CONGRESSO REGIONALE *SIMEU* 2013:
Ferrara — 8 Febbraio 2013
Aula Magna "Nuovo Ospedale S. Anna" Cona, Ferrara

Il Pronto Soccorso
e il ricovero appropriato

Il boarding e i suoi rischi

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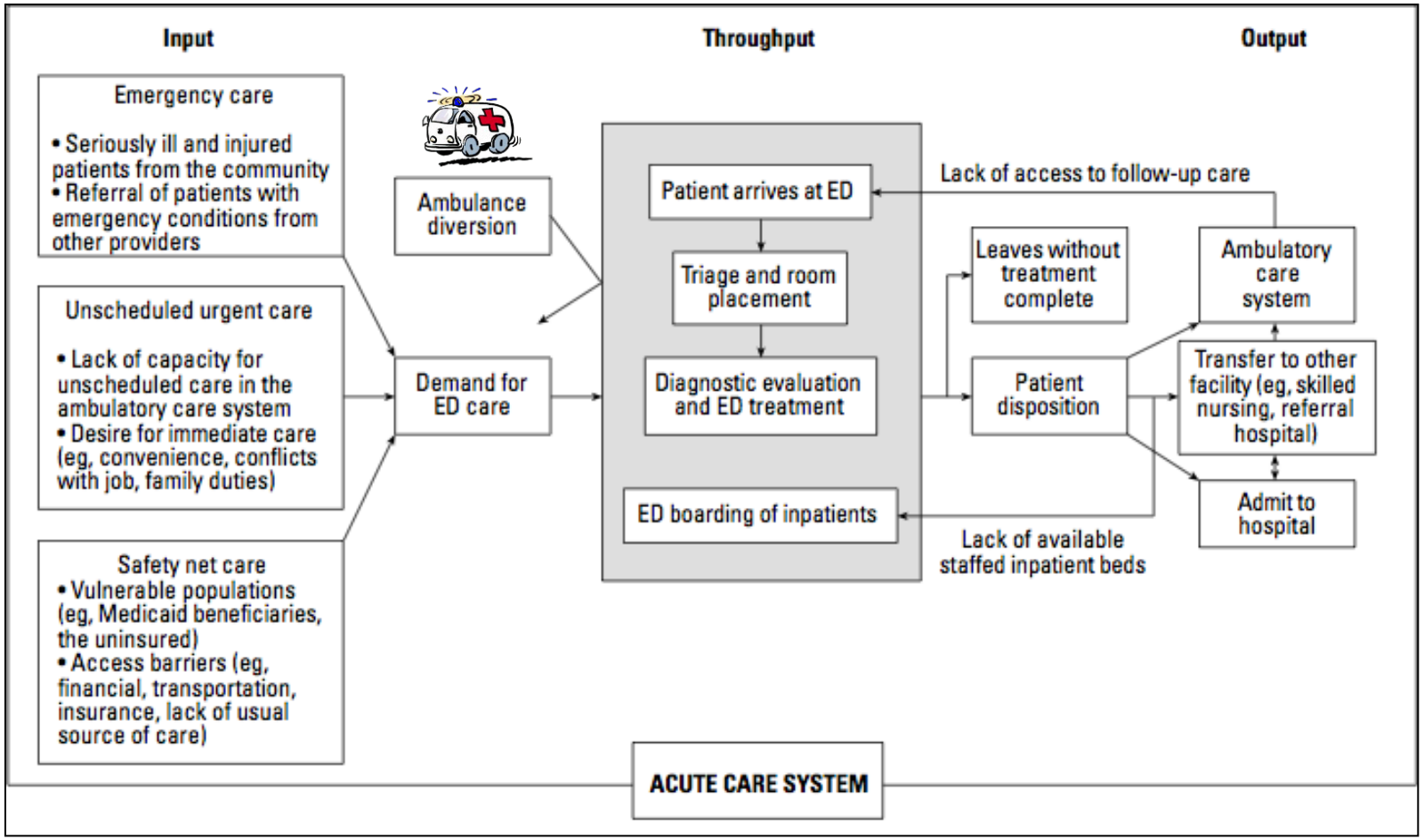
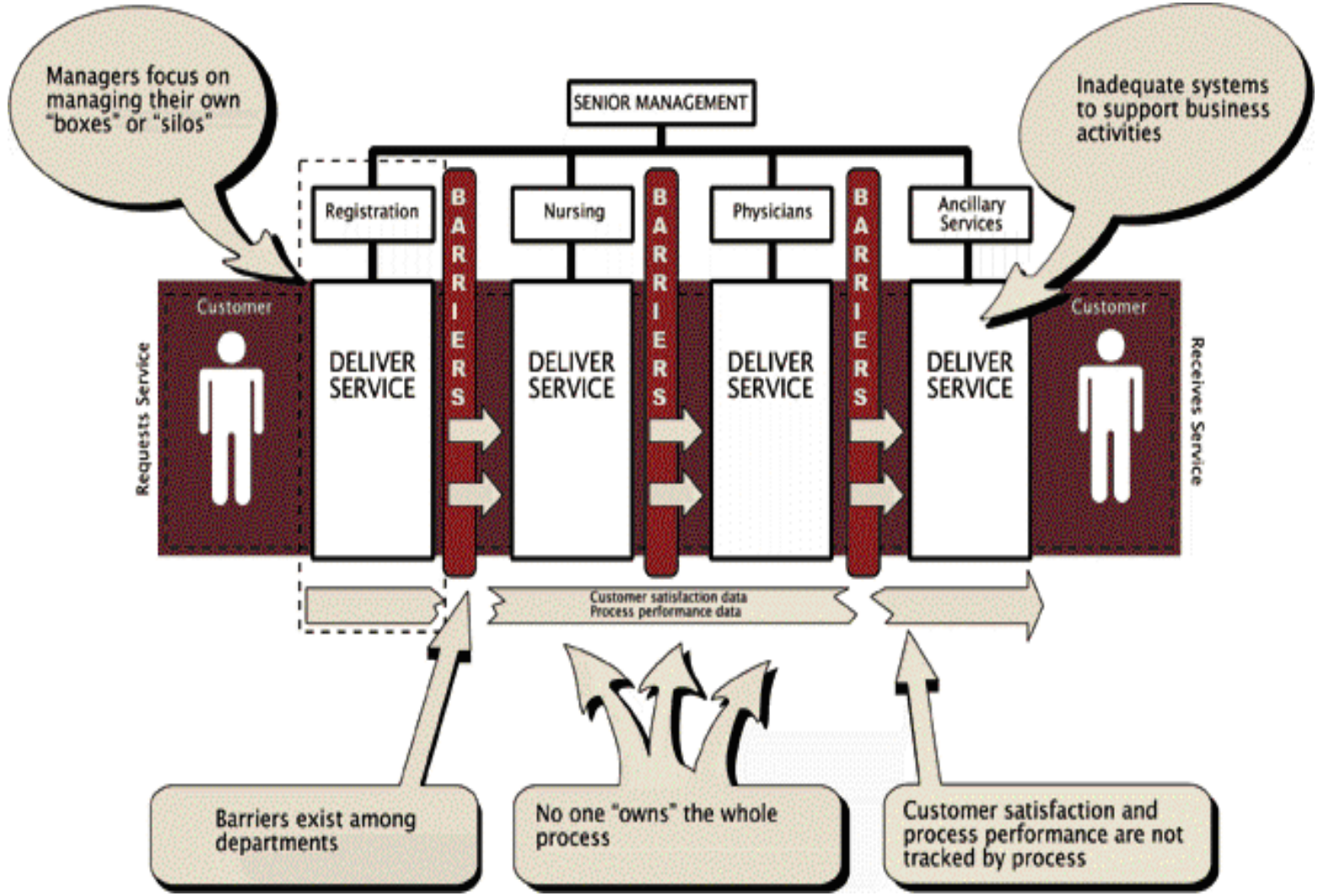
Conceptual Model of Flow in ED

