Capital District Emergency Services Council "CDESC"

Quarterly Report

Quarter 1

With focus on IWK ED

Capital Health
A different today. A better tomorrow.

IWK Health Centre

DALHOUSIE UNIVERSITY
Inspiring Minds

EHS
Emergency Health Services

Introduction

Emergency Medicine is the medical specialty dedicated to the diagnosis and treatment of unforeseen illness and injury. It includes the initial evaluation, diagnosis, treatment, and disposition of any patient requiring expeditious medical, surgical, or psychiatric care <1>. Thus, the operationalization of "Integrated Networks of Emergency Care" is inherently interdisciplinary and interdependent upon multiple in-hospital and Health System wide structures and processes.

In alignment with the CDHA/IWK/EHSNS commitment to patient safety and with the Better Care Sooner standards (as well as with recommended national ED quality reporting guidelines) this quarterly report focuses on Key Process Indicators, and outcomes when available, to help drive the CQI imperative and to improve care to the patients and populations that we serve.

Emergency Medicine	**Unforeseen Unscheduled**	**Predictable Schedulable**
CTAS 1, 2, 3	• Often described as "real" emergencies 97% of fixed costs of ED to meet population burden of acute illness and injury<4> • Does include exacerbations of chronic problems	• "avoidable" CTAS 3 (ED as safety net) • - frail elderly with no acute event or problem • - partial diagnosis requiring further work up • - chronic condition requiring follow up or has predictable clinical course
CTAS 4, 5	• ***DO NOT*** cause ED overcrowding<2,3> • Very low marginal cost to see in ED<4,5> • 9/10 most common successful lawsuits in EM	• "inappropriate" ED visits (ED as gate keeper) • Medication refill • "sick note" for work or school • Queue jumping to see specialist

1. ACEP definition of Emergency Medicine: http://www.acep.org/Content.aspx?id=29164
2. MYTH: Emergency room overcrowding is caused by non-urgent cases - October 2009 Canadian Health Research Foundation Myth Buster of the year series
3. The Effect of Low-Complexity Patients on Emergency Department Waiting Times Schull MJ, Kiss A, Szalai JP. Ann Emerg Med. 2007 Mar;49(3):257-64, 264.e1. Acad Emerg
4. **THE COSTS OF VISITS TO EMERGENCY DEPARTMENTS** ROBERT M. W ILLIAMS , M.D., .PhD (N Engl J Med 1996;334:642-6.)
5. Emergency Medical Care: 3 Myths Debunked, Huffington Post. Leigh Vinocur, M.D. Director of Strategic Initiatives at the University of Maryland School Medicine.

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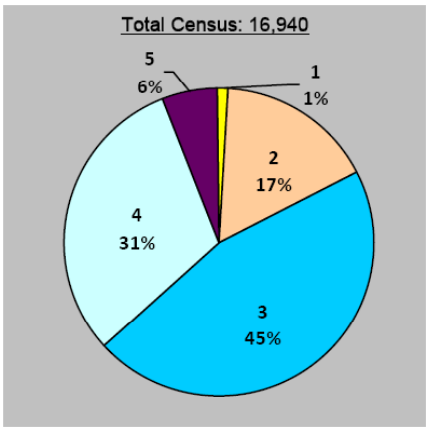
Demand

Census – Halifax Infirmary ED

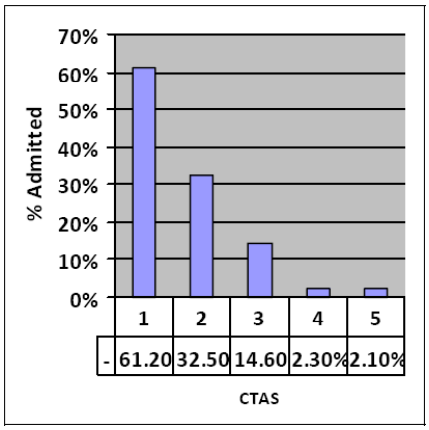
Reporting Date: Jan 1 – Mar 31, 2013

Context :

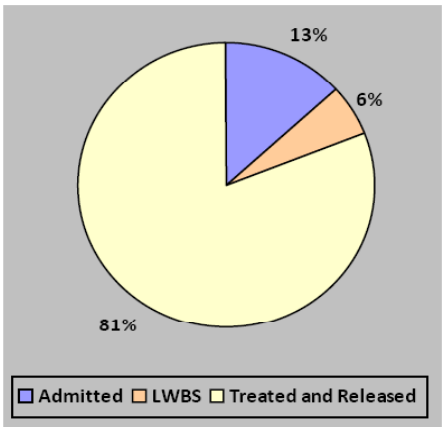
Emergency Departments are designed to meet the unscheduled (from life threatening to relatively minor) health care needs of the population. The 5 level CTAS score is used to differentiate acuity (1 being severe and time dependent) though it is only a surrogate marker for the complexity of care. Left Without Being Seen (LWBS) is a reflection of decreased access secondary to wait times (target 2-3%). Percentage admitted national benchmark is 16-18% for CTAS 3s.



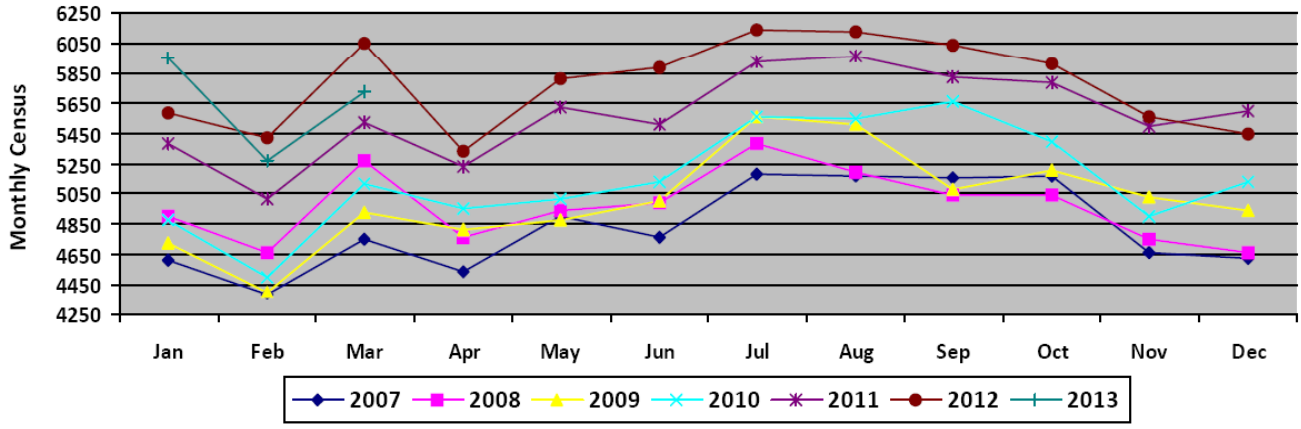
CTAS Distribution



Percentage Admits



Discharge Distribution



Analysis:

Initial census for 2013 continues at levels seen in 2012, with Left Without Being Seen still at 6%.

