Paediatric Critical Care Indicator and Reports Guide

Technical Guide for Report Format, Indicator Definitions and Performance Standards

Version 2.1

Critical Care Services Ontario
Updated May 2019

This report is a product of Critical Care Services Ontario (CCSO).

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Paediatric Critical Care Indicator and Reports Guide	
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Abbreviations

CCIS	Critical Care Information System
CCSO	Critical Care Services Ontario
CLI	Central Line Infection
CritiCall	CritiCall Ontario
ICU	Intensive Care Unit
LHIN	Local Health Integration Network
MERP	Medication Error Reporting and Prevention
MIS	Management Information System
MOHLTC	Ministry of Health and Long Term Care
NCC	National Coordinating Council
OR	Operating Room
PAHSC	Paediatric Academic Health Sciences Centre
PARR	Post Anaesthetic Recovery Room
PCCAC	Paediatric Critical Care Advisory Committee
PCMCH	Provincial Council for Maternal and Child Health
PM WG	Performance Management Working Group of the PCCAC
SPS	Solutions for Patient Safety
VAP	Ventilator Associated Pneumonia
WHO	World Health Organization

1. Purpose & Scope

Paediatric critical care is one of the core programs under Critical Care Services Ontario (CCSO). The Paediatric Critical Care Advisory Committee (PCCAC) was established in 2012 and reports to CCSO on the implementation and evaluation of strategies that support the paediatric critical care system in Ontario. The PCCAC is actively engaged in identifying potential areas for improvement in access to, and delivery of, quality care to ensure that regardless of geography, paediatric patients across Ontario have access to specialty critical care services. Key to achieving this objective is the development and implementation of a performance management framework to support a culture of accountability and system management.

The PCCAC is comprised of representatives from the five paediatric Academic Health Sciences Centres (PAHSCs) across Ontario, representing Senior Executive and/or Medical Director- level roles as well as senior administrative leadership from The Ministry of Health and Long Term Care (MOHLTC), CritiCall Ontario (CritiCall), Ornge and the Provincial Council for Maternal and Child Health (PCMCH).

The Ontario Paediatric Academic Health Sciences Centres (PAHSCs) are:

- The Hospital for Sick Children
- Children's Hospital of Eastern Ontario
- Children's Hospital of Western Ontario, London Health Sciences Centre
- McMaster Children's Hospital, Hamilton Health Sciences
- Kingston General Hospital

Following completion of the PCCAC Final Report in 2013, two Working Groups were constituted to support the immediate areas of focus for the PCCAC:

1. System Capacity and Capabilities (SCC) Working Group
2. Performance Management (PM) Working Group

As part of the ongoing work of the PCCAC, the Performance Management Working Group (PM WG) was tasked with identifying a standardized set of paediatric performance metrics and developing and utilizing a performance management framework to organize measures, identify priorities, and monitor hospital and system performance to ensure quality, access, and system integration. The PM Working Group has identified a list of 12 paediatric indicators for this purpose.

About this Guide

This guide is intended to provide paediatric hospitals with the standardized definitions and methodology used to produce paediatric critical care indicator data. The guide also includes an overview of the report format to familiarize users with the layout of reports (see Section 2).

This document contains methodology information for each of the paediatric indicators (see Section 3). Accompanying this document is the Paediatric Critical Care Scorecard.

Note: This guide is not a replacement for any hospital, LHIN or Ministry reporting requirements or performance management programs.

Audience

This guide is designed for hospital administrators, clinical leaders, and decision support/data analysts in Ontario PAHSCs. The intent of the guide is to summarize indicator reporting processes and define indicators and data methodology.

The Reporting Process

Paediatric Critical Care Scorecard reports will be issued quarterly. All PAHSCs are required to submit hospital-reported indicator data on a quarterly basis.

The general timeframes for hospital data submission and report release are outlined in the table below:

Quarter Dates	Month of Data Submission	Report Release
Q1: Apr 1- Jun 30	**July**	**August**
Q2: Jul 1- Sept 30	**October**	**November**
Q3: Oct 1- Dec 31	**January**	**February**
Q4: Jan 1- Mar 31	**April**	**May**

About the Indicator Development Process

From 2014-2015, the Performance Management Working Group of the PCCAC worked to identify meaningful and viable paediatric critical care performance indicators to assess and monitor system level access, quality, and system integration for paediatric critical care in the province.

At this time, there are 12 indicators identified for reporting. Indicator definitions were developed after careful consideration by the PM WG. Where clear definitions may not have been found in the literature, the experts sitting on the PM WG reached a consensus with the development of certain indicator definitions. The data for six of the indicators on the Scorecard is populated from the Critical Care Information System (CCIS), the data for two of the indicators is populated from CritiCall Ontario, and the remaining four indicators are populated from internal hospital systems.

The considerations used in selecting data sources included:

- Where possible, the focus has been reliance on standardized data sets and provincially available data to ensure consistency and comparability of data.

- The indicator development and reporting process will be updated over time to improve the quality of reported information supporting indicators.

A summary of the indicators reported is included below:

Indicator Domain	Indicator	Data Source
Paediatric Critical Care Indicators		
Quality	VAP Rate	CCIS
	CLI Rate	CCIS
	Unplanned Extubation Rate	CCIS
	Reported Medication Errors Rate	Hospital Data
	Pressure Ulcers Rate (Hospital Acquired)	Hospital Data
	Hand Hygiene Compliance Rate	Hospital Data
	48 Hour Readmission Rate	CCIS
Access	OR Cancellation Rate - For No ICU Bed	Hospital Data
	CritiCall R1 Acceptance Rate	CritiCall
	CritiCall R2 Acceptance Rate	CritiCall
System Integration	Avoidable Day Rate	CCIS
	Night Time Discharge Rate	CCIS

Target-Setting Methodology

Performance indicators are useful tools to highlight current state, but true performance management requires goals/targets. Desired targets are evidence-based/data-driven, agreeable to major stakeholders and can serve as the catalysts for system change and quality improvement.

In 2016-17, CCSO collaborated with the Performance Management Working Group (PM WG) of the PCCAC on the development of a methodology to set targets and target status as part of the Paediatric Critical Care Unit Scorecard.

