



Addressing ED Overcrowding: Experience with throughput interventions.

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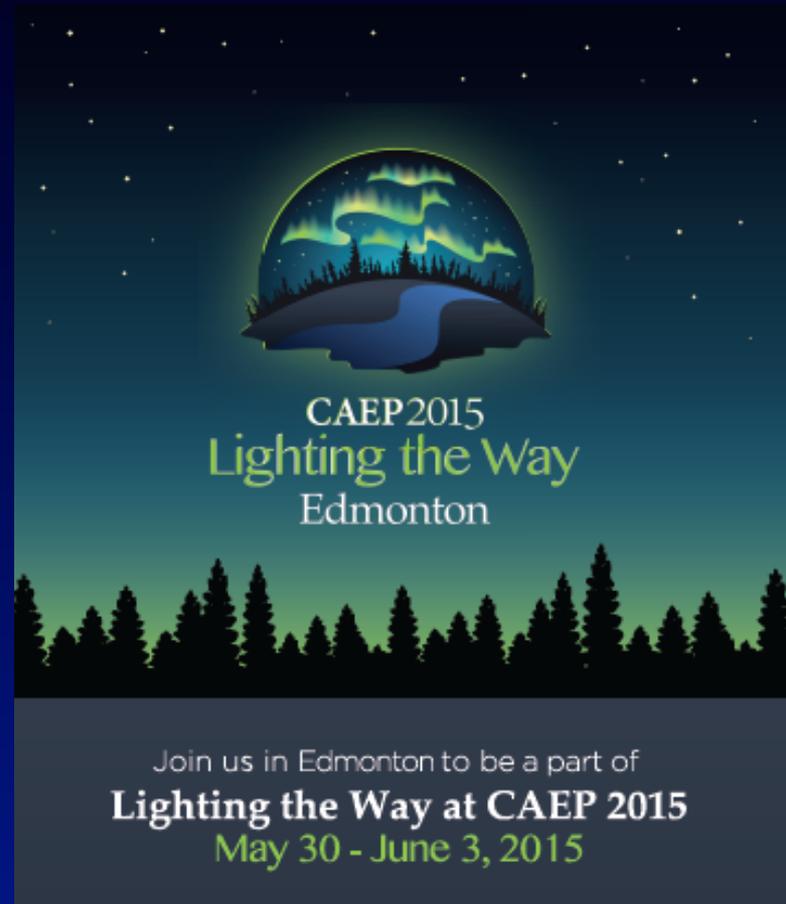


E2E Webinar
January 27, 2015



Disclosures

- I have no real, perceived or imagined COIs.
- Like all good Canadians, most of the “evidence” presented comes from self-citation and citation of friends.
- Please consider coming to CAEP-2015!



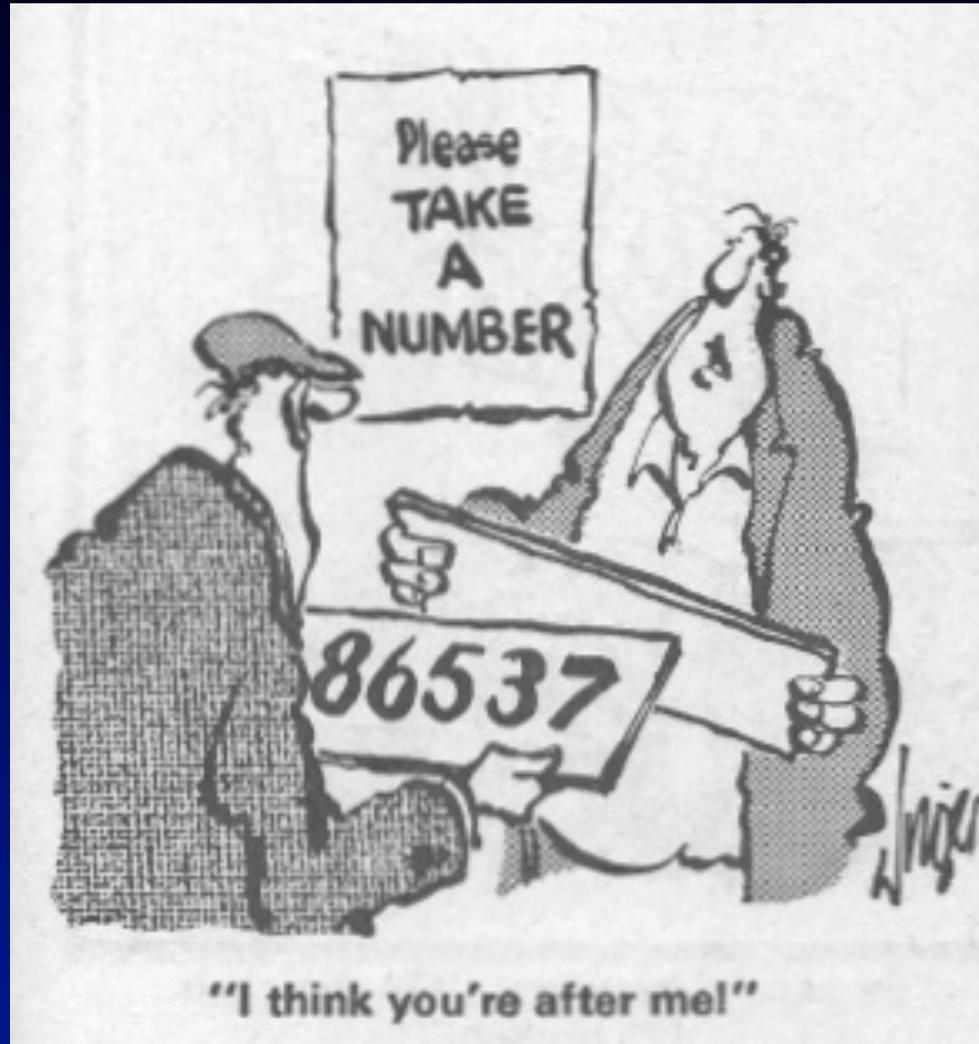
Outline

- Overcrowding background.
- Consequences of overcrowding.
- Interventions to mitigate crowding:
 - The evidence;
 - Examples of trials and systematic reviews.
- Lessons learned.
- Summary.

