ED OVERCROWDING: Evidence Based review

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Declaration

• This research was carried out whilst an employee of the Australian National University Medical School and was not separately funded
• Views expressed are those of the author and do not necessarily reflect those of any of his employers
• Overcrowding is my major research interest
• The Unit has received research funding
• Author has received travel/other expenses to speak
• Author owns no related shares
Objectives

- Outline the history of research into ED overcrowding
- Describe the major “landmark” studies in the field
- Identify generally accepted research about the causes, effects, and possible solutions
- Review research developments over the last three years in detail
- Since this is a rather dry topic, intersperse with anecdote, data and analogy which may help explain the issues
Crowding occurs when the identified need for emergency services exceeds available resources for patient care in the emergency department (ED), hospital, or both.

The causes of crowding are multifactorial and span the entire health care delivery system. Research has shown a continued increase in ED visits, which has outpaced population growth. Current trends show increasing patient acuity as well, requiring more complex evaluation and treatment plans that increase care delivery times, as well as ED and inpatient lengths of stay. The resultant strain on hospital inpatient bed capacity creates downstream pressure to board admitted patients* in the ED. These factors exacerbate crowding by utilizing limited ED resources, including beds and nursing care. Evidence has shown an increase in morbidity and mortality because of boarding.

*A “boarded patient” is defined as a patient who remains in the ED after being admitted to the facility but has not been transferred to an inpatient unit.

Results of crowding include the following:

- treatment of patients in areas not designated for treatment, such as hallways
- treatment of boarded inpatients by outpatient (ED) nurses
- increased morbidity and mortality for both boarded and other ED patients
- increased disability in older patients who are discharged to facilities rather than admitted
- increased inpatient length of stay
- decreased patient satisfaction
- significant delay in evaluation and treatment of emergency patients
- patients leaving before completion of medical treatment
- increased ambulance diversion time
- increased costs

It is the responsibility of hospital leadership to address well identified recurrent causes of crowding (such as unavailability of inpatient beds) to prevent poor outcomes related to crowding. It is imperative that local and national health care systems be active in addressing the more global and systemic causes of crowding, including hospital funding. Emergency medicine leadership should be actively involved in helping to identify successful solutions to crowding at both the local and national levels.
Overcrowding

- Concept of overcrowding is almost as old as the concept of crowds

- Wherever herd animals gather, the useful maximum number is sometimes exceeded unless there are external controls
Overcrowding

• Earliest descriptions of overcrowding in a healing setting date to biblical times

• Hospital Overcrowding and adverse effects described since at least the mid nineteenth century
Overcrowding

- Studies reporting increased ED workload pre-date recognition of ED as a specialty
- Multiple proposed solutions started 40 years ago
- Emerged as a significant subject for research

**SPECIAL ARTICLE**

**THE EMERGENCY ROOM AND THE CHANGING PATTERN OF MEDICAL CARE**

Ernest C. Shortliffe, M.D.,* T. Stewart Hamilton, M.D.,† and Edward H. Norbom‡

Hartford, Connecticut

Early in 1954 a survey of the Emergency Suite at Hartford Hospital was undertaken by a special joint committee of the medical and surgical staff and the administration. The action was prompted by rising apprehensions about the adequacy of physical facilities and supervision of the clinical work performed in the emergency unit. There was also a recognition of the need for the hospital to undertake a revision of its disaster plan and of the fact that the Emergency Room could well serve as a triage center in the event of a catastrophe. At the same time, problems had been presented regarding the extent and type of day-to-day work that should be permitted in the Emergency Room. The need for resolution of all these problems was the reason for the evaluation procedure.

Throughout its study this emergency-room committee was guided by the basic concept that an emergency service should offer to the public at large and the medical community in particular adequate facilities in which the emergencies of the area could be handled. We were aware of the challenge in the words of Dr. Robert H. Kennedy that “the weakest link in the chain of hospital care in most hospitals in this country is the Emergency Room care of the injured.” We also had been aware of the basic principle recently declared by Drs. Howell and Buerkii: “the Emergency Room could be a major source of expert diagnosis and treatment in almost any community, a vital factor in hospital public relations since its professional reputation often rides on the fate of patient care in its Emergency unit, and also one of the most valuable experiences for the doctor in training.”

After some months of study the committee prepared a report that led to the expansion of physical facilities as well as the reorganization of staff and administration.

