

Hospital e-Scorecard Report 2008: Acute Care
Clinical Utilization and Outcomes Technical Summary

This technical document has been updated by Linda Choy, H. Clara Pong and Cindy Zhang for Hospital e-Scorecard Report 2008. Acknowledgement is given to Geoffrey M. Anderson, Adalsteinn D. Brown, Diane Doran, Nicole Howe, Jeff Green, Marc Tallentire and Nita Dharwarkar, the original contributors of the technical document.

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Clinical Utilization and Outcomes

1. Overview

Hospital e-Scorecard Report 2008: Acute Care contains information on seven measures used in hospital-specific comparisons. This *Technical Summary* provides a detailed explanation of the methods used to select and calculate these.

Sex¹-stratified data and analyses of the Clinical Utilization and Outcomes indicators are provided at a hospital and aggregate levels (i.e. peer group, regional and provincial) in the e-Scorecard.

Researchers defined indicators of adverse events, readmissions and cardiac care for hospital level analysis. These indicators were selected based on the results of a comprehensive literature review and the advice of expert panels, and are distributed as follows:

Patient Group	Adverse Events		Readmissions		Appropriateness
	Nurse-Sensitive Adverse Events	Labour and Delivery	Specific-cause Readmissions	Labour and Delivery	Access to coronary angiography
Specific Medical Conditions	*		*		
Specific Surgical Procedures	*		*		
Women's Health		*		*	
Cardiac Care					*

All of these measures should be used as screening tests. Screening tests – such as Pap smears or mammograms – are often used in medicine. Screening tests can produce both false positives (individuals with positive test results who do not have cancer) and false negatives (individuals with cancer whose test results are negative). The same is true for measures of comparative hospital performance. An effort has been made to minimize false positives, but they cannot be totally

¹Sex is biological maleness and femaleness. Gender is made up of multiple dimensions, and reflects the interaction of sex with other economic, cultural, environmental, social characteristics (e.g., age, income, ethnicity, social support), as well as roles ascribed to the sexes, and relations between the sexes. Because of the limited availability of other gender-related variables in routinely collected hospital data, the analysis is limited to sex. Pursuing gender-based analysis is an important long-term goal.

eliminated. In medicine, screening tests do not provide a final diagnosis, but can help to identify cases that need follow-up. Likewise, the measures of clinical performance in this report should not be taken as a definitive assessment of access, efficiency, or quality. Rather, they are a first step in a quality assessment and improvement process that should involve more detailed analysis.

Although they are screening tests, the Clinical Utilization and Outcomes measures should help health care providers, administrators, and the public to better understand the clinical performance of their institutions and of the hospital system as a whole. Clinical care is the core process of the hospital and information on clinical performance can be used to support quality improvement as well as for accountability purposes.

The results presented in *Hospital e-Scorecard Report 2008: Acute Care* describe a portion of hospital care provided during fiscal 2006/2007. They also describe a system undergoing continual and substantial change. They do not necessarily reflect the system of today and should not be used to identify the best hospital(s) in the province or to guide choices around personal care.

2. Methodology

What's new for Clinical Utilization and Outcomes 2008?

Changes and methodological enhancements for the Clinical Utilization and Outcomes (CUO) quadrant include:

- Additional cases from the National Ambulatory Care Reporting System (NACRS) have been included to better capture episodes of care.
- Modifying the restriction on the transfer criteria in our episode building programs to accommodate cases when the incorrect value is entered in the "transfer to/from institution number" or "discharge disposition" fields.
- Updating fall-related external cause codes in General Exclusions to improve the capture of post-admission fall cases in the Nurse-sensitive Adverse Events indicators. The fall codes (W01, W03, W04, W05, W06, W07, W08, W10, W18, and W19) are no longer excluded from the analysis.

Data from fiscal year 2006-2007 was used.

Data Sources

All the clinical utilization and outcome measures were derived from Canadian Institute for Health Information (CIHI) data that have been collected under consistent guidelines, by trained abstractors, in all acute care hospitals in Ontario. These data have been used extensively in previous reports on health care performance, and form the basis for many journal articles. The data undergo extensive edit checks to improve accuracy, but all errors cannot be eliminated. It is important to recognize the limitations of the measures of utilization and outcomes; they will only be as accurate as the data sources on which they are based. However, using these data to produce comparative performance information should lead to refinements and improvements in data quality over time.

Some indicators were previously reported in *Hospital Report 2003: Acute Care*, using ICD-9 and CCP codes. Starting in fiscal 2002-2003, the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada* (ICD-10-CA) and the new *Canadian Classification of Health Interventions* (CCI) were implemented in Ontario. As a result of the change between the classification systems, the diagnoses and procedure codes were converted from ICD-9 and CCP to ICD-10-CA and CCI. Classification experts at CIHI facilitated this process, however it should be noted that the mapping of codes between the two classification systems might not be perfect.

Coding variations in type 2 diagnoses have improved. Examples of changes undertaken to help reduce coding variations include the development of a revised grade list grouper as well as clarifying CIHI's Diagnosis Typing Coding Standards and circulating this to all Canadian hospitals. For further details on the *Coding Variations in CIHI Discharge Abstract Database (DAD) Data* project, please visit CIHI's website at http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=GR_1002_E.

Since April 1 2003, all Ontario day procedure abstracts have been submitted to the National Ambulatory Care Reporting System (NACRS) (prior to this they were submitted to the Discharge Abstract Database (DAD)). The NACRS database includes data from day procedure units, emergency departments, and other ambulatory care clinics. It uses a different approach for identifying day procedure cases than the DAD. For more information see the "Same Day Procedure Data in Ontario" sidebar below.

Same Day Procedure Data in Ontario

Effective April 1, 2003, all Ontario hospitals were mandated to report all ambulatory care data to the National Ambulatory Care Reporting System (NACRS) at CIHI. NACRS includes data acquisition and reporting standards intended for hospital- and community-based private and public ambulatory care activity that occurs in clinics, emergency departments, and day procedure units. These data are intended to support: management and operational decision making at the facility level; resource allocation decisions at a global and facility level; provincial and national comparisons; and the effective analysis of ambulatory care services.

