

This presenter has  
nothing to disclose

# Evidence-based Staffing and Scheduling

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*Chief Medical Officer*

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# Outline

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- Academic Principles
- Case Study – 75,000-visit ED
- Approach to Staffing Optimization
  - Define Demand
  - Define Capacity
  - Contextualize
- Conclusions

# Outline

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- **Academic Principles**
- Case Study – 75,000-visit ED
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# Queuing Theory - Agner Krarup Erlang

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Copenhagen Telephone Company (KTAS), 1908

"Solution of some Problems in the Theory of Probabilities of Significance in Automatic Telephone Exchanges," 1917

# A Simple Queue

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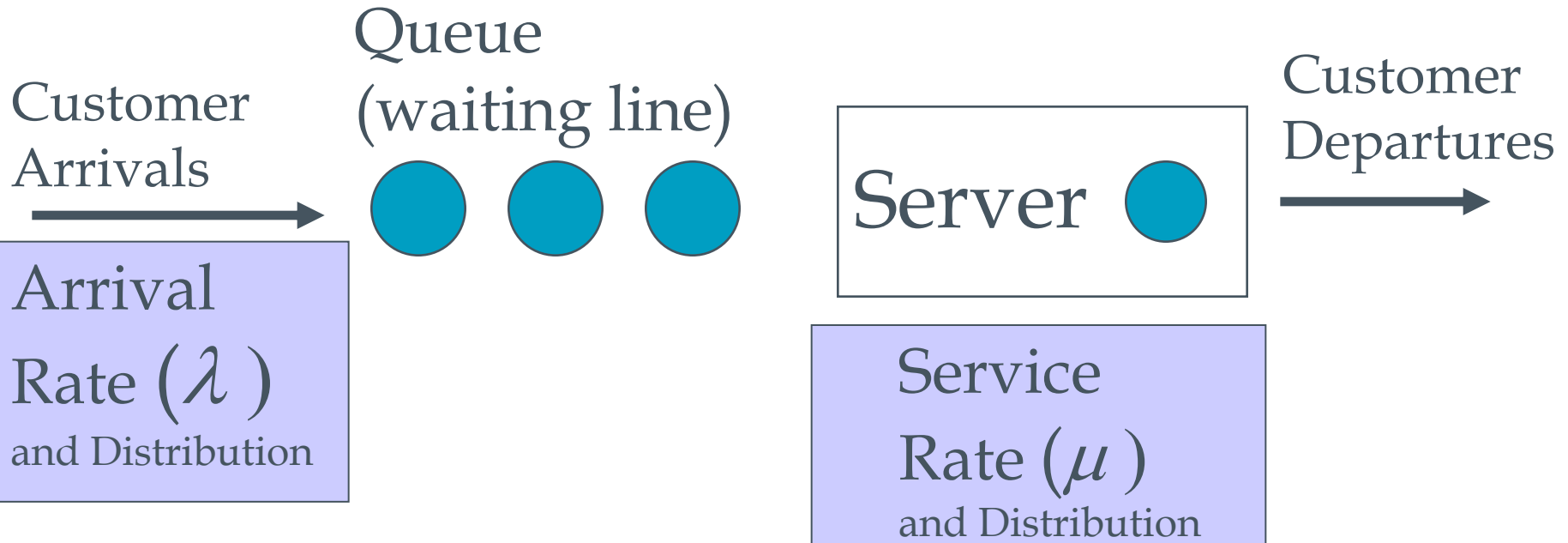
# A Simple Queue

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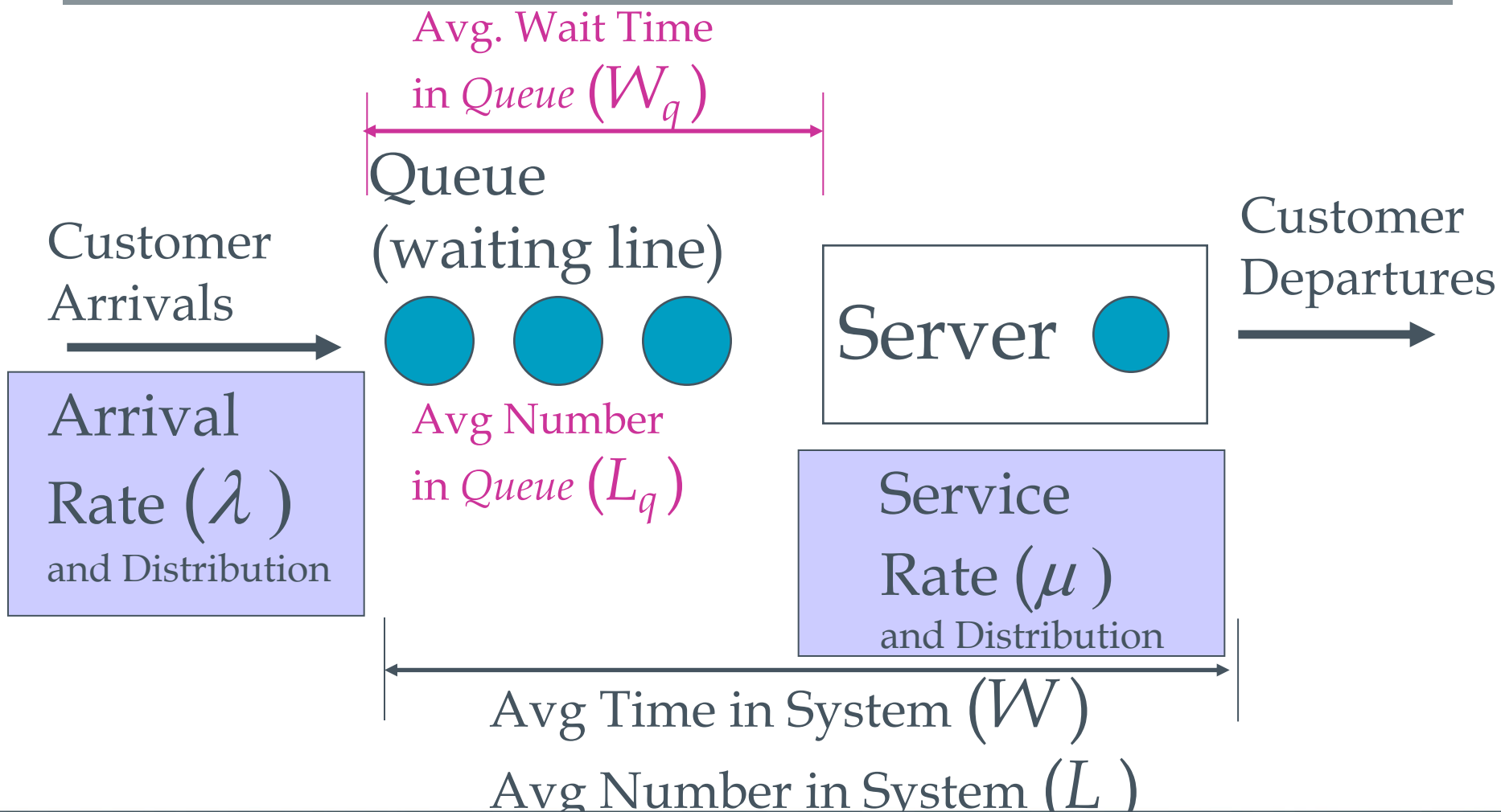


# A Simple Queue

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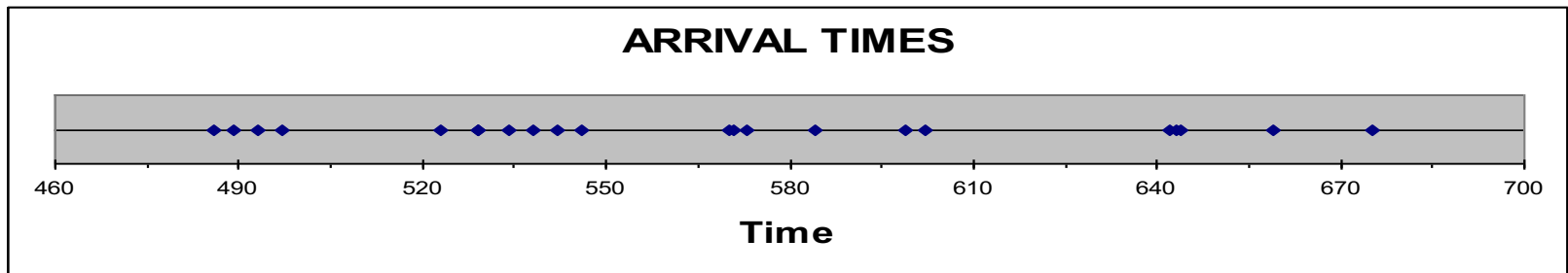
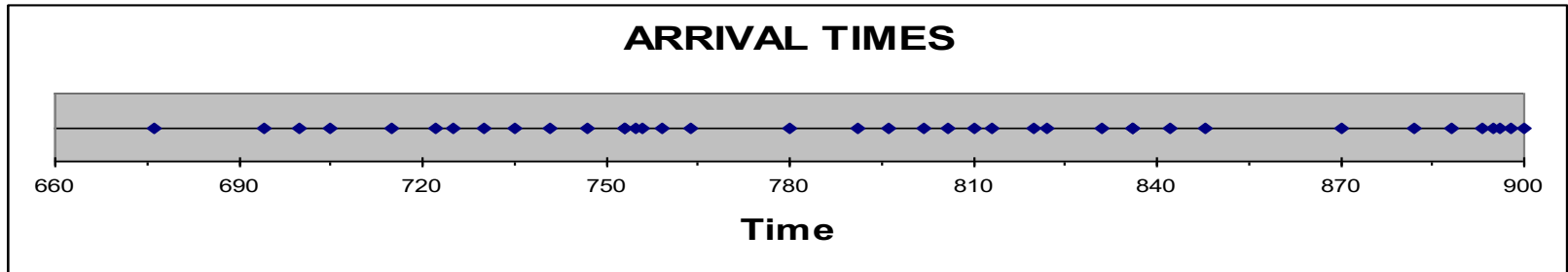


# A Simple Queue





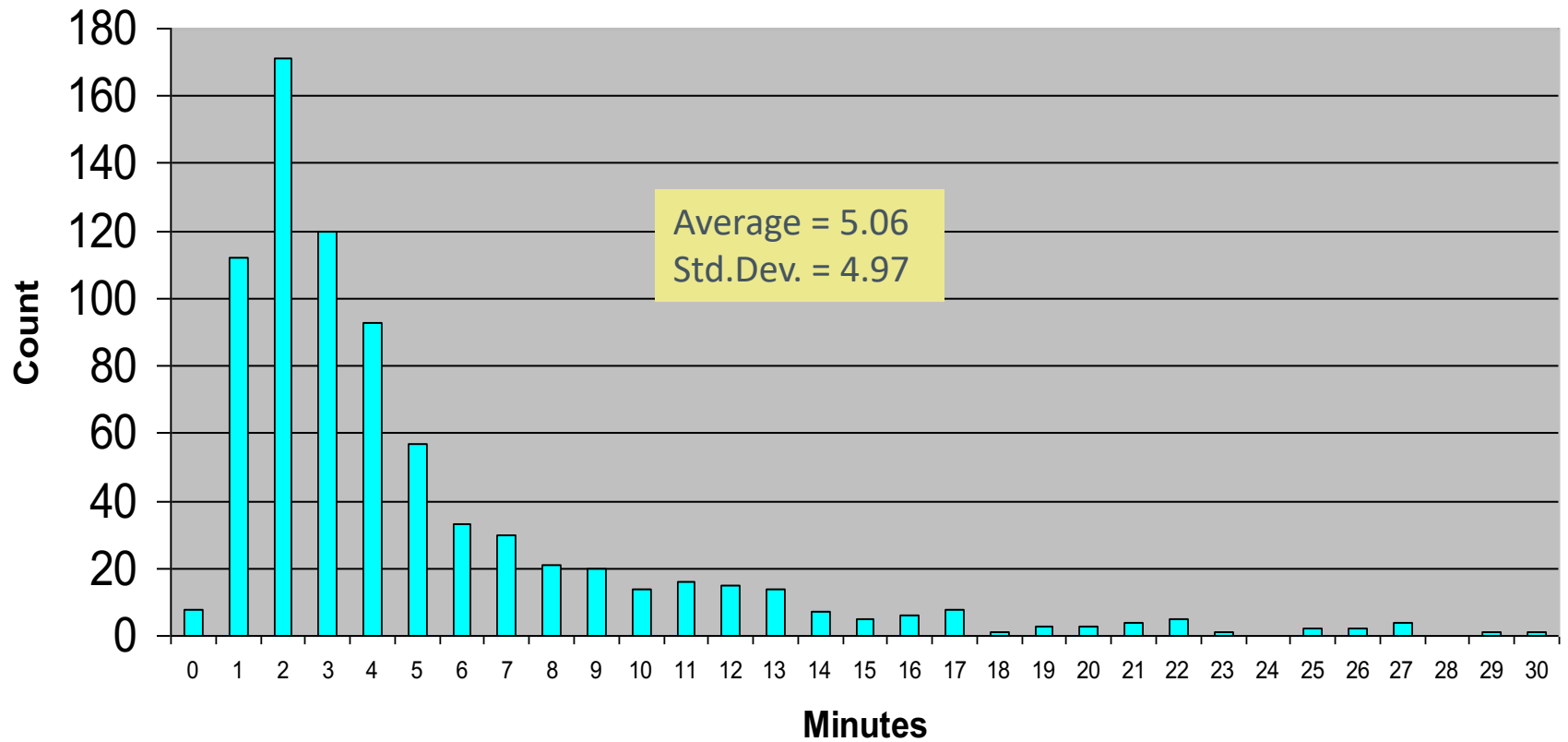
# Demand on Key Servers - Arrivals



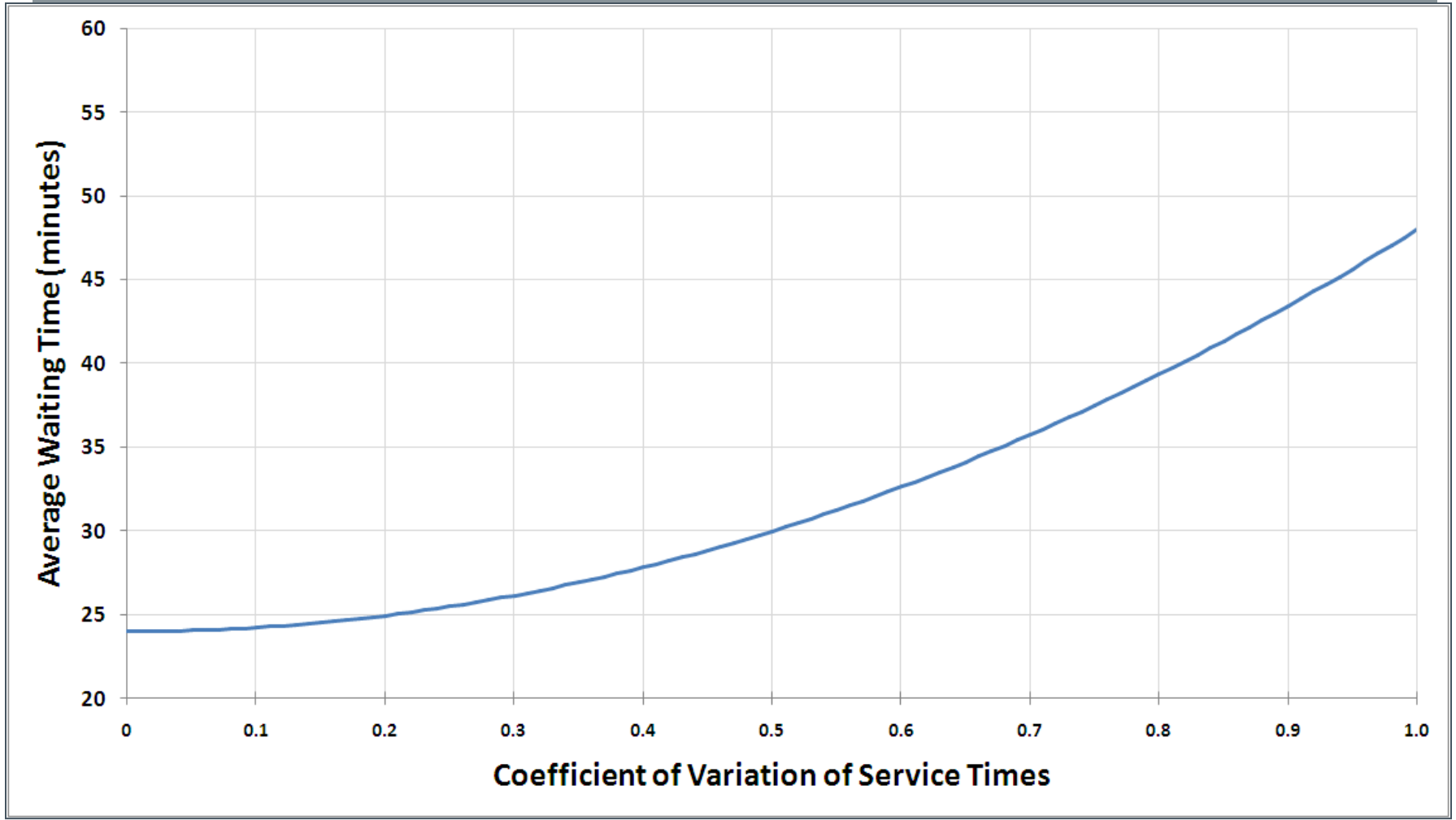
Arrival data from a California hospital. Mondays, 2pm-6pm.

# Demand on Key Servers - Service

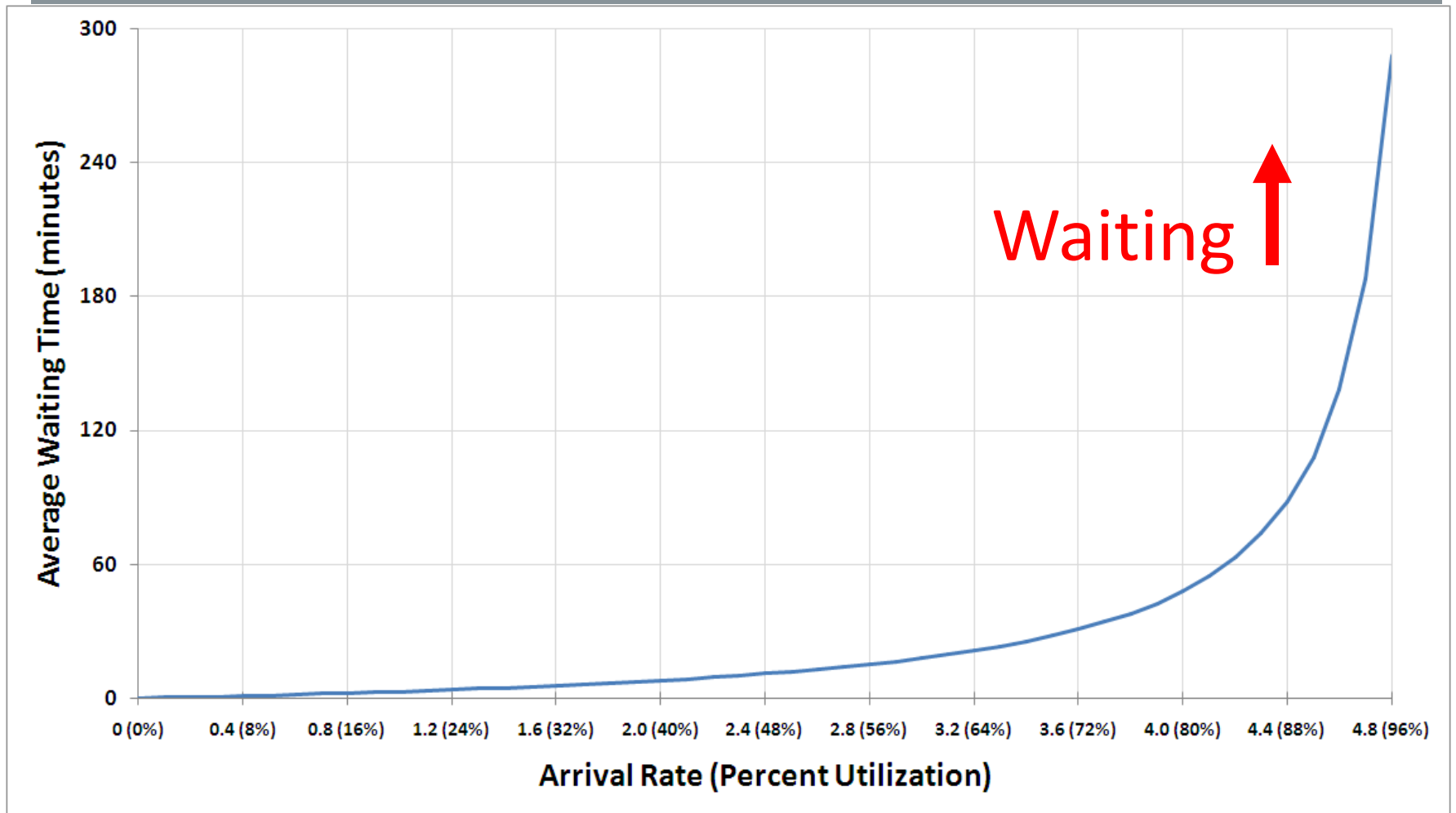
Distribution of Observed Triage Times (n=777)



# As Server Variation Increases...



# As Utilization Increases...



# Theory of Constraints – FT Example

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**Physician**

3pts/hr



**Nurse**

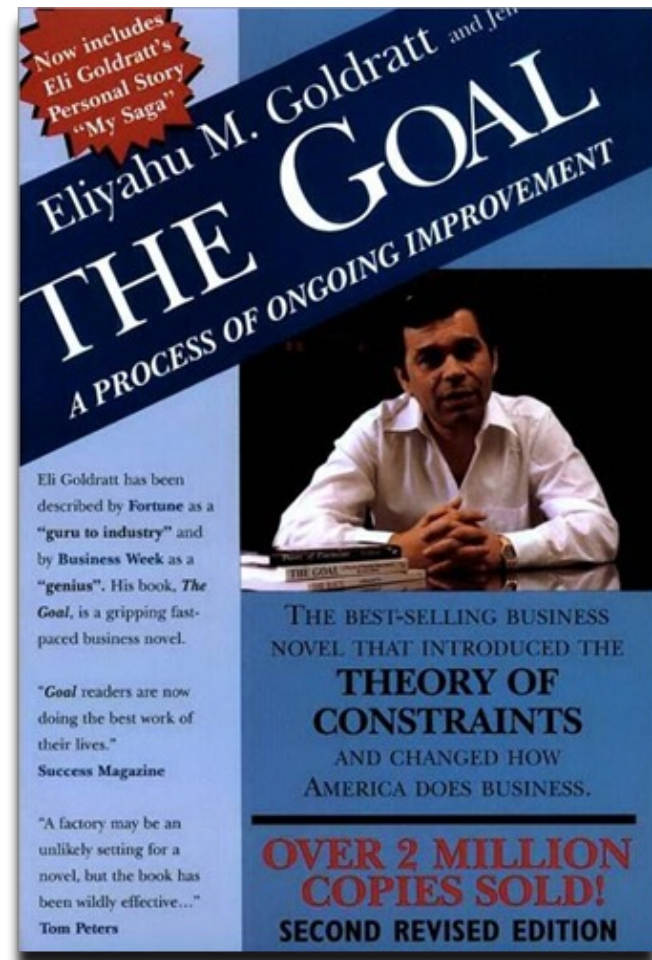
30 min/pt

=

- 1) How many patients can my clinic see per hour?
- 2) How can you improve this system?
- 3) if you can't add resources....