Sam Campbell, Site Chief, HI ED

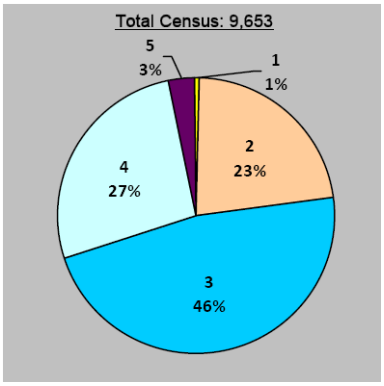
Demand

Census – Dartmouth General ED

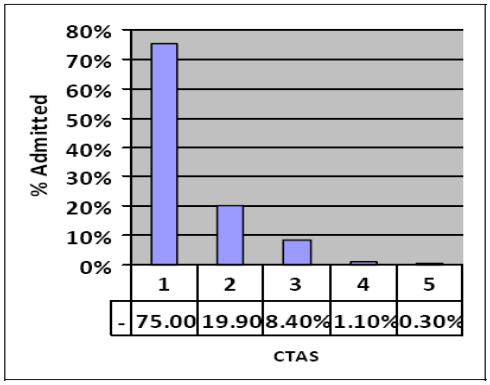
Reporting Date: Jan 1 – Mar 31, 2013

Context:

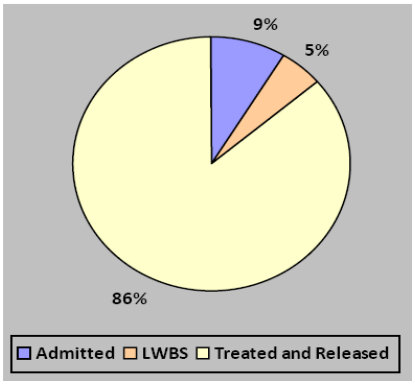
Emergency Departments are designed to meet the unscheduled (from life threatening to relatively minor) health care needs of the population. The 5 level CTAS score is used to differentiate acuity (1 being severe and time dependent) though it is only a surrogate marker for the complexity of care. Left Without Being Seen (LWBS) is a reflection of decreased access secondary to wait times (target 2-3%). Percentage admitted national benchmark is 16-18% for CTAS 3s



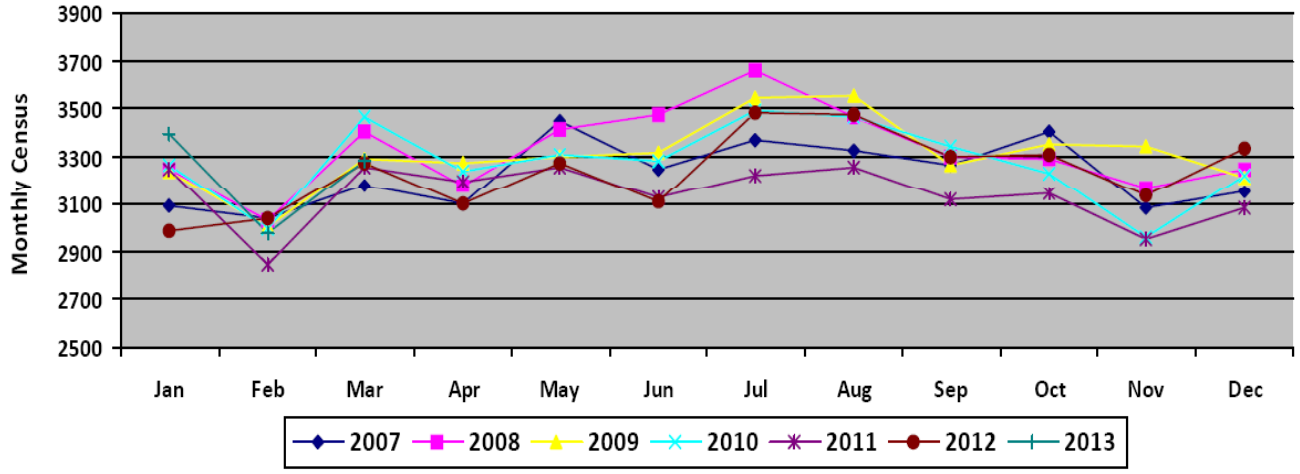
CTAS Distribution



Percentage Admitted



Discharge Distribution



Analysis:

Percentage of patients admitted and CTAS distribution consistent with historical norms. LWBS number improving compared to previous year.

Total census during this quarter increased 3.7% compared to first quarter last year.

Ravi Parkash, Site Chief, DGH ED

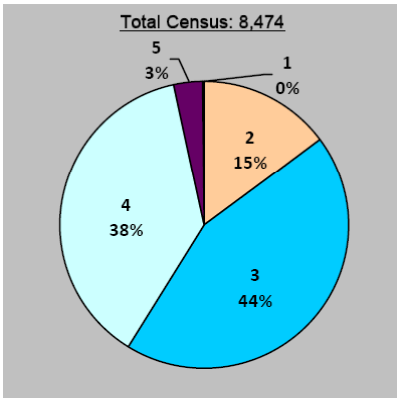
Demand

Census – Cobequid Community ED

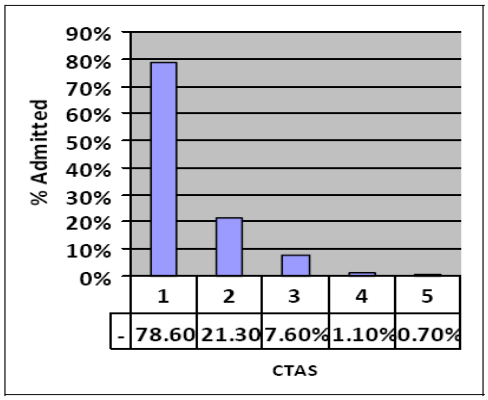
Reporting Date: Jan 1 – Mar 31, 2013

Context:

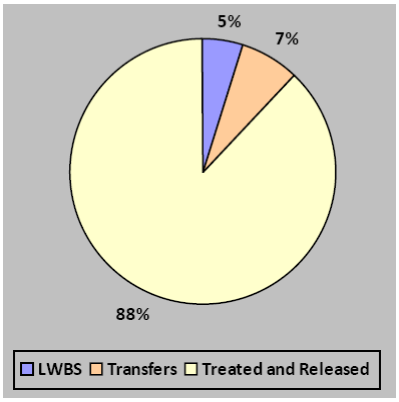
Emergency Departments are designed to meet the unscheduled (from life threatening to relatively minor) health care needs of the population. The 5 level CTAS score is used to differentiate acuity (1 being severe and time dependent) though it is only a surrogate marker for the complexity of care. Left Without Being Seen (LWBS) is a reflection of decreased access secondary to wait times (target 2-3%). Percentage transferred is used as a surrogate for admits for CCHC.