Conclusions

- ED overcrowding increases the morbidity and mortality of patients in the ED.
- The conceptual model for ED overcrowding involves *input-throughput-output* factors.
- Interventions to mitigate crowding involve *input, throughput, output* and/or **system-wide** solutions.
- Implementation of solutions requires careful attention to quantitative and qualitative outcomes and the hospital system.
- A system-wide strategy is worth it...I think!

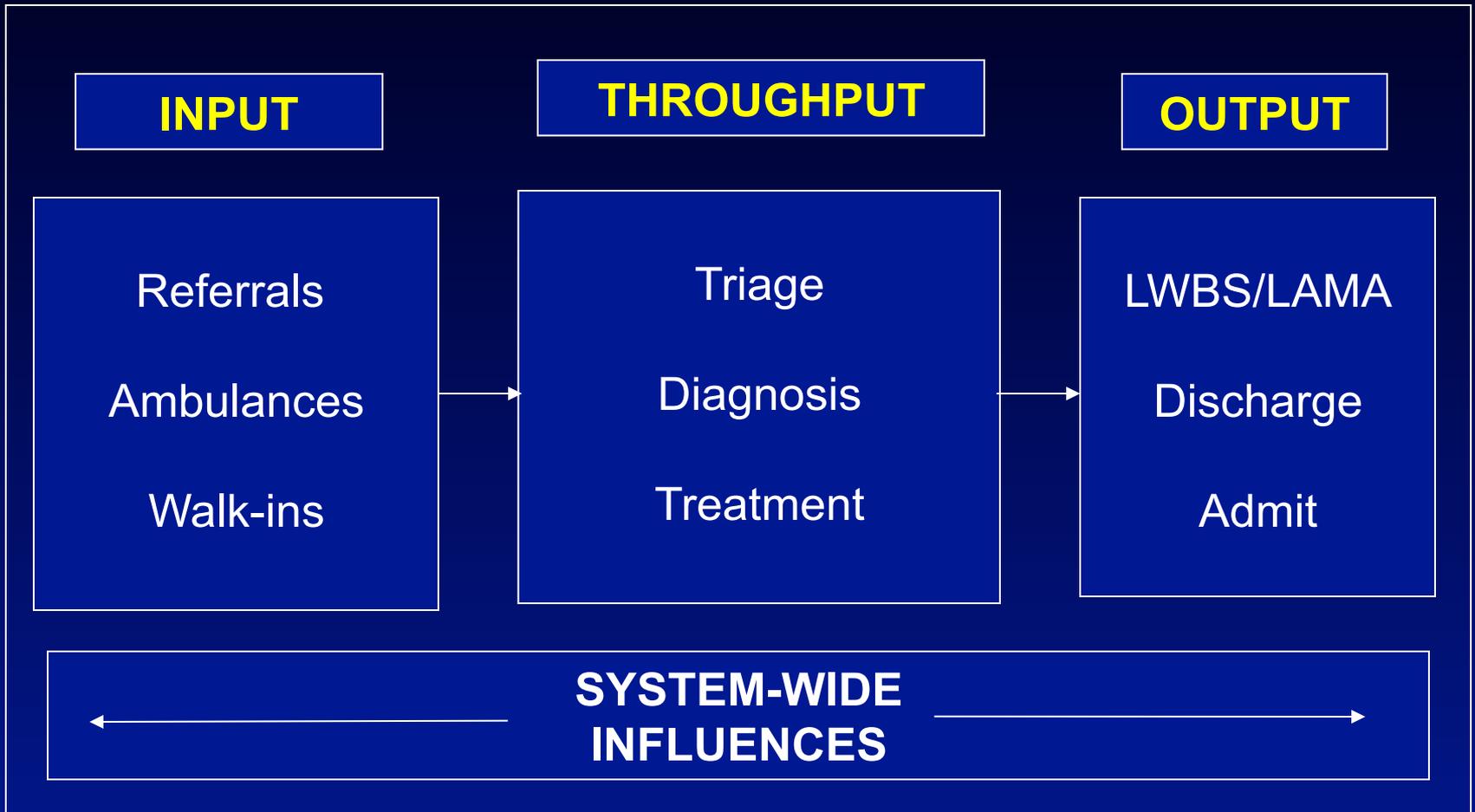
Public reality in most urban EDs!



Definitions

- ED Overcrowding occurs when:
 - *the demand for emergency services exceeds the ability of an emergency department to provide quality care within appropriate time frames.*
 - NENA and CAEP Statement
- The problem has been described since the 1980s; primary issue EIPs.
- Little attention paid to it in Canada, and elsewhere until the late 1990s or early 2000s.

Conceptual Model



Adapted from Asplin and Fatovitch.

Why should we care?

After all, Canadian's are used to waiting...

For the post office...

For the economy in the US to recover...

For the Stanley Cup to return....