This year's methodology for selecting day procedure cases from NACRS is based on the MIS functional centres mandated by the MOHLTC for 'surgical day/night care'.

Table 1: Identifying day procedure cases

	Criteria	Codes	
Include	<p>NACRS records identified as 'surgical day/night care'</p> <p><i>New for 2006/07 data:</i> Cardiac catheterization cases for all indicators[†]</p> <p>Any MIS Functional Centre that has a procedure of interest not captured by the above codes*</p>	<p>7 ~ 34020</p> <p>7 ~ 34025**</p> <p>7 ~ 34055</p> <p>7 ~ 260**</p> <p>7 ~ 262</p> <p>7 ~ 265**</p> <p>7 ~ 310</p> <p>7141544</p> <p>714154410</p> <p>714154420</p>	<p>Day/Night Surgical Procedures Excluding OR/PARR</p> <p>Day/Night Surgical Procedures Including OR/PARR</p> <p>Day/Night Endoscopy</p> <p>Main OR</p> <p>Combined OR/PARR</p> <p>Post Anaesthetic Recovery Rooms</p> <p>Emergency (only if surgical D/N care services provided by this FC)</p> <p>DI Cardiac Catheterization Lab</p> <p>DI Cardiac Catheterization Interventional</p> <p>DI Cardiac Catheterization Diagnostic Services</p>
Exclude	All unscheduled ER visits	Functional centre codes 7 ~ 310 where the 'Scheduled ED Visit Indicator' = 'N'	

~, ** = any numeric value

* = cholecystectomy, prostatectomy, hysterectomy, and angiography

[†]Note: *In Hospital Report 2007: Acute Care*, cardiac catheterization labs were only included for the "Access to Coronary Angiography" indicator and if an angiography was recorded on the abstract.

The record layout of the NACRS database is substantially different than the DAD. However, comprehensive analysis and re-formatting of the NACRS data was

performed by CIHI to enable consistent analysis based on the two databases. NACRS same day procedure data was mapped to the DAD layout then joined with the DAD inpatient data to enable consistent analysis. Note that for many fields, imperfect 'mappings' were required to translate the NACRS data to the DAD layout. This may impede Ontario hospitals' ability to replicate results that include day procedure cases.

Selection of Patient Categories and Eligible Cases

In order to make performance information meaningful to the public and useful for quality improvement, medical and surgical patient groups were examined separately. The selection of the patient groups relied on diagnostic, procedural, and demographic information contained in hospital discharge abstracts submitted to CIHI.

Both patient groups share a set of general exclusions. These general exclusions were designed to remove from the analysis potential data quality problems, patients who could not be linked from hospital to hospital, or patients who would require specific or unusual management. The diagnosis codes for cancer, AIDS/HIV, and trauma in the general exclusion criteria were updated this year to reflect more current coding practices. The general exclusion criteria are:

Table 2: General Exclusions

	Criteria	Codes
Exclude:	Patients with a diagnosis of cancer listed on the discharge abstract	ICD-10-CA C00-C26, C30-C44, C45-C97, Z51.0, Z51.1, Z51.2
	Patients with a diagnosis of AIDS/HIV listed on the discharge abstract	ICD-10-CA B24, Z21, R75
	Patients with a diagnosis of violent trauma listed on the discharge abstract	ICD-10-CA V01-V99, W00, W02.^, W09, W11-W17, W20 -W23, W25-W27, W30, W31, W33-W40, W44, W45, W50-W60, W64-W77, W81-W99, X00-X19, X20-X29, X30, X31, X33-X38, X51, X53, X54, X57, X60-X84, X85-Y09, Y35.0-Y35.4, Y35.6, Y35.7, Y36.^
	Patients without an Ontario residence	Postal Code that does not begin with: K, L, M, N, P
	Patients without a valid health insurance number (HIN)	HIN equal to 'Zs' (hospitals can check records with an invalid HIN from their CIHI default report) HIN equal to '0', '1' *
	Patients less than 15 or greater than 84 years of age (Note: For Labour and Delivery indicators only: Patients less than 13 or greater than 64)	
	Care provided outside of Ontario	Submitting Province Code not equal to 5
	Gender not recorded as male or female	

* '0' and '1' are valid HINs in DAD, however, these case cannot be linked throughout the healthcare system for episode building, therefore, are not included in the analysis.

Linking Cases Across Hospitals

The research report draws on data for all of Ontario's acute care hospitals. Transferring patients from one hospital to another is an important facet of health care in Ontario. Although transfers are relatively rare for surgical patients, they occur more frequently in medical patients. In order to avoid analyzing transfers as two separate hospitalizations, the basic unit of analysis studied in *Hospital e-Scorecard Report 2008: Acute Care* is the episode of care. An episode includes all continuous hospitalizations in acute care hospitals and day procedure facilities, and can include transfers from one facility to another. The rules for transfers are as follows:

1. If the patient is admitted within 24 hours of discharge, and either of the institutions has coded it as a transfer, the case is considered as a transfer.
2. If the patient is admitted more than 24 hours following discharge, it is not considered a transfer and is treated as a new episode.

Unique patients are tracked from one hospital to another based on scrambled health card numbers and their birth date. Data elements, such as admitting date and time, discharge date and time, transfer to/from institution type, discharge disposition, and institution type are used to determine whether the records should be linked as a transfer. "Transfer to/from institution type" are data elements derived from the "transfer to/from institution number" submitted by the hospital on the abstract. One of the transfer criteria in our analytic programs checks that the "discharge disposition" and "transfer to institution number" are consistent (i.e. if the "discharge disposition" = transferred to an acute care institution, the "transfer to institution number" should also be an acute care institution number). Hospitals may record the wrong "discharge disposition" or "transfer to institution number" (e.g. a hospital records the NACRS institution number instead of the DAD institution number when the patient was actually transferred to an acute care institution) so the case would not meet this criteria, however, we have now modified the restriction to accommodate this. For further details, please refer to Appendix A at the end of this Technical Report. Note that the "Readmission Code" data element in DAD is not used to determine readmissions.

