FOCUS on Emergency Departments

DATA DICTIONARY

Table of Contents

FOCUS on Emergency Departments: Technical Data Definitions and Data Sourcing[1,2]

Patient time to see an emergency doctor	
Calculation	Patients' time to see an emergency doctor = (Physician initial assessment (PIA) time) - (Triage time) Metric: Median and 90th percentile time in hours
Description	**Triage time:** The patient's first contact with a healthcare provider (triage nurse), regardless of whether or not the registration time is recorded prior to triage.[3] **PIA time:** The time captured in an information system when a physician indicates they will assess the patient.
Data source(s)	National Ambulatory Care Reporting System (NACRS)
Assumptions	None
Exclusions	1. Patients are excluded if either time stamp in the calculation is missing. 2. Patients are excluded if their recorded wait to see an emergency physician is greater than 72 hours (3 days) or a recognized data entry error occurred.[4] 3. Results prior to the start of the 2016/17 fiscal year (prior to April 2016) are excluded at the Northern Lights Regional Health Centre and the Queen Elizabeth II Hospital due to concerns about the quality and reliability of the data during this time. Prior to 2016/17, less than 60% of the physician initial assessment time stamps were captured at these two sites, which was deemed too low for reliable public reporting by AHS. Due to efforts to improve this data capture, by April 2016 the data quality stabilized at a higher standard (85-90% captured), sufficient for reliable reporting. 4. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.

[1] Documentation and sourcing for the reported emergency department measures is the result of collaborative work between members of the HQCA's Health System Analytics team and members of AHS' Analytics team. Credit regarding determining the appropriate data definitions should be attributed to the AHS Analytics team for most of the measures below.

[2] While the HQCA used all reasonable efforts to ensure the accuracy, completeness, and reliability of the data used in this website, data continues to expand in scope and completeness. As such, the values reported may change over time.

[3] This is the standard for both Alberta and CIHI.

[4] E.g., if the patient's wait to see an emergency physician is less than 0 hours.

Limitations	1. Different emergency departments have varying degrees of electronic support for standardizing the assignment of the CTAS score. Therefore it is more valid to compare CTAS data over time within a single site rather than comparing sites. 2. The time of physician initial assessment (PIA) is a mandatory field in the NACRS database; however, this time is occasionally not recorded during a visit, resulting in some missing data. Overall, this amounts to less than 10% of the data at most of the emergency departments during the 2016/17 fiscal year, but there are exceptions.[5] Data for the 2016/17 fiscal year is most complete. 3. Processes for physician sign up to see new patients may differ between sites. At some sites physicians may sign up for multiple patients at one time, especially for lower acuity cases. In this case, the data captured in the source information systems would differ from what actually happened. Some data systems capture this more reliably than others but overall the data is sufficiently consistent to make reliable comparisons. 4. For critically ill patients, where the focus is on life-saving patient care, the data for triage time and PIA may be recorded after the patient care is completed. Data irregularities introduced by this practice appear to occur consistently, suggesting a stable bias.[6]

AHS Analytics. *Alberta Emergency Department (Urban) Operational and Performance Dashboard.*

[5] See 'Exclusions' section for more information.

[6] Any errors introduced by this practice are small and remain consistent over time.

Patient emergency department total length of stay (LOS)	
Calculation	Patients' total length of emergency department stay = (Emergency department last contact time) - (Triage time) Metric: Median and 90th percentile time in hours
Description	**Triage time:** The patient's first contact with a healthcare provider (triage nurse), regardless of whether or not the registration time is recorded prior to triage.[7] **Emergency department last contact time:** The last time there is a recorded emergency department entry in a patient's chart.
Data source(s)	National Ambulatory Care Reporting System (NACRS)
Assumptions	The emergency department last contact time is when the patient no longer requires emergency department care.
Exclusions	1. Patients are excluded if either time stamp in the calculation is missing. 2. Patients are excluded if their total length of emergency department stay is greater than 168 hours (7 days) or a recognized data entry error occurred.[8] 3. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. There is a minimal amount of missing data for the emergency department last contact time. Overall, this amounts to less than 1% of the data at all of the emergency departments, except for the Northern Lights Regional Health Centre,[9] during the 2016/17 fiscal year. This small amount of missing data is stable historically. 2. Some patients might leave the emergency department before assessment or treatment by a physician occurs, without notifying staff they are leaving. The last contact time for these patients is recorded when staff notice they have left or at the end of the staff's shift, and therefore might not accurately reflect the duration of patients' emergency department stay. 3. Patients might leave before the last contact time is recorded or stay in the emergency department for a variable amount of time after the emergency department last contact time. These times would not be captured.

AHS Analytics. *Alberta Emergency Department (Urban) Operational and Performance Dashboard*.

*For more information regarding definitions, exclusions, etc., please visit the NACRS Abstracting Manual, 2014-2015 Edition.[10]

[7] This is the standard for both Alberta and CIHI.

[8] E.g., if the patient's total emergency department length of stay is less than 0 hours.

[9] The Northern Lights Regional Health Centre is missing 10% of its data on the emergency department last contact time during the 2016/17 fiscal year. Caution is urged when interpreting results for the Northern Lights Regional Health Centre, as the amount of missing data may make comparisons with this facility unreliable.

[10] Canadian Institute for Health Information. NACRS Abstracting Manual, 2014-2015 Edition. Ottawa, ON: CIHI; 2014.