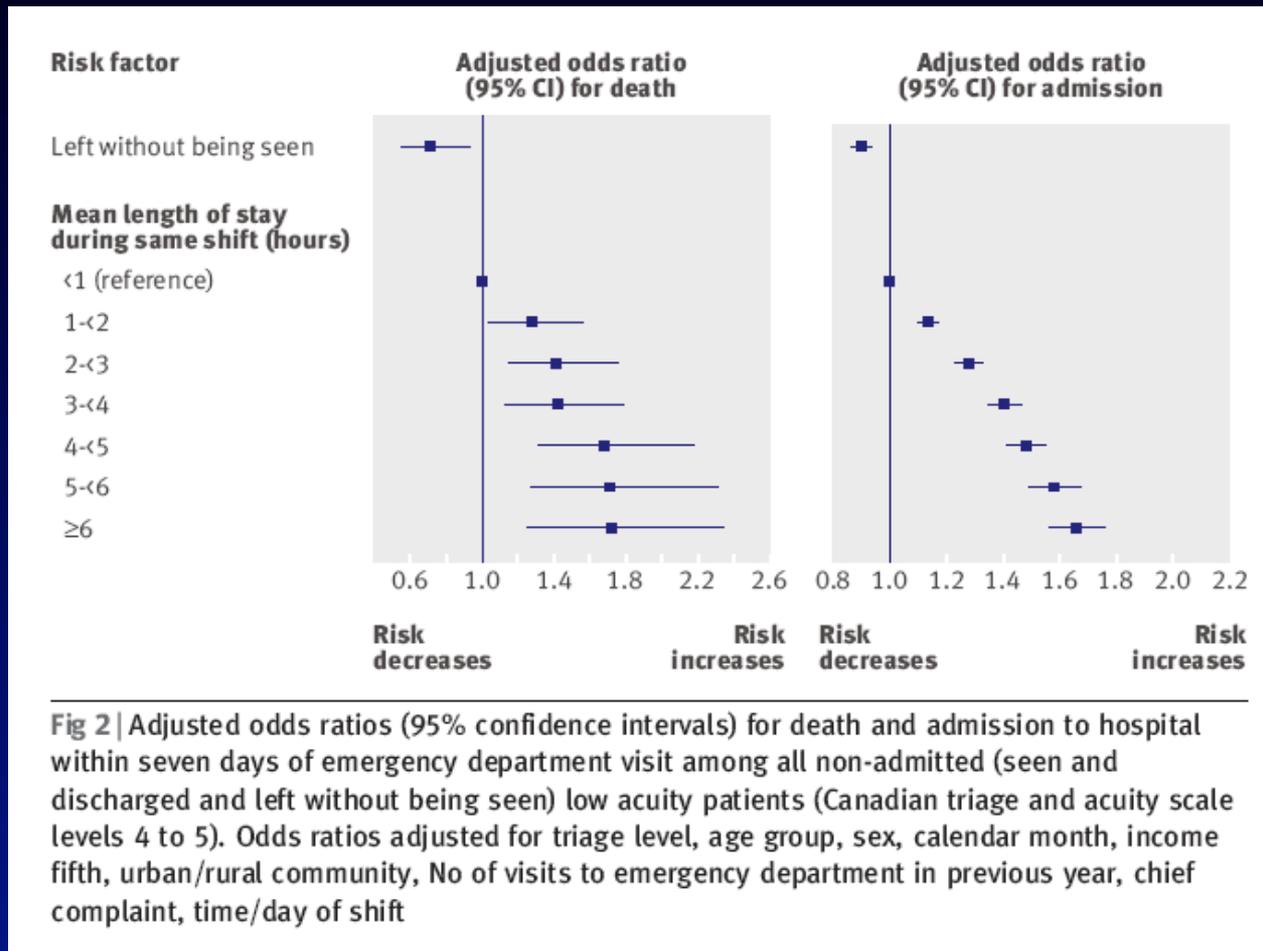
Consequences

- Sub-standard medical care:
 - Delays in time-sensitive treatments (e.g., antibiotics for infections, thrombolytics for AMI, etc);
 - Outcomes:
 - Prolonged LOS;
 - Increased death (e.g., sepsis, AMI).
- Increased risks:
 - Medical errors;
 - Patient safety.

Consequences (continued)

- Infection Control:
 - ↑ risk of contagious illnesses.
- Human resources:
 - Decreased job satisfaction among nurses and physicians;
 - Increased sick time and absenteeism.
- Loss of privacy/dignity.
- Costs:
 - ↑ costs associated with ED overcrowding.

Consequences: how bad could it get?



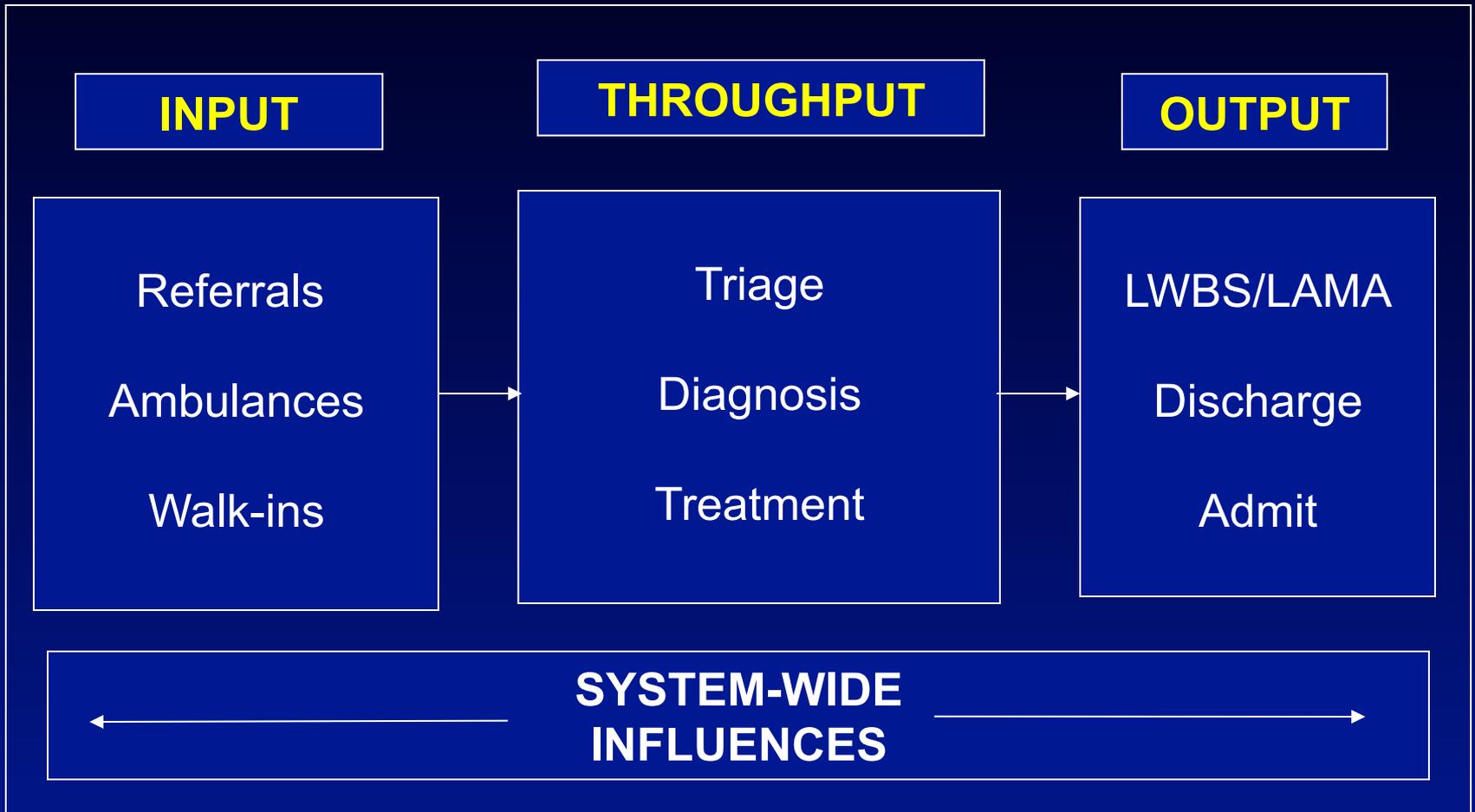
ED overcrowding summary:

