

# LV Prasad Eye Institute Final Presentation

Ali Kamil, Dmitriy Lyan, Nicole Yap, MIT Student  
MIT Sloan School of Management | Global Health Lab  
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# Agenda

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- About LVPEI
- Opportunity, challenges, and approach
- General observations
- Analysis and recommendations
- Next steps
- Appendix

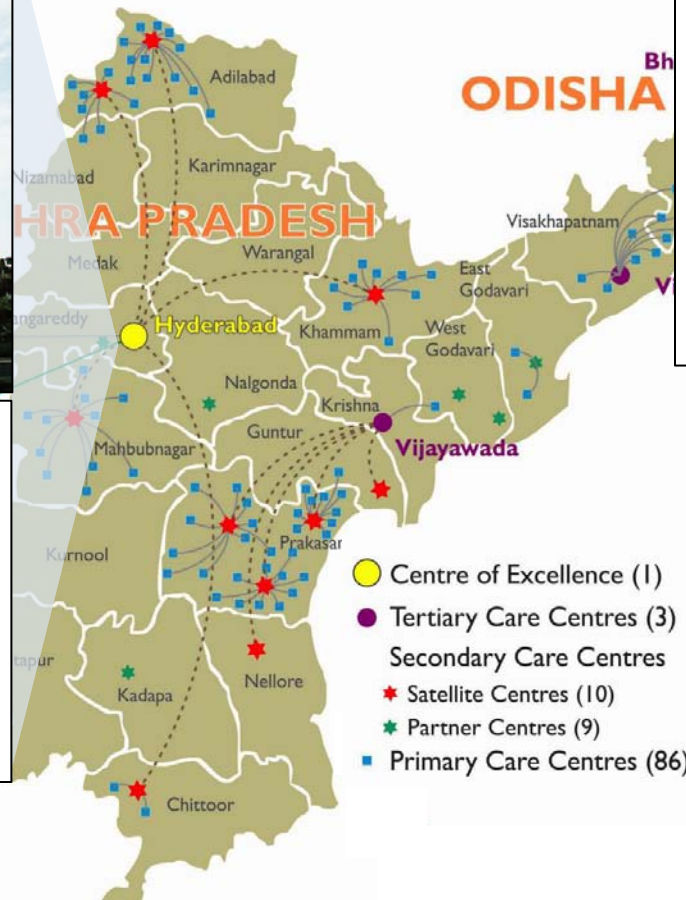
LVPEI is a non-profit organization focused on the delivery of eye care to patients at all levels of the economic pyramid.

## Hyderabad Campus



### Centre of Excellence:

- Provides outpatient services to 200,000 people
- Performs 25,000 surgeries
- Trains 250 professionals at all levels of eye care
- Provides low vision services to 3,000 people



### Services offered:

- Comprehensive patient care
- Clinical research
- Sight enhancement and rehabilitation
- Community eye health
- Education
- Product development

### LVPEI Eye Health Pyramid



# The GHL team at MIT Sloan was engaged to identify bottlenecks and causes of high patient service time in the LVPEI outpatient department (OPD).

## Challenges

- High patient service times
- High provider fatigue due to high patient volume and extended hour of service

## Opportunities

- Reduce service time without compromising LVPEI's high standard of quality care
- Increase capacity without compromising LVPEI's high standard of quality care

## Team Approach

### Pre-trip (January to March)

- Engaged Sashi Mohan, Head of Operations, and Raja Narayan, Head of Clinical Services at LVPEI, over Skype
- We interviewed key personnel at hospitals in the Boston area, including operations leaders at Massachusetts General Hospital (MGH) and practitioners at Massachusetts Eye and Ear Infirmary (MEEI) and Mount Auburn Hospital

### On-site (Mid- to late- March)

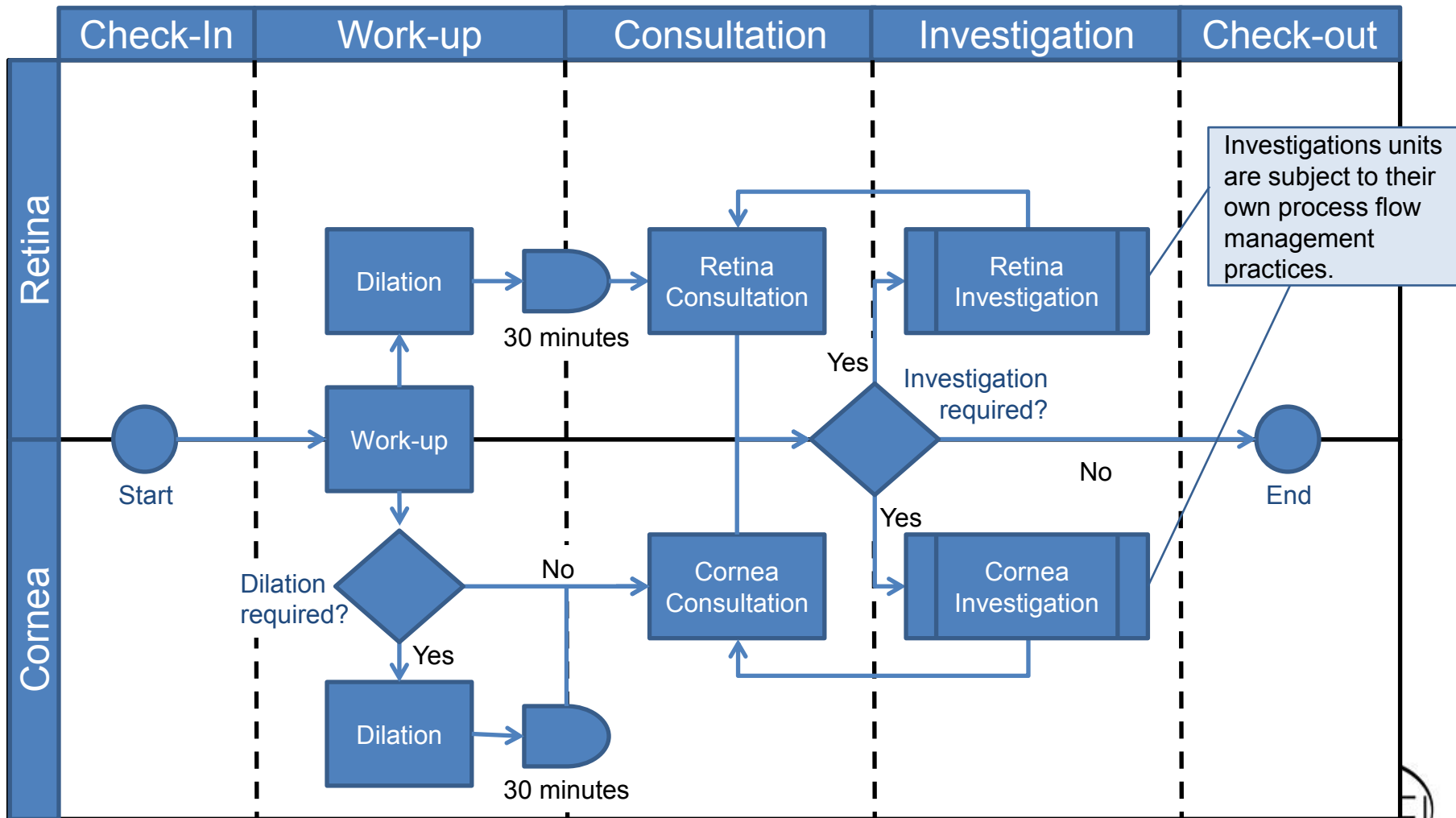
- Conducted time and motion studies in two cornea and two retina OPD clinics, collecting timestamps on the flow of patient folders, and noting management practices
- Interviewed faculty ophthalmologists and optometrists, and OPD scheduling administrator
- Conducted patient surveys at the walk-in counter

### Post-trip (April to May)

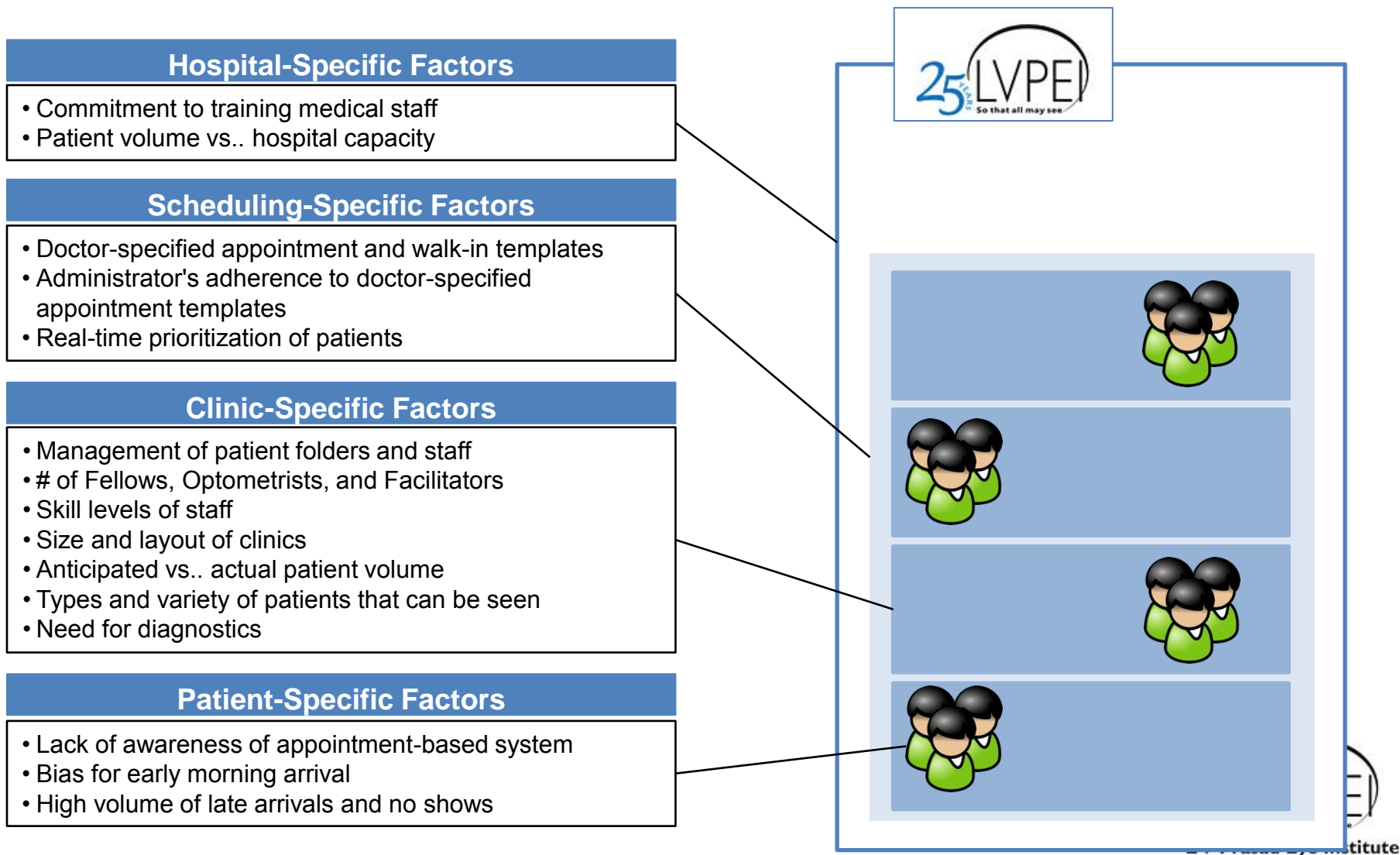
- Ran statistical analyses to quantitatively identify relationships between different variables and patient service times
- Compared findings to our interviews and observations of management practices
- Derived recommendations for addressing systemic causes of increases in patient service times in the OPD

# GENERAL OBSERVATIONS

Patient pathways varied significantly depending on the clinic, and on the type of patient and appointment.



# Additionally, several combinations of factors impact patient service time.

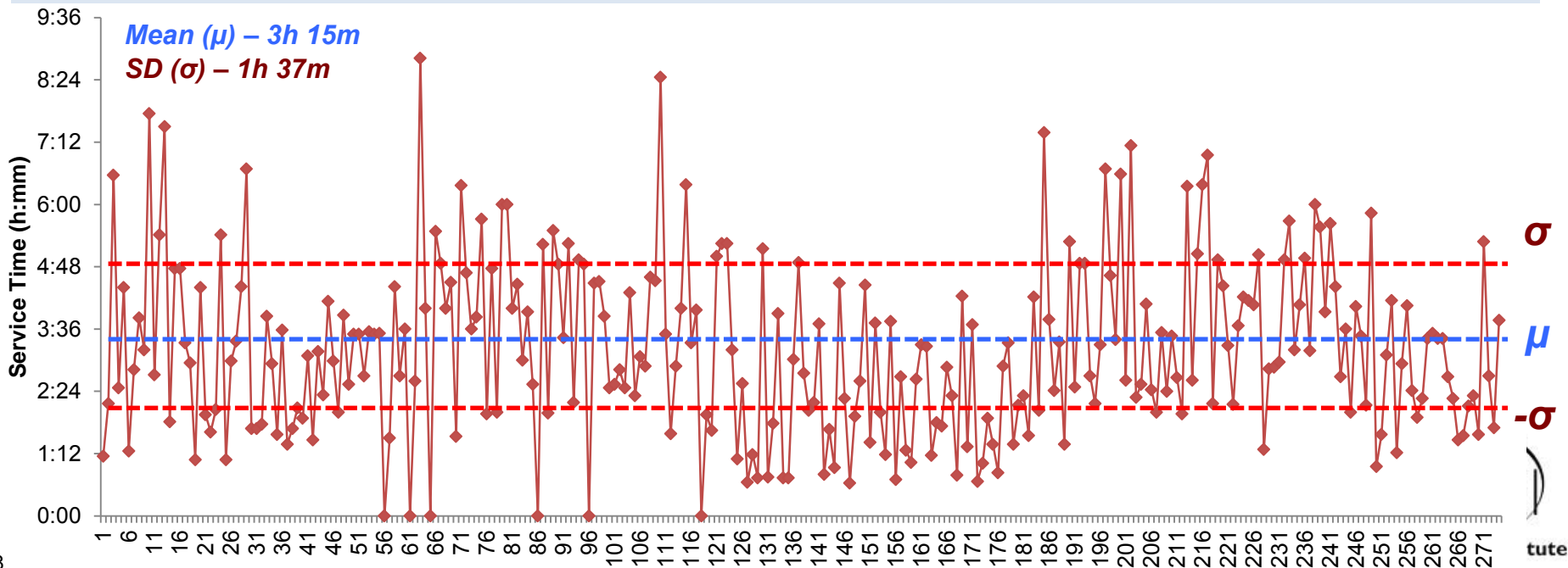


There is little discrepancy in patient service time between non-paying and general patients, but high variability ranging from two to four hours.

