ED Staffing

Understanding your ED capacity

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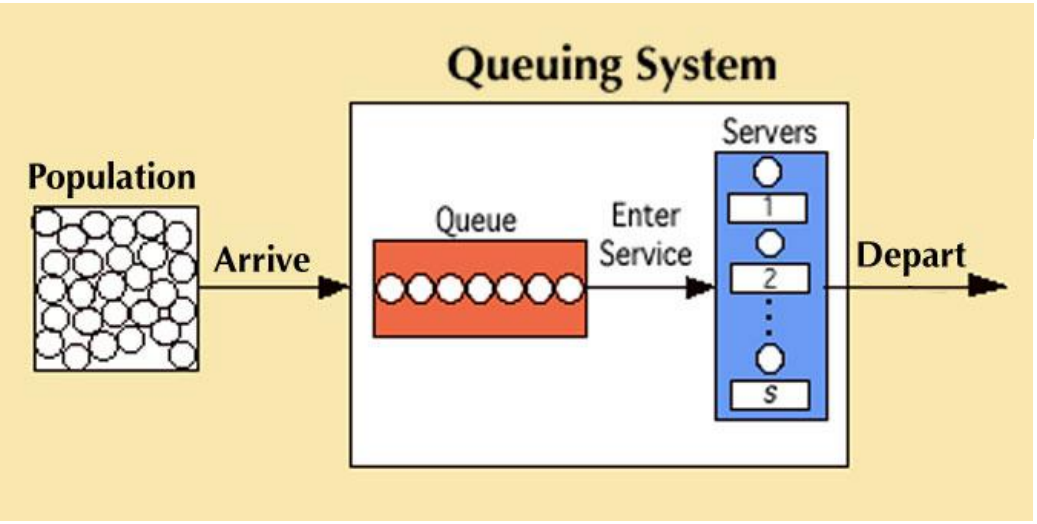
Questions

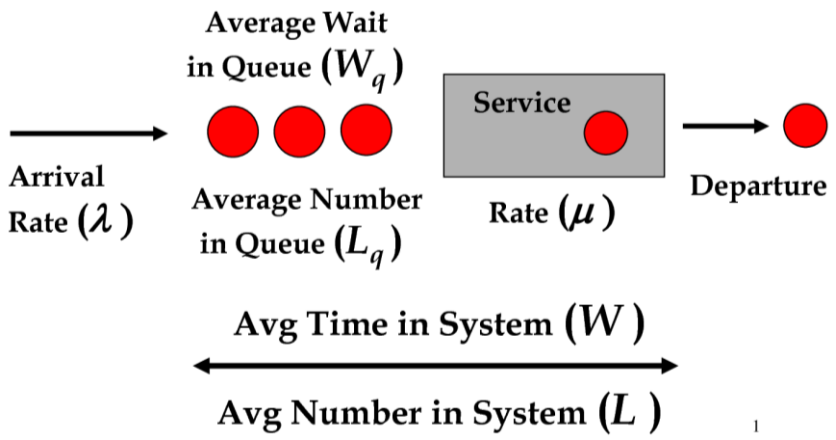
- How many physician staffing hours do I need?
- How many nursing hours?
- Am I using the right benchmarks?
- If my staff is very efficient, why do I have longer than desired wait times?

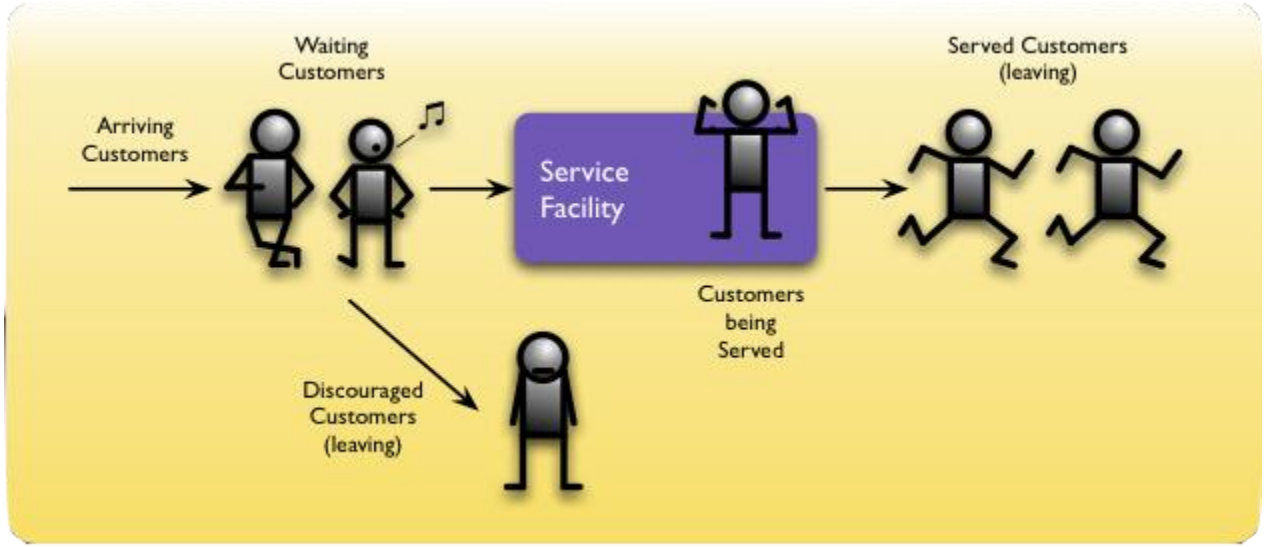
Assess your ED staffing : Five concepts

- Understand Queuing Theory
- Understand the Arrival Rates & Acuity Levels of Your Patients
- Measure Your Provider Capacity
- Aligning Capacity With Demand
- Continuously Reassess Your Staffing