- Its bad for patients, staff, and administrators.
- Most often affects:
 - Urban and large-volume EDs; trauma and referral centres; teaching centres.
- Main issue:
 - In-patients in the ED/system over-capacity.
- Efforts to mitigate ED overcrowding are worthwhile.

What are the potential solutions?

Evidence generation:
Knowledge synthesis and
primary trials.

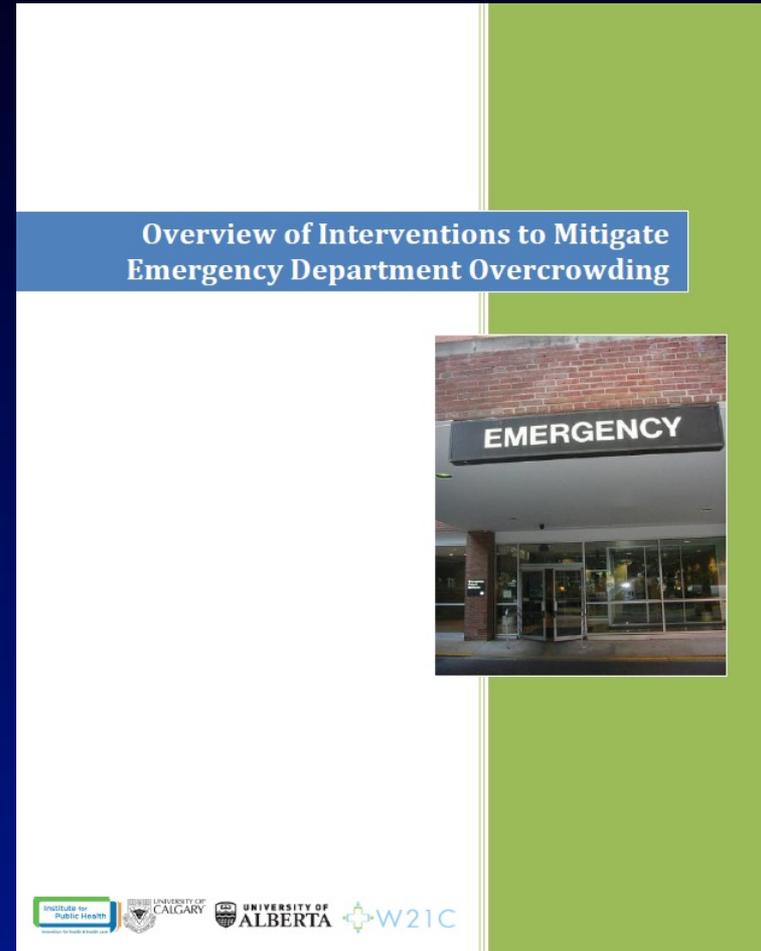
Return to the Conceptual Model



Adapted from Asplin and Fatovitch.

Possible Solutions

- Overview commissioned by HQCA
- Rapid review methodology seeking HTA, SRs, and primary studies on selected interventions.
- Review reveals an extensive body of literature assessing interventions.



Pre-ED (input)

- Decreasing demand:
 - ED wait times reporting
 - Media campaigns;
 - Improved access to primary care;
 - Prevention (e.g., helmet laws) initiatives;
 - Chronic disease (e.g., COPD) management.
- Diversions of care:
 - Alternative sources (WIC, UCC) of care;
 - EMS:
 - Alternative destinations;
 - Ability to treat and discharge.

Pre-ED (input)

- Decreasing demand:
 - ED wait times reporting (?);
 - Media campaigns (-);
 - Improved access to primary care (?);
 - Prevention (e.g., helmet laws) initiatives (+);
 - Chronic disease (e.g., COPD) management (+).
- Diversions of care:
 - Alternative sources (WIC, UCC) of care (-);
 - EMS:
 - Alternative destinations (-);
 - Ability to treat and discharge (+).