NEJM 1958 Jan 2; 258(1): 20-5

**Triage: a working solution to overcrowding in the emergency department**

Chandrakant P. Shah, M.D. and Lofty M. Carr, B.A. Toronto, Ont.

Summary: Recently, emergency departments across the continent have become crowded with patients requiring non-urgent care. To alleviate this situation at The Hospital for Sick Children in Toronto, receptionists in the emergency department direct patients requiring urgent care to the emergency room and those requiring non-urgent care to a screening clinic (triage). During a two-month period, 13,561 patients visited the emergency department. The triage receptionists sent 8368 patients to the emergency room and 5183 to the screening clinic. About 45% of patients visiting the emergency room had suffered accidents and injuries, and 19% had respiratory illness; 15% of patients visited resulted in admission to hospital. In contrast to this, 49% of patients sent to the screening clinic had respiratory illness and 19% had infectious diseases; less than 1% of patients needed hospitalization.

Receptionists report the directive to direct from the service of care in those cases that are more urgent or in need of a service of diagnostic care which is not available at the emergency room. On a routine or daily basis, 13,561 patients have visited the service of care in the emergency room and 5183 have visited the screening clinic. The majority of patients visiting the emergency room have suffered accidents and injuries, and 19% have respiratory illnesses; 15% of patients visiting resulted in admission to hospital. In contrast to this, 49% of patients sent to the screening clinic had respiratory illness and 19% had infectious diseases; less than 1% of patients needed hospitalization.

Can Med Assoc J 1974 May 4; 110(9): 1039-43
• 1148 papers in international literature to Feb 2016

• Read all these abstracts so you don’t have to
History

- **Overcrowding became a major issue in USA in late 1980s**
  - Traditionally started in New York
  - Others lay claim

- **Scientific descriptions started in 1990s**
  - General Medical Literature
  - Health Services Literature
  - Emergency Medicine Literature

- **Clear recognition that cause and solutions lay outside ED**


Bindman AB, Grumbach K, Keane D, Rauch L, Luce JL. Consequences of Queuing for Care at a Public Hospital Emergency Department. JAMA. 1991 Aug 28;266(8):1091-6


History

• Despite a lack of supporting evidence, unambiguously stated that overcrowding was a threat to patient safety

• Early publications tended to start from this assumption then describe ways to fix it
  – Triage
  – Short stay Units
  – Multimodal interventions

G Dickinson. Emergency department overcrowding. CMAJ. 1989 Feb 1;140(3): 270-1


Neville L, Rowand RS. Short stay unit solves emergency overcrowding. Dimens Health Serv. 1983 Feb;60(2): 26-7

Feferman I, Cornell C. How we solved the overcrowding problem in our emergency department. CMAJ. 1989 Feb 1;140(3): 273-6


History

• **First systematic research showed association with increased costs**
  – Actually spending midnight in ED not associated with less ward LOS

• **First outcome study showed increased mortality in Spain**
  – Weak methodology, weekly presentations, no correction for seasonal factors

• **First Review article listed 8 adverse effects but provided a reference for only one of them (ambulance diversion)**

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Systematic studies

• New generation of researchers entered the field in 2000s

• Systematically examined
  – Definitions (still needs work)
  – Causes
  – Effects
    • Process
    • Quality
    • Patient Outcome including mortality
  – Solutions

• Fair to say that even with good data it has proven difficult to persuade our inpatient and administrative colleagues
  – Even if our children think we research “the bleeding obvious”
Colleges needed no persuasion

• “Crowding occurs when the identified need for emergency services exceeds available resources for patient care in the emergency department (ED), hospital, or both”

• “Overcrowding is the situation where Emergency Department function is impeded primarily because the number of patients waiting to be seen, undergoing assessment and treatment, or waiting for departure exceeds either the physical or the staffing capacity of the Emergency Department”

• “Access Block is the situation where patients in the ED requiring inpatient care are unable to gain access to appropriate hospital beds within a reasonable time frame. It is expressed as the proportion of patients requiring formal admission to hospital who have a total ED time greater than 8 hours”
Causes of Overcrowding - 1