Priority Level	Patient Count	Clinic 1	Clinic 2	Clinic 3	Clinic 4	Average Service Time
<b>G</b>	182	2:44	4:08	2:17	3:26	<b>3:12</b>
<b>NP</b>	56	2:55	3:35	2:51	4:01	<b>3:29</b>

Average patient service times for general and non-paying patients differed by only **17 minutes**.

**Service Time Variability (All Days)**



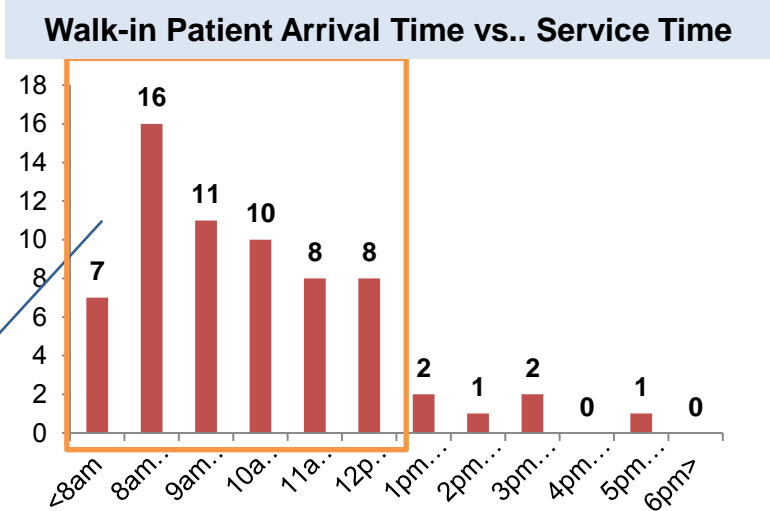


Walk-in patients have higher variability in service times compared to patients with appointments.

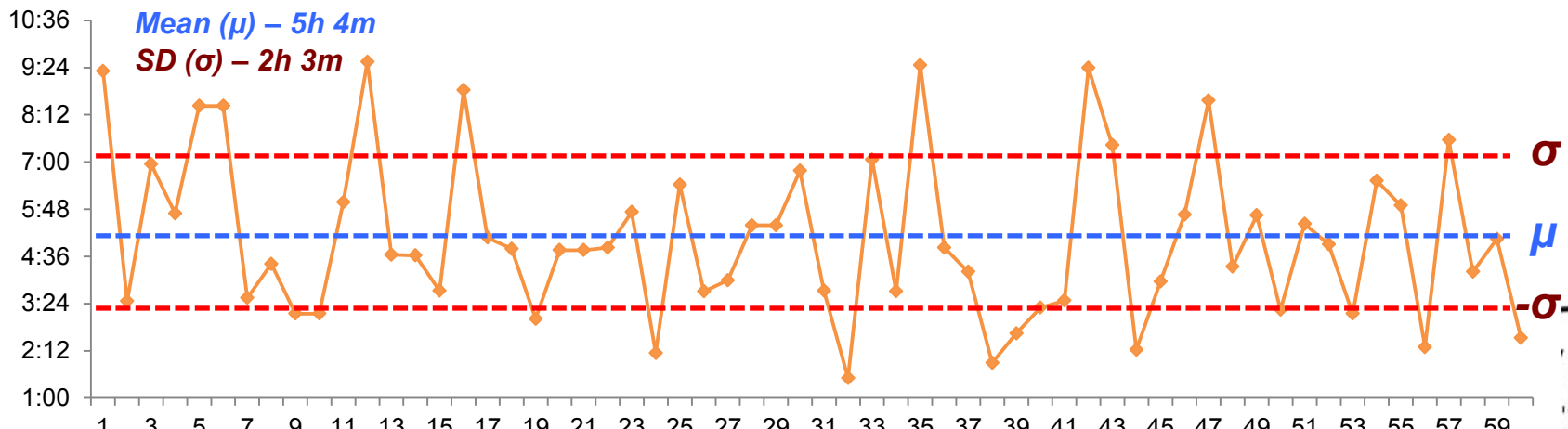
Clinic 1	Clinic 2	Clinic 3	Clinic 4	Average Service Time	Total Patient Count
6:21	5:01	4:38	5:04	5:04	60
4	28	8	20		

Walk-in patient service time is higher than apt-based patients

86% of walk-ins arrive before 12pm



### Walk-in Patient Service Time Variability (all days)



# ANALYSIS & RECOMMENDATIONS

# Require doctors to adhere to appointment based system and encourage on-time arrivals.

## Key Observations

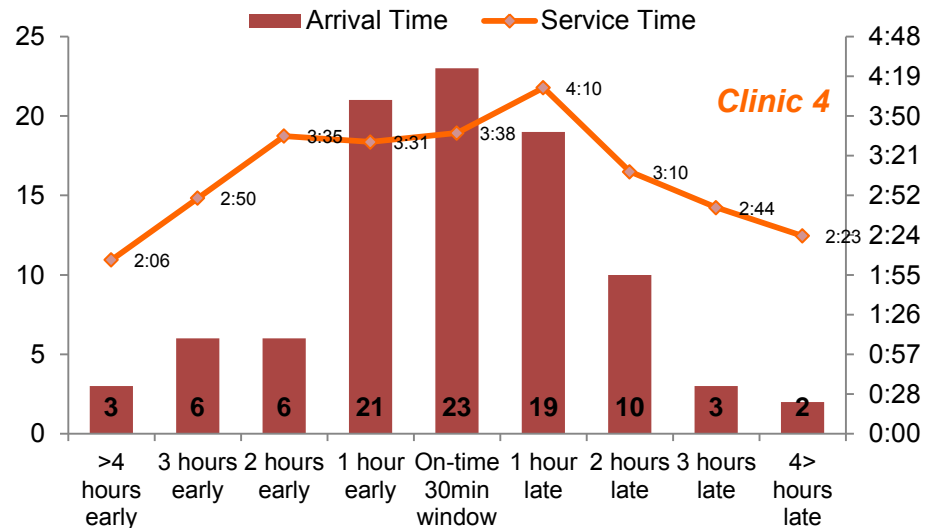
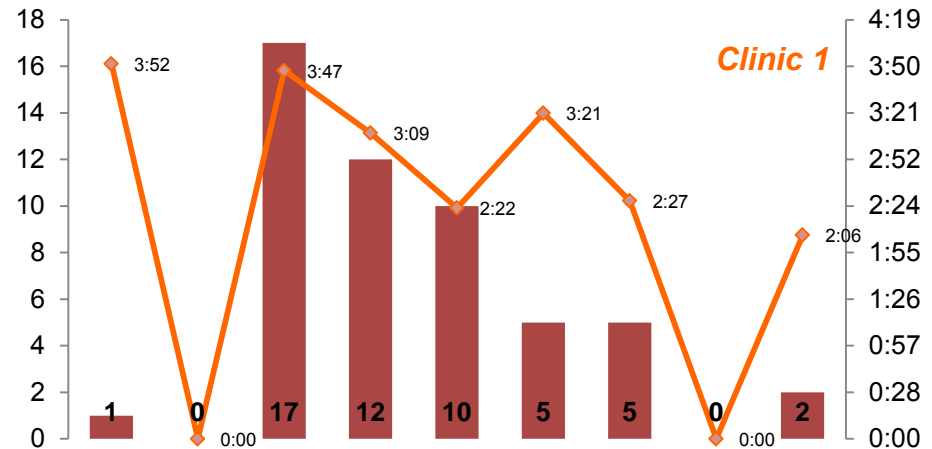
- Only **28%** of all apt. based patients arrived on time
- Clinics adhering to apt. based system achieved shorter service times
- Clinics 1 and 3 adhered to apt. based system and penalized patients for early (<30m) or late arrivals (>30m)
- Clinics 2 and 4 did not actively adhere to apt. system and had significantly higher service times for on-time patients

## Service Times for On-time Patients

	Clinic 1	Clinic 2	Clinic 3	Clinic 4
Avg. Service Time	2h 22 m	3h 58m	2h 4m	3h 38m
St. Dev	1h 17 m	1h 33m	1h 22m	1h 23m

## Recommendations

- Require doctors to adhere to apt. based system
- Prioritize patients based on their appointment times and not check-in times
- Educate patients about apt. based system and encourage adherence



# Encourage the use of appointment system, while simultaneously employing strategies to better manage walk-in patients.

## Walk-in Survey Results Summary

### 40 patients surveyed in total

- 41% of patients had tried unsuccessfully to make an appointment; 50% of these were because the requested appointment time was unavailable
- 80% of patients who did not make appointments were unaware of the option

## Survey Findings

- In general, awareness of the appointment option is low
- Patients choose the walk-in option because the next available appointment is too far away
- The majority of walk-in patients are new to LVPEI

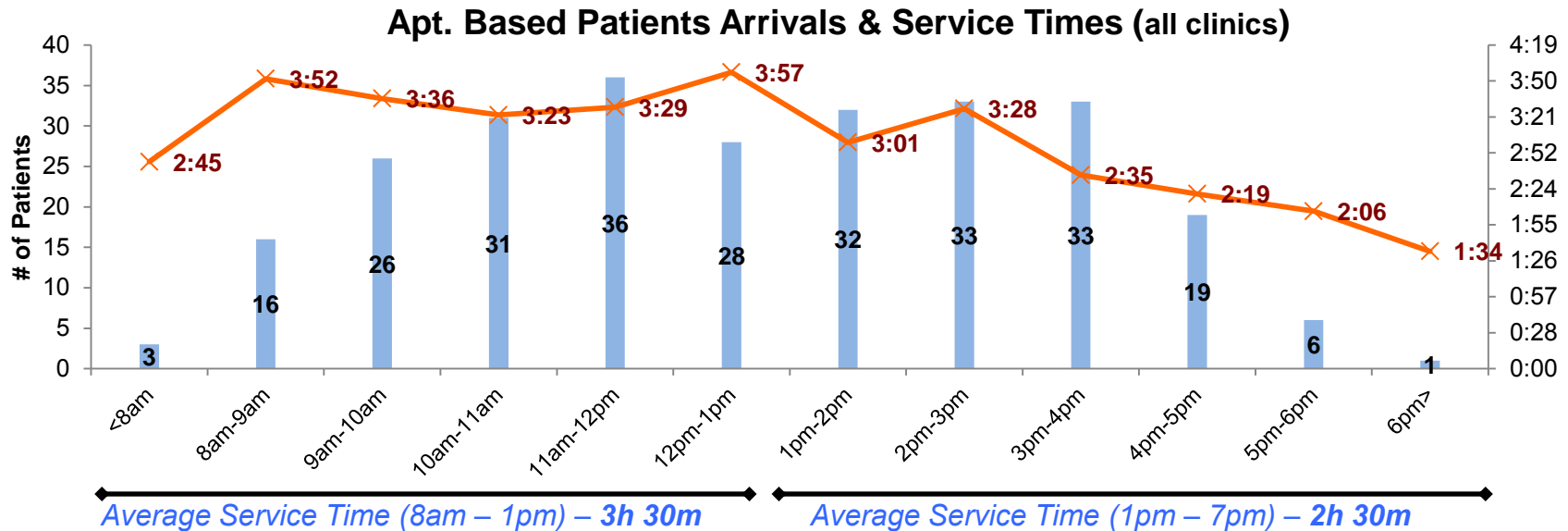
## Interview Findings

- Doctor scheduling for walk-in patients by time and type is often not adhered to due to over demand and incorrect triage
- Unexpected walk-ins are disruptive to the patient flow, but doctors have no choice but to accommodate
- Incorrect triage results in re-routing patients to other clinics and increased service time
- Walk-in patients often have primary care concerns that do not require specialized attention, or ask to see a specific doctor unnecessarily

## Ideas to Consider

- Better promote appointment system, especially among new patients
- Designate general doctors for walk-in clinic to reduce specialist time on general cases
- Require referral letters for new patients asking to see a specific doctor
- Enforce ophthalmologist-set guidelines for appointment booking at the walk-in counter

# Identify factors contributing to decreasing service times in the late afternoon.



## Key Observations

- Average service time decreases with time of day
- Appointment-based patients arrival time has normal distribution

## Potential Factors to Consider

- Providers work more efficiently towards the end of the day
- Patients that do not require diagnostics are stacked later in the day
- Reduced number of walk-ins in the latter half of the day

## Ideas to Consider

Closely observe the behavioral patterns of providers during the later half of the day. If positive behavior is identified, this practice should be replicated during the rest of the day.

# Monitor practitioner fatigue in latter half of workday, as high pressure to serve customers can lead to increased errors and reduced service quality.