# TOC: The Theory of Constraints

- **Bottleneck**- A resource that has the capacity equal to or less than the demand placed upon it
- **Non-bottleneck**- A resource that has a capacity that is greater than the demand placed upon it



# Outline

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# Case Study: 75,000-visit Peds ED





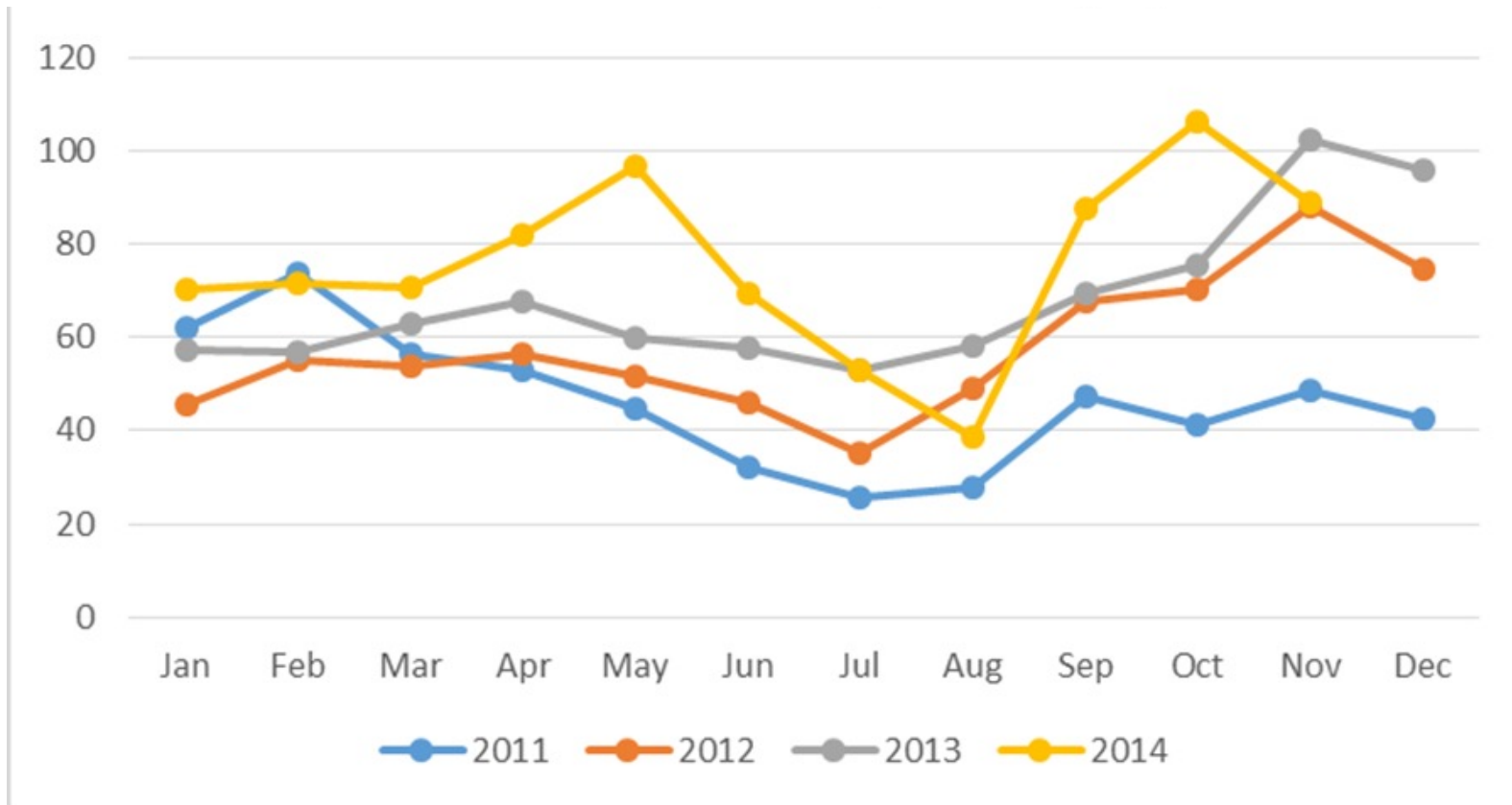
# You're called into the CEO's Office!

---

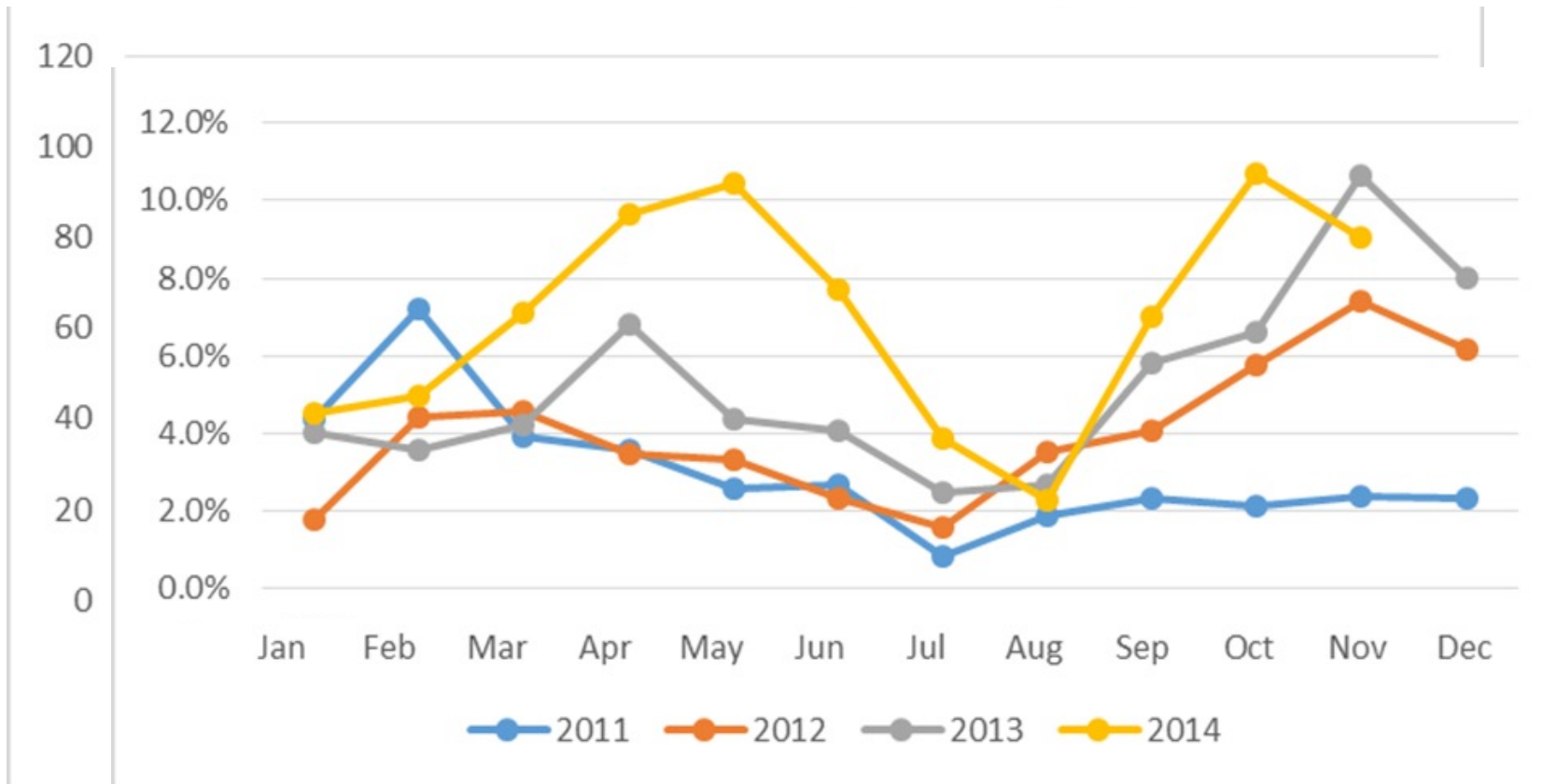
Our ED  
really  
stinks!



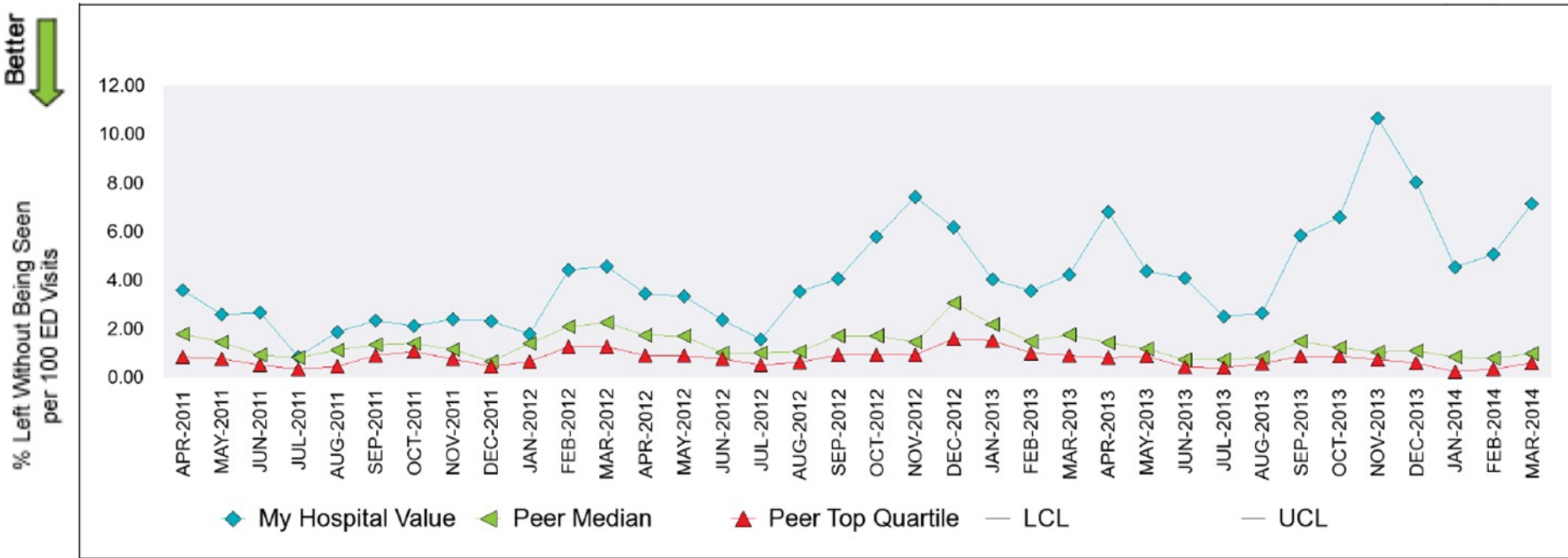
# Peds ED Door to Doc by Month



# Peds ED LWOBs by Month



# Peds ED LWOBs vs. Peers



# You're called into the CEO's Office!

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Our ED  
really  
stinks!

YOU better  
fix this  
NOW!



# What are you going to do?

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# What Information Do You Need?

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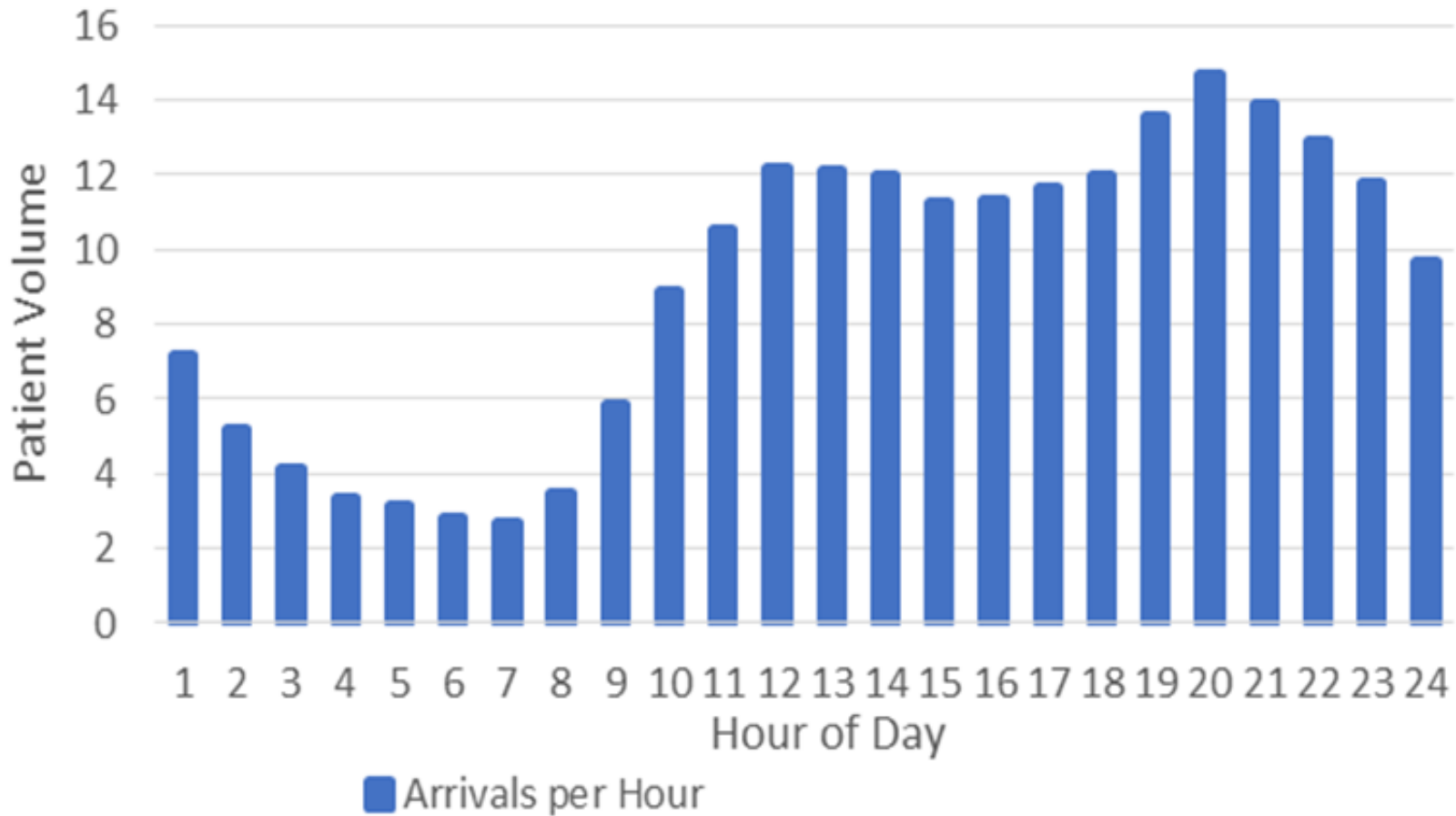
# PEDs ED Acuity Mix by ESI Level

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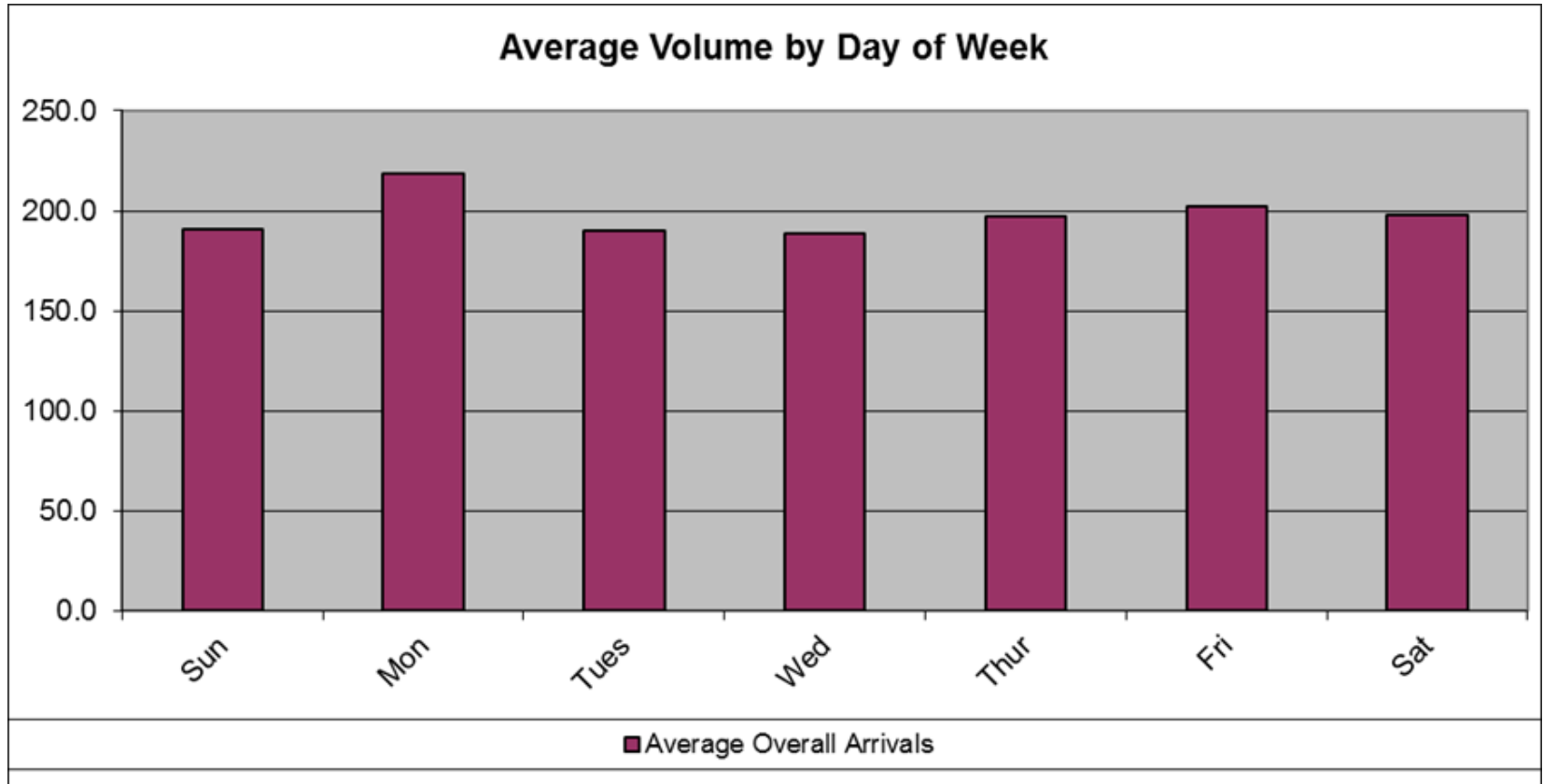
## ESI Distribution

ESI Level 1	1.64%
ESI Level 2	20.00%
ESI Level 3	36.37%
ESI Level 4	30.20%
ESI Level 5	11.80%