The following principles were used to guide the target setting:

- Balance between robust data and consistency in practice
- Consensus-driven selection process
- Meaningful peer measurement and comparison
- Targets focused on outcomes, with goal toward preventable harm, consistent with a high reliability/safety culture

After a careful review of the literature on target setting, including the Institute for Healthcare Improvement (IHI) High Reliability Healthcare & Designing for Zero methodologies, and example methodologies used by Health Quality Ontario and within other CCSO program areas, the PM WG reached consensus on the target setting approach as summarized in the table below:

Domain	Objective	Indicator Name	Target
Quality	*Deliver Safe Care*	CLI rate (‰)	Theoretical Best
		VAP rate (‰)	Theoretical Best
		Unplanned Extubation Rate (‰)	Theoretical Best
		Reported Medication Error Rate (‰)	Theoretical Best
		HAC Pressure Ulcer Rate (‰)	Theoretical Best
		Hand Hygiene Compliance Rate (%)	Theoretical Best
Effectiveness	*Deliver Effective Care*	48 Hour Readmission Rate (%)	Top 25th percentile*
Access	*Provide Timely Care*	OR Cancellation Rate- For No ICU Bed (%)	Top 25th percentile*
		*CritiCall R1 Acceptance Rate (%)	Top 25th percentile*
		*CritiCall R2 Acceptance Rate (%)	Top 25th percentile*
System Integration	*Optimize Patient Flow*	Avoidable Days Rate (%)	Top 25th percentile*
		Night Time Discharge Rate (%)	Top 25th percentile*

*25th percentile is derived based on the most recent year's performance for all paediatric units in the province

Target Status

The red, yellow and green status provides an 'at-a-glance' view of the indicator's performance for the reporting period. When a target is not met, the status is indicated by a '*red*' signal. A '*green*' signal indicates the set target has been met or exceeded. A '*yellow*' signal indicates that indicator requires monitoring relative to performance target. Where data is not available the cell will have no colour.

Status	Definition
	Target Achieved – Satisfactory target performance
	Requires Monitoring – Warning signal relative to performance
	Target Missed – Target is not being met and action should be taken

Consensus was reached on the following target status approach:

Indicator Name	Green	Yellow	Red
VAP Rate (‰)	Value = 0‰	Value≥ Top 25th Percentile Performance	Value< Top 25th Percentile Performance
CLI Rate (‰)	Value = 0‰		
Incident Rate - Unplanned Extubation (‰)	Value = 0‰		
Reported Medication Error Rate (‰)	Value = 0‰		
HAC Pressure Ulcer Rate (‰)	Value = 0‰		
Hand Hygiene Compliance Rate (%)	Value = 100%		
48 Hour Readmission Rate (%)	Value ≥ Top 25th Percentile Performance	Median Performance < Value ≤ Top 25th Percentile Performance	Value< Median Performance
OR Cancellation Rate - For No ICU Bed (%)			
Criticall R1 Acceptance Rate (%)			
Criticall R2 Acceptance Rate (%)			
Avoidable Days Rate (%)			
Night-time Discharge Rate (%)			

Target and Target Status Setting Process

Target values and target status will be reset annually based on the previous fiscal year's performance of all paediatric critical care units in Ontario. New performance targets will be released in the Q1 report of every fiscal year.

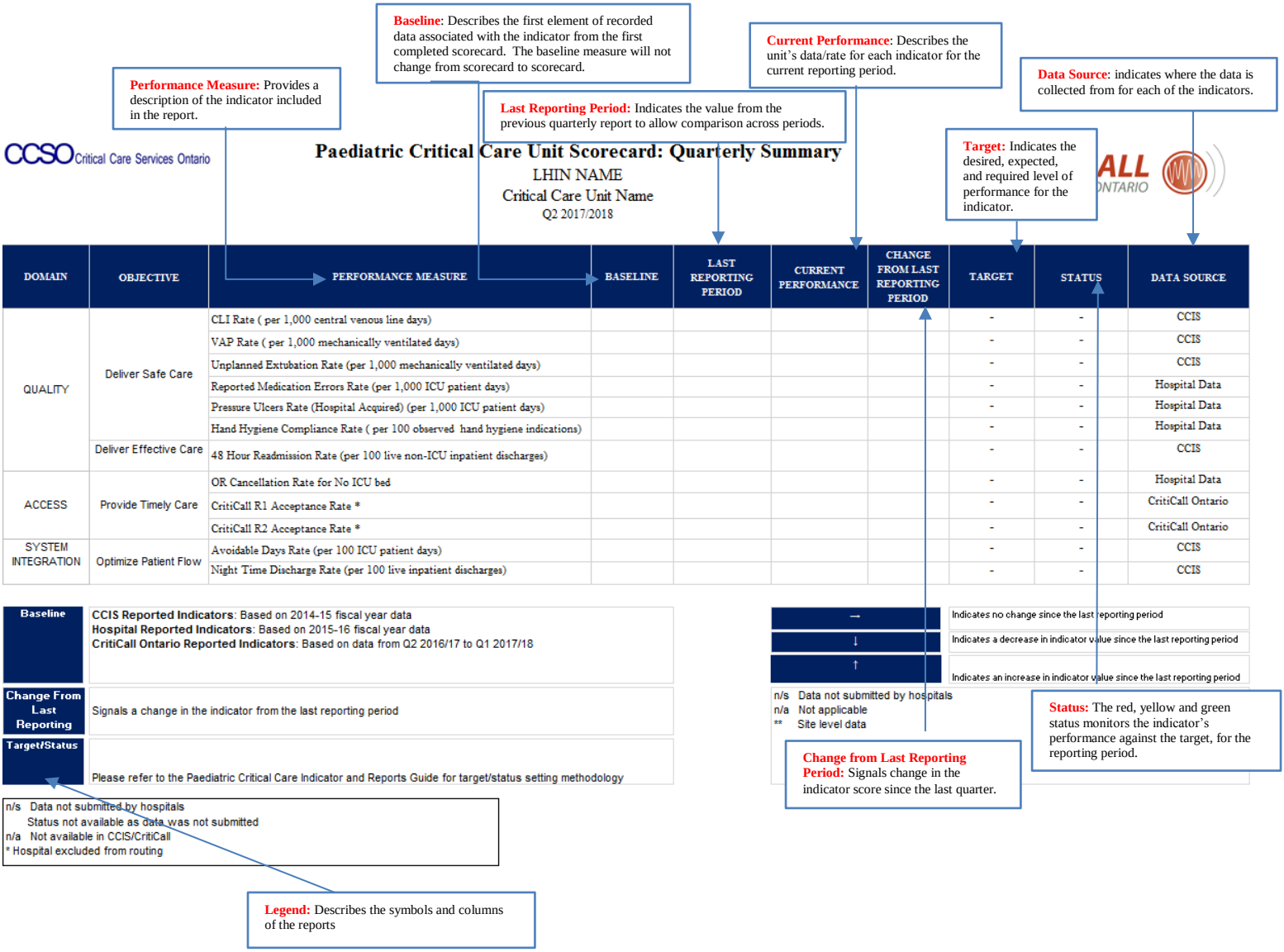
2. Report Overview

The Paediatric Critical Care Unit Scorecard Package includes the following:

1. Unit Scorecard Report: describes the performance of each PAHSC on the 12 scorecard indicators during the reporting time period
2. Peer Group 6 Report: provides comparative data across all PAHSCs on all scorecard indicators
3. Run Charts: Graphs displaying performance of each indicator over time for a specified paediatric critical care unit.

2.1 Paediatric Critical Care Unit Scorecard

An overview of the Scorecard report format is provided below along with information about different features of the report.



2.2 Peer Group 6 Report

Performance Measure: describes the indicators selected to be included in the unit level scorecard.