Example #1:

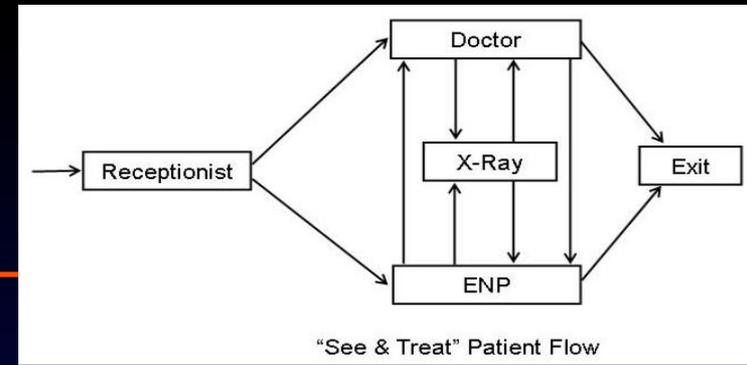
- Reporting ED wait times (estimated time).
- Posting on AHS internet site (Calgary and Edmonton only).
- Presumes patients can accurately self-triage (counter evidence available).

Edmonton Area Emergency Departments  Jan 27 8:53 a.m.

<u>Fort Sask Community Hospital</u>	01 : 17 HOURS MINUTES
<u>Grey Nuns Community Hospital</u>	00 : 43 HOURS MINUTES
<u>Leduc Community Hospital</u>	00 : 39 HOURS MINUTES
<u>Misericordia Community Hospital</u>	01 : 44 HOURS MINUTES
<u>Northeast Community Health Centre</u>	01 : 46 HOURS MINUTES
<u>Royal Alexandra Hospital</u>	01 : 45 HOURS MINUTES
<u>Stollery Children's Hospital</u> For Patients 16 & Under	00 : 35 HOURS MINUTES
<u>Strathcona Community Hospital</u> This location is in Sherwood Park	01 : 11 HOURS MINUTES
<u>Sturgeon Community Hospital</u> This location is in St. Albert	00 : 43 HOURS MINUTES
<u>University of Alberta Hospital</u>	00 : 58 HOURS MINUTES
<u>WestView Health Centre</u> This location is in Stony Plain	01 : 05 HOURS MINUTES

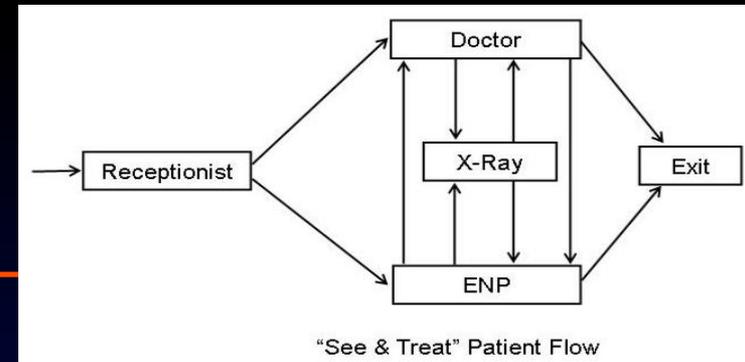
If you are in need of serious medical attention, please call 911 or go directly to your nearest emergency department

In-ED (Throughput)



- Triage.
- Triage nurse ordering.
- Triage liaison physician.
- Enhanced diagnostics and access to results.
- Intermediate care: RAZ (+/-), Obs Units.
- EBM – care maps, eCPGs, etc.
- Staffing levels, surge capacity.
- Engagement: Lean approach.
- Primary care (e.g., NPs) in the ED.

In-ED (Throughput)



- Triage (-).
- Triage nurse ordering (+/-).
- Triage liaison physician (+).
- Enhanced diagnostics and access to results (+).
- Intermediate care: RAZ (+/-), Obs Units (+/-).
- EBM – care maps, eCPGs, etc (+).
- Staffing levels, surge capacity (+/-).
- Engagement: Lean approach (+).
- Primary care (e.g., NPs) in the ED (-).

Example #2:

- Triage Liaison Physician (TLP).
- Novel intervention to deal with overflowing waiting rooms.
- Poor quality research and unclear benefit.
- Randomized controlled trial completed.



PICO-D Research Question

- P:** among adult patients at an urban, high-volume, trauma centre;
- I:** adding a **TLP** physician shift per day;
- C:** compared to the traditional physician shifts per day;
- O₁:** LOS (admitted/discharged)?
- O₂:** LWBS/LAMA, improve MD/nursing satisfaction?
- D:** un-blinded, parallel group, randomized, controlled trial.

Methods

- **Study period:** 8 week study period;
- **Allocation:** computerized, block-randomized sequences covering 8 weeks (2-week blocks).

Control days: usual emergency physician clinical shift schedule (7 X 8 hour shifts);

Intervention days: additional TLP shift physician (8 hours); funded by CHA.

Data Collection:

- Administrative data (PIA, LOS, LWBS, LAMA, patient volumes);
- Surveys issued pre-study and post-study.

	SUN	MON	TUES	WED	THU	FRI	SAT
						(24) ON	(25)
B L O C K 1	(26) ON	(27)	(28) ON	(29)	(30) ON	(1)	(2) ON
	(3)	(4) ON	(5)	(6) ON	(7)	(8) ON	(9)
B L O C K 2	(10) ON	(11) ON	(12)	(13) ON	(14)	(15)	(16) ON
	(17)	(18)	(19) ON	(20)	(21) ON	(22) ON	(23) ON
B L O C K 3	(24)	(25)	(26) ON	(27)	(28) ON	(29)	(30)
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	(14)	(15)	(16) ON	(17) ON	(18)	19 August	

Results

Variable	TLP days (n = 2,841)	Control Days (n = 2,889)	Change
LOS (mins) all cases, median (IQR)	4:21 (2:20, 8:36)	4:57 (2:38, 9:11)	36 minutes (p = 0.01)
LOS (mins) CTAS-3, median (IQR)	5:27 (2:56, 9:46)	6:06 (3:47, 10:45)	39 minutes (p = 0.01)
LWBS	6.3%	7.9%	p = 0.02

Summary

- Quantitative research:
 - Important effectiveness outcome end-points were achieved (MCID).
- Qualitative research:
 - MDs overwhelmingly favoured the shift;
 - Triage nurses felt supported by TLP;
 - Charge nurses felt flow was improved.
- Decision: continuation and expansion of the intervention was supported.