Queuing Theory

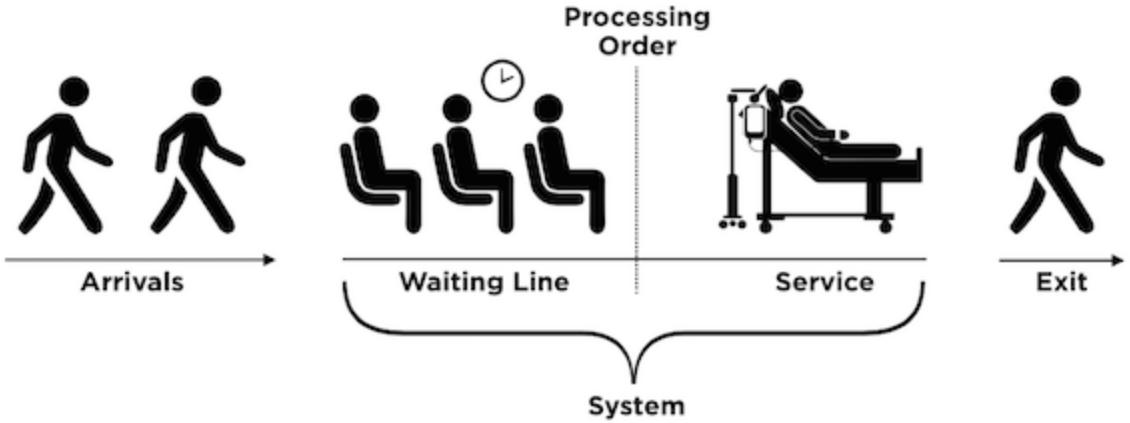






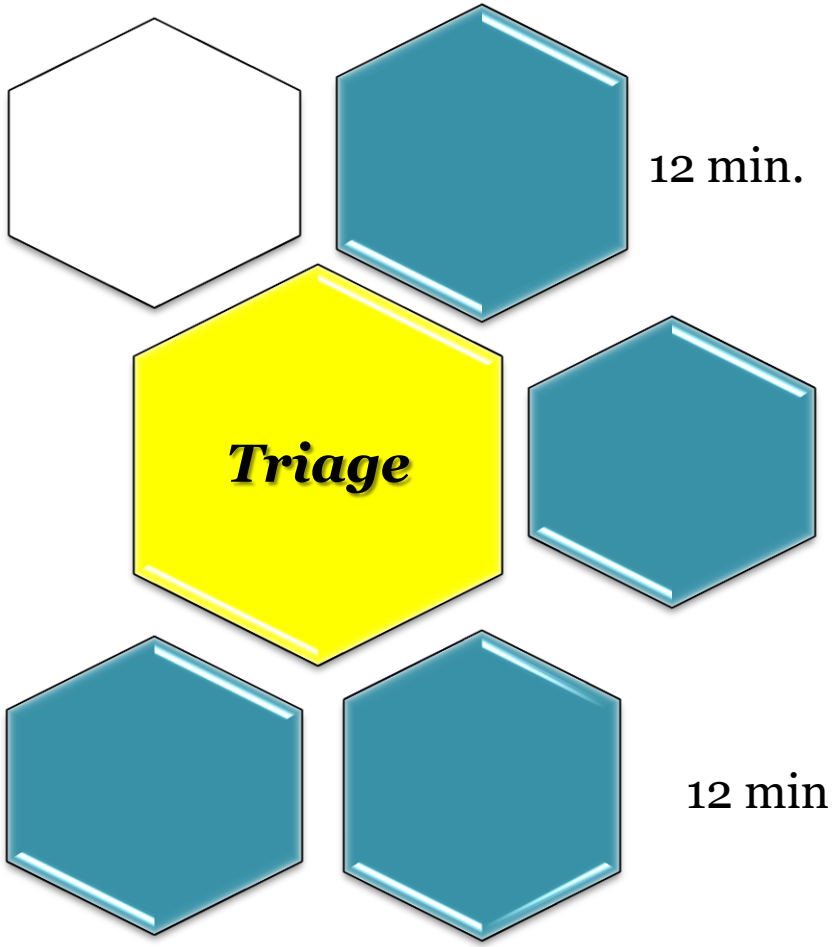
Queuing Theory

- Predict wait times and line lengths
  - Arrival rate and the service rate
    - How many patients are arriving by hour of day?
    - How long does a provider spend with each patient?
- Variation in system
  - Arrival side and the service side
    - Accidents and injuries
    - Extreme complexity of patients, requires varying levels of provider time.