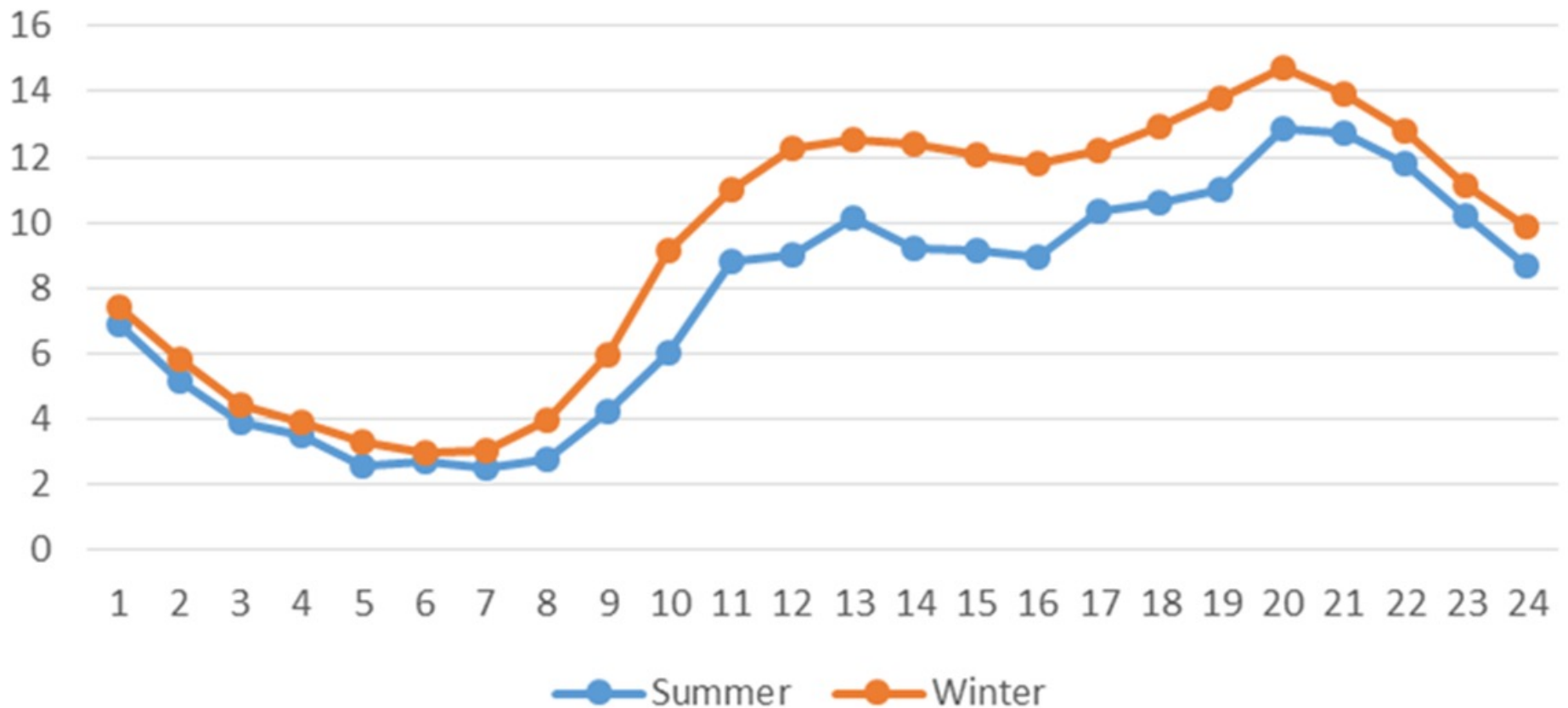
# Peds ED Hourly Arrivals



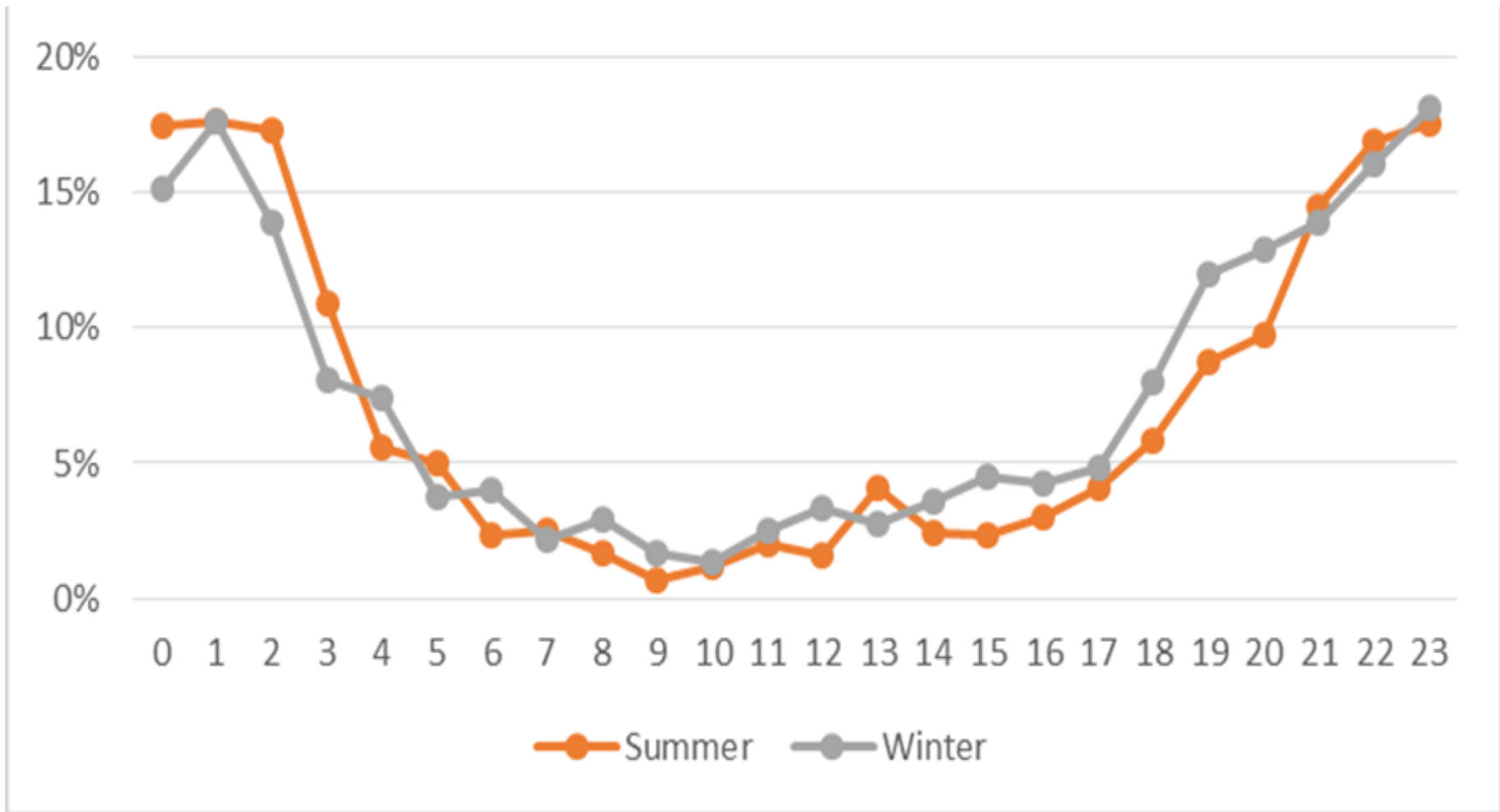
# Peds ED Day of Week Arrivals



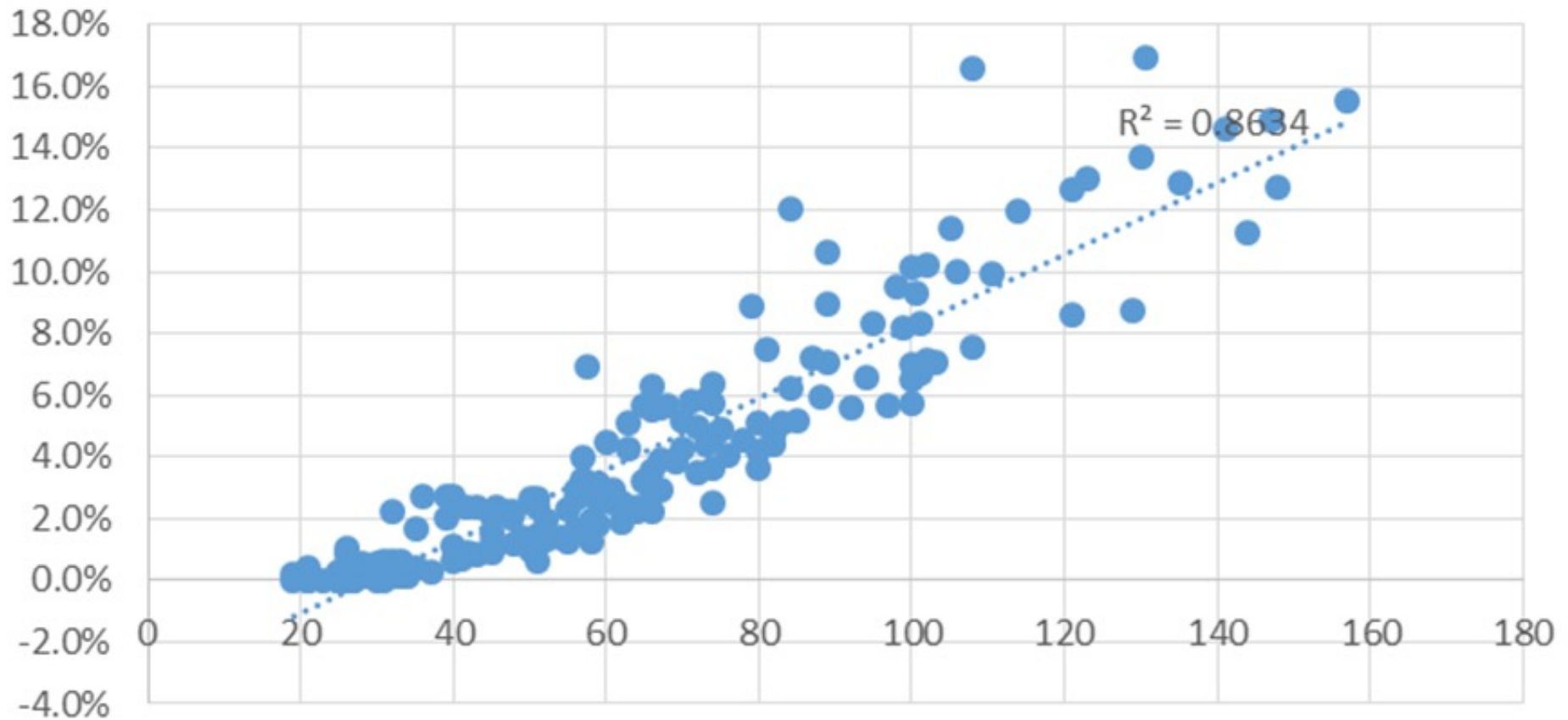
# Peds ED Seasonal Hourly Arrivals



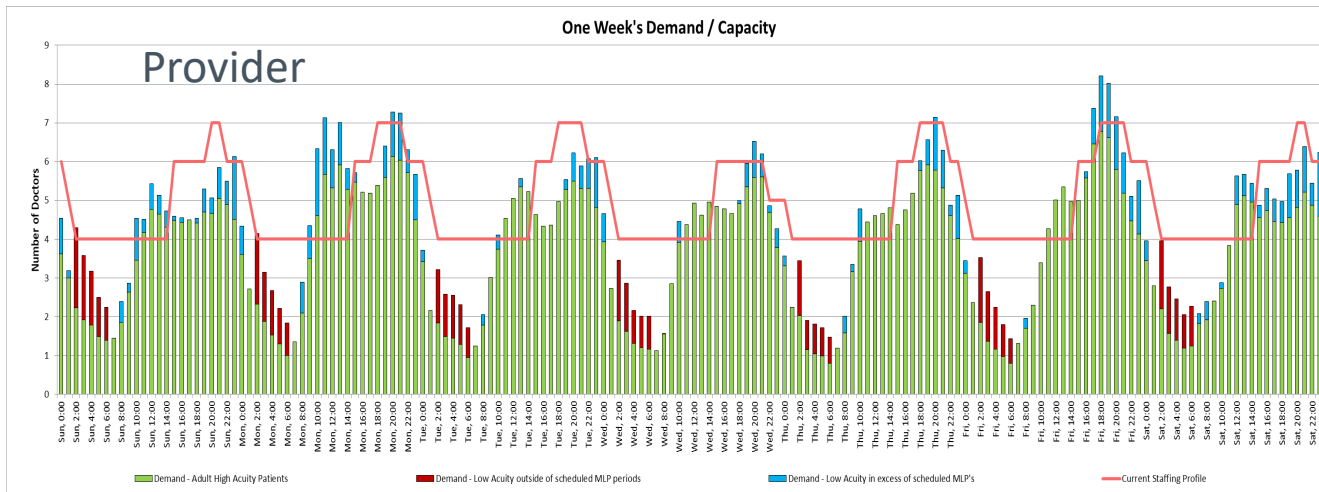
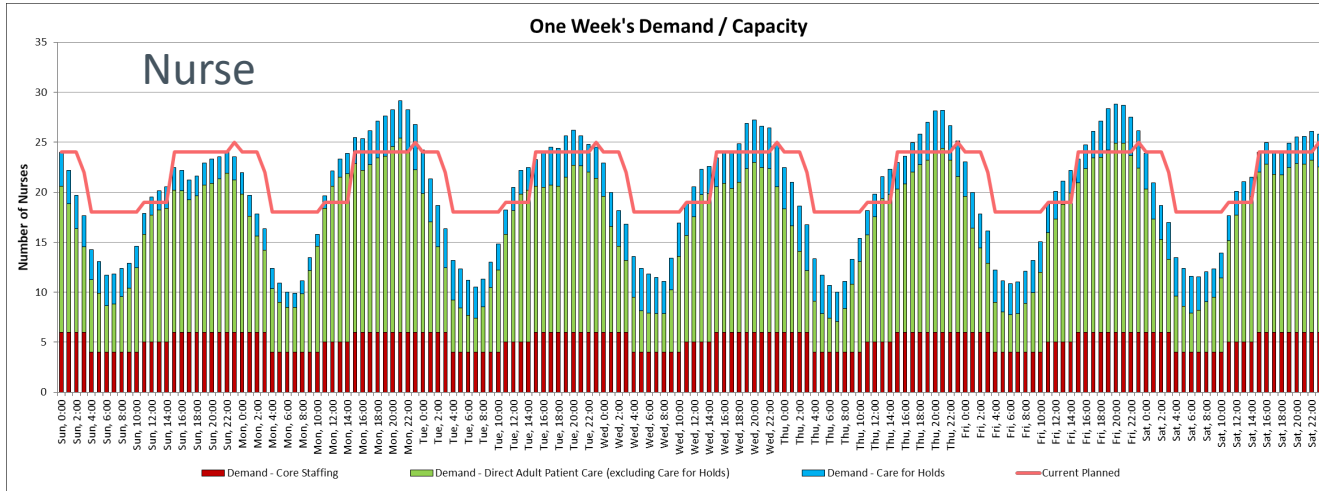
# Peds ED Hourly LWOBS



# Peds ED LWOBs vs Door to Doc



# Nurse vs. Provider Staffing



# Breakout Session – 7 min

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How do you turn this around?

Provide a 5-point, bulleted summary of the following:

1. Problems identified (top 3)
2. Proposed solutions (top 3)
3. Information needed (top 3)

Designate one person to present







# What are the most significant problems in this emergency department?

Top

| 0 | test'

# Outline

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- Academic Principles
- Case Study – 75,000-visit ED
- **Approach to Staffing Optimization**
  - Define Demand
  - Define Capacity
  - Contextualize
- Conclusions

# Basic Approach to Staffing

---

1. Define the arrival *Demand*
2. Define and align the server *Capacity* (physician, nurse, APC, resident, bed productivity)
3. Execute in the *Context* of your current operational environment

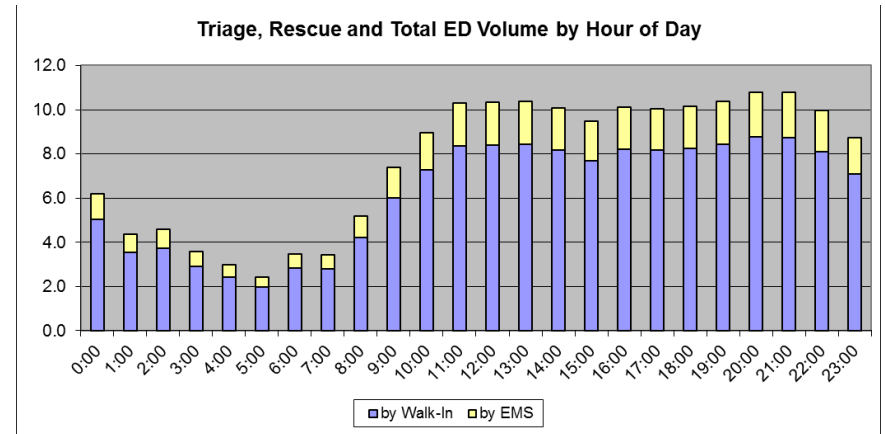
# Basic Approach to Staffing

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1. Define the arrival *Demand*
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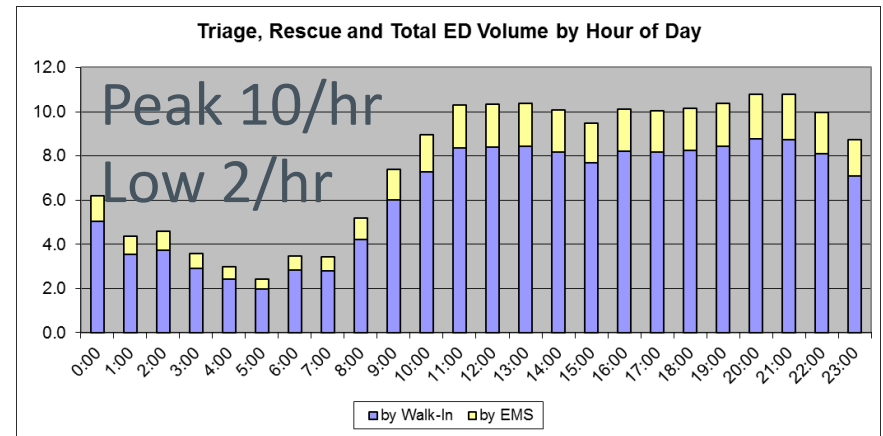
# 1. Define the Arrival Demand

- Arrival demand defines the demand for healthcare delivery
- Is the primary driver for physician, APC, and resident staffing



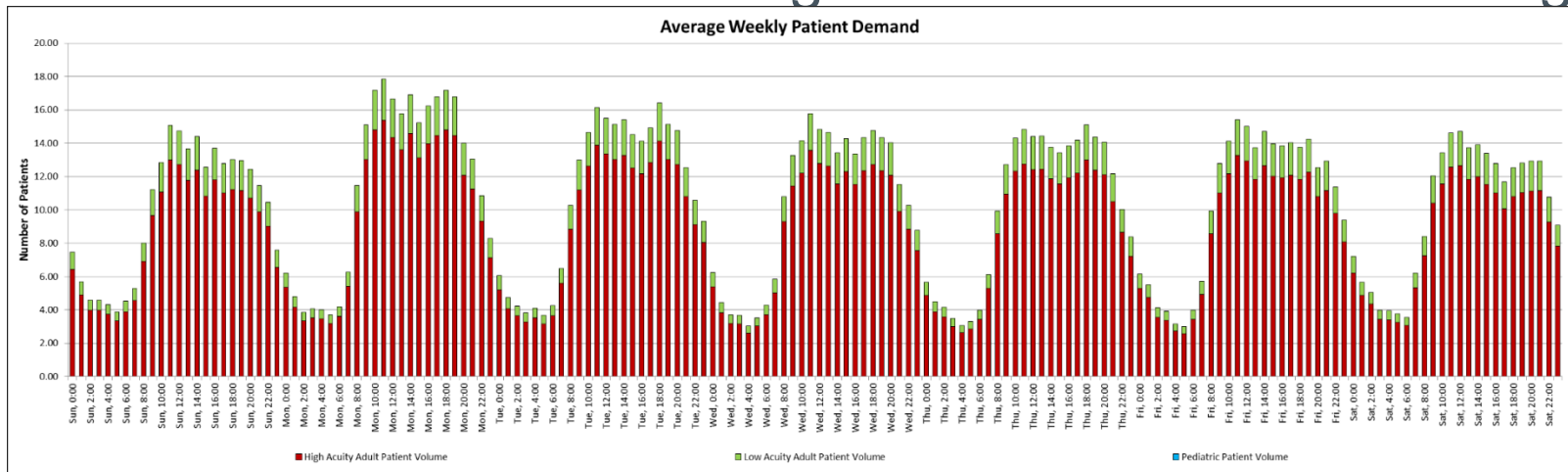
# 1. Demand – Hour of Day Variation

- Peak usually starts between 8a and 11am
- Usually ends between 9pm and 11pm
- Typically between 4:1 and 6:1 peak vs overnight arrivals
- Pediatrics and low acuity – higher evenings



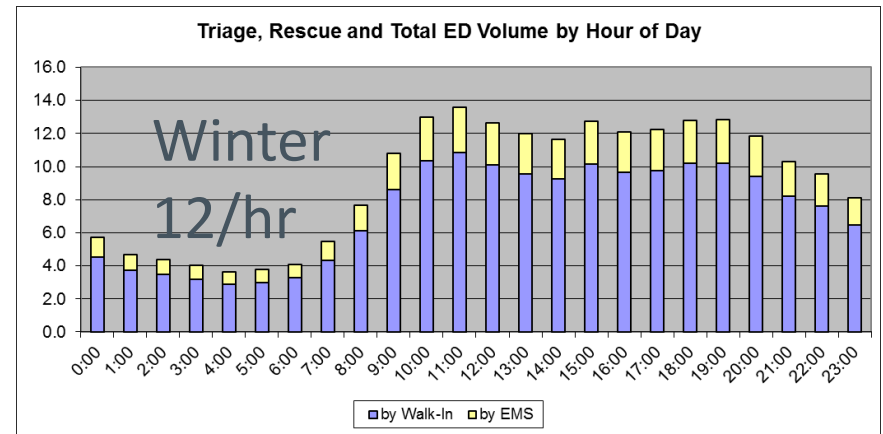
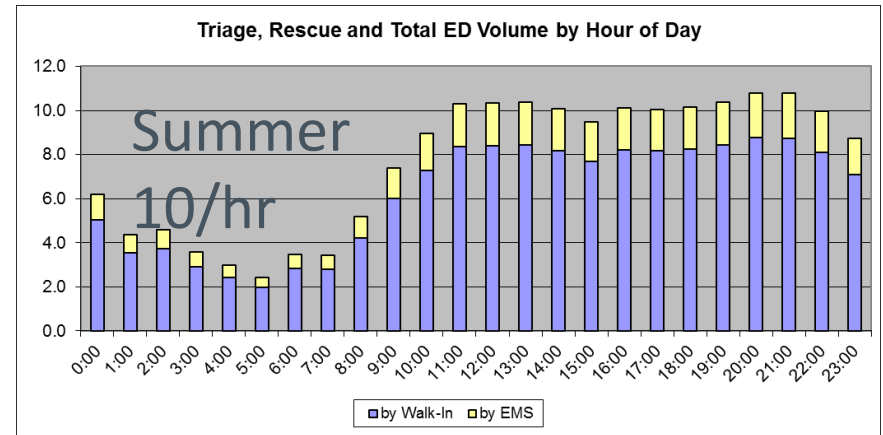
# 1. Demand – Hour of Week Variation

- Volume varies significantly by day of week in most institutions
- Weekend volume is usually lower than weekday volume
- Mondays are usually the busiest and also have the highest acuity
- Pediatrics will have much higher weekends and evenings



# 1. Demand - Seasonal Variation

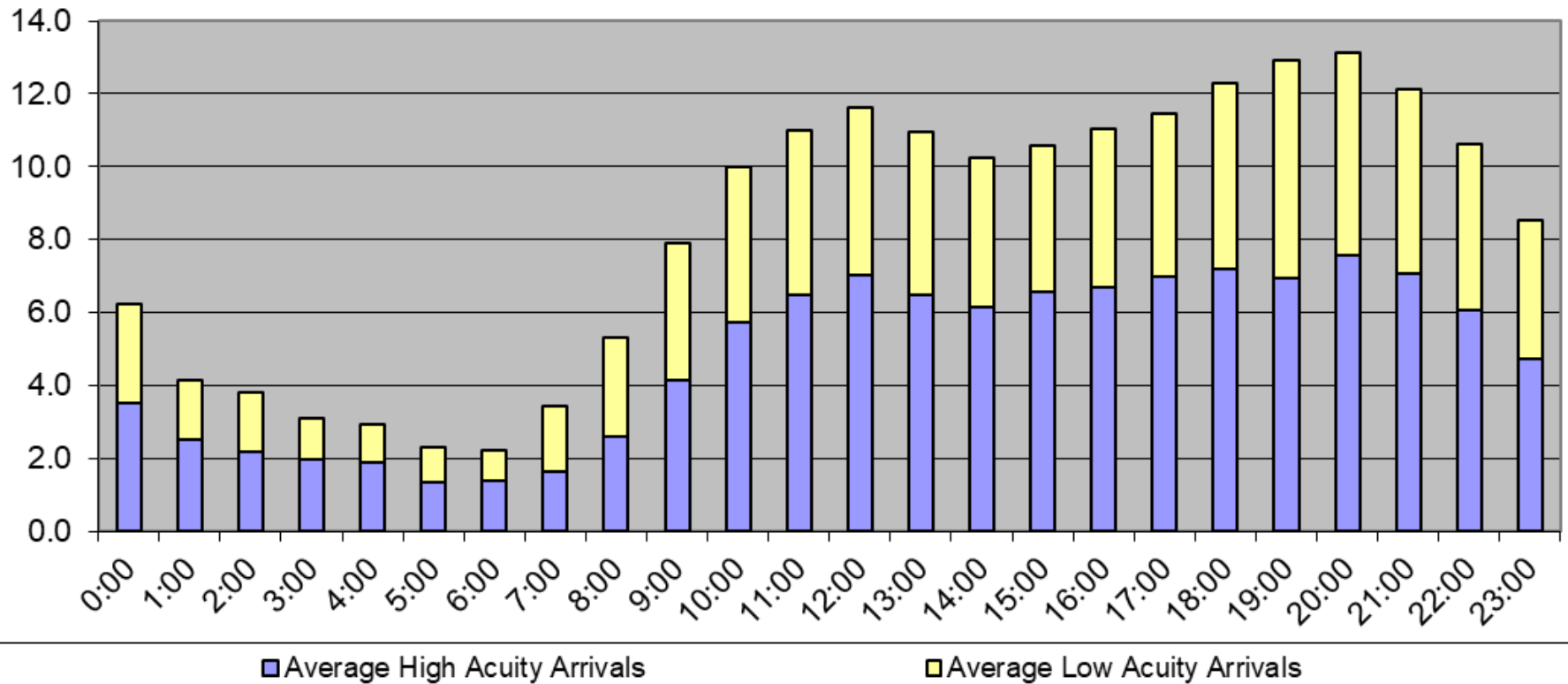
- Seasonal Variation can be problematic if not considered
- Ultimately affects the size of your ED and the operational approach
- Peds follows this profile
- Need specific strategies to staff appropriately – part time staffing, preferential vacations, snowbird scheduling





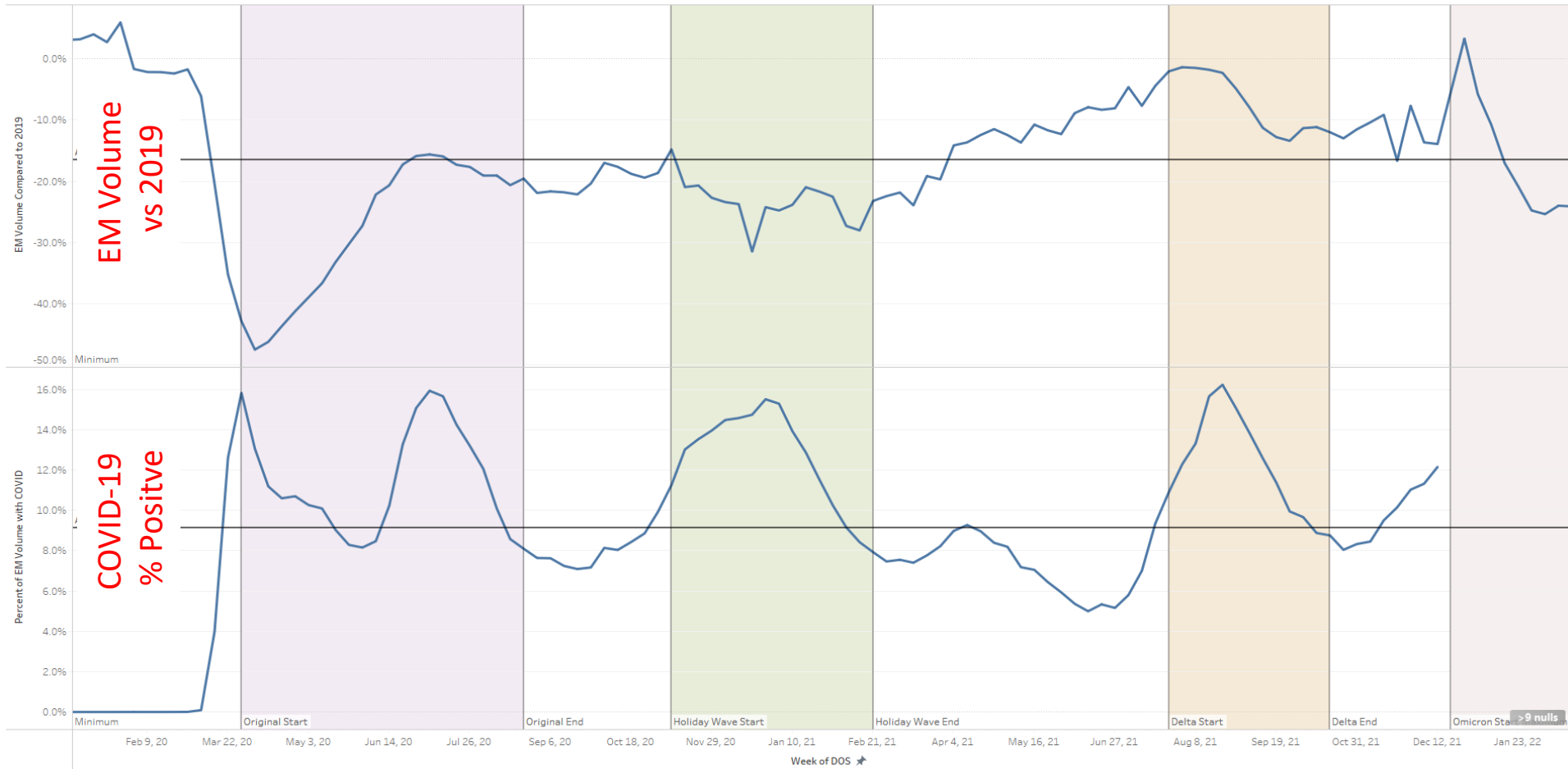
# 1. Demand - Acuity

High and Low Acuity Volume by Hour of Day



# 1. Demand – Special Demand COVID-19

Emergency Medicine  
2021 Volume Compared to 2019  
Association with Emergency Medicine COVID volume



The 2020 holiday wave aligns most closely with the current volume experience; both in timing around the holiday season and the depth of the volume suppression. This has led to its use as the historical modelling point for the analysis.

