EARLY EXPERIENCE WITH AN OVERCAPACITY PROTOCOL

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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 authors and do not necessarily reflect those of any 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

INTRO: ED Overcrowding is bad

- **Overcrowded EDs are dysfunctional and unsafe**
  - **Worse process outcomes**
  - **Worse quality outcomes**
  - **Worse patient outcomes**
- **Multiple international studies show increase in patient mortality associated with overcrowding**
- **One of the major causes is access block (“boarding”), prolonged stays by patients awaiting inpatient beds**

Chalfin DB, Trzeciak S, Likourezos A, et al; DELAY-ED study group. Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit. Crit Care Med. 2007 Jun;35(6):1477-8357

Hong YC, Chou MH, Liu EH, et al. The effect of prolonged ED stay on outcome in patients with necrotising fasciitis. Am J Emerg Med. 2009 May;27(4):385-90

Jo S, Kim K, Lee JH, Rhee JE, Kim YJ, Suh GJ, Jin YH. Emergency department crowding is associated with 28-day mortality in community-acquired pneumonia patients. J Infect. 2012 Mar;64(3):268-75

Guttmann A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada. BMJ. 2011 Jun 1; 342:d2983

Shenoi RP, Ma L, Jones J, Frost M, Seo M, Begley CE. Ambulance diversion as a proxy for emergency department crowding: the effect on pediatric mortality in a metropolitan area. Acad Emerg Med. 2009 Feb;16(2):116-23

Singer AJ, Thode HC Jr, Viccellio P, et al. The association between length of emergency department boarding and mortality. Acad Emerg Med. 2011; 18: 1324-1329

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

Sun BC, Hsia RY, Weiss RE, Zingmond D, Liang LJ, Han W, McCreath H, Asch SM. Effect of emergency department crowding on outcomes of admitted patients. Ann Emerg Med. 2013 Jun;61(6):605-611

Overcrowding can be addressed

- **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 medium term**
  - **Reversibility of flow issues demonstrated**
  - **Not specific interventions, but financial incentives & resources**
  - **Sustainability much less clear in long term**

Weber EJ, Mason S, Carter A, Hew RL. Emptying the corridors of shame: organizational lessons from England's 4-hour emergency throughput target. Ann Emerg Med. 2011 Feb; 57(2): 79-88.e1

Ben-Tovim DI, Dougherty ML, O'Connell TJ, McGrath KM. Patient journeys: the process of clinical redesign. Med. J. Aust. 2008; 188 (6 Suppl): S14–17

Richardson DB, Kelly A-M, Kerr D. Prevalence of Access Block in Australia 2004-8. Emerg Med Australas. 2009 Dec; 21(6): 472-478

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

“Overcapacity Protocols” form part of it

- **Multiple descriptions of fixed protocols mandating transfer of inpatients to ward spaces when ED capacity is exceeded**
  - **Objective is to spread hospital overcrowding so that it falls more evenly across units, not just ED**
- **All the published descriptions are positive**
  - **Likely publication bias**
- **Many of the studies are of low methodological quality**

Innes GD, Grafstein E, Stenstrom R, et al. Impact of an overcapacity care protocol on emergency department overcrowding. CJEM 2007;9:196

Innes GD, Grafstein E, Scheuermeyer F, et al. Impact of an overcapacity care protocol on emergency department and hospital access block. CJEM 2008;10:258

Viccellio A, Santora C, Singer AJ, et al. The association between transfer of emergency department boarders to inpatient hallways and mortality: a 4-year experience. Ann Emerg Med 2009;54:487-91

Rowe BH, Crooks J, Evans J, et al. A controlled clinical trial of a system-wide, multifaceted stratedgy to reduce overcrowding: impact on health services outcomes. CJEM 2009;11:274

Hung GR, Kissoon N. Impact of an observation unit and an emergency department-admitted patient transfer mandate in decreasing overcrowding in a pediatric emergency department: a discrete event simulation exercise. Pediatr Emerg Care. 2009 Mar;25(3):160-3