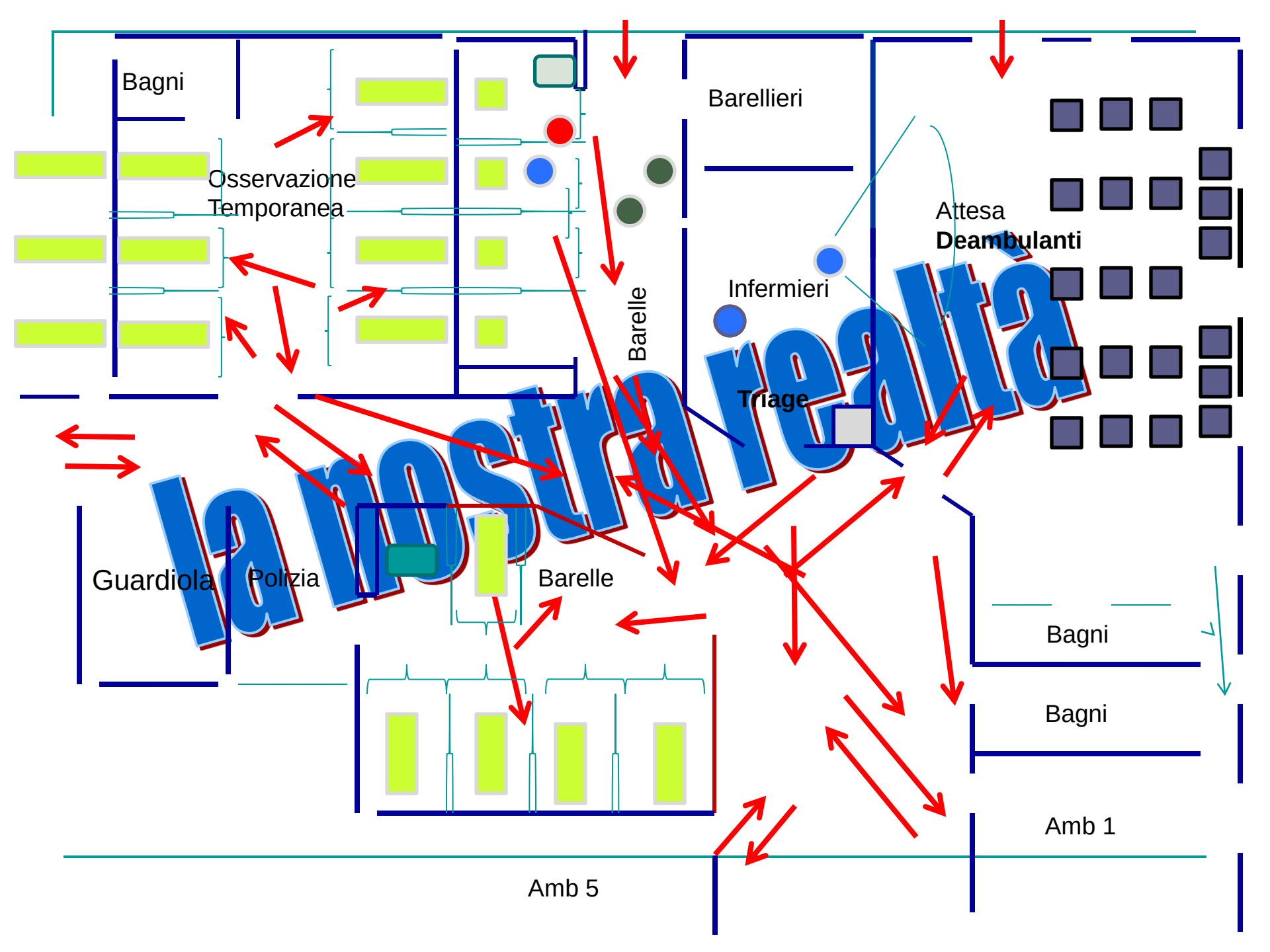
Input ↓ Throughput ↓ Output ↓



Putting the patient in the middle ….



Source: Mike Hill, MD


Bagni
Osservazione
Temporanea
Barellieri
Attesa
Deambulanti
Infermieri
Barelle
Triage
la nostra realtà
Guardiola
Polizia
Barelle
Bagni
Bagni
Amb 1
Amb 5

Crowding and Boarding . ….

"Hard to define, but I know it when I see it"

Crowding

"debated, unclear and variable"

Boarding

"the process of holding patients in the ED for extended periods of time"

Access Block

"the prolonged wait for an inpatient hospital bed after ED treatment"

Over-crowding has led to an increase in boarding (*the practice of treating patients in the ER hallways*)….

Generally agreed that boarding is the major culprit in ED overcrowding

Causes of ED over-crowding

1. Input Factors: What brings patients into the ED
2. Throughput Factors: Bottlenecks within the ED
3. Output Factors: Obstacles outside the ED

Principali cause di sovraffollamento

INPUT	THROUGHPUT	OUTPUT
Crisi sistema cure primarie	Complessità delle cure	Sovraccarico di pazienti ricoverati
Fasce vulnerabili	Organico inadeguato	Ritardo delle dimissioni
Invecchiamento popolazione	Ritardi servizi di supporto diagnostico	Access block
Epidemiologia		Riduzione dei posti letto
Aumentate richieste di salute		

Effects of Crowding & Boarding

Adverse Outcomes
- Patient Mortality

Reduced Quality
- Transport Delays
- Treatment Delays

Impaired Access
- Ambulance Diversion
- Patient Elopement

Provider Losses
- Financial Effects

Implication for team
- Verbal or physical assault
- Impaired gratification
- Burn-out

Negative Effects of Crowding & Boarding

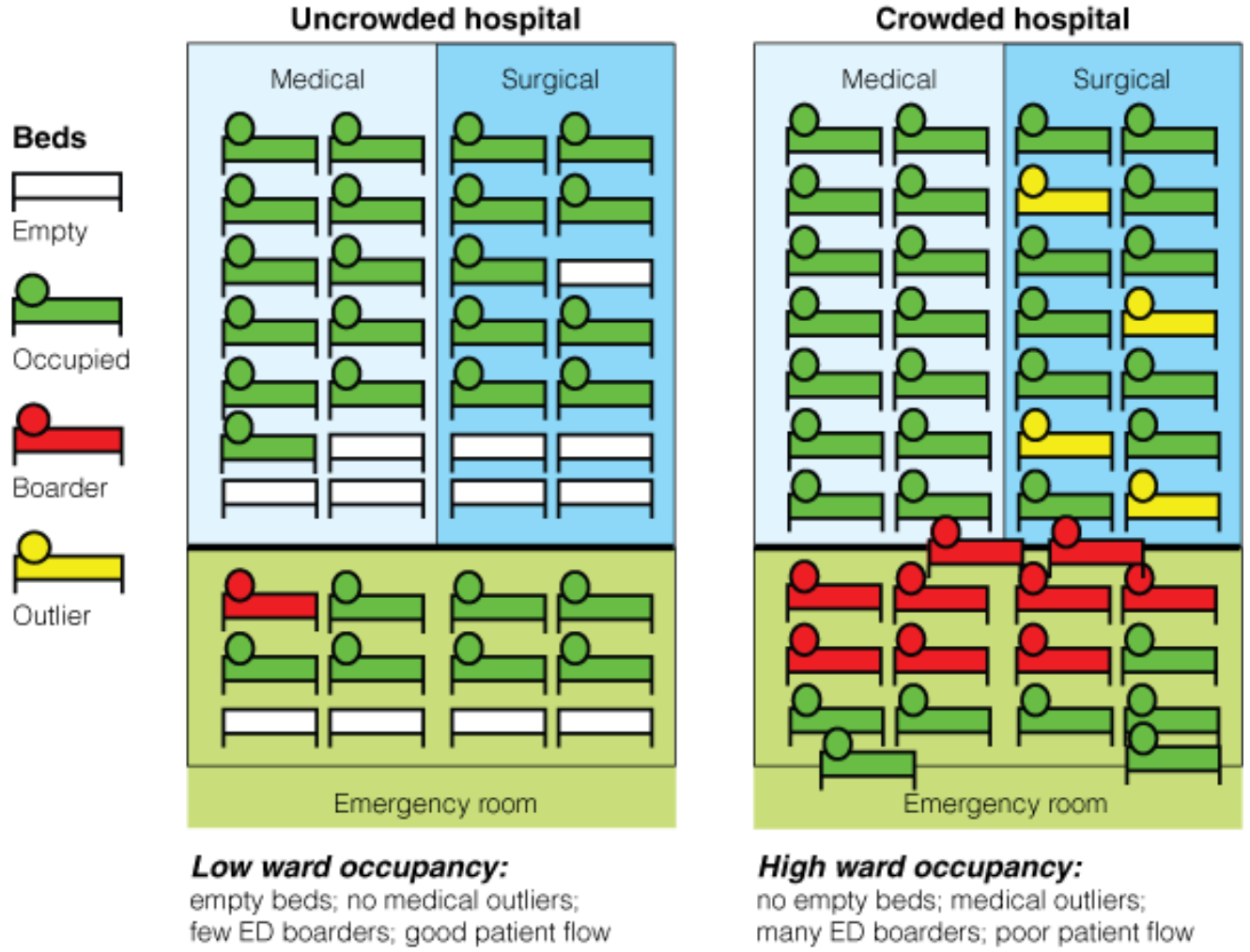
Mortality

Wait Times

Medical Errors

Hip # Pain - *Hwang 2006 (VOL)*
Hip # Surg - *Richardson 2009 (BT)*
ABx Pneumonia - *Fee 2007 (VOL)*
ACS Chest Pain - *Pines 2009 (OCC)*
NSTEMI - *Diercks 2007 (LOS)*
High Acuity - *McCarthy 2009*
Abdo Pain - *Mills 2009*
Pain Tx - *Pines 2008*
Lytics - *Schull 2004 (DIV)*

"Changes to ED structure and function do not address the underlying causes or major adverse effects of overcrowding…
[these] lie outside the ED *Richardson, Med J Aust 2006*



ED =emergency department. Boarders =patients waiting for an inpatient bed. Outliers=patients unable to be admitted to the “correct” ward (eg, medical patients on surgical wards).

