X=11:58:04
LCL=8:13:43
UCL=8:08:20
X̄=5:04:22
LCL=2:00:23
Jan09
Feb09
Mar09
Apr09
May09
Week1
Week2
Week3
Week4
Week5
Week6
Week7
Week8

MHH Evolution

- Lack of attending staffing
- Split Flow Model
- Shift from bringing additional staff to patients to bringing additional patients to staff

Split Flow Dynamics



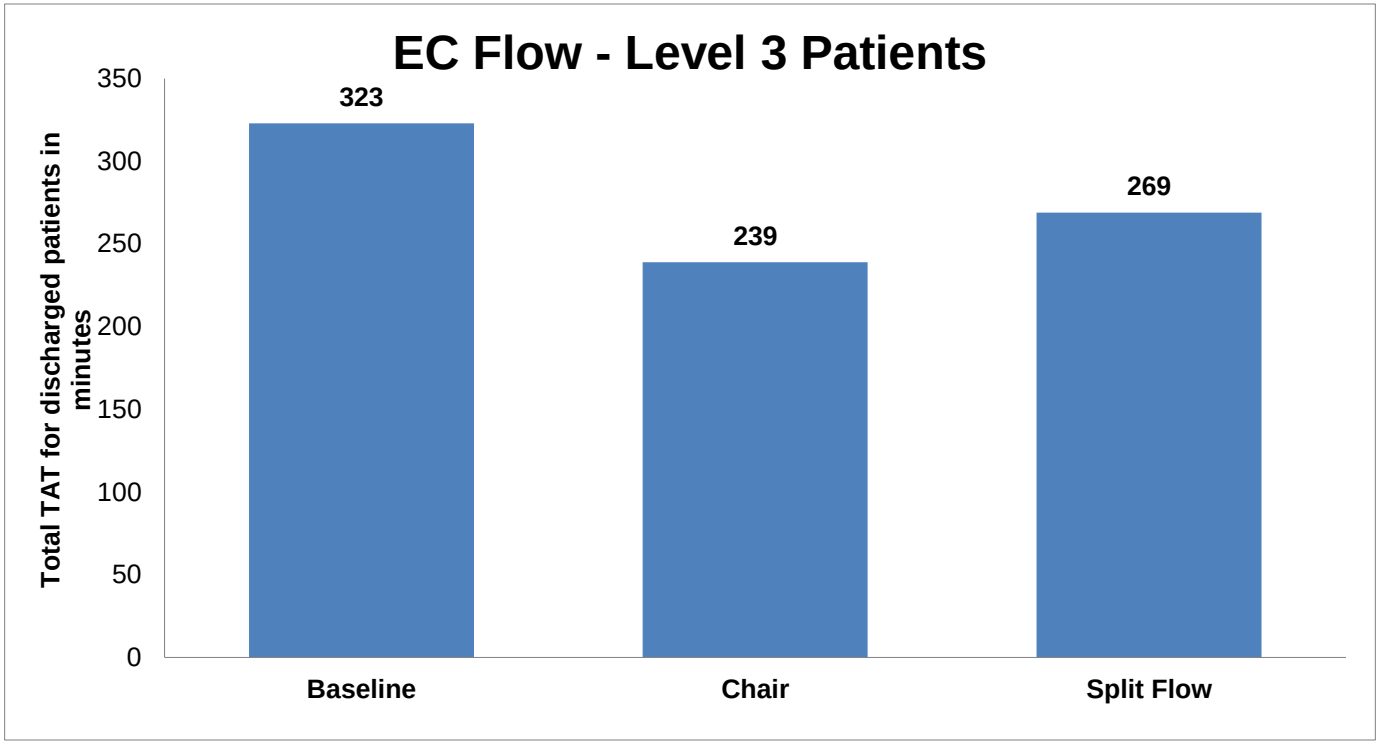
Entry / Exit

Physician

Evaluation

Results waiting

TAT for 3 Models



Future Outcomes

- Long Term Process Oriented Outcomes
- Process Oriented Outcomes vs. Patient Oriented Outcomes
- ED Medical Error Registry and Database
- Operations: Science vs. Economics
  - Reporting equilibrium
  - Lack of ability to do controlled assessment
    - i.e. CPOE