- Increasing demand at the front door noted since 1950s
- “Build it and they will come”
  - USA: 102.8M in 1999 to 136.1M in 2009 (32%)
    - 37.8/100 to 45.1/100 persons (19%)
  - Australia: 37% over decade 2000-01 to 2009-10
    - 1.8% annual increase after population growth
- Development of EM as a specialty has contributed to a positive attitude towards ER
- Development of medical care in general increases demand
- Population aging is important

Causes of Overcrowding - 2

- Accepted by professional bodies that access to inpatient beds ("access block") and resultant "boarders" causative.
- This research base started in 2003
  - Clear statistical link between hospital occupancy and ED LOS
- Subsequently confirmed in multiple studies around world
- Mostly retrospective
- Ever increasing sophistication


Causes of Overcrowding - 3

- Politicians and funders tended to blame “non-urgent patients”, “GP-type patients”, “uninsured”
  - Language and reasoning varied but everywhere
- Research response also happened around the world
- Retrospective studies of load
- Some prospective studies of telephone advice lines, low-acuity services
- Low acuity patients do not block ambulances from unloading


Causes of Overcrowding - Recent

- More prospective studies on the effects of closing inpatient beds
  - Not good for ED

- Ever more complex models used in analysis
  - Admission practice in off-peak times does impact results at peaks
  - Distinct “Choke points” found in large hospitals around discharge timing from the wards
  - Hospital Occupancy and complexity as measured by admissions important
  - Same patterns across broad groups of hospitals


Causes of Overcrowding - Recent

- Sep and Dec 2012 Annals of EM
- 424 hospitals: Throughput performance measures highly dependent on “exogenous variables”
  - Seeking a way to adjust measures for hospital and outside factors
  - Concluded no simple way exists
  - Volume, casemix, age, teaching etc
- 8 years of National Ambulatory Medical Care Surveys
  - Visits up 1.9% per annum (15%)
  - Occupancy up 3.1% per annum (27%)
  - Increase driven by practice intensity
  - Doing more for each patient
Causes of Overcrowding - Recent

- Boarding still contributes to crowding, but is no longer getting worse the way it was a decade ago
- In this US series growth is in practice intensity
  - Older and sicker?
  - Substituting admissions?
  - Doing too much?
- Most growth in imaging
- Most contribution simple tests and treatment
- Much more research to be done

Consequences of Overcrowding

• As noted, in 2000 it was accepted as a given that ED overcrowding was bad, but no evidence base
• The next generation of researchers set about seeking any relationship between overcrowding and undesirable outcomes
• Broadly this came to 3 different approaches:
  • Is a crowded ED a functional place? Process
  • Is a crowded ED a safe place? Quality
  • What happens to patients in a crowded ED? Outcome
• Subdivided by:
  – What happens to those who board / have access block?
  – What happens to those who come to a crowded ED?
Process

• Perhaps surprising that little immediate followup to the 1994 study linking overcrowding with costs
• First published report statistically linking access block with ED function (mean wait) – Nov 2000
• Followed by a series of confirmatory studies

Process – Statistical Links Demonstrated

- **Access Block – EMS Bypass**
- **Divert Status – Ambulance delay for chest pain**
- **NEDOCS – LWBS**
- **Access Block – Waiting Times**
- **Subjective overcrowding – Waiting Time**
- **Boarding Hours – Multiple flow measures**
- **Boarder Burden – Median LOS discharged ED**
- **8am boarders – >6h LOS daily**
- **Largely retrospective studies**


Individual Quality

• Large studies linked delay in reaching an inpatient bed with:
  – Defined adverse events in various groups (all, ICU, >65)
  – Delay to provision of home medications
  – Worse adherence to AMI guidelines
  – Pneumonia in intubated patients


Overall Quality

- **Worse pain care in**
  - Hip fracture
  - Severe pain
  - Back pain
  - Sickle Cell Crisis
  - Children with long bone fractures

- **Lesser patient satisfaction in admitted and discharged patients**

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Overall Quality

- **Greater risk of Missed AMI**
- **Delay to thrombolysis in AMI**
- **Delay to antibiotics in CA pneumonia**


Overall Quality

- Adverse events in AMI
- Delay to surgery in #NOF
- Compliance with Sepsis Bundle
- Delay to Steroids in pediatric asthma
- Delay to resuscitation


Overall Quality

- Violence towards ED staff
- Defined complications in boarders
- Contamination of Blood cultures
- Time to antibiotics in febrile neonates
- Quality and timeliness (but not equity) in paediatric asthma
- Preventable Medical Errors (National ED Safety Study)
- Blood culture contamination