Peter C Sprivulis, Julie-Ann Da Silva, Ian G Jacobs, Amanda RL Frazer and George A Jelinek The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments; MJA 2006; 184: 208–212

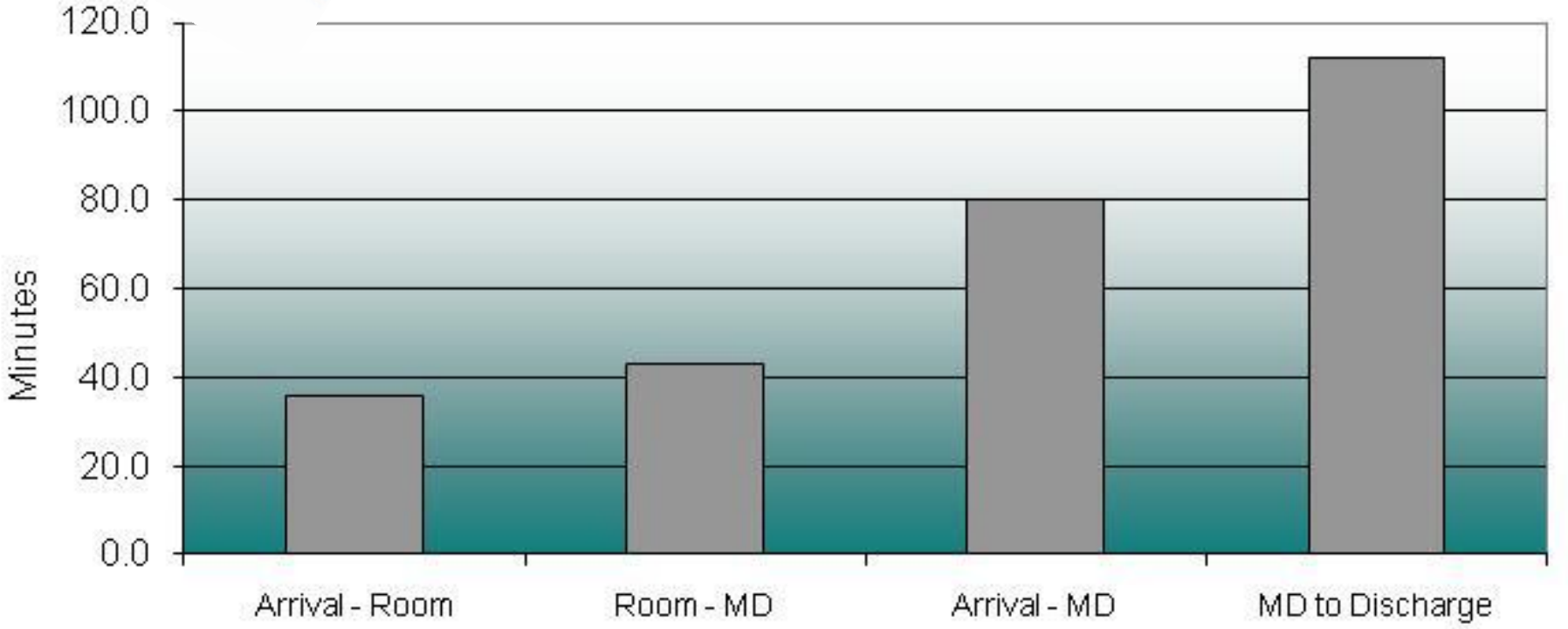
Negative Effects of Crowding & Boarding

- Increased door-to-needle times for patients with suspected acute myocardial infarction (*Schull et. al. 2004*)
- Lower likelihood of patients with community-acquired pneumonia to receive timely antibiotic therapy (*Fee et. al. 2007, Pines et. al. 2007*)
- Poor pain management (*Hwang et. al. 2008*)
- Increased mortality (*Richardson et. al. 2006, Sprivulis et. al. 2006*)
- Lower patient and staff satisfaction (*Boudreaux 2004, Richards, 2000*)
- High occupancy was estimated to cause 13 deaths per year.

ED Boarding is one of the largest factors slowing a patients stay in the Emergency Department.

ED Process Bottlenecks

BSA Health System
ED Discharges Average Throughput Times, 2010



Top Barriers to Inpatient Assessment

- Admission criteria not utilized consistently
  - ICU
  - Tele/step down units
- Complex admission process utilizing multiple systems
  - Silos in patient movement
  - Overlap of responsibilities
  - No clear expectations and authority

Solutions …

1. Reduced Request / Supply ratio
2. Real Time Metric Measurements
3. Staff by Demand by Forecasting Flux Models
4. Redesigning of Intake Process
5. Streamline ED Ordering
6. Quality Improvement
7. Discharge Slotting

1. Reduced Request / Supply Ratio

Prospective Identification and Triage of Nonemergency Patients Out of an Emergency Department: A 5-Year Study

Study objective: To determine whether nonemergency patients can be prospectively identified by triage nurses and safely triaged out of the emergency department without treatment.

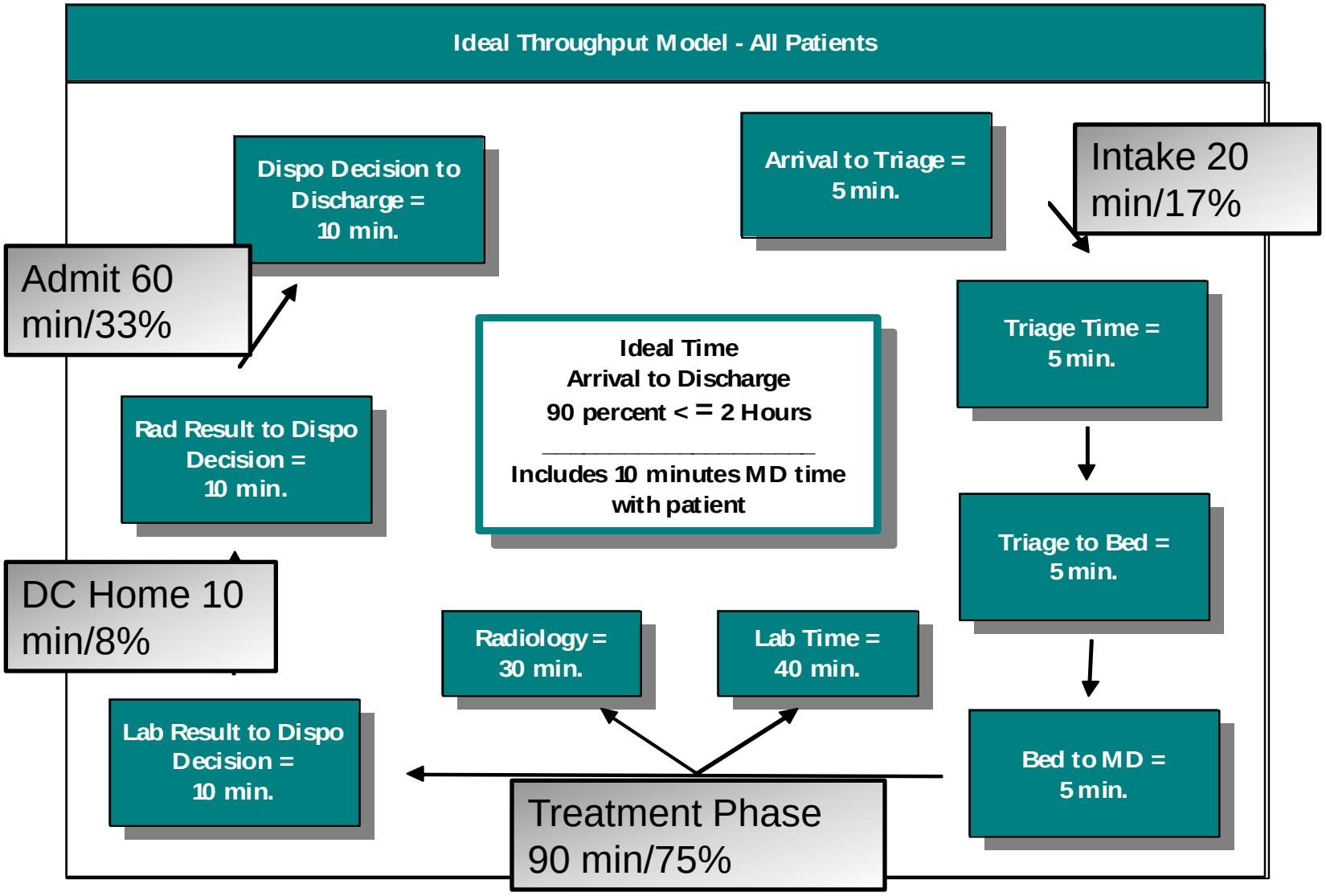
Methods: All adult patients (16 years or older) who presented to a university ED were provided an evaluation by a triage nurse. For a patient's case to be defined as nonemergency, four criteria were required: vital signs within a specific range, presence of 1 of 50 potentially nonemergent chief complaints, absence of key indicators found on screening examination, and absence of chest pain, abdominal pain, any severe pain, and inability to walk. Between July 1988 and July 1993, patients who satisfied these criteria were defined as nonemergency, refused care in the ED, and triaged out of the ED. Patients were referred to off-site clinics. The clinics had agreed to see patients in advance of the study, and the referral lists were frequently updated. Outcome data were obtained by telephone surveys to both triaged individuals and other health care providers.