Length of time emergency department patients wait for a hospital bed after a decision to admit	
Calculation	Time admitted patients wait in the emergency department = (Emergency department last contact time) - (Decision to admit time) Metric: Median and 90th percentile time in hours
Description	**Decision to admit time:** When an admission order or request is completed in an information system. If the admission order time is unknown, the request for an inpatient bed or admission time from the inpatient record is recorded as the decision to admit time. **Emergency department last contact time:** The last time there is a recorded emergency department entry in a patient's chart.
Data source(s)	National Ambulatory Care Reporting System (NACRS)
Assumptions	Patients who have a recorded decision to admit time were moved to an inpatient bed in the hospital.
Exclusions	1. Patients are excluded if a decision to admit to the hospital did not occur. This includes patients who: • were discharged directly from the emergency department • were transferred to another facility • left the emergency department against medical advice • died in the context of their emergency department visit 2. Patients are excluded if either time stamp in the calculation is missing. 3. Patients are excluded if their recorded wait between the decision to admit and last contact is greater than 72 hours (3 days) or a recognized data entry error occurred.[11] 4. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. There is a minimal amount of missing data for the emergency department last contact time. Overall, this amounts to less than 1% of the data at all of the emergency departments, except for the Northern Lights Regional Health Centre,[12] during the 2016/17 fiscal year. This small amount of missing data is stable historically. 2. Patients might leave before the last contact time is recorded or stay in the emergency department for a variable amount of time after the emergency department last contact time. These times would not be captured. 3. A small percentage of admitted patients are not moved to an inpatient bed in the hospital (e.g., those who improved and were discharged from the emergency department or those who died before being moved to an inpatient bed).

AHS Analytics. *Alberta Emergency Department (Urban) Operational and Performance Dashboard*.

*For more information regarding definitions, exclusions, etc., please visit the NACRS Abstracting Manual, 2014-2015 Edition.[13]

[11] E.g., if the patient's wait between the decision to admit and last contact is less than 0 hours.

[12] The Northern Lights Regional Health Centre is missing 10% of its data on the emergency department last contact time during the 2016/17 fiscal year. Caution is urged when interpreting results for the Northern Lights Regional Health Centre, as the amount of missing data may make comparisons with this facility unreliable.

[13] Canadian Institute for Health Information. NACRS Abstracting Manual, 2014-2015 Edition. Ottawa, ON: CIHI; 2014.

Patients who left without being seen (LWBS) by an emergency department doctor	
Calculation	Percentage of patients who left without being seen (LWBS) = $\left(\frac{\text{Number of patients that LWBS during the reporting period}}{\text{Number of all emergency department visits during the reporting period}}\right) \times 100$ Metric: Percentage of emergency department patients that LWBS by an emergency department physician.
Description	**LWBS:** Patients who decided to leave the emergency department before assessment or treatment by a physician occurred.
Data source(s)	National Ambulatory Care Reporting System (NACRS)
Assumptions	All patients who present to the emergency department and decide to leave without being seen by a physician are given a final disposition of LWBS.
Exclusions	1. Patients who left the emergency department against medical advice (i.e., patients who decide to leave the emergency department after they had been assessed by a physician, but prior to treatment, and against medical advice) are not included in this measure. 2. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	A very small percentage of patients present to the emergency department but leave before they were triaged or registered. These patients would not be captured. Therefore, results presented are a conservative estimate of actual rates of leaving the emergency department without being seen.

AHS Analytics. *Alberta Emergency Department (Urban) Operational and Performance Dashboard*.

*For more information regarding visit dispositions, including LWBS status, please visit the NACRS Abstracting Manual, 2014-2015 Edition.[14]

[14] Canadian Institute for Health Information. NACRS Abstracting Manual, 2014-2015 Edition. Ottawa, ON: CIHI; 2014.

Time waiting for specialist/admitting doctor opinion	
Calculation	Time patients wait for specialist/admitting physician(s) opinions in the emergency department = (Disposition time) - (Consult request time) Metric: Median and 90th percentile time in hours
Description	**Consult request time:** The time the first consult request was recorded in an information system.[15] **Disposition time:** • Admitted patients – when an admission order or request is completed in an information system. If the admission order time is unknown, the request for an inpatient bed or admission time from the inpatient record is recorded as the decision to admit time. • Discharged patients – the discharge time in an information system (see information systems below).
Data source(s)	**Primary** - National Ambulatory Care Reporting System (NACRS) **Secondary**[16] - Emergency Department Information System (EDIS) - Regional Emergency Department Information System (REDIS) - Sunrise Clinical Manager (SCM)
Assumptions	None
Exclusions	1. Patients are excluded if they were discharged from the emergency department and a specialist/admitting physician was not involved in their care. 2. Patients are excluded if either time stamp in the calculation is missing. 3. Patients are excluded if their emergency department visit was not a face-to-face interaction between the patient and provider. 4. Patients are excluded if their recorded wait between first consult request and disposition time is greater than 72 hours (3 days) or a recognized data entry error occurred.[17] 5. Results prior to April 2013 are excluded due to concerns about the quality and reliability of consult service data during this time. Before 2013/14, data was not captured consistently enough for the information to be a reliable reflection of time waiting for a consultation with a specialist/admitting doctor.

[15] For some patients more than one consult may occur before a decision to admit or a decision to discharge occurs.
[16] Secondary data sources (clinical information systems) capture the consult request time because it is not a mandatory field in NACRS.
[17] E.g., if the patient's wait between first consult request and disposition time is less than 0 hours.

Limitations	1. The consult request time and the disposition time are proxy measures used to define the actual duration of the consultation. 2. Information on consult request time is incompletely captured at the five regional emergency department sites (Chinook Regional Hospital, Medicine Hat Regional Hospital, Red Deer Regional Hospital, Northern Lights Regional Health Centre, and Queen Elizabeth II Hospital), resulting in a large amount of missing data. Therefore, this time interval is only reported for the 11 sites in the Calgary and Edmonton zones. 3. Some patients require multiple consults, resulting in longer times before a disposition is recorded. These longer time intervals may be entirely appropriate and not necessarily reflect an inefficient system. Caution is urged when interpreting the length of this time interval.