## Interview Findings

- Error rate of providers rises throughout the day for both optometrists and ophthalmologists
- After 4:00PM, doctors begin to observe fatigue in their teams
- After 4:00PM, doctors begin to observe work being completed in a hurry

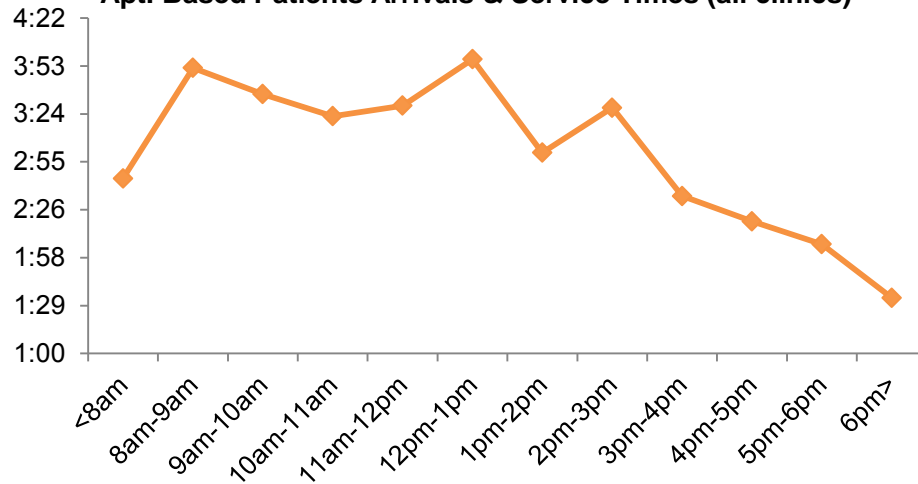
## Key Observations

- Patients who arrive later in the day and patients who arrive significantly late for their appointments tend to experience lower service times.
- Average service time decreases with time of day
- With time of day, providers and staff tend to get fatigue and are prone to mistakes/errors

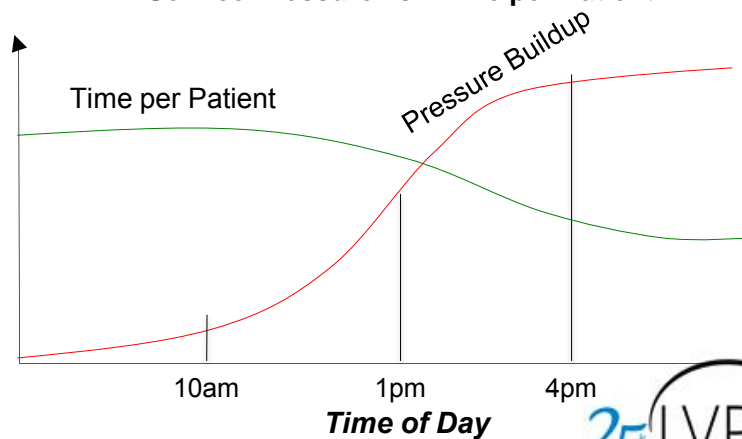
## Ideas to Consider

- Closely observe the error rate that is created at any given time
- Closely observe the frequency of re-work over a given time period
- Determine the cause of the decline in service times during latter half of the day

Apt. Based Patients Arrivals & Service Times (all clinics)



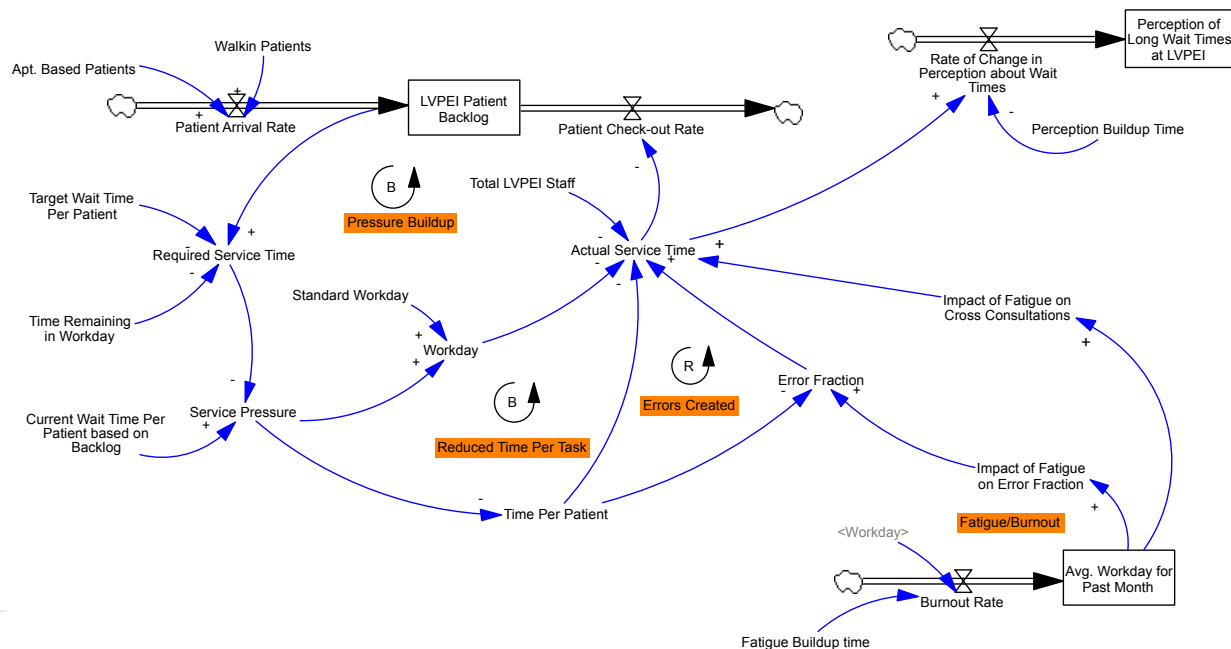
Service Pressure vs.. Time per Patient



# Monitor practitioner fatigue in latter half of workday, as high pressure to serve customers can lead to increased errors and reduced service quality.

## Insights

- Workday is scheduled for 8am – 5:30pm. Providers observed working until 7/8pm to service all patients
- High patient backlog increases pressure on LVPEI providers to service all patients in a given day
- Latter part of the day has been observed (via interviews) to increased fatigue and errors in service
- High pressure situation coupled with long workdays will lead to high turnover of staff



## Ideas to Consider

- Adherence to apt. based system and reducing number of walk-in patients
- Consider provider/staff rotation between high-pressure clinics and regular clinics
- Identify rework and errors created by time of day

## Modeling Next Steps

- Consider long term impact to quality of service and reputation due to high service times and errors/rework
- Identify impacts to staffing and turnover due to high pressure environment
- Consider competitor/alternate emergence scenario

# Identify and encourage best cross-consultation management practices

## Relevant Clinic Observations

- Cross-consultation cases comprise a non-negligible percentage in each clinic: **10 to 15%**
- **3 out of 4** clinics employed practices to manage and integrate cross-consultation cases into existing patient flow
- Management of cross-consultation cases differed across clinics
- Passive cross-consultation management was disruptive to regular patient flow

## Sample Cross-Consultation Management Practices

- **Fixed time allocation:** 15 minutes every 2 hours for cross-consultations and short follow-ups
- **Real-time prioritization:** integration and prioritization of cross-consultations with existing patients
- **Prioritization by check-in:** prioritization of cross-consultation patients according to check-in time

## Ideas to Consider

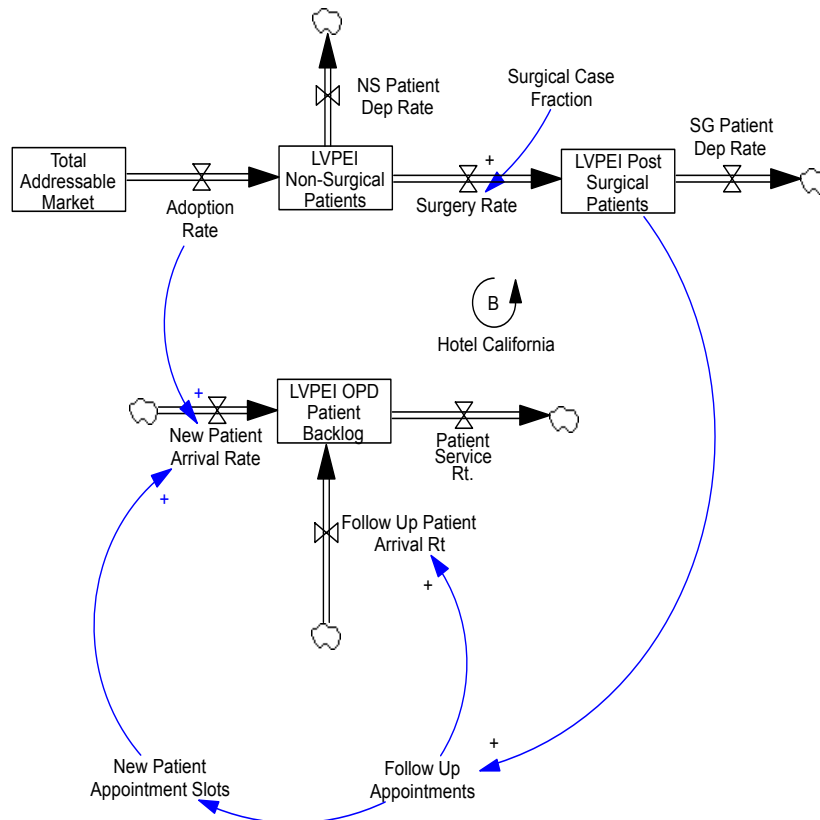
- Conscious management of cross-consultation patients in each clinic
- Identification of good cross-consultation management practices
- Closer observation of the decision-making process behind the need for cross-consultation
- Guidelines for providers on the necessity for cross-consultation



# Remove annual post-surgery follow-up requirement and divert patients to comprehensive clinic for ongoing long follow-ups

## Observations

- 60-70% of doctor's appointment templates are dedicated to seeing new patients
- 20% of all patients seen across the four days of study are new patients.
- Providers perform over 500 surgeries a year
- All patients are requested to come back for follow-ups at least once a year regardless of the need.



## Insights

- Continuing with the policy of requiring patients to come back for simple follow ups exhausts LVPEI doctors' capacity to serve new patients.
- Dedicating more of providers' time to follow up patients reduces opportunities to learn from diverse and complex cases.
- Ongoing reduction in time available to see new patients limits LVPEI's ability to realize its vision to reach all those in need.

## Ideas to Consider

- Removing the requirement for all patients to come in for yearly follow-ups post-surgery
- Transitioning fully recovered patients to comprehensive clinic for ongoing long follow-ups

# NEXT STEPS

Additional studies and modeling exercises will build a comprehensive understanding of the factors contributing to patient service time in the OPD.

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## Future Studies

- Time and motion studies that include cross consultation patients
- Time and motion studies on cornea diagnostics
- Patient flow of patients before they get to clinics
- Triage process at the walk-in counter
- Patients returning to LVPEI due to incorrect diagnosis
- Effectiveness of short-term recommendations
- Identification of best practices in clinic management

## Simulation Models

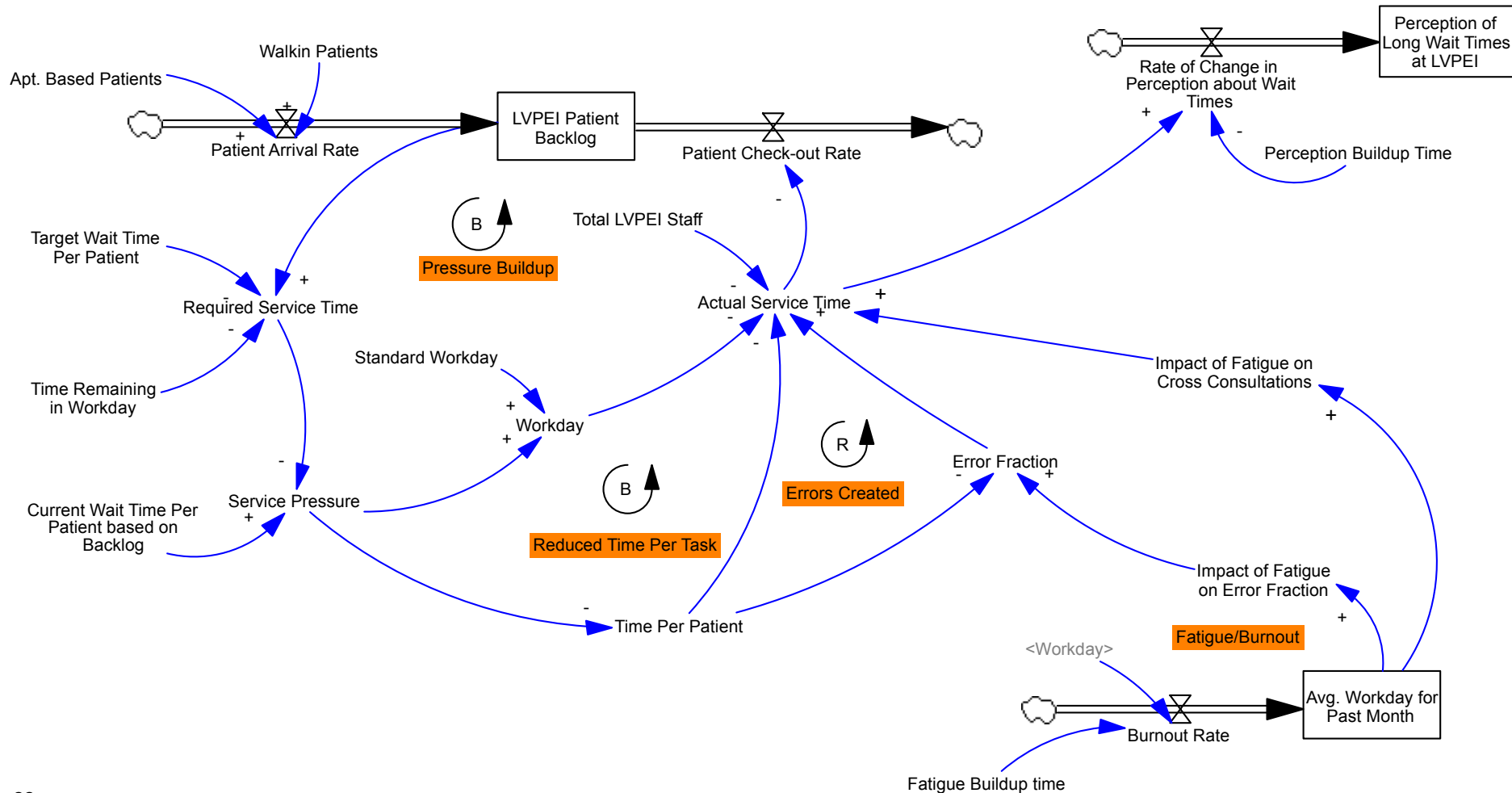
- Additional data collection needed to quantify key relationships
- LVPEI's patient flow system for cornea and retina clinics

QUESTIONS?

# APPENDIX

# Monitor practitioner fatigue in latter half of workday, as high pressure to serve customers can lead to increased errors and reduced service quality.

