



Architecting the Healthcare System for Stakeholder Value

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21st January 2009

US Health Care Issues

“Simply stated, the US does not have a health care system.”

William Brody, President of Johns Hopkins University, 2007

Access

15% of US population is uninsured
75% of care delivery is done by groups of five physicians or less

Quality

44,000 to **98,000** patient deaths attributed to medical error
55% of recommended care is administered to adults

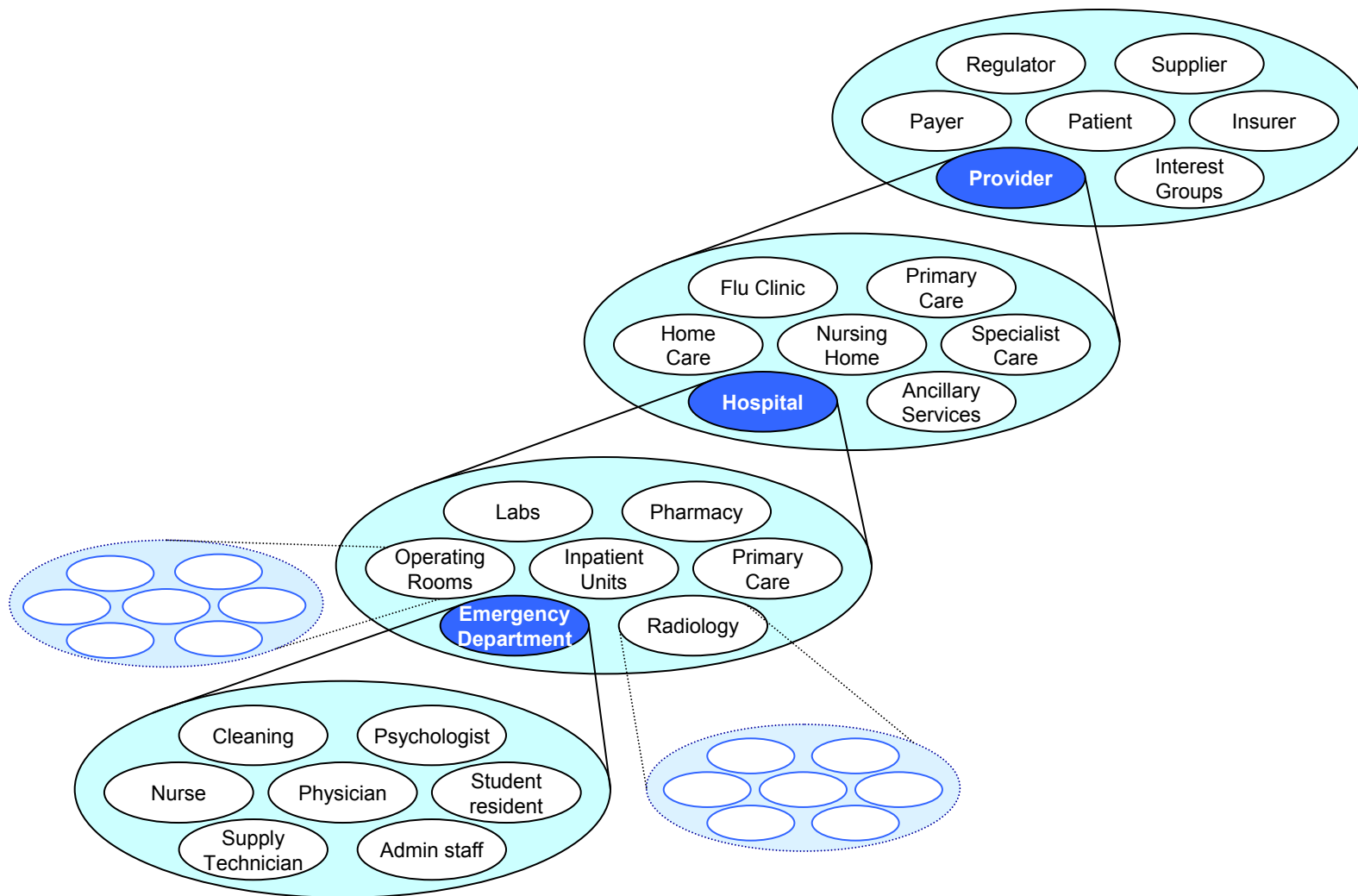
Cost

16% of GDP spent on health care in 2005
30.8% of total health care expenditure is spent on hospitals

“...the strategies [hospitals] develop and implement to compete have a significant effect on costs, quality, and access to care.”