Example #3:

- Rapid Assessment Zone (RAZ).
- Novel intervention to assess patients from the waiting rooms.
- Poor quality research and unclear benefit.
- 6-week RCT completed using similar methods.



PICO-D Research Question

- P:** among adult patients at an urban, high-volume, trauma centre;
- I:** adding a **RAZ** unit model in one ED area;
- C:** compared to the traditional patient locations;
- O₁:** LOS (admitted/discharged)?
- O₂:** LWBS/LAMA, improve MD/nursing satisfaction?
- D:** un-blinded, parallel group, randomized, controlled trial.

Results

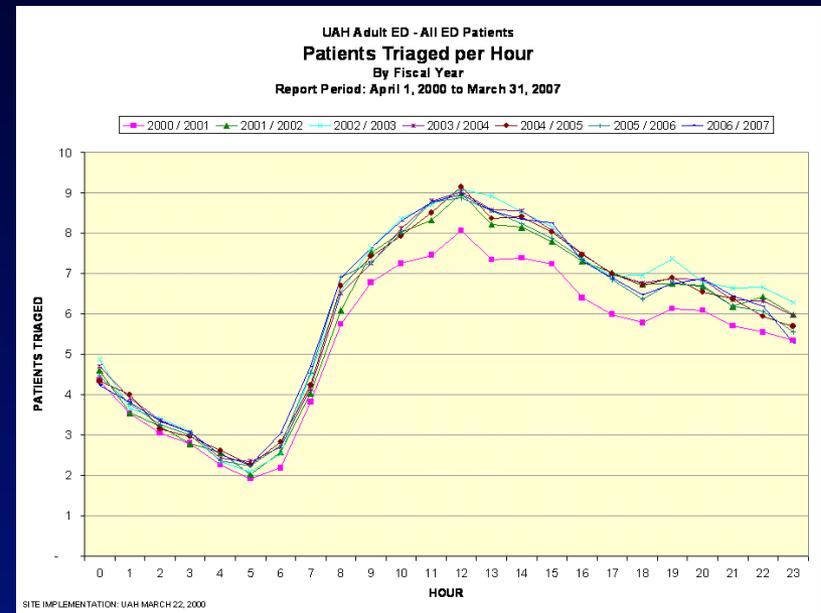
Variable	RAZ days (n = 3,114)	Control Days (n = 3,103)	Change
LOS mins (hrs) all cases	435 (7:15)	462 (7:42)	27 minutes (p = 0.014)
LOS mins (hrs) CTAS-3	544 (9:04)	561 (9:21)	15 minutes (p = 0.025)
LWBS	6.6%	7.1%	p = 0.43

Summary

- Quantitative research:
 - *Some* important effectiveness outcome endpoints were achieved (MCID).
- Qualitative research:
 - MDs overwhelmingly disliked the change;
 - Triage nurses felt TLP was distracted;
 - Charge nurses felt flow was unchanged.
- Decision: intervention was not continued.

Example #4:

- Volume-based staffing.
- Intervention to add additional shifts during periods of high volumes.
- Poor quality research and unclear benefit.
- Randomized controlled trial completed.



Rowe BH, et al. *Can J Emerg Med.* 2012; 14(1):S1.

University of Alberta Hospital (UAH)

- University-based adult (55,000) and pediatric (35,000) tertiary care ED.
- Full-time, dedicated ED (CFPC-EM, ABEM, or FRCPC) staffing;
- High referral and ambulance traffic; 23% admission.
- Impressive overcrowding issues.
- **Staffing model:**
 - Static 8-hour shifts (weekday = weekends);
 - No “on-call” system; however, TTL funded;
 - Funded Triage Liaison Physician (TLP; 08-24:00) position;
 - Fast track, “pod system” (Acute vs non-acute), no RAZ;
 - Acute: 06, 12, 18, 24; Non-Acute: 9, 14, 19 (56 hrs/d).

ED visits over time

- University of Alberta Hospital ED pediatric/adult patient visits (4/01/2005 to 3/31/2012).



Justification

- **Rationale:**

- Among *throughput* interventions, volume-based staffing has been described infrequently.

- **Study objective:**

- To evaluate the impact of adding an additional shift in a moderate case-complexity area of a typical urban, high-volume and academic centre with severe ED overcrowding.

PICO-D Research Question

P: among adult patients at an urban, high-volume, trauma centre;

I: adding a **fourth** physician shift per day in the ambulatory pod;

C: compared to the traditional **three** physician shifts per day in the ambulatory pod;

O₁: LOS (admitted/discharged)?

O₂: LWBS/LAMA, improve MD/nursing satisfaction?

D: un-blinded, parallel group, randomized, controlled trial.

Methods

- **Study period:** June 24 – Sep 15, 2011;
- **Allocation:** computerized, block-randomized sequences covering 12 weeks (2-week blocks).

Control days: usual emergency physician clinical shift schedule (09-17, 14-22, 19-03 hours);

Intervention days: additional ambulatory pod shift physician (09-17, 13-21, 17-01, 21-05 hours)

Data Collection:

- Surveys issued pre-study and post-study;
- Administrative data (PIA, LOS, LWBS, LAMA, patient volumes);
- Minimum clinically important difference (MCID).