Patients waiting in the emergency department for a hospital bed	
Calculation	Number of emergency inpatients (EIPs):[18] $$H_i = \frac{\sum(\text{minute} - \text{by} - \text{minute counts of all EIPs in hour } i)}{60 \text{ minutes}}$$ $$Avg(EIP) = \frac{\sum(H_i)}{\text{Total number of hours per month/quarter}}$$ Where H_i is the average hourly count of all EIPs and $Avg(EIP)$ is the average monthly/quarterly count of all EIPs per hour Metric: Average number of emergency inpatients (EIPs) per hour
Description	**EIP:** An emergency patient who has been admitted to the hospital (decision to admit time) but has not moved to an inpatient bed (ED last contact time). **Decision to admit time:** When an admission order or request is completed in an information system. If the admission order time is unknown, the request for an inpatient bed or admission time from the inpatient record is recorded as the decision to admit time. **Emergency department last contact time:** The last time there is a recorded emergency department entry in a patient's chart.
Data source(s)	**Primary** - Emergency Department Information System (EDIS) - Regional Emergency Department Information System (REDIS) - Sunrise Clinical Manager (SCM) **Secondary** - National Ambulatory Care Reporting System (NACRS)
Assumptions	The data is comparable between NACRS and EDIS/REDIS/SCM.
Exclusions	1. Patients are excluded if their total emergency department length of stay is greater than 168 hours (7 days) or a recognized data entry error occurred.[19] 2. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. Final disposition (i.e., whether patients are recorded as admitted or discharged) can differ between the primary data sources (EDIS, REDIS, SCM) and the secondary data source (NACRS). These discrepancies may influence comparability between the regional sites, which rely heavily on NACRS data, and the Calgary and Edmonton sites.

[18] An emergency patient who has been admitted to the hospital but has not moved to an inpatient bed.
[19] E.g., if the patient's total emergency department length of stay is less than 0 hours.

	2. There is a minimal amount of missing data for the emergency department last contact time. Overall, this amounts to less than 1% of the data at all of the emergency departments, except for the Northern Lights Regional Health Centre,[20] during the 2016/17 fiscal year. This small amount of missing data is stable historically. 3. Patients might leave before the last contact time is recorded or stay in the emergency department for a variable amount of time after the emergency department last contact time. These times would not be captured.

AHS Analytics. *ED Census Summary – Facility Dashboard*.

[20] The Northern Lights Regional Health Centre is missing 10% of its data on the emergency department last contact time during the 2016/17 fiscal year. Caution is urged when interpreting results for the Northern Lights Regional Health Centre, as the amount of missing data may make comparisons with this facility unreliable.

Hospital occupancy	
Calculation	Hospital occupancy = $\left(\frac{\text{Average number of acute care inpatients in hospital during the reporting period}}{\text{Average number of staffed beds in the hospital during the reporting period}}\right) \times 100$ Metric: Percentage of a facility's total staffed beds that are occupied by inpatients.

Description	All patients admitted as inpatients are included in the numerator regardless of whether they are in day surgery areas, surgical suites, emergency, etc. Therefore, the hospital occupancy calculation can be over 100%.
	
	Numerator – Inclusions:
	• Adult and child acute care inpatients
	• Emergency inpatients (EIPs) (i.e., admitted patients in the emergency department waiting for an inpatient bed)
	• Post-anesthetic recovery patients (PARs)
	• Admitted day-of procedure patients (ADOPs)
	• Patients in operating room (OR location as an inpatient)
	• Patients in special care units (e.g. ICU, NICU, CCU, CVICU)
	• Inpatients in all spaces (including holding beds)
	• Patients on passes (out of hospital but still flagged as an inpatient)
	• Maternity patients
	
	Denominator – Inclusions:
	• Staffed beds (i.e., beds that have designated nursing staff). This is reported in the Bed Survey as "staffed and in operation."
	  ○ Labour and delivery rooms
	  ○ Special care units
	  ○ Acute care units
	  ○ Subacute units (transition/rehab)

Data source(s)	**Numerator:** Admit/Discharge/Transfer (ADT) source systems: • Emergency Department Information System (EDIS) • Regional Emergency Department Information System (REDIS) • Sunrise Clinical Manager (SCM) • Clinibase • Tandem/Vax • MediTech **Denominator:** • AHS Bed Survey (bed tracker tool) The bed tracker data relies on bed count information recorded daily via the online AHS Bed Survey. Staff at each acute care facility are responsible for submitting the number of

	staffed beds in operation on a daily basis via this tool. Beds are counted as staffed and in operation unless they will be closed for more than 24 hours (i.e., beds are counted if they will be available at any point during a 24 hour period.
Assumptions	1. There are different information systems capturing this data in different hospitals. It is assumed the data is comparable between the different ADT source systems. 2. Beds that will be open at some point during a 24 hour period are considered open for the entire 24 hour period.
Exclusions	**Numerator:** • Day procedures, day medicine • Outpatient (ambulatory) registrations • Newborns in bassinets (per above, all patients in the NICU are included) **Denominator:** • Over complement/overcapacity/overflow spaces (e.g., beds located in lounges, shower rooms, hallways, etc. to handle surge capacity) • Closed beds (i.e., permanent closures physically ready to open if staffing and funding were available) • Operating rooms • Blocked beds (i.e., beds closed temporarily for more than 24 hours due to staffing, isolation, weekends, holidays, maintenance, renovations, special patient care needs, etc.) • Bassinets Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	The bed tracker data is updated on a daily basis, with no adjustments being made throughout the day. It is fairly common practice for beds to be opened and closed throughout the course of a day, as required to meet patient demand. Capturing bed counts once-a-day implies that the number of open beds for a given day is static, when in reality this may be fluid over the course of a day.

AHS Analytics. *Acute Care Occupancy – Data Table Dashboard*.

