Strategies to Improve Emergency Department Patient Flow – Our Experience

NewYork-Presbyterian Hospital

Columbia University Medical Center

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NYS DOH Patient Safety Conference

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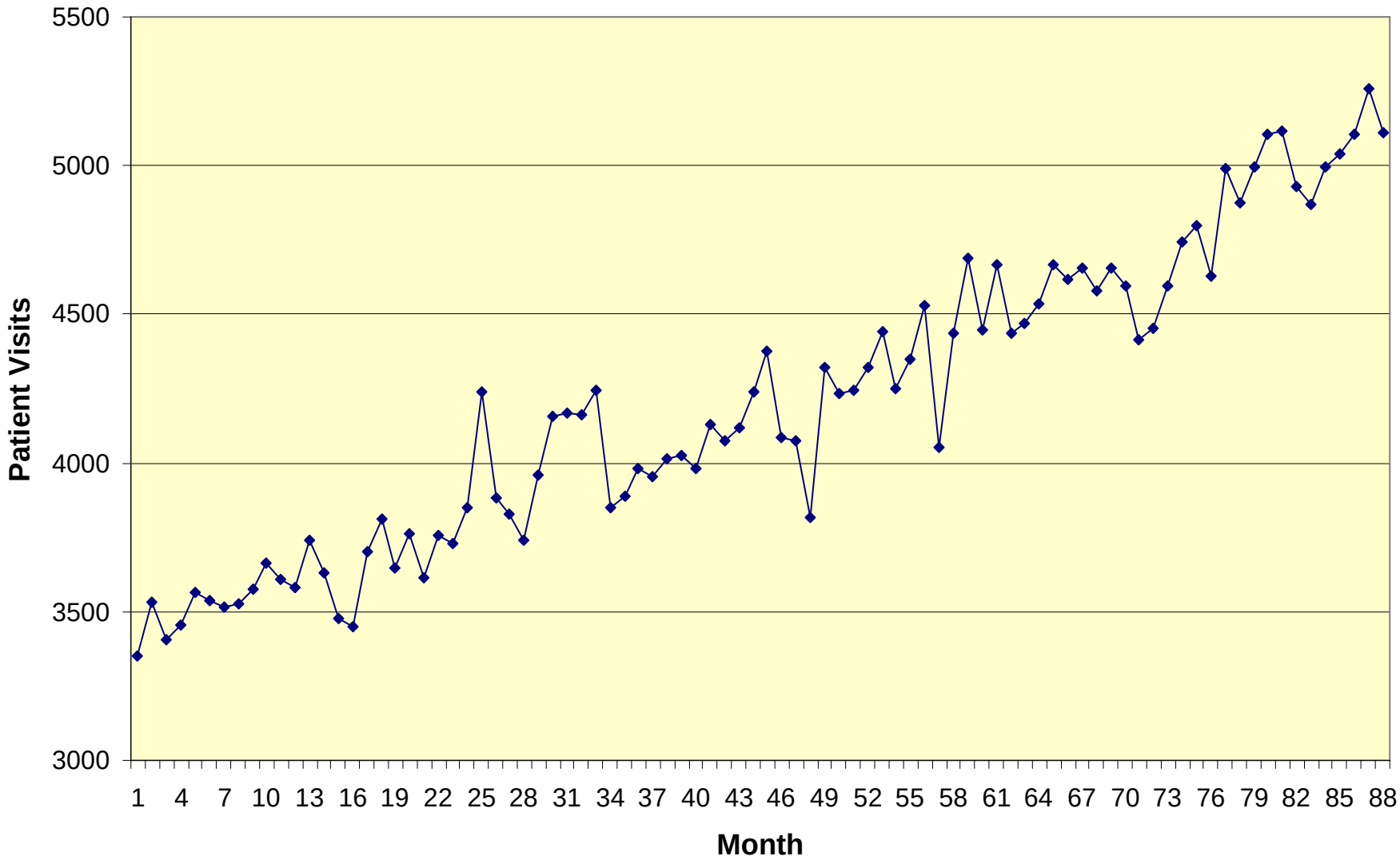
Year 2000