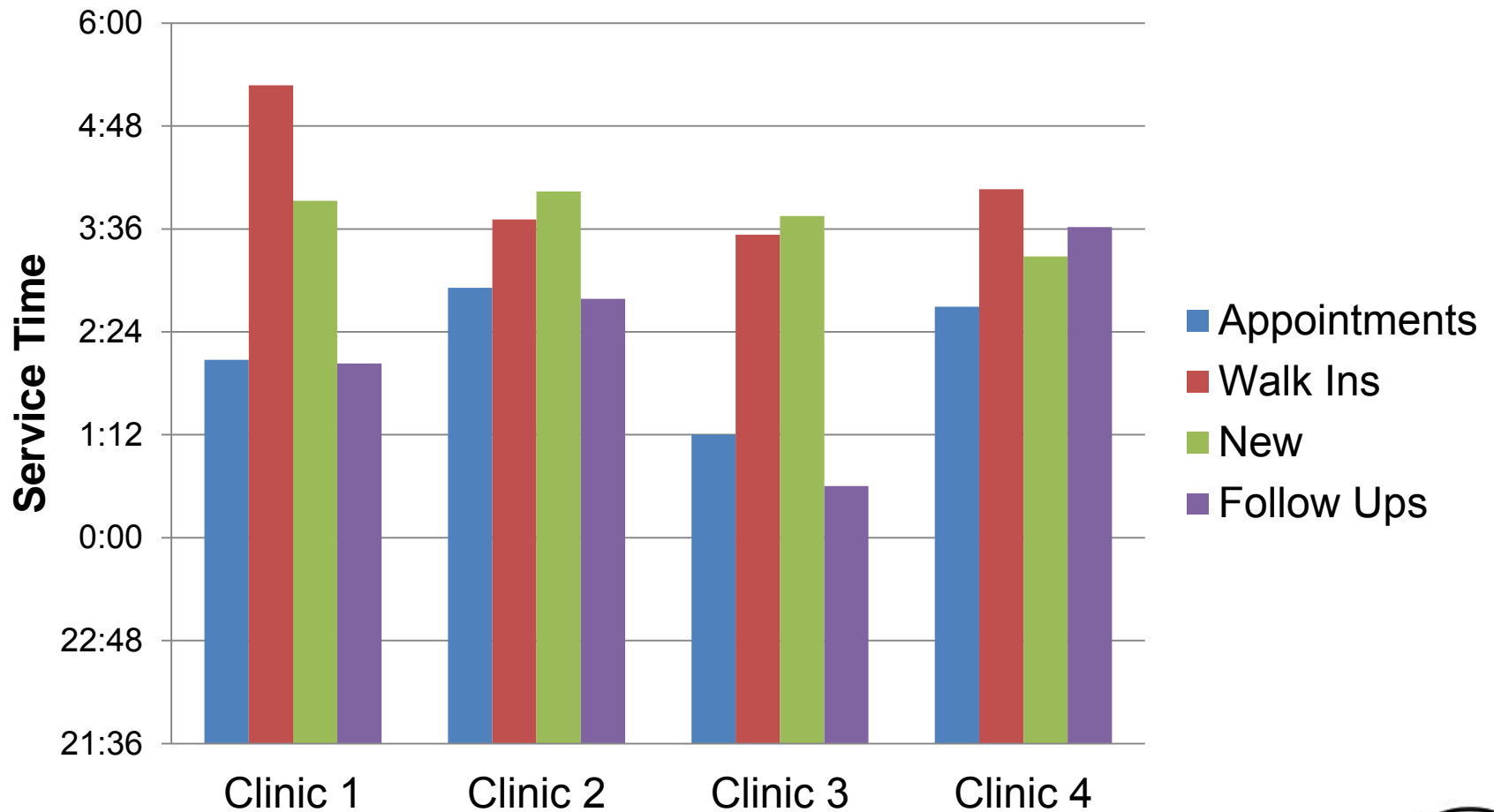
## System Dynamics Service Pressure Loop



# Summary Of Approximate Patient Waiting Times

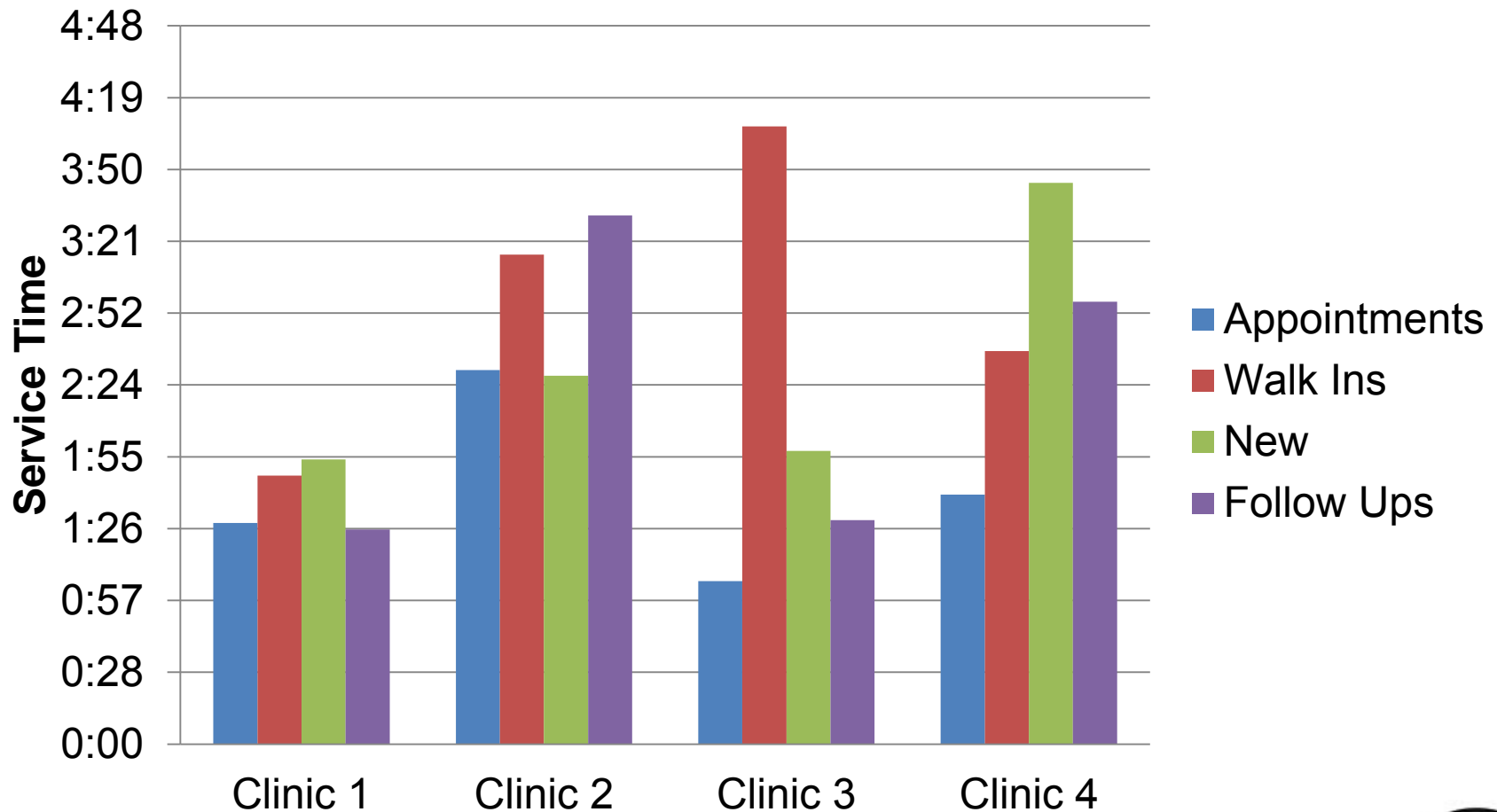
Day	Type	Workup Waiting Time	Diagnostic Waiting Time	Total Service Waiting Time	Number Of Patients	Percentage of Walkins	Percentage of New Patients
Clinic 1	Appointment	1:28	2:33	2:04	57	7%	14%
	Walk In	1:47	3:21	5:16			
	New	1:54	3:42	3:55			
	Follow Up	1:26	2:19	2:01			
Clinic 2	Appointment	2:29	2:40	2:54	97	30%	26%
	Walk In	3:16	1:31	3:42			
	New	2:27	2:37	4:02			
	Follow Up	3:32	1:59	2:47			
Clinic 3	Appointment	1:05	0:46	1:12	72	11%	14%
	Walk In	4:07		3:32			
	New	1:57	2:07	3:45			
	Follow Up	1:29	1:39	0:36			
Clinic4	Appointment	1:40	0:24	2:41	113	18%	22%
	Walk In	2:37	0:52	4:03			
	New	3:45	2:09	3:16			
	Follow Up	2:57	0:18	3:37			