CCSO Critical Care Services Ontario

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Paediatric Critical Care Unit Scorecard: Peer Group Level Report

Peer Group: 6

Q1 2017/2018

LHIN	Hospital Name	Unit Name	CLI Rate (per 1,000 central venous line days)	VAP Rate (per 1,000 mechanically ventilated days)	Unplanned Extubation Rate (per 1,000 mechanically ventillated days)	Reported Medication Errors Rate (per 1,000 ICU patient days)	Pressure Ulcers Rate (Hospital Acquired) (per 1,000 ICU patient days)	Hand Hygiene Compliance Rate (per 100 observed hand hygiene indications)	48 Hour Readmission Rate (per 100 live non-ICU inpatient discharges)	OR Cancellation Rate for No ICU bed(per 100 cases)	Criticall R1 Acceptance Rate**	Criticall R2 Acceptance Rate**	Avoidable Days Rate (per 100 ICU patient days)	Night Time Discharge Rate (per 100 live inpatient discharges)
South West (2)	London Health Sciences Centre - Children's Hospital at London Health Sciences Centre	Paediatric Medical/ Surgical Critical Care Unit												
Hamilton Niagara Haldimand Brant (4)	Hamilton Health Sciences - McMaster University Medical	Paediatric Critical Care Unit												
		PICU SD												
Toronto Central (7)	The Hospital for Sick Children	Level II ICU												
		Paediatric Cardiac Critical Care Unit												
		Paediatric Medical/ Surgical Critical Care Unit												
South East (10)	Kingston Health Sciences Centre - Kingston General	PECU												
Champlain (11)	Children's Hospital of Eastern Ontario - Ottawa Children's Treatment Centre	Paediatric Medical/Surgical and Cardiac Critical Care Unit												

n/s Data not submitted by hospitals
n/a Not applicable
** Site level data

2.3 Run Charts

Run Charts are graphs that display data about a process or system over time; they are frequently used for monitoring quality improvement initiatives and for predicting future performance.

Intended Use

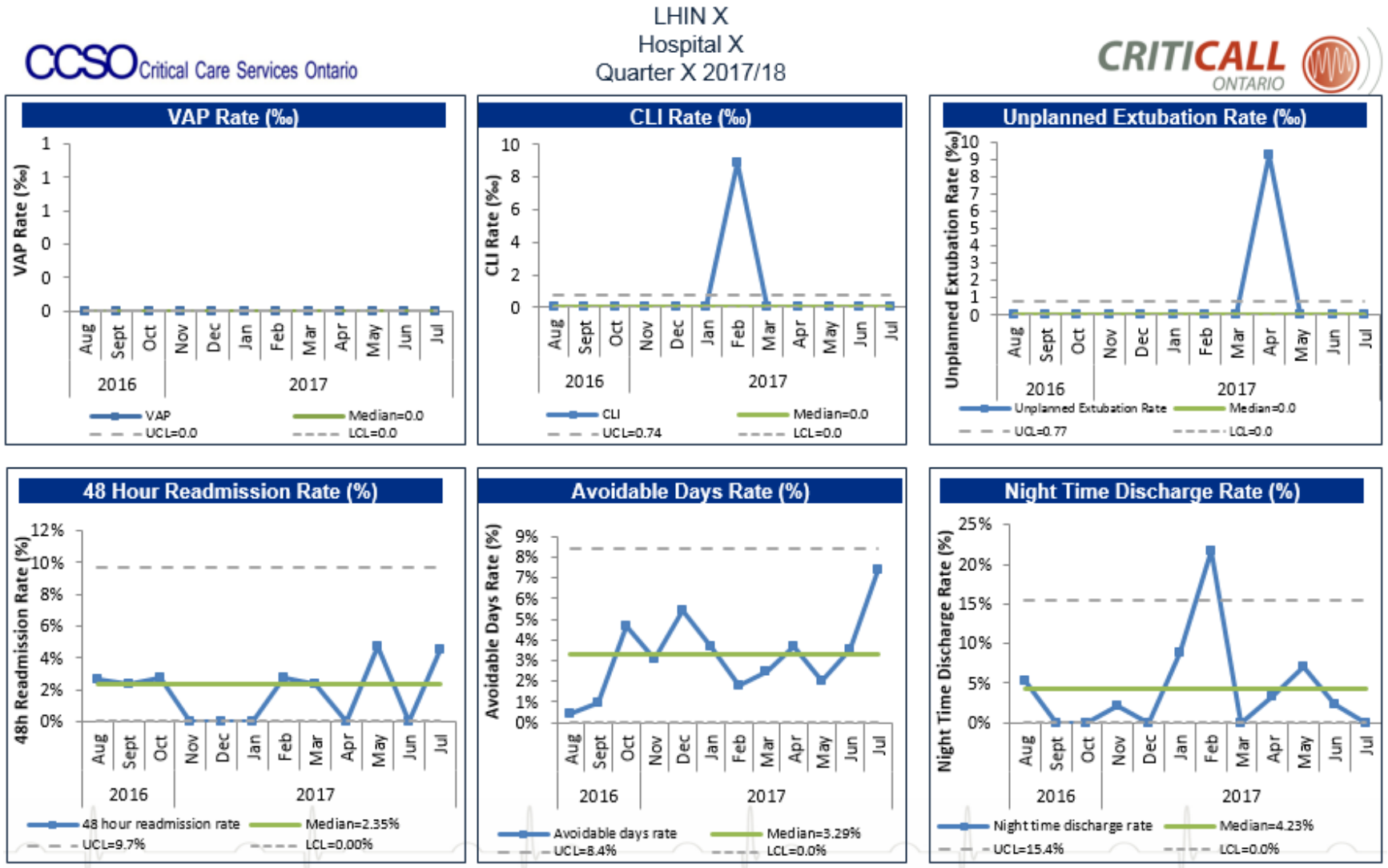
Run Charts can be used by units to identify the occurrence of trends, shifts or outliers. There are three rules for interpreting Run Charts, which are explained in Appendix D. The presence of any single rule is evidence of a non-random sign of change (i.e. there is less than 5 % probability that the conditions for a rule will be met simply by chance).[1]

One goal of using a control Run Chart is to maintain process stability. This is done by adding 'control limits' to the Run Charts. Wide control limits indicate instability (inconsistency) of process overtime; meanwhile narrow control limits indicate stability (consistency) of process overtime. Observations outside of the control limits need to be investigated to gain further understanding and to monitor quality improvement initiatives over time.

Please refer to Appendix D for a detailed review of data used to generate sample Run Charts including calculations used to determine the upper and lower control limits.