- ED LOS (Admitted Patients) — 14 hours
- Left without being seen — 8%
- Diversion hours — 1081 annually
  21 hours/week


NewYork-Presbyterian Hospital
Columbia University Medical Center
Monthly Patient Visits Jan 1997 - April 2004
Patient Visits
5500
5000
4500
4000
3500
3000
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88
Month

Indicators of ED Throughput Efficiency

- ED Length of Stay (Overall)
  - Admitted
  - Discharged
- Diversion
- Walkouts

Intrinsic versus Extrinsic causes of Throughput Problems

- Intrinsic
  - Staffing levels
  - Productivity
- Extrinsic
  - Inpatient bed availability
  - Lab/Radiology Turnaround Time
  - Transport
  - Nursing Report to Inpatient Unit
  - Inpatient Physician Assignment

Key Points

- Hospital Administration: Understanding and willingness to tackle extrinsic causes of ED throughput issues
- Highest level involvement at regularly scheduled multidisciplinary meetings focused on the function of the ED
- (Extrinsic) Change does not occur or reverts quickly back to baseline without this high level involvement

Key Points (2)

- The case for change and new initiatives was made with DATA
  - If we can't measure it, we can't improve it.
- Development of novel ideas specific to your ED
- Change serial processes into parallel processes
- Optimize current staffing allocation based on arrival patterns and queueing theory
- Series of incremental small changes resulted in significant improvement in throughput

Multidisciplinary Team

- Led by Chief Operating Officer and VP for Operations
- Committee composition:
  - Dept of Emergency Medicine and Dept of Medicine Senior Leadership
  - Nursing Administration (ED and Hospital)
  - Admitting/Census Director and Associate Director
  - Housekeeping Director
  - Finance

Initiatives 2001-2007

- Intrinsic
  - Queueing Model and reallocation of physician staffing hours
  - Productivity feedback to physicians
  - Additional nursing and physician resources added
  - Movement of Patient To Inpatient Location after bed assigned S -> P
- Extrinsic
  - Inpatient Hallway Bed Policy S -> P
  - No-delay Faxed Nursing Report
  - Pre-Diversion Policy
  - Department of Medicine Admission Assignment Policy (MAR) S -> P
  - Early Bed Request S -> P
  - Transportation Request Policy (Pending) S -> P
  - Bed Tracking System for Inpatient Bed Identification and Housekeeping
  - Transport of Patients To ICU