(Devers et al. 2003)

Health Care is a Complex Socio-Technical System



Greater Boston Hospital Case

- **Leading multi specialty physician led group practice with national and international recognition (i.e. neuro, liver, heart & vascular, etc)**

2006 Highlights

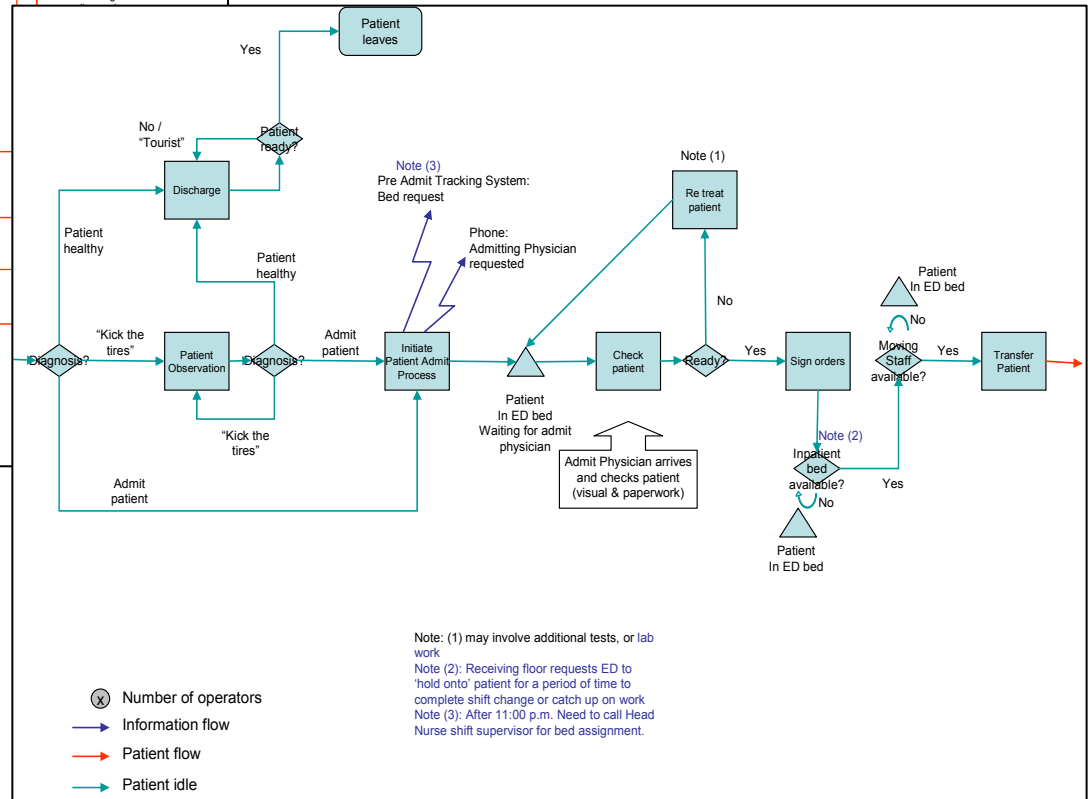
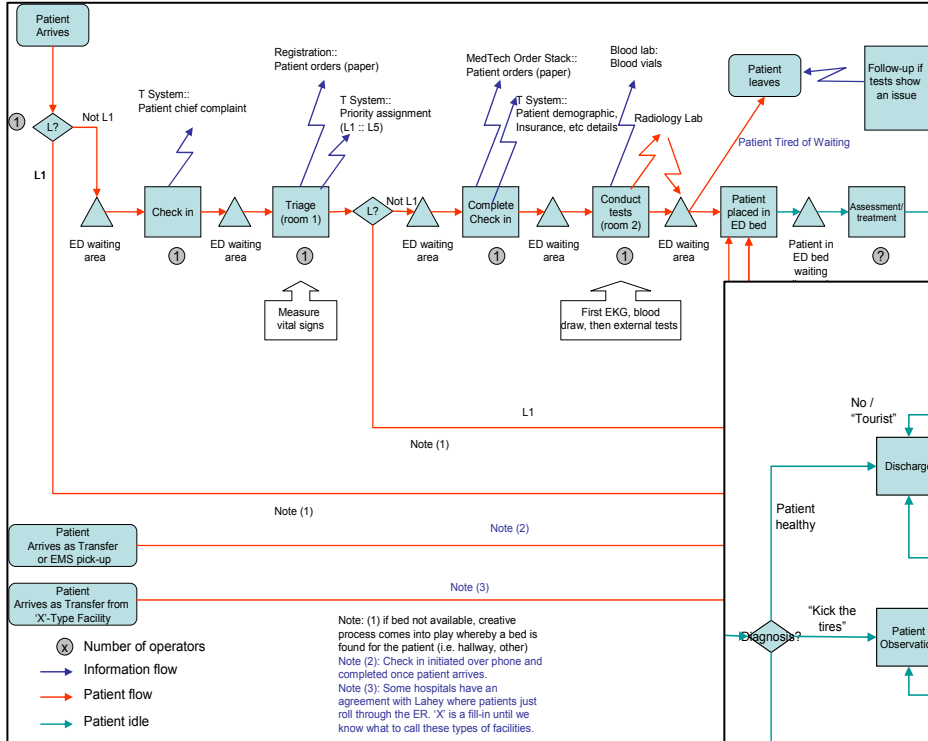
- Emergency Visits: 38,631
- Total Beds: 293
- Total Staff: 4263
- Total Income: \$679,454,000
- Total Expenses: \$628,525,000
- Operating Income: \$50,929,000