[1] Provost and Murray – The Health Care Data Guide: Learning from Data For Improvement (2011)

Paediatric Critical Care Unit Scorecard- Run Chart Sample



3. Indicator Definitions and Performance Standards

1) Ventilator-Associated Pneumonia (VAP) Rate

Indicator Name	Ventilator-Associated Pneumonia (VAP) Rate
Indicator Domain	Quality
Indicator Objective	Deliver Safe Care
Indicator Definition	The Ventilator-Associated Pneumonia (VAP) Rate is defined as the number of ventilator-associated pneumonia incidents diagnosed after 48 hours of admission to ICU per 1000 ICU ventilator days. VAP is defined as a pneumonia (a serious lung infection) that can occur in patients, specifically those in Intensive Care Units (ICU) who need assistance breathing with a mechanical ventilator for at least 48 hours. * Definition for VAP consistent with criteria currently used for CCIS reporting.
Indicator Data Source	CCIS
Indicator Calculation	• **Numerator:** Number of VAP incidents diagnosed after 48 hours of critical care admissions • **Denominator:** Number of mechanically ventilated days in critical care • **Calculation:** [Numerator] / [Denominator] x 1000 • **Inclusion:** All patients cared for in the Paediatric Critical Care Unit
Indicator Consideration	This indicator is consistent with the current CCSO Critical Care Unit Level Scorecard indicator. Future refinement of scorecard could consider bundle compliance rate as a reliability indicator.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from CCIS data

2) Central Line Infection (CLI) Rate

Indicator Name	Central Line Infection (CLI) Rate
Indicator Domain	Quality
Indicator Objective	Deliver Safe Care
Indicator Definition	Central Line-Associated Primary Bloodstream Infections (CLI) occur when a central venous catheter (or "line") placed into a patient's vein gets infected. The CLI Rate is the rate of CLI incidents diagnosed after 48 hours of admissions to ICU per 1000 central venous line days in ICU. * Definition for CLI consistent with criteria currently used for CCIS reporting.
Indicator Data Source	CCIS
Indicator Calculation	• **Numerator:** Number of CLI incidents diagnosed after 48 hours of critical care admissions • **Denominator:** Number of central line days in critical care • **Calculation:** [Numerator] / [Denominator] x 1000 • **Inclusion:** All patients cared for in the Paediatric Critical Care Unit
Indicator Consideration	This indicator is consistent with the current CCSO Critical Care Unit Level Scorecard indicator. Future refinement of scorecard could consider bundle compliance rate as a reliability indicator.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from CCIS data

3) Unplanned Extubation Rate

Indicator Name	Unplanned Extubation Rate
Indicator Domain	Quality
Indicator Objective	Deliver Safe Care
Indicator Definition	This incidence rate measures the rate of self-extubation in ICU by the patient, family members, or accidental extubation by members of staff during bedside procedures per 1000 ICU ventilated days.
Indicator Data Source	CCIS
Indicator Calculation	• **Numerator:** Number of unplanned extubation incidents in ICU • **Denominator:** Number of mechanically invasive ventilated days in ICU • **Calculation:** [Numerator] / [Denominator] x 1000 • **Inclusion:** All patients cared for in the Paediatric Critical Care Unit
Indicator Consideration	This indicator is consistent with the current CCSO Critical Care Unit Level Scorecard indicator.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from CCIS data

4) Reported Medication Errors Rate

Indicator Name	Reported Medication Errors (With Patient Harm) Rate
Indicator Domain	Quality
Indicator Objective	Deliver Safe Care
Indicator Definition	This indicator measures the number of medication errors that caused patient harm in ICU per 1000 ICU patient days.
Indicator Data Source	Hospital reported data

Indicator Calculation	• **Numerator:** Total number of adverse drug events reported in ICU with Level 3 to Level 6 degrees of harm (mild harm to death), combined
	• **Denominator:** Total number of ICU patient days
	• **Calculation:** [Numerator] / [Denominator] x 1000
	
	• **Inclusion:**
	  ○ All patients cared for in the Paediatric Critical Care Unit
	  ○ All medication errors that caused patient harm (from mild harm to death)
	• **Exclusion:**
	  ○ Medication errors that did not result in patient harm, Level 1 (Near miss) and Level 2 (No harm).
	
	Appendix A contains the PCCAC-PM WG 6-Level Scale of Harm for reporting Medication Errors. A conversion table is provided for the 6-Level Scale, NCC MERP Medication Error Index and WHO's Degree of Harm Guidelines.

Indicator Consideration	Currently, each hospital uses a different scale for measuring levels of harm due to medication error. To help align hospital's reporting, a 6-level scale of harm was developed by the PCCAC Performance Management Working Group to easily transition from WHO's Degree of Harm reporting and SPS NCC MERP's Index for Categorizing Medication Errors. Medication errors with level 1 and level 2 harm are not included as they are the most numerous in occurrence but render no harm to the patient. To be transparent and inclusive, all other incidents that led to patient harm are captured in this indicator. This indicator will be influenced by the disclosure rate of medication errors at each hospital.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from hospital submitted data

5) Pressure Ulcers Rate (Hospital Acquired)

Indicator Name	Pressure Ulcers Rate (Hospital Acquired)
Indicator Domain	Quality
Indicator Objective	Deliver Safe Care
Indicator Definition	Measures the rate of pressure ulcers in ICU per 1000 ICU patient days.
Indicator Data Source	Hospital reported data
Indicator Calculation	• **Numerator:** Number of Mucosal, Stage II, III, IV, deep tissue injuries (DTI), and unstageable pressure ulcers in ICU • **Denominator:** Total number of ICU patient days • **Calculation:** [Numerator] / [Denominator] x 1000 • **Inclusion:** ○ All patients cared for in the Paediatric Critical Care Unit ○ Pressure Ulcer Counting: ▪ Pressure ulcers are assigned the month the event occurred. ▪ Each pressure ulcer is only recorded once; when they have reached Stage II. ▪ Count each pressure ulcer found during surveillance. ○ If the pressure ulcers are non-contiguous, then count pressure ulcers separately even if on the same body part or caused by the same device. • **Exclusion:** ○ Pressure ulcers that were developed prior to ICU admission. Any pressure ulcers that were identified during the first assessment at admission to the ICU should be excluded. ○ Excludes Stage I pressure ulcers: Intact skin with non-blanchable redness in a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching and may differ in colour from the surrounding area. Ulcer stage definitions are contained in Appendix B.
Indicator Consideration	The importance of using the Braden Score as a preventative tool for assessing the risk of pressure ulcers was discussed, but for scorecard reporting purposes, it was determined that reporting actual incidents would be more valuable. Future scorecard iterations could involve incorporating the Braden Score as a reliability metric, which would help add additional context to this indicator.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from hospital submitted data

6) Hand Hygiene Compliance Rate

Indicator Name	Hand Hygiene Compliance Rate (before patient contact)
Indicator Domain	Quality
Indicator Objective	Deliver Safe Care
Indicator Definition	The number of times that hand hygiene was performed in the critical care unit (by health care providers) before initial patient contact divided by the number of observed hand hygiene indications for before initial patient contact in the critical care unit multiplied by 100.
Indicator Data Source	Hospital reported data
Indicator Calculation	• **Numerator:** Number of times hand hygiene performed in ICU • **Denominator:** Number of observed hand hygiene indications in ICU • **Calculation:** [Numerator] / [Denominator] x 100
Indicator Consideration	This indicator is consistent with current CCSO Critical Care Unit Level Scorecard and publicly reported patient safety data. This indicator is reported on a quarterly basis and at the unit level.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from hospital submitted data