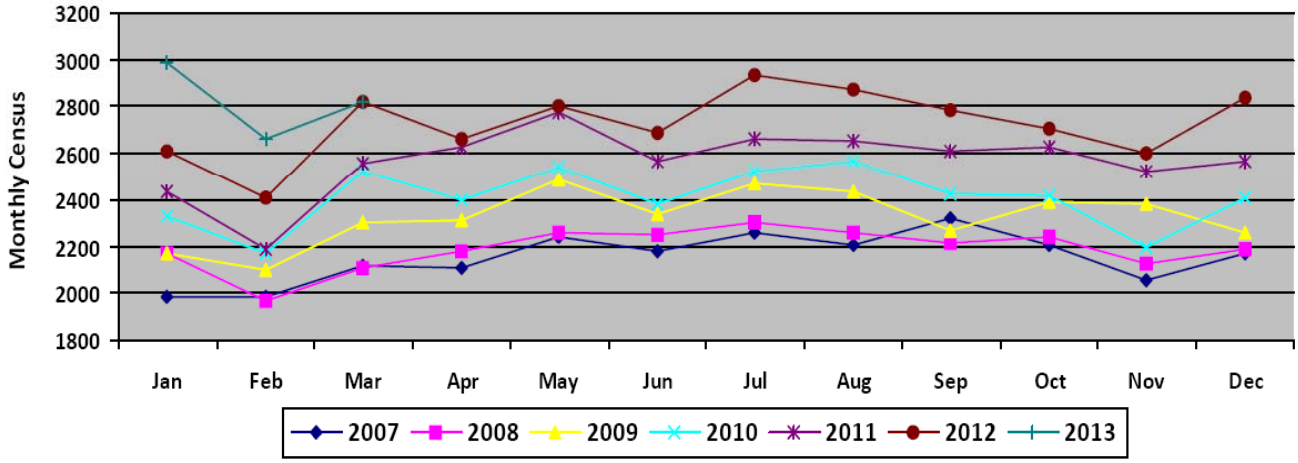
CTAS Distribution



Percentage Transferred



Discharge Distribution



Analysis:

Volumes at CCHC continue to increase with a an 8.2 percentage increase in patient volumes from 2012 to 2013. Despite this increase utilization the LWBS percentage was reduced from 7.5% to 5.1%. Factors contributing to this improvement include improved patient process procedures and increased nursing and physician resource received to implement the extension of operating hours.

Mike Clory, Site Chief, CCHC ED

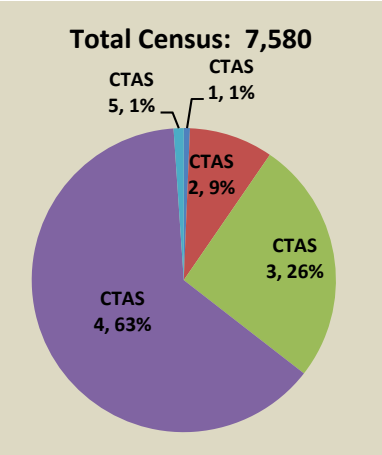
Demand

Census – IWK Health Centre ED

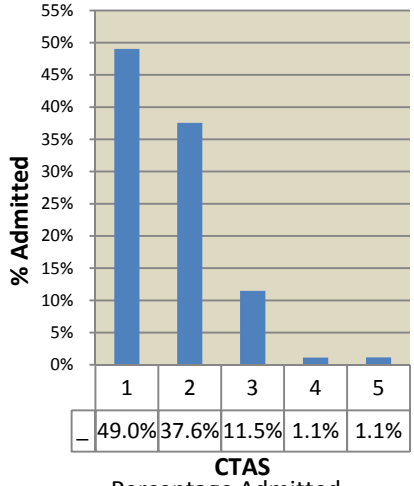
Reporting Date: Jan 1 – Mar 31, 2013

Context:

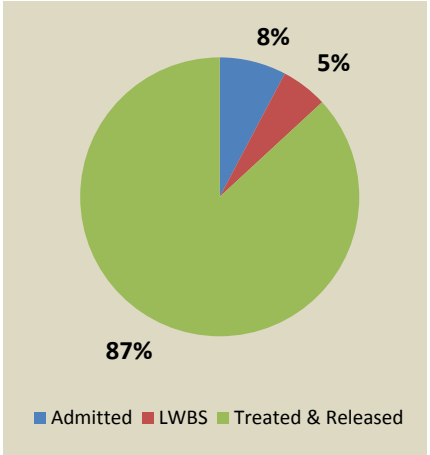
Emergency Departments are designed to meet the unscheduled (from life threatening to relatively minor) health care needs of the population. The 5 level CTAS score is used to differentiate acuity (1 being severe and time dependent) though it is only a surrogate marker for the complexity of care. Left Without Being Seen (LWBS) is a reflection of decreased access secondary to wait times (target 2-3%).



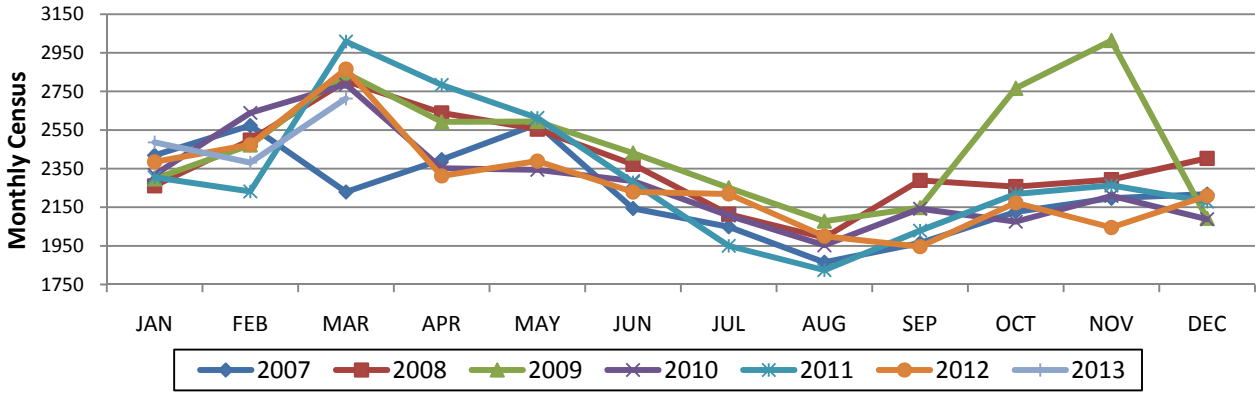
CTAS Distribution



Percentage Admitted



Discharge Distribution



Analysis: Demand has been relatively stable over the last five years. CTAS distribution is approximately 60% Level IV/V and 40% Level I/II/III which mirrors data from every other tertiary care pediatric ED in Canada. 39% of the patients we care for in our ED are under the age of 2. Considerable variation in demand for emergency care by season. Winter months are typically busier with a high burden of infectious disease in naïve young children. This year's infectious disease started slightly later than usual, and is continuing strong into the spring months. The mental health population has increased by 13%, 22% and 17% respectively over the last 3 years. Projecting from 3 quarters of data for 2012/13, we are anticipating over 1400 mental health presentations for the last fiscal year, accounting for just over 5% of total visits.
The IWK ED is struggles with the disparate age cut off of 16 for medical patients, and 19 for mental health patients. This leads to a fragmented system of care for these vulnerable youth.