# Basic Approach to Staffing

---

1. Define the arrival Demand
2. Define and align the server Capacity (physician, nurse, APC, resident, bed productivity)
3. Execute in the Context of your current operational environment

## 2. Define Server Capacity

---

1. Assess the volume over a week and divide by the total staffing hours

$$\frac{1400 \text{ pts/wk}}{700 \text{ doc hrs/wk}} = 2 \text{ pts/hr}$$



## 2. Capacity – Average Service Rate

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1. Assess the volume over a week and divide by the total staffing hours

$$\frac{1400 \text{ pts/wk}}{700 \text{ doc hrs/wk}} = 2 \text{ pts/hr}$$

2. Peak productivity will usually be higher as lower overnight volumes tend to drive the overall average down

$$\frac{1100 \text{ pts/wk}}{500 \text{ doc hrs/wk}} = 2.2 \text{ pts/hr}$$

# Benchmarks are Scarce

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## Nursing

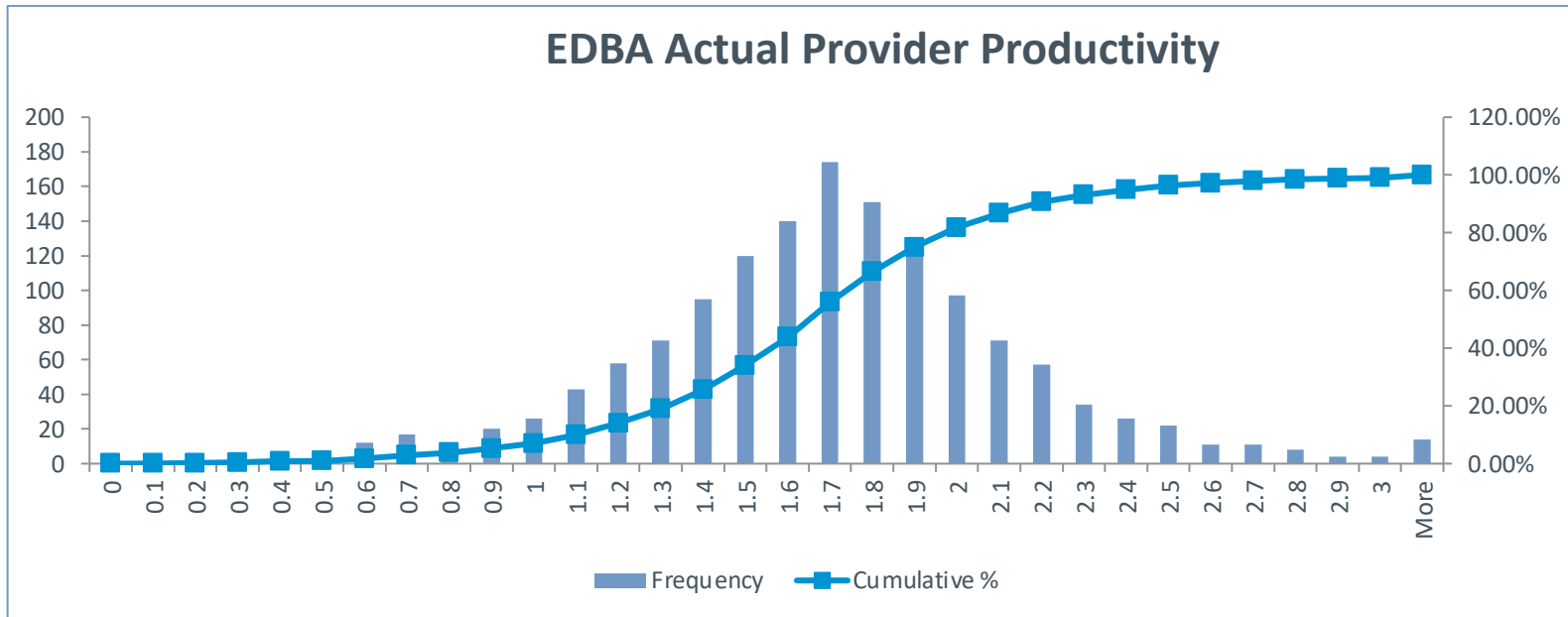
- No source for ideal productivity
- Most recommendations are from nurse advocate organizations
- Growing evidence that lower nurse staffing results in increased morbidity, mortality, and cost

## Physician

- No source for ideal productivity
- ACEP, SAEM, AAEM all have position statements
- Other studies are largely inaccurate, outdated

Recommended Benchmarking Sources: ACEP; Premier; EDDBA; VHA

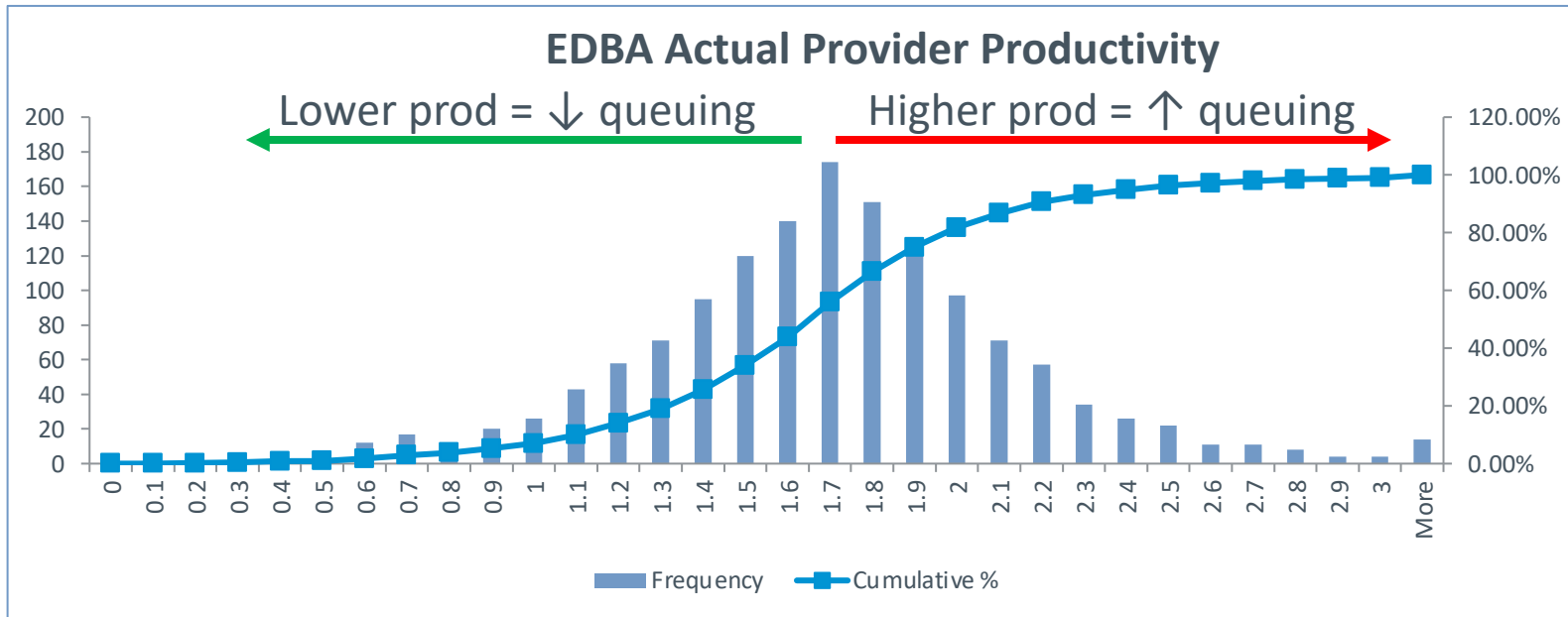
# EDBA Actual PPH



<i>EDBA Actual Provider PPH</i>	
Mean	1.67
Median	1.67
Mode	1.34
Standard Deviation	0.46
Range	3.84
Minimum	0.14
Maximum	3.98
Count	1377

Based on 2018 data

# EDBA Actual PPH



EDBA Actual Provider PPH	
Mean	1.67
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Range	3.84
Minimum	0.14
Maximum	3.98
Count	1377

Must take system flow into account!

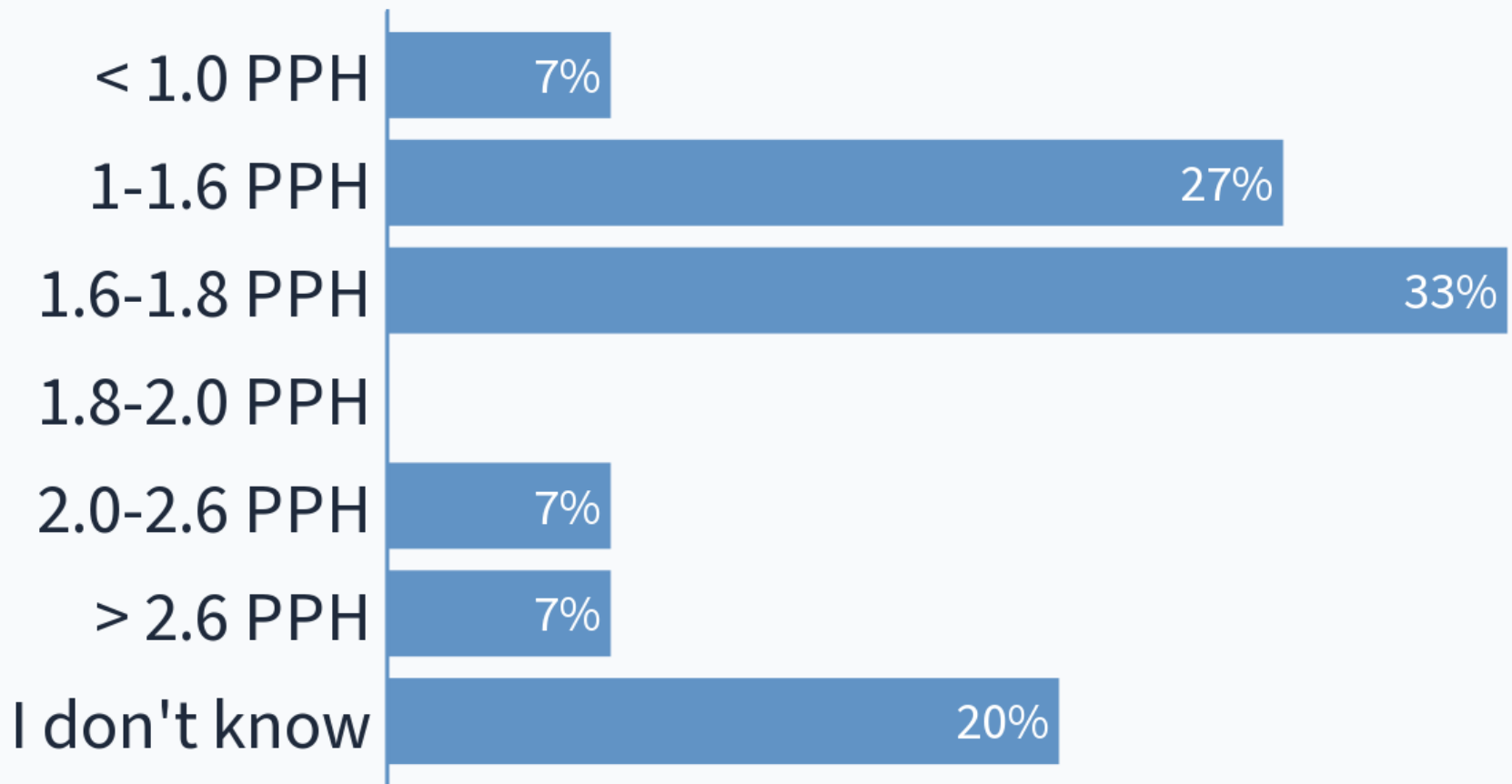
Based on 2018 data



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# What is Your Current Provider Productivity?



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# 4,000 Clicks

The screenshot displays the website for The American Journal of Emergency Medicine. The article title is "4000 Clicks: a productivity analysis of electronic medical records in a community hospital ED". The authors listed are Robert G. Hill Jr., MD, Lynn Marie Sears, MBA, and Scott W. Melanson, MD. The abstract text is highlighted with a red border and includes sections for Objective, Methods, Results, and Conclusion. The Results section states: "The mean percentage of time spent on data entry was 43% (95% confidence interval, 39%-47%). The mean percentage of time spent in direct contact with patients was 28%. The pooled weighted average time allocations were 44% on data entry, 28% in direct patient care, 12% reviewing test results and records, 13% in discussion with colleagues, and 3% on other activities. Tabulation was made of the number of mouse clicks necessary for several common emergency department charting functions and for selected patient encounters. Total mouse clicks approach 4000 during a busy 10-hour shift." The Conclusion states: "Emergency department physicians spend significantly more time entering data into electronic medical records than on any other activity, including direct patient care. Improved efficiency in data entry would allow emergency physicians to devote more time to patient care, thus increasing hospital revenue."

**Abstract**

**Objective**

We evaluate physician productivity using electronic medical records in a community hospital emergency department.

**Methods**

Physician time usage per hour was observed and tabulated in the categories of direct patient contact, data and order entry, interaction with colleagues, and review of test results and old records.

**Results**

The mean percentage of time spent on data entry was 43% (95% confidence interval, 39%-47%). The mean percentage of time spent in direct contact with patients was 28%. The pooled weighted average time allocations were 44% on data entry, 28% in direct patient care, 12% reviewing test results and records, 13% in discussion with colleagues, and 3% on other activities. Tabulation was made of the number of mouse clicks necessary for several common emergency department charting functions and for selected patient encounters. Total mouse clicks approach 4000 during a busy 10-hour shift.

**Conclusion**

Emergency department physicians spend significantly more time entering data into electronic medical records than on any other activity, including direct patient care. Improved efficiency in data entry would allow emergency physicians to devote more time to patient care, thus increasing hospital revenue.

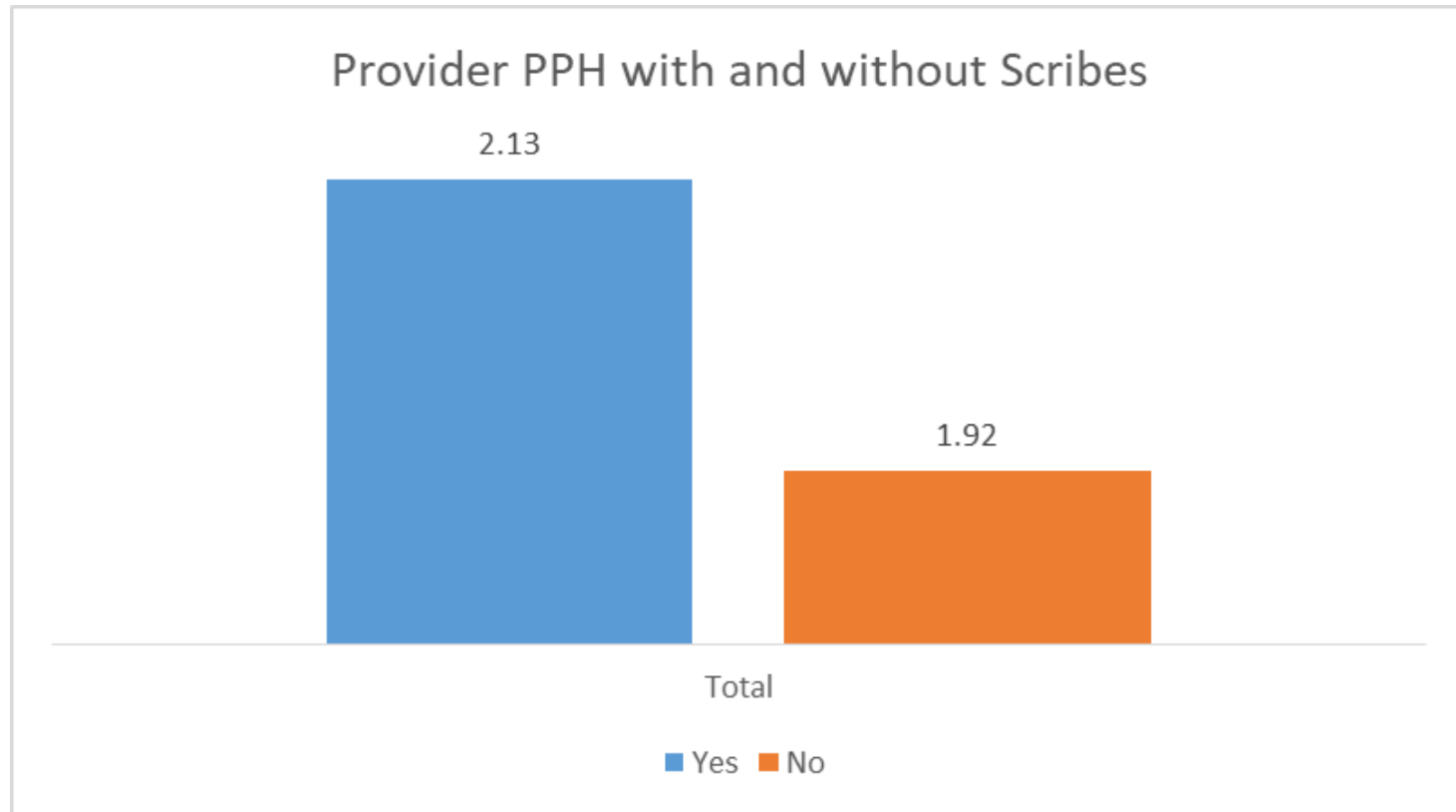
- 43% of time on data entry
- 28% on direct care
- 12% Results review
- 13% Communication
- 3% Other

# Scribes



# EDBA Impact of Scribes

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# Scribes vs Voice Dictation

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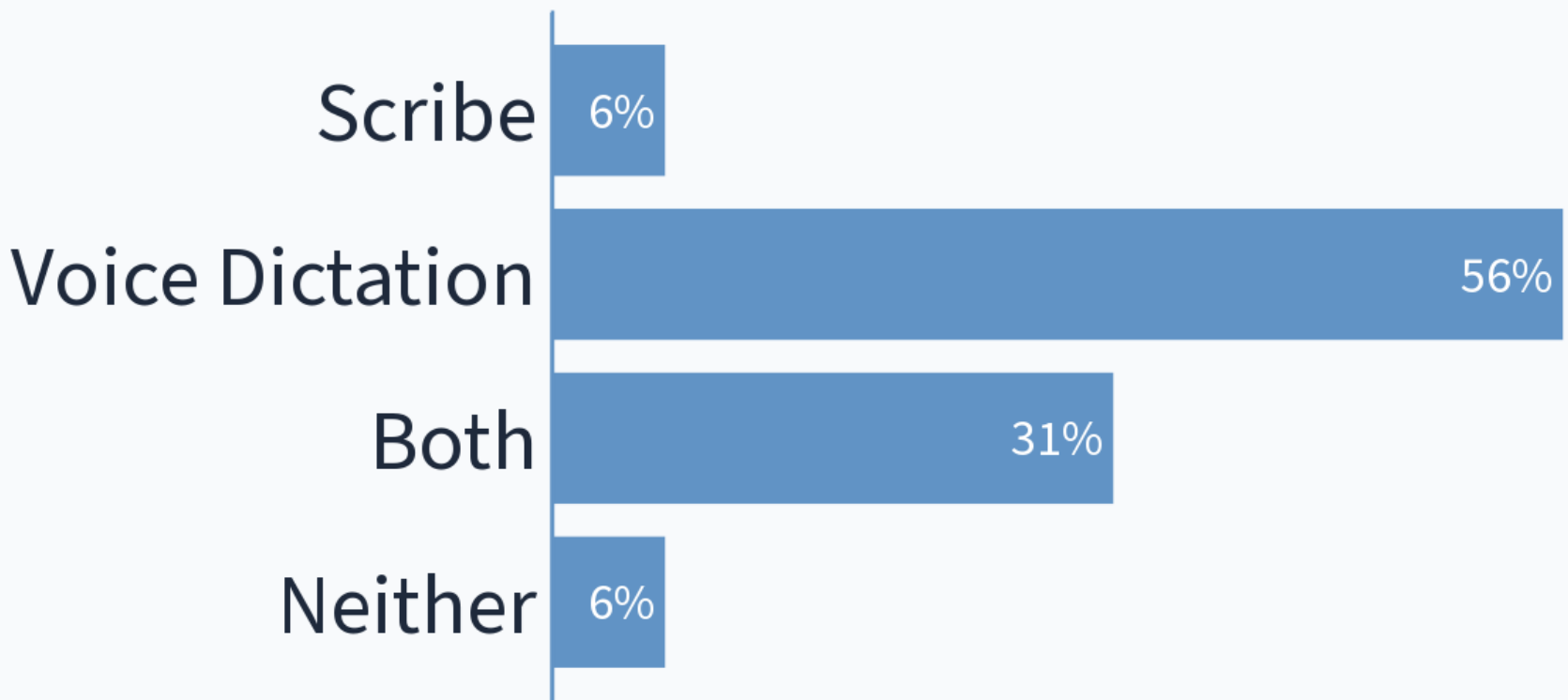


**Nuance Dragon Medical One**

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# Does Your ED Currently Use Scribes or Voice Dictation?



Start the presentation to see live content. For screen share software, share the entire screen. Get help at [pollev.com/app](https://pollev.com/app)

# Theory of Constraints – FT Example

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**Physician**

3pts/hr



**Nurse**

30 min/pt

=

- 1) How many patients can my clinic see per hour?
- 2) How can you improve this system?
- 3) if you can't add resources....

# 2. Nurse Capacity

The screenshot shows the ABC News website interface. At the top, there's a navigation bar with the ABC News logo and the tagline 'start here'. To the right, it displays the date 'Sunday, September 14, 2008' and links for 'Register' and 'Sign In'. Below this is a horizontal menu with categories like 'Home', 'World', 'U.S.', 'Investigative', 'Politics', 'Polls', 'Money', 'Health', 'Entertainment', and 'ESPN SportsCenter'. The 'Health' category is highlighted in a blue bar.

The main content area features a breadcrumb trail: 'Home > Health > Health'. The article title is 'Nursing Shortage: How It May Affect You' in a large blue font, followed by the subtitle 'Family Awarded \$2.7 Million over Alleged Nursing Neglect at Kansas Hospital'. The author is 'By LAURA MARQUEZ' and the date is 'Jan. 21, 2006'. To the right of the author information is a 'WORLD NEWS with Charles Gibson' logo and a link for '12 comments'.

The article text begins with: 'Shirley Keck, a 61-year-old mother of five, was having trouble breathing one Sunday afternoon, so her daughter, Becky Hartman, rushed her to the emergency room at Wesley Hospital in Wichita, Kan. Doctors there thought Keck had pneumonia and admitted her. But for the next seven hours, Hartman sat by her mother's bedside watching her condition deteriorate, and seeing her struggle for each breath. She said she repeatedly tried to get help from the nurses. "I begged for help," she said. "We had plenty of time to get help, and we got none." Keck did not have pneumonia. She was actually having a heart attack that was causing liquid

On the right side of the article, there is a 'FONT SIZE' control with three 'A' icons, and a list of sharing options: 'EMAIL', 'PRINT', 'SHARE', and 'RSS'. Below these is a vertical 'ADVERTISEMENT' banner.



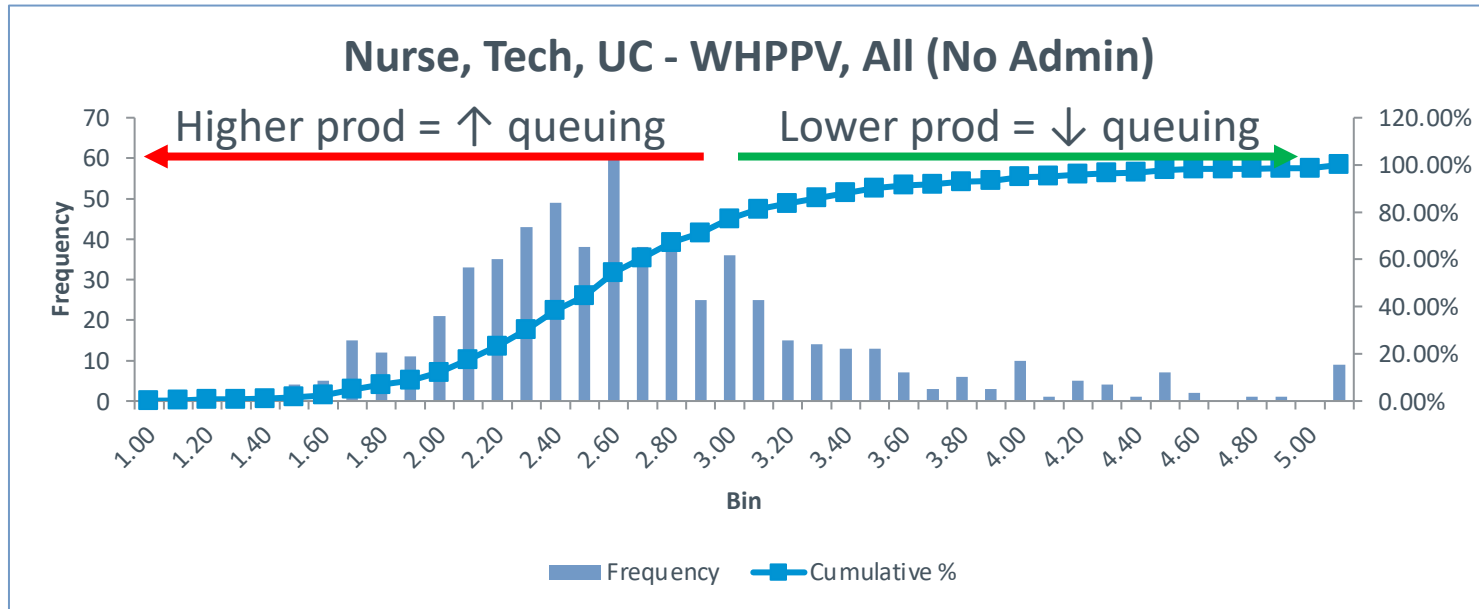
# Worked Hours per Patient Visit (whppv)

- Nursing worked hours per patient visit:
- WHPPV is just the inverse of the calculation we use for provider pts/hr

$$\begin{array}{c} \text{Pts/hr} \\ \frac{1400 \text{ pts/wk}}{700 \text{ doc hrs/wk}} = 2 \text{ pts/hr} \end{array} \quad \begin{array}{c} \text{inverse} \\ \text{Whppv} \end{array} \quad \begin{array}{c} \frac{1000 \text{ RN hrs/wk}}{600 \text{ pts/wk}} = 1.67 \text{ whppv} \end{array}$$

- Total worked hours per patient visit is calculated similarly, but includes all other staff as well as nurse admin FTEs.