Hospital patients who require an alternate level of care	
Calculation	Percentage of acute care inpatient days classified as Alternate Level of Care (ALC) days = $$\left(\frac{\text{Total number of acute care inpatient ALC days}}{\text{Total number of acute care inpatient days}}\right) \times 100$$ Metric: Percentage of acute care inpatient days classified as ALC days
Description	**ALC**: A patient is classified as an ALC patient if they are occupying an acute or sub-acute hospital bed, and they do not require the intensity of resources and/or services provided in that care setting; however, they do require an alternate level of care, so they cannot be discharged home. **Beds included for ALC classification:** • Acute care beds • Mental health beds • Rehabilitation beds • Sub-acute care beds • Transition beds
Data source(s)	AHS Provincial Discharge Abstract Database (DAD)
Assumptions	None
Exclusions	1. Inpatients are excluded if they do require acute care resources and/or services. 2. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. Caution is urged when making comparisons between facilities prior to 2013; historical differences in data capture (i.e., inconsistent definitions, documentation, and coding practices) make comparisons between facilities unreliable prior to that time. 2. While in the hospital, there is a period of assessment to see whether a patient qualifies as requiring an alternate level of care. At the end of the assessment period an 'approval' is issued to proceed with determining an appropriate placement for the patient. This process may take several days. ALC days are counted from the date of 'approval,' thus underestimating the total number of ALC days attributed to each patient and, by extension, the hospital. 3. ALC days are based on a retrospective count from the DAD data source. Therefore, the measure should be interpreted as the percentage of hospital beds that were occupied by an ALC patient *discharged* within the reported time period. The consequences of this are, for example, if a new continuing care facility opens there will be an increase in the number of ALC patients discharged from acute care. This means that the numerator (total number of acute care inpatient ALC days) increases, consequently resulting in a higher %ALC. This gives the artificial impression that ALC days were more of a problem during that time period than they really were.

AHS Analytics. *Provincial ALC Statistics Dashboard*.

Length of patient hospital stay compared to Canadian average length of hospital stay	
Calculation	The number of acute days in acute care hospitals compared to expected length of stay in acute care hospitals[21] = $\left(\frac{\text{Total number of acute days in hospital for acute care inpatients}}{\text{Total number of expected inpatient days as determined by CMG Plus}^{22}\text{ groupers from CIHI}}\right) \times 100$ Metric: Acute (actual) LOS (ALOS) as a percentage shorter or longer than the expected LOS (ELOS)
Description	This measure compares the acute LOS to the Canadian Institute for Health Information (CIHI) expected/anticipated LOS for Canadian acute care patients with similar disease complexity. **Inclusion criteria:** All typical[23] inpatient cases from acute care hospitals, as determined by CIHI. **Inpatient length of stay (LOS):** The number of days from the date of admission to the hospital to the date of discharge, indicated in a hospital record (Statistics Canada, 2012). These include acute care inpatient days and alternate level of care (ALC) days (see *Hospital patients who require an alternate level of care* measure). Only the acute portion of the inpatient LOS is included in the calculation of this measure.
Data source(s)	AHS Provincial Discharge Abstract Database (DAD)
Assumptions	If acute LOS is shorter than the expected LOS it may suggest efficiencies in overall inpatient length of stay. If acute LOS is longer that the expected LOS it may indicate an opportunity to reduce inpatients' acute LOS.
Exclusions	**Exclusion criteria:** • Atypical[22] inpatient cases, as determined by CIHI • Acute care inpatient days classified as alternate level of care (ALC) Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.

[21] Statistics Canada (2000)

[22] The Case Mix Group Plus (CMG+) assignment is a grouping of patient stays with similar clinical and resource utilization for comparison of hospital resource use. It also takes into account the reason for hospitalization, age, comorbidity, and complications. The CMG+ assignment is based on the patient's Most Responsible Diagnosis (MRDx); the diagnosis that, at discharge, is determined to have been responsible for the greatest portion of the patient's length of stay (LOS) in hospital or resource use (Alberta Health, 2015).

[23] In case mix classification systems, patients are categorized as typical or atypical, based on several criteria. A typical patient is one who has a normal length of stay, whose treatment is completed in a single facility, and whose resource use is relatively homogeneous within their case mix classification. Typical patients can be assigned a relative resource weight according to their case mix classification. An atypical patient is one where the hospitalization involves a transfer, sign-out against medical advice, ends in death, includes non-acute days, or has a length of stay beyond the trim point established by CIHI (additional days are deemed outliers). An atypical patient has a different resource use within the hospital relative to a typical patient (Alberta Health, 2015).

Limitations	1. Excluded atypical cases include long-stay patients, where acute (actual) LOS greatly exceeds the expected LOS or cut-off established by CIHI. This may result in the ALOS:ELOS result not being sensitive to frequent long-stay cases and resource implications for this patient population. 2. ALC days are based on a retrospective count from the DAD data source. Therefore, the measure should be interpreted as the percentage of hospital beds that were occupied by an ALC patient *discharged* within the reported time period. This means that the number of days subtracted because they are designated as ALC is not a true count of ALC days during the reporting time period, but rather the number of ALC days accrued by patients discharged during the reporting time period. 3. CIHI's CMG Plus groupers are updated on a yearly basis and applied retrospectively to historical data. This results in slight changes to the results reported in previous report iterations every year. The process of applying this update historically was established by CIHI in order to minimize historical change of reported results (due to different CMG Plus groupers being applied to different years of data) and to allow for the reliable comparison of Alberta results with results from other provinces across Canada.

AHS Analytics. *Provincial ELOS vs ALOS Dashboard*.

Alberta Health. Performance Measure Definition: Acute LOS to Expected LOS Ratio (February 2015). Available at: http://www.health.alberta.ca/documents/PMD-Acute-Expected-LOS-Ratio.pdf

Statistics Canada: Health Indicators (December 2000). Available at: http://www.statcan.gc.ca/pub/82-221-x/4060874-eng.htm.

Statistics Canada (Johansen and Finès). Acute care hospital days and mental diagnoses (November 2012). Available at: http://www.statcan.gc.ca/pub/82-003-x/2012004/article/11761-eng.pdf.