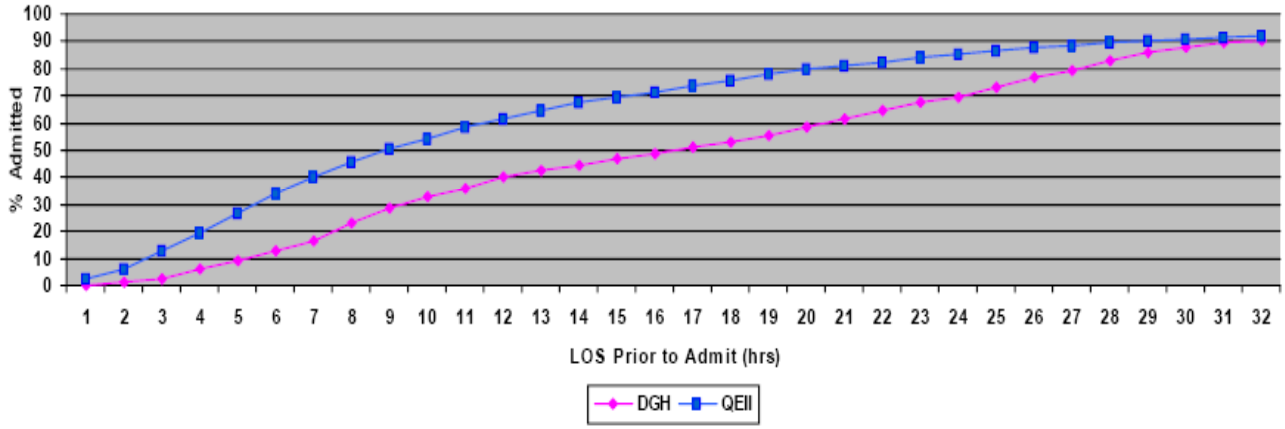
Shannon MacPhee, Site Chief, IWK Health Centre ED

Flow and Network Integration

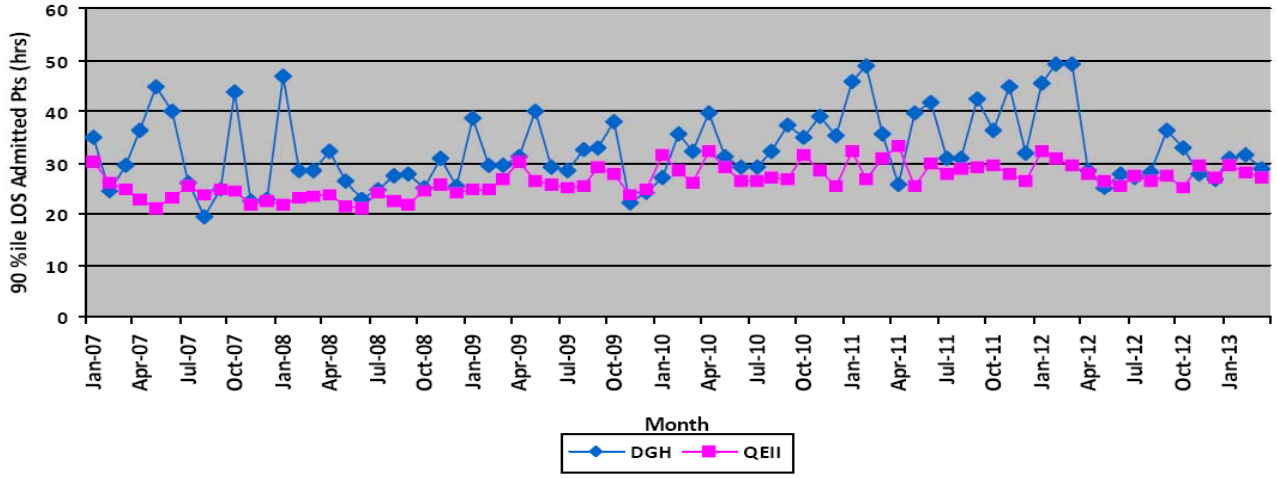
ED Length of Stay for Admitted Patients

Context:

ED LOS of admitted patients (i.e. "ED boarding") has been recognized as the main – 75% of the variance - cause of overcrowding in the ED. Overcrowding is the term used to describe access block. Access block as manifested by increased patient wait times, increased ambulance offload times, and increased LWBS rates is associated with increased adverse outcomes, increased mortality (in a dose/response relationship), and increased costs to the system overall.



Percentile Length of Stay for Non CDU Admitted Patients



90th Percentile Length of Stay Admitted Patients

Analysis:

The upper "90 percentile performance" graph compares the ED LOS for admitted patients from the HI to DGH. The Better Care Sooner standard for this metric is 8 hours 90% of the time (in Ontario the 90th percentile standard is 6 hours). 45% of HI patients are admitted by 8 hours and 25% of DGH patients achieve this target. The 90th percentile performance for both hospitals is 30 hours (the comparison for Academic Heath Science centres across Canada as measured by the Collaborative in Health Care Excellence is 16 hours). The bottom graphic shows the trending of performance for this Key Process Indicator since 2007 at both DGH and the HI.

David Petrie, District Chief, CDHA

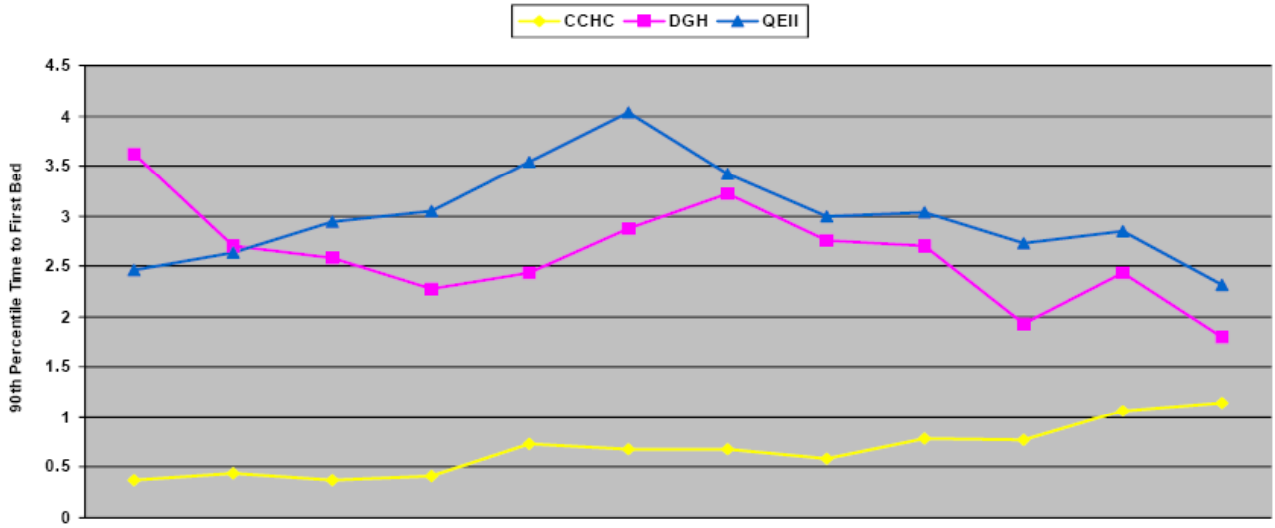
Flow and Network Integration

Ambulance Offload / Transition

Context:

Ambulance offload times are another Key Process Indicator which has implications both to the individual patient (i.e. wait times to see an MD), and to the community (i.e. turn around times for the ambulance to get back to the streets and available to the community for the next 911 emergency call.