# EDBA WHPPV – All Sites



<i>WHPPV, All (No Admin)</i>	
Mean	2.68
Median	2.56
Mode	2.80
Standard Deviation	0.80
Range	7.70
Minimum	0.67
Maximum	8.37
Count	610

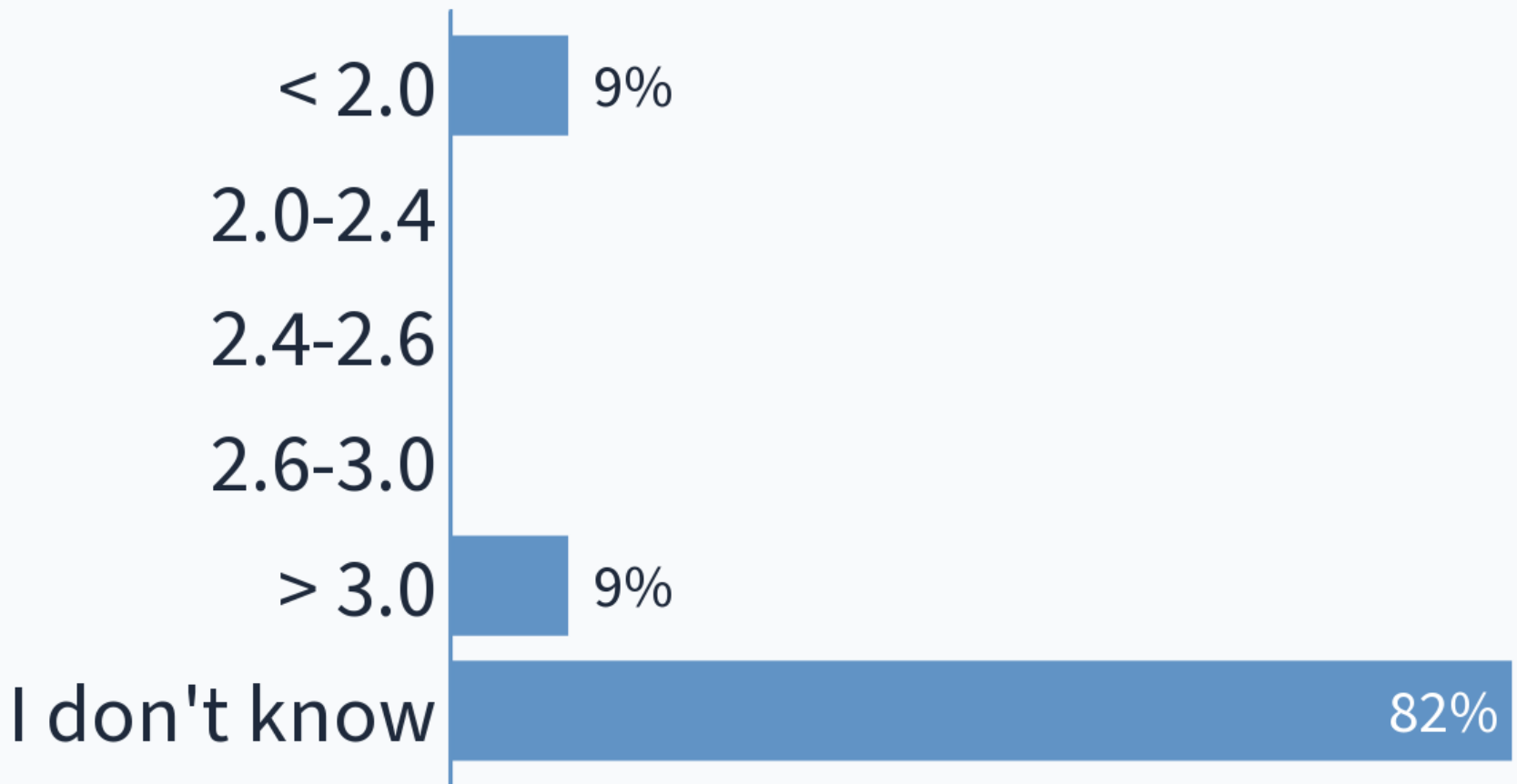
\*This data set does not include admin FTE

Based on 2018 data

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## What is Your Current Nurse WHPPV?



Start the presentation to see live content. For screen share software, share the entire screen. Get help at [pollev.com/app](https://pollev.com/app)

## 2. Capacity – Nurse Staffing Ratios

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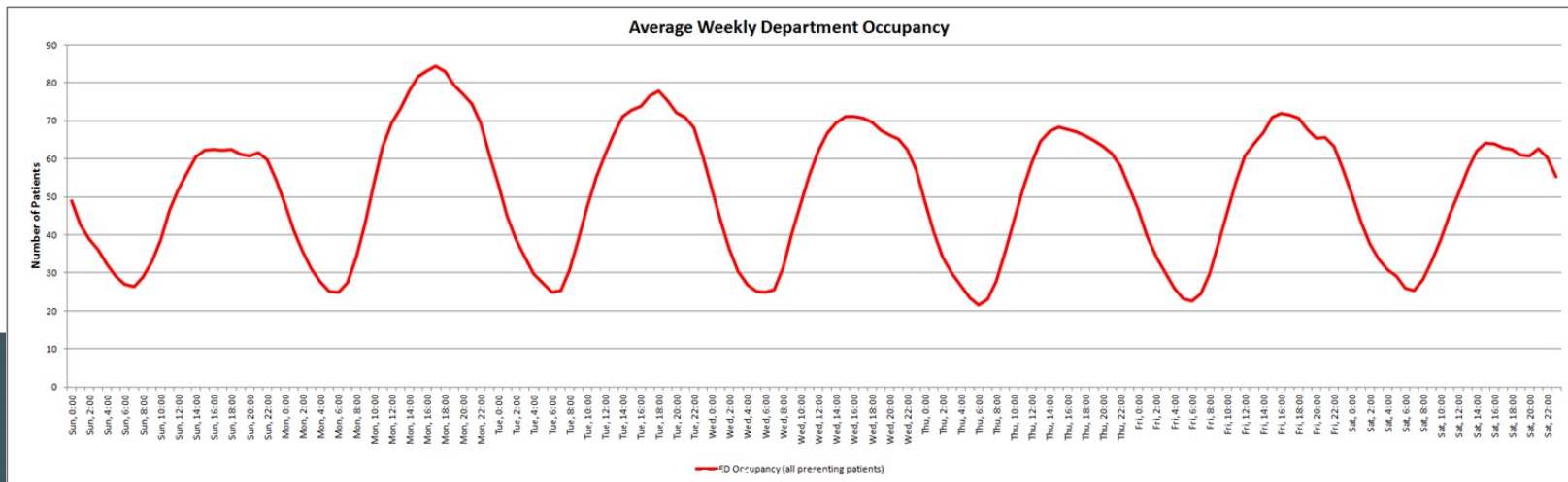
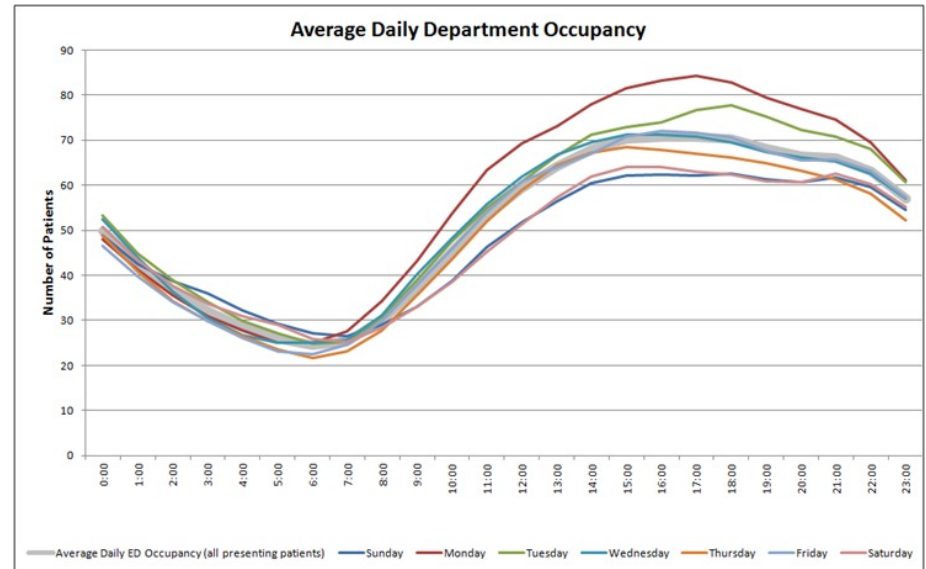
1. Many nurse staffing paradigms are driven off of bed ratios (4 beds per nurse)
2. Nurse staffing will depend on occupancy


**3 OUT OF 2  
PEOPLE  
HAVE  
TROUBLE  
WITH  
FRACTIONS**



# 2. Capacity – Nurse Staffing Ratios

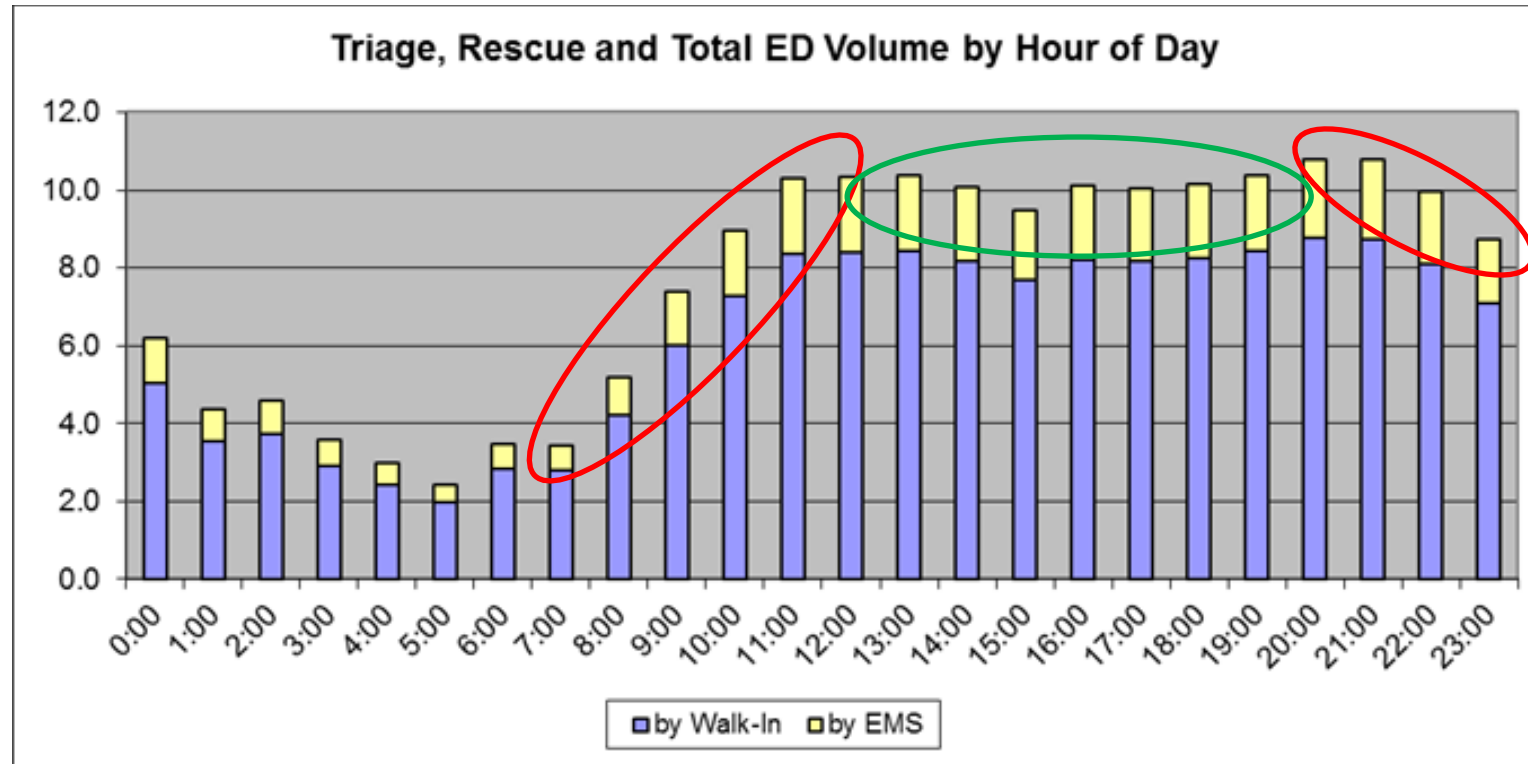
1. Many nurse staffing paradigms are driven off of bed ratios (4 beds per nurse)
2. Nurse staffing will depend on occupancy



The image shows the exterior of a building with a white cinder block facade. A dark red horizontal stripe runs along the top edge. A single, small, white, dome-shaped light fixture is mounted on the wall above the sign. The sign itself is painted in a bold, dark red, sans-serif font. Below the sign is a large, white, multi-paneled garage door. Two small red rectangular markers are visible on the wall, one on each side of the garage door.

**ALIGNMENT SHOP**

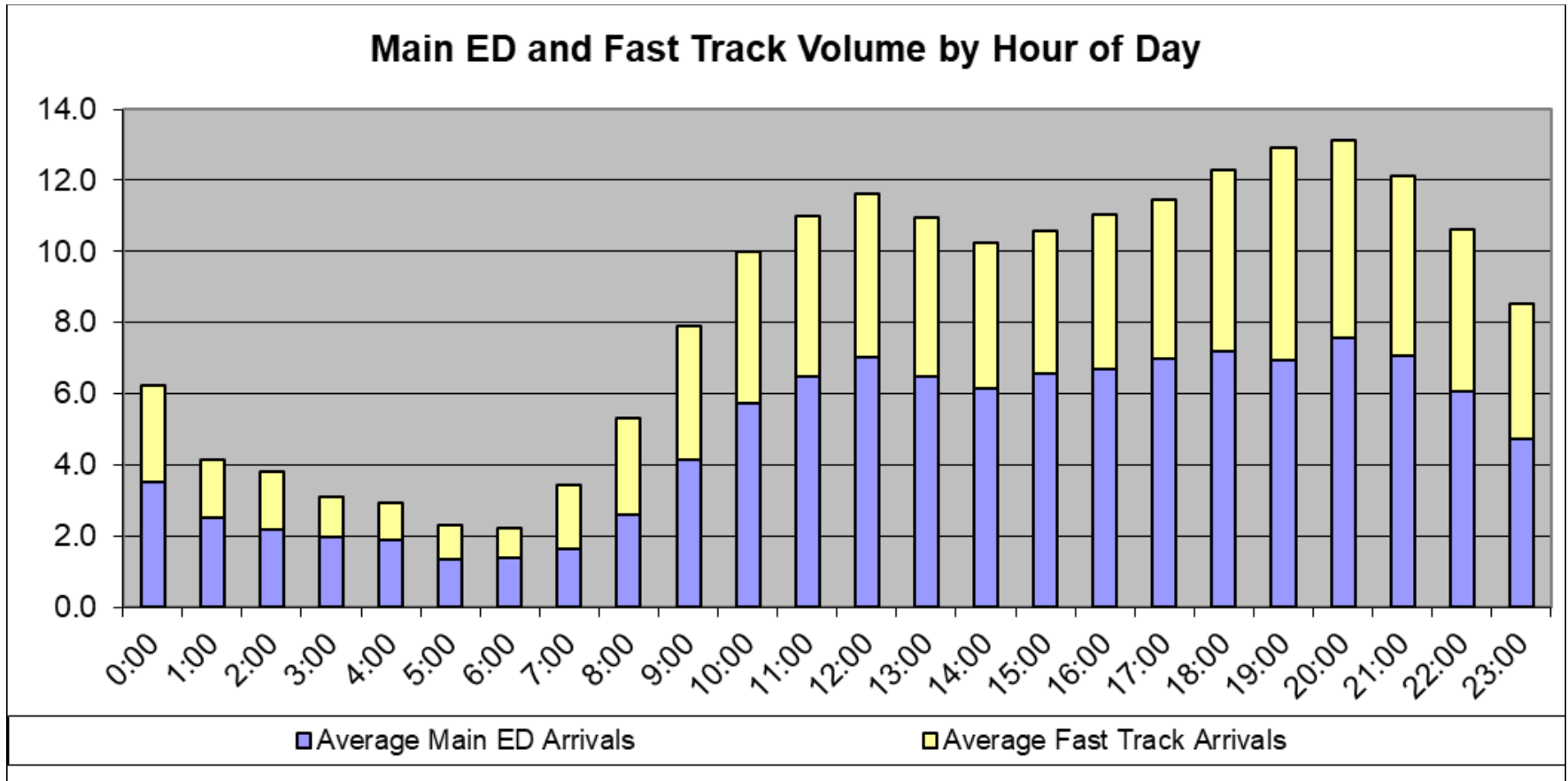
# Dynamic Capacity Alignment



Steady state staffing is straightforward

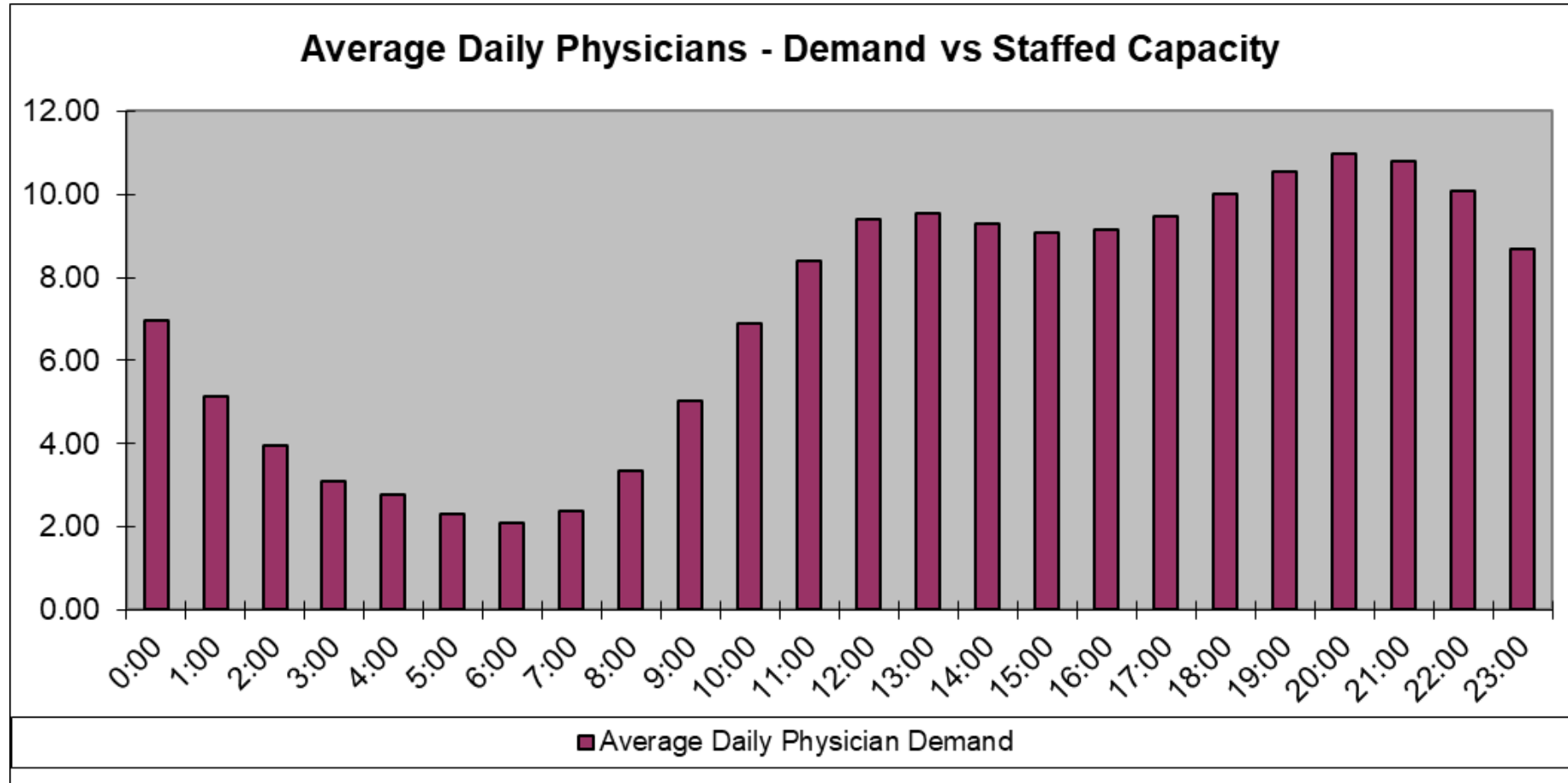
Ramp up and ramp down is more difficult

# Arrivals – 72k Visits

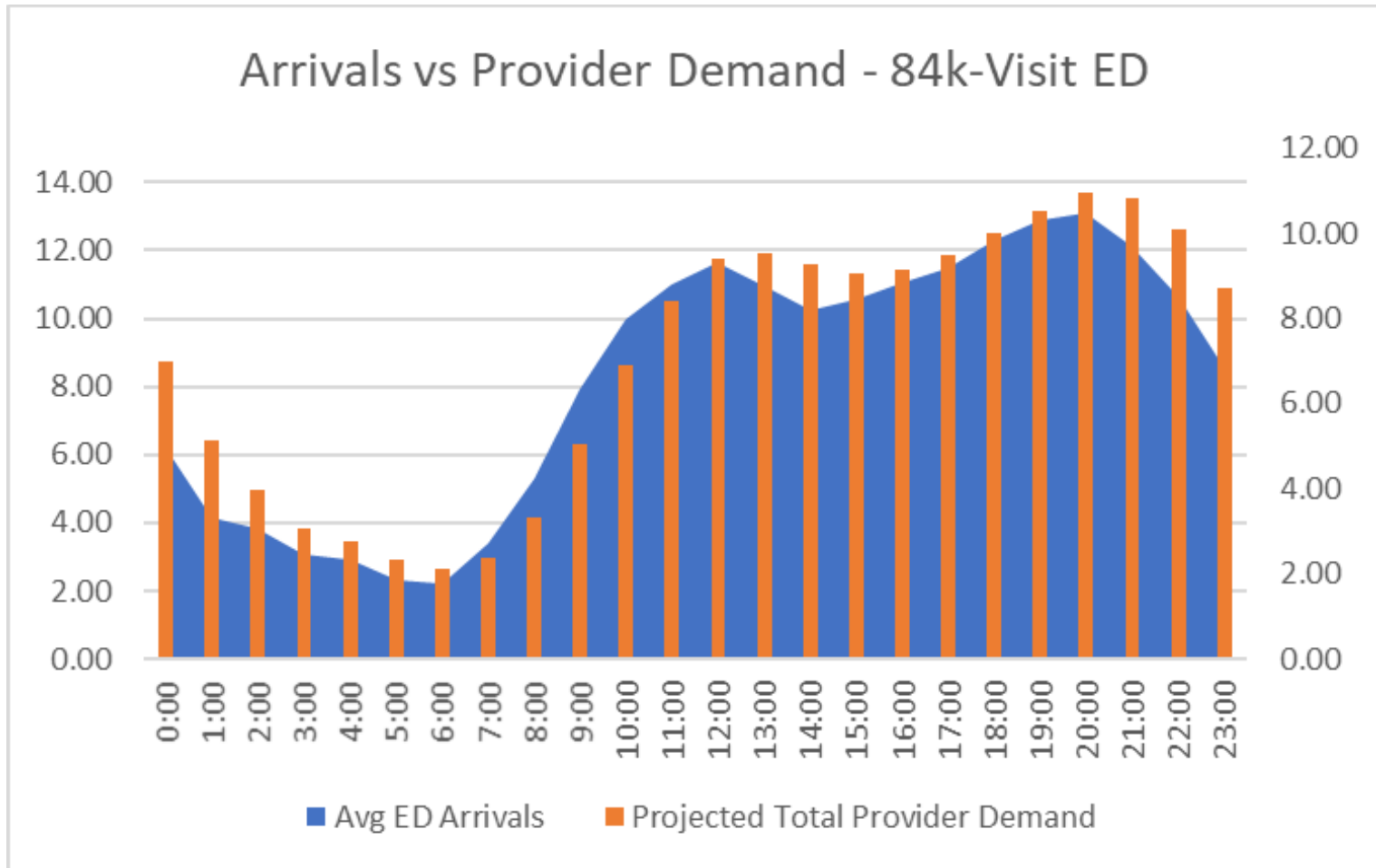




# Provider Demand – 72k Visits



# Overlay Arrivals and Provider Demand



# MD Demand – 2 pts/hr



MD spends 30 minutes per patient,  
but when?