NewYork Presbyterian Hospital
Scatter Plot of Length of Stay and Walkouts

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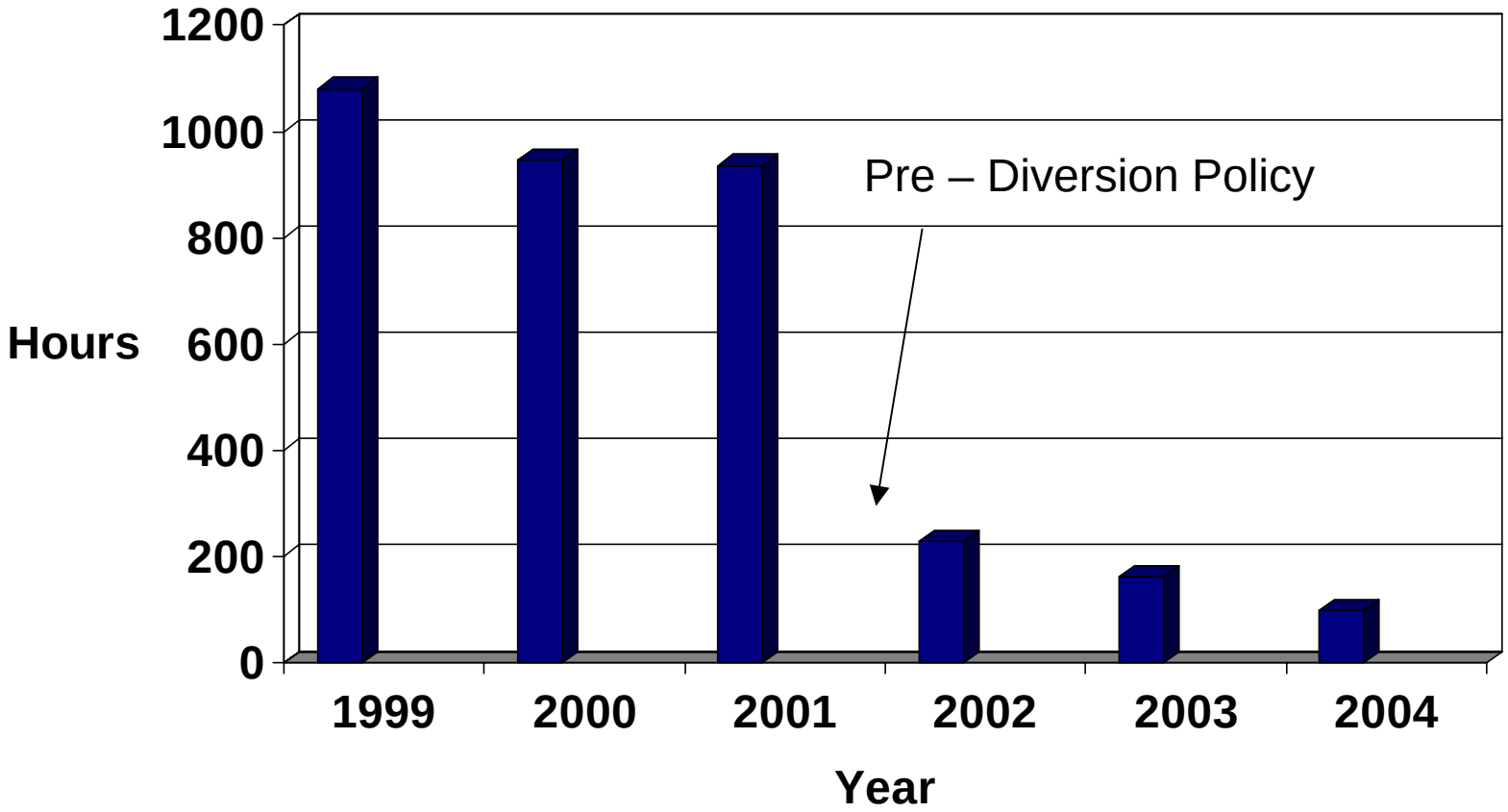
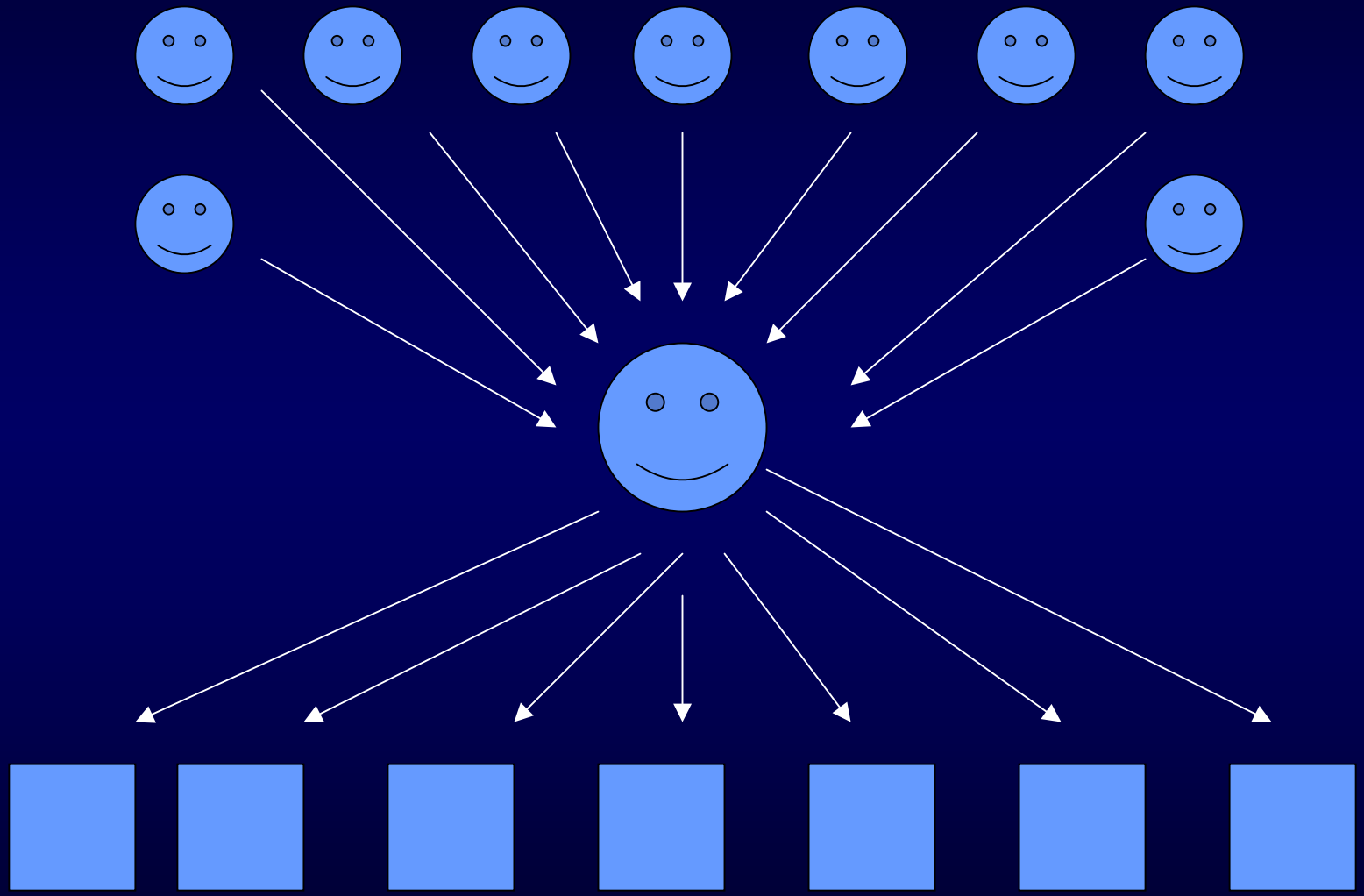
Diversion Hours