Patients who returned to the emergency department within 72 hours	
Calculation	Patients who returned to an emergency department or urgent care centre within 72 hours of discharge from the emergency department = $\left(\frac{\text{Total number of return visits within 72 hours of discharge}}{\text{Total number of emergency department discharges}}\right) \times 100$ Metric: Percentage of emergency department patients who return within 72 hours.
Description	All patients discharged from the emergency department who return, whether planned or unplanned, within 72 hours to *any* emergency department or urgent care centre in Alberta are included.[24]
Data source(s)	National Ambulatory Care Reporting System (NACRS)
Assumptions	None
Exclusions	1. Patients who seek other healthcare services within 72 hours of being discharged from the emergency department (e.g., primary care/family physician). 2. Patients are excluded if their visit to the emergency department (initial or return) or urgent care centre (return only) was not a face-to-face interaction between the patient and provider. 3. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. For patients returning to a different emergency department than the one they last sought care in, matching is done on ULI or PHN. Occasionally these unique identifiers are recorded incorrectly, resulting in being unable to identify a return visit. 2. Return visits for patients in the emergency department during the last three days of March, June, September, and December may not be captured due to the unavailability of the NACRS data for the subsequent month (i.e., the return visit may have occurred after the end of the month). As such, the values reported for March, June, September, and December (and quarters ending in these months) may change when the data is available and updated for the next quarter.

[24] Return visits to the emergency department are sometimes split to separate out planned and unplanned return visits within 72 hours of discharge from the emergency department; however, this measure includes both planned and unplanned return visits.

Time to get X-ray completed	
Calculation	Emergency department patients' time to get X-ray completed = (Test completion time[25]) - (Imaging order time) Metric: Median and 90th percentile time in hours
Description	**Imaging order time:** When a diagnostic imaging (DI) order for an X-ray is entered in a DI information system. **Test completion time:** When the test (X-ray) has been completed and the images are made available to emergency department physicians.
Data source(s)	**Emergency department visits:** National Ambulatory Care Reporting System (NACRS) **Diagnostic imaging:** Provincial DI data source, extracted from three information systems • Millenium (Calgary) • Agfa (Edmonton) • Meditech (regional sites/rest of Alberta)
Assumptions	Data is comparable between the different diagnostic imaging information systems.
Exclusions	1. Patients are excluded if: • the time interval between when an imaging (X-ray) order is placed and when the test is completed is greater than 36 hours • either time stamp in the calculation is missing • a recognized data entry error occurred[26] 2. Results from May and June 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	Some diagnostic imaging information systems may capture data more reliably than others, but overall the data is sufficiently consistent to make reliable comparisons.

AHS Analytics. *Alberta Emergency Visits and Related DI Orders - Trend*.

[25] Test completion time was chosen as the final time stamp for this time interval because when an X-ray is completed the images are immediately made available to emergency department physicians. For the majority of general X-rays, emergency department physicians are able to make clinical decisions about their patients' care based on these images, without having to wait for an interpretation from the radiologist.

[26] E.g., if the patient's wait for X-ray results is less than 0 hours.

Patient reason for emergency department visit	
Survey question(s)	Why did you choose to go to the emergency department, instead of somewhere else such as a doctor's office? FILL-IN ALL THAT APPLY ○ The emergency department was the only choice available at the time. ○ The emergency department was the most convenient place to go. ○ I (we) thought the emergency department was the best place for my medical problem. ○ I was told to go to the emergency department rather than somewhere else. ○ Other: _____
Calculation	Results are displayed separately for those who report each of the four primary response options displayed in the survey question above: $\left(\frac{\text{Number of respondents that report only choice}}{\text{Total number of respondents during the reporting period}^{27}}\right) \times 100$ $\left(\frac{\text{Number of respondents that report convenience}}{\text{Total number of respondents during the reporting period}}\right) \times 100$ $\left(\frac{\text{Number of respondents that report it was the best place}}{\text{Total number of respondents during the reporting period}}\right) \times 100$ $\left(\frac{\text{Number of respondents that report they were told to go}}{\text{Total number of respondents during the reporting period}}\right) \times 100$
Description	Reported separately, percentage of patients who: • Believed the emergency department was the only choice available at the time. • Thought the emergency department was the most convenient place to go. • Thought the emergency department was the best place for their medical problem. • Were told to go to the emergency department rather than somewhere else.
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	These are self-reported reasons for choosing the emergency department and are not meant to imply appropriateness or inappropriateness of the choice.
Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites. • Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.)

[27] This question was asked of all respondents; therefore, the denominator consists of all patients with valid responses to this question (indicated at least one response category).

	2. Patients in need of resuscitation who presented to the emergency department (CTAS 1) are excluded, since it is assumed they do not have the choice to go somewhere other than the emergency department. 3. Patients who reported 'Other' are excluded from the report, since the number of respondents who answered in this fashion are too small to ensure the reliability and validity of the data, as well as to ensure the confidentiality of respondents. 4. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. Respondents are given the option to choose as many response options they feel are appropriate to describe the reasons they chose to go to the emergency department. As a result, when comparing results for a specific month or quarter, the sum of the percentages for each response option will be larger than 100%. 2. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 3. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[28] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[29] – caution is urged when interpreting specific data points.

[28] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[29] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Patient experience with staff introductions	
Survey question(s)	During this emergency department visit, how often did nurses introduce themselves to you? ○ Never ○ Sometimes ○ Usually ○ Always During this emergency department visit, how often did doctors introduce themselves to you? ○ Never ○ Sometimes ○ Usually ○ Always
Calculation	Results are displayed separately for nurses and doctors: $\left(\frac{\text{Number of respondents that report nurses always introduced themselves}}{\text{Total number of respondents during the reporting period}^{30}}\right) \times 100$ $\left(\frac{\text{Number of respondents that report doctors always introduced themselves}}{\text{Total number of respondents during the reporting period}^{31}}\right) \times 100$
Description	Reported separately, percentage of patients who said that: • Emergency department nurses always introduced themselves • Emergency department doctors always introduced themselves
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	In order to determine the most appropriate comparison of categories for public reporting, the HQCA performed an item response theory (IRT) analysis. The findings of this work indicated that the comparison of the 'always' response category versus combining the other response categories ('usually', 'sometimes', and 'never') resulted in the most appropriate of all potential category combinations (this grouping resulted in the most amount of measurement information compared to all other response category combinations).
Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites.