Gilligan P, Quin G. Full capacity protocol: an end to double standards in acute hospital care provision. Emerg Med J. 2011 Jul;28(7):547-9

Watase T, Fu R, Foster D, Langley D, Handel DA. The impact of an ED-only full-capacity protocol. Am J Emerg Med. 2012 Oct;30(8):1329-35

“Overcapacity Protocols” form part of it

- **Most recent review (2010) found insufficient evidence**
  - **“Although FCPs may be a promising alternative for overcrowded EDs, the available evidence upon which to support implementation of an FCP is limited. Additional efforts are required to improve the outcome reporting of FCP research using high-quality research methods.”**
- **The consensus view amongst experts is that this is about to change once formal publication of the Alberta experience occurs**

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Original Contribution

The role of full capacity protocols on mitigating overcrowding in EDs☆,☆☆

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Abstract

Objective: Overcrowding is an important issue facing many emergency departments (EDs). Access block (admitted patients occupying ED stretchers) is a leading contributor, and expeditious placement of admitted patients is an area of research interest. This review examined the effectiveness of full capacity protocols (FCPs) on mitigating ED overcrowding.

Methods: A comprehensive literature search was undertaken to identify potentially relevant studies between 1966 and 2009. Intervention studies in which an FCP was used to influence ED/hospital length of stay and ED/hospital access block were included as a single program or part of a systemwide intervention. Two reviewers independently assessed citation relevance, inclusion, study quality, and extracted data; because of limited data, pooling was not undertaken.

Results: From 14 446 potentially relevant studies, 2 abstracts from the same comparative study were included. From 29 studies on systemwide intervention, 4 contained an FCP component. The included study was a single-center ED study using a before-after design; its methodological quality was rated as weak. One of the abstracts reported that an FCP was associated with less ED length of stay (5-hour reduction) when compared with the comparison period; the other reported that an FCP decreased ED

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Impact of an Overcapacity Protocol on ED access and flow in a Health Region

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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
- Dec 2010: Implementation of the Alberta Overcapacity Plan
- 14 Teaching Hospitals across Alberta simultaneously
- >650,000 patients /year
- All wards/units including EDs identified overcapacity spaces (“OCP spaces”) for patients

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)

The ACT Experience

- **The Canberra Hospital attempted to introduce an overcapacity protocol modelled on Alberta in 2013**
  - **Sending patients to "overcapacity" spaces (corridors) not accepted**
- **Revised to an overcapacity protocol which sent admitted patients to registered hospital beds when these beds were closed out-of-hours**
  - **Criteria of ED overcrowding, 10+ inpatients waiting for beds, and 3+ from same hospital division**
  - **Second component of ED cost centre charging wards for admitted patients from 2 hours after admission**
- **This enabled ED to staff the overcapacity inpatient beds until they were reopened by ward staff in the morning**

AIM

- **To describe the early impact of the modified Overcapacity Protocol introduced at The Canberra Hospital**