Because of rising ambulance offload times in the past (due to ED access block) a transition team has been in place to assume the observation of care in the “ambulance hallway” prior to



	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13
CCHC	0.37	0.44	0.37	0.41	0.73	0.68	0.68	0.58	0.78	0.77	1.06	1.14
DGH	3.62	2.7	2.58	2.27	2.44	2.88	3.22	2.75	2.7	1.93	2.43	1.8
QEII	2.46	2.63	2.94	3.05	3.54	4.04	3.42	2.99	3.03	2.73	2.85	2.32

90th Percentile Time to Bed (hr)

CCHC	160	198	181	193	196	183	232	222	243	281	270	228
DGH	510	528	514	569	579	541	577	573	657	627	548	612
QEII	1215	1224	1253	1229	1208	1180	1234	1177	1207	1295	1242	1191

Ambulance Volume

Analysis:

There seems to be a downward trend in time to first bed at both the HI and DGH. This may possibly be due to the ambulance smoothing initiative within the district and an increased push on the efficiency of bed hour utilization in the ED. There has been a slight increase at the CCHC likely secondary to the increased volume of ambulances.

David Petrie, District Chief, CDHA

Flow and Network Integration

Matching Capacity with Demand:

Context:

Ambulance smoothing has occurred in the central region for Quarter 1 2013 based on the relative surge capacity at each ED site. This table shows the percentage of time that the HI and DGH were on then escalating levels of capacity (Red being the highest surge level). CCHC is also part of this network. The surge levels are determined by 5 criteria and are measured real time so the status changes dynamically. If an ambulance patient does not meet exclusion criteria (CTAS ½ previously determined trip destination criteria for major trauma, stroke, STEMI, or have had recent admit to hospital) then patients may be rerouted from a Red ED to a Green ED.

QEII	DGH	%
GREEN	GREEN	12.26%
YELLOW	GREEN	12.01%
YELLOW	YELLOW	11.03%
GREEN	YELLOW	8.94%
YELLOW	RED	8.18%
GREEN	RED	7.29%
YELLOW	ORANGE	6.54%
ORANGE	RED	4.94%
GREEN	ORANGE	4.83%
RED	RED	4.66%
ORANGE	GREEN	4.00%
ORANGE	YELLOW	3.94%
ORANGE	ORANGE	3.50%
RED	YELLOW	3.01%
RED	ORANGE	2.49%
RED	GREEN	2.36%

Analysis:

During Quarter 1 2013, DGH Red/HI Green occurred 7.29% of the time and HI Red/DGH Green occurred 2.36% of the time. Ambulance smoothing may occur during these times. CCHC also may receive CTAS 3/4/5 ambulance patients from both DGH and HI regions at 1 patient per hour before 16:00. David Petrie, District Chief, CDHA

Flow and Network Integration

Pod of Initial Destination at the HI ED / RAU

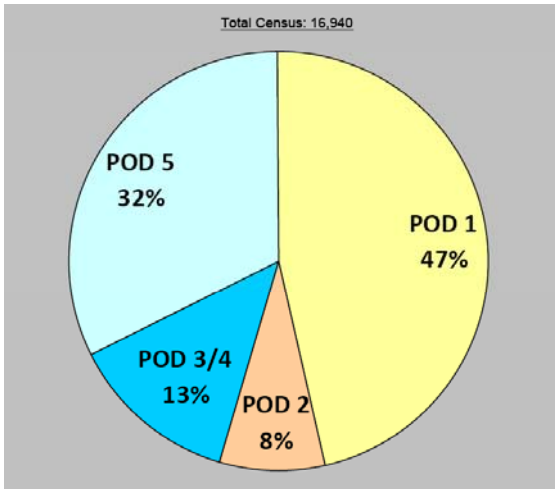
Context:

Internal flow within an ED needs to optimize available space/capacity to meet the volume/CTAS demands of the presenting patients**.**

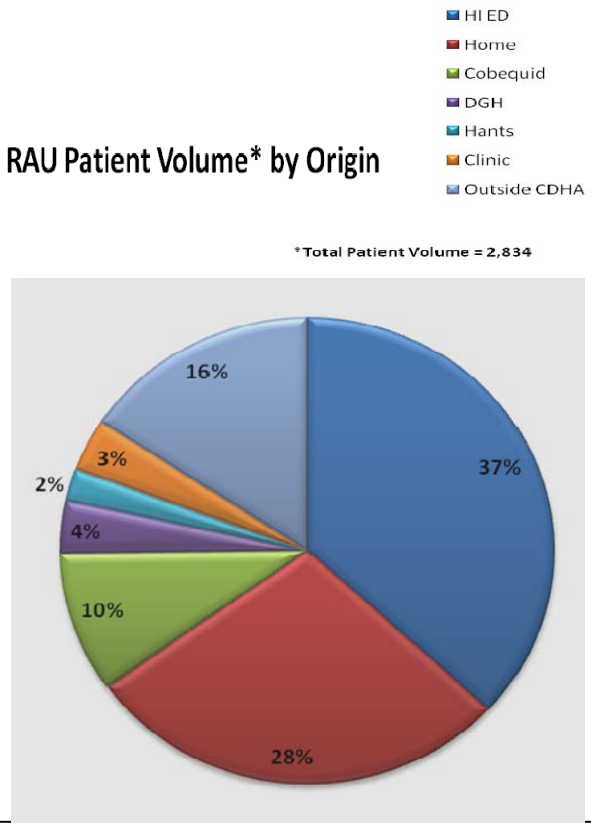
The HI ED has innovated (chair centric Pod 1, fast track/paramedic assisted pod 5) to meet the needs of this demand. The Rapid Assessment Unit is another aspect of the ED which has evolved to meet the needs of transferred patients and referred patients from our own ED. This allows expedited consultations to specific services and frees up bed time to see the next Emergency patient in the waiting room or ambulance hallway.

HI ED- POD Utilization

- Initial Location POD 1-2-3-4-5 or Psych



- Initial Location POD 1-2-3-4-5 or Psych
- Psych and Intake A part of Pod 1
- Intake B Part of Pod 5
- No LWBS Counted



Analysis:

79% of all patients are seen in Pod 1 (chair centric care) or Pod 5 (fast track) – up from 74% in Quarter 4 2012. This is a reflection of the number of hours that our actual ED acute care beds in Pods 2, 3, and 4 are blocked by admitted in-patients. This ratio is likely too high and will be decreased with the reduction of ED boarding.

The RAU receives patients from many different sources with 16% being transferred from other hospitals from outside the district and 19% coming from within the district.

Interestingly, 28% come from home (including post-op rechecks/complications, etc.) which potentially could be seen more efficiently in clinics. David Petrie, District Chief, CDHA

Flow and Network Integration

Clinical Decision Unit (CDU) Utilization

Context:

The Clinical Decision Unit is a virtual unit embedded within the physical space of the ED which facilitates observation and rechecks by the Emergency Physician. The purpose is twofold; to improve the transfer of care with more explicit ordering and documentation clinical care pathways, and to try and reduce admissions for patients that potentially may "turn around" with 6 – 24 hours of treatment and observation.

Site	CDU Patients	CDU Patient Admitted	Percentage CDU Admitted	Total Site Patient Volume	Percentage Total Patients CDU	Median Length of Stay CDU No Admitted Patients
HI ED	15	3	20.0%	8474	0.2%	9.44
DGH ED	513	137	26.7%	9653	5.3%	16.22
CCHC ED	205	48	23.4%	16941	1.2%	21.11

Analysis:

The benchmark for CDU use in the province of Ontario is 4 – 5%. Unfortunately documentation of its use has not been very good at the HI or CCHC but is approximately at the expected rate at the DGH.