Overall Quality - Recent Literature

- So many to choose from
- Acting on IOM research priorities
- Quality defined by timeliness of therapy in asthma, fracture
- 9 overcrowding measures
- Large statistical adjustment
- Best overcrowding measures
  - Total patient care hours
  - Arrivals last 6 hours
- Retrospective, limited input variables (no boarding)
- Simple measures often best

2006: Institute of Medicine Report

- Marked the widespread acceptance outside the EM community that there is a problem
- Multiple recommendations
- Improved efficiency and flow
- Coordination and accountability
- Increased resources
- Pay attention to Children
  - Research agenda
Correlation or Causation?

- Demonstrating causality is generally agreed to require the Bradford-Hill criteria:
  - Strength of association
  - Consistency
  - Specificity
  - Temporality
  - A dose–response relationship
  - Biological plausibility
  - Coherence
  - Reversibility
  - Consideration of alternative explanations

Patient Outcomes

• Self evident to EPs that after the presenting emergency condition has been identified and managed, prolonged care in the ED is not in the best interests of the patient
• Boarding or Access Block represents restricted access to timely urgent care, which delays definitive therapy, prolongs hospital stay and increases complications
• ED staff equipped to provide acute care are not the most appropriate providers to inpatients
• An ED working at 200% of its capacity is likely to provide a lesser standard of care than a ward never exceeding 100%
• Less self-evident to outsiders
Patient Outcome beyond the ED

• 2002: First study to show effect of prolonged ED LOS on subsequent (not total) hospital LOS
• Dose-response curve
Patient Outcome beyond the ED

- Same result when correcting for age, time of day, casemix
- Same result in other countries
- Same result in ICU patients
- Adverse events in over 65
- Adverse events in AMI
- Pneumonia in trauma patients
- Defined adverse events in boarders
- Again mostly retrospective but confounders addressed with multivariate techniques

References:


Diercks DB, Roe MT, Chen AY, Peacock WF, Kirk JD, et al. Prolonged emergency department stays of non-ST segment-elevation myocardial infarction patients are associated with worse adherence to the American College of Cardiology/AHA Guidelines for management and increased adverse events. Ann Emerg Med. 2007 Nov; 50(5): 489-96


Overall Outcome beyond the ED

• Medical care strives to produce best patient outcomes rather than simply best measures of process or documented quality
• Mortality is the unequivocal outcome for which research seeking any link with ED overcrowding is critical
• Death after ED presentation is multifactorial and rare so large series are required
• First published study from Spain was poorly controlled but found an excess of deaths
• Second published study from Houston was underpowered but found a trend towards excess trauma mortality
• Third & fourth studies were well designed from Australia


2006: Overcrowding and Mortality

- Two studies from different places with totally different methodological approaches
  - One retrospective matched cohort in a single ED over 3 years
  - One multivariate 3-hospital study of admissions through ED
- Both found around 30% increase in short term mortality from presenting to a crowded ED or crowded hospital
Overcrowding and Mortality

- Multiple major studies have reported an increased mortality:
  - Intensive care patients
  - Sepsis and pneumonia patients
  - All patients discharged from ED
  - All presentations

- In places with ambulance diversion during overcrowding:
  - Hospital mortality lower as ambulances are turned away
  - Citywide AMI mortality higher

- Two neutral findings:
  - Suggested these are settings where overcrowding so severe that no adequate control periods

References:


Recent Work - 1

- 3 yr of admissions in academic ED
- Stratified by boarding interval
- Adjusted for measures of severity and comorbidity
- Hospital with an overcapacity protocol: low-risk boarders could be moved to ward hallways
- 41256 patients

Recent Work - 2

• Highly significant dose-response relationship between boarding duration and ICU admission, mortality and inpatient LOS

• Overcapacity protocol is a theoretical weakness but the data is compelling
Recent Work - 2

• Case-crossover study of Medicare patients with AMI from 4 Californian counties
  – All Medicare claims
  – All ambulance diversion logs
  – 6 years (2000-2006)
  – No AMI specific transport policies