[30] This question was asked of all respondents; therefore, the denominator consists of all patients with a valid response to this question.
[31] This question was asked of all respondents; therefore, the denominator consists of all patients with a valid response to this question.

	• Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.) 2. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 2. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[32] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[33] – caution is urged when interpreting specific data points.

[32] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[33] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Patient experience with communication about follow-up care	
Survey question(s)	Before you left the emergency department, did someone discuss with you whether you needed follow-up care? ○ Yes ○ No Before you left the emergency department, did someone ask if you would be able to get this follow-up care? ○ Yes ○ No
Calculation	Results for these two questions are aggregated to create a single measure: $\left(\frac{\text{Number of respondents that report 'yes' to both questions}}{\text{Total number of respondents during the reporting period}^{34}}\right) \times 100$
Description	Percentage of discharged patients who answered 'yes' to both of the questions listed above – respondents reported they were talked to about whether they needed follow-up care and they were asked if they could get this follow-up care.
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	Integral in the decision to combine these two questions into a single measure is the HQCA's belief that, ideally, all patients (before they are discharged from the emergency department) should have someone talk to them about their follow-up care[35] and ensure they can access the care needed.
Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites. • Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.) 2. Those who were admitted to the hospital are not asked these questions since they did not have the experience of being discharged to the community from the emergency department. 3. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.

[34] The first question was asked of all respondents identified as discharged patients, while the second was only asked of those who said 'yes' to the first (someone discussed with them whether they needed follow-up care); therefore, the denominator consists of all patients with valid responses to the first question.

[35] Even if just to communicate that they do not need follow-up care.

Limitations	1. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 2. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[36] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[37] – caution is urged when interpreting specific data points.

[36] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[37] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Patient experience with help for pain	
Survey question(s)	During this emergency department visit, did the doctors and nurses try to help reduce your pain? ○ Yes, definitely ○ Yes, somewhat ○ No
Calculation	Results for those who reported 'yes' (either somewhat or definitely) are aggregated together: $\left(\frac{\text{Number of respondents that report 'yes' staff tried to help reduce pain}}{\text{Total number of respondents during the reporting period}^{38}}\right) \times 100$
Description	Percentage of patients who were in pain while they were in the emergency department and reported 'yes' staff tried to help reduce their pain (either somewhat or definitely).
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	In order to determine the most appropriate comparison of categories for public reporting, the HQCA performed an item response theory (IRT) analysis. The findings of this work indicated that combining the 'yes definitely' and 'yes somewhat' responses compared to the 'no' response category resulted in the most appropriate of all potential category combinations (this grouping resulted in the most amount of measurement information as opposed to combining 'yes somewhat' and 'no' response categories).
Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites. • Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.) 2. Those who reported they were not in pain while in the emergency department are not asked this question as it is not applicable. 3. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.

[38] This question was only asked of respondents who reported they were in pain while they were in the emergency department; therefore, the denominator consists of all patients who were in pain while in the emergency department with valid responses to this question.

Limitations	1. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 2. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[39] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[40] – caution is urged when interpreting specific data points.

[39] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[40] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Overall rating of care	
Survey question(s)	Using any number from 0 to 10, where 0 is the worst care possible and 10 is the best care possible, what number would you use to rate your care during this emergency department visit? ○ 0 Worst care possible ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 Best care possible
Calculation	Patients' average overall rating of care = $Avg(ORC) = \left(\frac{\sum(ORC_i)}{\text{Total number of respondents during the reporting period}^{41}}\right) \times 10$ Where ORC_i represents each respondent's rating of their overall emergency department care and $Avg(ORC)$ is the average rating of patients' overall emergency department care experiences.
Description	Average rating of patients' overall emergency department care experiences. Patients' average ratings (0-10 scale) are multiplied by 10 to create a 0-100 scale, which facilitates reporting consistency between patient experience measures.
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	None
Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites. • Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.)

[41] This question was asked of all respondents; therefore, the denominator consists of all patients with a valid response to this question.

	2. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 2. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[42] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[43] – caution is urged when interpreting specific data points.

[42] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[43] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Overall patient experience with emergency department communication	
Survey question(s)	Each of the following questions asked about different aspects of communication with patients by emergency department staff. These questions were asked separately for doctors and nurses. During this emergency department visit, how often did doctors/nurses introduce themselves to you? ○ Never ○ Sometimes ○ Usually ○ Always During this emergency department visit, how often did doctors/nurses treat you with courtesy and respect? ○ Never ○ Sometimes ○ Usually ○ Always During this emergency department visit, how often did doctors/nurses listen carefully to you? ○ Never ○ Sometimes ○ Usually ○ Always During this emergency department visit, how often did doctors/nurses explain things in a way you could understand? ○ Never ○ Sometimes ○ Usually ○ Always
Calculation	A principle components analysis was performed to identify sets of variables (targeting quality) that share common underlying "themes". Based on these results, and a subsequent analysis of internal consistency (reliability) for the survey questions within each component, composite measures were constructed.