Occasionally, when a patient is transferred from one facility to another, the discharge date/time from the first hospital may be later than the admission date/time from the second hospital. Similarly, some patients are transferred to a day procedure facility while they are inpatients at another facility; while they receive the day procedure, their bed at the inpatient facility stays open, waiting for their return. The methodology behind the episode building accounts for these kinds of transfers. In cases with a multi-hospital episode of care, LOS is calculated as follows:

(Last hospitalization discharge date - first hospital admission date) - ALC days in last hospitalization

Replication of Results by Ontario Hospitals

As part of the verification process for the Clinical Utilization and Outcomes results, many participating hospitals go through a detailed validation of the values that underlie their performance allocations. This is an important step in ensuring the accuracy of the results, and helps to build confidence in the values presented in *Hospital Report: Acute Care*. However, for many of the indicators it is not possible to exactly replicate the results. This is due to the fact that the unit of analysis for the CUO quadrant is an "episode of care", which can potentially span more than one acute care and/or day procedure facility. As such, outcomes are attributed in specific ways for each indicator.

A special advisory panel of hospital chief executive officers and other stakeholders helped to develop rules for assigning outcomes to episodes of care involving more than one hospital. In each case, the rules were based on the principle that the hospital with the most control over the outcome should be assigned that outcome. However, the fact that so many hospitals are involved in the care of a single patient

emphasizes the inter-linked nature of the hospital system. The following list explains how each outcome indicator is allocated, and to what extent hospitals can expect to replicate the results:

- **Labour and Delivery Readmissions:** the readmission for 'Rate of 14-day unplanned readmissions for patients undergoing labour and delivery' is assigned to the hospital where the delivery occurred
- **Other Readmissions** are attributed to the last hospital in the episode. For example, if an episode spans two hospitals – i.e. first they are admitted to Hospital A, then transferred to Hospital B, then discharged (marking the end of this episode of care) – then they are admitted to another hospital, Hospital C, within 28 days (or other specified time as per the indicator definition) with a condition of interest in Hospital A (or for any readmission reason as per the indicator definition), then Hospital B is assigned the readmission outcome for this patient. Because the readmission can be to any hospital in Ontario, hospitals will not likely be able to replicate the exact numerator for any readmission indicators. They should be able to replicate some of the denominator and a subset of the actual numerator (since they can count cases readmitted to their own facility).
- **Adverse Events** (Nurse-sensitive Adverse Events for specific medical conditions and surgical procedures, labour and delivery) are attributed to the hospital treating the patient when the adverse event diagnosis developed. For example, if an episode spans three hospitals – i.e. first they are admitted to Hospital A, then transferred to Hospital B, then transferred to Hospital C, then discharged (marking the end of this episode of care) – and the patient has a valid adverse event in Hospital C, then only Hospital C will be assigned the adverse event outcome. Hospitals A and B will not have an adverse event assigned to them. Hospitals should be able to replicate most of the denominator and a subset of the actual numerator. The denominator consists of both inpatient and day procedure cases. For the medical indicator, day procedure cases can be included in the episode but they cannot be the first hospitalization in the episode. In addition, a hospital may not be able to replicate the entire numerator because a LOS cut-off (used as a screen to identify cases where the adverse event likely impacted the patient's overall LOS) is compared to the episode LOS that cannot be calculated if the episode of care spans across different hospitals.
- **Appropriateness (Access to coronary angiography)** is attributed to the first hospital in the episode. Using this rule, hospitals that do not have their own cardiac catheterization facilities can receive credit for recognizing the need to access the technology. For example, if an episode spans two hospitals – small community Hospital A, then a transfer to large teaching Hospital B – and the patient receives a coronary angiography at Hospital B, it is actually Hospital A that is attributed with providing access to the advanced technology. As such, hospitals will not be able to replicate the numerator of this indicator. They should, however, be able to replicate a subset of the denominator. Hospitals

may not be able to replicate the entire denominator because of transfers during the episode of care.

Note that for the denominator, the first hospitalization in the episode must start with a diagnosis/procedure of interest. Medical cases must also start as an inpatient case, whereas, surgical and labour and delivery cases can start as either an inpatient or day procedure case.

Understanding the rules for attributing episodes to hospitals is important to interpreting hospital-specific results. If care for a specific patient group in a hospital rarely involves a transfer, then the number of episodes assigned to that hospital for the calculation of adverse events, readmission rates, and appropriateness should be very similar. However, if care for a specific patient group in a hospital frequently involves transfers, then the number of episodes assigned to the hospital for calculation of adverse events, readmission rates, and appropriateness may be substantially different.

3. Indicator Definitions

3.1. Adverse Events

3.1.1. Adverse Events: Nurse-sensitive Medical

As in last year's report, the nursing-related indicators are aggregated by combining the nurse-sensitive adverse events – Urinary Tract Infections Following Specific Surgical Procedures (for surgical patients only), Post-admission Pressure Ulcers, Fractures from Falls Following Admission to Hospital, and Post-admission Pneumonia.

Sum of nurse-sensitive adverse events for acute myocardial infarction (AMI), heart failure, asthma, GI bleed, and stroke

This indicator identifies selected medical patient groups that had:

- post-admission pressure ulcers
- post-admission fractures from falls (hip and limb fractures)
- post-admission pneumonia

Note:

- **In the denominator, medical cases must start as an inpatient case with a diagnosis of interest in the first hospitalization of the episode.**
- Day procedure cases can be included in the episode but they cannot be the first hospitalization in the episode.
- A provincial median episode LOS screen is used to identify cases where the adverse event likely impacted the patient's overall LOS.