# Overall Patient Average Service Time

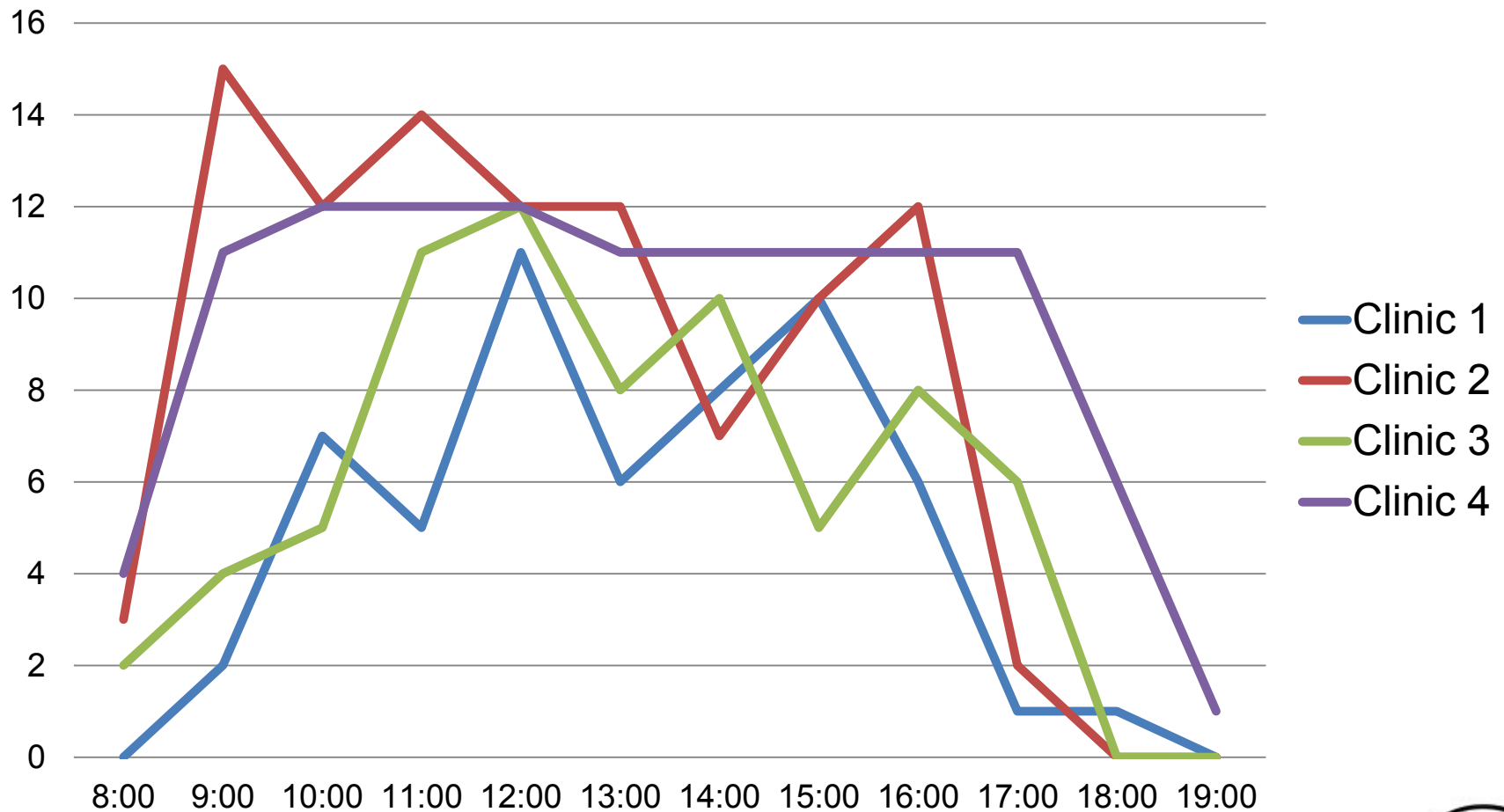




# Overall Patient Check-in to Dilation Average Service Time

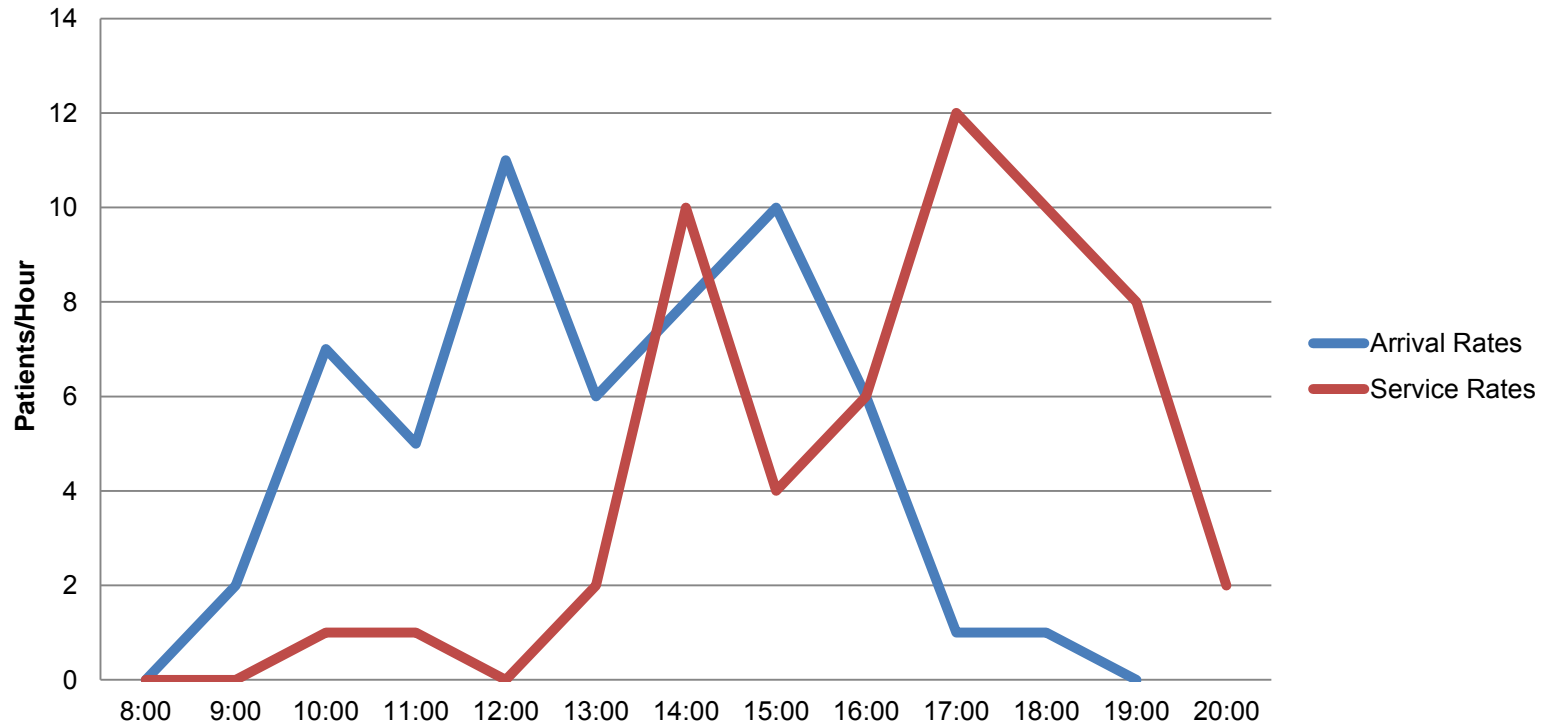


# Overall Patient Arrival Rates



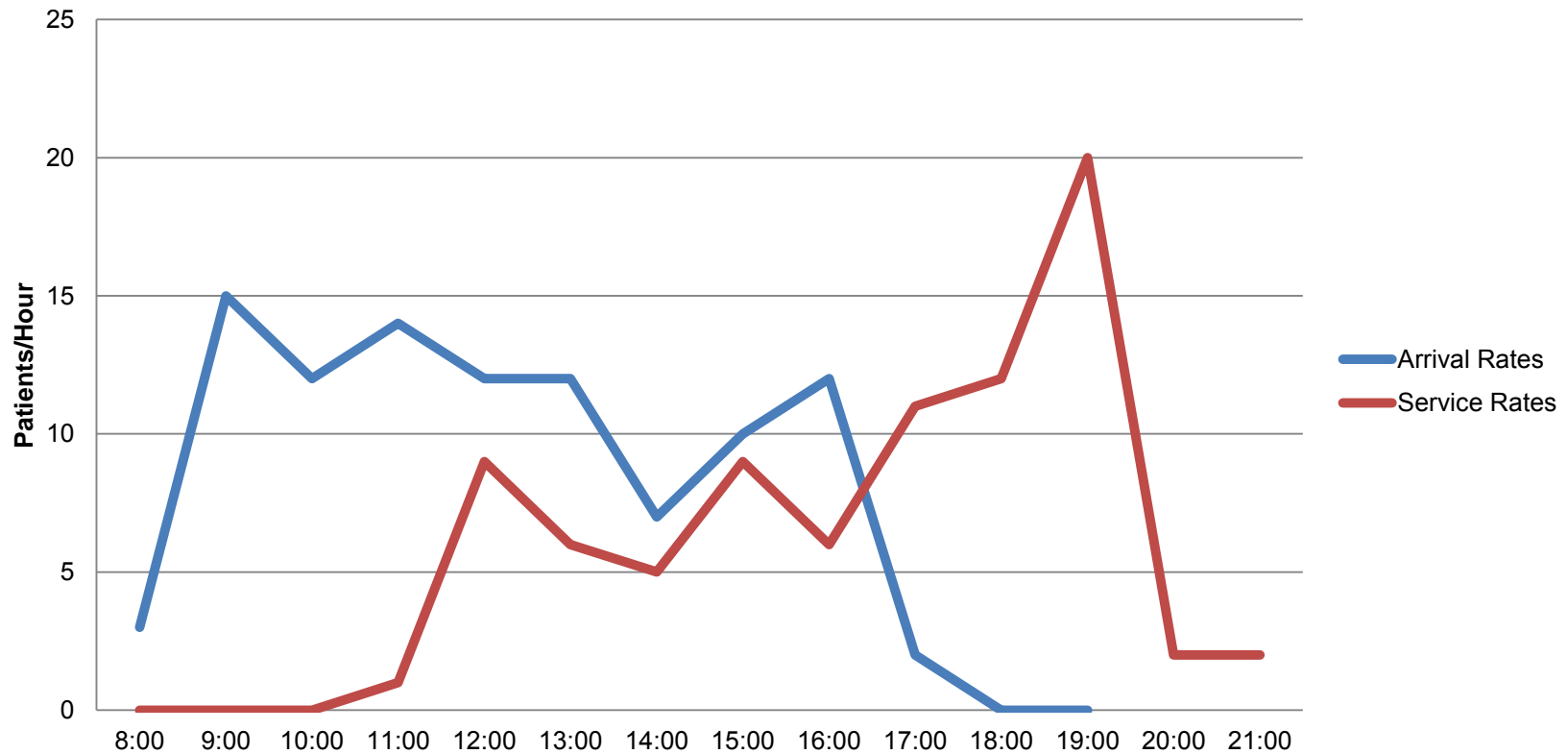
# Patient Arrival & Service Completion Rates

**Arrival and Service Completion Rates  
@ Clinic 1**



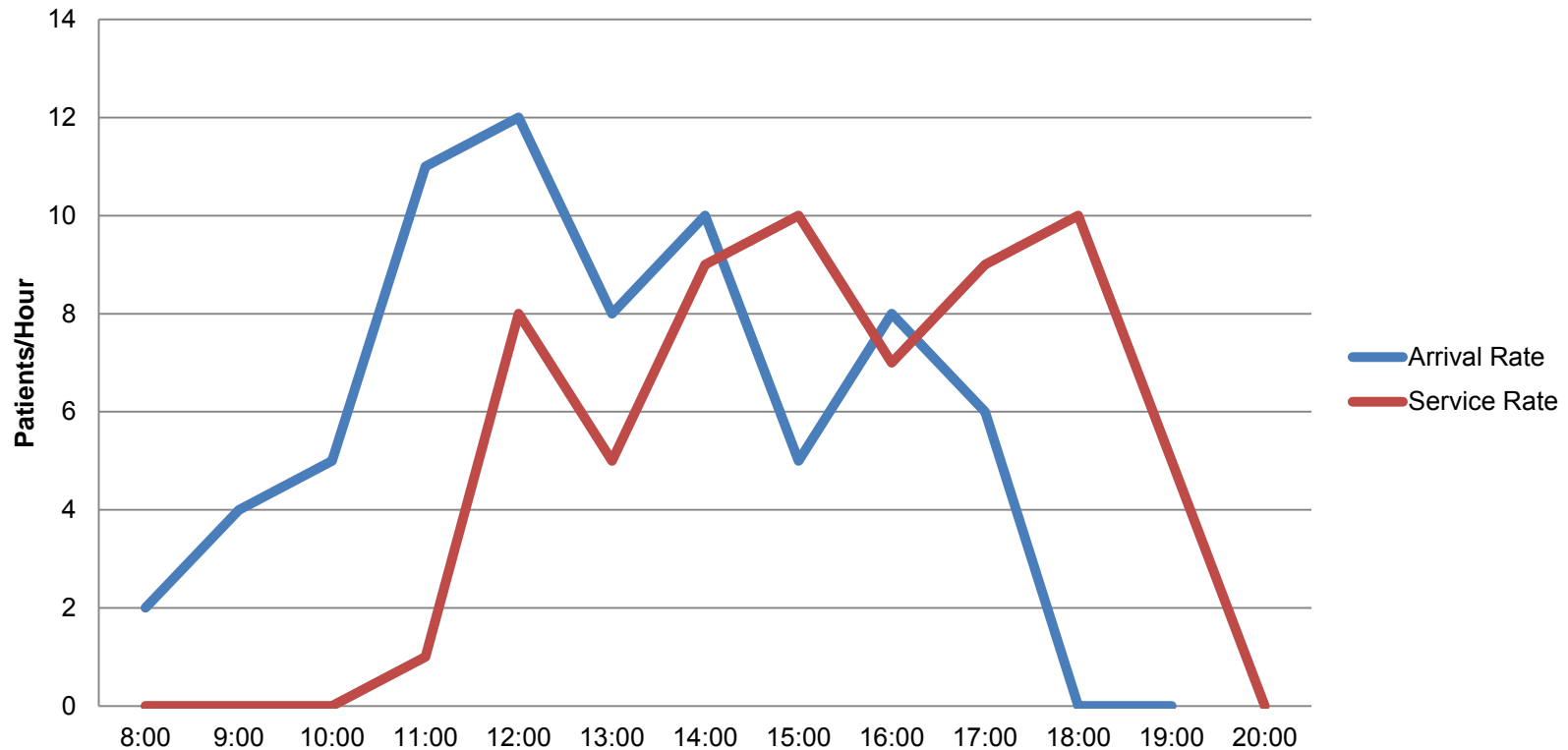
# Patient Arrival & Service Completion Rates

## Arrival and Service Completion Rates @ Clinic 2

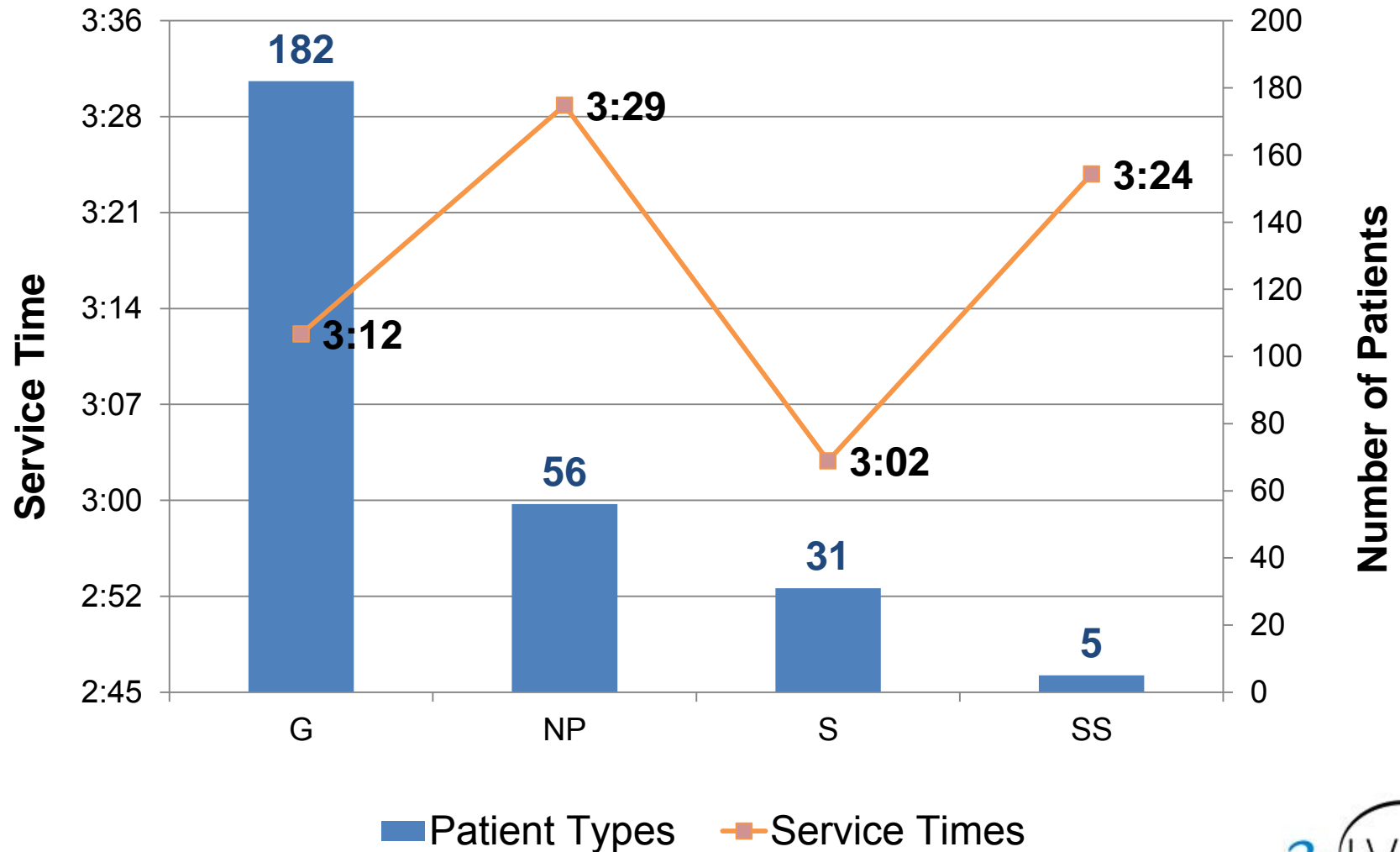


# Patient Arrival & Service Completion Rates

## Arrival and Service Completion Rates @ Clinic 3

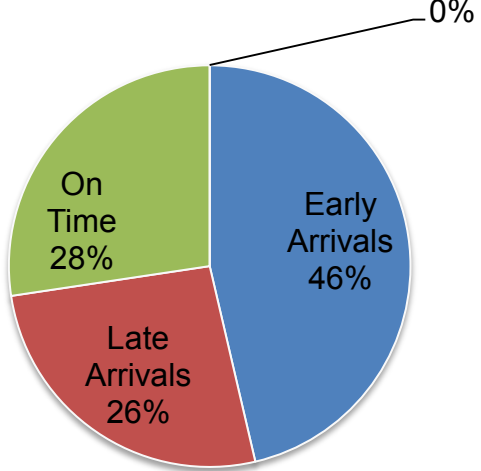


# Appointment-based Patient Patient Type (G, NP, S, SS) & Service Time

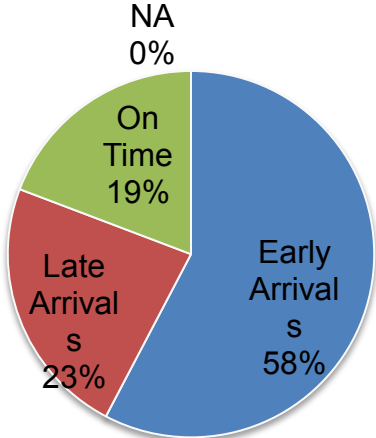


# Appointment-based Patient Distribution Early/Late/On-Time Arrivals

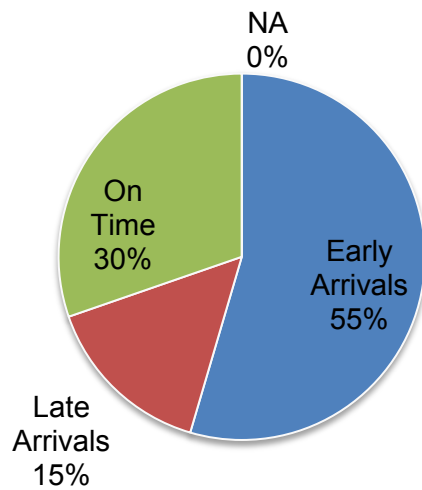
## Arrivals (Total)