	Record-level composite scores were calculated following principles established in the HQCA's 2007 *Emergency Department Patient Experience Survey*.[44] In keeping with the principles established in the HQCA's 2007 emergency department survey, regarding the composite scale the HQCA has adopted the standardized response scoring scheme (0-100 scale) employed by the Healthcare Commission for the British *Emergency Department Survey*.[45] According to this scoring scheme, responses to individual survey questions are scored on a scale from 0 to 100; a score of 0 indicates the lowest ranking of patient experience (suggesting considerable room for improvement), while a score of 100 indicates the highest and best ranking of patient experience. For response options in between the most-negative (0) and most-positive (100) responses, scores are assigned at appropriate positions along the scale (i.e., for the questions that make up this composite, never = 0, sometimes = 33, usually = 67, always = 100). Average scores are calculated across all non-missing question responses within the composite for each respondent: $$Q_i = \frac{\sum(\text{nonmissing composite question response scores for respondent } i)}{\text{Total number of nonmissing composite question responses for respondent } i}$$ Average composite scores are then calculated for each facility: $$Avg(COMP) = \frac{\sum(Q_i)}{\text{Total number of respondents with nonmissing composite scores}}$$
Description	Reported separately, based on responses from the four survey questions listed above: • Average rating of patients' overall experience communicating with emergency department doctors (0-100 rating). • Average rating of patients' overall experience communicating with emergency department nurses (0-100 rating).
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	Composite measures are essentially summary scores that capture broad themes of patient experience in the emergency department. These broad themes are generally not measureable in and of themselves; rather they are only measurable through specific survey questions that contribute to the theme[46] (are shown to be related via the above-mentioned principle components analysis). The responses to these survey questions are combined (see Calculation section) to score the theme as a whole.

[44] For more information on the calculation of composite measures, including the consideration of alternative methods, please see the HQCA's 2007 *Emergency Department Patient Experience Survey*, accessible at: http://hqca.ca/surveys/emergency-department-patient-experience/emergency-department-patient-experience-survey/.

[45] More information about this scoring scheme can be found in the User Guide for the British *Emergency Department Survey*, accessible at: http://doc.ukdataservice.ac.uk/doc/5092/mrdoc/pdf/5092userguide2004.pdf.

[46] Lakhani, A. Indicators for Measuring Patient Experience. *NHS Patient Experience Journal: Measures and Metrics*; 2012. Accessed November 28, 2016 via: http://patientexperienceportal.org/wp-content/uploads/2012/07/Inspiration-NW-Journal-2.pdf.

Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites. • Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.) 2. The questions that make up this composite were asked of all respondents. Specific to the questions about communication by doctors, a small number of respondents who indicated that they did not see a doctor during their emergency department visit were classified as "not applicable," were not assigned a response score, and were not included in the composite calculation. These cases were excluded because they do not contribute to our understanding of patients' experiences communicating with emergency department doctors. 3. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.
Limitations	1. This method of calculating composites is sensitive to missing data and, when respondents have not answered all survey questions that make up the composite, individual survey questions count more than they do for respondents that answered all composite questions.[47] 2. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 3. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[48] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[49] – caution is urged when interpreting specific data points.

[47] This method has the advantage of producing a composite score for each respondent. Record-level composite scores are valuable because they make it possible to perform various multivariate analyses.
[48] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[49] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Communication with patients about possible side effects of medicines	
Survey question(s)	Before giving you any new medicine, did the doctors or nurses describe possible side effects to you in a way you could understand? ○ Yes, definitely ○ Yes, somewhat ○ No Before giving you pain medicine, did the doctors and nurses describe possible side effects in a way you could understand? ○ Yes, definitely ○ Yes, somewhat ○ No
Calculation	A principle components analysis was performed to identify sets of variables (targeting quality) that share common underlying "themes". Based on these results, and a subsequent analysis of internal consistency (reliability) for the survey questions within each component, composite measures were constructed. Record-level composite scores were calculated following principles established in the HQCA's 2007 *Emergency Department Patient Experience Survey*.[50] In keeping with the principles established in the HQCA's 2007 emergency department survey, regarding the composite scale the HQCA has adopted the standardized response scoring scheme (0-100 scale) employed by the Healthcare Commission for the British *Emergency Department Survey*.[51] According to this scoring scheme, responses to individual survey questions are scored on a scale from 0 to 100; a score of 0 indicates the lowest ranking of patient experience (suggesting considerable room for improvement), while a score of 100 indicates the highest and best ranking of patient experience. For response options in between the most-negative (0) and most-positive (100) responses, scores are assigned at appropriate positions along the scale (i.e., for the questions that make up this composite, no = 0, yes somewhat = 50, yes definitely = 100). Average scores are calculated across all non-missing question responses within the composite for each respondent: $$Q_i = \frac{\sum(\text{nonmissing composite question response scores for respondent } i)}{\text{Total number of nonmissing composite question responses for respondent } i}$$ Average composite scores are then calculated for each facility: $$Avg(COMP) = \frac{\sum(Q_i)}{\text{Total number of respondents with nonmissing composite scores}}$$

[50] For more information on the calculation of composite measures, including the consideration of alternative methods, please see the HQCA's 2007 *Emergency Department Patient Experience Survey*, accessible at: http://hqca.ca/surveys/emergency-department-patient-experience/emergency-department-patient-experience-survey/.

[51] More information about this scoring scheme can be found in the User Guide for the British *Emergency Department Survey*, accessible at: http://doc.ukdataservice.ac.uk/doc/5092/mrdoc/pdf/5092userguide2004.pdf.