Episodes (Numerator)		
	Criteria	Codes
Include:	Type 2 diagnosis of any of the following conditions:	Type 2 diagnosis
	Decubitus ulcer	L89.^
	Fracture of shoulder and upper arm	S42.^
	Fracture of forearm	S52.^
	Fracture at wrist and hand level	S62.^
	Fracture of femur	S72.^
	Fracture of lower leg, including ankle Includes: malleolus	S82.^
	Fracture of foot, except ankle	S92.^
	Fractures involving multiple regions of one upper limb	T02.2^
	Fractures involving multiple regions of one lower limb	T02.3^
	Fractures involving multiple regions of both upper limbs	T02.4^
	Fractures involving multiple regions of both lower limbs	T02.5^
	Fractures involving multiple regions of upper limb(s)	T02.6^
	Fracture of upper limb, level unspecified	T10.^

	Fracture of lower limb, level unspecified	T12.^
	Post-admission pneumonia	Type 2 J13, J14, J15.^, J16.^, J18.^, or Type 2 J69.0 and Type 3 B95.^ or B96.^†
AND	<i>For AMI cases:</i> Episode LOS greater than provincial median of 6 days or died	Episode LOS > provincial median of 6 days or Discharge Disposition = 07 (died)
	<i>For Heart Failure cases:</i> Episode LOS greater than provincial median of 6 days or died	Episode LOS > provincial median of 6 days or Discharge Disposition = 07 (died)
	<i>For Asthma cases:</i> Episode LOS greater than provincial median of 3 days or died	Episode LOS > provincial median of 3 days or Discharge Disposition = 07 (died)
	<i>For GI Bleed cases:</i> Episode LOS greater than provincial median of 4 days or died	Episode LOS > provincial median of 4 days or Discharge Disposition = 07 (died)
	<i>For Stroke cases:</i> Episode LOS greater than provincial median of 7 days or died	Episode LOS > provincial median of 7 days or Discharge Disposition = 07 (died)

† Note that in some instances, the type 3 B95.^ or B96.^ code may be linked to another type 2 condition found on the abstract.

Cases (Denominator)		
	Criteria	Codes
Include:	AMI **	I21.^, I22.^ (Diagnosis type M (but not type M and 2) or I21.^, I22.^ as type 1, W, X, Y ¹ (with another diagnosis as type M and 2)
	Heart failure*	I50.^, I26.0, I27.9
	Asthma*	J45.^
	GI Bleed*	K92.0, K92.1, K92.2, K25.0, K25.2, K25.4, K25.6, K26.0, K26.2, K26.4, K26.6, K27.0, K27.2, K27.4, K27.6, K28.0, K28.2, K28.4, K28.6
	Stroke*	I60.^, I61.^, I62.^, I63.^, I64

Exclude:	General Exclusion Criteria	(see the Methodology section of this report)
	AMI:	
	Bypass, coronary arteries	1.IJ.76.^
	Dilation, coronary arteries and Pharmacotherapy (local), vessels of heart	1.IJ.50.^, 1.IL.35.^, 1.IJ.57.^
	Implantation of internal device, heart NEC	1.HZ.53.^
	Implantation of internal device, epicardium	1.HB.53.^
	Implantation of internal device, endocardium	1.HD.53.^
	Management of internal device, epicardium	1.HB.54.^
	Management of internal device, endocardium	1.HD.54.^

¹ W, X, Y are diagnosis codes associated with first/second/third service transfers

*Patients were included in the diagnostically defined groups if the diagnosis of interest was coded as a type M diagnosis. However, since the goal was to identify conditions that developed before hospital admissions, if the M-diagnosis was also listed on the discharge abstract as a type 2 diagnosis, indicating that the most responsible condition developed after admission, the patient was excluded from the analysis. In order to identify patients who might have been admitted with the diagnosis of interest, but who had developed another most responsible diagnosis after admission, patients were also included if another diagnosis was coded as a type M *and* a type 2 (indicating that the M-diagnosis developed after admission) and the diagnosis of interest was coded as a type 1.

**Note: Some health regions record their AMI patients as defined by a combination of the following AMI criteria:

1. Coronary artery disease (CAD) I25.0, I25.1^, I25.8, I25.9 as type M,
2. AMI I21.^, I22.^ as type 1, W, X, Y,
3. along with percutaneous coronary intervention (PCI) 1.IJ.50.^, 1.IJ.57.GQ.^ or coronary artery bypass graft (CABG) 1.IJ.76.^

For this adverse event indicator, these cases get dropped due to the overlapping exclusion criteria of PCI and CABG.

3.1.2. Adverse Events: Nurse-sensitive Surgical

Sum of nurse-sensitive adverse events for cholecystectomy, hysterectomy, and prostatectomy

This indicator identifies selected surgical patient groups that had:

- post-admission urinary tract infections
- post-admission pressure ulcers
- post-admission fractures from falls (hip and limb fractures)
- post-admission pneumonia

Note:

- **In the denominator, surgical cases can start as either inpatient or day procedure cases with a procedure of interest in the first hospitalization of the episode.**
- All possible 20 procedures on the discharge abstract are included in the analysis.
- A provincial median episode LOS screen is used to identify cases where the adverse event likely impacted the patient's overall LOS.

Episodes (Numerator)		
	Criteria	Codes
Include:	Type 2 diagnosis of any of the following conditions:	Type 2 diagnosis
	Urinary tract infection, site not specified	N39.0
	Decubitus ulcer	L89.^
	Fracture of shoulder and upper arm	S42.^
	Fracture of forearm	S52.^
	Fracture at wrist and hand level	S62.^
	Fracture of femur	S72.^
	Fracture of lower leg, including ankle Includes: malleolus	S82.^
	Fracture of foot, except ankle	S92.^
	Fractures involving multiple regions of one upper limb	T02.2^
	Fractures involving multiple regions of one lower limb	T02.3^
	Fractures involving multiple regions of both upper limbs	T02.4^
	Fractures involving multiple regions of both lower limbs	T02.5^
	Fractures involving multiple regions of upper limb(s)	T02.6^
	Fracture of upper limb, level unspecified	T10.^
	Fracture of lower limb, level unspecified	T12.^
	Post-admission pneumonia	Type 2 J13, J14, J15.^, J16.^, J18.^, or Type 2 J69.0 and Type 3 B95.^ or B96.^ †
AND	Cholecystectomy: Episode LOS greater than provincial median of 5 days (open cholecystectomy) or 0 days (laparoscopic cholecystectomy) or died	Episode LOS > provincial median of 5 days (open: 1.OD.89.LA 1.OD.89.SM-AG