CDU has been shown to reduce EDLOS, reduce admission rates with no increase in ED revisit rates in a recent Academic Emergency Paper.

David Petrie, District Chief, CDHA

Flow and Network Integration

IWK Health Centre ED Admissions

Reporting Date: Oct 1 – Dec 31, 2012

Context:

The ED admission rate at the IWK is approximately 8% which is identical to other tertiary care pediatric centres across the country. Approximately 50% of admissions go to the inpatient pediatric unit (PMU), 30% to the MSNU (surgical unit), and 7% to psychiatry. The remainder are admitted to the neonatal intensive care unit, pediatric intensive care unit and oncology

ED Admissions - Oct-Dec 2012	
Total Emergency Department Admitted	529
Average Length of Stay (minutes)	299.3
Median Length of Stay (minutes)	281
90th Percentile Length of Stay (minutes)	481.4
Number of ED Admissions Length of Stay <= 8 hrs	474
Percentage of ED Admissions Length of Stay <= 8 hrs	89.6%

Analysis:

Time to the inpatient unit at the IWK is considerably less than at the adult facilities in this province, which is consistent with data across the country. There is a significant discrepancy with outflow of patients to the surgical versus the medical inpatient unit. The length of stay (LOS) for children and families admitted to the Inpatient Pediatric Unit (PMU) is approximately five hours, compared to a LOS of 2.5 hours for those patients admitted to surgical floors. Efficient outflow of patients to the floor to the Pediatric Medical Unit (PMU) has been targeted over the last two years. With the cooperation of the PMU and housestaff at the IWK, , stable bronchiolitics and asthmatics now have their admission clerking done on the floor when possible. Follow up data and feedback will be analyzed to determine the impact of this change on patient care. Shannon MacPhee, Site Chief, IWK Heallth Centre ED

Patient Experience

Wait Times – HI ED

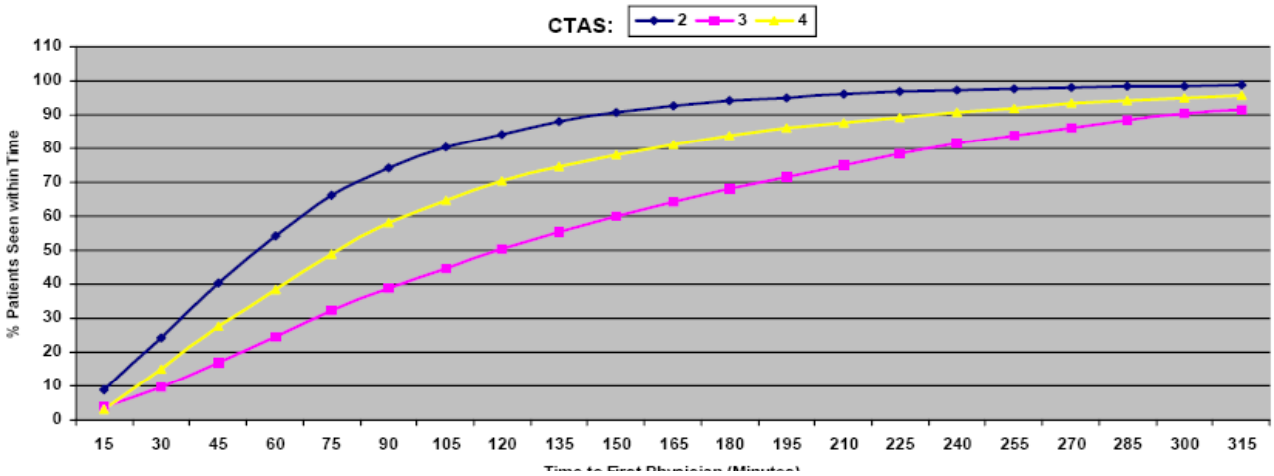
Context:

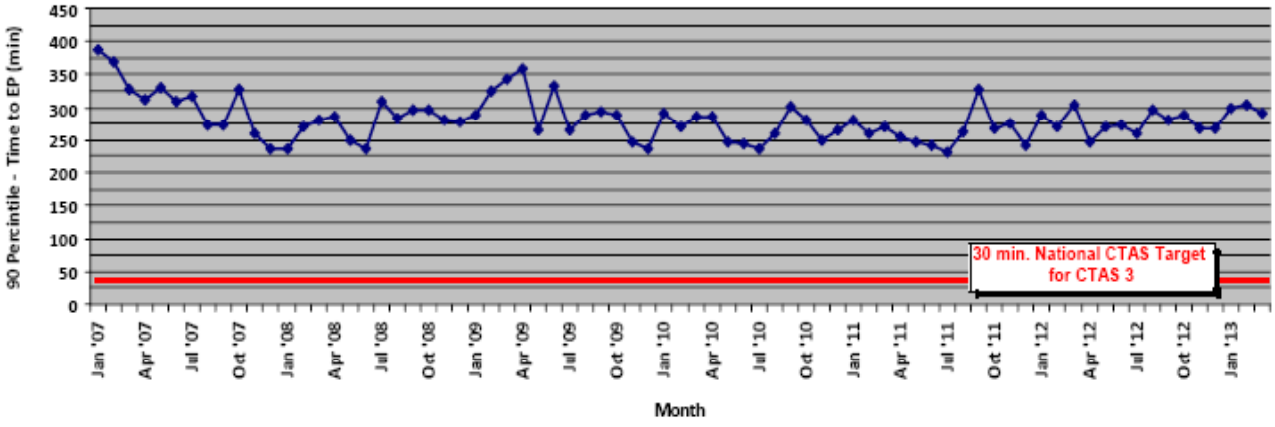
One of the main ways ED access block manifests itself is in patient wait times (time from registration to time to see MD). Wait times have been shown to be associated with adverse outcomes in a dose response curve that suggests causation.

This data looks at the wait time performance curve for CTAS 2, 3, and 4s (assuming CTAS 1s get seen expeditiously and CTAS 5s have less of a time dependency).

The time targets are: CTAS 2 = 15 min, CTAS 3 = 30 min, CTAS 4 = 60 min.

HI ED – 90th Percentile Time to EP





CTAS 3

Analysis:

Waits for CTAS 3 patients remain 10 times those of nationally endorsed recommendations. Paradoxically, CTAS 4 patients wait shorter times than the sicker CTAS 3 patients, a direct result of access to nursing beds being blocked by inpatients. CTAS 4 waits (95th percentile at 230 minutes) still exceed recommended times by a factor of 4. This data suggest opportunities to improve flows in both "rapid turnover" ambulatory areas, and in bed-based care areas of the ED.

Sam Campbell, Site Chief, HI ED

Patient Experience

Wait Times – DGH ED

Context:

One of the main ways ED access block manifests itself is in patient wait times (time from registration to time to see MD). Wait times have been shown to be associated with adverse outcomes in a dose response curve that suggests causation.

This data looks at the wait time performance curve for CTAS 2, 3, and 4s (assuming CTAS 1s get seen expeditiously and CTAS 5s have less of a time dependency).