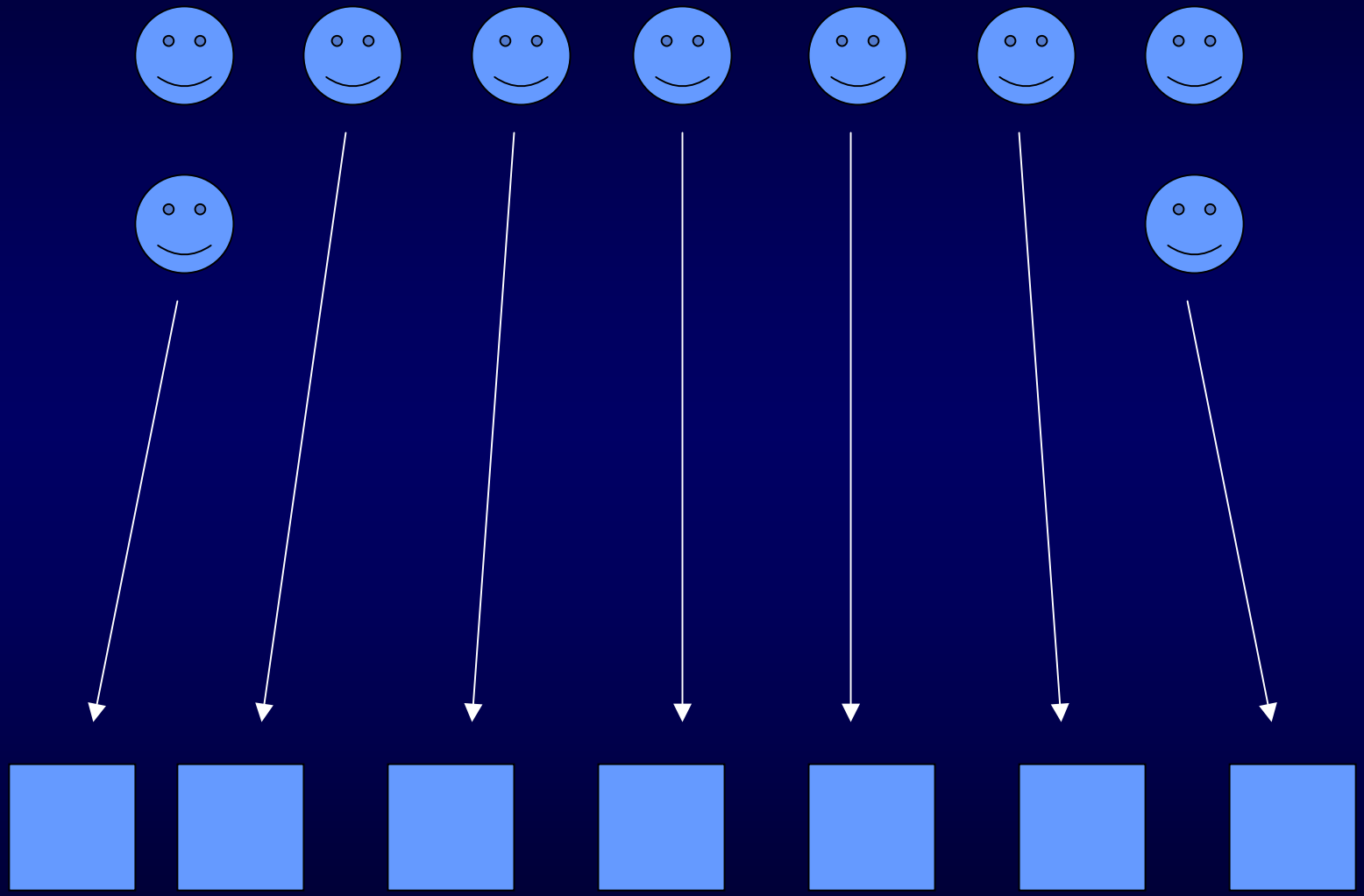


Prior Admitting System - MAR



Inpatient Admitting Teams

New System of Admitting



Inpatient Admitting Teams

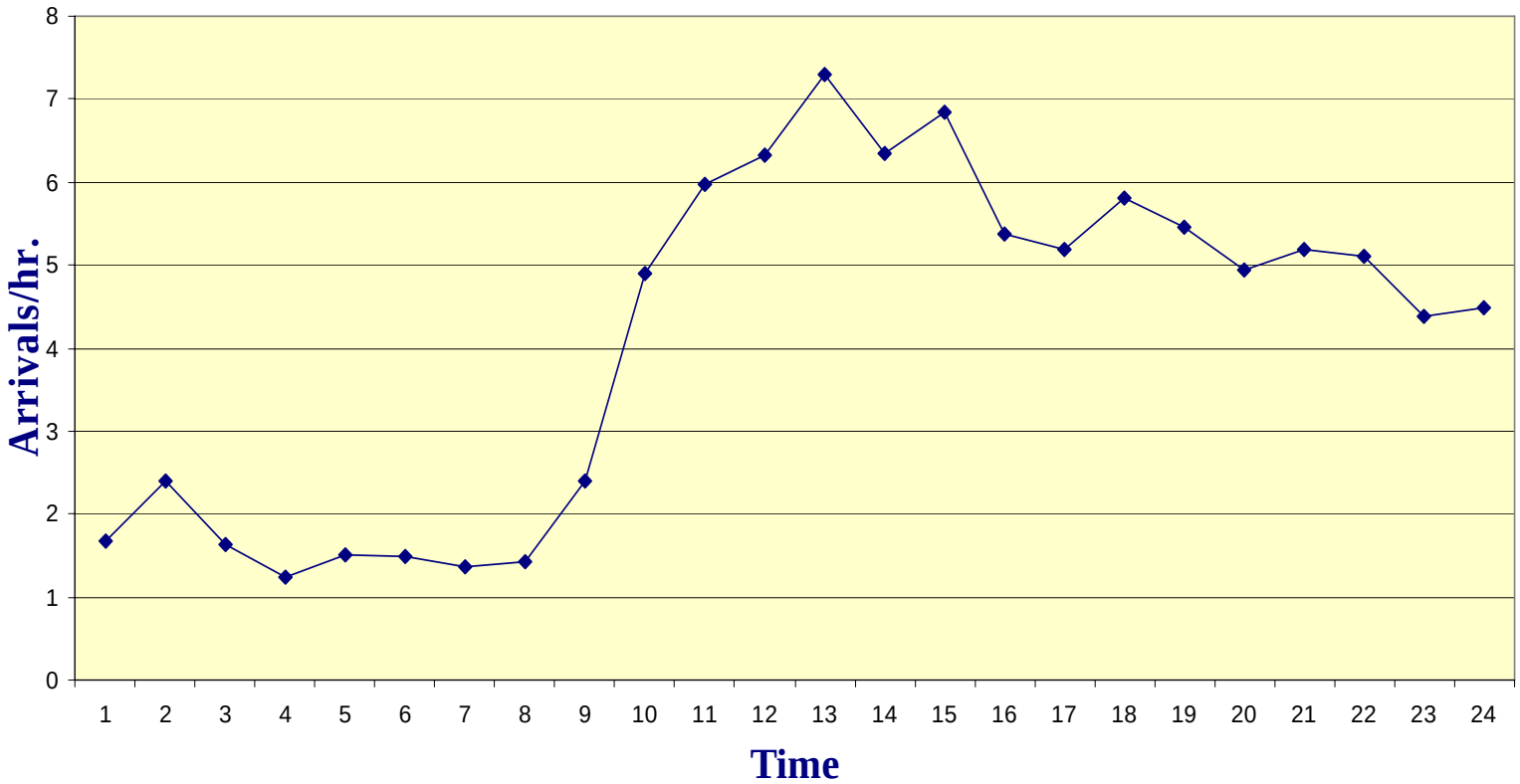
Admitting Program

- Developed by ED personnel for use in new admitting system for the Department of Medicine
- Resulted in 1 hour decrease in overall Length of Stay
- See Computerized Admit Board