		<p>1.OD.89.SM-AM 1.OD.89.SM-AS 1.OD.89.SM-BD 1.OD.89.SM-GX 1.OD.89.TP)</p> <p style="text-align: center;">or</p> <p>0 days (laparoscopic: 1.OD.89.DA 1.OD.89.DT-GX 1.OD.89.EC 1.OD.89.DT-AM 1.OD.89.DT-AG 1.OD.89.DT-AS 1.OD.89.DT-BD 1.OD.89.PN)</p> <p style="text-align: center;">or</p> <p>Discharge Disposition = 07 (died)</p>
	<p>Hysterectomy: Episode LOS greater than provincial median of 2 days (vaginal hysterectomy) or 3 days (abdominal hysterectomy) or died</p>	<p>Episode LOS > provincial median of 2 days (vaginal: 1.RM.89.AA, 1.RM.89.CA, 1.RM.89.DA, 1.RM.91.CA, (1.RM.87.DA^^, 1.RM.87.BA^^, 1.RM.87.CA^^ with extent attribute = 'SU'))</p> <p style="text-align: center;">or</p> <p>3 days (abdominal: 1.RM.89.LA, 1.RM.91.LA, (1.RM.87.LA-GX or 1.RM.87.LA-AK with extent attribute = 'SU'))</p> <p style="text-align: center;">or</p> <p>Discharge Disposition = 07 (died)</p>
	<p>Prostatectomy: Episode LOS greater than provincial median of 2 days or died</p>	<p>Episode LOS > provincial median of 2 days</p> <p style="text-align: center;">or</p> <p>Discharge Disposition = 07 (died)</p>

† Note that in some instances, the type 3 B95.^ or B96.^ code may be linked to another type 2 condition found on the abstract.

Cases (Denominator)		
	Criteria	Codes
Include:	Cholecystectomy	1.OD.89.^^
	Hysterectomy	1.RM.89.^^, 1.RM.91.^^, or 1.RM.87.^^ with extent attribute = 'SU'
	Prostatectomy	1.QT.59.^^, 1.QT.87.^^

Exclude:	General Exclusion Criteria	(see the Methodology section of this report)
	<i>Cholecystectomy:</i>	
	Transplant, liver	1.OA.85.^
	Excision partial, abdominal aorta	1.KA.87.^
	Bypass, abdominal aorta	1.KA.76.^
	Drainage, liver	1.OA.52.^
	Excision partial, liver	1.OA.87.^
	Destruction, liver	1.OA.59.^
	Excision partial, large intestine	1.NM.87.DF, 1.NM.87.DE, 1.NM.87.DN, 1.NM.87.DX, 1.NM.87.DY, 1.NM.87.RN, 1.NM.87.RD, 1.NM.87.RE, 1.NM.87.TF, 1.NM.87.TG
	Excision total, large intestine	1.NM.89.^
	Excision partial, pancreas with duodenum	1.OK.87.^
	Excision radical, pancreas with duodenum	1.OK.91.^
	Excision partial, stomach	1.NF.87.RP, 1.NF.87.DG, 1.NF.87.RH, 1.NF.87.RJ, 1.NF.87.RK, 1.NF.87.DH, 1.NF.87.DQ, 1.NF.87.GX, 1.NF.87.DJ, 1.NF.87.DL, 1.NF.87.RG
	Excision total, stomach	1.NF.89.^
	Excision total with reconstruction, stomach	1.NF.90.^
	Excision radical, stomach	1.NF.91.^
	Excision radical with reconstruction, stomach	1.NF.92.^
	<i>Hysterectomy:</i>	
	Drainage, large intestine	1.NM.52.DA, 1.NM.52.LA, 1.NM.52.LA-TS
	Procurement, large intestine	1.NM.58.^
	Destruction, large intestine	1.NM.59.^
	Bypass, large intestine	1.NM.76.^
	Excision partial, large intestine	1.NM.87.^
	Excision total, large intestine	1.NM.89.^
	Excision radical, large intestine	1.NM.91.^
	Drainage, small intestine	1.NK.52.DA, 1.NK.52.LA
	Removal of device, small intestine of jejunal tube [e.g. drainage, feeding] inserted using open approach	1.NK.55.LA-TS
	Removal of foreign body, small intestine	1.NK.56.DA, 1.NK.56.LA
	Procurement, small intestine	1.NK.58.^
	Bypass, small intestine	1.NK.76.DN, 1.NK.76.DP, 1.NK.76.RE, 1.NK.76.RF
	Excision partial, small intestine	1.NK.87.^
	Dilation, small intestine	1.NK.50.^
	Implantation of internal device, small intestine	1.NK.53.DA-TS, 1.NK.53.LA- TS, 1.NK.53.LA-QB
	Fixation, small intestine	1.NK.74.^
	Bypass with exteriorization, small intestine	1.NK.77.^