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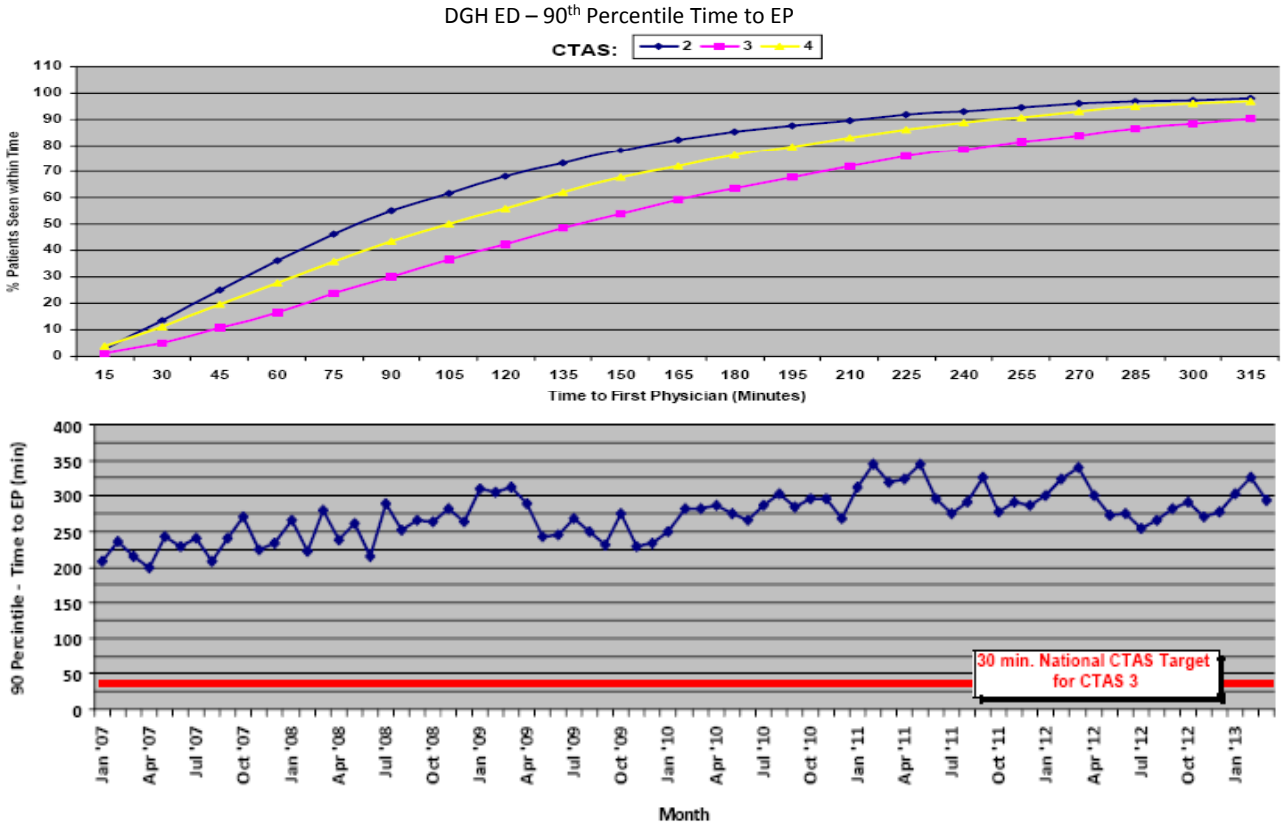

Analysis:

Gradually worsening wait times for level 3 patients, 90th percentile approaching 300 min (5 hrs) in Jan 2013. Concerns given: 1) implementation of ambulance offload team and liaison nurse role. 2) hospital wide overcapacity protocol in place

CTAS 3 present ongoing challenge given physical constraints on inpatient capacity at DGH.

Time to ED hopefully will improve for CTAS 4 given change to fast track area started end of Jan 2013.

Ravi Parkash, Site Chief, DGH ED

Patient Experience

Wait Times – Cobequid ED

Context:

One of the main ways ED access block manifests itself is in patient wait times (time from registration to time to see MD). Wait times have been shown to be associated with adverse outcomes in a dose response curve that suggests causation.

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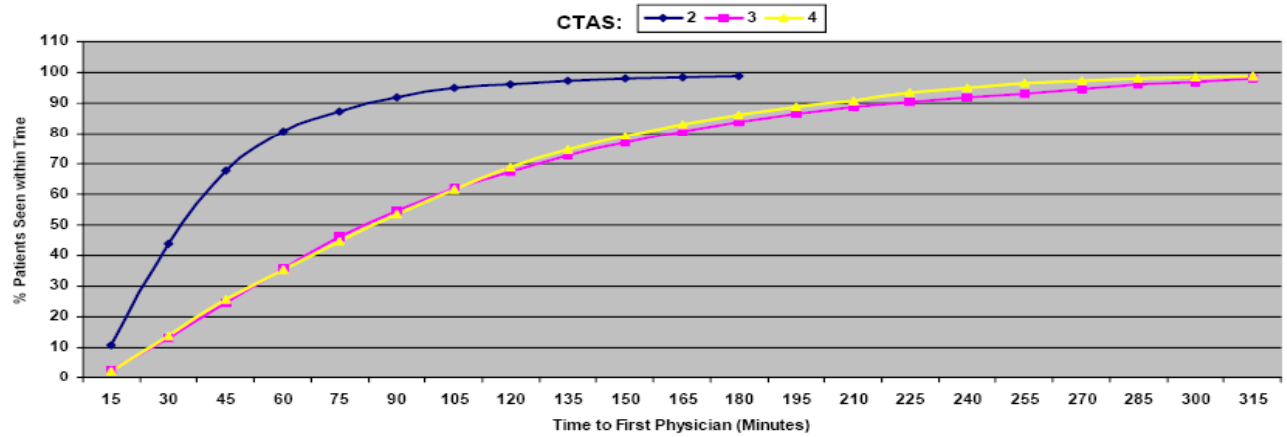
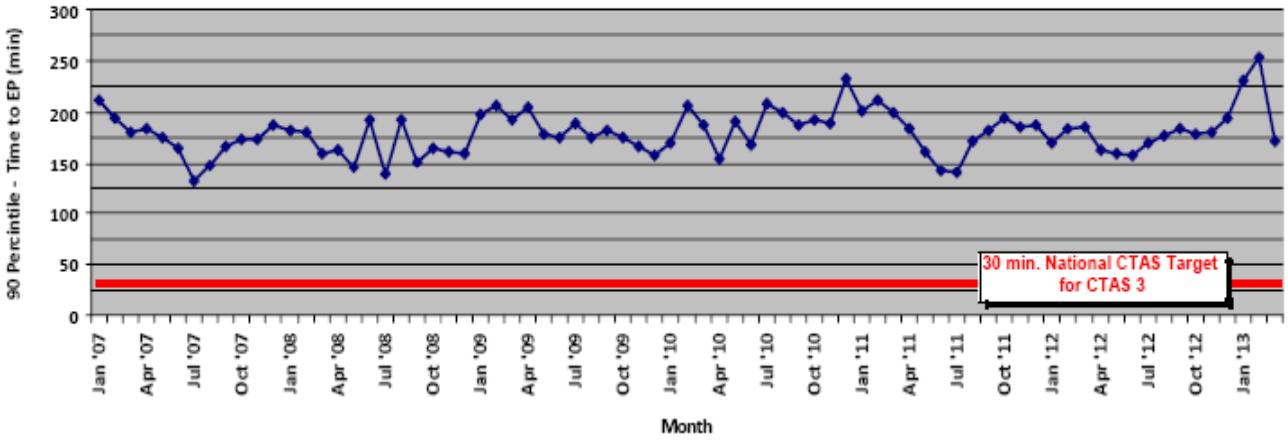
CCHC- 90th Percentile Time to EP





CTAS 3

Analysis:

The average wait time for CTAS 3 patients hit an all time high of over 250 minutes in January/February. This was due to increased volumes 8.2% over the quarter and more specifically 14.5 % and 10.6% respectively in January and February. There were also staffing coverage issues for the paramedic position. The 90th percentile of approximately three and one quarter hours is multi factorial but represents an area to strive to improve. Resources have been redeployed to try to better match nursing and physician resource to presentation time of patients.