• Each case linked to closest ED by mailing address

• EDs acted as their own controls

• Adjustments for demographics, comorbidities, hospitals

• 13860 AMIs, 149 EDs

Shen Y, Hsia RY. Association Between Ambulance Diversion and Survival Among Patients With Acute Myocardial Infarction. JAMA. 2011; 305(23): 2440-2447
Recent Work - 2

- When hospital on diversion >12h per day, less AMI patients admitted to hospitals with a catheter lab (78% vs 87%)
- Diversion >12hr associated with 3% increase in mortality at 30 days, persisting for at least 1 year
- Unable to separate ambulance, ED and hospital effects, but ambulance diversion is bad for patients
Recent Work - 3

- 995979 admissions through ED to 187 hospitals
  - California, 2007
- Crowding defined as days of top quartile of ambulance diversion for that hospital
- Model included demographics, day of week, time of year, comorbidities

Recent Work - 3

- Results highly significant
- 5% greater chance of inpatient death [300 deaths]
- 0.8% longer hospital stay [6200 bed-days]
- 1.1% increased costs [$17M]
Recent Work - 4

- Used existing dataset from large ED in Korea over 2 years
- Overcrowding measured by simultaneous occupancy ratio
- 1846 with BP<90
- In-hospital outcome
- Mortality higher
- No dose-response
- Mostly trauma, ID
  - Fits with experience

The Debate is well and truly over

• Finally now accepted that ED and hospital crowding do cause harm to patients
• Strength of association
• Consistency
• Specificity
• Temporality
• A dose–response relationship
• Biological plausibility
• Coherence
• Reversibility
• Consideration of alternative explanations

Two mortality reversibility studies

- A randomised controlled trial of overcrowding unlikely
- Two reports of reversibility of the mortality effect so far
- Requires a well documented system which improves its overcrowding status in a short period
- State of Western Australia done that
- PA Hospital in Brisbane has done that
- WA: Access block from 40% to 10% in 3 tertiary hospitals
- Mortality reduced from 1.12% to 0.98% in same period
- WA is best regarded as an encouraging first report
  - Too many variables and changes in hospitals’ practice to be certain it is causative
  - Documentation is ongoing – a more definitive result is expected

Geelhoed GC, de Klerk NH. Emergency department overcrowding, mortality and the 4-hour rule in Western Australia. Med J Aust. 2012 Feb 6;196:122-6
Two mortality reversibility studies

- **PA Hospital**: Well described hospital-wide intervention
- **Studied Jan-Mar over 3 years**
- **Overall NEAT 32% to 62% to 72%**
- **HS Mortality Rate 93 to 72 to 55**

Two mortality reversibility studies

• Also reported
  – Absolute drop in in-hospital death
  – Strong negative association between NEAT and HSMR

• Fits with the theory and understanding of overcrowding

• Definitely an encouraging second report

• Time series and close to 1 life saved every second day
  – Likely some other changes at work
  – Further analysis undertaken
Cures for Overcrowding?

- Three basic approaches
  - Mitigating the bad effects and decreasing ED LOS (ED internal)
  - Cutting occupancy with particular groups (ED collaborative)
  - Whole of hospital change
- There is sufficient before-after jurisdiction-wide evidence that it can be changed longer term
  - Reversibility of flow issues demonstrated, as noted awaiting good studies on outcome
  - Not specific interventions, but indication that financial incentives and extra resources work


Geelhoed GC, de Klerk NH. Emergency department overcrowding, mortality and the 4-hour rule in Western Australia. Med J Aust. 2012 Feb 6;196:122-6
Multiple successful approaches

- Small, mostly before-after studies with publication bias
  - We report what works
- Local process changes, staff
- Streaming
  - Fast-track and “Mid-track”
- Early Senior input
- Joint with radiology/pathology
- Overcapacity protocols
- Top-down incentives


Multiple successful approaches

- “Journey Coordinators”
- “Logistic Management”
- “Senior Assessment and Streaming”
- Only intervention consistently reported as not working is telephone advice lines


Graber DJ, Ardagh MW, O'Donovan P, St George I. A telephone advice line does not decrease the number of presentations to Christchurch Emergency Department, but does decrease the number of phone callers seeking advice. 2003 Jul 11;116(1177):U495
Telephone Advice Lines

• Politically popular
• Still trying to spin them as effective
• The data really does not support
• One from 2015
  – Cat 4-5 patients went UP
  – “May help to decrease lower-acuity patient visits”
• So Wrong

