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Introductions

Ali Kamil
System Design & Management Fellow
Sloan School of Management
School of Engineering

*Work Experience:*
Deloitte Consulting LLP

Dmitriy Lyan
System Design & Management Fellow
Sloan School of Management
School of Engineering

*Work Experience:*
Primus Asset Management
Lehman Brothers

MIT Student
Msc. in Management Studies
Sloan School of Management

*Work Experience:*
African Solar Rise
Citigroup Global Markets

Nicole Yap
Msc. in Management Studies
Sloan School of Management

*Work Experience:*
Deloitte Consulting LLP
Executive Summary

• Visited 3 local hospitals in Boston to observe patient flow and operations

• Interviewed 4 hospital (operations) managers – understanding existing patient flow optimization practices

• Observed use of technology (dashboards) in managing patient flows

• Conducted a literary review of articles, research papers, and thoughtware associated with long wait times in hospitals and appropriate interventions that work in resource limited settings

• Developed action plan for time and motion study at LVPEI
Literature Review

- Observation through time and motion study is an effective tool to identify bottlenecks in the system\(^1\)
- Design effective queuing system to manage patient flow in a high utilization environment\(^2\)
- Use Management Tools to reduce waste and improve the quality of care in patient delivery systems\(^3\)
- Understand the supply and demand structure of patient systems in a low-resource setting\(^4\)
- Technology is an enabler and not a solution to the problems in patient flow systems. Identify bottlenecks in the system and improve the process flow\(^5\)

2. Note on the Management of Queues
3. NHS Seven Ways to No Delays – Version 2.0, January 2010
4. 4. Waiting lists, waiting times, and admissions: an empirical analysis at hospital and general practice level.
5. Massachusetts General Hospital's Pre-Admission Testing Area (PATA) Kelsey McCarty, Jérémie Gallien, Retsef Levi
Massachusetts Eye and Ear
Emergency Department (ED)

• All Patients are walk-ins – emergency room model
• Operates 24 hours, 7 days-a-week
• 2 physicians (+1 back-up physician at Comprehensive Ophthalmology Clinic)
• Experiences high patient volumes on holidays, Monday and Friday afternoon, and favorable-weather days
• Also serves MGH ED for patients with eye injuries
• Uses status screen in waiting room (sample below)

<table>
<thead>
<tr>
<th>Name</th>
<th>Treatment</th>
<th>Stage</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Smith</td>
<td>Retina</td>
<td>Vitals and EKG</td>
<td></td>
</tr>
<tr>
<td>Adam Jones</td>
<td>Cornea</td>
<td>Waiting Room</td>
<td></td>
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<tr>
<td>Tiffany Kelly</td>
<td>Glaucoma</td>
<td>Waiting Room</td>
<td></td>
</tr>
<tr>
<td>Ben Williams</td>
<td>Cornea</td>
<td>Physician Room</td>
<td></td>
</tr>
<tr>
<td>Jane Doe</td>
<td>Retina</td>
<td>Waiting Room</td>
<td></td>
</tr>
</tbody>
</table>

Legend
- < 10 Minutes
- 10-15 Minutes
- > 15 Minutes
Massachusetts Eye and Ear
Clinic and Operating Room (OR)

- Patients are categorized as “New Patient”, “Post-op” and “Follow-up”
- Almost all patients are OPS
- Ophthalmologists are always double or triple booked
- Stacks post-op patients in one day (because post-ops take less time and included in the insurance)
- Appointment is required. Walk-ins are rarely seen.
- All patients are assigned to a designated doctor
- Each clinic has its own lab technician
- Uses medical management software (McKesson Paragon) for patient flow management in OR
Massachusetts Eye and Ear Clinic and OR – Patient Pathway

**Patient Pathway (97 minutes average check-in check-out time)**

1. Patient Checks-In – reception logs in arrival time  
   a. If new patient – Patient is asked to fill out medical forms at reception (10 minutes)

2. Lab Technician (or nurse) puts patient in a queue  
   a. Basic tests and vitals performed (20 minutes)

3. Patients wait to see the Physician (15 – 30 minutes)

4. Physician face time with patient (15 – 45 minutes)  
   a. Physician provides prescription, discharge information, and a chart to bring back to the secretary

5. Payment, follow-up scheduling, and check-out (5-10 minutes)
Massachusetts General Hospital (MGH)
Pre-Admission Testing Area (PATA) Case Study

• PATA is an outpatient clinic responsible for completing the required tests and screenings for outpatients at the Mass General Hospital (MGH)

• Any patient scheduled for surgery at MGH is required to go through PATA for screening

• Operated with 12 exam rooms, 5 Registered Nurses, 7 Anesthesiologists, 2 Lab Technicians, and 2 Charge Nurses