7) 48 Hour Readmission Rate

Indicator Name	48 Hour Readmission Rate
Indicator Domain	Quality
Indicator Objective	Deliver Effective Care
Indicator Definition	Percent of patients readmitted back to the same ICU within 48 hours after their initial discharge to a non-ICU inpatient location.
Indicator Data Source	CCIS
Indicator Calculation	• **Numerator:** Number of Readmissions to the same ICU Within 48 Hours from non-ICU inpatient locations • **Denominator:** Number of Live non-ICU Inpatient Discharges • **Calculation:** [Numerator] / [Denominator] x 100 • **Inclusion:** ○ All patients cared for in the Paediatric Critical Care Unit ○ Patient initial discharge destination is one of the following: Level 2 or Step Down, Unit/Ward, Inpatient Rehab ○ Patient subsequent admission source is one of the following: Level 2 or Step Down, Unit/Ward, Inpatient Rehab, Emergency Department, OR/PACU
Indicator Consideration	This indicator is consistent with the current CCSO Critical Care Unit Level Scorecard indicator.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from CCIS data

8) OR Cancellation Rate – For No ICU Bed

Indicator Name	OR Cancellation Rate – For No ICU Bed
Indicator Domain	Access
Indicator Objective	Provide Timely Care
Indicator Definition	Percentage of elective surgery cancellations due to unavailable ICU bed over all performed elective surgeries and active cancellations.
Indicator Data Source	Hospital reported data
Indicator Calculation	• **Numerator:** Number of elective surgeries cancelled due to no post-operative critical care bed available • **Denominator:** Total number of elective cases actively cancelled + number of elective surgeries completed for patients where an ICU bed requirement was identified prior to OR • **Calculation:** [Numerator] / [Denominator] x 100 • **Inclusion:** ○ Elective surgery cases where a requirement for a post-operative paediatric ICU bed was identified prior to surgery ○ Cases scheduled in a fully equipped OR, which includes the following locations (MIS Functional Centers): ▪ 71260 – In-patient Operating Room ▪ 71262 – In-patient OR / Post Anaesthetic Recovery Room (PARR) - used by small hospitals ▪ 71367 – Day surgery pre- and post- operative care ▪ 71360 – Day surgery OR ▪ 71362 – Day surgery combined OR and PARR ▪ 71365 – Day surgery post-anaesthetic recovery room ▪ 71369 – Day surgery combined OR, PARR, pre- and post-care
Frequency of Reporting	Quarterly
Report Generator	CritiCall from hospital submitted data

9) CritiCall R1 Acceptance Rate

Indicator Name	CritiCall R1 Acceptance Rate
Indicator Domain	Access
Indicator Objective	Provide Timely Care
Indicator Definition	Percentage of paediatric critical care patients accepted by each site compared to the total requested transfers from CritiCall when the site was most responsible based on the approved catchment area algorithm for paediatrics. (I.e. referral was from within their responsible catchment area)
Indicator Data Source	CritiCall

Indicator Calculation	• **Numerator:** Number of R1 Acceptances
	  ○ Acceptance indicates how often the site accepted a referral when they were the most responsible site as per approved algorithm
	• **Denominator:** Number of Requested R1 Transfers
	  ○ Requested Transfer indicates how often the site was requested to accept a transfer when they were the most responsible site
	• **Calculation:** [Numerator] / [Denominator] x 100
	
	• **Inclusion:**
	  ○ Referrals from hospital's responsible R1 catchment areas
	• **Exclusion:**
	  ○ Neonates
	
	CritiCall R1 catchment areas for each hospital can be found in Appendix C.

Indicator Consideration	Only a subset of paediatric critical care population is captured presently in CritiCall as not all organizations route all calls through CritiCall (as they are expected to do) for transfers in the province of Ontario. Some children requiring a higher level of care than that offered at the most responsible site are sometimes deferred to another hospital.
Frequency of Reporting	Quarterly
Report Generator	CritiCall

10) CritiCall R2 Acceptance Rate

Indicator Name	Inter-Catchment R2 Acceptance Rate
Indicator Domain	Access
Indicator Objective	Provide Timely Care
Indicator Definition	Percentage of paediatric critical care patients accepted by each site compared to the total requested transfers from CritiCall when the site was not the most responsible based on the approved catchment area algorithm for paediatrics. (i.e. referral was from outside their catchment area)
Indicator Data Source	CritiCall

Indicator Calculation	• **Numerator:** Number of R2 Acceptances
	  ○ Acceptance indicates how often the site accepted a referral when they were not the most responsible site as per approved algorithm; the referral is from outside their predefined catchment area
	• **Denominator:** Number of Requested R2 Transfers
	  ○ Requested Transfer indicates how often the site was requested when they were not the most responsible site
	• **Calculation:** [Numerator] / [Denominator] x 100
	
	• **Inclusion:**
	  ○ Referrals from outside the hospital's responsible R1 catchment areas
	• **Exclusion:**
	  ○ Neonates
	
	CritiCall R1 Catchment areas for each hospital can be found in Appendix C. All requested transfers from outside the hospital's predefined R1 catchment area are considered R2 transfers.

Indicator Consideration	Only a subset of the paediatric critical care population is captured presently in CritiCall as not all organizations route all calls through CritiCall (as they are expected to do) for transfers in the province of Ontario.
Frequency of Reporting	Quarterly
Report Generator	CritiCall

11) Avoidable Days Rate

Indicator Name	Avoidable Days Rate
Indicator Domain	System Integration
Indicator Objective	Optimize Patient Flow
Indicator Definition	The amount of time that patients spend occupying an ICU bed when they no longer require the intensity of care of an ICU. Wait durations above 4 hours are considered avoidable hours; therefore, avoidable days exclude the first 4 hours of a wait.
Indicator Data Source	CCIS

Indicator Calculation	• **Numerator:** Total Delayed Transfer Days
	  ○ Total Delayed Transfer Days (Avoidable Days) = (Discharge Date & Time – Awaiting Transfer Start Date & Time) – 4 hours
	  ▪ For cases with Total Delayed Transfer Days < 0 hours, they are treated as 0 hours.
	• **Denominator:** Total ICU Patient Days
	• **Calculation:** [Numerator] / [Denominator] x 100
	
	• **Inclusion:** All patients cared for in the Paediatric Critical Care Unit
	• **Exclusion:**
	  ○ Cancelled Awaiting/Discharge Transfers
	  ○ First 4 hours of wait, avoidable hours are considered when durations are above 4 hours

Indicator Consideration	This indicator is consistent with the current CCSO Critical Care Unit Level Scorecard indicator.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from CCIS data