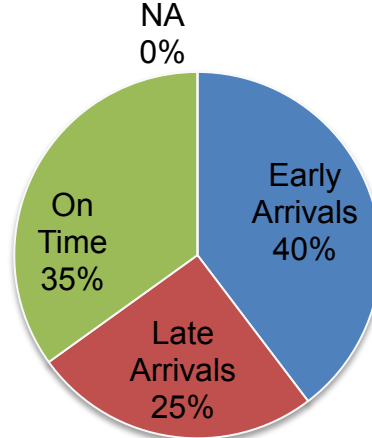
## Clinic 1



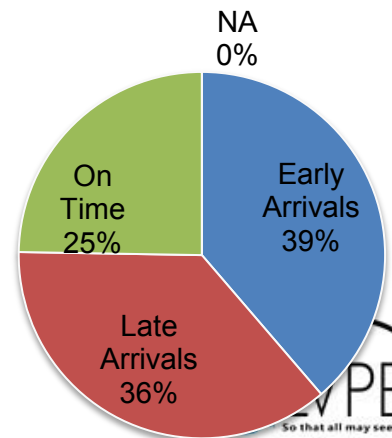
## Clinic 2



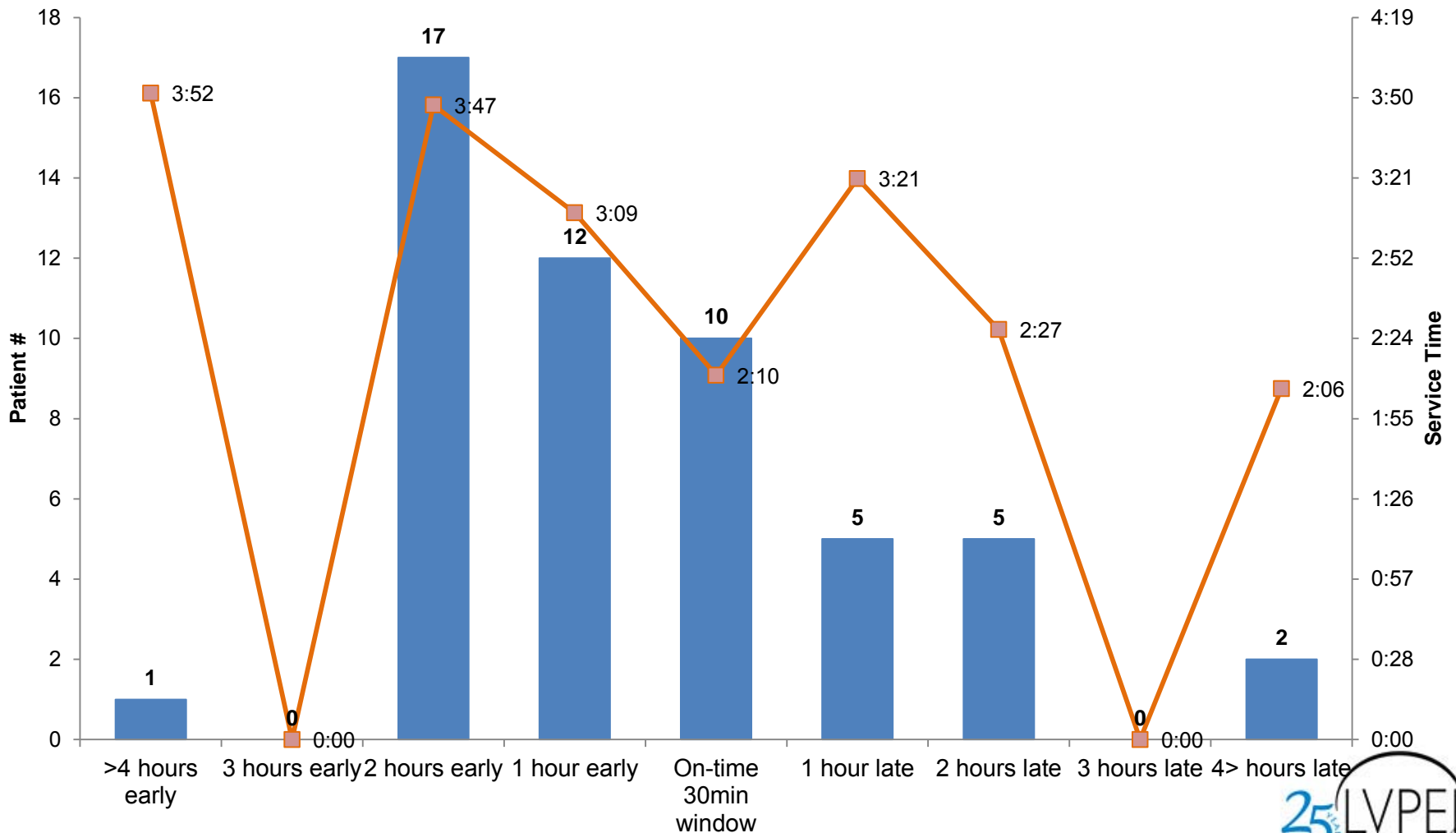
## Clinic 3



## Clinic 4

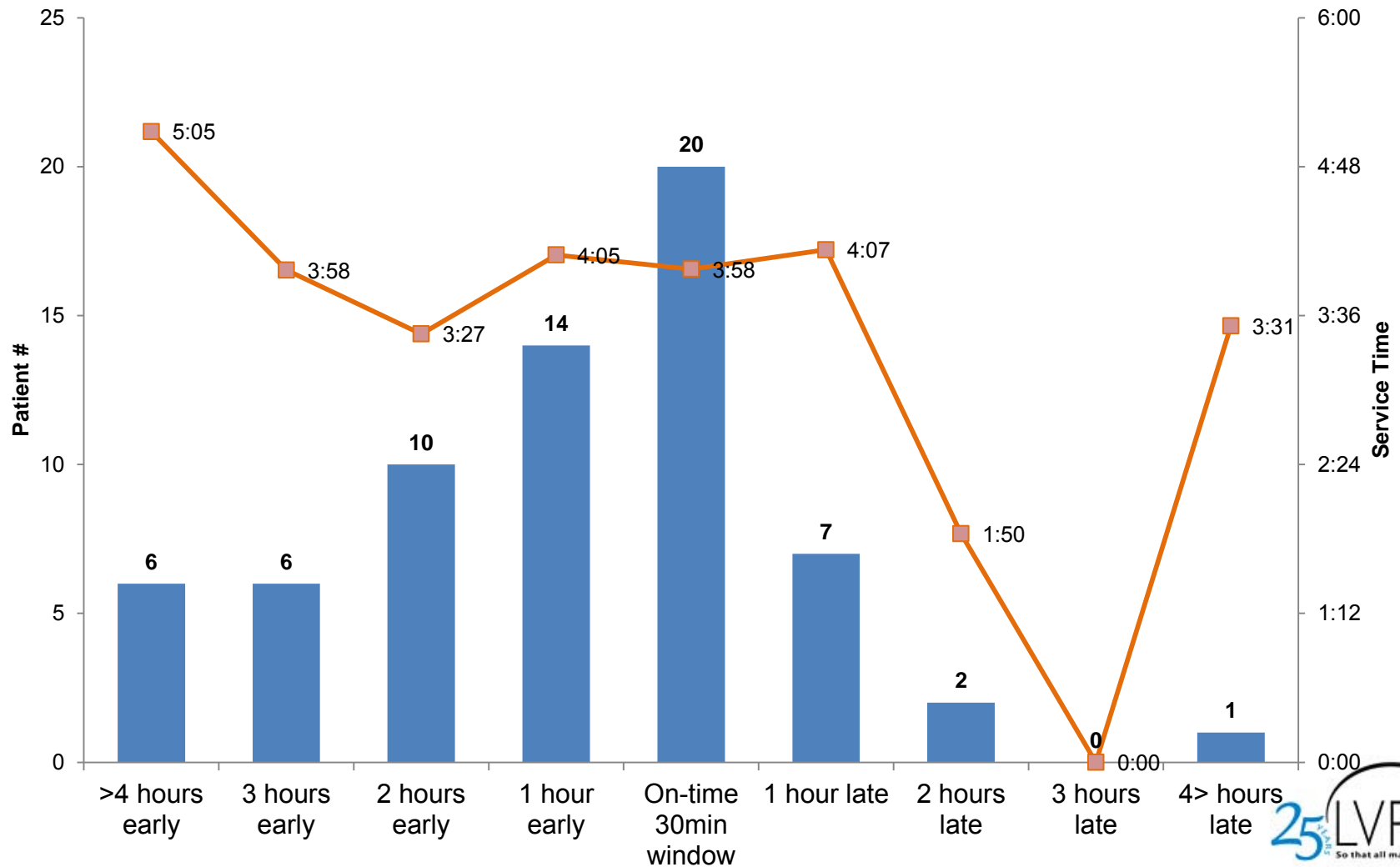


# Appointment-based Patient Arrival & Service Time (Clinic 1)

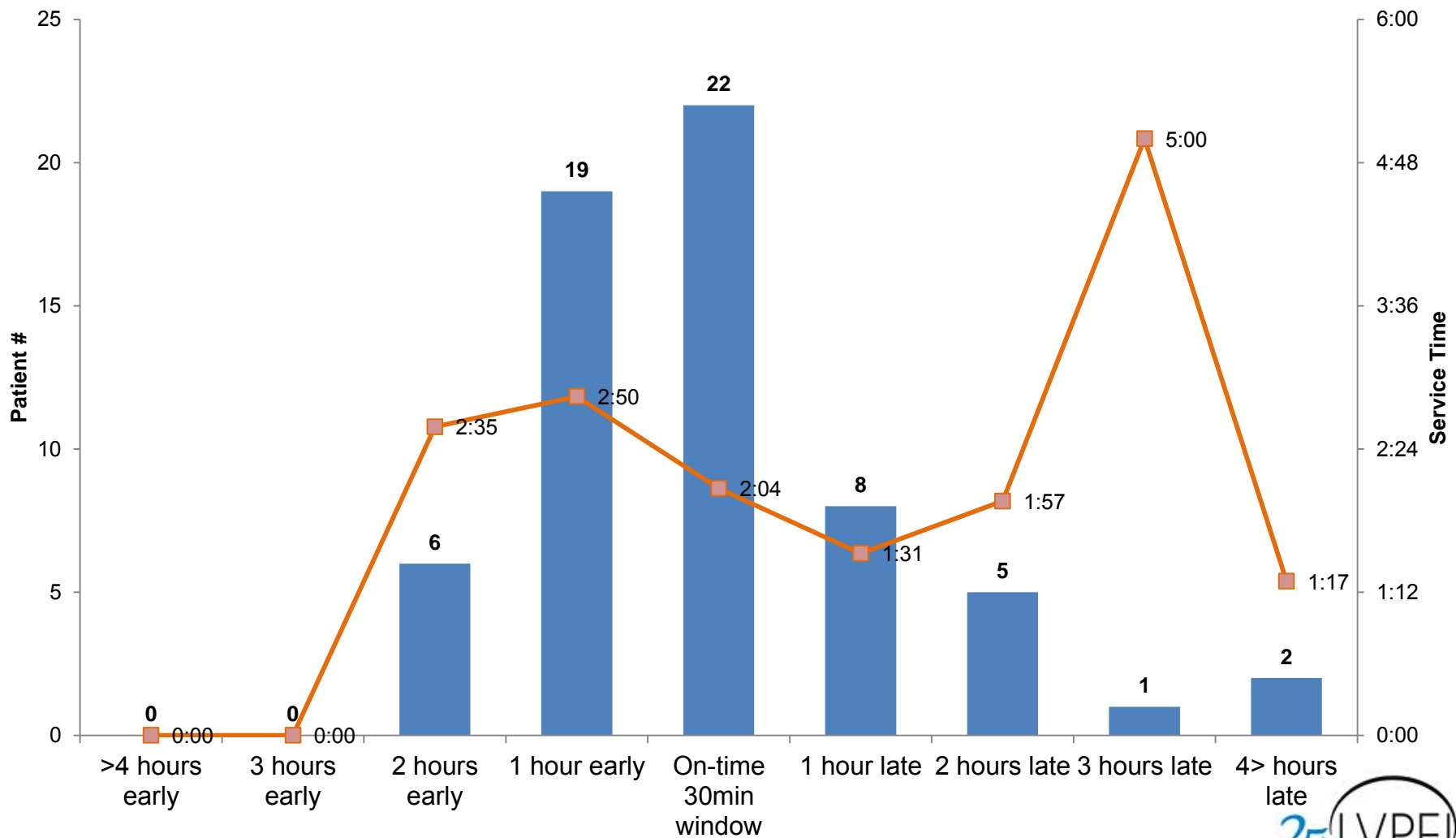




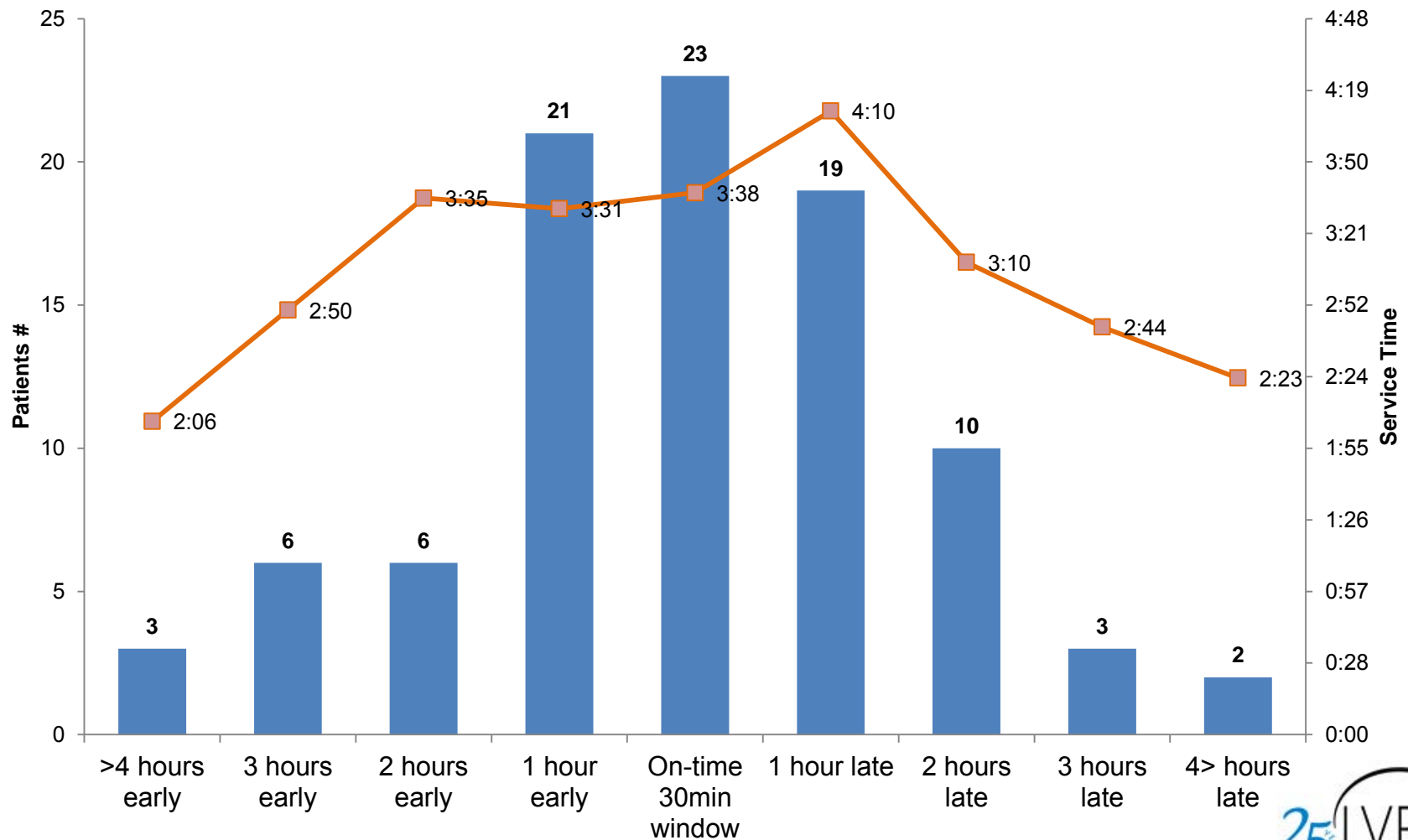