METHODS

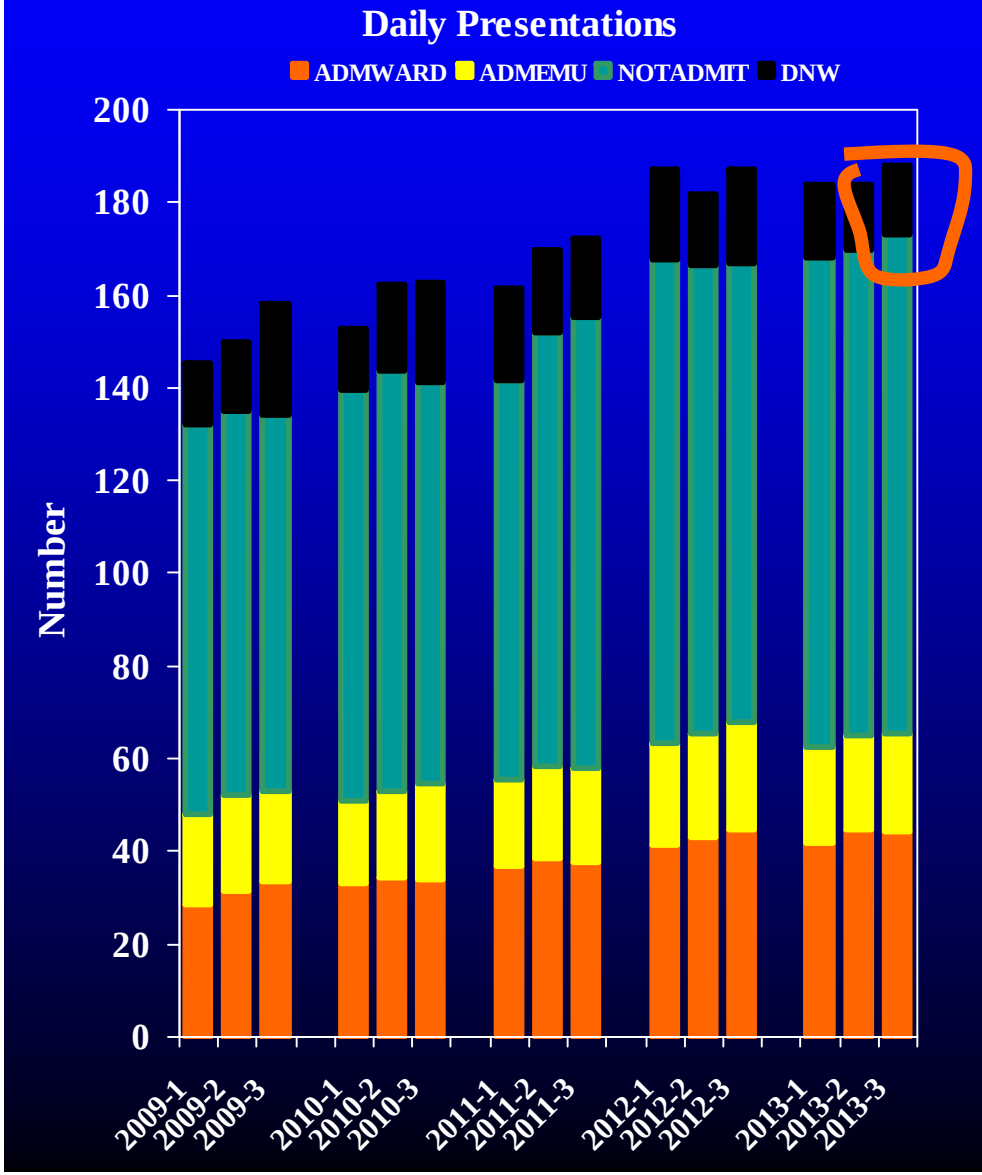
- **Prospective Before-After study with additional historic controls**
- **ED Data from three consecutive 5 week periods starting:**
  - **25-Mar-13 (BEFORE)**
  - **29-Apr-13 after opening of Chest Pain Evaluation Unit (CPEU)**
  - **3-Jun-13 after the OCP introduced (NEW)**
- **Standard ED measures of demand and performance**
- **Additional calculation: number waiting for inpatient beds**
- **Comparison between the groups and with historical data from same weeks last 4 years**