12) Night Time Discharge Rate

Indicator Name	Night Time Discharge Rate
Indicator Domain	System Integration
Indicator Objective	Optimize Patient Flow
Indicator Definition	Rate of night-time in-patient discharges (between 18h00 and 06h59).
Indicator Data Source	CCIS
Indicator Calculation	• **Numerator:** Number of Patients Discharged from an ICU between 18h00 and 06h59 to a specified non-ICU inpatient destination • **Denominator:** Number of Live Inpatient Discharges in the critical care Unit • **Calculation:** [Numerator] / [Denominator] x 100 • **Inclusion:** ○ All patients cared for in the Paediatric Critical Care Unit ○ Non-ICU Inpatient Discharge Destination includes: Unit/Ward, Level 2 unit or step down unit, Inpatient rehab • **Exclusion:** ○ Discharges to any other Critical Care Unit, and ○ Discharge Destination = “Admitted to CCIS in Error” or “Deceased”
Indicator Consideration	Night time is from 18h00 to 06h59. Please note this is different from the definition used by the Adult Critical Care Unit Scorecard. Modification to the start time, from 22h00 to 18h00, is meant to better align with service handovers and work flow in hospital critical care units and identify the number of critical care discharges that occur when medical teams have shifted to an on-call night coverage model.
Frequency of Reporting	Quarterly
Report Generator	CritiCall from CCIS data

Appendices

Appendix A: PCCAC- PM WG 6-Level Scale of Harm for Reporting Medication Errors

PCCAC PM WG 6-Level Scale of Harm	WHO Degrees of Harm Methodology[1]	SPS- NCC MERP Index Methodology[2]
1. Near Miss		
2. No Harm	**1. None-** patient outcome is not symptomatic or no symptoms detected and no treatment is required**.**	
3. Mild Harm	**2. Mild Harm-** patient outcome is symptomatic, symptoms are mild, loss of function or harm is minimal or intermediate but short term, and no or minimal intervention (e.g., extra observation, investigation, review or minor treatment) is required.	**E. Temporary Harm-** An error occurred that may have contributed to or resulted in temporary harm to the patient and required intervention.
4. Moderate Harm	**3. Moderate Harm-** patient outcome is symptomatic, requiring intervention (e.g., additional operative procedure; additional therapeutic treatment), an increased length of stay, or causing permanent or long term harm or loss of function.	**F. Temporary Harm-An** error that resulted in initial or prolonged hospitalization
		G. Permanent Harm- An error that may have resulted in or contributed to permanent harm.
5. Severe	**4. Severe-** Symptomatic, requiring life-saving intervention or major surgical/medical intervention, shortening life expectancy or causing major permanent or long term harm or loss of function.	**H. Intervention Required-** to sustain life
6. Death	**5. Death**	**I. Death-** An error occurred that contributed to or resulted in the patient's death

Sources:

1 WHO Conceptual Framework for the International Classification for Patient Safety Version 1.1 Final Technical Report January 2009
2 NCC MERP Index for Categorizing Medication Errors. http://www.nccmerp.org/sites/default/files/indexColor2001-06-12.pdf

Appendix B: Pressure Ulcer Stages

Stages	Description
Mucosal Pressure Ulcer	Mucosal Pressure Ulcers are pressure ulcers found on mucous membranes (inside mouth and nose) with a history of a medical device in use at location of ulcer. The injured tissue bleeds and forms a clot within minutes. Because of the moist environment and mucus, the clot does not resemble the hard, dry clots seen on skin. The clot on mucous membrane is soft, and then becomes coagulum, which is easily shed. It is understood that these ulcers may indeed be due to pressure, however anatomically analogous tissue comparisons cannot be made.
Stage II	Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.
Stage III	Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscles are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.
Stage IV	Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.
Deep Tissue Injury	Purple or maroon localized area of discolored intact skin or blood filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm mushy, boggy, warmed or cooler as compared to adjacent tissue.
Unstageable	Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.

Source:
Children's Hospital's Solutions for Patient Safety Operation Definitions. October 2013.

Appendix C: CritiCall R1 Catchment Area and Catchment Population, by Paediatric Academic Health Science Centre (PAHSC)

PAHSC	LHINs	Age for Paediatric ICU patients	Age for Paediatric Trauma patients
Hospital for Sick Children (Toronto)	5. Central West 6. Mississauga Halton (Trillium Health Partners only) 7. Toronto Central 8. Central 9. Central East 12. North Simcoe Muskoka 13. North East (Parry Sound, Blind River, Espanola, Little Current, Mindemoya, Health Sciences North and Elliot Lake only)	17 and under (<18)	15 and under
McMaster Children's Hospital (Hamilton)	3. Waterloo Wellington 4. Hamilton Niagara Haldimand Brant 6. Mississauga Halton (Georgetown, Oakville and Milton only)	17 and under	15 and under
Children's Hospital, LHSC (London)	1. Erie-St. Clair 2. South West 14. North West 3. Waterloo Wellington (North Wellington Health Care-Louise Marshall Hospital and Palmerston District only) 13. North East (Hornepayne, Wawa, Sault Area Hospital-Matthews Memorial, Thessalon and General only)	17 and under	17 and under
Children's Hospital of Eastern Ontario (Ottawa)	11. Champlain 13. North East (Iroquois Falls, Matheson, Chapleau, Englehart, Hearst, Kirkland Lake, Cochrane, Mattawa, North Bay, Kapuskasing, Smooth Rock Falls, New Liskeard, Timmins, Sturgeon Falls only)	17 and under	17 and under
Kingston General Hospital (Kingston) -includes CHEO on the calls	10. South East 13. North East (Attawapiskat, Moosonee, Fort Albany, Moose Factory only)	17 and under	17 and under

Source: CritiCall Ontario. Updated June 1, 2016

Appendix D: Run Charts and Calculation[2]

The data from the table below was used in the sample run charts.

Table 1: Avoidable Day Rate, Length of Stay, Night Time Discharge Fiscal Year 2012/2013.

	Avoidable Day Rate (%)	ICU Average Length of Stay (Days)	Night Time Discharge Rate (%)
2012-Apr	0.00	2.13	1.45
2012-May	0.00	1.55	4.28
2012-Jun	12.50	2.56	2.34
2012-Jul	11.20	3.15	1.89
2012-Aug	8.40	1.18	0.79
2012-Sept	9.20	1.28	1.37
2012-Oct	7.20	2.89	2.34
2012-Nov	12.30	3.14	1.84
2012-Dec	7.80	3.23	1.73
2013-Jan	6.40	2.56	1.61
2013-Feb	0.00	3.12	1.22
2013-Mar	1.20	2.85	0.79

Descriptive information is calculated for the three indicators:

	Median	Mean	Upper Control Limits	Lower Control Limits
Avoidable Day Rate (%)	7.50	6.35	12.63	0.07
ICU Average Length of Stay (Days)	2.71	2.47	4.29	0.65
Night Time Discharge Rate (%)	1.67	1.80	3.37	0.23