	SUN	MON	TUES	WED	THU	FRI	SAT
						(24) ON	(25)
B L O C K 1	(26) ON	(27)	(28) ON	(29)	(30) ON	(1)	(2) ON
	(3)	(4) ON	(5)	(6) ON	(7)	(8) ON	(9)
B L O C K 2	(10) ON	(11) ON	(12)	(13) ON	(14)	(15)	(16) ON
	(17)	(18)	(19) ON	(20)	(21) ON	(22) ON	(23) ON
B L O C K 3	(24)	(25)	(26) ON	(27)	(28) ON	(29)	(30)
	(31) ON	(1) ON	(2)	(3) ON	(4)	(5)	(6) ON
B L O C K 4	(7) ON	(8) ON	(9)	(10)	(11) ON	(12) ON	(13)
	(14)	(15)	(16) ON	(17) ON	(18)	19 August	

Results – ED MCID

Response rate 30/33 (91%)	Time to MD (mins)	EDLOSA (hours)	EDLOSD (hours)	LWBS (↓%)
Minimum Clinically Important Difference	30 (20, 30)	1 (1, 2)	0.5 (0.5, 1)	25 (25, 50)

Emergency physicians were approached and asked to provide estimates of the minimally clinically important difference (MCID);

Benchmark provided: TLP study (↓ LOS by 30 minutes/patient; ↓ LWBS by 25%);

MCID described as” “the point where an intervention would be considered worth continuing irrespective of the cost of the intervention”.

Data are presented using numbers (%) and medians (IQR)

Results

- Over the three months prior to the study and during the study period, similar patient volumes and patient characteristics presented.

Variable	3 months prior	3 months of study
Visit Numbers	15,135	14,005
CTAS		
1,2	23.8%	22.5%
3	46.6%	46.4%
4,5	29.6%	31.1%
Median age (years; IQR)	46 (29, 63)	46 (28, 63)
Male sex (%)	51.8%	52.6%
Admission (%)	22.7%	22.9%
CTAS denotes Canadian Triage Acuity Scale; IQR= interquartile range.		

Results – PIA/LOS

Variable	Intervention days	Control days	p value
PIA (mins) all cases, median (IQR)	69 (35, 123) (n = 6891)	76 (38, 138) (n = 7114)	p < 0.001
LOS (hrs) admitted patients, median (IQR)	10.2 (6.5, 16.7) (n = 1554)	10.5 (6.4, 17.8) (n = 1664)	p=0.27
LOS (hrs) discharged patients, median (IQR)	3.9 (2.3, 6.4) (n = 5337)	4.1 (2.3, 6.7) (n = 5450)	p = 0.06

Results – PIA/LOS

Multiple linear regression model:

- Adjustment for important confounders:
 - Age (increasing age increased LOS);
 - Sex (male sex ↑ LOS);
 - CTAS 3 (CTAS 3 ↑ LOS compared to CTAS 1,2),
 - CTAS 4,5 (CTAS 4,5 ↓ LOS compared to CTAS 1,2);
 - Consultations (consults ↑ LOS).
- **Conclusion:** The intervention provided a statistically significant influence on overall LOS ($p=0.003$).

Results – LWBS/LAMA & Patient Volume

Variable	Intervention days	Control days	p value
LWBS rate (%)	3.7%	5.1%	p<0.001
LAMA rate (%)	0.5%	0.7%	p=0.084

Physician patient volume:

Variable	All	Intervention days	Control days
AB pod MD	3391 (25.8%)	1694 (25.9%)	1697 (25.5%)
CDEF pod MD	9775 (74.2%)	4830 (74.0%)	4945 (74.4%)
Patients seen/physician in AB pod (Median, IQR)	15 (13, 19)	15 (12, 18)	16 (13, 20)
Patients seen/physician in CDEF pod (Median, IQR)	23 (20, 28)	22 (19, 24)	27 (23, 32)

* AB pod= acute pods; CDEF= ambulatory pods.

Study Limitations

- One centre; while results are not be generalizable to other centres, the methodology could easily be applied elsewhere.
- No patient satisfaction data were collected (satisfaction is closely linked with wait times).
- Long-term follow-up and outcomes were not examined.
- Missing data points in the administrative databases (<20%).

Summary

- Quantitative research:
 - Important effectiveness outcome end-points were *not* achieved (MCID).
- Qualitative research:
 - MDs overwhelmingly liked the shift change;
 - Clinical nurses experienced less idle time;
 - Charge nurses felt flow was improved.
- Decision: Unanimous support for the continuation of the intervention.

Beyond the ED

- Rapid transfer to the floors (OCP/FCP).
- Increased bed availability:
 - Medical admission units = MAU;
 - Reducing length of stay (e.g., care paths, patient placement);
 - Planning electives/surgical smoothing.
- Discharge planning:
 - Ancillary staff;
 - AM discharge priority.

Beyond the ED

- Rapid transfer to the floors (OCP/FCP) (?).
- Increased bed availability:
 - Medical admission units = MAU (+/-);
 - Efforts to reduce length of stay (e.g., care paths, patient placement) (+);
 - Planning electives/surgical smoothing (+).
- Discharge planning:
 - Ancillary staff (+);
 - AM discharge priority (+).

System-wide solutions

- Pay for performance (not to individual MD/nurse) activities.
- Bench-marking (e.g., dashboards, reporting) of performance.
- Accountability (performance tied to employment) framework.
- System-wide initiatives.

System-wide solutions

- Pay for performance (not to individual MD/nurse) activities (+).
- Bench-marking (e.g., dashboards, reporting) of performance (+).
- Accountability (performance tied to employment/incentives) framework (+).
- System-wide initiatives (+/-).