	Repair, small intestine	1.NK.80.DA, 1.NK.80.DA-W2, 1.NK.80.DA-W3, 1.NK.80.LA, 1.NK.80.LA-W2, 1.NK.80.LA-W3
	Reattachment, small intestine	1.NK.82.^
	Construction or reconstruction, small intestine	1.NK.84.^
	Transplant, small intestine	1.NK.85.^
	Dilation, large intestine	1.NM.50.^
	Removal of device, large intestine	1.NM.55.DA-TS, 1.NM.55.LA-TS
	Removal of foreign body, large intestine	1.NM.56.DA, 1.NM.56.LA
	Fixation, large intestine	1.NM.74.^
	Bypass with exteriorization, large intestine	1.NM.77.^
	Repair, large intestine	1.NM.80.^
	Reattachment, large intestine	1.NM.82.^
	Perfusion, small with large intestine	1.NP.16.^
	Reduction, small with large intestine	1.NP.73.LA
	Transplant, small with large intestine	1.NP.85.^
	Closure of fistula, small with large intestine	1.NP.86.^
	Excision total, appendix	1.NV.89.^
	Drainage, appendix	1.NV.52.^
	Drainage, rectum	1.NQ.52.HA, 1.NQ.52.LA, 1.NQ.52.LA-TS
	Removal of foreign body, rectum	1.NQ.56.DA, 1.NQ.56.LA
	Destruction, rectum	1.NQ.59.^
	Release, rectum	1.NQ.72.^
	Fixation, rectum	1.NQ.74.^
	Repair, rectum	1.NQ.80.^
	Closure of fistula, rectum	1.NQ.86.MB, 1.NQ.86.MB-XX-E, 1.NQ.86.MB-XX-F, 1.NQ.86.ME, 1.NQ.86.ME-XX-E, 1.NQ.86.ME-XX-F
	Excision partial, rectum	1.NQ.87.^
	Excision total, rectum	1.NQ.89.^
	Construction or reconstruction, anus	1.NT.84.PB, 1.NT.84.PF
	Control of bleeding, anus	1.NT.13.^
	Drainage, anus	1.NT.52.^
	Implantation of internal device, anus	1.NT.53.^
	Removal of device, anus	1.NT.55.^
	Removal of foreign body, anus - open approach	1.NT.56.LA
	Destruction, anus	1.NT.59.^
	Release, anus	1.NT.72.^
	Reduction, anus	1.NT.73.^
	Repair, anus	1.NT.80.^
	Construction or reconstruction, anus	1.NT.84.LF
	Closure of fistula, anus	1.NT.86.^
	Excision partial, anus	1.NT.87.^
	Excision partial, stomach	1.NF.87.RP, 1.NF.87.DG
	Bypass, stomach - gastroenterostomy [diversion around	1.NF.76.DQ, 1.NF.76.RJ

	distal stomach]	
	Endometriosis of pelvic peritoneum	N80.3
	Endometriosis of rectovaginal septum and vagina	N80.4
	Endometriosis of intestine	N80.5
	Repair, bladder neck	1.PL.74.DA,
	Pharmacotherapy (local), bladder neck	1.PL.35.BA-W2, 1.PL.35.BA-W8, 1.PL.35.HA-W2, 1.PL.35.HA-W8
	Repair, bladder neck	1.PL.74.AF-XX-A, 1.PL.74.AF-XX-L, 1.PL.74.AF-XX-N, 1.PL.74.AF-XX-Q
	Female urethrocele	N81.0
	Cystocele	N81.1
	Rectocele	N81.6
	Uterovaginal prolapse, unspecified	N81.4
	Incomplete uterovaginal prolapse	N81.2
	Complete uterovaginal prolapse	N81.3
	Vaginal enterocele	N81.5
	Other female genital prolapse	N81.8
	Female genital prolapse, unspecified	N81.9
	In situ neoplasms	D00-D09
	Neoplasms of uncertain or unknown behaviour	D37-D48

Note: there are no exclusion criteria for prostatectomy.

3.1.3. Adverse Events: Labour and Delivery

Note: The Obstetric chapter in Folio is unique in assigning the diagnosis type from other chapters. Since the patient can have a short LOS, type 1 and type 2 diagnoses are sometimes used interchangeably. As a result, we will not be using type 2 as a criteria for the adverse events listed, but rather we are relying on the selection of obstetrical codes that fall under the sixth-digit sub classification 'Delivered, with mention of postpartum condition', with the exception of the condition for uterine rupture. As there is no post-partum code available under this category, we will use the codes available under the sixth-digit sub classification 'Delivered, with or without mention of antepartum condition' for this condition.

Proportion of women undergoing labour and/or delivery who experience adverse events (attributed to the hospital treating the patient when the complication developed).

Note:

- Please see section on Replicating Results for Ontario Hospitals regarding replication of results for multi-hospital episodes of care for this indicator.
- **In the denominator, labour and delivery cases must start with a delivery code of interest in the first hospitalization of the episode.**

Episodes (Numerator)		
	Criteria	Codes
Include:	Cases within denominator with:	any diagnosis type
	Endometritis	O85.002, O86.102
	Organ failure/ dysfunction*	O74.202, O75.402, O75.882*
	Sepsis	O85.002
	Uterine rupture	O71.101, O71.111, O71.181
	Eclampsia	O15.202
	Pulmonary or cardiac events (congestive heart failure, pulmonary edema, embolism)	O75.402, O99.402, O99.502
	Renal failure	O90.402
	Urinary tract infection (UTI)	O86.202
	Wound infection	O86.002
	Hemorrhage	O72.002, O72.102, O72.202
	Aspiration Pneumonitis due to anaesthesia during labour and delivery	O74.001, O74.002
AND	Episode LOS greater than provincial median of 2 days	

*Note: The codes to identify organ failure/dysfunction are not exclusive to these conditions. As a result, these codes, in particular **O75.882 Other specified complications of labour & delivery**, may also include other conditions that are not related to organ failure/dysfunction.

Cases (Denominator)		
	Criteria	Codes

Include:	All patients admitted for delivery	5.MD.50.^- 5.MD.60.^
Exclude:	General Exclusion Criteria (exclude if age < 13 or > 64 years)	(see section on General Exclusions of this report)

3.2. Readmissions

3.2.1. Readmissions: Specific Medical Conditions

Sum of readmission rates for AMI, heart failure, asthma, GI bleed, and stroke (medical)

Readmissions are defined using information from both the initial episode and the subsequent hospitalization. An episode of care is counted as having a readmission (in either the same or another Ontario acute care hospital) if all of the following criteria are met:

1. The subsequent hospitalization was for a diagnosis or procedure that was defined by an expert panel as relevant to the initial surgery;
2. the initial episode did not end with the patient signing him/herself out against medical advice (or died);
3. if the patient is admitted more than 24 hours following discharge, it is not considered a transfer and is treated as a new episode. (See 'Linking Cases Across Hospitals' in the Methodology section of this report); and,
4. if the subsequent admission was not defined as being as elective.