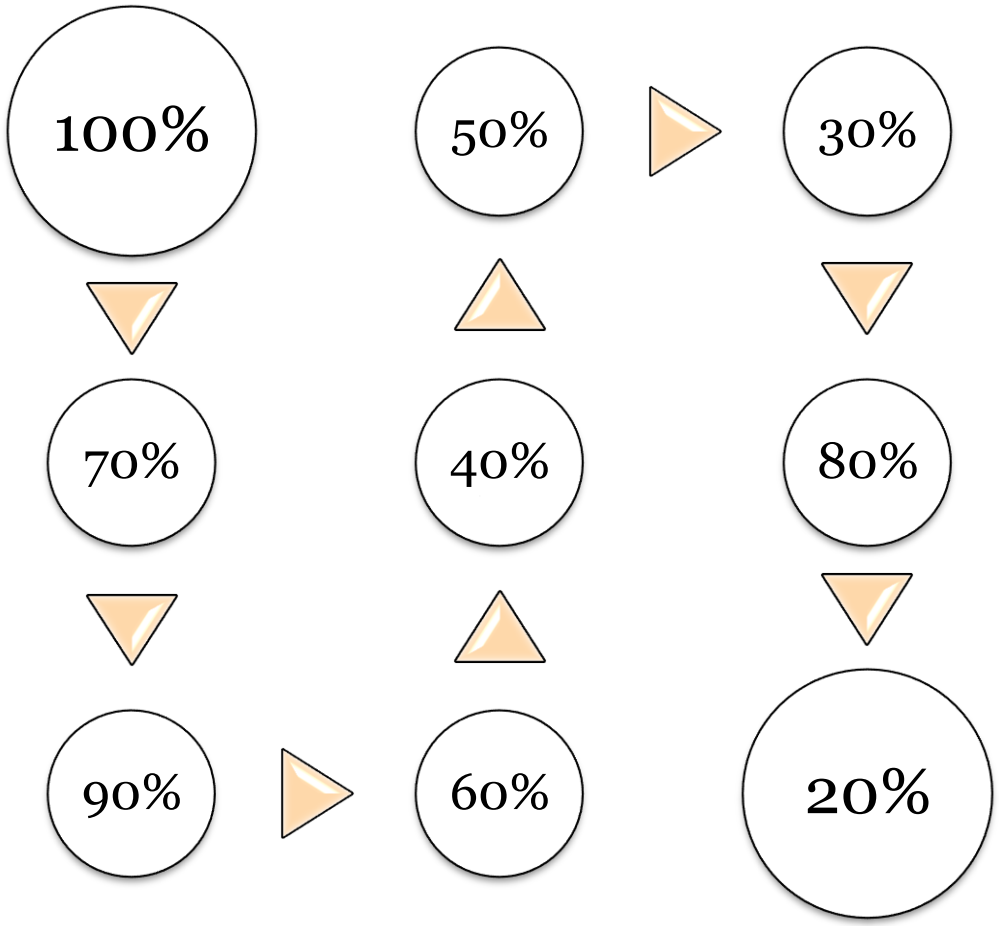


Utilization

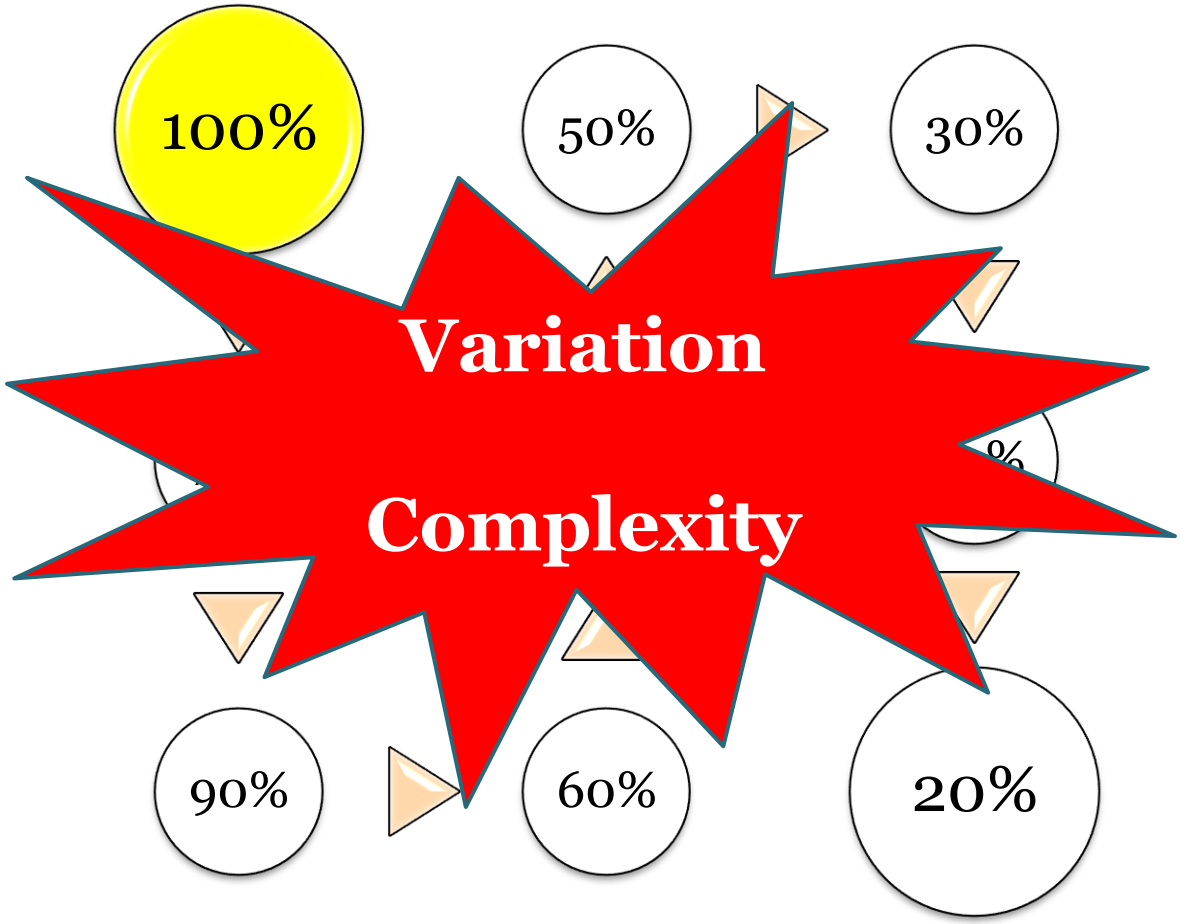
Utilization = 4/5
0.8 or 80%



Utilization



Utilization



Utilization

- Waiting in the ED must be minimized

Key providers :
Physicians and nurses