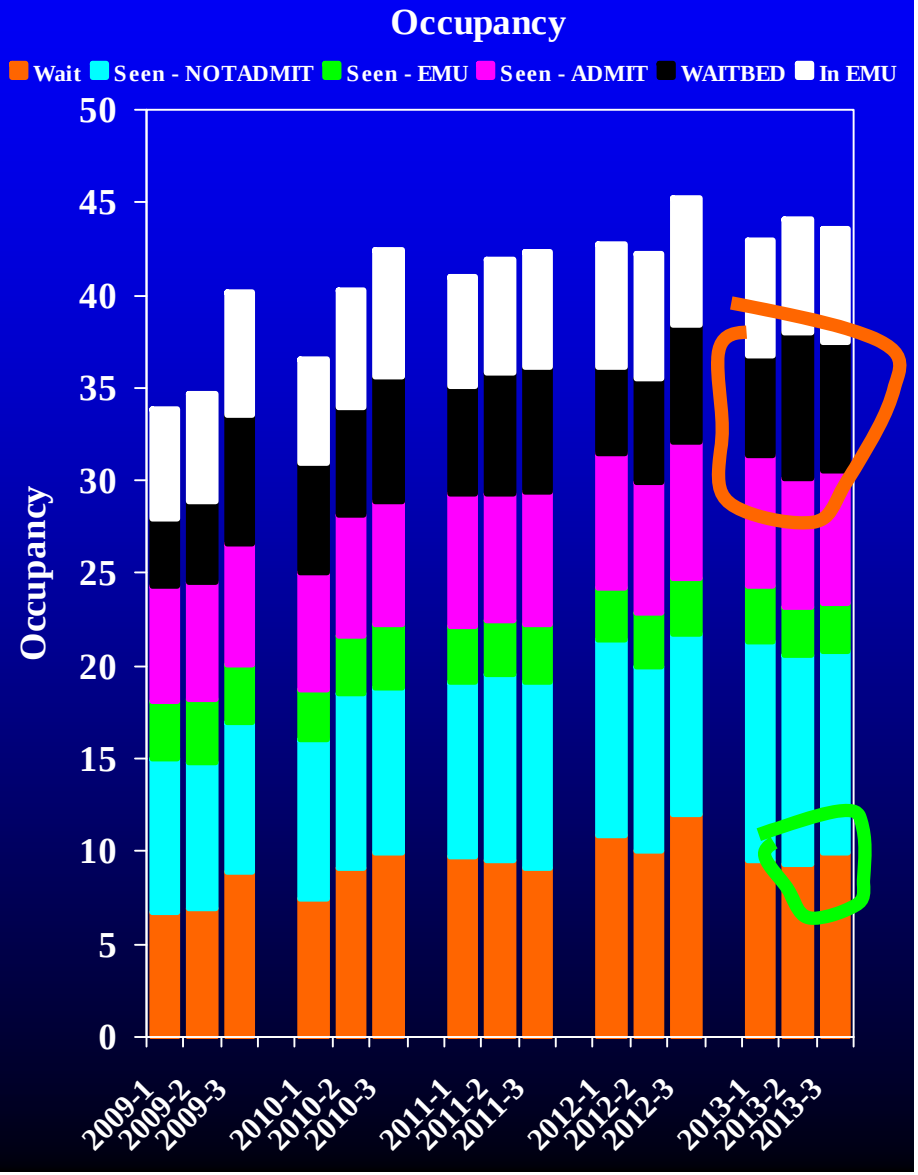
RESULTS: Before-After

	BEFORE	CPEU	NEW
Daily	184.0	183.8	187.9
Ward Admit	41.7	44.6	44.4
EMU	20.8	20.6	20.8
DNW	8.6%	7.7%	7.8%
Mean Occupancy	27.3	28.6	27.5
Mean Waiting Beds	5.4	7.95	6.72
NEAT for admissions	22.6	21.2%	22.5%

- Not a big change but historical controls suggest that 4 more patients per day and going into winter normally associated with worse crowds