Mike Clory, Site Chief, CCHC ED

Clinical Care

Diagnostic Imaging & Lab Reporting

Context:

Through put of patients in the Emergency Department is impacted by the intensity of the work up (lab and diagnostic imaging required). Decision rules developed in the Emergency Department setting (Cat Scan Head, Cervical-Spine, Ottawa Ankle, Rule Out Deep Vein Thrombosis, Rule Out Pulmonary Emboli, etc) all impact the cost effectiveness of patient investigation.

Reporting Period from: Jan 1, 2013 to: Mar 31, 2013

DI Ordered						
Site	Pt Volume	CT Orders (%Pt Volume)	US Orders (%Pt Volume)	MRI Orders (% Pt Volume)	XR Orders (%Pt Volume)	Total Di Orders (% Pt Volume)
QEII	16941	1838 (10.8%)	675 (4.0%)	36 (0.2%)	7506 (44.3%)	10055 (59.4%)
DGH	9653	1358 (14.1%)	377 (3.9%)	0	5431 (56.3%)	7166 (74.2%)
CCHC	8474	697 (8.2%)	179 (2.1%)	0	4505 (53.2%)	5381 (63.5%)
HCH	4090	0	49 (1.2%)	0	1400 (34.2%)	1449 (35.4%)
Total	39158	3893 (9.9%)	1280 (3.3%)	36 (0.1%)	18842 (48.1%)	24051 (61.4%)

Labs Ordered			
Site	Patients with Labs Ordered	%Pts with Labs	Volume
QEII	7087	41.8%	16941
DGH	4855	50.3%	9653
CCHC	3809	44.9%	8474
HCH	1172	28.7%	4090
Total	16923	43.22%	39158

Analysis:

This is raw data looking at the percent of overall patients who receive a Cat Scan, Ultrasound, MRI (Magnetic Resonance Imaging), X-Ray or labs ordered during their assessments in the Emergency Department. This data is not adjusted to acuity, complexity, or presenting complaint / diagnosis. There are no national benchmarks for these indications but they will allow for come comparison within CDESC.

David Petrie, District Chief, CDHA

Patient Flow in the tertiary care Pediatric ED

The model of input, throughput and output is well established in emergency medicine to describe patient flow. A plethora of adult ED literature focuses on admission delays as the most significant indicator of ED overcrowding. Anything less than a hospital or even district-wide integrated system to enhance patient flow is unlikely to produce sustained improvements in adult ED overcrowding.

But what about the pediatric ED? Are there any studies to help our team focus its efforts on ED overcrowding? It turns out that the vast majority of overcrowding literature has been based on studies limited to the adult population, and there is very little literature on overcrowding in the pediatric ED setting.

Our day-to-day experience at the IWK, shows that inpatient bed availability may play less of a role in overcrowding. The average time to floor at the IWK after a bed request is 2.5 hours which closely mirrors the national average (Stang, 2010). This may in part be due to more rapid turnover of inpatient beds with the median length of stay for children being half the length of the typical adult inpatient stay. But we do have an overcrowding problem with long waits, high left without being seen rates, and more recent issues with lack of physical space within the ED to care for our patients.

The largest study of Pediatric ED overcrowding was published out of Montreal Children's Hospital (Stang et al. Markers of Overcrowding in a Pediatric Emergency Department. Academic Emergency Medicine; 2010; 17:151-156.) The first phase of this project elicited expert opinion on the relevant markers of Pediatric ED (PED) overcrowding. The questionnaire was administered to all 12 tertiary care Pediatric ED directors and 10 PEM Program directors in Canada. Sixty nine factors were identified, and categorized into:

- Patient volume (25%)
- ED operational processes (55%)
- Admission delays (13%)
- Miscellaneous (7%)

The overwhelming majority of factors thought to contribute most to pediatric overcrowding in Canada were related to *input and throughput, with much less emphasis on output*.

In the second phase of this study 138,361 patient visits at Montreal Children's Hospital ED were analyzed for 41 of these markers that were quantifiable and measurable. Researchers performed a common factor analysis (CFA) on the data. CFA is a statistical method used when the causes are complex, multivariate, and where root causes and basic concepts are unclear. CFA provides a means of identifying common factors that can explain the correlation among variables. The three factors which accounted for the largest degree of variance were:

Factor 1: Throughput for CTAS 3,4,5 and LWBS	16% of variance
Factor 2 : Volume of patient arrivals and # of patients under observation	16% of variance
Factor 3: Wait at triage	10% of variance

Factor 4: Delay in transferring patient to inpatient bed	6% of variance
Factor 7: Delay in finding in patient bed	3% of variance

Markers involving patient volume (input) and ED operational processes (throughput) may be more relevant for pediatrics rather than those reflecting delays in transferring patients into the hospital (OUTPUT).

Does this apply at the IWK?

The data in this study reflects our anecdotal experience at the IWK. We have enormous fluctuations in patient volume during the winter months due to a large burden of infectious disease, where INPUT appears to be the most contributable factor to overcrowding. This was reflected most acutely across North American PEDs during H1N1 where patient volumes skyrocketed and overwhelmed the PED system. This occurs to a lesser extent on an annual basis in the PED. The unpredictable nature of when a viral surge is going to hit makes staffing difficult.

The other factor that has been a major factor in our ability to care for patients in a timely fashion has been throughput. The IWK ED has outgrown its facility. The increasing volume of patients, the complexity of those patients, and further innovations in care have led to longer stays for emergency care. Increasingly, the most limiting factor has been the lack of actual room space to care for patients. We are seeing increasing numbers of adolescents with mental health issues. As our mental health system works diligently to try to right size resources for the increasing demand, we continue to see increasing numbers for this population. The mental health team has increased their coverage in ED to help with this issue, but without increased nursing staff and space, we are unable to keep pace with this growing demand.

The ED clinicians are accustomed to interviewing and examining patients in the triage area, in the hallway, but of late, even these spaces are filled and at a premium. The dual pressures of a viral surge and an ever increasing mental health population forced the IWK ED to enter into a Code Census recently. Space to care for patients was obtained outside of the ED to allow us to continue responding to patient demand/volume. Although this may be a short-term solution, this space is only available evenings and weekends, and again requires additional nursing staff to provide safe, high-quality care.

Although delay in finding and transferring to an inpatient bed are statistically reported to be less significant, they do add to the pressures in the IWK ED particularly during the peak respiratory season. Delays in admissions at this time of year highlight the lack of space and staff available in the ED.

Stang's (2010) study adds a great deal to our understanding of overcrowding in the Pediatric ED environment, and targeting of resources such as space and nursing complement may yield high dividends in our environment.