Results: In this 5-year study, 176,074 adults presented to the ambulatory triage area in the ED, and 31,165 (18%) were defined as nonemergency, were not treated, and were referred elsewhere. Letters and telephone calls to all referral clinics, eight local EDs, and the coroner's office identified no instances of gross mistriage and only a small number of insignificant adverse outcomes. Telephone follow-up to individuals triaged away was successful in 34% of calls and showed that 39% of persons received care elsewhere on the same day, 35% received care within 3 days, and 26% decided not to seek medical care. A group of 1.0% sought care at other hospital EDs for minor complaints.

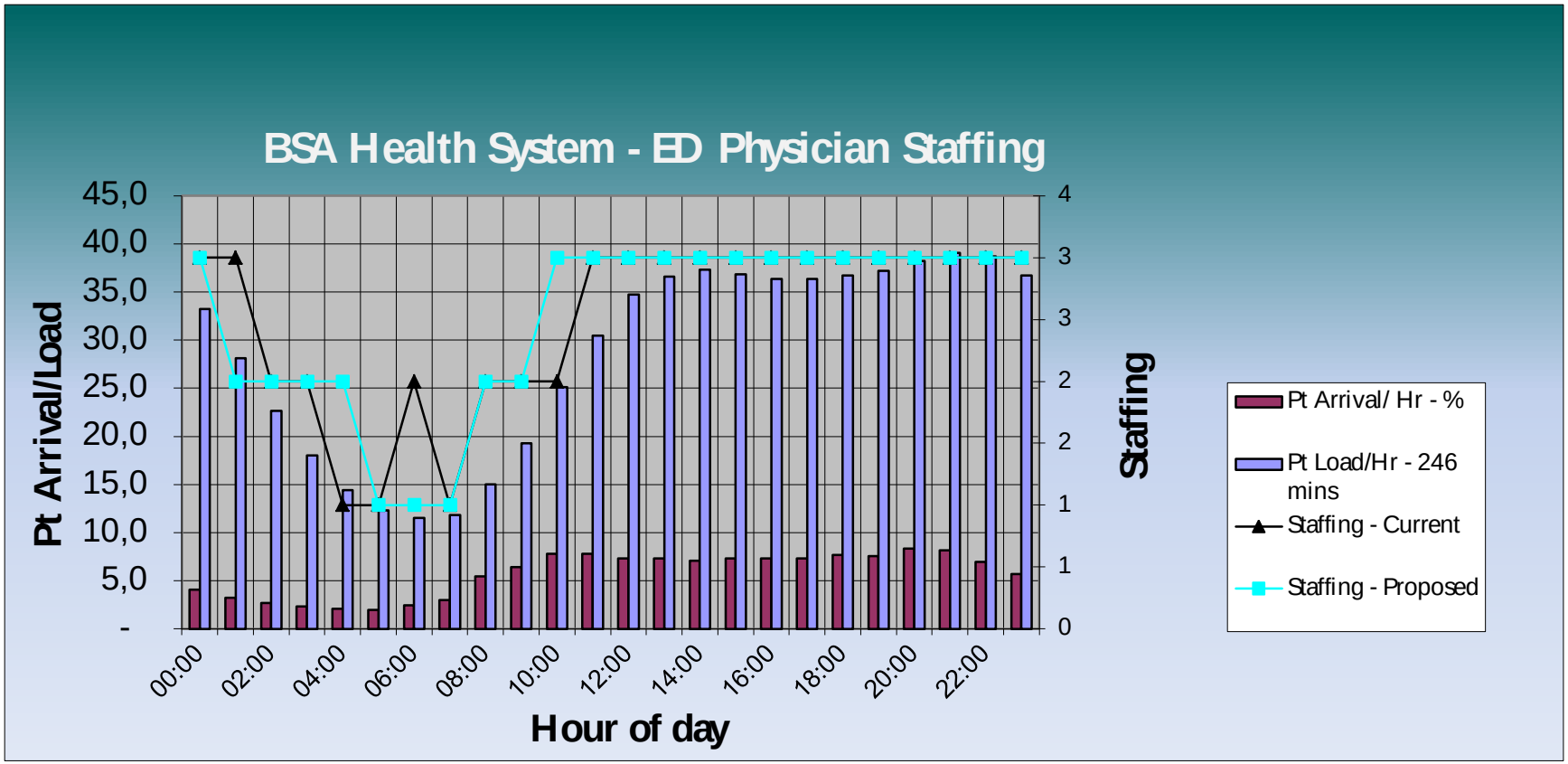
Conclusion: A subset of patients with nonemergency problems can be prospectively identified and triaged out of the ED without significant adverse outcomes provided there is community support for follow-up care.