Cannot perform at *100 percent utilization*

Variation must be reduced

FIG. 1: THE IMPACT OF INCREASING UTILIZATION RATES ON PATIENT WAIT TIMES

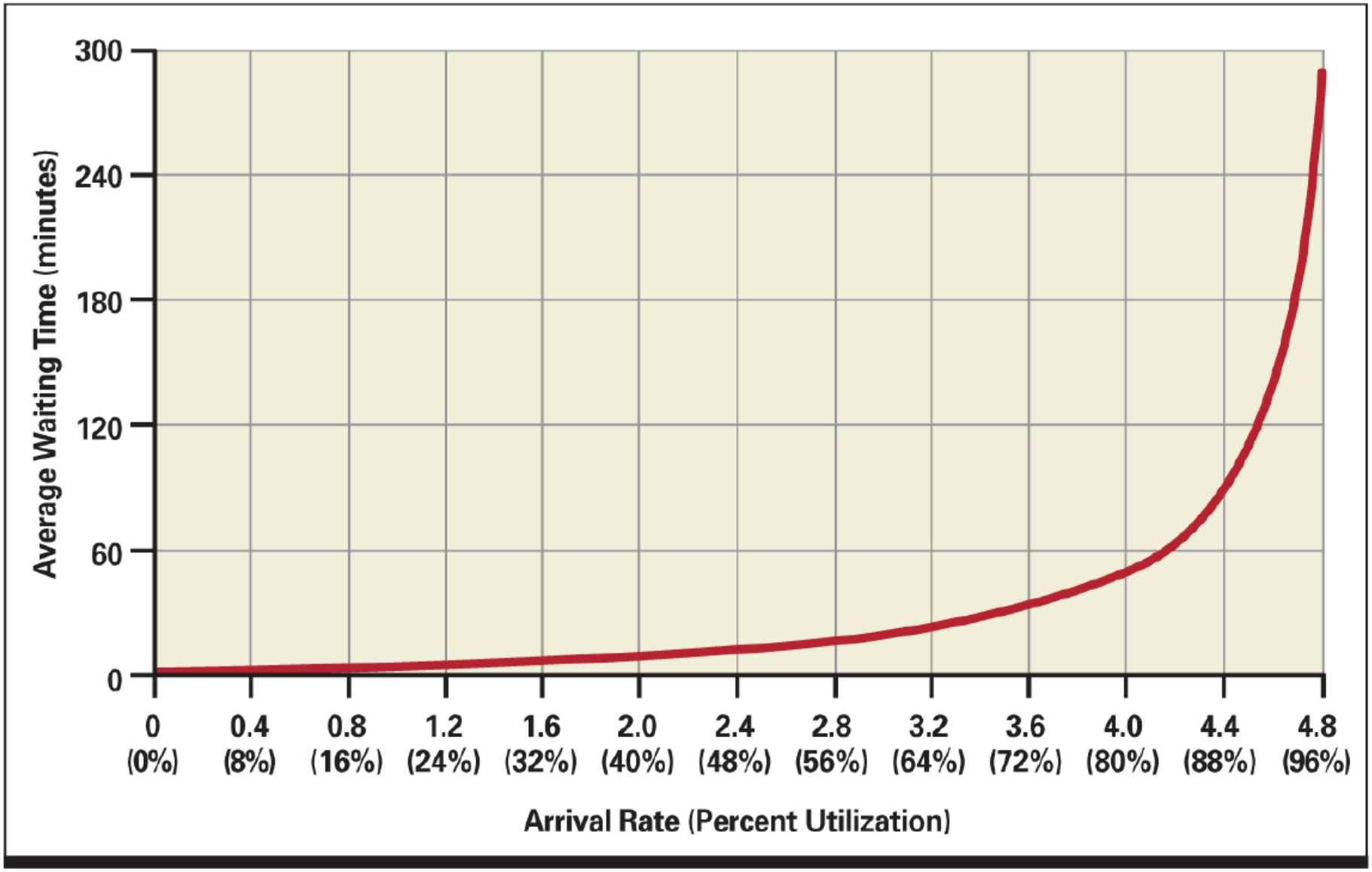


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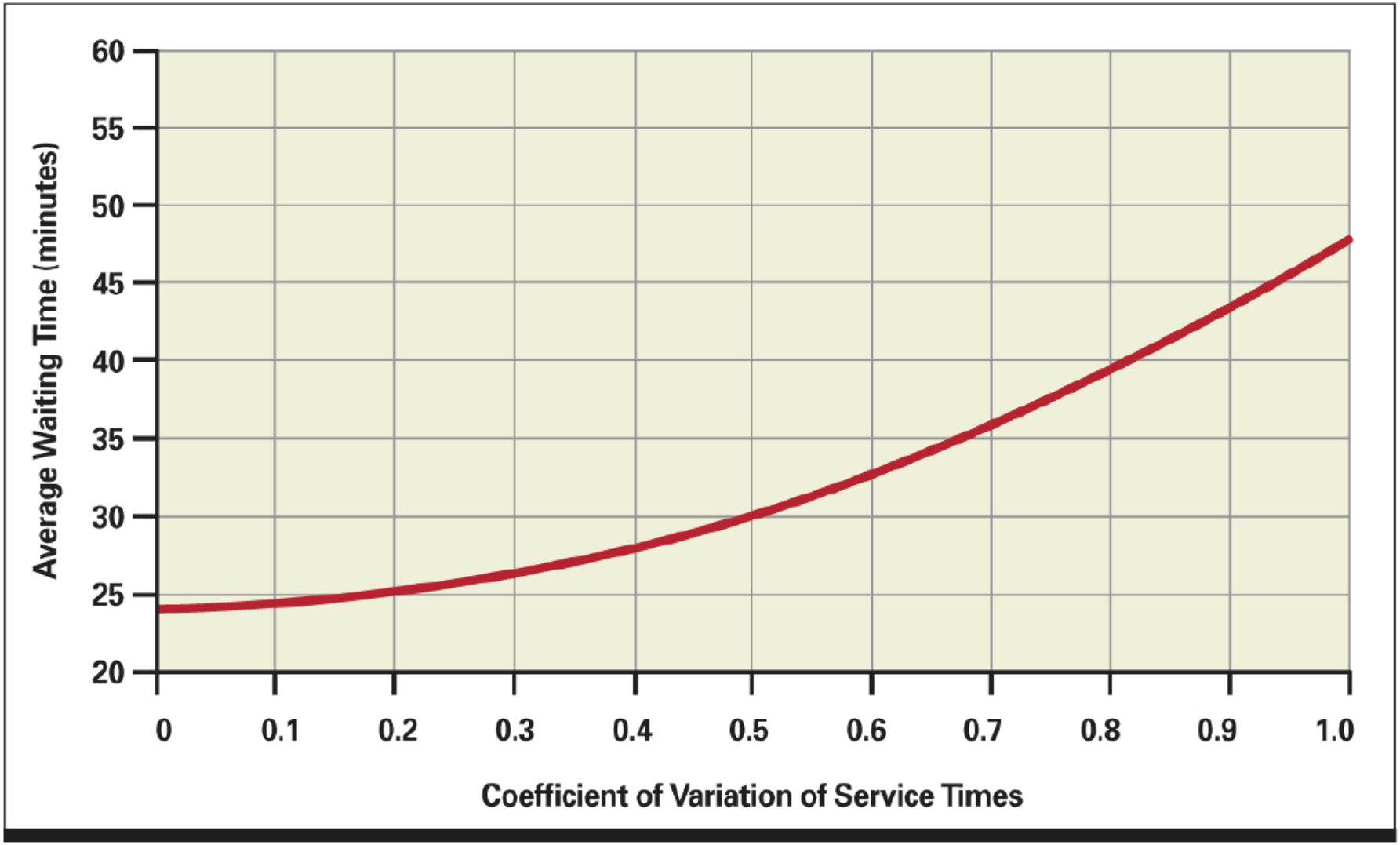