50% in first 33%

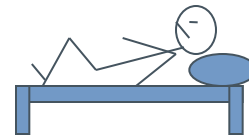
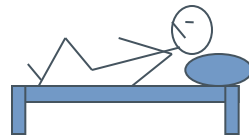
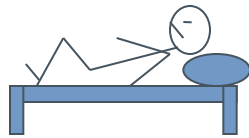
20% in second 33%

30% in third 33%

15 Minutes  
in first  
hour

6 Minutes  
in second  
hour

9 Minutes  
in third  
hour



1 hour

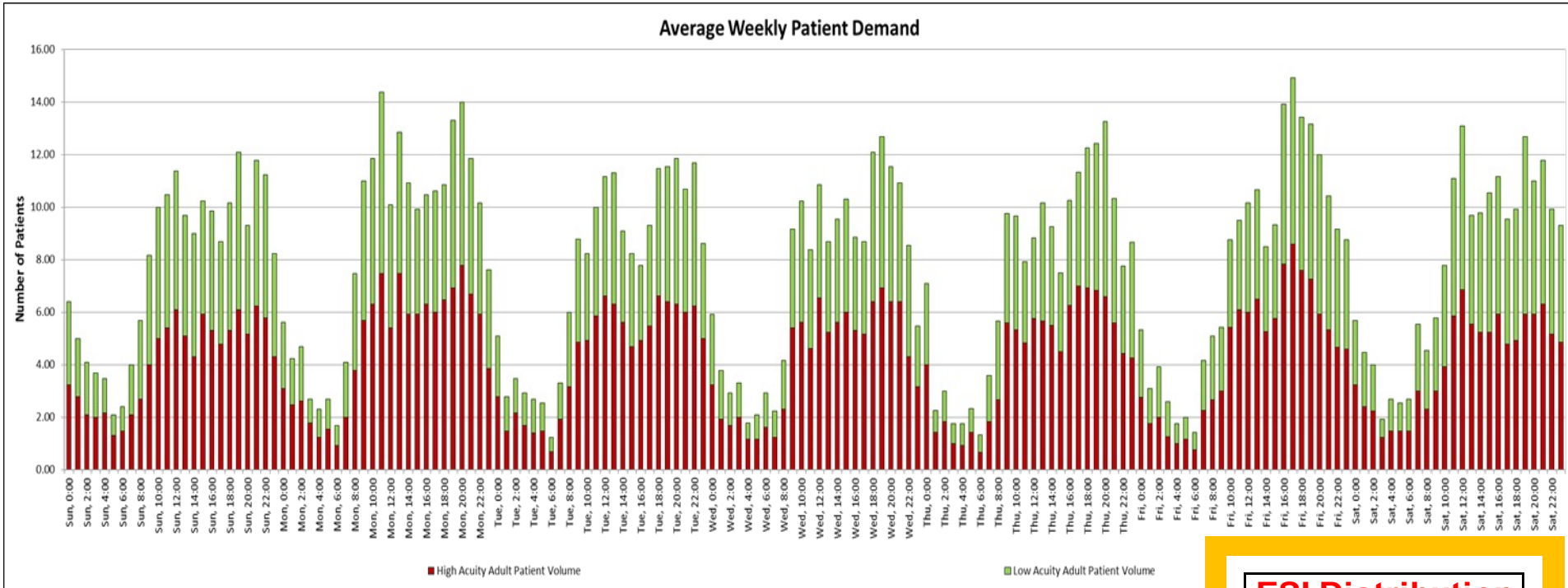
1 hour

1 hour

1 hour

3-hour Length Of Stay

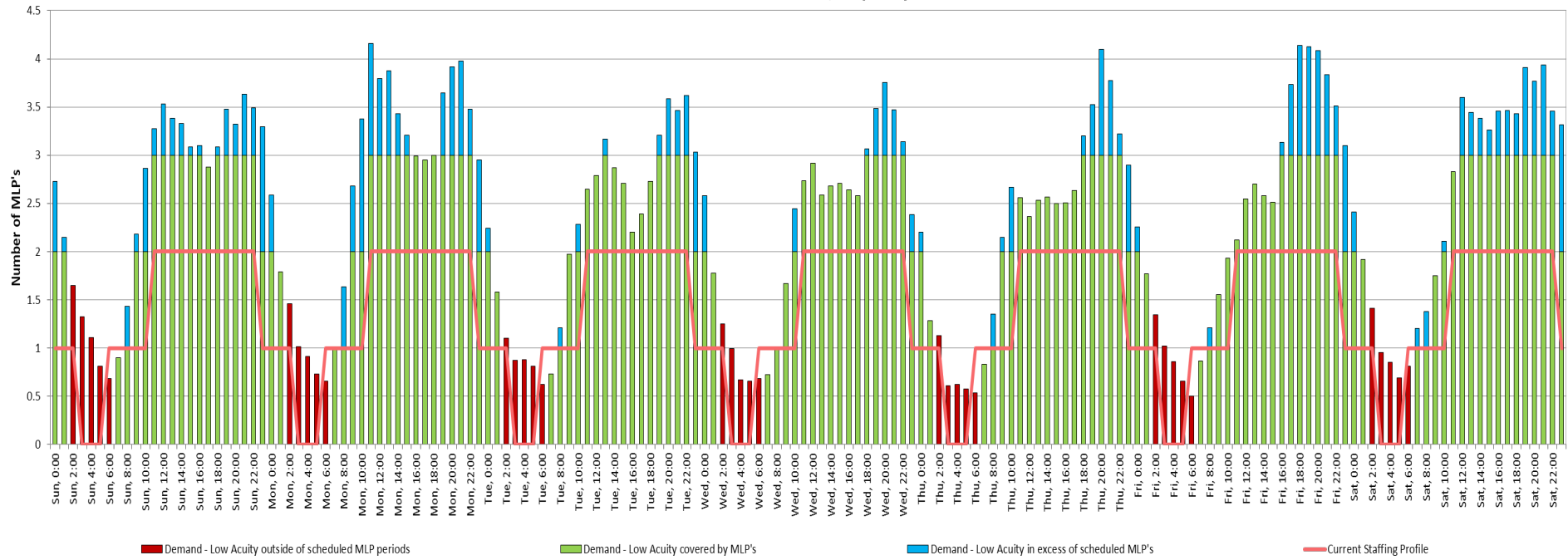
# Optimizing the Alignment



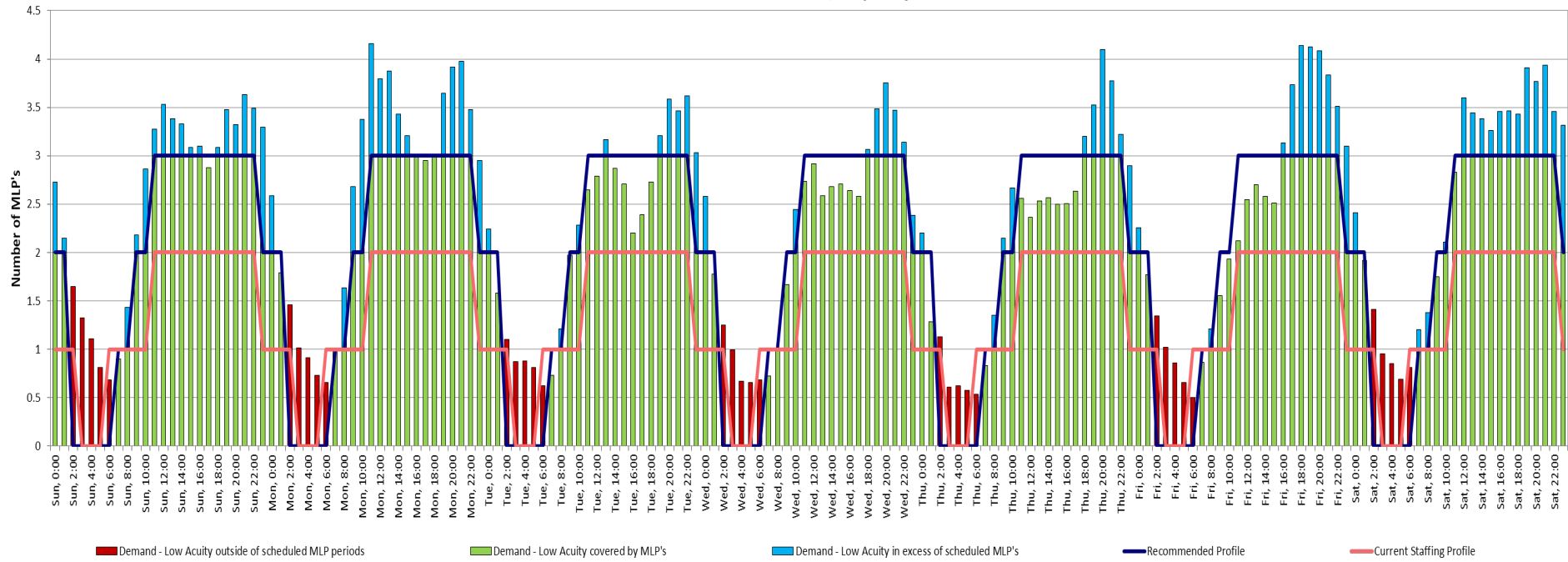
## ESI Distribution

ESI Level 1	1.64%
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## One Week's Demand / Capacity