Queueing models

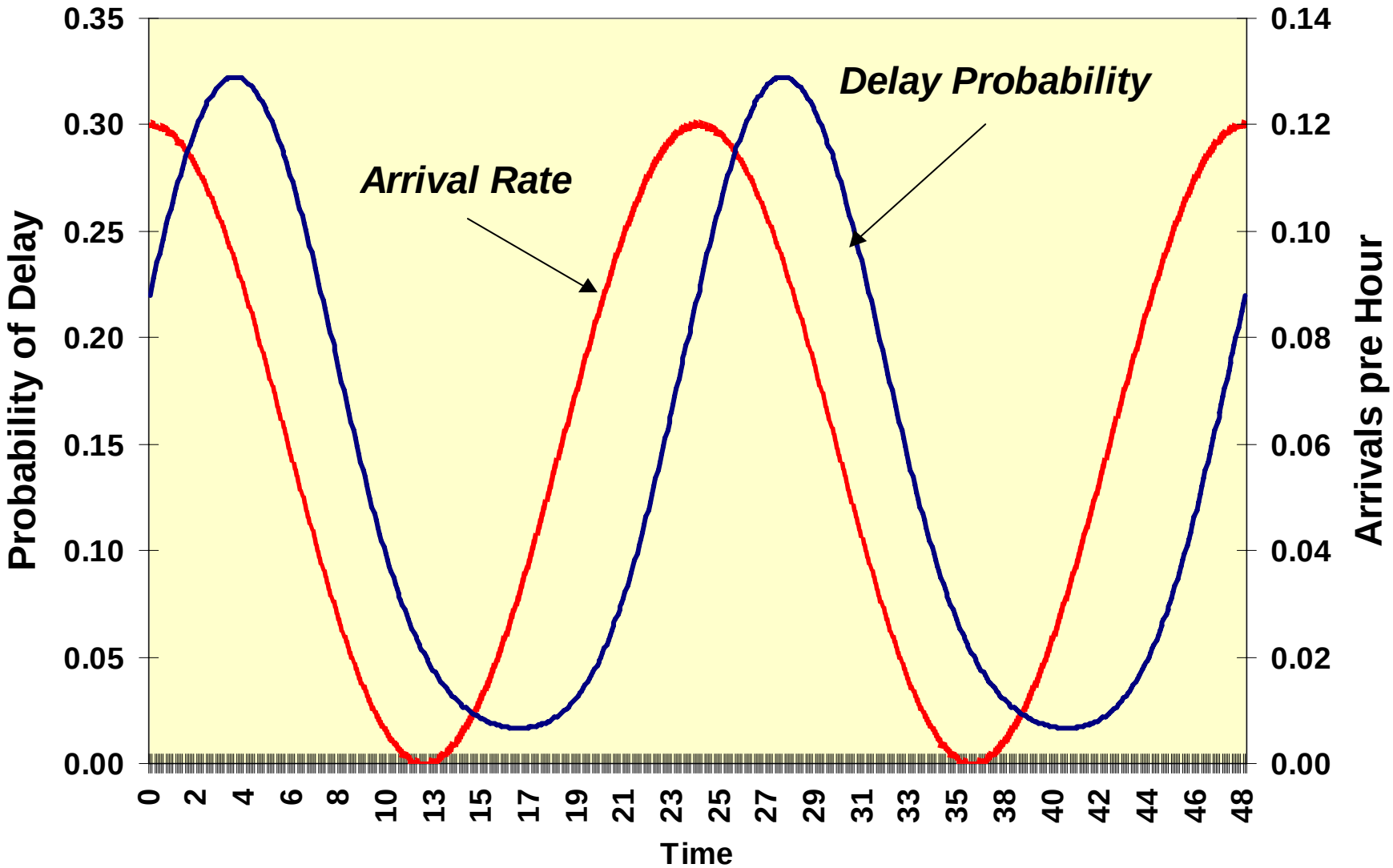
- Efficiency is often a key dimension of good service. In the ED it is an important factor in patient satisfaction and ED throughput
- Delays result from short-term, unpredictable fluctuations in demand and capacity
- Queueing phenomenon is complex and impossible to predict without appropriate tools
- Good performance is particularly difficult when:
  - Relative amplitude (ratio of peak to average demand) is high
  - Staffing periods are long (e.g. more than 1 hour)
  - Service times are long (e.g. more than ½ hour)