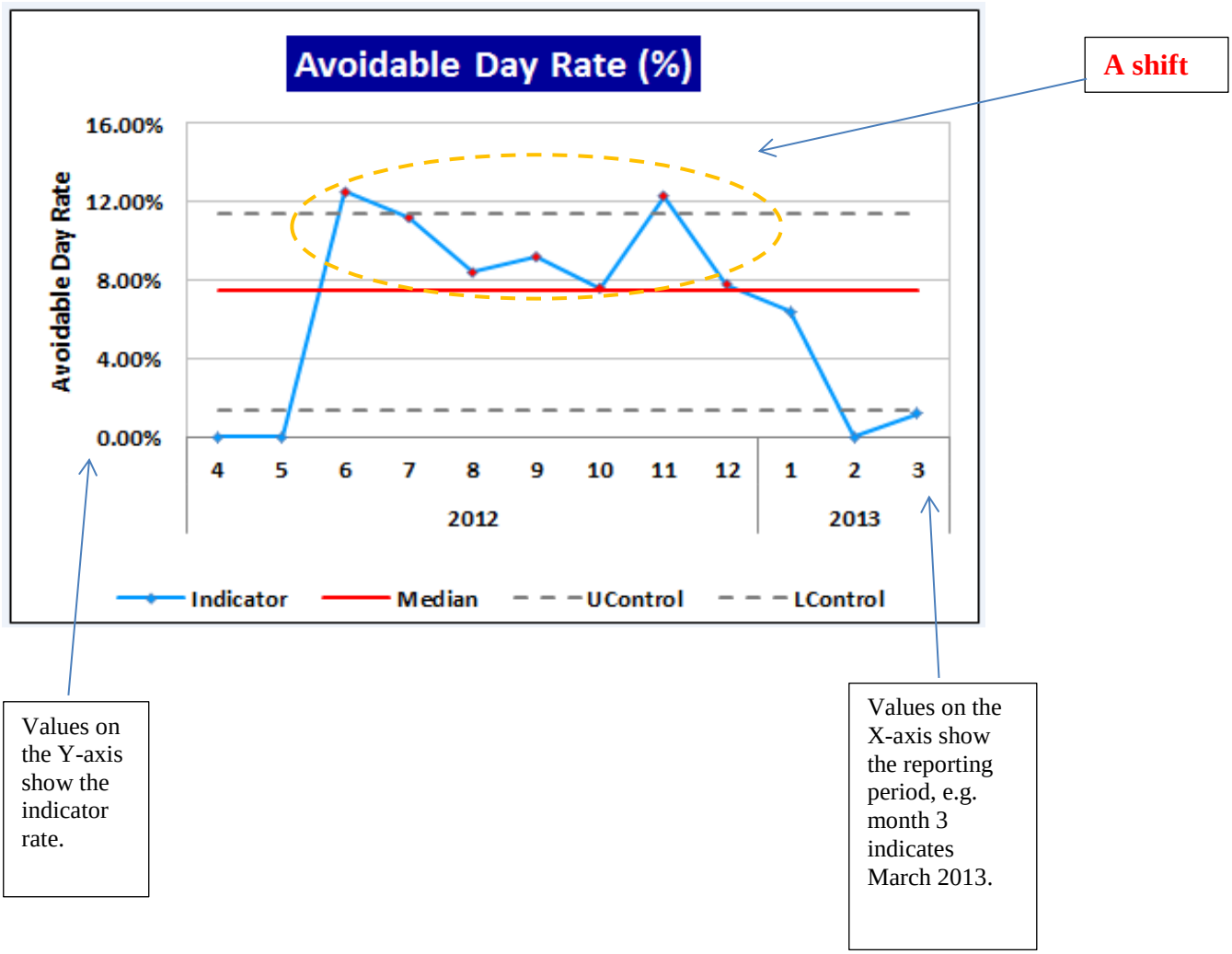
[2] Source: Critical Care Services Ontario. Critical Care Scorecard Reports Guide (V3.3).

Rule 1: Shift

A shift is six or more consecutive points, either all above or all below the median line. Values that fall on the median line neither add to nor break a shift and thus are not included in the count.

Run Chart Example 1 shows a shift for the period from June 2012 to December 2013 (shown as seven red points: 12.5%, 11.2%, 8.4%, 9.2%, 7.6%, 12.3% and 7.8% all greater than the median of 7.5%).

Example 1: Avoidable Day Rate

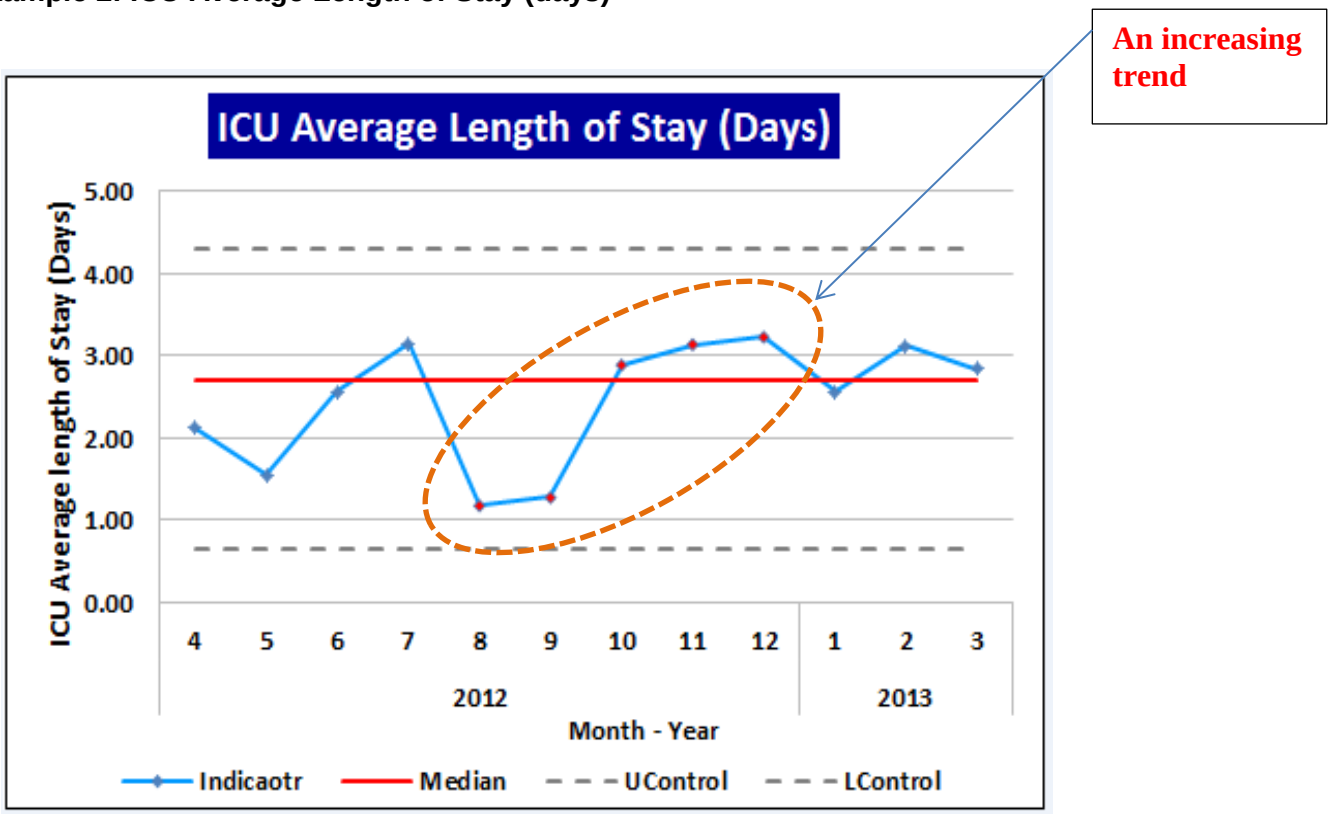


Rule 2: Trend

A trend is five or more consecutive points all going up or all going down. If the value of two or more consecutive points is the same, ignore one of the points and continue counting.
Example 2 shows a trend (increasing) for the period of August 2012 to December 2012 (shown as 5 red points). The data points increased from 1.18 to 3.23.

