Creating Our Future Together

Emergency Services Forum

*Held in conjunction with the Behavioral Health Care Symposium*
ED Crowding: Novel Approaches to Improving Thoughput in a Value-Based World

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Emergency Department Crowding: The Evidence and Potential Solutions

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Learning Objectives

- To understand the current literature related to ED crowding/boarding and patient safety
- To explore real solutions to reduce crowding and improve safety
Fundamental Questions

- Why is crowding unsafe?
- What can be done?
What is Crowding?

- Supply-demand mismatch
  - Long waits to be seen
  - Long waits for tests
  - Long waits for beds
What is crowding?
- The state of an ED when waits are long
  - Supply-demand mismatch
Measuring Crowding (cont.)

• What is crowding?
  – Waiting….
    • Times to see a physician
    • Times to get medications
    • Times to get tests done
    • Times to get inpatients beds (i.e., boarding)
  – Crowding = Non-flow
What is crowding?

- Crowding occurs when there are insufficient resources to handle demand
- Resources:
  - ED staff
  - ED bed capacity
  - Inter-dependent (Radiology, Lab, Consultant, Inpatient)
Measuring Crowding (cont.)

• What is crowding?
  – Crowding occurs when peaks in demand for resources outstrip a particular resource
    Demand > Supply
Measuring Crowding (cont.)

- Does crowding mean that we are just too busy?
  - “Which resource is constrained?”
    - ED staff with critically ill patients (staff-constraint)
    - Patients may be “busy” waiting (bed-constraint)
    - It may be a combination
Patient Safety Issues

- Mechanisms for potential “harm” (staff)
  - Increased medical errors
    - Cognitive load
  - Missed orders (i.e., home meds)
  - Occult decline goes unrecognized
  - Delay in recognizing a patient is “sick”
  - Patient with occult disease
  - Delays in medication administration
  - Delays in tests/transfer/other interventions
  - Delays in consultation
  - Delays in bed placement
Patient Safety Issues (cont.)

• Mechanisms for potential “harm” (space)
  • The waiting room
    – Unrecognized decline
    – Nursing ratio (25:1)
  • Hallway beds
    – Incomplete evaluations
  • Left without being seen
    – Risk of poor outcomes
  • Boarding
Patient Safety Issues (cont.)

• Who crowding doesn’t effect
  – The obviously critically ill
  • Resources are directed to “sick” patients
  • STEMI
    – No impact on door to percutaneous intervention
      (Harris, Ann Emerg Med 2012)
• Acute stroke
  – No impact on time to CT/thrombolysis for “in
    window” patients (Chatterjee, Pines Stroke 2011)
• Time to antibiotics
  – No impact in septic shock/severe sepsis
Measuring Crowding

• How crowded is “too crowded?”
  – Is there a critical threshold where the system gets more dangerous or waits are prolonged?
• Depends upon the system
• Depends upon the resource
Adverse Outcomes

• Adverse consequences from crowding & boarding
  – Longer antibiotic delays in CAP
  – Inadequate analgesia & delays
  – Higher death rates in ICU patients
  – Higher rates of cardiovascular complications in chest pain syndrome
Adverse Outcomes (cont.)

• Crowding/analgesia
    • Severe pain:
      – Less likely to get treated
      – More likely to experience a delay
    Abdominal pain (Acad Emerg Med 2009)
  • Back pain (Acad Emerg Med 2009)
  – Hwang et al.
    • (JAGS 2006) Older adults with hip fracture
    • (Acad Emerg Med 2008) General ED population
Crowding/antibiotic delays

- Patients with pneumonia
    - 69% get abx within 4 hours – not crowded
    - 28% get abx within 4 hours – very crowded
  - Fee (Ann Emerg Med 2008)
  - Less likely to get timely antibiotics when it’s crowded
  - Septic shock & severe sepsis patients
  - No effect
Adverse Outcomes (cont.)

• ED boarding times/higher death rates
  – Chalfin et al. (Crit Care Med 2007)
  – ED LOS > 6 hours in ICU patients
    • 17.4% Mortality (boarded > 6 hours)
    • 12.9% Mortality (boarded ≤ 6 hours)
    • Differences persisted after risk-adjustment
  – Singer, Pines et al. (Acad Emerg Med 2011)
    • Longer boarding times are associated with higher mortality rates (single-hospital study)
Adverse Outcomes (cont.)

• Crowding/CV complications
  – Pines et al. (Ann Emerg Med 2009)
  – Crowding associated with a higher rates of inpatient CV complications
    • Patients with ACS-related chest pain – OR 3-5x
    • Patients without ACS-related chest pain – OR 2-3x
  – Is crowding the marker of a dysfunctional hospital?
  – Fishman et al. (Ann Emerg Med 2006)
    • Trauma alert activations/higher adverse events in CV pts
Prolonged boarding times/higher risk of inpatient adverse outcomes

- Ackroyd-Stolarz (BMJ Qual Saf 2011)
- 14.3% AE rate
- For each our in ED, odds of an AE increased 3% (OR 1.03, 95% CI 1.004 to 1.05)
- Patient with an AE had 2x LOS
Adverse Outcomes (cont.)

• Crowding and medical errors
  – 8.6 of 533 patients – PME
  – Higher levels of crowding (Q4 v. Q1) PME rate was two-fold higher
Solutions to Crowding

The real question:
What to do?
Approaches

1) Reduce demand
2) Increase supply
3) Better match supply and demand
4) Make ED safer during episodes of crowding
Avoiding Crowding

• Increasing space/staff
  – This has been variably effective (Han Acad Emerg Med 2007; Soremkun, Pines 2012 in progress)
  • Expensive
  – Additional staff: Physician extenders, nurses >50% effective (Pines West J Emerg Med 2011)
  – Virtual space
    • Keeping patients “vertical”
    • Removing the “space” constraint
Avoiding Crowding (cont.)

• Making processes “leaner”
  – Immediate bedding
    • Effective in the UK
  – Physician-in-triage (many studies)
    • Improve door-to-doctor, reduced LOS
  – Internal waiting rooms
  – Simultaneous evaluation
    • Christiana Care (SPEED protocols)
  – Surgical schedule smoothing
  – Pooling between units
Avoiding Crowding (cont.)

• Matching supply and demand
  – Demand vary, provides vary
  • The A-team principle
    – Provider variation in fast-track treatment time (McCarthy, Pines Med Care 2010)
• Call-in system for staff
  – Should we staff to “average” or “peak” capacity
  – Flex up/down depending on demands
Avoiding Crowding (cont.)

• Matching supply and demand
  – Demand vary, provides vary
  • Scheduling tools
    – InQuick ER
  • Carefully tracking bottlenecks for interdependent resources
Get Patients Out of the ED

• Prolonged LOS of ED patients
  – Contributors across US EDs (Practice intensity > Boarding)
    • Pitts, Pines, Kellermann Ann Emerg Med 2012
  – Delayed transitions in care
    • Many delays are not “capacity” constraint
    • Hospital culture (McClelland, Pines)
      – Work-up gets done in the ED
      – Accountability
Get Patients Out of the ED (cont.)

• Prolonged LOS of ED patients
  – Full capacity protocols (Viccellio Ann Emerg Med 2009)
    • Inpatient hallways v. ED hallways
  – Transition units
    • Effective but pushes the work downstream Hong Kong approach
Making Crowded EDs Safer

• Literature is sparse
  – Protocols to identify potentially sick “occult” patients
  – Redesigning the waiting room/protocols
  – Point-of-care testing
Wrap-up

• Causes of ED crowding
• Adverse effects on patients
• Solutions
Questions?
Thank you

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