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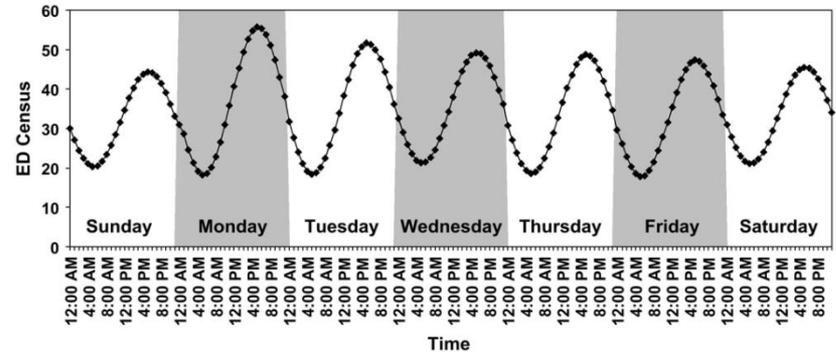
George Washington University

National Conference on Health Statistics—August 18, 2010

The effect of ED crowding on outcomes

The problem of ED crowding

- ED crowding is a periodic supply-demand mismatch
- Effects
 - Lower satisfaction
 - Delays
 - Errors & Complications
 - Mortality



An exposure to “crowding”

- Exposure
 - When is the ED at “peak” capacity
 - Ways to measure
 - ED occupancy, census, waiting room number, NEDOCS, EDWIN, others
 - The effect of crowding is longer time intervals
 - Many studies have studied the link between longer intervals and outcomes

Satisfaction

- Major reason for ED dissatisfaction: long waits
- LWBS is related to long waits
 - Higher LWBS rates during higher episodes of crowding
- ED crowding associated with lower ED satisfaction scores
- People don't forget
 - ED length of stay & hallway placement predict lower OVERALL hospital satisfaction

Satisfaction

- Are these LWBS patients inconsequential?
- Patients who LWBS are high risk
 - 60% of LWBS patients seek medical attention within one week
 - 11% hospitalized or require emergency surgery

Rowe Acad Emerg Med 2006
Baker JAMA 1991

Delays in care

- Pneumonia care
 - More likely to experience delays in antibiotics
 - 31% had abx after four hours during least crowded, 72% at most crowded times
- Pain management
 - More likely to experience delays with acute pain
 - Hip fracture
 - Abdominal pain
 - Back pain
 - Severe pain

Errors and complications

- High workload is a significant factor in medical errors
- More than 25% of patients have one or more undesirable events while boarding in the ED
- Patients with chest pain 3-5x more likely to have a post-ED complication
- Trauma patients who spend > 6 hours in ED intubated more likely to get ventilator pneumonia

Liu Ann Emerg Med 2009

Horowitz Ann Emerg Med 2009

Pines Acad Emerg Med 2009

Carr J Trauma 2007

Mortality

- Australian studies
 - Crowding - risk factor 10-day mortality (RR 1.34)
 - Higher ED & hospital occupancy associated with higher 2, 7, and 30-day mortality (HR 1.2-1.3)
- ED LOS > 6 hours associated with higher inpatient mortality in ICU patients
 - 12.9% < 6 hours; 17.4% > 6 hours
 - Differences persist after adjustment

Richardson Med J Aust 2006
Sprivulis Med J Aust 2006
Chalfin Crit Care Med 2007

Is the link ubiquitous?

- Likely no!
- Some populations are unlikely to be harmed by crowding
 - The first few hours of obviously critically ill patients
 - Difference is harm by hospital
- Multi-center studies are needed
 - NHAMCS may be potentially used to demonstrate the risks of crowding