Derlet RW, Ann Emerg Med 1995

2. Real Time Metrics Measurement



3. Forecasting Flux Models: Staff by Demand



4. Redesigning of Intake Process

1. Rapid Medical Evaluation (RME)
2. All universal rooms (nearly there)
3. Direct to bed – "Pull until Full"

Development of a Rapid Medical Treatment product line

In-depth study of LAB / RAD. utilization process

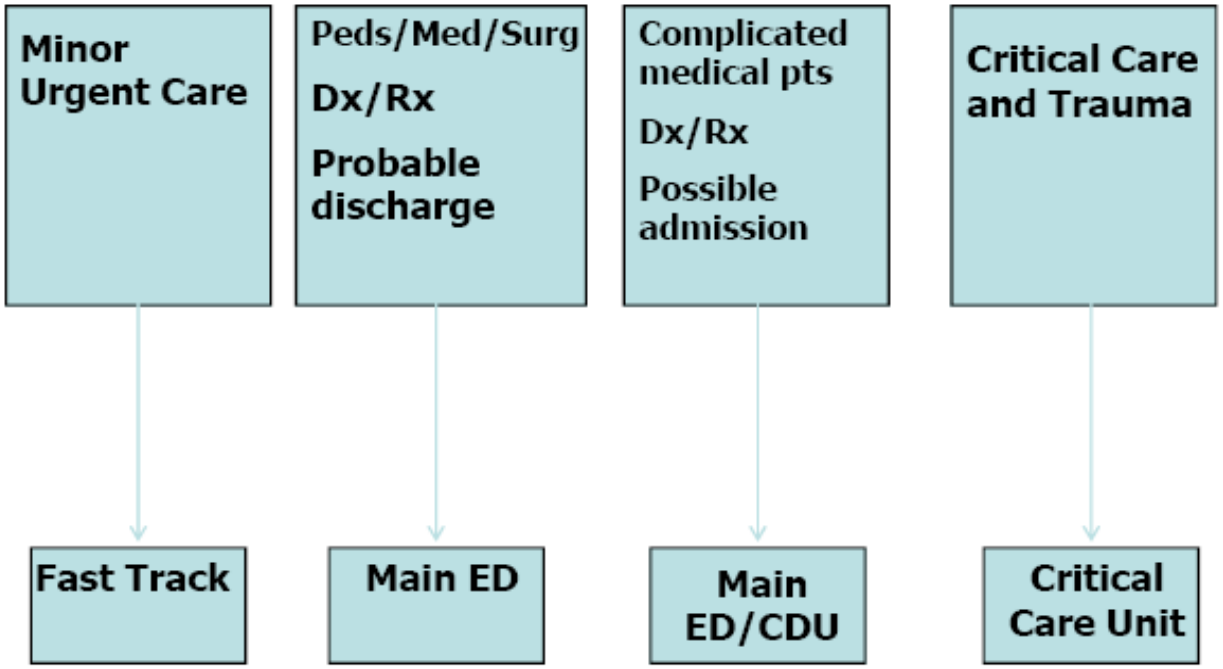
Point-of-Care/Stat LAB

Re-align staff and skill set around demand and skill needs

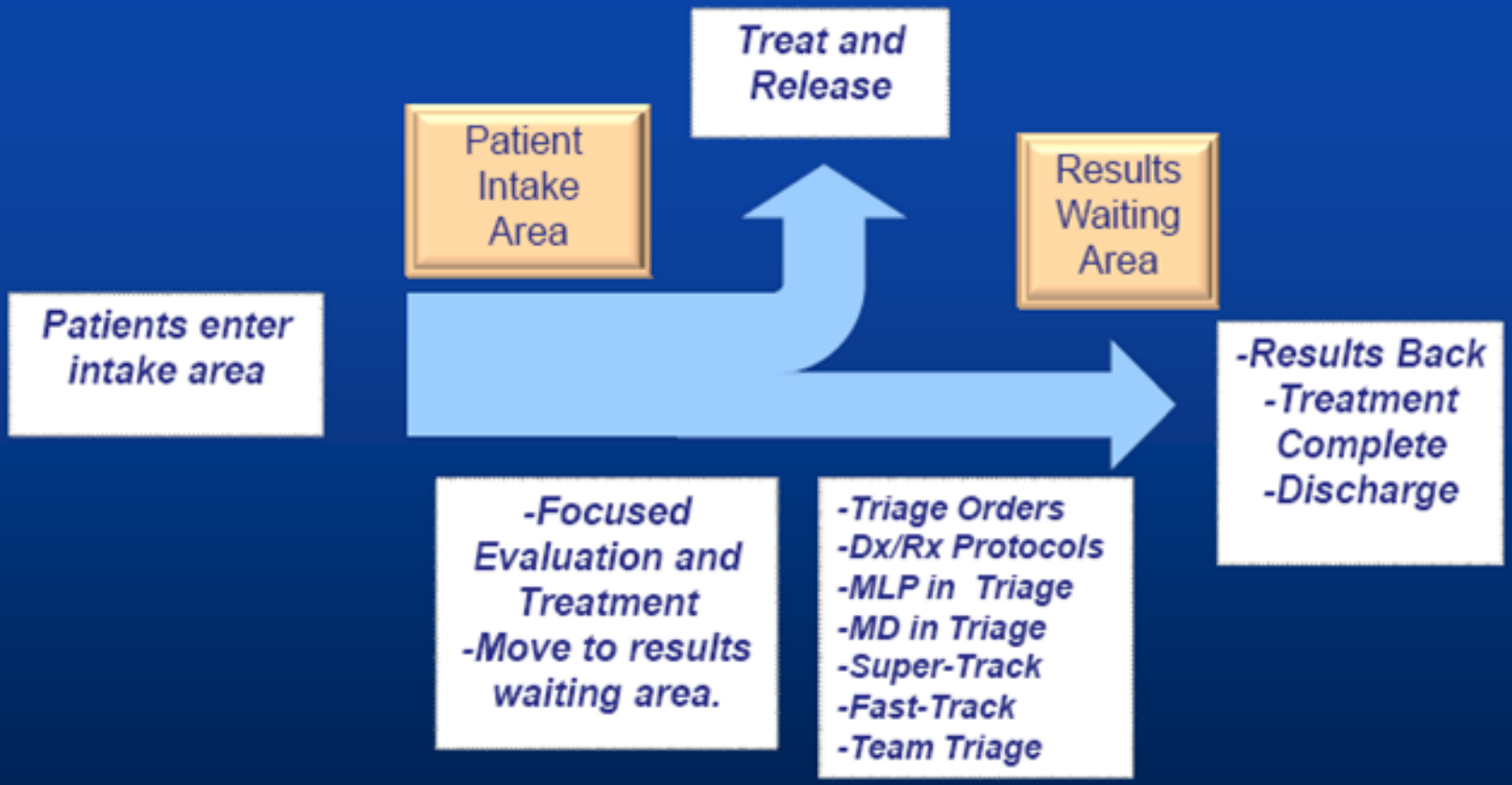
1. Clinical Decision Unit (CDU)
2. Rapid Admission Unit (RAU)
3. Discharge Lounge (DL)

5. Streamline ED Intake & Ordering

Segmenting ED Patient Flow



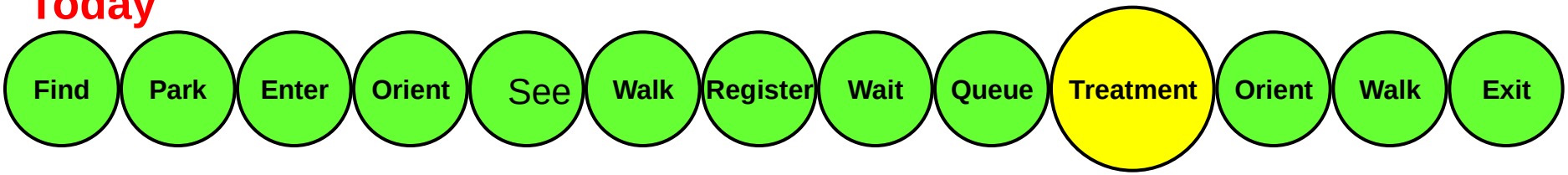
Keeping Our Vertical Patients Vertical and Moving



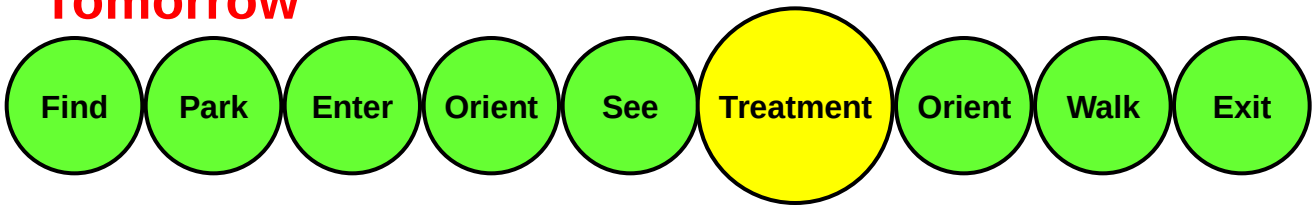
5. Streamline ED Intake & Ordering

100% of the Care…10% of the Experience

Today



Tomorrow

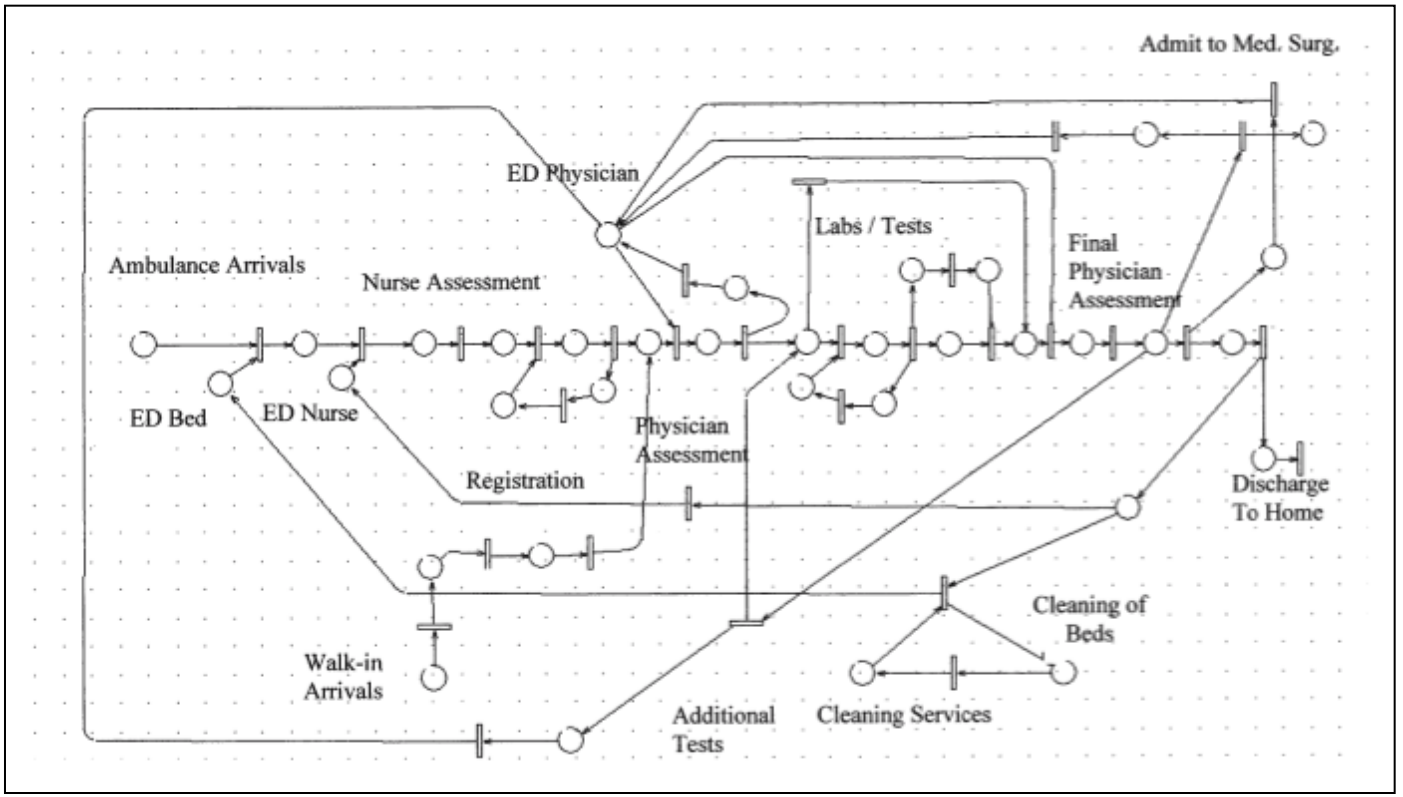


Facility Factors Influencing The Patient Experience

- Visibility
- Image
- Access
- Parking
- Amenities
- Color
- Texture
- Environment
- Convenience
- Sound
- Light
- Nature
- Privacy
- Comfort
- Peace
- Ceremony
- Distance
- Wayfinding
- Dignity
- Security