FIG. 2: THE IMPACT OF INCREASING VARIATION ON PATIENT WAIT TIMES



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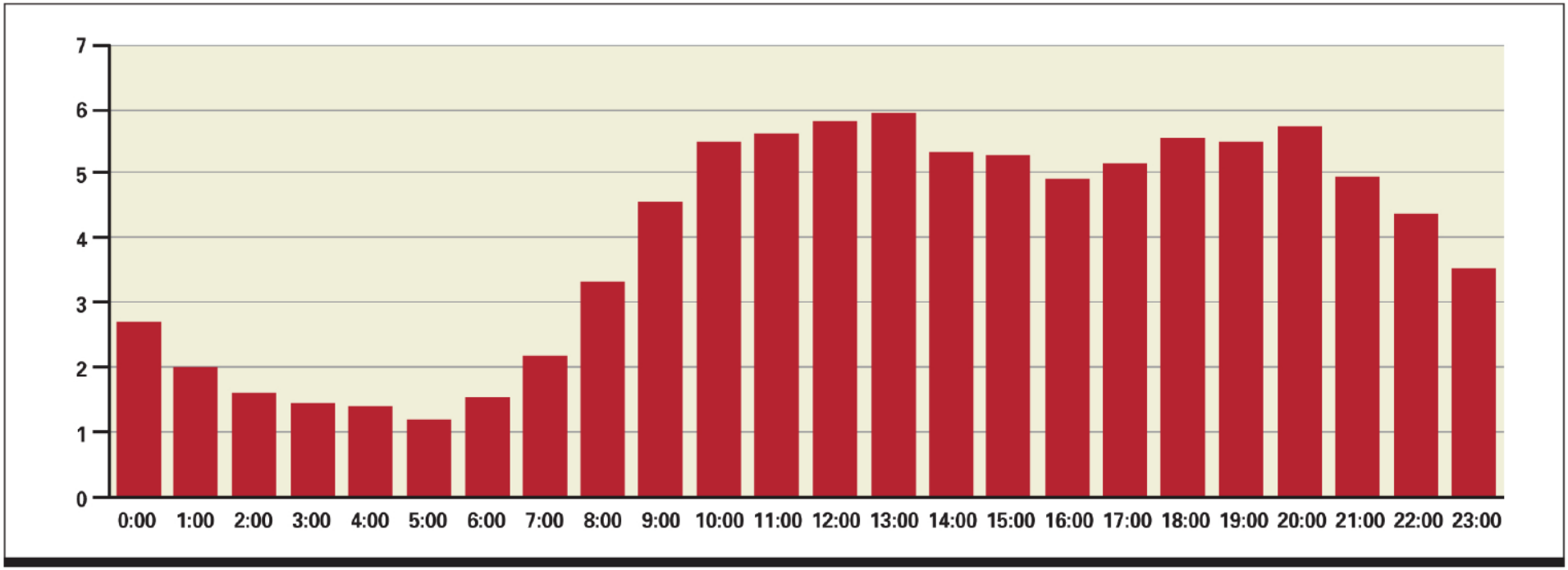
Understand the Arrival Rates & Acuity Levels of Your Patients