Monday
ED Arrival Pattern at Allen Pavilion Hospital



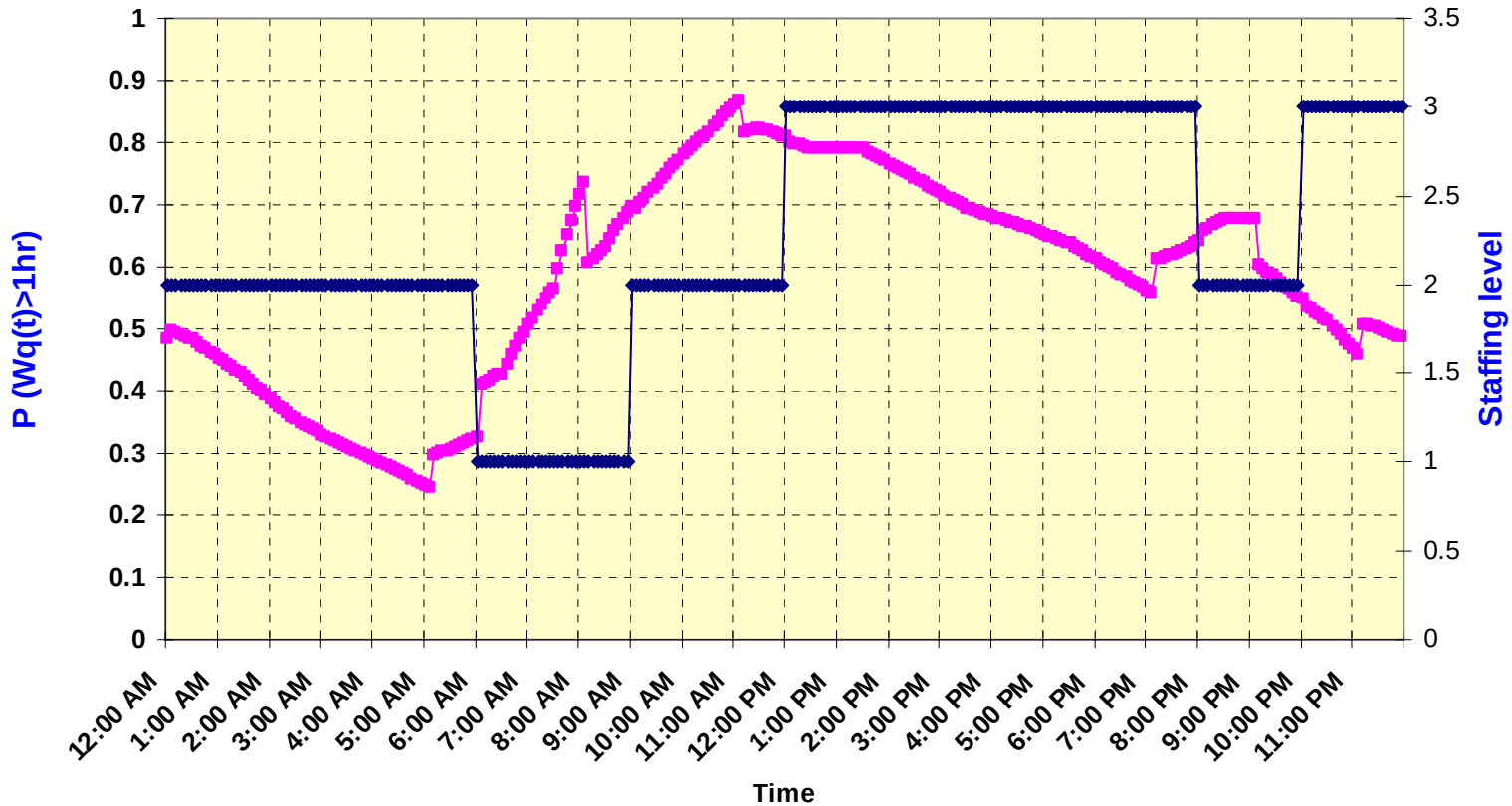
An Example of the Lag Phenomenon

$\lambda = 0.2$, $\mu = 0.2$, RA = 1, s = 7



Staffing Levels and Estimated Pr (Delay > 1 hr)

Avg. service time = 45 minutes



Allen Pavilion ED

Results of Physician Staffing Rearrangement Utilizing Queuing Theory Model

	Oct 2002 – Feb 2003	Oct 2003 – Feb 2004
Patients treated	4807	5354
Patients who LWBS	431 (8.2%)	412 (7.1%) 13% Reduction
Total	5238	5766

Inpatient Hallway Bed Policy

- Prior policy – patients wait for a clean assigned bed
- Serial processing versus parallel processing
- Patients can wait in the hallway next to room if not yet ready upon arrival
- Communication with the patient – Manage Expectations