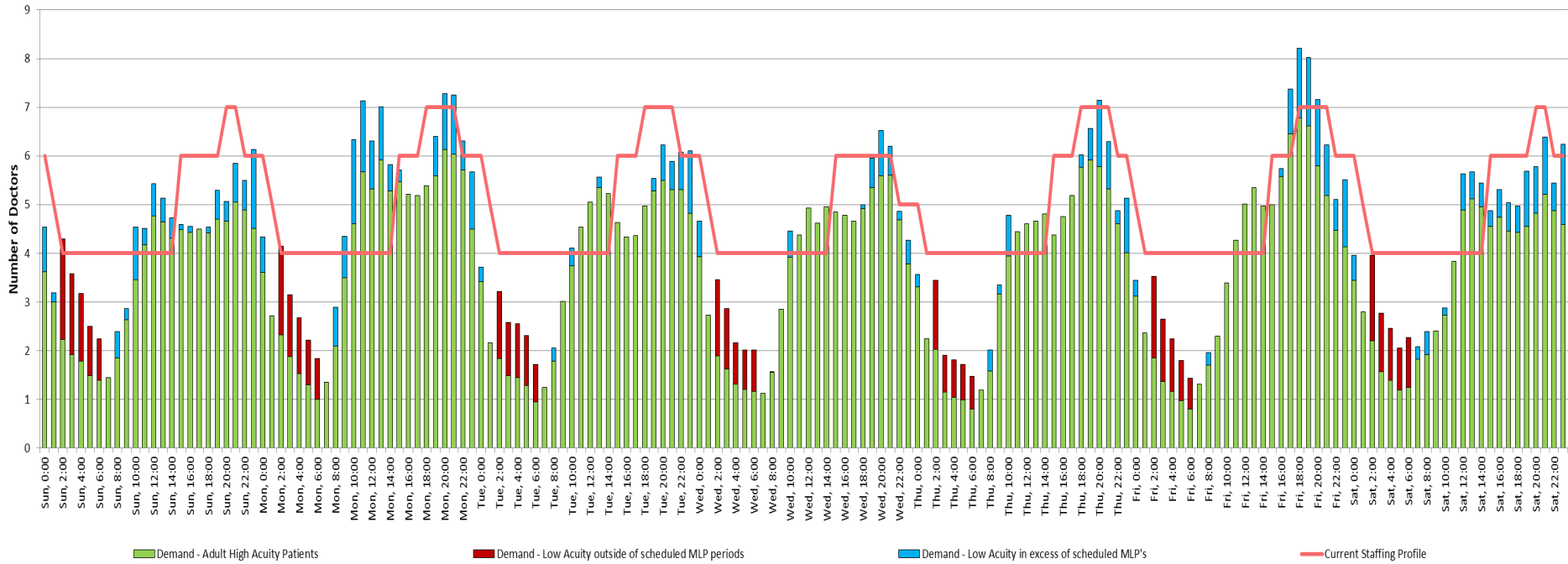


## One Week's Demand / Capacity



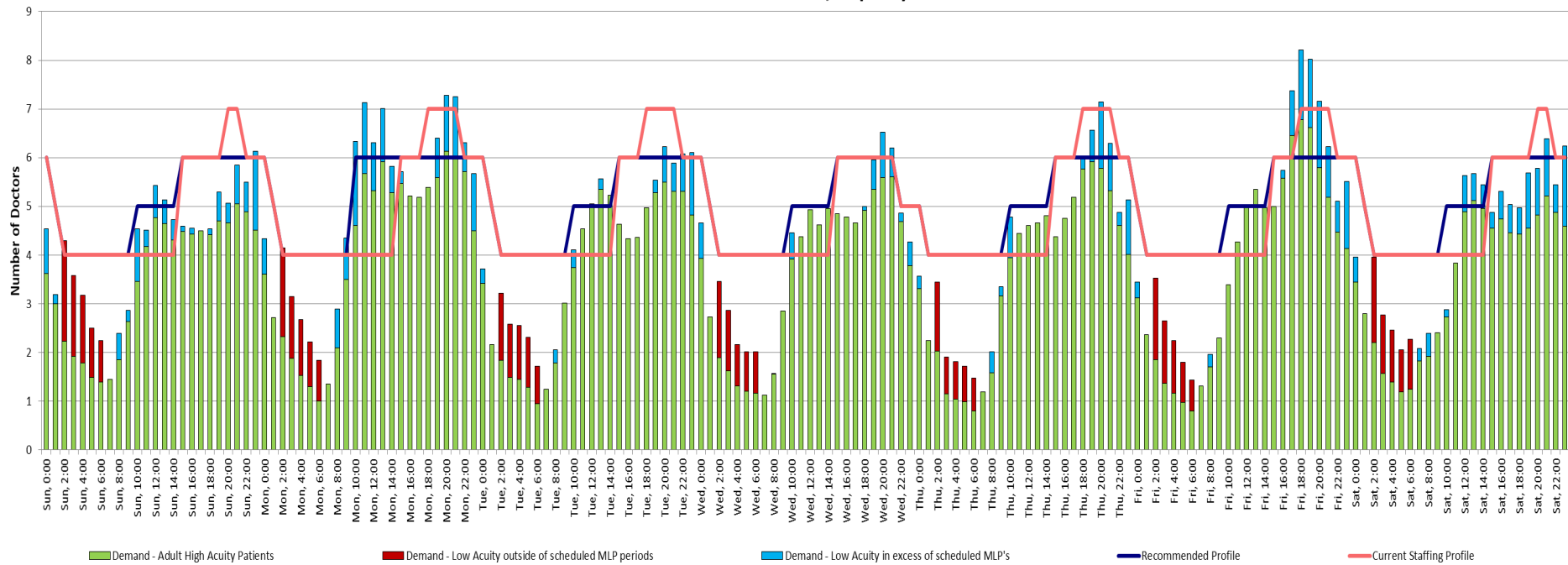
# Physician

One Week's Demand / Capacity



# Physician

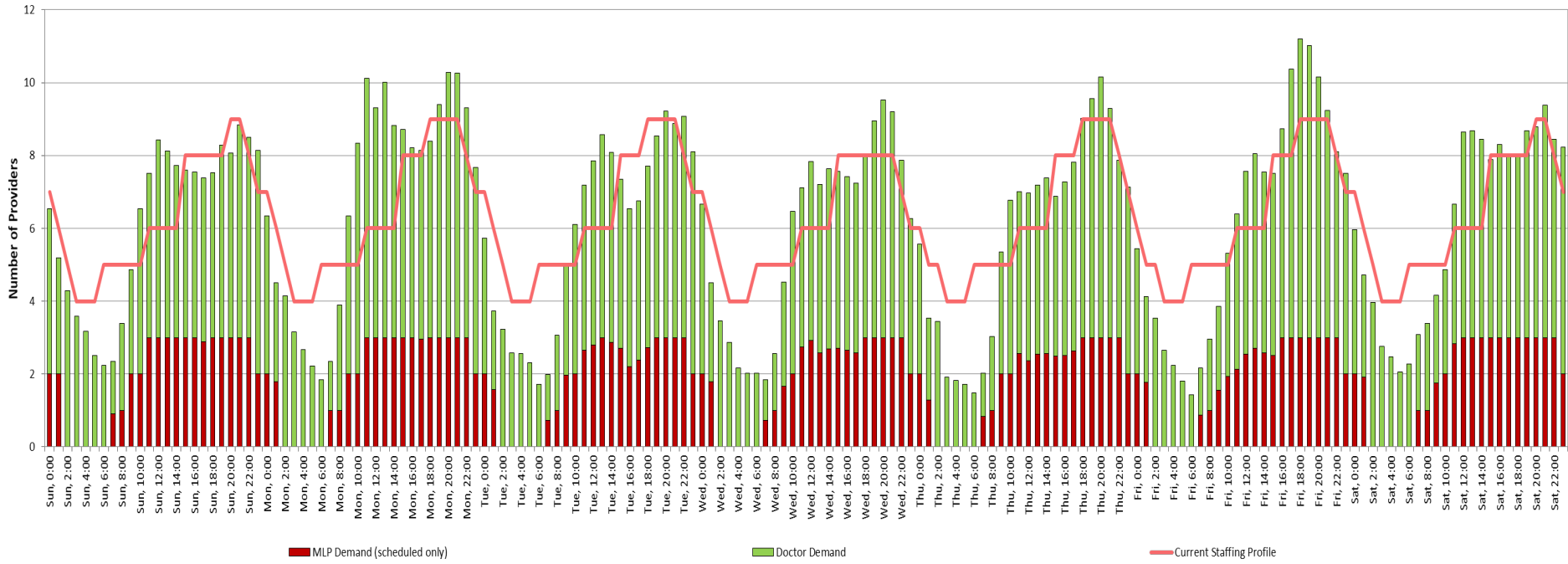
One Week's Demand / Capacity





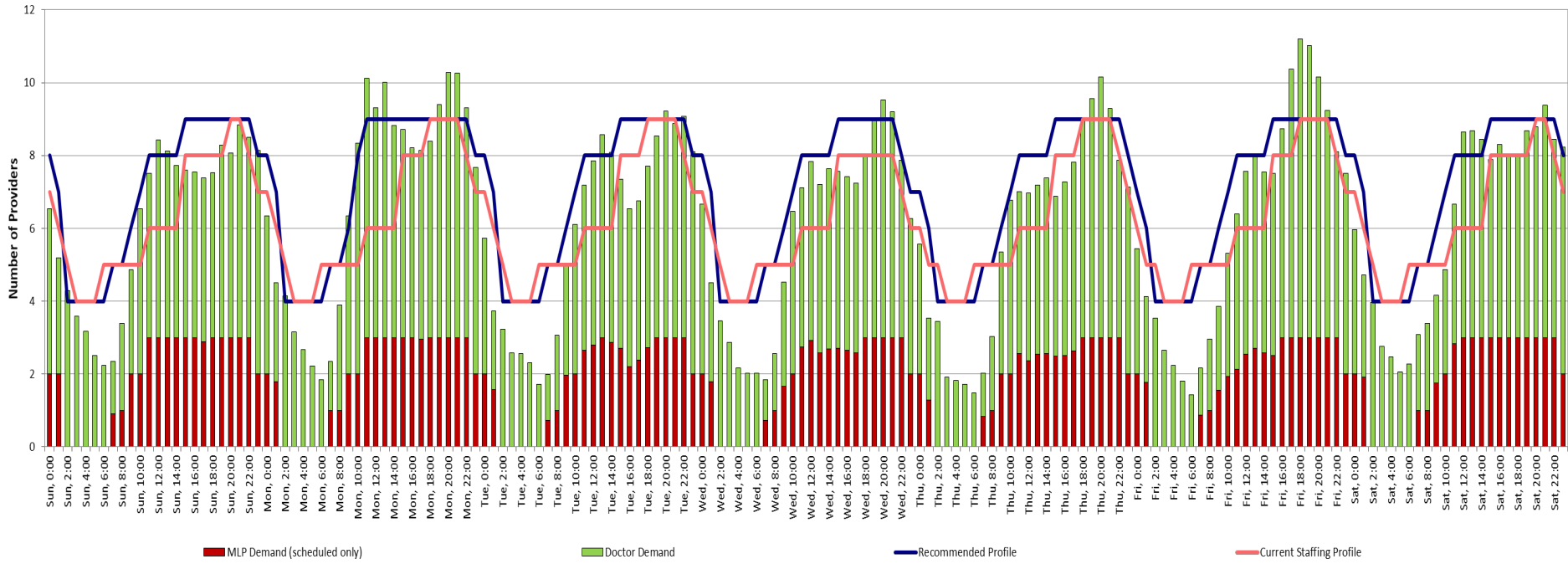
# Provider

One Week's Demand / Capacity



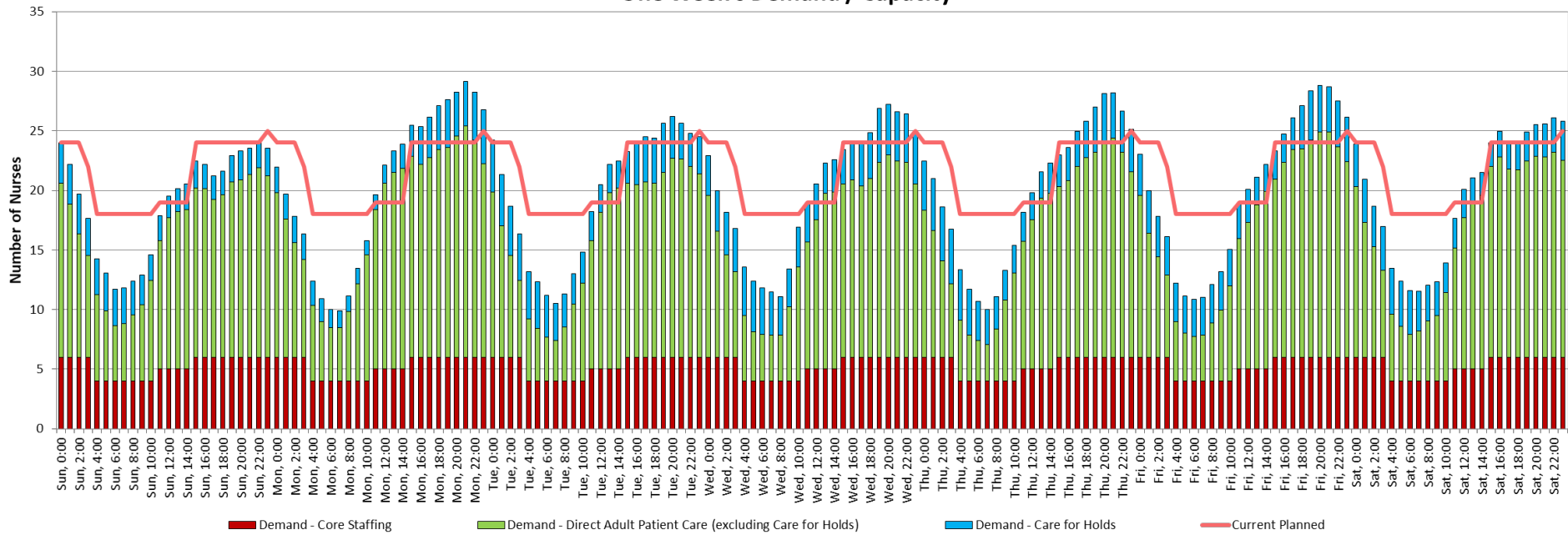
# Provider

One Week's Demand / Capacity



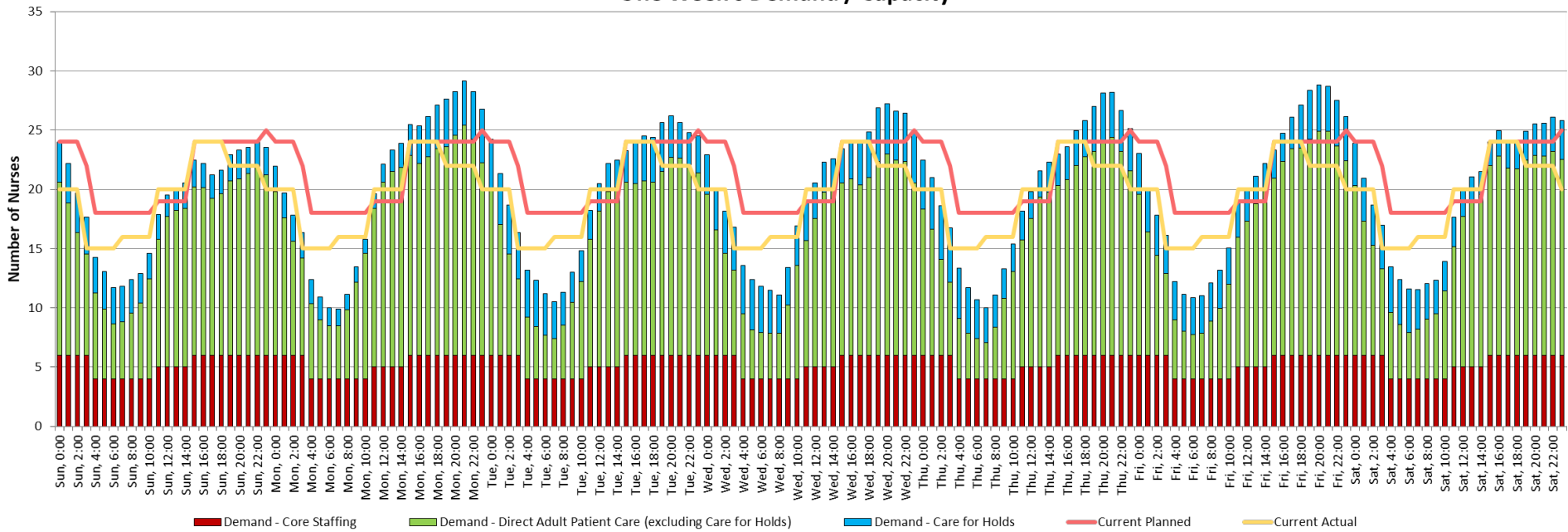
# Current Nurse Staffing - Planned

One Week's Demand / Capacity



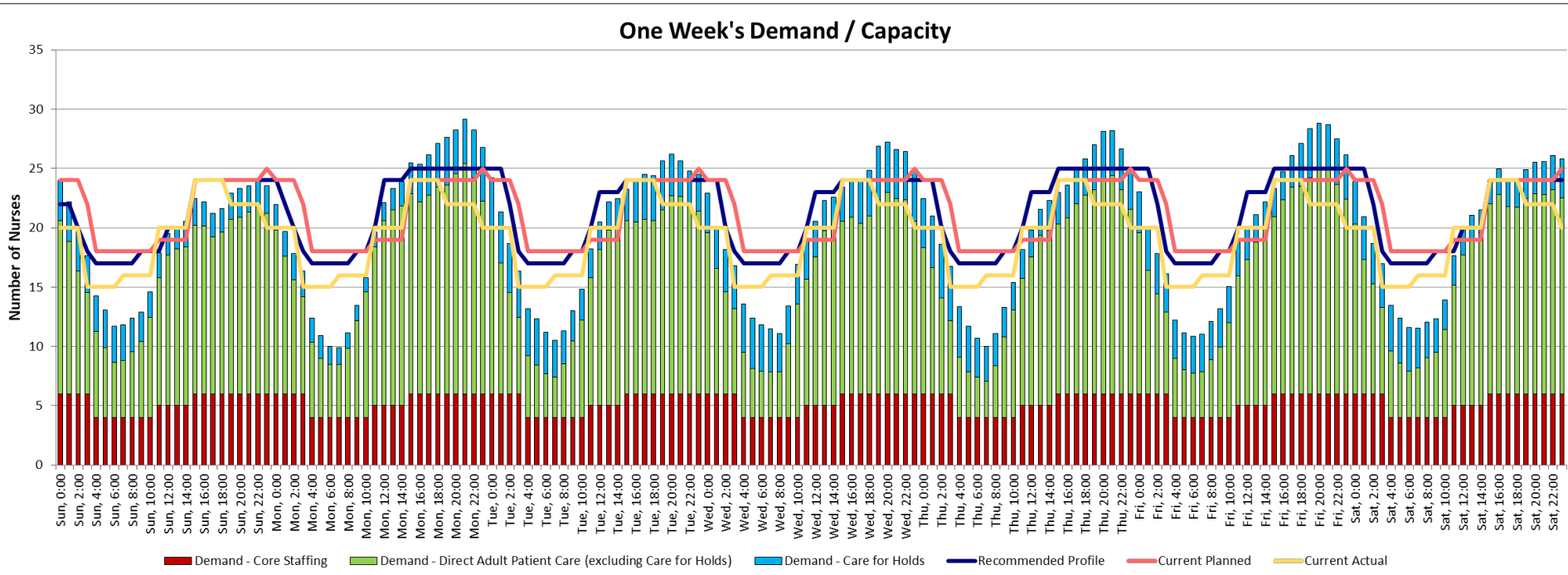
# Current Nurse Staffing - Actual

One Week's Demand / Capacity



# Future Nurse Staffing

One Week's Demand / Capacity



# Basic Approach to Staffing

---

1. Define the arrival *Demand*
2. Define and align the server *Capacity*  
(physician, nurse, APC, resident, bed productivity)
3. Execute in the *Context* of your current operational environment



## Clinical & Practice Management

### Clinical & Practice Management

- Clinical Policies >
- Policy Statements >
- Residency Programs >
- EMS & Disaster Preparedness >
- Disaster Preparedness Resources >
- Resources >
- Find a Physician Group >
- Journals and Publications ▾
  - ACEP Now >
  - Annals of EM >
- Corporate Education Resources >
- Urgent Matters >

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## Staffing an ED Appropriately and Efficiently

Many EDs Vary 40% Between Their Slowest and Busiest Days, So Peak Load Crises Are Inevitable. But How Many Are Tolerable?

ACEP News  
August 2009

By Martha Collins  
ACEP News Contributing Writer

Having the right mix of physicians, nurses, midlevel providers, and support staff in the emergency department can help ensure emergency department efficiency, patient satisfaction, cost-effective care, and medical-legal safety. But just how do you know that you are staffing your emergency department appropriately and efficiently?

"When it comes to ED staffing, there are strategic drivers and tactical drivers. The strategic drivers are quality of care, patient safety, and the level of service you want to deliver. The tactical drivers are patient volume, acuity, patient length of stay, admit holds, physician capabilities, and non-physician staffing," said Kirk B. Jensen, M.D., MBA, who is chief medical officer for BestPractices, Inc. Dr. Jensen also is a faculty member of the Institute for Healthcare Improvement (IHI) in Boston, and chair of IHI's collaborative on Improving Flow in the Acute Care Setting and Operational and Clinical Improvement in the ED.

- Geography,
- Process,
- and People

# This ED is a lot harder to staff....



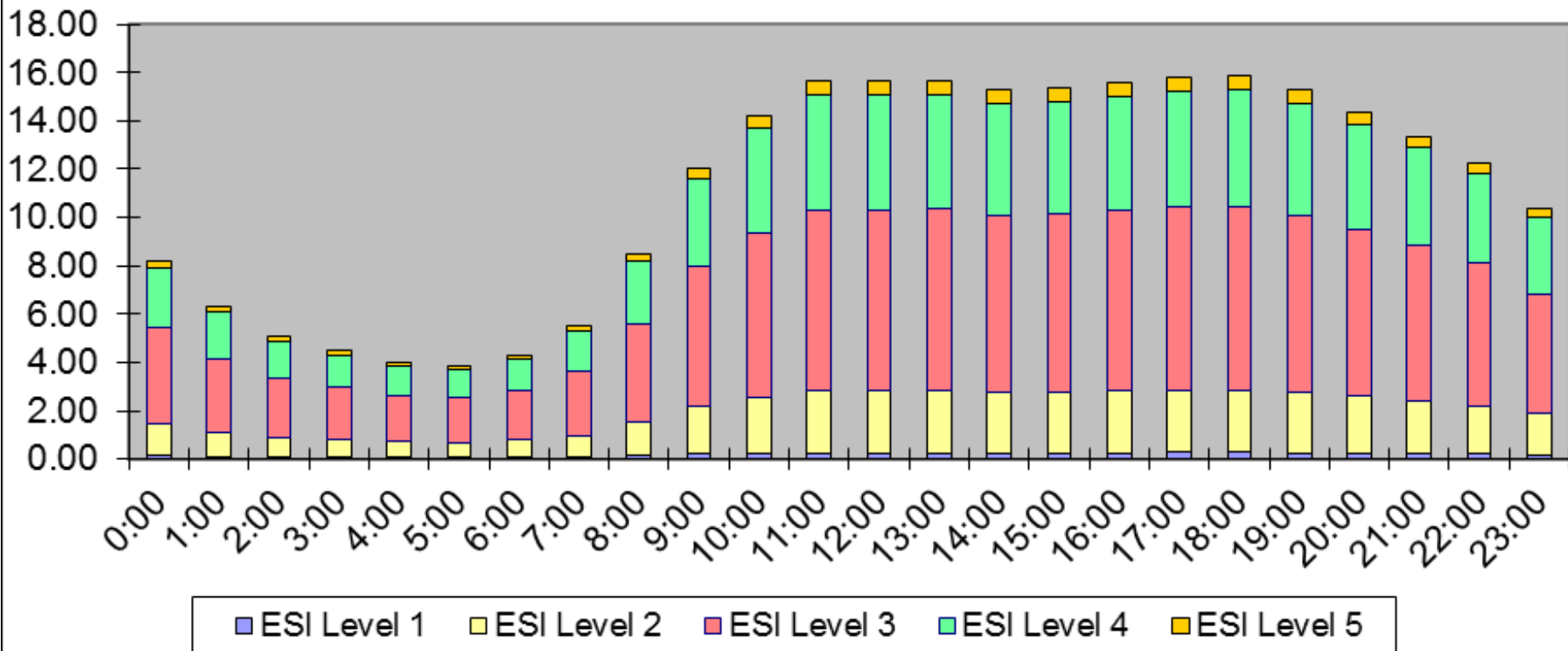


# Than this ED....



# Arrival Acuity by HOD

## Daily ESI Distribution - Overall ED



# There are Really Only 3 Types of ED Patients...

---



Easy



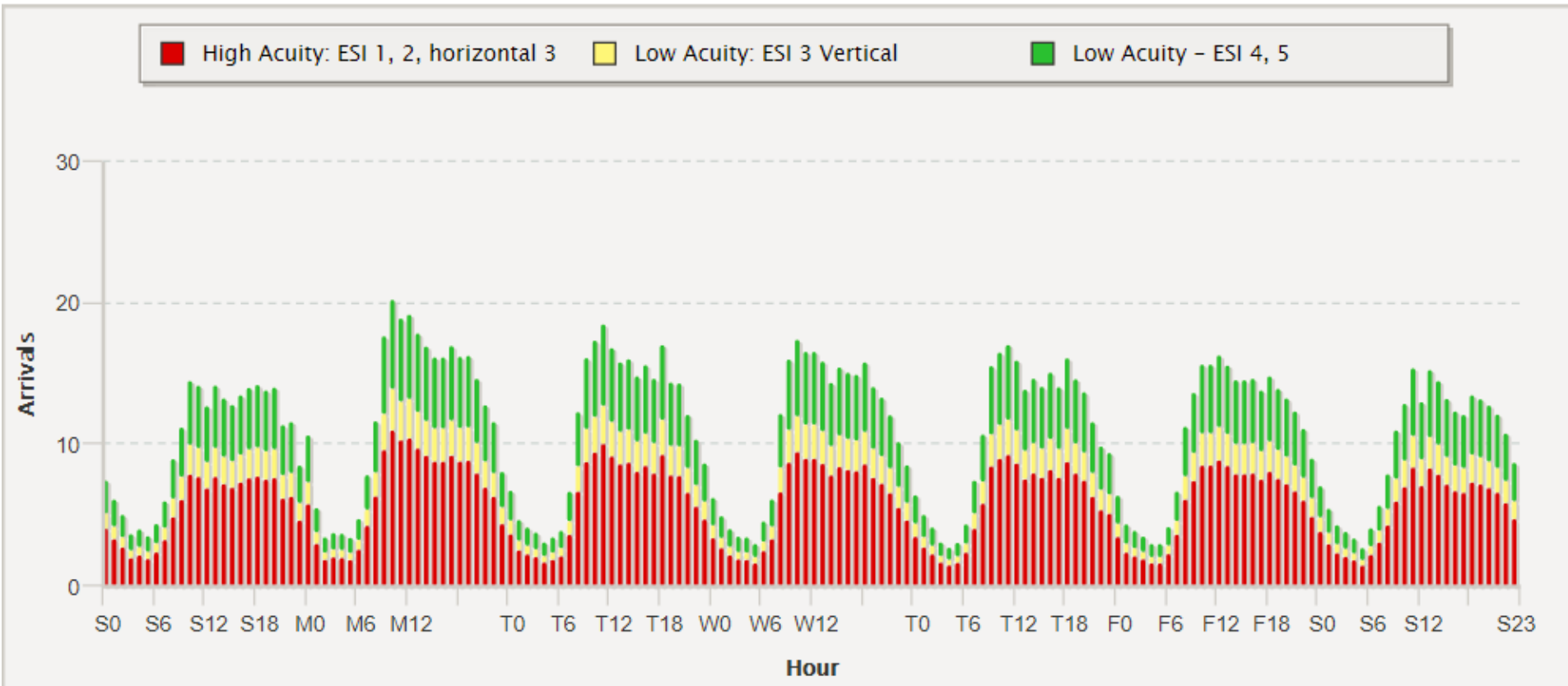
Complicated



Sick

# Optimizing Streams

## Arrivals: Horizontal versus Vertical, 3 layers





Walk-in Arrivals



Ambulance Arrivals

Assessment



Easy



Complicated



Sick

8 pts/hr

“Vertical”

Super Track

3 pts/hr

“Vertical”

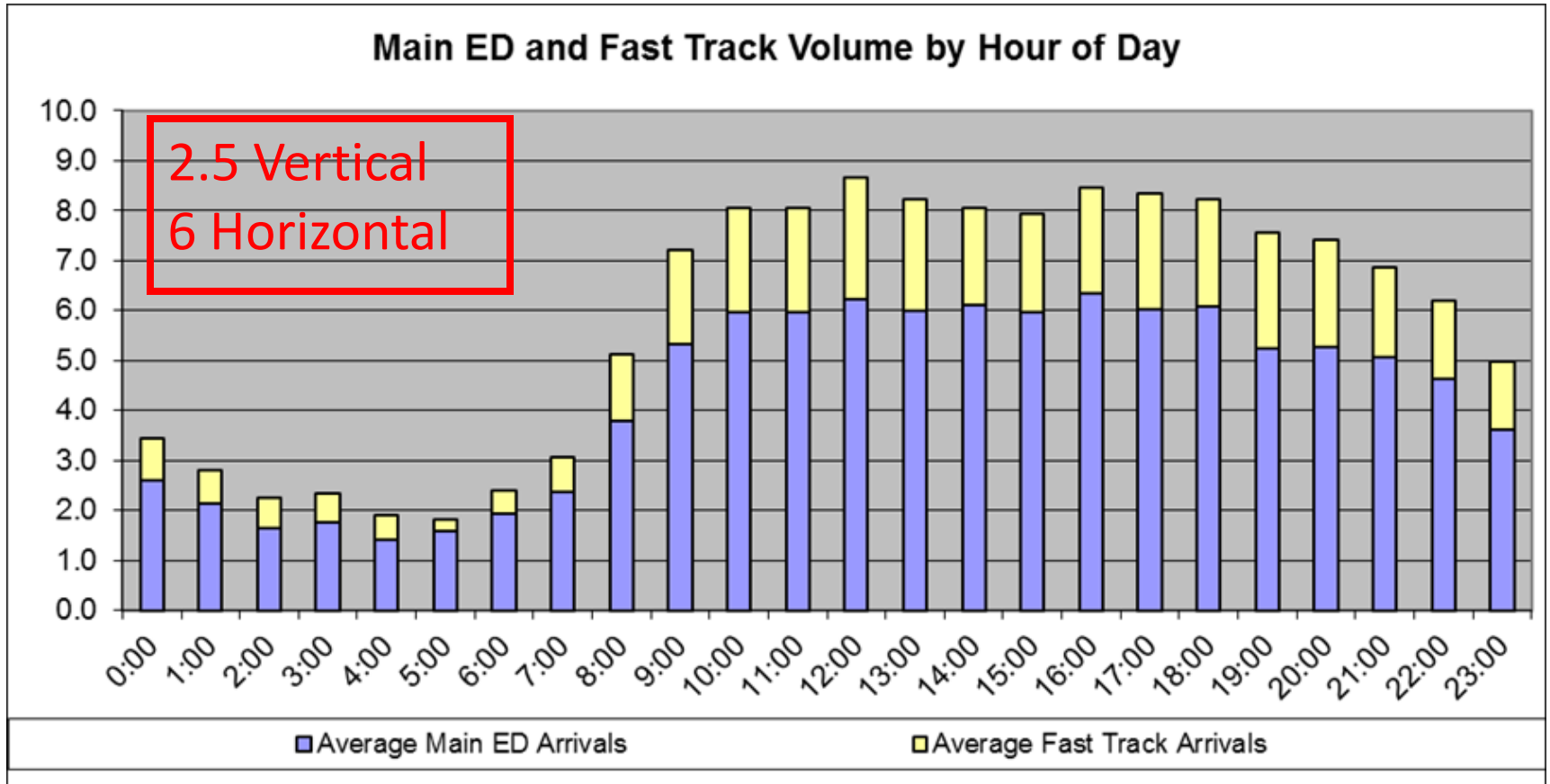
Intake/RME

8 pts/hr

“Horizontal”

Main ED

# Low Acuity Arrivals = ESI 4,5





Walk-in Arrivals



Ambulance Arrivals

Assessment



2.5 pts/hr  
"Vertical"

Super Track



6 pts/hr  
"Horizontal"

Main ED

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ON PRACTICE TRENDS  
GO TO:  
WWW.ACERNOW.COM

## SPECIAL OPs



**DR. WELCH** is a practicing emergency physician with Utah Emergency Physicians and a research fellow at the Intermountain Institute for Health Care Delivery Research. She has written numerous articles and three books on ED quality, safety, and efficiency. She is a consultant with Quality Matters Consulting and her expertise is in ED operations.

# The SuperTrack Is SUPER!

Patient segmentation can improve efficiency, patient care, and other key ED metrics

Other newer examples of patient segmentation include:

- Geriatric ED
- Chest pain center
- Pediatric ED
- Critical decision unit
- Observation unit
- SuperTrack

by SHARI WELCH, MD, FACEP

For emergency departments seeing medium to high volumes of patients, the concept of patient segmentation is becoming popular as a flow strategy.<sup>13</sup> Patient segmentation means grouping patients requiring similar levels of care and having similar anticipated lengths of stay (LOS) into a geographic area with dedicated staff and resources. The earliest example of patient segmentation is Fast Track, which now has a very compelling body of literature behind it.<sup>14</sup> Other newer examples of patient segmentation include:

- Geriatric ED
- Chest pain center
- Pediatric ED
- Critical decision unit
- Observation unit
- SuperTrack

SuperTrack was pioneered by Jody Crane, MD, in the Mary Washington Hospital Emergency Department in Fredericksburg, Virginia, as part of a complete patient-flow makeover.<sup>7</sup> The Mary Washington ED was seeing more than 100,000 visits when it opened its new doors in 2006 and was plagued with front-end waits and delays. As part of a complete overhaul of its ED patient flow, Crane and his colleagues



acuity patients (Emergency Severity Index Level 5). It dedicated six rooms as SuperTrack from 8 a.m. to 6 p.m., where identified patients would be seen by a patient care team con-

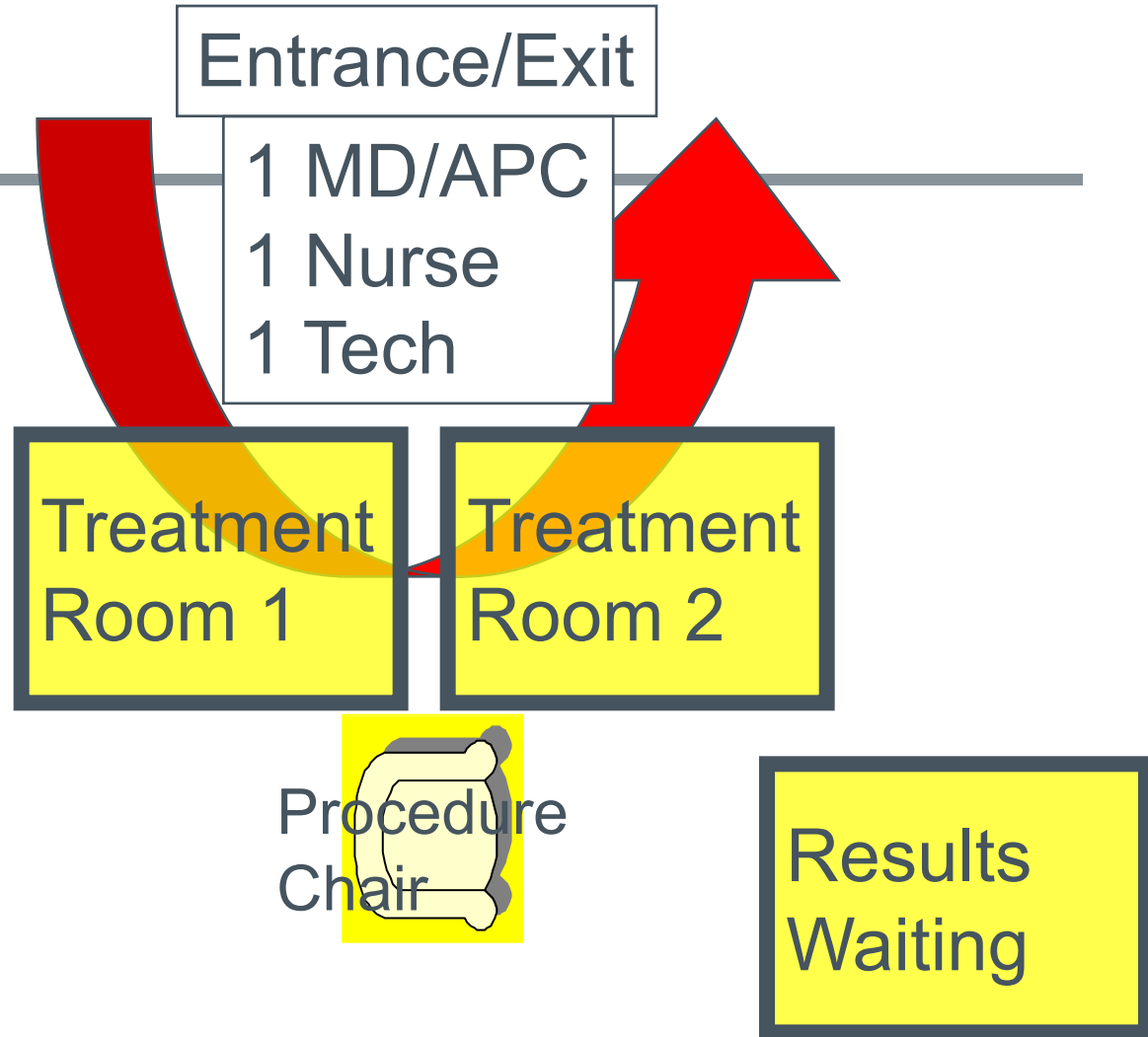
Once patients were found to meet the SuperTrack criteria, they were quickly placed in a room, and a patient care tech (PCT) would expedite this process and alert the pro-

plies, and staff dedicated to the care of very low-acuity patients. Parkland UCED improved all of its performance metrics, improved the overall flow of the department, and



# “Super Track”

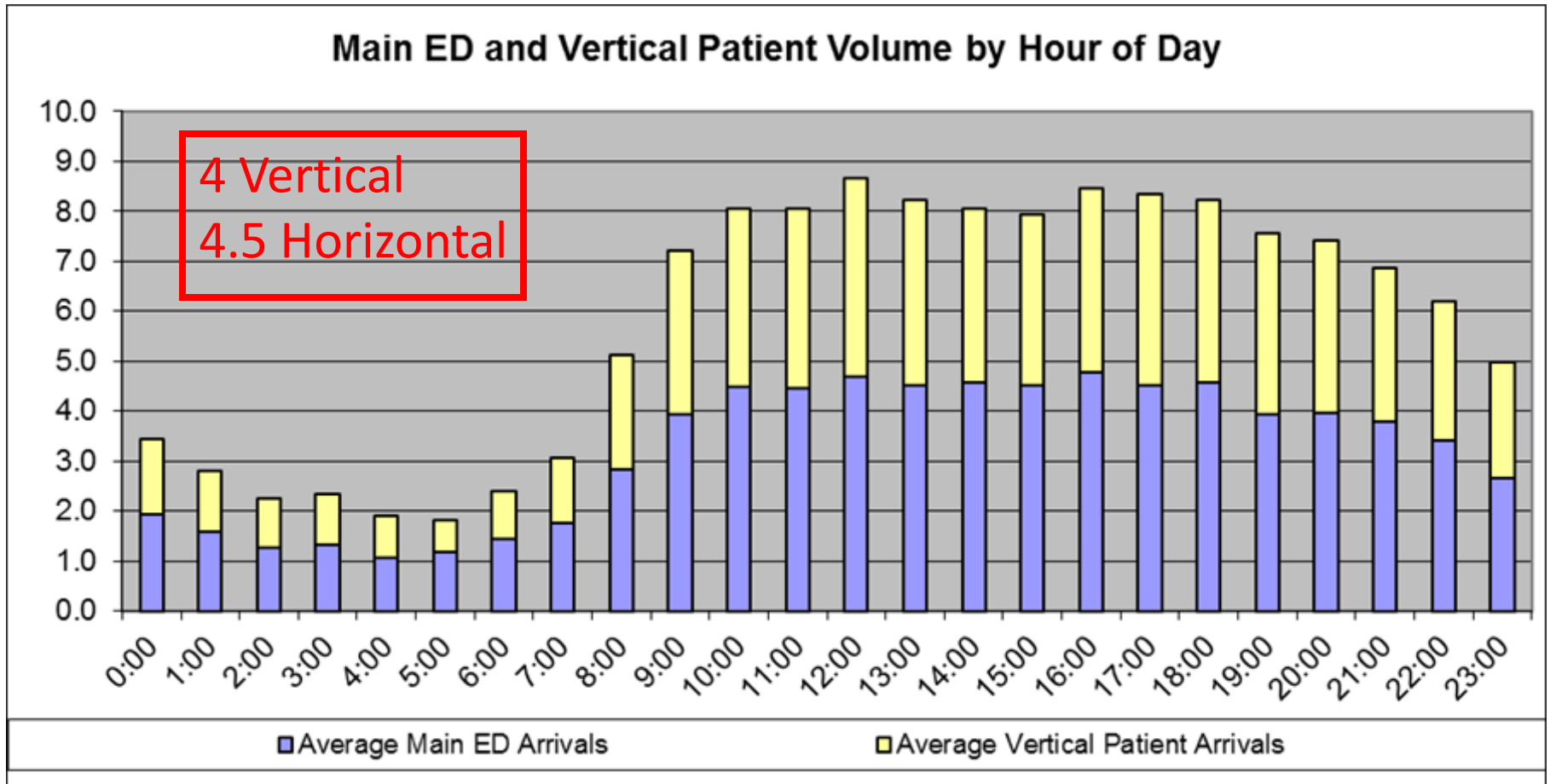
- Fast Track located *in or near triage* for the purpose of promptly treating patients who require very low resource utilization