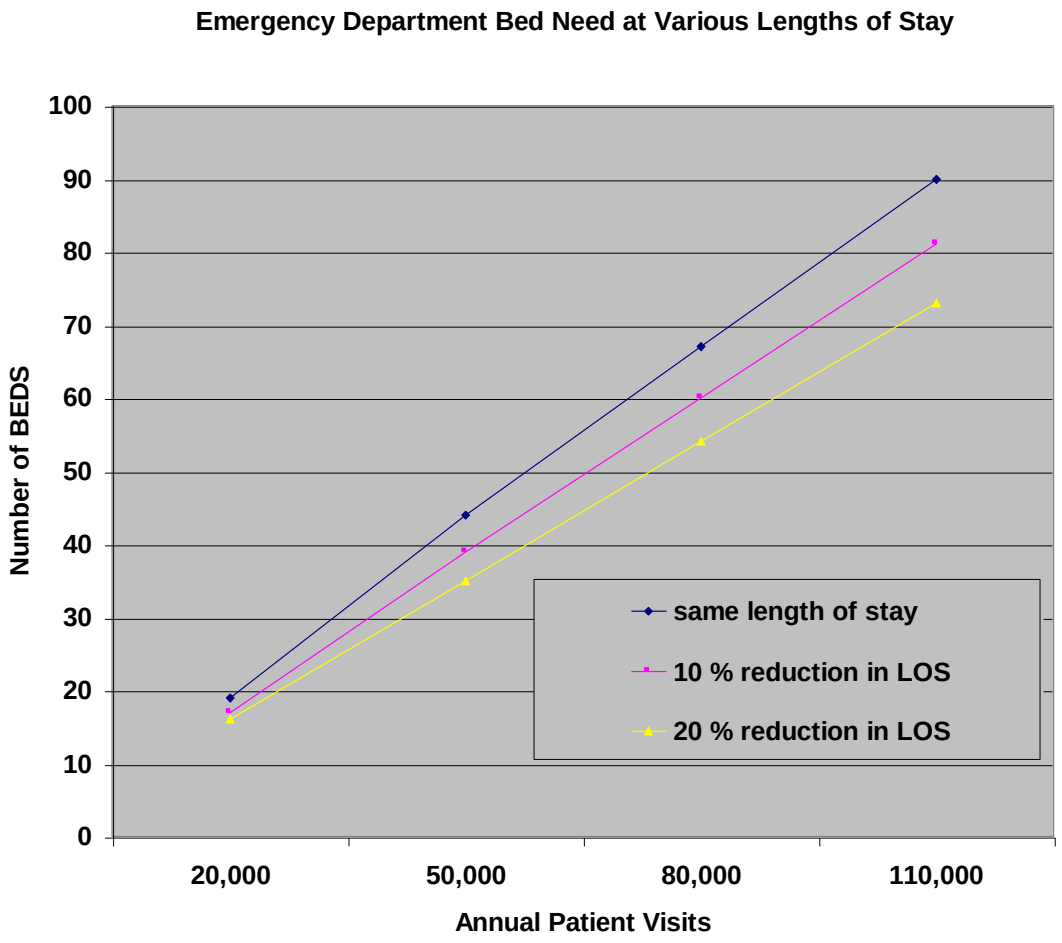
6. Quality Improvement

Applying systems engineering principles in improving health care delivery. *Kopach-Konrad, J Gen Intern Med 2007.*



6. Quality Improvement

Making a Business Case for Flow



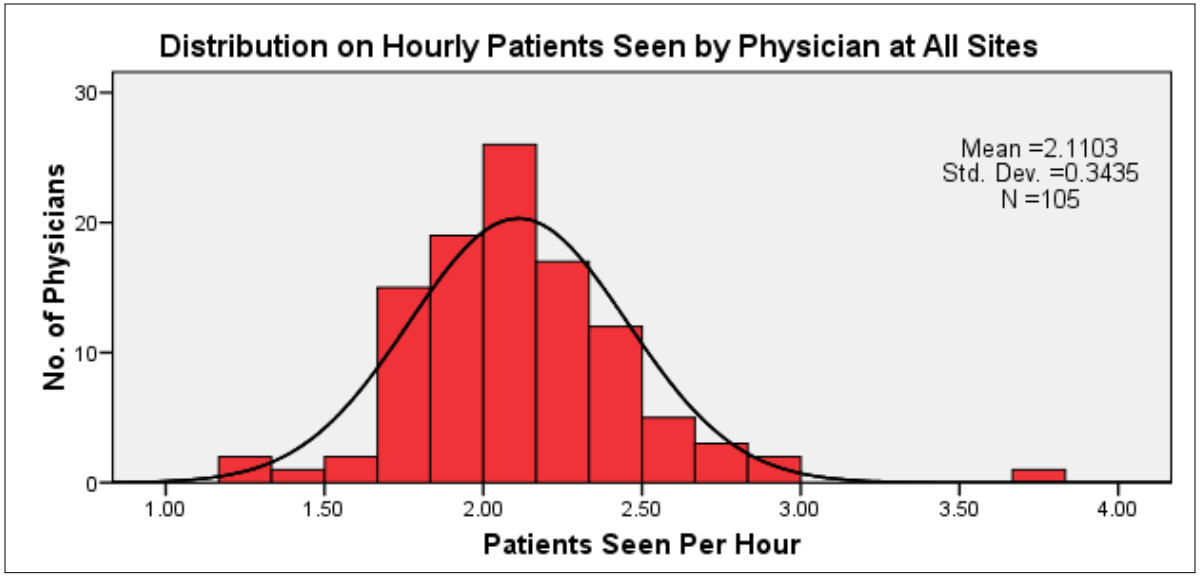
Improvement in ED throughput produces at least:

10% = 5 beds

15% = 10 beds

20% = 15 beds

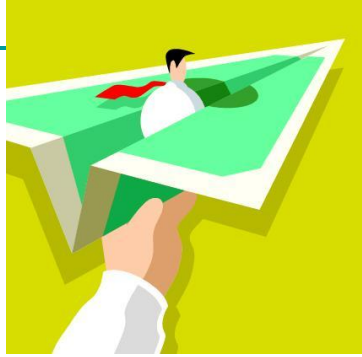
6. Quality Improvement



In Direct Control
- Speed
- Service Use (DI, Lab, Consult)
- Teaching

Out of Direct Control
- ED Factors
- Services Themselves
- Output

7. Discharge Slotting



Identifies up to a 40% capacity waste

Decreases length of stay by ½ day

Promotes nursing to manage their shift more efficiently

Less bottlenecks reducing capacity-waste by 10-15%

Discharges can be synchronized to the admission process.

- Admits linked to the planned discharges based on a master schedule

Improves effective management of ancillary resources, i.e.