Example 3 (see next page) shows a trend (decreasing) for the period of October 2012 to March 2013 (shown as 6 red points). The data points decreased from 2.34% to 0.79%.

Example 2: ICU Average Length of Stay (days)

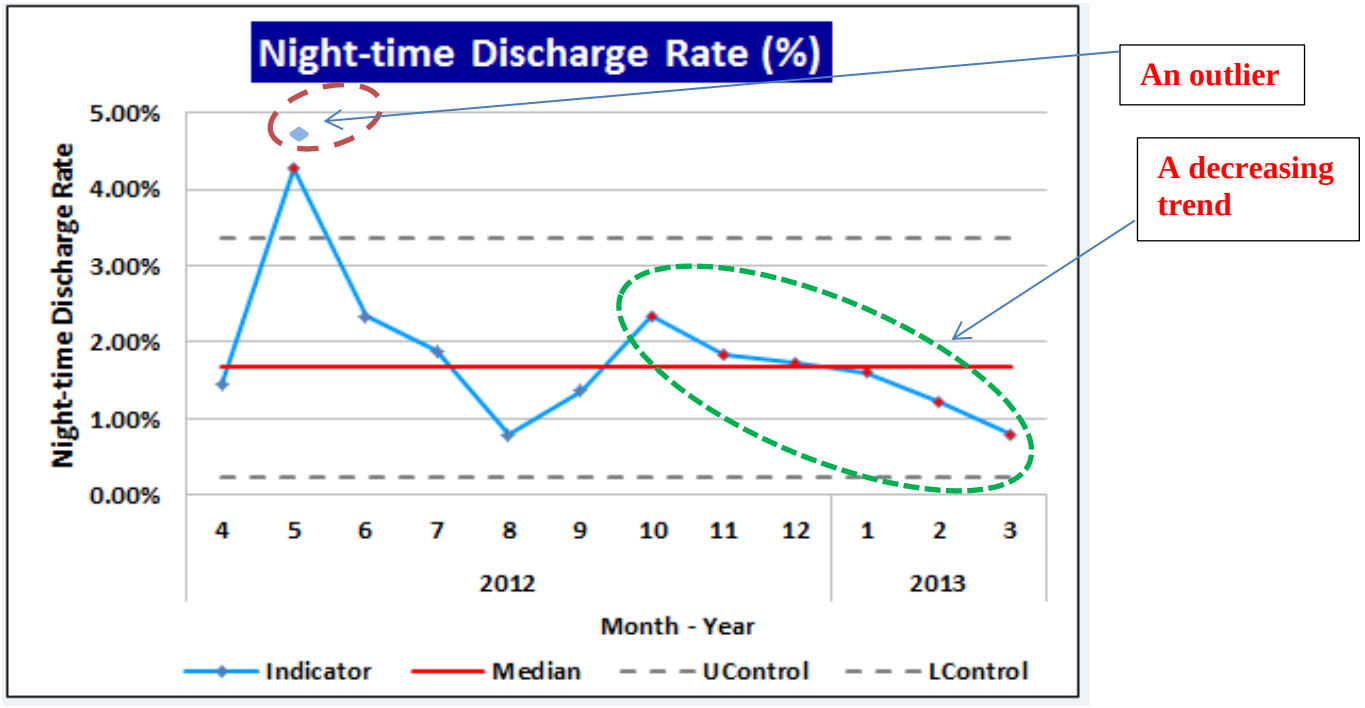


Rule3: Astronomical Point (Outlier)

An astronomical data point is one point that has an obviously different value. Every data set will have a highest point and a lowest point, but this does not necessarily make it an outlier. It is worth understanding the cause of an outlier point, as this will allow users to either emulate if it is a result of a positive process, or avoid/address if it is an adverse impact due to an ineffective/inefficient process.

Example 3 shows an astronomical data point (1 outlier point: 4.28%).

Example 3: Night Time Discharge Rate



Detailed Calculations (Using ICU Average Length of Stay Days as an example)

Median

The median of a finite list of numbers can be found by arranging all the observations from lowest value to highest value and picking the middle one (e.g., the median of {3, 5, and 9} is 5). If there is an even number of observations, then there is no single middle value; the median is then usually defined to be the mean of the two middle values, which corresponds to interpreting the median as the fully trimmed mid-range (e.g., the median of {3, 5, 7and 9} is $\frac{5+7}{2} = 6$).

$Median_{LOS}$=

(1.18, 1.28, 1.55, 2.13, 2.56, ***2.56***, ***2.85***, 2.89, 3.12, 3.14, 3.15, 3.23) = $\frac{2.56+2.85}{2} = 2.71$

Mean

The mean is the sum the sampled values divided by the number of items in the sample.

$Mean_{LOS}$ =

$$\frac{\sum_{1}^{12} LOS_i}{12} = \frac{2.13+1.55+2.56+3.15+1.18+1.28+2.89+3.14+3.23+2.56+3.12+2.85}{12} = 2.47$$

Control Limits (Upper and Lower)

The consistency with in a control run chart is characterized by a stream of data falling within the control limits of the centerline. The centerline is chosen as the median in order to omit the skewed points in the process. Since the measurements are correlated, the moving ranges are calculated between successive data entries, as MRi= |Xi+1 - Xi|. Plus or minus 3.144 times of the average MR is calculated as up and low control limits.

LOS	2.13	1.55	2.56	3.15	1.18	1.28	2.89	3.14	3.23	2.56	3.12	2.85
Absolute Range=$\|LOS_i - LOS_{i-1}\|$	-	0.58	1.01	0.59	1.97	1.10	1.61	0.25	0.09	0.67	0.56	0.27
Median(Absolute Range): $\overline{MR}$ [3] = ***0.58***												
Upper Control Limits (***UControl***): $Mean_{LOS}$+ 3.14* $\overline{MR}$ [1]= 2.47 + 3.14 * 0.58 = ***4.29***												
Lower Control Limits (***LControl***) : $Mean_{LOS}$- 3.14* $\overline{MR}$ [1]= 2.47 - 3.14 * 0.58 = ***0.65***												

[3]Introduction to Statistical Quality Control – Chapter 5 Method and Philosophy of Statistical Process Control – XMR Chart – Median MR. Douglas C. Montgomery, Arizona State University. John Wiley & Sons, Inc .2009.