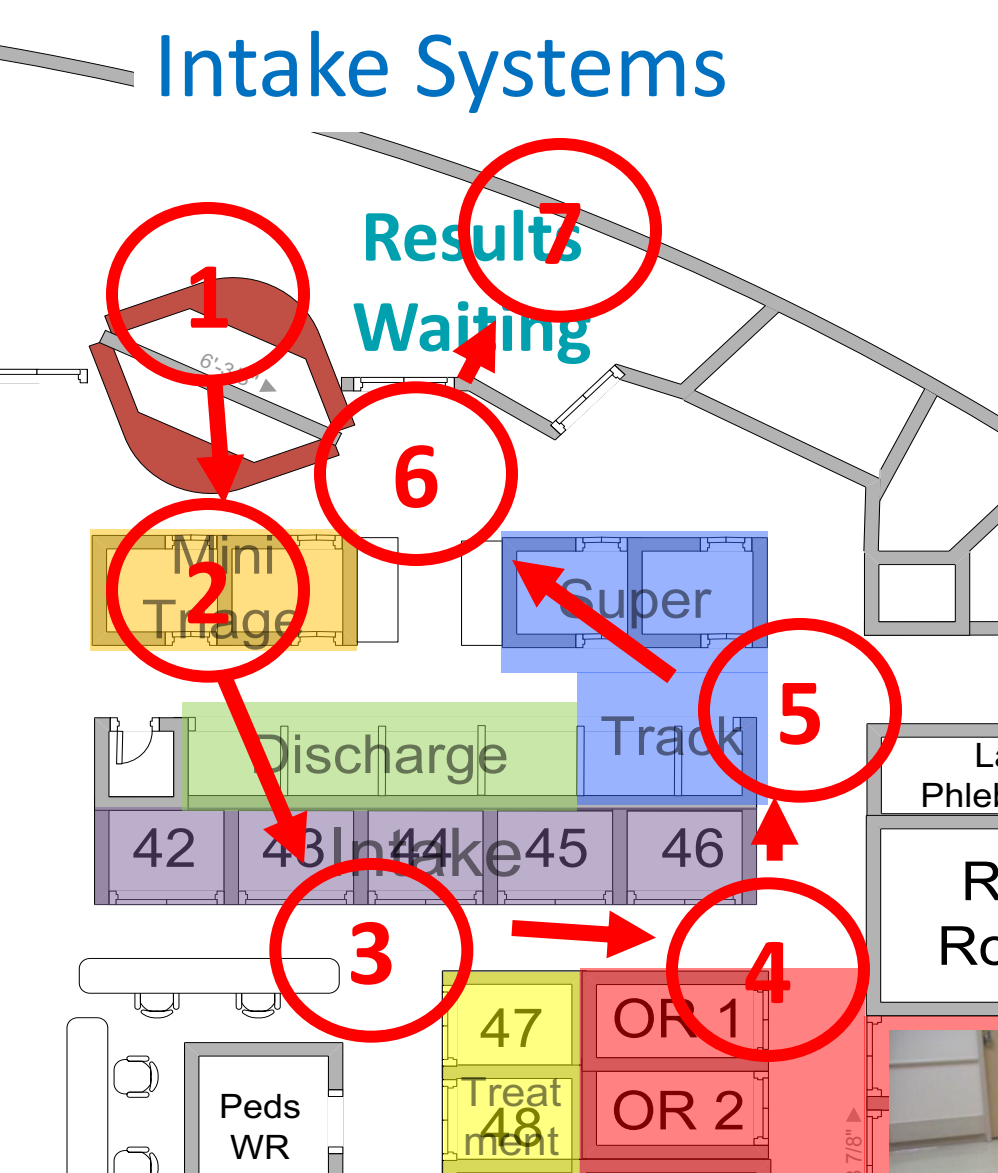
2 x Doc

4.5 x Nurse

# Intake Arrivals – ESI 4, 5, 33% ESI 3



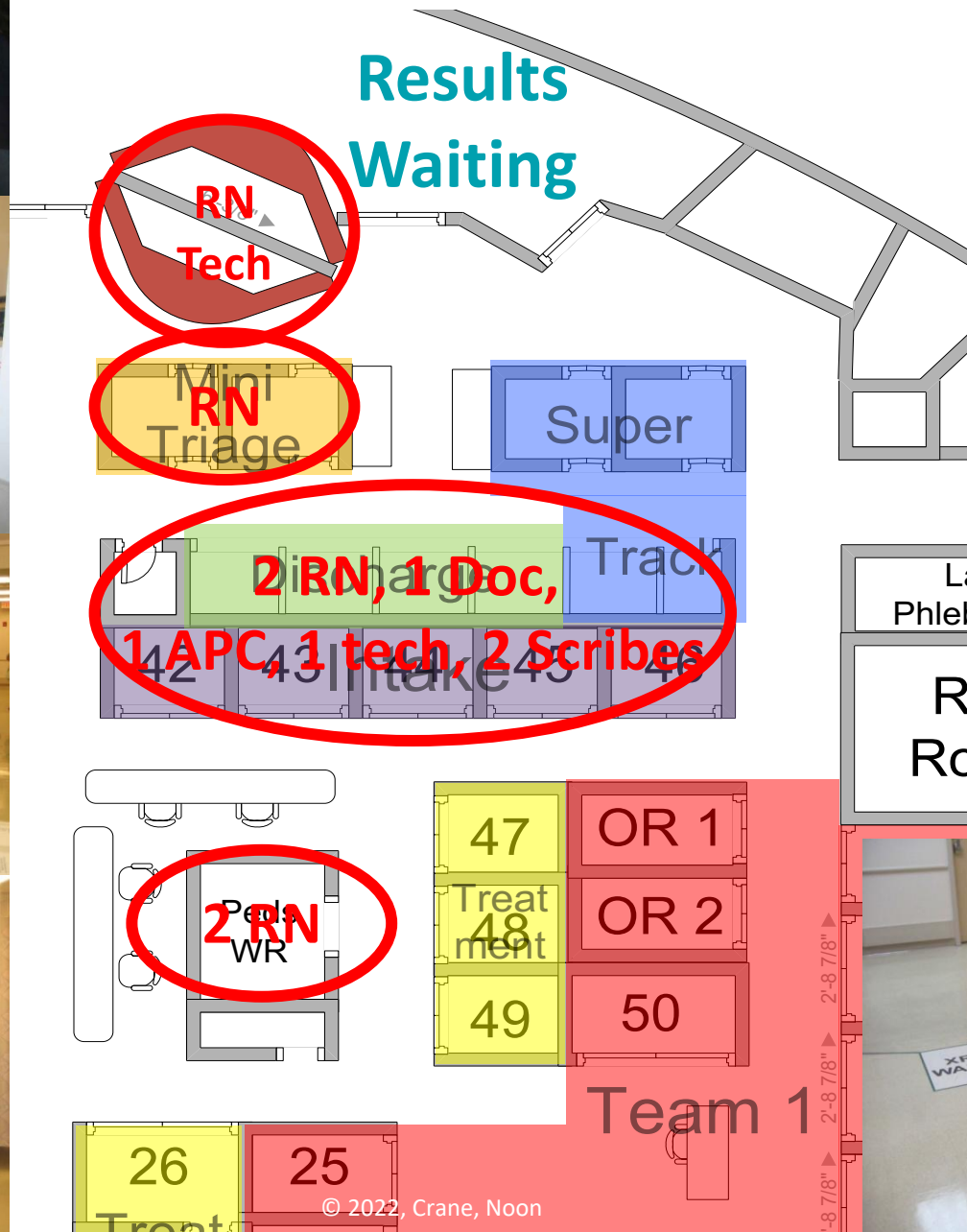
# Intake Systems



1.25 x Doc      3.5 x Nurse



# Know Your Staff Needs



## Clinical & Practice Management

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HCP Access Code: REGISTER  
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### Staffing an ED Appropriately and Efficiently

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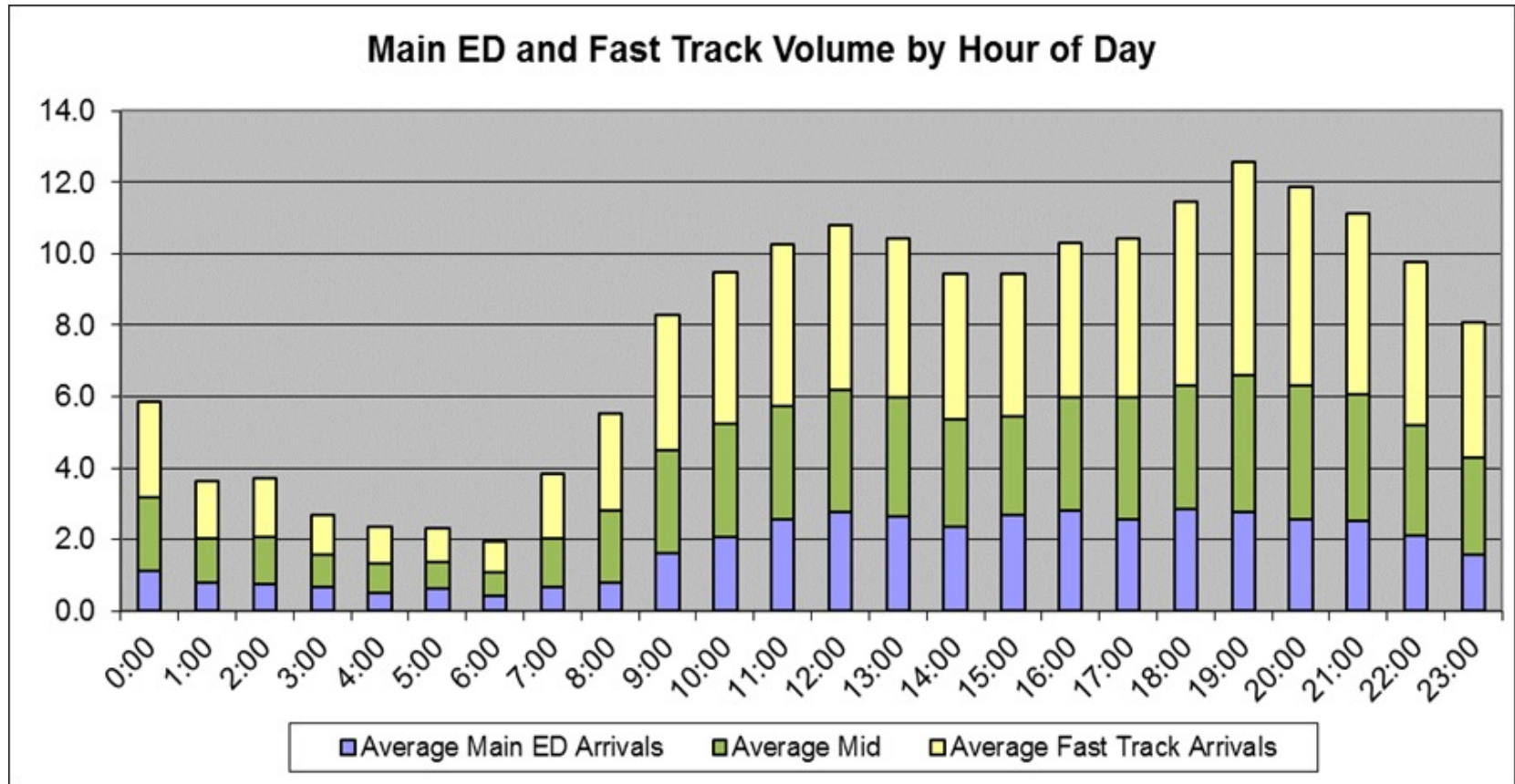
- Symptoms:
  - Elevated patient throughput times
  - High left-without-being-seen rate
  - Low patient satisfaction
  - Clinician behavior in a stressful environment
  - Low clinician satisfaction and retention
- The four key drivers of patient satisfaction:
  - Length of stay
  - Quality of the interactions with providers
  - Quality of the explanations
  - Pain management

# Outline

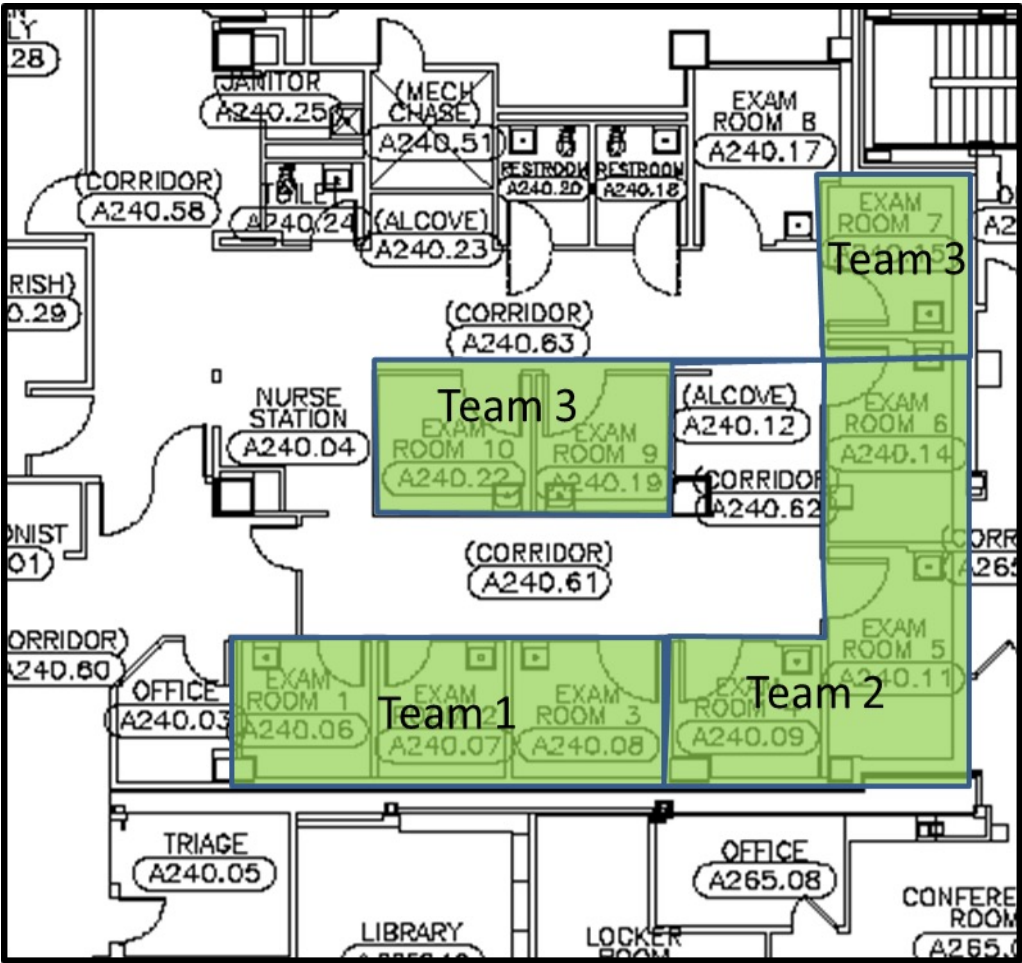
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- Academic Principles
- Case Study – 75,000-visit ED
- Approach to Staffing Optimization
  - Define Demand
  - Define Capacity
  - Contextualize
- **Conclusions**

# Case Study - Future Directions



# Low Acuity Option 2





# Overall Provider

## Current Staffing Profile

Sun	Mon	Tues	Wed	Thur	Fri	Sat
7.0	7.0	7.0	7.0	6.0	6.0	7.0
6.0	6.0	6.0	6.0	5.0	5.0	6.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0
8.0	8.0	8.0	8.0	8.0	8.0	8.0
8.0	8.0	8.0	8.0	8.0	8.0	8.0
8.0	8.0	8.0	8.0	8.0	8.0	8.0
8.0	9.0	9.0	8.0	9.0	9.0	8.0
8.0	9.0	9.0	8.0	9.0	9.0	8.0
9.0	9.0	9.0	8.0	9.0	9.0	8.0
9.0	9.0	9.0	8.0	9.0	9.0	8.0
9.0	9.0	9.0	8.0	9.0	9.0	8.0
8.0	8.0	8.0	7.0	8.0	8.0	8.0
7.0	7.0	7.0	6.0	7.0	7.0	7.0
152.0	154.0	154.0	148.0	152.0	152.0	152.0
1,064.0						

## Recommended Profile

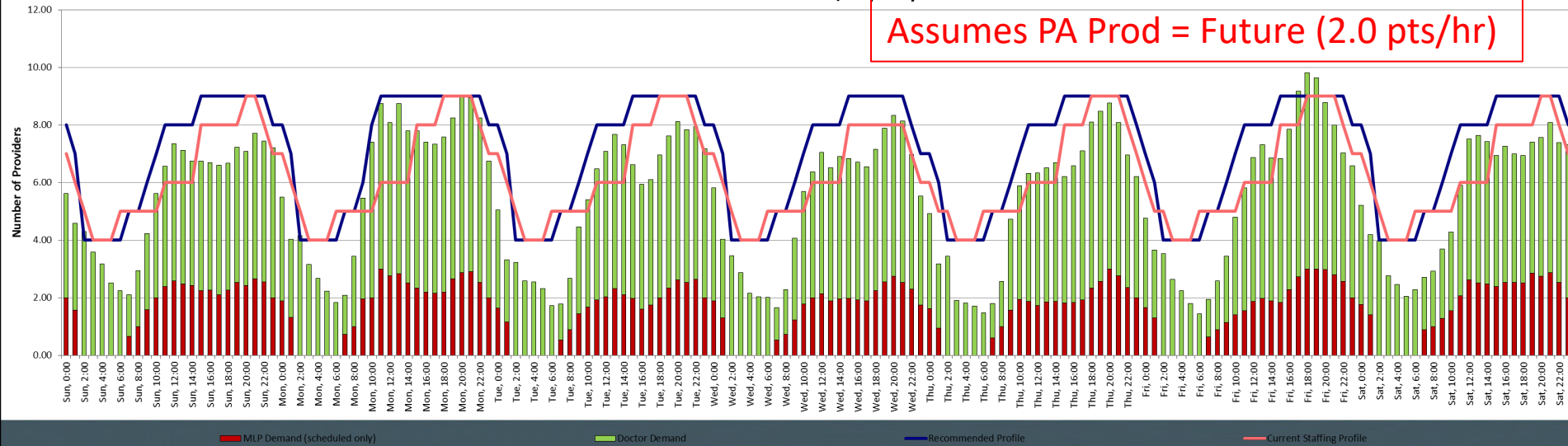
Sun	Mon	Tues	Wed	Thur	Fri	Sat
8.0	8.0	8.0	8.0	7.0	7.0	8.0
7.0	7.0	7.0	7.0	6.0	6.0	7.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0
7.0	8.0	7.0	7.0	7.0	7.0	7.0
8.0	9.0	8.0	8.0	8.0	8.0	8.0
8.0	9.0	8.0	8.0	8.0	8.0	8.0
8.0	9.0	8.0	8.0	8.0	8.0	8.0
8.0	9.0	8.0	8.0	8.0	8.0	8.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0
8.0	8.0	8.0	7.0	8.0	8.0	8.0
170.0	175.0	170.0	168.0	168.0	168.0	170.0
1,189.0						

## Change from Current

Sun	Mon	Tues	Wed	Thur	Fri	Sat
1.0	1.0	1.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
2.0	3.0	2.0	2.0	2.0	2.0	2.0
2.0	3.0	2.0	2.0	2.0	2.0	2.0
2.0	3.0	2.0	2.0	2.0	2.0	2.0
2.0	3.0	2.0	2.0	2.0	2.0	2.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
1.0	0.0	0.0	1.0	0.0	0.0	1.0
0.0	0.0	0.0	1.0	0.0	0.0	0.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0
18.0	21.0	16.0	20.0	16.0	16.0	18.0
125.0						

## One Week's Demand / Capacity

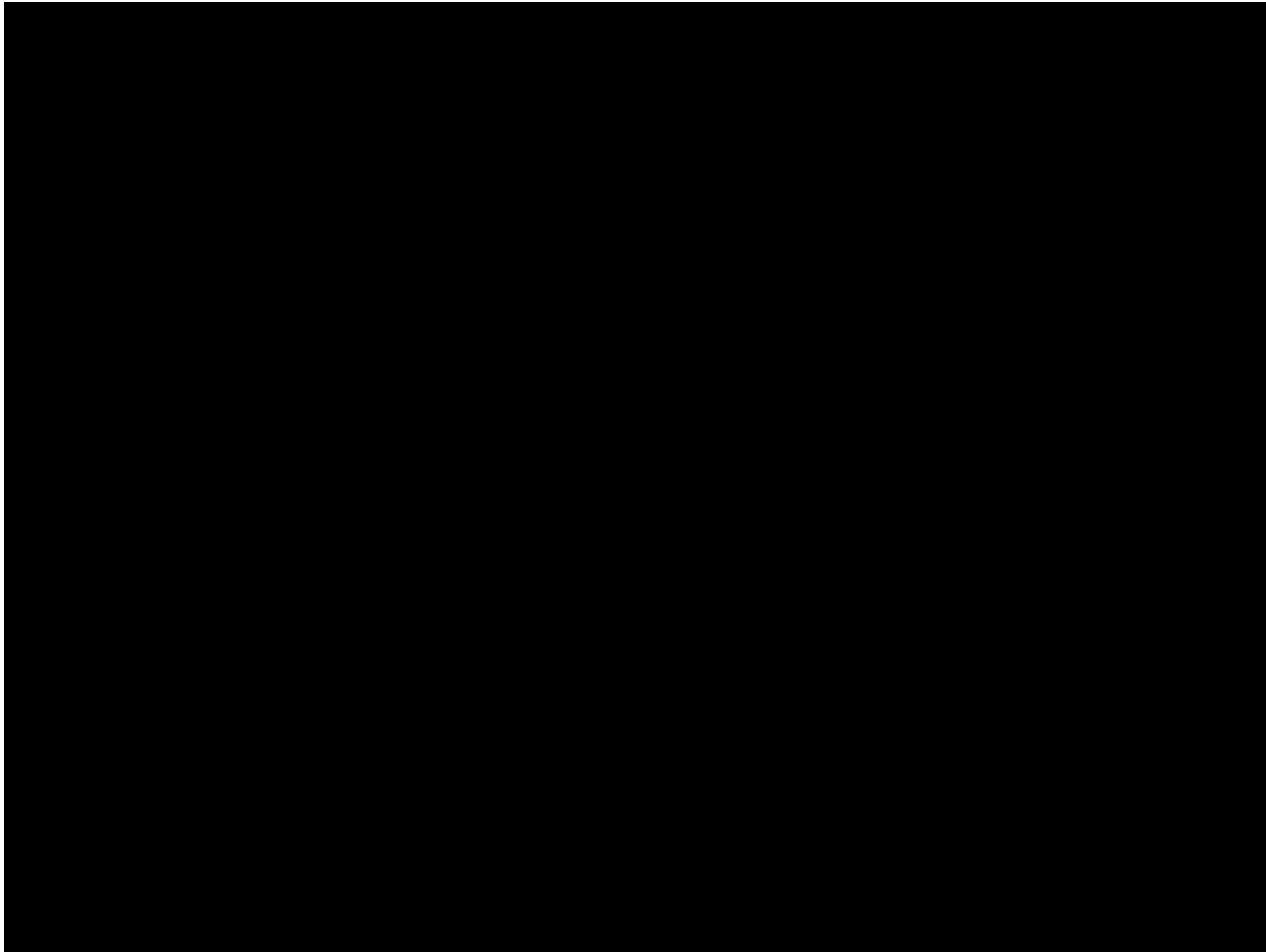
Assumes PA Prod = Future (2.0 pts/hr)





# What Are You Sinking About?

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YOU CAN DO ANYTHING,  
BUT NOT EVERYTHING.

-DAVID ALLEN



# Conclusions

---

- Optimizing staffing in the emergency department requires understanding core flow concepts like queuing theory and the theory of constraints
- An accurate assessment of demand, capacity, and variation is necessary to be successful
- A consistent approach to staffing is necessary to achieve consistent results
- Physician staffing cannot be looked at in isolation and must be contextualized relative to nurse staffing, bed constraints, physical space, skill mix and acuity mix