Description	Average rating of patients' overall experience with communication about possible side effects of medicines (0-100 rating) based on responses from the two survey questions listed above.
Data source(s)	HQCA Emergency Department Patient Experience of Care (EDPEC) Survey
Assumptions	Composite measures are essentially summary scores that capture broad themes of patient experience in the emergency department. These broad themes are generally not measureable in and of themselves; rather they are only measurable through specific survey questions that contribute to the theme[52] (are shown to be related via the above-mentioned principle components analysis). Responses to these survey questions are combined (see Calculation section) to score the theme as a whole.
Exclusions	1. General exclusion criteria for the HQCA EDPEC Survey include the following: • Children aged 0 to 15 for the 14 large urban and regional adult emergency department sites. • Patients older than 12 for the two Children's Hospital emergency department sites. • Patients who left the emergency department before being seen or treated. • Patients who died in the context of their emergency department or inpatient stay. • Patients without contact information (phone number). • Privacy-sensitive cases (e.g., domestic abuse, attempted suicide, etc.) 2. Additional exclusion criteria for this composite measure are the product of the constituent questions only being asked of a subset of survey respondents: *New medicine* • Only respondents who indicated they were given new medicines they had not taken before during their emergency department visit were asked this question *Pain medicine* • Only respondents who indicated that they were in pain and got medicine for pain while in the emergency department were asked this question Note: Although only approximately 30% of respondents answered the question about whether doctors and nurses described possible side effects of new medicines to them, and only about 40% of respondents answered a similar question about pain medicine, those who are missing are in most cases ineligible to be asked the question (93-94% of respondents missing on these questions were gated[53] out due to previous responses). Therefore, despite the large number of missing data, we can be confident that these questions were asked of people whom it was appropriate. 3. Results from April to July 2016 are not reported for the Northern Lights Regional Health Centre due to the forest fire that affected Fort McMurray and forced the closure of the Northern Lights Regional Health Centre.

[52] Lakhani, A. Indicators for Measuring Patient Experience. *NHS Patient Experience Journal: Measures and Metrics*; 2012. Accessed November 28, 2016 via: http://patientexperienceportal.org/wp-content/uploads/2012/07/Inspiration-NW-Journal-2.pdf.

[53] 'Gating' or 'screening' is a commonly used method in surveys to ensure respondents are only being asked questions that are appropriate for them, based on their experience and their answers to previous survey questions. For example, if a respondent indicates that they were not in pain or given pain medicine, it would not be appropriate to then ask them if staff described the possible side effects of pain medicine to them.

Limitations	1. This method of calculating composites is sensitive to missing data and, when respondents have not answered all survey questions that make up the composite, individual questions count more than they do for respondents that answered all composite questions.[54] Scores for this composite may be more sensitive to missing data than the other composites due to the exclusion criteria listed above. 2. Sampling for the HQCA EDPEC Survey purposely excludes patients in specific age groups at specific sites (see Exclusions section). As a result, data collected for these sites does not represent the experiences of all patients treated at these emergency department sites, but does represent the majority. 3. Sample sizes per site, per month have been determined to reflect the principles of statistical process control (SPC) methods, and allows for the monitoring of patient experience over time.[55] The number of patients surveyed per site per month/quarter are not statistically representative of the population treated at each site for that given time period; the sample is statistically representative at the site-level every 6 months[56] – caution is urged when interpreting specific data points.

[54] This method has the advantage of producing a composite score for each respondent. Record-level composite scores are valuable because they make it possible to perform various multivariate analyses.
[55] See Appendix A for an explanation of the sample size determination and the principles of SPC methods.
[56] More information about the statistical representativeness calculation (with finite population correction) can be found at: http://www.sut.ac.th/im/data/read6.pdf.

Appendix A – Sample size and the principles of statistical process control (SPC) methods

Determining appropriate sample sizes for improvement projects is less well-defined than traditional research projects, primarily because data is often collected over time.[57] As a result, there is no "industry consensus" regarding how to determine appropriate sample size.

Donald J. Wheeler proposes the following questions about sample sizes:[58]

- Are the data collected in a manner that will allow the charts to detect process changes that are large enough to be of interest?
- Do the data give us the appropriate information needed to take action on our process?

Additional considerations for determining sample size include, but are not limited to, the following:[57]

- project objectives
- data type
- expected rate of meaningful change in the data
- availability of data
- availability of resources to collect the data
- project importance/visibility

The most desirable methodological solution from the point of view of detecting process shifts for improvement projects would be to take large samples very frequently; however, this is not economically feasible.[59] Sample size issues in improvement efforts are often a balance between resources and the clarity of the results desired.[57] I.e., the sample size determination depends on how many respondents are needed to observe changes in the data (non-random variation), without being so expensive that the project is unsustainable.

This issue of appropriately allocating sampling effort often results in the following choice: take smaller samples at shorter intervals or take larger samples at longer intervals. Industry practice favours smaller, more frequent samples because it allows for quicker corrective action when a process shift occurs.[59] Similarly, healthcare providers and quality improvement personnel benefit from more frequent reporting because it enables iterative improvement (causes of positive changes can be reinforced, while causes of negative changes could lead to corrective action). These benefits support the HQCA's decision to survey fewer patients than is required for the sample to be statistically representative of the population treated at each site for a given time period (month/quarter).

Many applications of SPC methods use sample sizes as small as 5 or 10 observations to monitor the quality of a process.[57,59] The HQCA's previous work with emergency department patient experience surveys and the application of SPC methods to this historical data suggests that a sample size of 30 to 50 emergency department patients per site, per month, is sufficient to detect meaningful (non-random) changes in patient

[57] Provost L.P., Murray S.K. The Health Care Data Guide: Learning From Data for Improvement. San Francisco, CA: Jossey-Bass; 2011.
[58] Wheeler D.J. Rational Sampling. Accessed from http://www.qualitydigest.com/inside/statistics-column/070115-rational-sampling.html.
[59] Montgomery D.C. Introduction to Statistical Quality Control. 6th ed. Hoboken, NJ: John Wiley & Sons; 2009.

experience.[60] For this iteration of the HQCA's emergency department survey, the sample size has been inflated to between 60 and 80 patients per site, per month. This change should result in process shifts being detected more efficiently than in the HQCA's previous application of these methods.

[60] For more information on the HQCA's previous application of SPC methods to the analysis of emergency department patient experience data, please see the HQCA's *Urban and Regional Emergency Department Patient Experience Report (2010-2013)*, accessible at: http://hqca.ca/surveys/emergency-department-patient-experience/.