Readmissions are excluded if they are for procedures that constitute part of the expected care following a specific type of hospitalization, for example readmission for coronary angioplasty following an initial hospitalization for heart failure.

Note:

- For multi-hospital episodes of care, readmissions were attributed to the last hospital from which the patient was discharged before the readmission.
- As diagnosis typing is not an available field in NACRS, for all fiscal year 2006 day procedure records, the first diagnosis is assumed to be Type M and any subsequent diagnoses is assumed to be Type 1.
- The period case for eligible readmission cases for Readmissions indicators is from the end of the fiscal period to March 3 to allow for 28 days of follow-up.
- **In the denominator, medical cases must start as an inpatient case with a diagnosis of interest in the first hospitalization of the episode.**

Episodes (Numerator)		
	Criteria	Codes
Include:	AMI: Readmission occurred within 28 days of discharge	Type M diagnosis only
	AMI	I21.^, I22.^
	Other acute and subacute forms of ischemic heart disease	I20.0, I23.82, I24.^
	Old myocardial infarction	I25.2
	Angina pectoris	I20.^
	Other forms of chronic ischemic heart disease	I25.0, I25.1^, I25.3, I25.8, I25.9
	Conduction disorders	I44.^, I45.^
	Cardiac Dysrhythmias	I46.0, I46.9, I47.^, I48.^, I49.^
	Functional disturbances following cardiac surgery	I97.0, I97.1
	Pneumonia	J13, J14, J15.^, J16.^, J18.^
	Urinary tract infection	N39.0
	Asthma: Readmission occurred within 28 days of discharge	Type M diagnosis only
	Asthma	J45.^
	Empyema	J86.^
	Pulmonary collapse	J98.1
	Respiratory arrest	J96.^, R09.2
	Respiratory complications resulting from a procedure	J95.4, J95.8, J95.9
	Pneumonia	J13, J14, J15.^, J16.^, J18.^
	Heart failure: Readmission occurred within 28 days of discharge	Type M diagnosis only
	Acute myocardial infarction	I21.^
	Subsequent myocardial infarction	I22.^
	Other acute ischaemic heart diseases	I24.^
	Old myocardial infarction	I25.2
	Angina pectoris	I20.^
	Atherosclerotic heart disease	I25.1^
	Aneurysm of heart	I25.3
	Coronary artery aneurysm	I25.4
	Ischaemic cardiomyopathy	I25.5
	Silent myocardial ischaemia	I25.6
	Other forms of chronic ischaemic heart disease	I25.8
	Chronic ischaemic heart disease, unspecified	I25.9
	Atrioventricular and left bundle-branch block	I44.^
	Other conduction disorders	I45.^
	Paroxysmal tachycardia	I47.^
	Atrial fibrillation and flutter	I48.^
	Ventricular fibrillation and flutter	I49.0^
	Atrial premature depolarization	I49.1
	Junctional premature depolarization	I49.2
	Ventricular premature depolarization	I49.3
	Other and unspecified premature depolarization	I49.4

	Sick sinus syndrome	I49.5
	Other specified cardiac arrhythmias	I49.8
	Cardiac arrhythmia, unspecified	I49.9
	Cardiac arrest with successful resuscitation	I46.0
	Cardiac arrest, unspecified	I46.9
	Acute bronchitis	J20.^
	Acute bronchiolitis	J21.^
	Pneumonia	J13, J14, J15.^, J16.^, J18.^
	GI bleed: Readmission occurred within 7 days of discharge	Type M diagnosis only
	Gastric ulcer, acute with haemorrhage	K25.0
	Gastric ulcer, acute with both haemorrhage and perforation	K25.2
	Gastric ulcer, chronic or unspecified with haemorrhage	K25.4
	Gastric ulcer, chronic or unspecified with both haemorrhage and perforation	K25.6
	Duodenal ulcer, acute with haemorrhage	K26.0
	Duodenal ulcer, acute with both haemorrhage and perforation	K26.2
	Duodenal ulcer, chronic or unspecified with haemorrhage	K26.4
	Duodenal ulcer, chronic or unspecified with both haemorrhage and perforation	K26.6
	Peptic ulcer, acute with haemorrhage	K27.0
	Peptic ulcer, acute with both haemorrhage and perforation	K27.2
	Peptic ulcer, chronic or unspecified with haemorrhage	K27.4
	Peptic ulcer, chronic or unspecified with both haemorrhage and perforation	K27.6
	Gastrojejunal ulcer, acute with haemorrhage	K28.0
	Gastrojejunal ulcer, acute with both haemorrhage and perforation	K28.2
	Gastrojejunal ulcer, chronic or unspecified with haemorrhage	K28.4
	Gastrojejunal ulcer, chronic or unspecified with both haemorrhage and perforation	K28.6
	Haematemesis	K92.0
	Melaena	K92.1
	Gastrointestinal haemorrhage, unspecified	K92.2
	Pneumonia	J13, J14, J15.^, J16.^, J18.^
	Stroke: Readmission occurred within 28 days of discharge	Type M diagnosis only
	Thrombophlebitis migrans	I82.1
	Embolism and thrombosis of vena cava	I82.2
	Embolism and thrombosis of renal vein	I82.3
	Embolism and thrombosis of other specified veins	I82.8
	Embolism and thrombosis of unspecified vein	I82.9
	Haematemesis	K92.0