Arrival rate = Demand = Staffing

FIG. 3: AVERAGE ARRIVALS BY HOUR FOR A 35,000 VISIT ED



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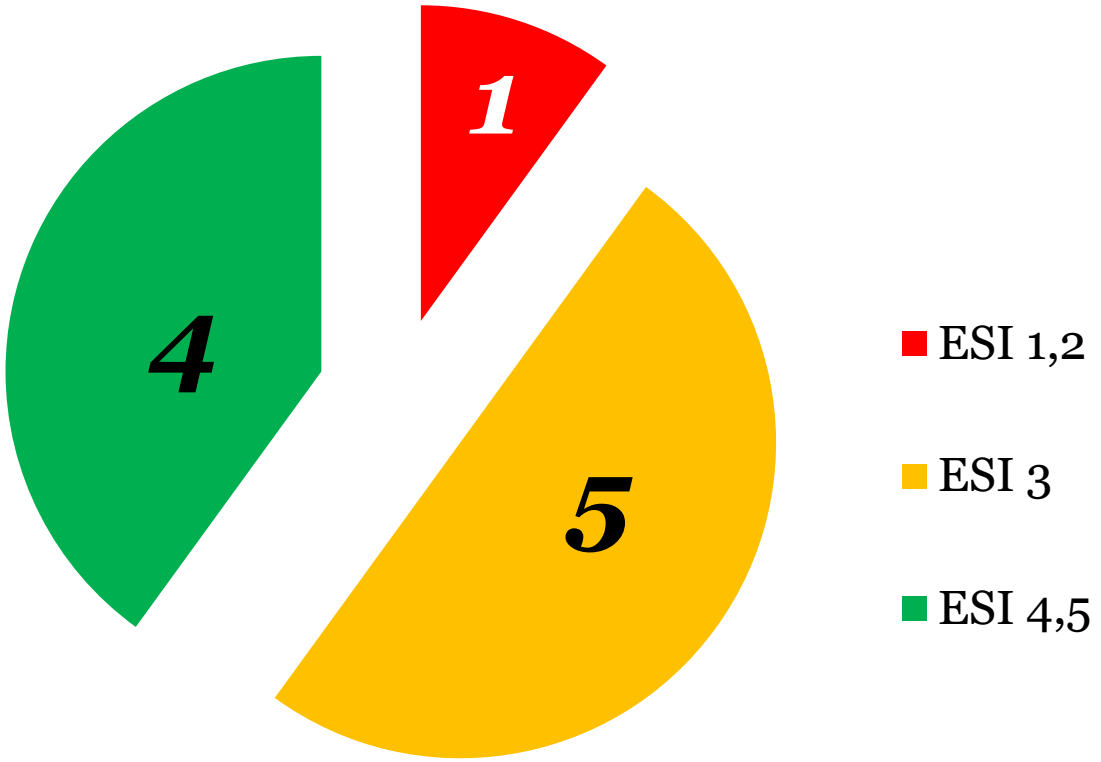
Arrival Rates & Acuity Levels

*If **10** arrivals per hour*



Measure Your Provider Capacity

- ***Capacity*** is essentially your physicians' and nurses' ability to treat

  - calculated based on the average ***productivity*** and the ***number of providers*** you have working at *each hour* of the day

Capacity = Productivity(per hour) x Number of providers

Productivity

- ***Physicians*** : patients per hour
- ***Nurses*** : worked hours per patient

$$\text{Patients per hour} = \frac{1}{\text{Worked hours per patient}}$$

Productivity

Easy way to calculate

Productivity = Average arrival rate per day / Physician hours or Nurse hours

Good range :

Physician 1.8-2.0 pts./hr.

Nurse 0.5-0.8 pts./hr.

Productivity

Example 1

physician hours 16/d = 16 x 8 hr. = 128 hr/d
nurse hours 51/d = 51 x 8 hr. = 408 hr/d

if arrival rate per day = 250

physician productivity = 250/128 = 1.9 pts/hr
nurse productivity = 250/408 = 0.6 pts/hr

Good range :
Physician 1.8-2.0 pts./hr.
Nurse 0.5-0.8 pts./hr.