- housekeeping

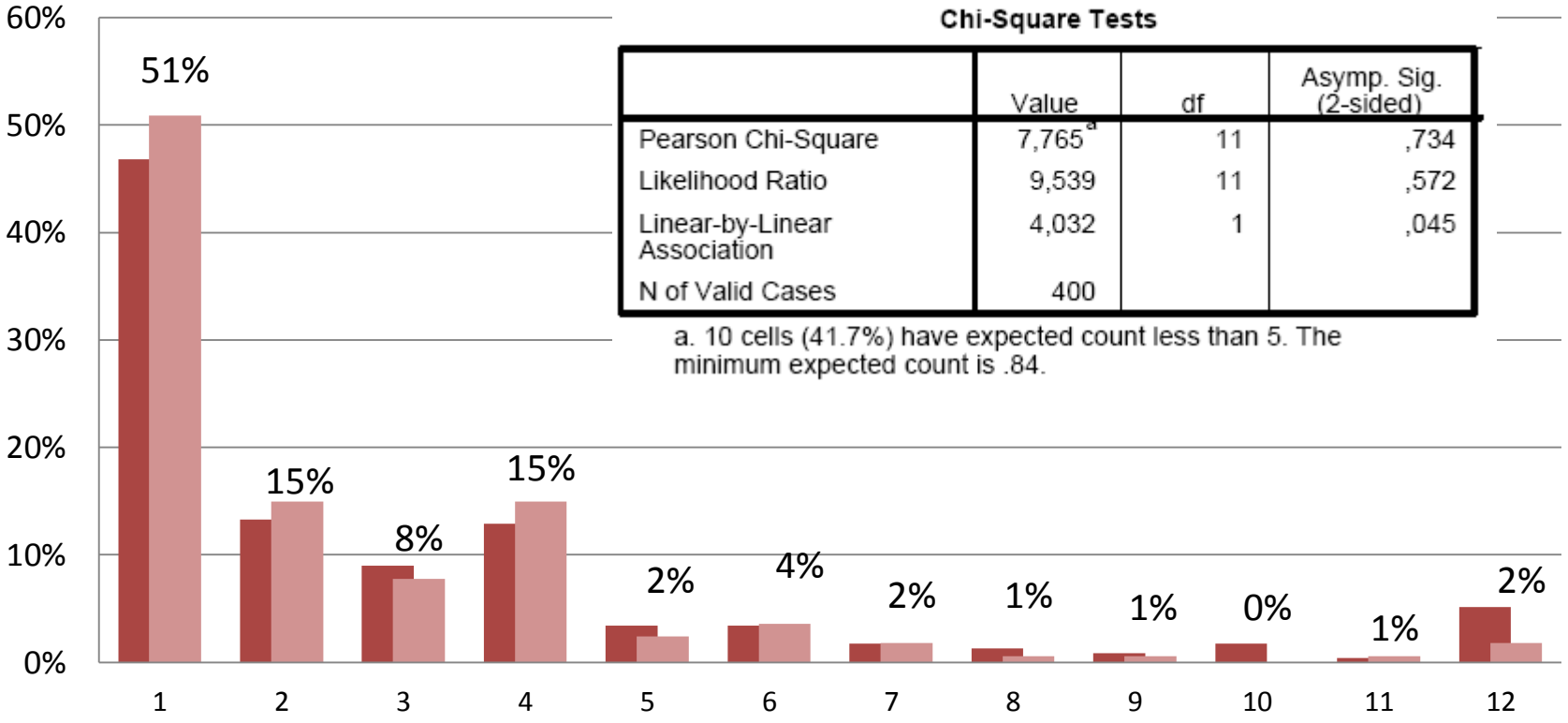
Un Nuovo Piano Operativo al DEA di Forlì

L'attività di un Team (Medico Coordinatore + Infermiere In Area triage) con il compito di:

1. Inquadramento clinico iniziale con eventuale trattamento precoce dei soggetti con indicazione ad un percorso in emergenza (COD rossi)
2. Valutare per eventuale presa in carico i soggetti a rischio di compromissione rapida delle funzioni vitali (COD Gialli)
3. Inquadramento dei soggetti con urgenze differibili (COD verdi) destinati alla sala d'attesa con possibilità di facilitazione dei percorsi diagnostici.
4. Prestazione definitiva nei soggetti a bassa complessità (COD bianchi)


CROCE ROSSA ITA

Ictus cerebrale



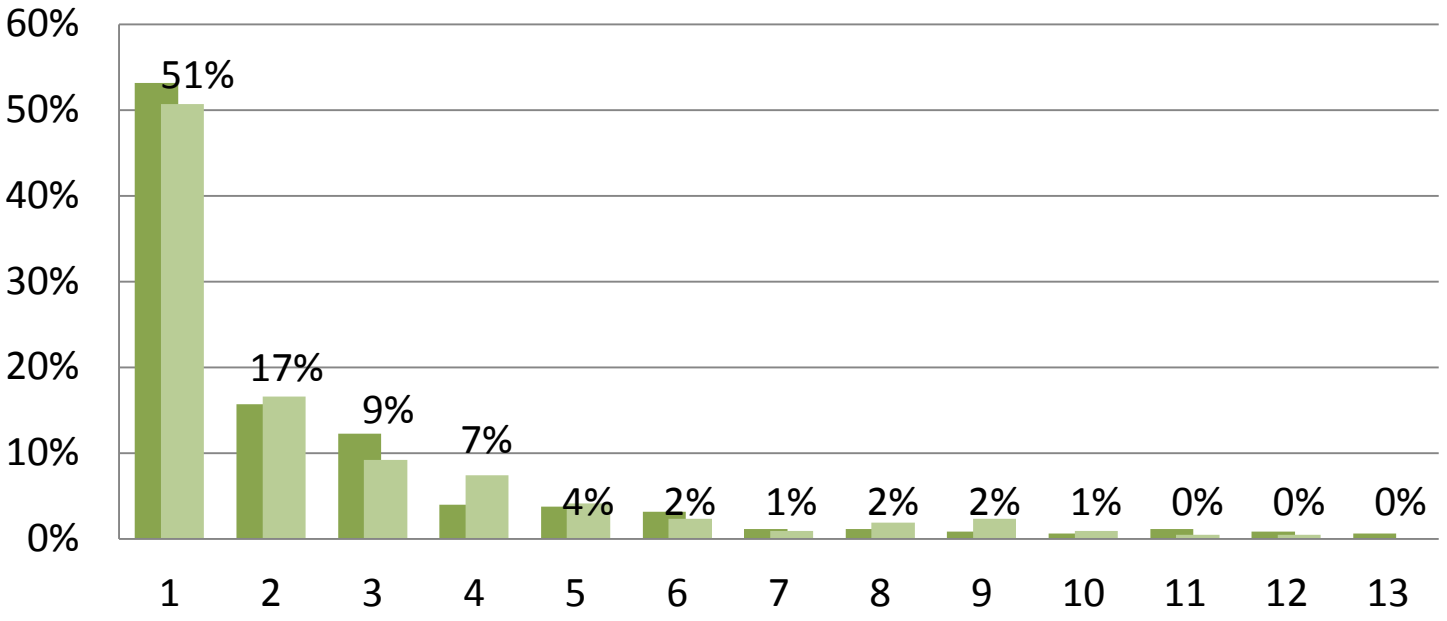
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7,765[a]	11	,734
Likelihood Ratio	9,539	11	,572
Linear-by-Linear Association	4,032	1	,045
N of Valid Cases	400		

a. 10 cells (41.7%) have expected count less than 5. The minimum expected count is .84.

Confronto Tempi di attesa (interv.10 min) 2009 vs. 2010 con RME, 19: 180 – 240 min, 20: >240 min

SCA, NSTEMI, STEMI



Chi-Square Tests for Linear Trend: NS
Chi-Square Tests: <30 min : NS

National Trends in Emergency Department Occupancy, 2001 to 2008: Effect of Inpatient Admissions Versus Emergency Department Practice Intensity

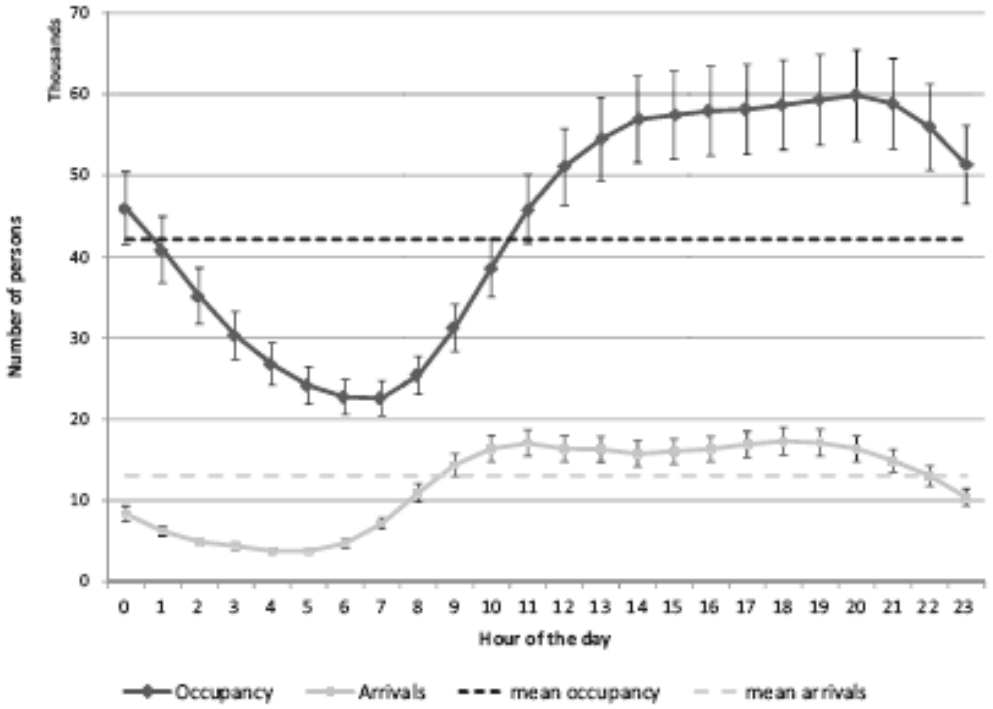


Figure 1. Average daily US ED visits and occupancy, by hour of day, United States, 2001 to 2008 combined. Error bars are 95% CIs.