Problem Statement

- Emergency Department (ED) struggling to keep up with demand
- Long wait times in the ED and patient leaving without being seen
- ED staff blame inpatient staff and vice versa
- ED staff churn levels significant

**What can be done to speed patient flow in the ED?
Where should a process improvement initiative focus?**

Emergency Department VSM



Emergency Department Analysis

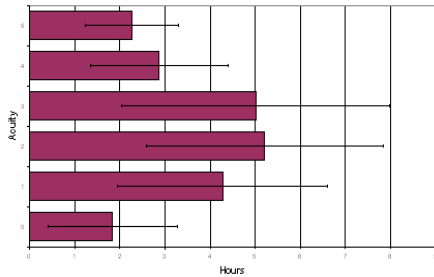
Description of patient time spent in ED

Average Total Time Spent in the ED

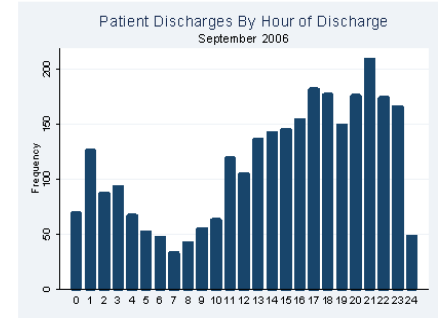
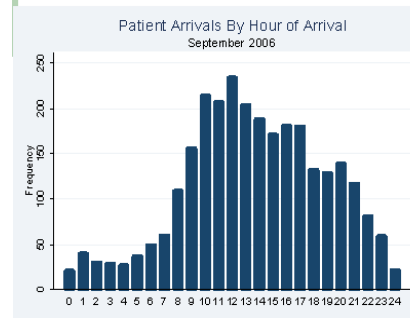
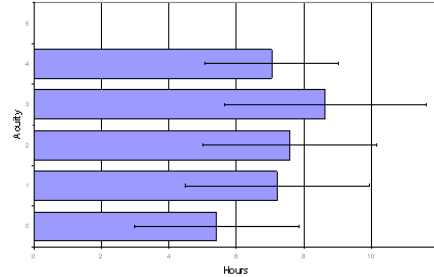
Patients Not Admitted:	4.14 hrs
Patient Admitted:	7.85 hrs