Floorplan of pre-admission testing area removed due to copyright restrictions. Refer to: Fig. 1 in McCarty, K., J. Gallien, R. Levi. "Massachusetts General Hospital’s Pre-Admission Testing Area (PATA)." January 3, 2012.
MGH – PATA
Problems

• Average wait time – 3 hours and 15 minutes
• Variability in service rate – 40 minutes to 4 hours
• Patients arrived early in the day resulting in overutilization of nurses and MDs
• Unhappy patients - many walked out with no screening. Showed up on day of surgery causing delays and backlog on surgeon’s schedule
• PATA was scheduled to run from 8am-3pm.
• Due to long-wait times, staff worked overtime until 7pm
• Overutilization increased error rate, resulting in adverse patient experience, and exhausted staff

Long wait times, unpredictable service rate, and overutilization of staff led to unfavorable experience for patients
MGH – PATA
Methodology

• Brought on external personnel (MIT Sloan MBA Students) for problem identification
• Conducted time and motion study
  • Shadowing providers, nurses, and staff
  • Following patient pathways
• Reviewed patient logs to identify wait times at step in the patient flow
• Reviewed provider logs to review utilization, tasks, and distribution of staff
• Conducted patient survey to gauge satisfaction and impression

External input, time and motion studies, and heuristics used to identify source of problems at MGH-PATA
MGH – PATA
Recommendations for Improvement

Immediate changes
• Establish shared responsibility for operations among the staff. Reduce burden on Charge Nurse
• Situate Lab Technicians close to front-desk to expedite EKG and Vitals
• Recommend having MDs and RNs use the same operating room

Long term changes
• Add 3 additional RNs to match the number of MDs
• Proactively display current wait times to patients in the waiting room

Shared responsibility, effective use of space and resources, and managing patient expectations led to 40% reduction in wait time (1h50min from 3h10min)
Mount Auburn Hospital
Patient Flow in Clinics

- Some slots allocated for “urgent care” (walk-ins) each day – filled in by patients calling in at the beginning to the day
  - Early triage done on the phone (patients directed to appropriate clinic)
  - Walk-ins who cannot be slotted are directed to the walk-in clinic
- Typical face time with patient: 15 minutes for follow-up, 30 minutes for full physical
- Up to 4 physicals each day, remaining are follow-up and/or “urgent care”
- Clinic operates with 3 doctors, 3 administrators, 2 medical assistants, and 1 office manager. Office manager can fill role of medical assistant if needed
- Referrals to other clinics are done directly by doctors via phone or e-mail (leverage personal links in the hospital)
- Electronic system used to communicate patients waiting in the room to providers and staff
Mount Auburn Hospital
Key Insights and Ideas to Reduce Variability

• Allocate resources specifically for walk-in patients
  • E.g. Walk-in clinic, dedicated practitioners, blocks of time for walk-ins only
• Early triage can prevent re-routing
  • E.g. Diagnosis done over phone, advising patient to proceed to another clinic or to ER
• “Paraskilling” to dynamically resolve bottlenecks
  • E.g. Cross-training medical assistants, office managers to take on other tasks as necessary

Efficient resource allocation, early triage, and cross-training has helped remove bottlenecks keeping wait times low
Appendix
Mass. Eye and Ear – OR
Paragon OR Management Case Tracker

List of schedule and status in OR in any given day
Mass. Eye and Ear – OR
OR Big Board 3.1.0.3

<table>
<thead>
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<th>11:00-12:00</th>
<th>12:00-13:00</th>
<th>13:00-14:00</th>
<th>14:00-15:00</th>
<th>15:00-16:00</th>
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<td>Surgeon: Procedure: Patient:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR 3</td>
<td>Surgeon: Procedure: Patient:</td>
<td>Surgeon: Procedure: Patient:</td>
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<tr>
<td>OR 4</td>
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<td>Surgeon: Procedure: Patient:</td>
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</tbody>
</table>

Arrival/Pending  
Waiting  
Pre Op  
Ready  
Intra Op  
Recovery Stage 1  
Recovery Stage 2  
Transferred  
Cancelled

OR Management Case Tracker is reflected on a big board for surgeons and nurses
Mass. Eye and Ear – OR
Intra-Op Chart: Case Information

Nurse pulls out patient information and logs in starting time and finishing time of the surgery
Massachusetts Eye and Ear Clinic and OR – Patient Pathway

Average – 97 Minutes

- **Existing Patients**
  - 5-10 minutes
  - Bloodwork Vitals
  - 15-30 minutes
  - Physician Facetime
  - 15-45 minutes
  - Checkout
  - 5-10 minutes

- **New Patients**
  - 15 minutes
  - 20 minutes

15-30 minutes
15.S07 GlobalHealth Lab
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