# Appointment-based Patient Arrival & Service Time (Clinic 2)



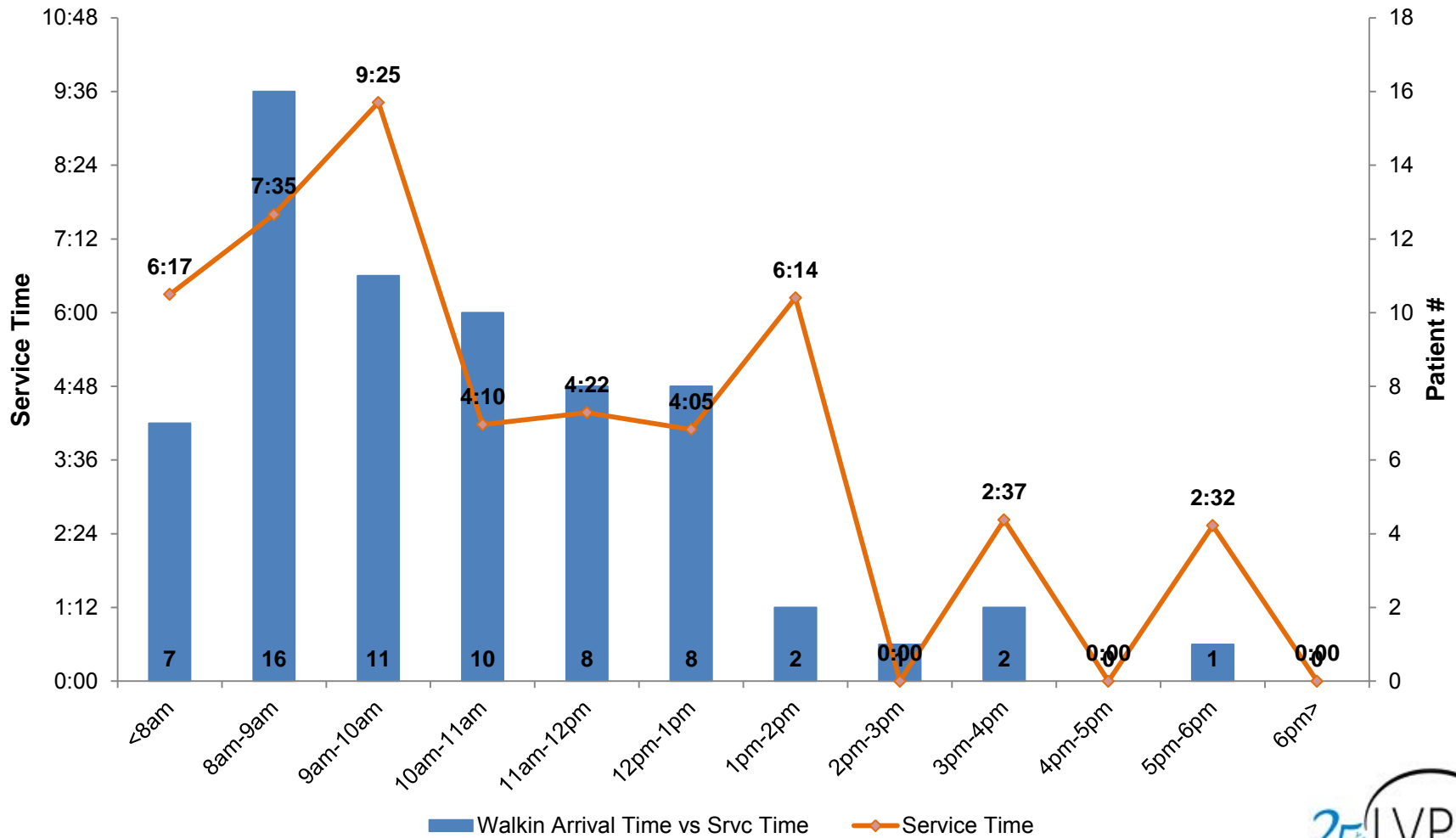
# Appointment-based Patient Arrival & Service Time (Clinic 3)



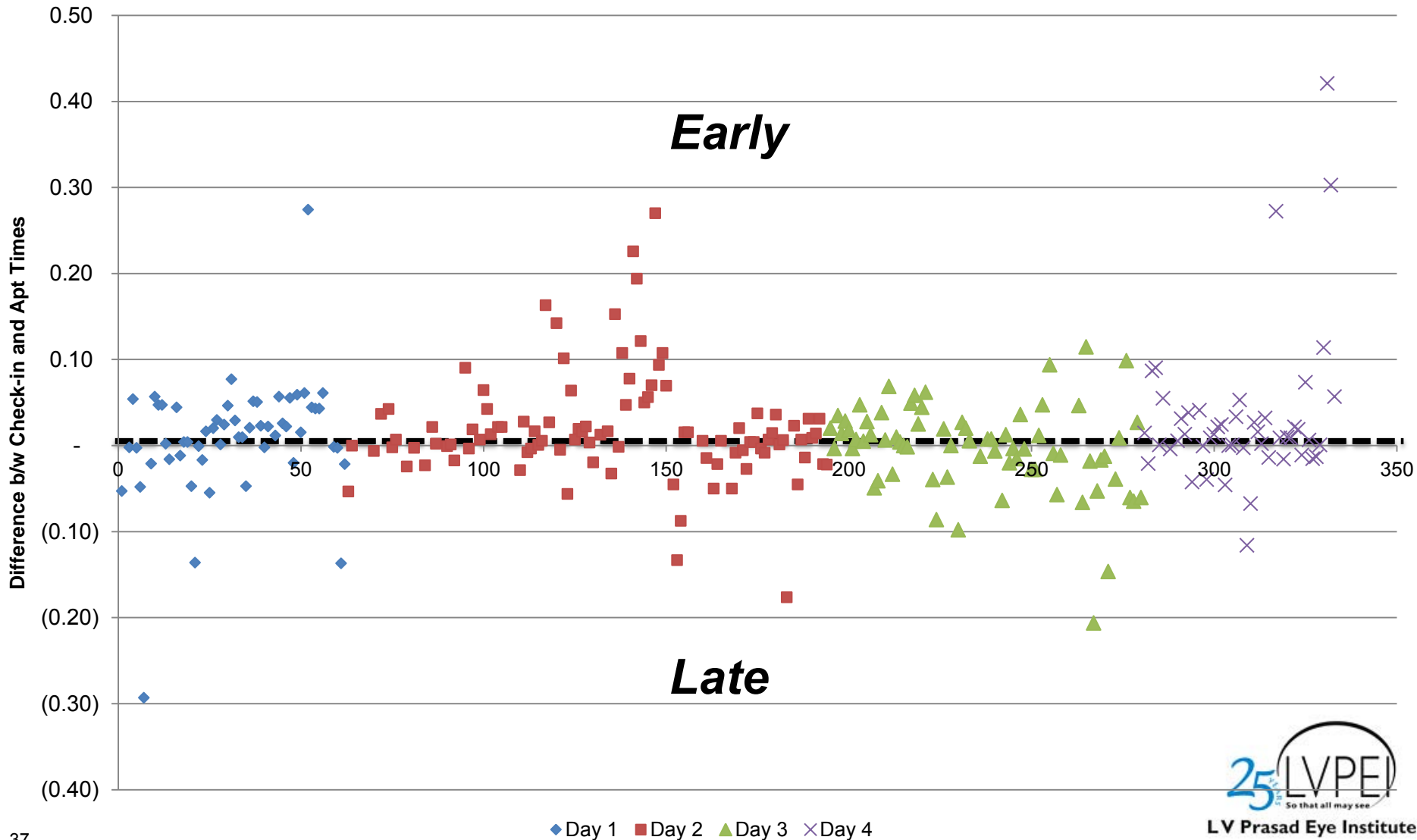
# Appointment-based Patient Arrival & Service Time (Clinic 4)



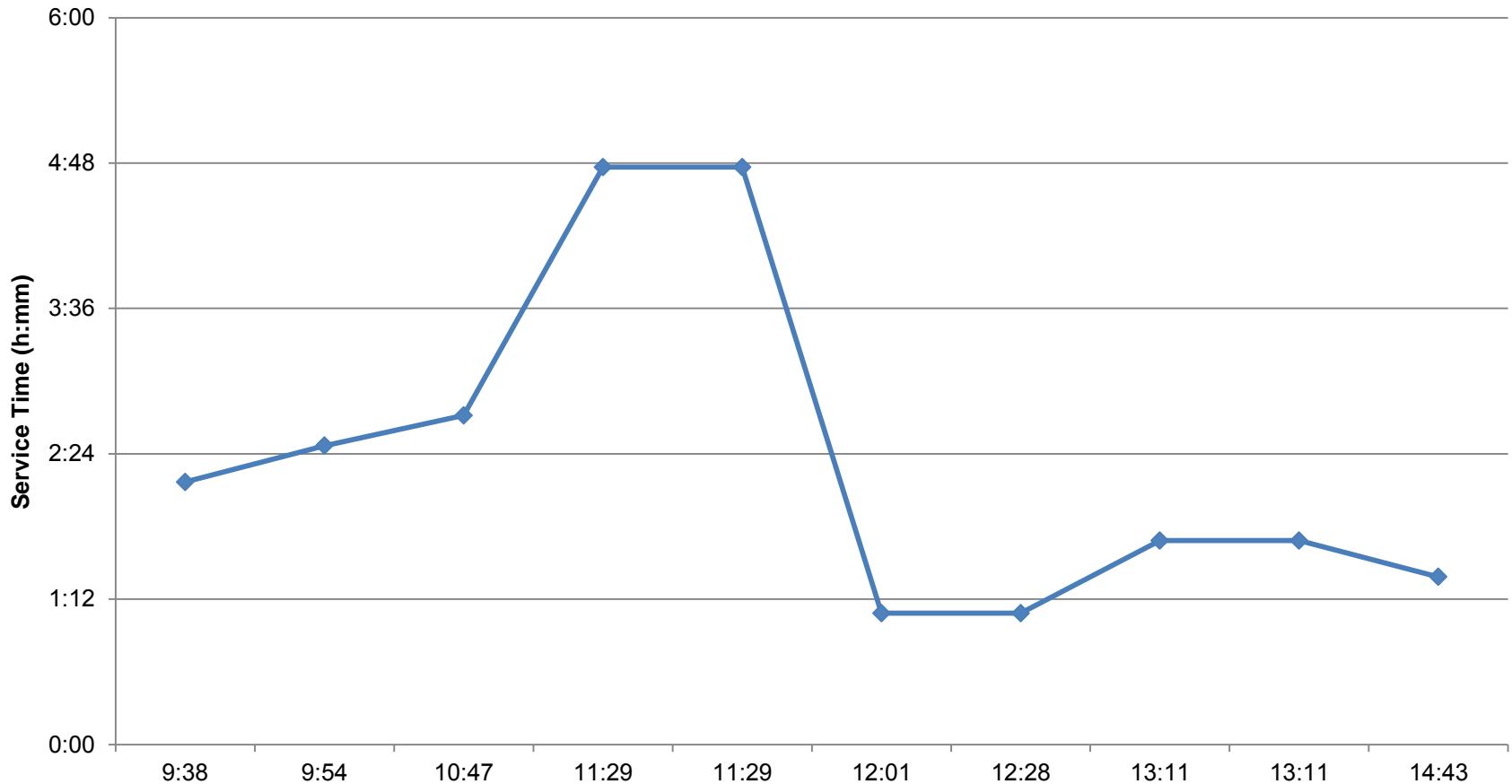
# Walk-in Patient Arrival & Service Time