Howell T. ED Utilization by Uninsured and Medicaid Patients after Availability of Telephone Triage. doi:10.1016/j.jen.2015.08.015
Learning from Others

- Overcrowding is not unique to Medicine
- As noted at the start, any herd animal likely to experience dysfunctionally large herds at times
- Common to say that Medicine should learn from hospitality and airlines for flow, air traffic control and nuclear power for safety
Learning from Others

- There are many lessons we can take from other services
- Some really good things in hospitality for elective surgery, invasive tests
- These services have better demand management strategies available
- Emergency Medicine cannot say no large groups after 5pm (surgeons do every day)
- EM cannot simply queue or deny without triage

**American Airlines**

**Flights with Oversales**

If at departure time more customers with confirmed reservations are present than there are seats available, gate agents will first ask for volunteers who are willing to give up their seats in exchange for compensation and a confirmed seat on a later flight. On extremely rare occasions, a customer may be denied boarding on an involuntary basis, if a sufficient number of volunteers are not obtained. In such events, we will usually deny boarding based upon check-in time, but we may also consider factors such as severe hardships, fare paid, and status within the AAdvantage program. With few exceptions, persons denied boarding involuntarily are entitled to compensation under federal law.
Learning from Others

• Doctors are highly regulated and highly rewarded
• Food Services are safety regulated but poorly rewarded
• Medical skills are in short supply, food preparation skills not
• The snake oil era of the 19th Century provides an illustration of unregulated “medicine”
  – In economic theory terms the disparity in information between the vendor and the consumer is too great for market forces alone to work
• Little need for restaurants to publicise their results
  – Most customers eat out 2-3 times per week (or more)
• Little desire for hospitals to publish (or even examine) theirs
  – Most customers use their elective services twice a decade and their emergency services a little more, never get to compare
• Better information makes a better market (internal/external)
Learning from Others

• This talk is not really about quality or reproducibility beyond the effect of overcrowding
• EM lacks the option of providing quality of care to the first arrivals and closing the door to latecomers
• In food service 5% get meals worse than the 5th centile – mostly indistinguishable
• If you see 200 patients/day, 10 will get care less than 5th centile – you know it when you see it and sometimes they do
• Difficult to establish benchmarks for assessment and management simultaneously – but we need to standardise
New Literature

- There is more to be learnt about streaming
- Recent poster at SAEM described changes to model of care when 8 new patient spaces added to an overcrowded ED
- Reorganised ED from a large Acute stream with 23% Fast-track and 3% Psych to balanced A-stream and B-stream
  - 50% and 41%, still 3% Psych
- Staff rotate to “both sides”
Productivity gain without new Doctors

- Nationally recognised Performance Indicators improved significantly accounting for workload
- Median waiting time to be seen fell from 0:44 to 0:42, 90th centile from 3:25 to 3:08
- Mean number tracked to a waiting area rather than a clinical space fell by 36% (P<10E-6)
- Interesting that no effect on time spent in ED
- A lot more remains to be learnt
  - Largest “sub-acute” stream in Australasian Literature
New Literature

- Ambulance Diversion does not make a difference
  - At least in Massachusetts where it was banned 1/1/2009
- Before and after study, 9 hospitals comparing two years
- After adjustments, volume increased, admitted LOS decreased, ambulance turnaround time decreased
New Literature

• A cluster randomised trial
  • Setting of financial incentives
  • Intervention was an additional nurse and doctor working in Triage area

• Intervention effective for non-consulted discharged patients
  • Wait decreased 25min
  • High Acuity LOS decreased 24min
  • Low Acuity LOS by 56min if seen

• LWBS 1.5% vs 2.2% (p=0.06)
• Not a surprising result

New Literature - Alberta

- Accepted 2016 by AEM
- Large and Well controlled
- Main intervention was improving General Internal Medicine (GIM)
  - Reduced IP LOS 1.4 days
  - No adverse effects like readmission
- ED LOS for GIM patients fell by 2.8 hours
  - 1 in 30, so only 15 min ED overall
- Statistically significant but obviously needs to involve more inpatient units

Newer Literature - Systematic Reviews

• Now so much work that we have seen the rise of the systematic review
• Mostly fairly critical of the methodologies used
• Appear to work
  – Triage Liaison Physician
  – Triage nurse ordering
  – Rapid Assessment/Fasttrack