Productivity

Example 2

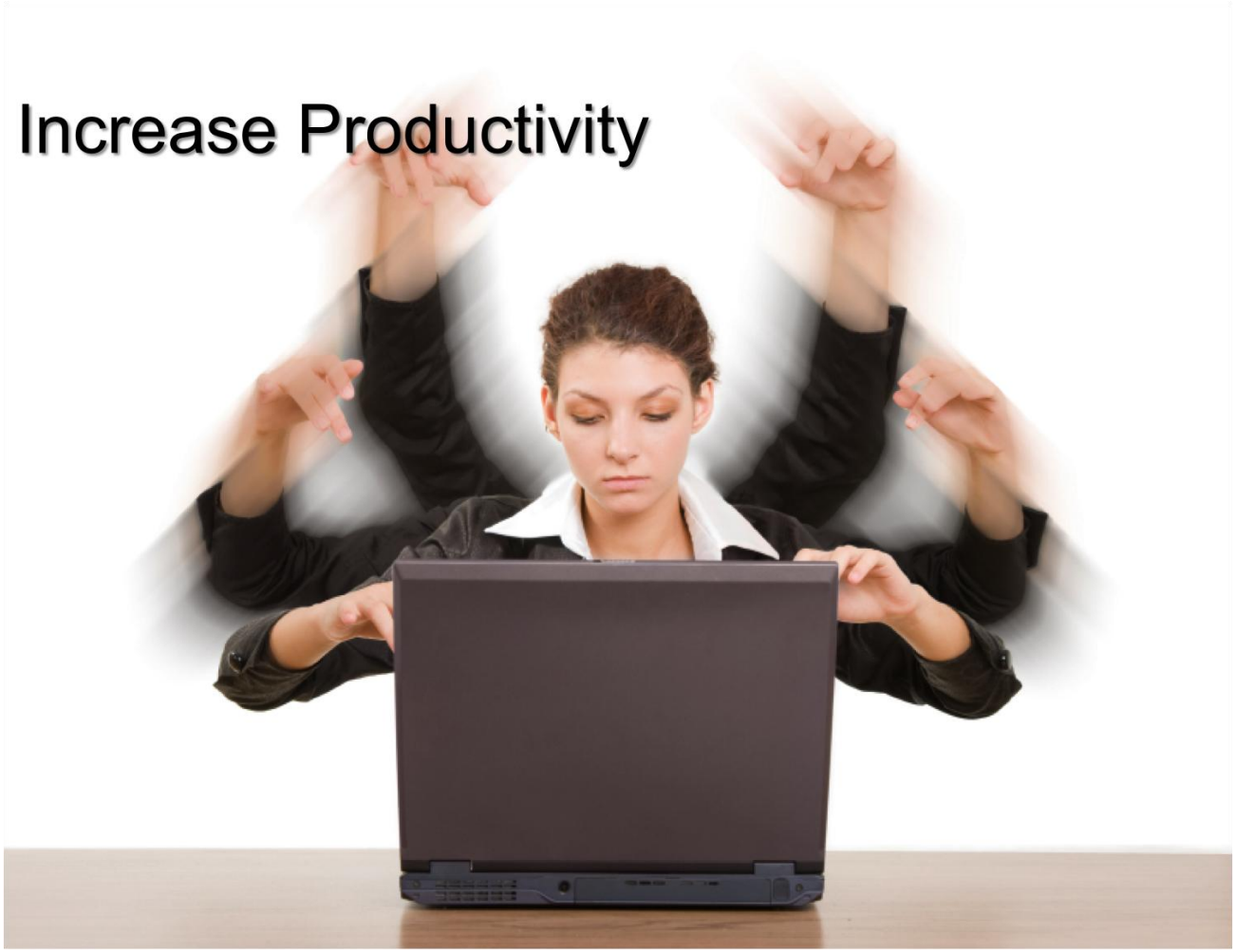
physician hours 16/d = 16 x 7 hr. = 112 hr/d
nurse hours 51/d = 51 x 7 hr. = 357 hr/d

if arrival rate per day = 250

physician productivity = 250/112 = 2.2 pts/hr
nurse productivity = 250/357 = 0.7 pts/hr

Good range :
Physician 1.8-2.0 pts./hr.
Nurse 0.5-0.8 pts./hr.

Increase Productivity



Productivity

Lower productivity

- high acuity mix
- high admission rate
- excessive numbers of midlevel providers or inexperienced physicians
- confounding variables such as boarding or process related issues