Description of patient arrivals and departures

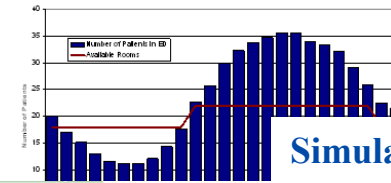
Total Time in ED for Patients Not Admitted, By Acuity



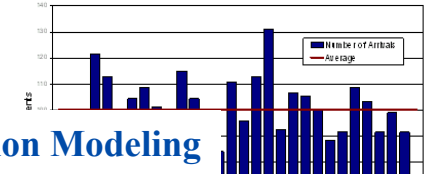
Total Time in ED for Admitted Patients, By Acuity



The Cumulative Number of Patients in ED (assume 20 patients in ED at start of day)

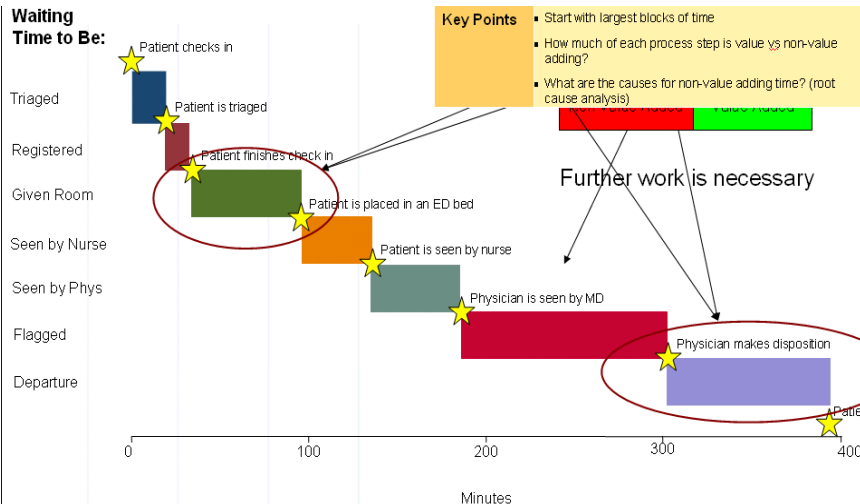


Daily Number of Arrivals (Avg = 1600)

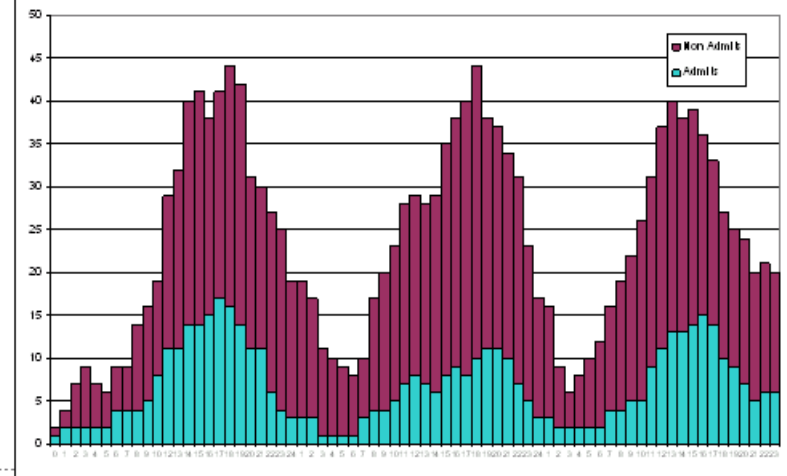


Simulation Modeling

Average time for each step of the patient process



Simulation patient levels in ED over three days



Preliminary Findings

Main Findings

ED average length of stay considered problematic, but **non-admitted** patients took 4 hours, whereas **admitted** patients took over 8 hours
ED **interacted** well with some patient wards but not with others
ED **heroic** employee efforts said to be common rather than sporadic
ED metrics and strategic goals **misaligned** with overall hospital (X-Matrix)