Pitts SR. **Ann Emerg Med** 2012;60:679-686

National Trends in Emergency Department Occupancy, 2001 to 2008: Effect of Inpatient Admissions Versus Emergency Department Practice Intensity

	ED visits (millions)			Total ED time in hours (millions)		
	2001	2008	Absolute increase (% increase)	2001	2008	Absolute increase (% increase)
Total	107.5	123.8	16.3 (15%)	330	417	87 (27%)
Race/ethnicity						
Non-Hispanic white	72.5	75.6	3.1 (4%)	179.8	235.6	55.8 (31%)
Non-Hispanic black	21.4	27.1	5.8 (27%)	58.7	92.9	34.2 (58%)
Hispanic	10.7	17.3	6.7 (63%)	30.9	55.2	24.3 (79%)
Other	3.0	3.7	0.7 (23%)	6.9	12.1	5.2 (75%)
Clinical categories						
Behavioral diagnosis	15.1	18.6	3.5 (23%)	48.1	74.2	26.2 (54%)
Abdominal pain	6.8	8.7	1.9 (28%)	23.4	38.5	15 (64%)
Chest pain	5.7	6.6	0.9 (17%)	17.3	27.0	9.6 (56%)
Dyspnea	4.6	5.7	1.1 (23%)	13.2	21.2	8 (60%)
Cough	3.1	3.4	0.3 (10%)	6.7	8.6	1.9 (28%)
Headache	3.2	3.3	0.2 (5%)	8.0	11.5	3.5 (44%)
Fever	4.3	5.4	1.2 (27%)	9.7	15.2	5.5 (57%)
Weekend	31.9	36.1	4.2 (13.3)	95.1	115.1	20.0 (21%)

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National Trends in Emergency Department Occupancy, 2001 to 2008: Effect of Inpatient Admissions Versus Emergency Department Practice Intensity

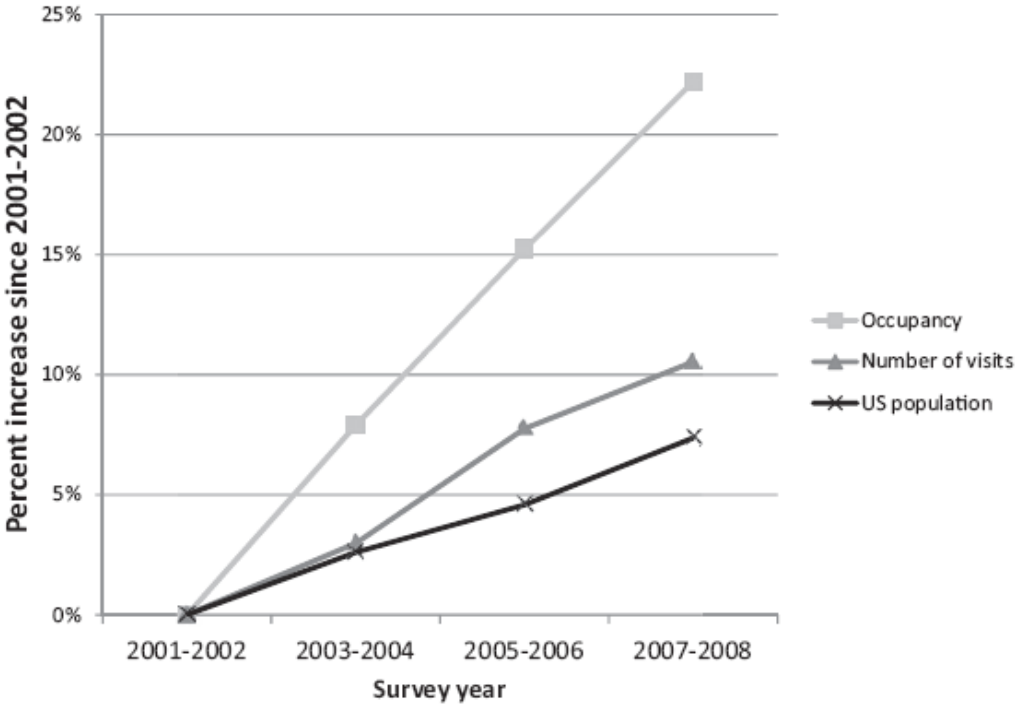

Figure 3. Trends in US population and ED crowding indices, 2001 to 2008. Data points represent percentage increase from 2001 to 2002 baselines in mean counts. Adjacent years are combined to reduce random variation of point estimates.

Pitts SR. **Ann Emerg Med** 2012;60:679-686

National Trends in Emergency Department Occupancy

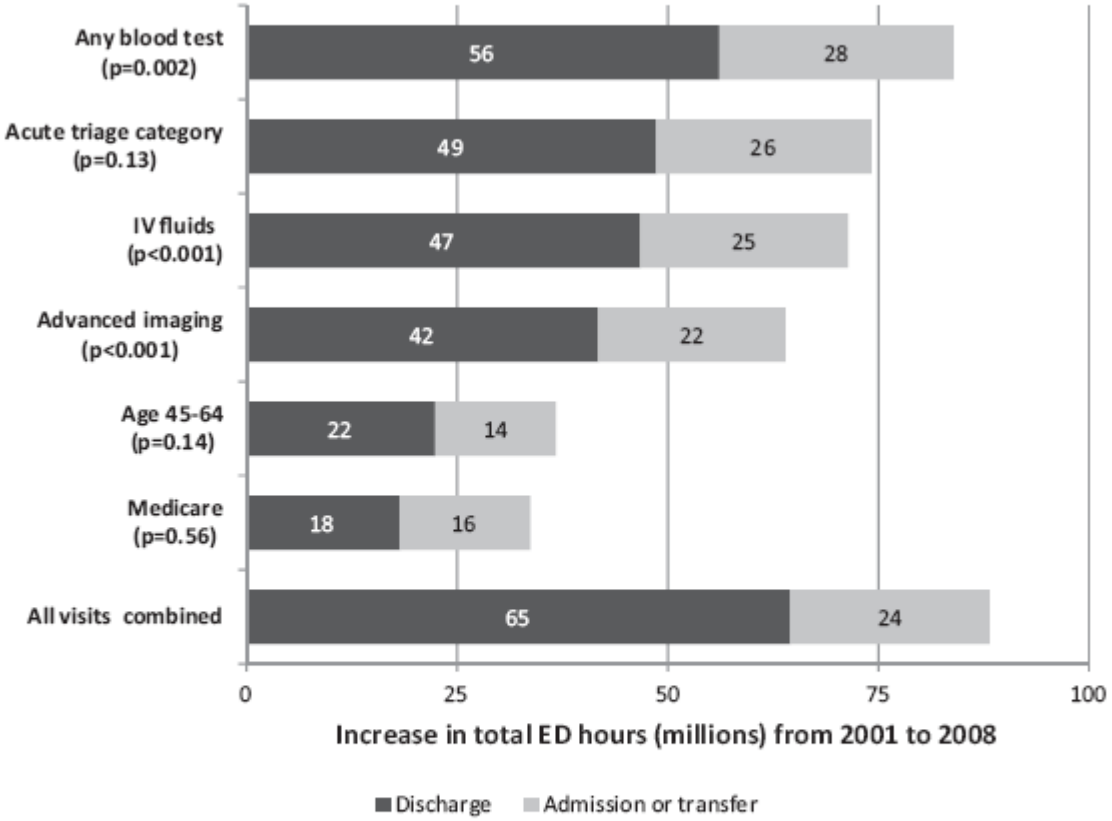

Figure 4. The absolute increase in total ED time from 2001 to 2008 (in millions of hours) for selected subgroups, by disposition. The *P* value is the probability of seeing this result or one more extreme assuming that there is no difference betweeen groups.

Pitts SR. **Ann Emerg Med** 2012;60:679-686

Conclusion

Despite repeated calls for action, ED crowding is getting worse. Sociodemographic changes account for some of the increase, but practice intensity is the principal factor driving increasing occupancy levels.

Although hospital admission generated longer ED stays than any other factor, it did not influence the steep trend in occupancy. [Ann Emerg Med. 2012;60:679-686.]

GRAZIE PER L'ATTENZIONE