Higher productivity

- efficient processes in the ED and support areas
- favorable acuity mix

Aligning Capacity With Demand

Demand = Arrival rates

physician/nurse capacity = number of providers X productivity

to understand the problem

match capacity per hour and arrival rate per hour

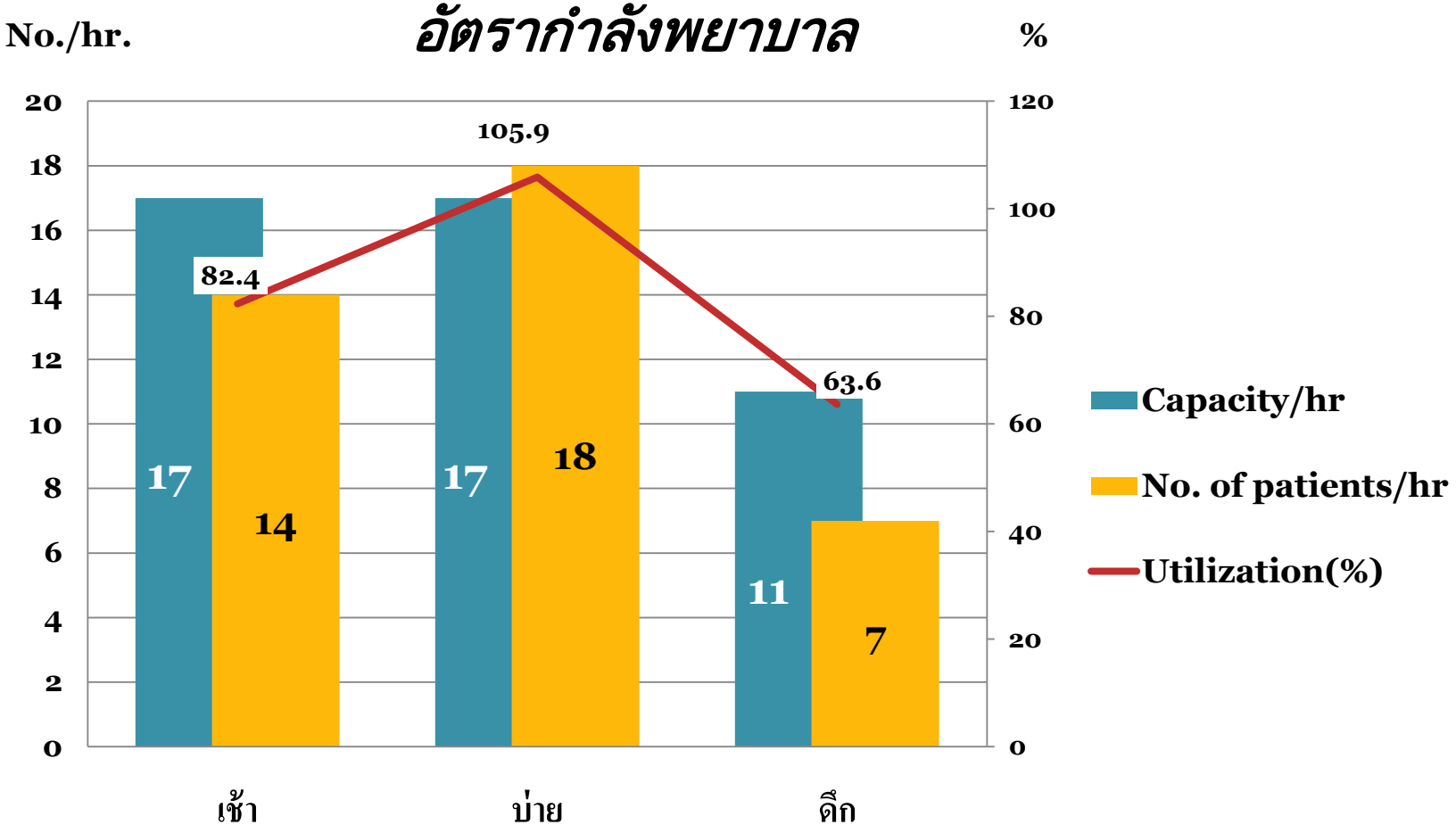
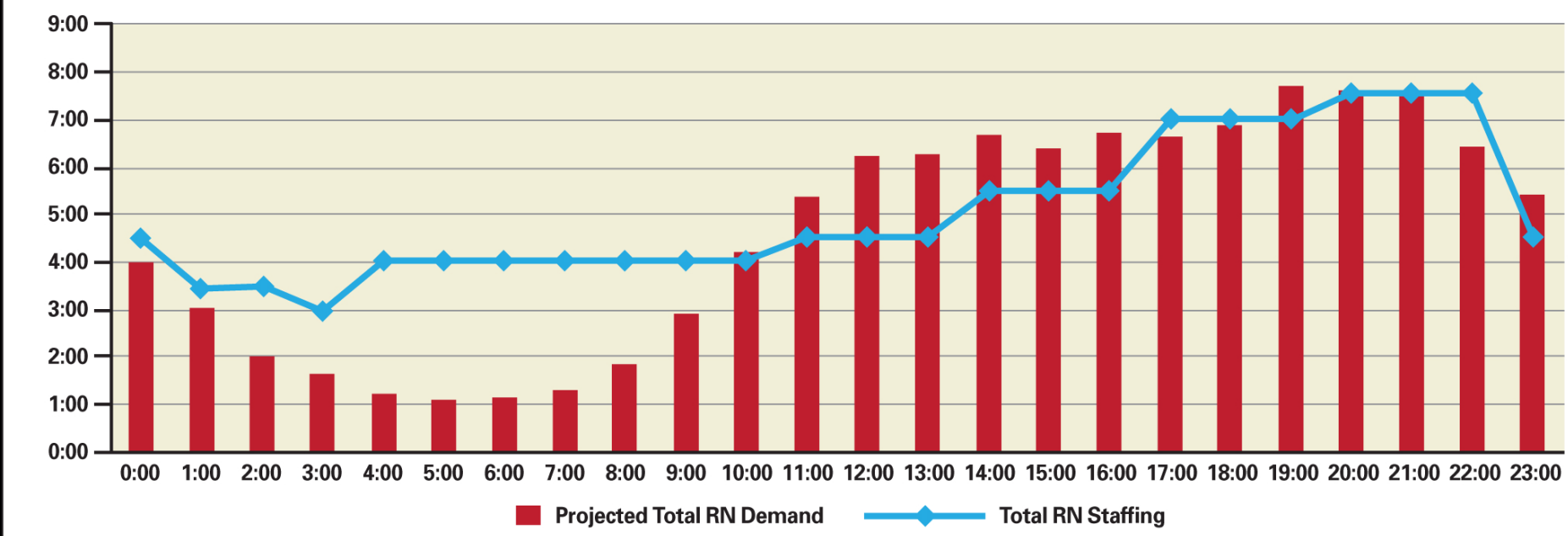

อัตรากำลังพยาบาล
No./hr.
%
20
18
16
14
12
10
8
6
4
2
0
120
100
80
60
40
20
0
105.9
82.4
63.6
17
14
17
18
11
7
เช้า
บ่าย
ดึก
Capacity/hr
No. of patients/hr
Utilization(%)

FIG. 4: AGGREGATE DEMAND/RN CAPACITY



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Capacity and Demand

Weekday ≠ Weekend

10-20% variation of arrival rates

But most EDs have the same staffing patterns 7 days a week.

Another consideration

- Boarding patients
  : Consumes ***nursing resources***,
  but not physician resources

- Trauma and other infrequent but high-demand patients

The waste : *Same pattern of staffing 7 days a week*

Too many or too few nurses/hr of the day

: *too few nurses* cannot care for the arriving volume

: *too many nurses* → hidden in reduced productivity levels on these days


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Continuously Reassess Staffing

- Sustain the system : continuous measurement and realignment
- If the volume of patients increases by 10 patients per day
  - increase nurse/physician hours
- Real-time demand/capacity matching
  - frustrate staff
  - require excessive numbers of as-needed (PRN) and temporary staffing
  - cost more money
  - harmful staff culture and morale

Five concepts

- *Understand Queuing Theory*
- *Understand the Arrival Rates & Acuity Levels of Your Patients*
- *Measure Your Provider Capacity*
- *Aligning Capacity With Demand*
- *Continuously Reassess Your Staffing*

Thank You