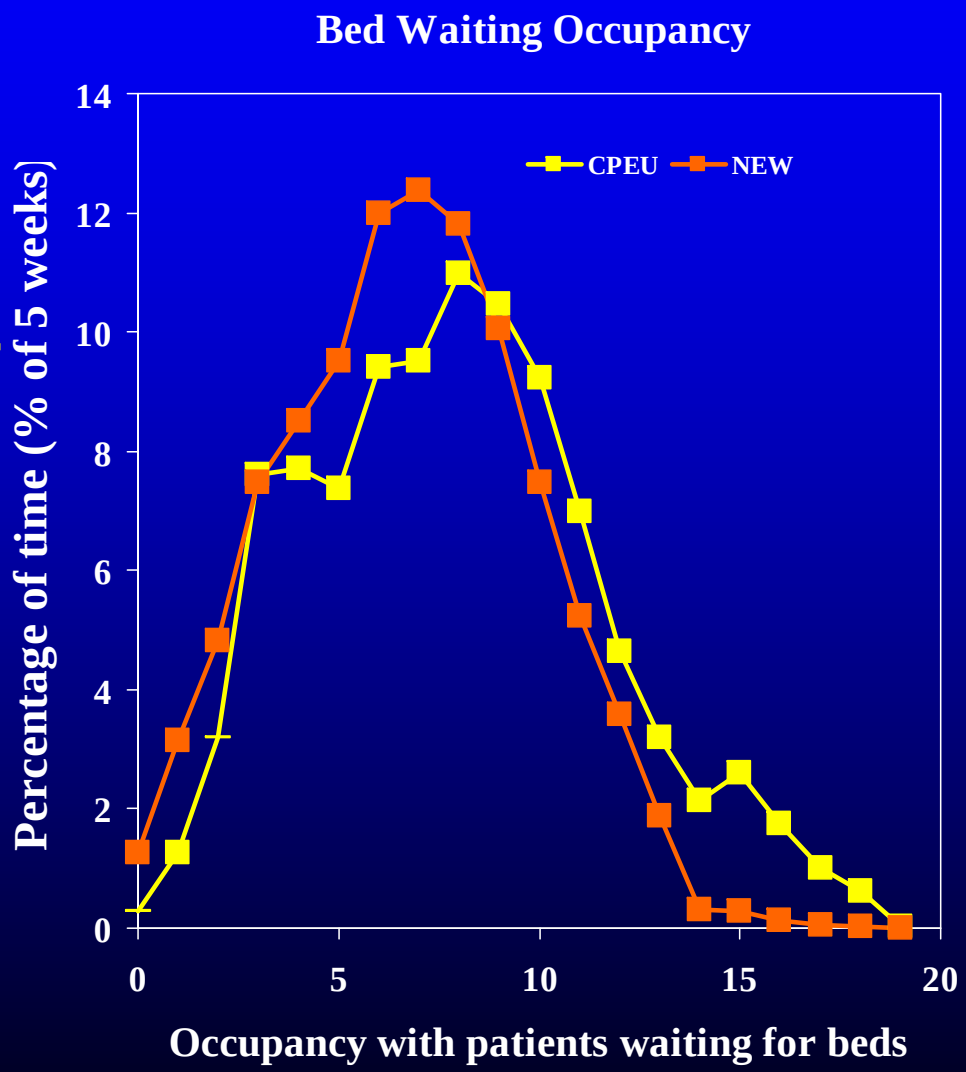
Historical Controls



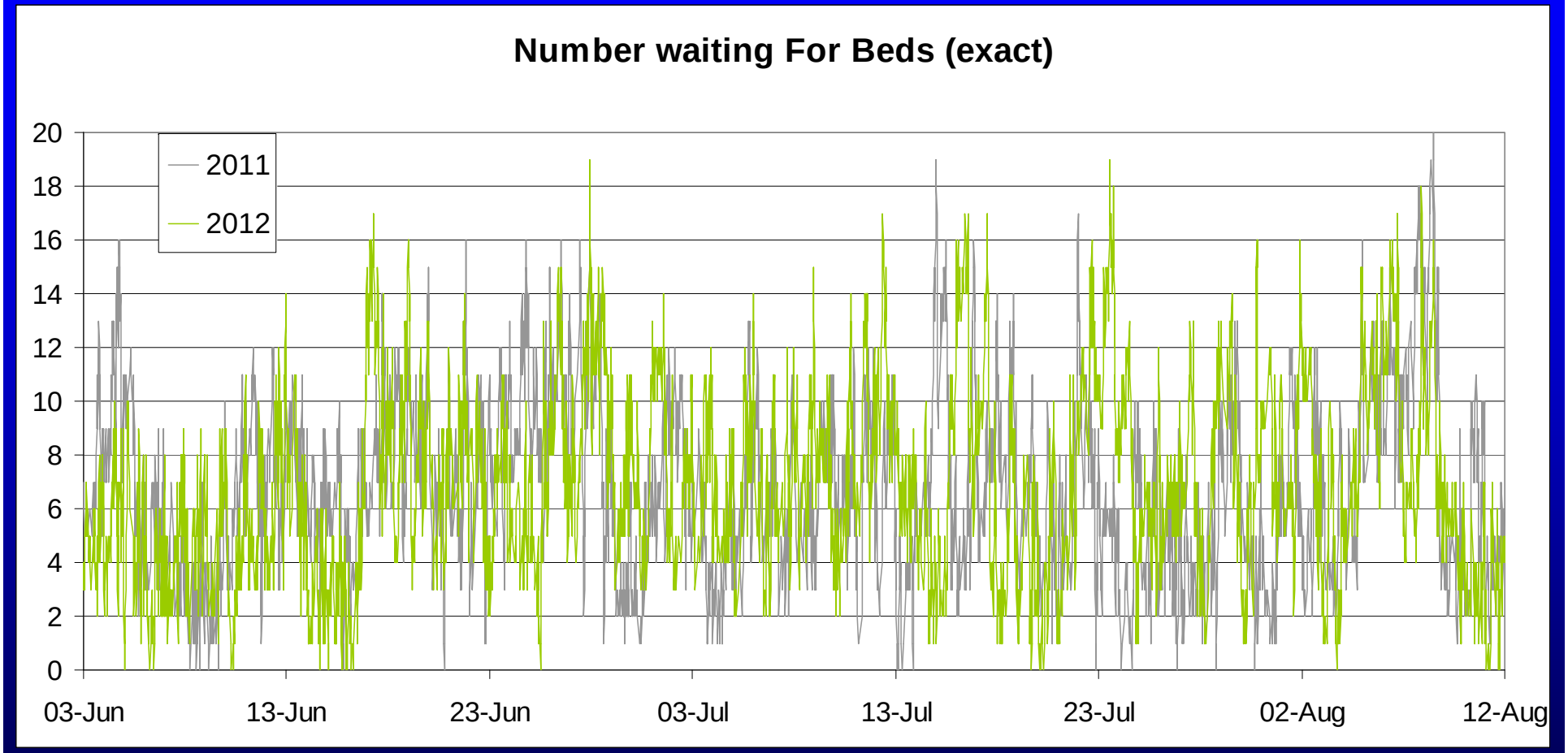


Number Waiting for Beds

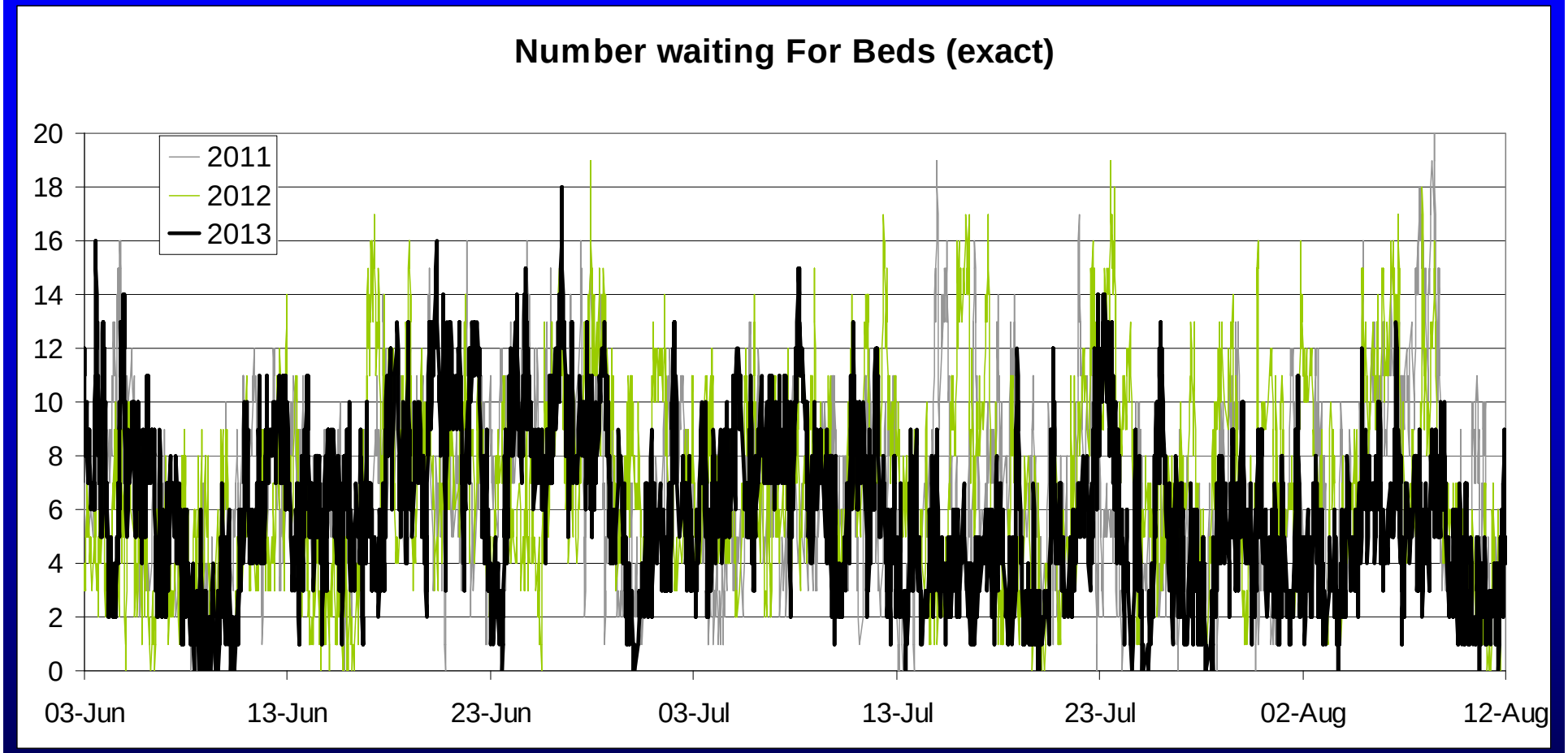
- Dramatic difference in distribution of the number waiting for beds
- In 5 weeks CPEU, 8.1% of time (68:23) over 13
- In 5 weeks NEW, 0.8% of time (6:43) over 13
  - A 90% drop (P<0.001)
- Subgroup analysis: performance better through briefer severe overcrowding periods
- Activated 6 times in 5w
  - ED safety valve, hospital incentive



10 Week Analysis



10 Week Analysis



Year	Pres	WardADM	DNW	%DNW	%>10	%>13	Mean
2011	11873	2634	1199	10.1	12.4	3.01	6.60
2012	12586	2944	1282	10.2	14.8	4.37	6.78
2013	12951	3068	1006	7.8	7.6	0.58	5.73

DISCUSSION

- **Overcapacity protocol (and bed management changes) was associated with highly significant decrease in ED crowding**
  - **Greatest decrease in duration of extremes (>13 waiting for beds)**
  - **Improved service as measured by Did-Not-Wait**
  - **Greater throughput to match increasing demand**
- **Sustained for at least 10 weeks**
  - **Long term effect remains to be seen**
- **As yet no evidence of adverse events such as inappropriate discharges – increased readmissions**
  - **This will be followed up closely, but insufficient data in 10w**
- **By preventing extremes, avoids vicious cycle of crowding**
- **Not actually used often – 6 times in first 10 weeks**
  - **Anecdotally, major effect was the effort to avoid it being triggered**

CONCLUSIONS

- **Despite being a limited OCP, active only after hours and using only registered inpatient beds, this intervention appears highly effective**
- **Does not “cure” ED crowding, but spreads the load and prevents extremes**
- **Clear association with increased throughput and performance**
- **Further long term study needed**