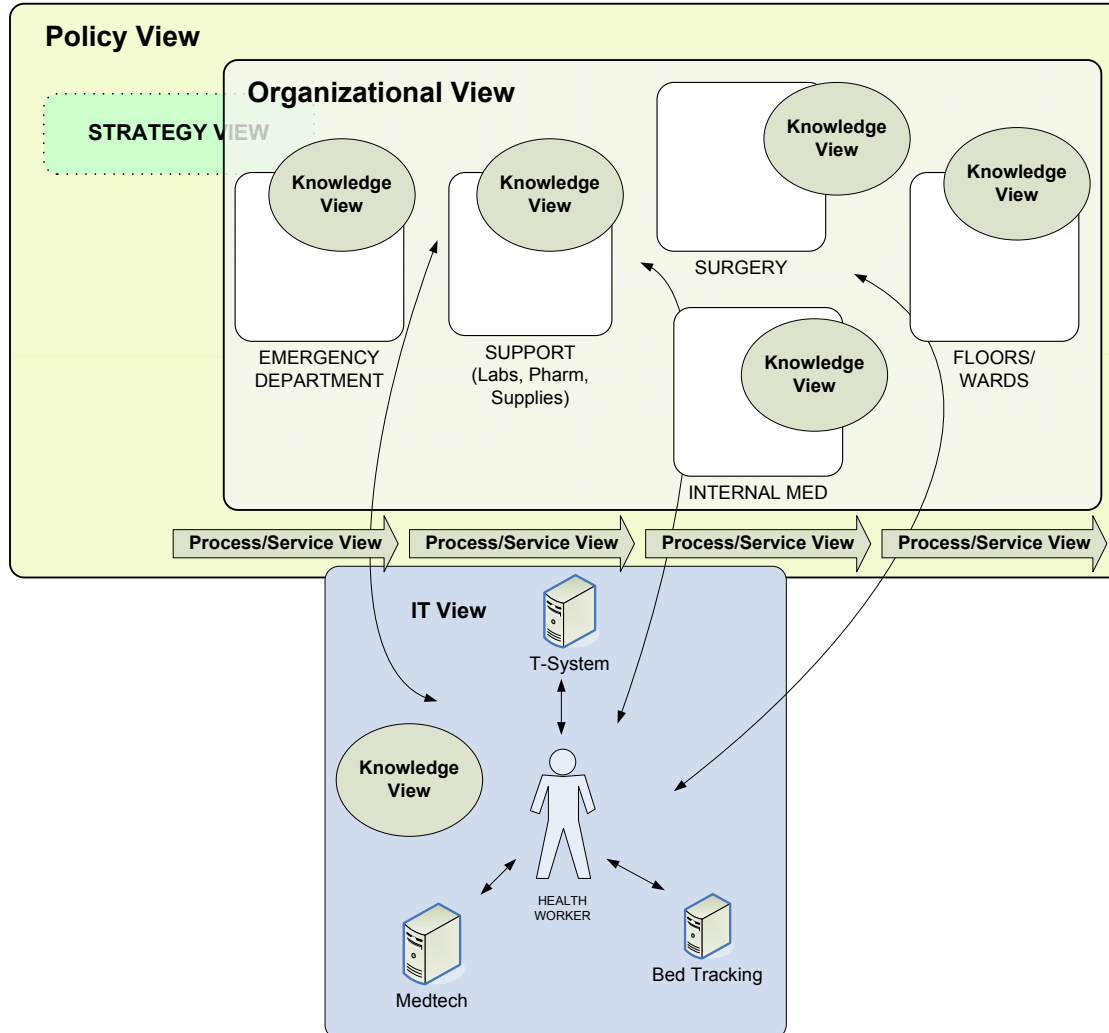
Questions For Further Study

Why was the ED managed as a **silo** rather than end-to-end?
Was the varying performance of **ED interactions** due to the payment model?
Could it be that different observed **EA configurations** were directly related to the different **observed performance levels**?

“The problem of redesign gets harder and the evidence weaker as one moves from the microsystem to the organization.”

Donald Berwick, President of Institute for Healthcare Improvement, 2002

“As Is” Enterprise Architecture



“To Be” Enterprise Architecture