Example #5: Canadian wait time targets

	Admits	High Acuity Discharges	Low Acuity Discharges
Nova Scotia	8 hours (90 th percentile)	8 hours (90 th percentile)	4 hours (90 th percentile)
Quebec	10 hours (mean)	8 hours (mean)* *only applies to stretcher patients	
Ontario	8 hours (90 th percentile)	8 hours (90 th percentile)	4 hours (90 th percentile)
Manitoba	N/A		
Saskatchewan	N/A		
Alberta	8 hours (90 th percentile)	4 hours (75 th percentile)	2 hours (75 th percentile)
British Columbia	10 hours (75 th percentile)	4 hours (75 th percentile)	2 hours (75 th percentile)

Summary

- There are a variety of options available to address overcrowding (smorgasbord/buffet).
- Each hospital is unique and the strategy requires a bottom-up/lean approach.
- Courageous and dedicated senior leadership is clearly essential.
- Gains may be modest and iterative evaluation is critical.

Lets see if we....

CAEP POSITION STATEMENT • DÉCLARATION DE L'ACMU

Emergency department overcrowding and access block

Andrew Affleck, MD^{*}; Paul Parks, MD[†]; Alan Drummond, MD[‡]; Brian H. Rowe, MD, MSc[§]; Howard J. Owens, MD[¶]

EXECUTIVE SUMMARY

Emergency department overcrowding (EDOC) is defined as a situation where the demand for emergency services exceeds the ability of an emergency department (ED) to provide quality care within appropriate time frames.^{1,2} ED overcrowding has been a key issue in Emergency Medicine in Canada for more than 20 years. Despite increased political, administrative, and public awareness, EDOC situations continue to rise in frequency and severity.¹ Patient suffering, prolonged wait times, deteriorating levels of service, adverse patient outcomes and the ability to retain experienced staff in an ED are all ill effects of this ongoing problem.

Contrary to popular perceptions, ED overcrowding is not caused by inappropriate use of ED's, or by high numbers of lower acuity patients presenting to the ED; the inability of admitted patients to access in-patient beds from the ED is the most significant factor causing EDOC in Canadian hospitals.

Despite its importance, there currently are no national benchmarks in place to determine severity (and thus identify the factors causing poor performance). Through this position statement, CAEP will put forth recommended national benchmarks (targets) for ED performance to help address the issue. The suggested targets are as follows:

i. **Time to physician initial assessment (PIA):**

- Median of 1 hour, 90th percentile of 3 hours.

ii. **Time (to transfer) to in-patient bed:**

- Median of 2 hours, 90th percentile of 8 hours

iii. **ED LOS:**

- **CTAS IV/V discharged patients** – median of 2 hours, 90th percentile of 4 hours;
- **CTAS I-III discharged patients** – median of 4 hours, 90th percentile of 8 hours;
- **Admitted patients (all CTAS levels)** – median of 8 hours, 90th percentile of 12 hours.

It is CAEP's belief that adoption of national benchmarks (*see recommendations for further details*) will provide goals for each province or territory to strive to achieve, and a mechanism for comparing their progress to their peers. We understand that depending on their circumstances and current situation, individual hospitals may find these targets difficult to reach while others may be performing at or above these targets, but we believe all will benefit from a set of common metrics and benchmarks.

EDOC is a public health concern whose root causes extend beyond the walls of Canada's ED's. It reflects a need for solutions and interventions at multiple levels within the health care system. Solutions outlined within this position statement will reflect this need while not minimizing the most important factor causing EDOC – delays in securing beds for patients admitted through the ED.

CAEP POSITION

1. The primary problem arising from EDOC is a block in the provision of health care required by patients presenting to the ED within an appropriate time and

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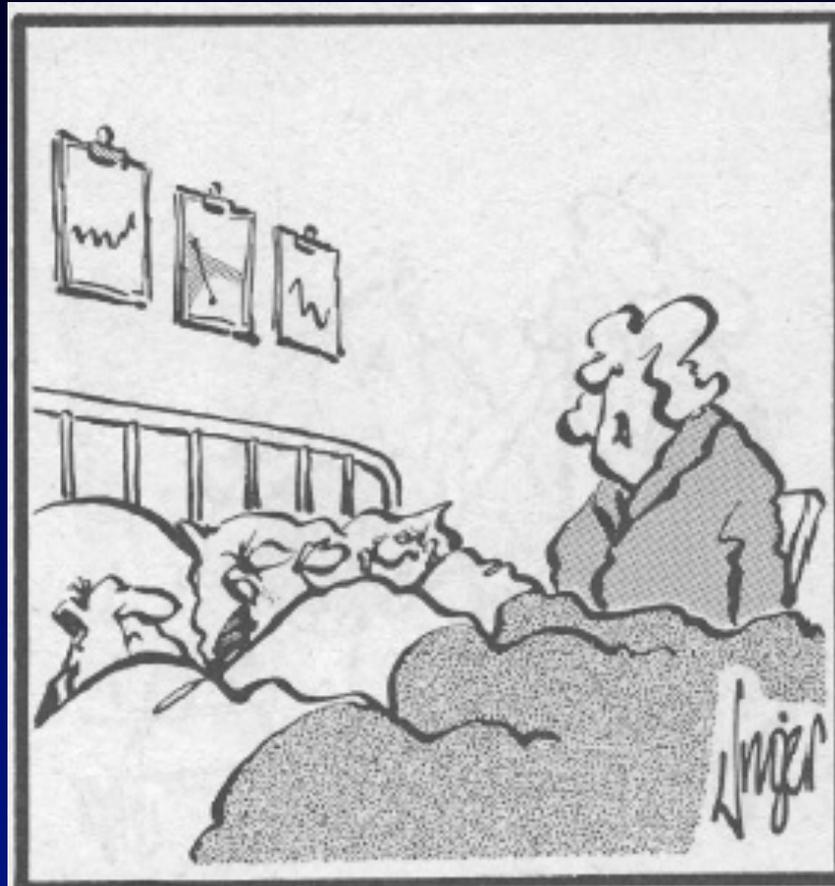
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2013; 15(6) 359

....can avoid this!



“Want me to try to get
you a private ward?”



Thanks for listening!

Questions for Julian?

brian.rowe@ualberta.ca