Newer Literature - Systematic Reviews

- **Appear not to work**
  - Primary care professionals in ED
- **Insufficient evidence**
  - Overcapacity protocols


This is likely to change

• The biggest news in the field of overcrowding cures came in 2012 with the series of abstracts from Alberta

• Canadian Emergency Medicine meeting, International conference on Emergency Medicine, Society for Academic Emergency Medicine (prize winning)

• Cannot really call it equivalent to peer-reviewed study until it is published, but this is the most exciting work
Impact of an Overcapacity Protocol on ED access and flow in a Health Region

Grant Innes, Andrew McRae, Dongmei Wang, Eddy Lang

Department of Emergency Medicine, University of Calgary
Access Block in Alberta

• Many flow projects and capacity expansions: 2005 - 2008
• A multi-million dollar system-wide acute access program (GRIDLOCC – 2007 / 2008) failed to improve hospital access or reduce ED boarding times
• For > a decade, ED and hospital access block increasing
• Dec 2010: Implementation of the Alberta Overcapacity Plan
• 14 Teaching Hospitals across Alberta simultaneously
• >650,000 patients /year

• Results mean that the evidence based reviews are likely to change their views shortly
OCP simplified

**ED Inflow:**
1) Arriving CTAS 2/3 patients will move within 15/30 min into an ED acute care space.
2) If no ED space available, patients will move to an ED overcapacity or intake space so care can be initiated.

**Hospital Inflow:** If . . .
a) ED is overcapacity by 10%, and
b) 35% of ED stretchers are blocked, and
c) arriving patient needs stretcher-based care

The most stable admitted patients go to OCP spaces on the most appropriate inpatient units.
Results

Primary outcomes:

• Mean ED LOS (ADM pts) fell by 33% (17.2 to 11.6 hr.)
• Mean # of admitted pts at 10am fell by 46% (11.3 to 6.1)

Secondary outcomes:

• Wait time to MD fell from 113.2 min to 99.3 min
• LWBS rate fell from 4.0% to 3.8%
• OCP effects sustained over time; but varied by site

*All differences significant at p<0.001 (sample size)
5 Philosophical tenets of a successful OCP

• The same care standards apply throughout the hospital, from patient arrival to discharge
• Overcrowding (access block) is addressed by the entire system
• Best outcomes and efficiencies occur when patients are matched to the right unit and team ASAP
• All units have important care missions and require reasonable access to their resources in order to provide acceptable care and meet performance targets
• Hallways are undesirable locations for patient care
The Future: OCP Adoption

• A successful OCP is a hospital-wide intervention
• Only going to work with administrative buy-in
• Australians have been pushing for years (x4 in NSW!)
  – 2003 SWSAHS
  – 2003 ECT DOH
  – 2004 SESIAHS
  – 2008 Sally McCarthy for NSW Emergency Care Taskforce
• Finally started to come without waiting for the evidence
Implemented in Liverpool – Sep 2012

• **NEAT:** August 32%  October 60%
• **Antibiotics for Sepsis:** August 54m  October 39m
• **Flow:** Subjectively Better
• **Complaints:** Reduced

• **Source:** Unpublished Data
• **Staff:** Difficult to implement but improved care
Philosophy

• There are many flaws in every health system, but largely they reflect the values of the funders/voters/patients
  – Modified by politics and inertia

• The systems value electives over emergencies
  – Managers find them easier to make a profit
  – Majority of doctors prefer the certainty they bring to life
  – Funders provide a system with these incentives

• Patients live with “elective” conditions (like arthritis of the hip) much longer than they live with their emergencies
  – Likely colours their view of how to vote and choose insurance

• This environment means major change comes from “political” processes – we have to “sell” the advantages of a high functioning ED to get system wide change
SUMMARY

- Now a large evidence base from overcrowding research
- Overcrowding in the ED is a whole of hospital problem with a major contribution from inpatient flow issues
- Overcrowding is bad for ED function
- Overcrowding causes bad outcomes including mortality
- It can be addressed although probably not eliminated
- Ample examples of local changes, some data quality issues
- Good examples of whole-of-system change which has improved ED function without detriment to outcomes
- Implementation (eg OCP) not all waiting for the data
- Really high quality studies showing reversibility of the adverse effects represent the next research frontier