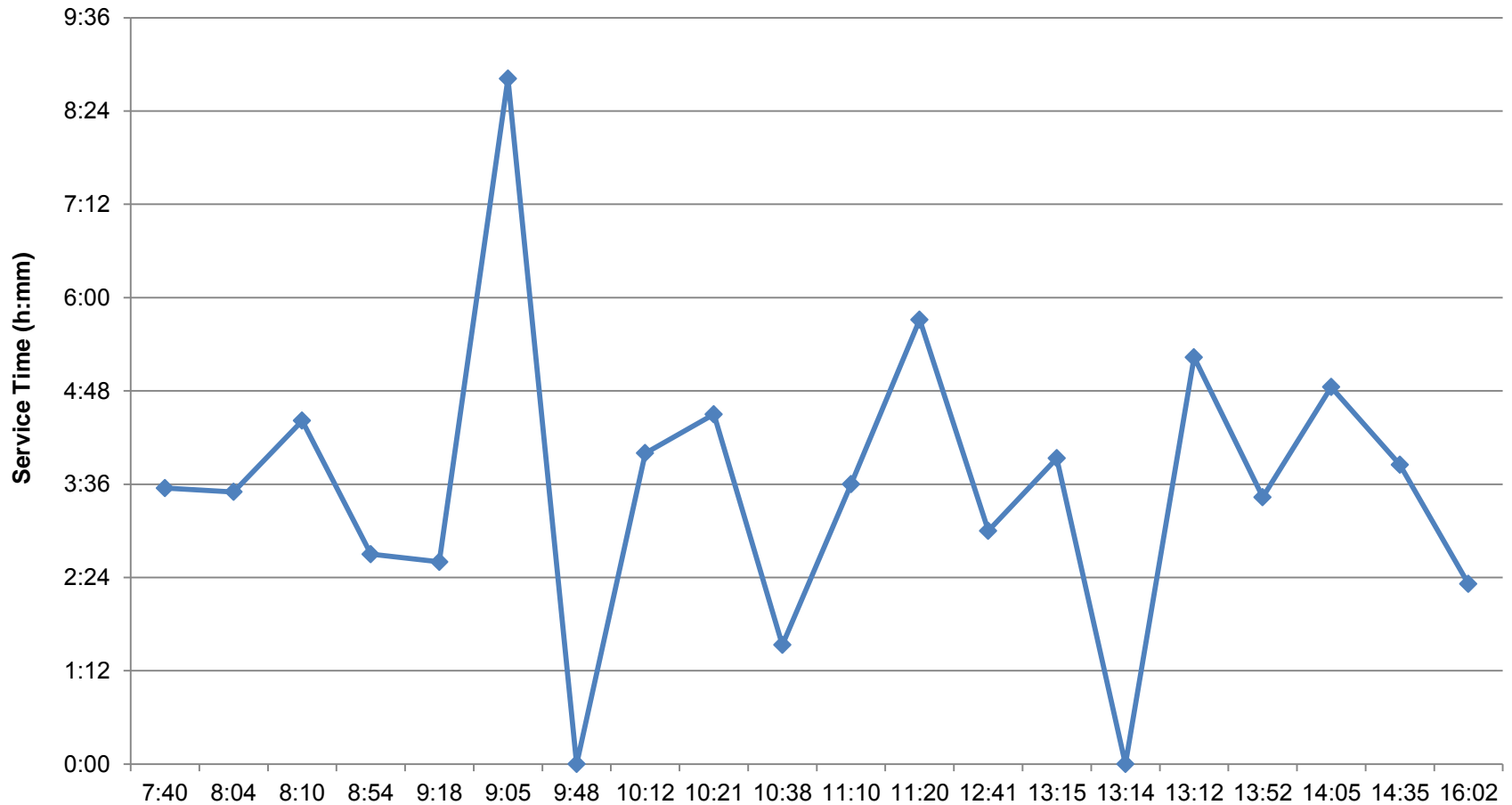
# Appointment-based Patient Arrival vs. Appointment Time Variability



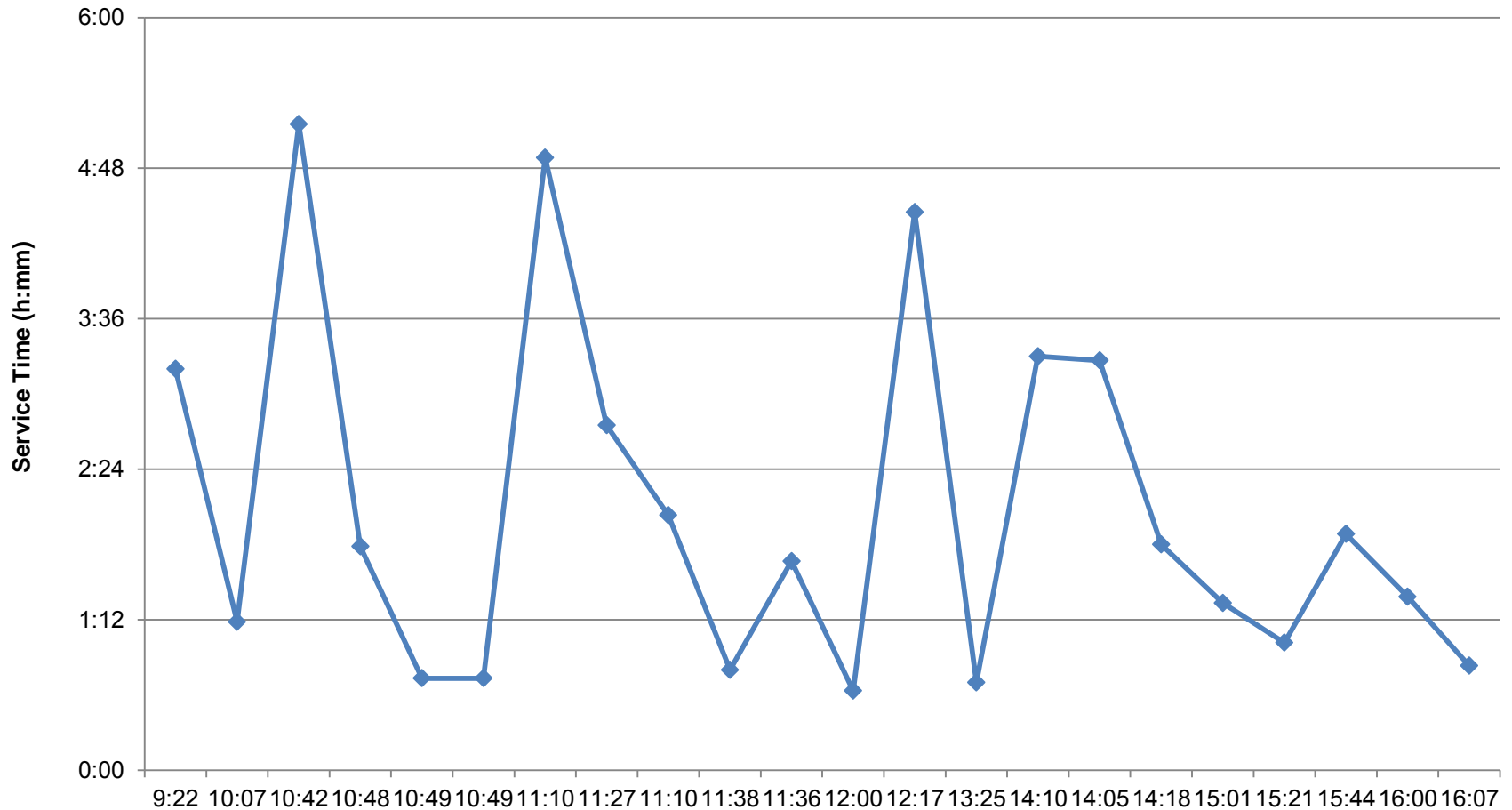
# Appointment-based Patient Service Time Variability for On-Time (Clinic 1)



# Appointment-based Patient Service Time Variability for On-Time (Clinic 2)

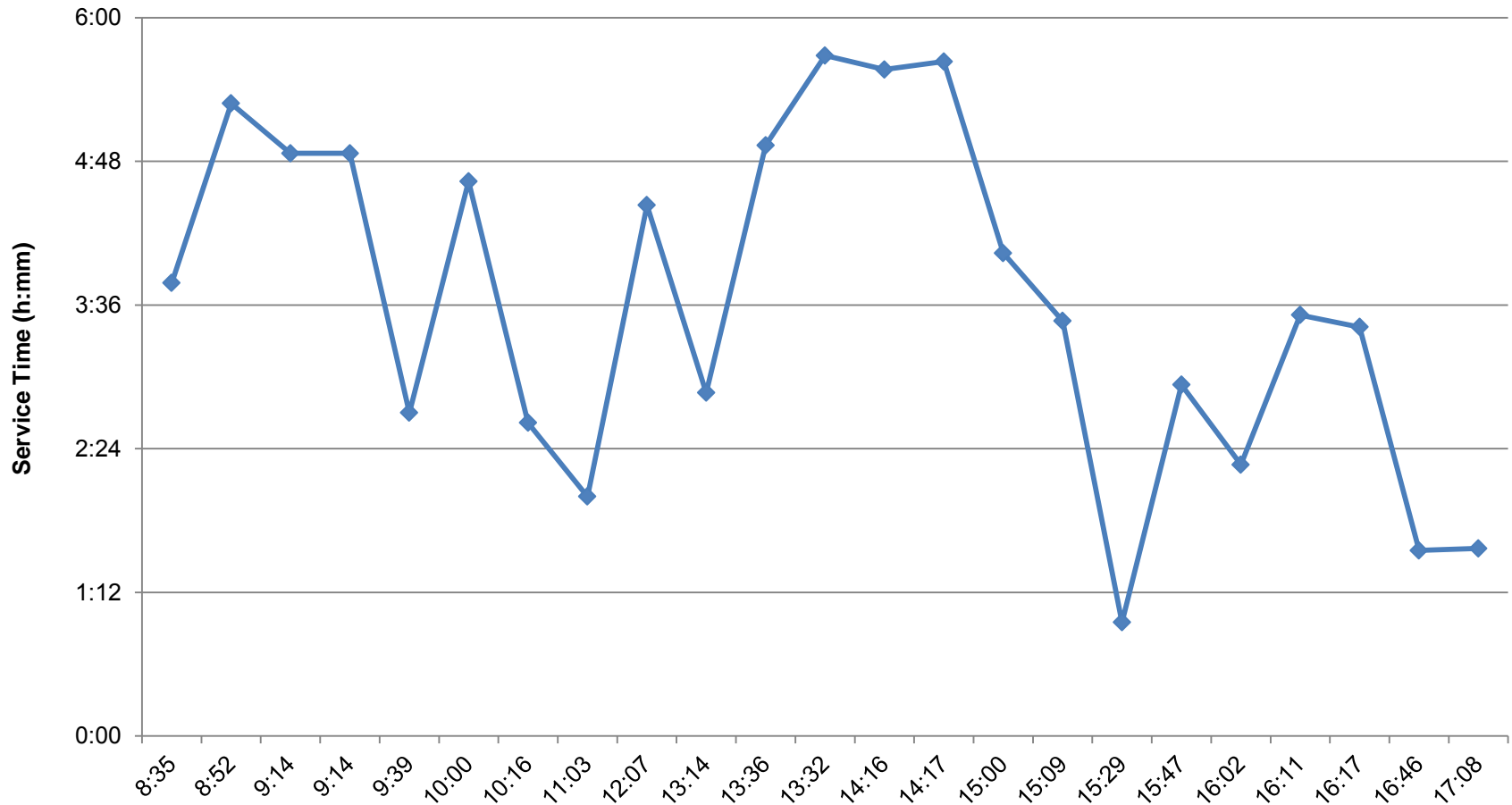


# Appointment-based Patient Service Time Variability for On-Time (Clinic 3)





# Appointment-based Patient Service Time Variability for On-Time (Clinic 4)



# Team Profiles

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**Ali Kamil** is a System Design & Management Fellow at MIT Sloan and MIT School of Engineering. Prior to MIT, he spent 6 years in corporate strategy consulting advising leading entertainment, media, and telecom clients.

His research and interests are focused on developing low-cost ICT based innovations for base of pyramid populations in developing and emerging economies. Originally from Pakistan, Ali intends to pursue a career in international development and social entrepreneurship post MIT

**Dmitriy Lyan** is a second year SDM student at MIT, where he is specializing in development of performance management systems for shared value focused organizations. In his thesis work he is using system dynamics methodology to explore

performance dynamics in US military behavioral health clinics. Prior to MIT Dmitriy spent 5 years working in investment banking and asset management as well as 2 years in software development industries. He holds an M.S. in Financial Engineering and a B.S. in Computer Engineering. He plans to apply his talents in impact investing and social entrepreneurship.

**MIT Student** is an MSc in Management Studies student at MIT Sloan. Prior to MIT, she spent 5 years in the financial service industry, marketing multi-asset investment solutions to institutional clients. After graduation, MIT Student hopes to employ management skills to disseminate innovative and affordable interventions designed to empower marginalized individuals in sub-Saharan Africa.

**Nicole Yap** is an MSc in Management Studies student at MIT Sloan. She has two years of consulting experience, advising large private and public sector clients on their Customer Relationship Management (CRM) strategies.

Her research focuses on the development of market-based policies and approaches that organizations can apply to sustainably reach developing markets. Nicole plans to apply her management consulting background to the development of sustainable global health strategy upon graduation in 2013.



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Spring 2013

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