	Melaena	K92.1
	Gastrointestinal haemorrhage, unspecified	K92.2
	Cardiac arrest with successful resuscitation	I46.0
	Cardiac arrest, unspecified	I46.9
	Respiratory failure, not elsewhere classified	J96.^
	Kwashiorkor	E40
	Marasmic kwashiorkor	E42
	Nutritional marasmus	E41
	Unspecified severe protein-energy malnutrition	E43
	Protein-energy malnutrition of moderate and mild degree	E44.^
	Retarded development following protein-energy malnutrition	E45
	Unspecified protein-energy malnutrition	E46
	Volume depletion	E86.^
	Acute renal failure	N17.^
	Malfunction of external stoma of urinary tract	N99.5^
	Other postprocedural disorders of genitourinary system	N99.8
	Postprocedural disorder of genitourinary system, unspecified	N99.9
	Postprocedural renal failure	N99.0
	Fever of unknown origin	R50.^
	Pneumonitis due to food and vomit	J69.0
	Pulmonary embolism without mention of acute cor pulmonale	I26.9
	Decubitus ulcer	L89.^
	Gangrene, not elsewhere classified	R02
	Urinary tract infection, site not specified	N39.0
	Convulsions, not elsewhere classified	R56.^
	Epidemic louse-borne typhus fever due to Rickettsia prowazekii	A75.0
	Recrudescent typhus [Brill's disease]	A75.1
	Typhus fever due to Rickettsia typhi	A75.2
	Typhus fever due to Rickettsia tsutsugamushi	A75.3
	Typhus fever, unspecified	A75.9
	Spotted fever [tick-borne rickettsioses]	A77.^
	Intracerebral haemorrhage	I61.^
	Cerebral infarction due to thrombosis of precerebral arteries	I63.0
	Cerebral infarction due to embolism of precerebral arteries	I63.1
	Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries	I63.2
	Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction	I65.^
	Occlusion and stenosis of cerebellar arteries	I66.3
	Cerebral infarction due to thrombosis of cerebral arteries	I63.3
	Cerebral infarction due to embolism of cerebral arteries	I63.4
	Cerebral infarction due to unspecified occlusion or	I63.5

	stenosis of cerebral arteries	
	Other cerebral infarction	I63.8
	Cerebral infarction, unspecified	I63.9
	Occlusion and stenosis of middle cerebral artery	I66.0
	Occlusion and stenosis of anterior cerebral artery	I66.1
	Occlusion and stenosis of posterior cerebral artery	I66.2
	Occlusion and stenosis of multiple and bilateral cerebral arteries	I66.4
	Occlusion and stenosis of other cerebral artery	I66.8
	Occlusion and stenosis of unspecified cerebral artery	I66.9
	Stroke, not specified as haemorrhage or infarction	I64
	Pneumonia	J13, J14, J15.^, J16.^, J18.^
Exclude:	Elective admissions	Admission Category not equal to "L"
	Heart failure:	
	Bypass, coronary arteries	1.IJ.76.^
	Dilation, coronary arteries or Pharmacotherapy (local), vessels of heart	1.IJ.50.^, 1.IJ.57.^, 1.IL.35.^
	Implantation of internal device, epicardium	1.HB.53.^
	Management of internal device, epicardium	1.HB.54.^
	Implantation of internal device, endocardium	1.HD.53.^
	Management of internal device, endocardium	1.HD.54.^
	Implantation of internal device, heart NEC	1.HZ.53.^
	Stroke:	
	Extraction, carotid artery	1.JE.57.^

Cases (Denominator)		
	Criteria	Codes
Include:	AMI	I21.^, I22.^ (Diagnosis Type M (but not type M and 2) or Type 1, W, X, Y ¹ (with another diagnosis type M and 2) or coronary artery disease (CAD) I25.0, I25.1^, I25.8, I25.9 as type M, AMI as type 1, W, X, Y, along with percutaneous coronary intervention (PCI) 1.IJ.50.^, 1.IJ.57.GQ.^ or coronary artery bypass graft (CABG) 1.IJ.76.^
	Heart failure*	I50.^, I26.0, I27.9
	Asthma*	J45.^
	GI Bleed*	K92.0, K92.1, K92.2, K25.0, K25.2, K25.4, K25.6, K26.0,

		K26.2, K26.4, K26.6, K27.0, K27.2, K27.4, K27.6, K28.0, K28.2, K28.4, K28.6
	Stroke [*]	I60.^, I61.^, I62.^, I63.^, I64
Exclude:	Readmissions that followed a discharge where the patient signed him/herself out or the patient died	Discharge Disposition Code not equal to 6 (sign out), 7 (death), or 9 (stillbirth)
	General Exclusion Criteria	(see the Methodology section of this report)

¹ W, X, Y are diagnosis codes associated with first/second/third service transfers

*Patients were included in the diagnostically defined groups if the diagnosis of interest was coded as a type M diagnosis. However, since the goal was to identify conditions that developed before hospital admissions, if the M-diagnosis was also listed on the discharge abstract as a type 2 diagnosis, indicating that the most responsible condition developed after admission, the patient was excluded from the analysis. In order to identify patients who might have been admitted with the diagnosis of interest, but who had developed another most responsible diagnosis after admission, patients were also included if another diagnosis was coded as a type M *and* a type 2 (indicating that the M-diagnosis developed after admission) and the diagnosis of interest was coded as a type 1.

3.2.2. Readmissions: Specific Surgical Procedures

Sum of readmission rates for cholecystectomy, hysterectomy, and prostatectomy (surgical)

Readmissions are defined using information from both the initial episode and the subsequent hospitalization. An episode of care is counted as having a readmission (in either the same or another Ontario acute care hospital) if all of the following criteria are met:

1. The subsequent hospitalization was for a diagnosis or procedure that was defined by an expert panel as relevant to the initial surgery;
2. the initial episode did not end with the patient signing him/herself out against medical advice (or died);
3. if the patient is admitted more than 24 hours following discharge, it is not considered a transfer and is treated as a new episode (See 'Linking Cases Across Hospitals' in the Methodology section of this report); and,
4. if the subsequent admission was not defined as being as elective.

Note:

- For multi-hospital episodes of care, readmissions were attributed to the last hospital from which the patient was discharged before the readmission.
- All possible 20 procedures on the discharge abstract are included in the analysis for this indicator.
- As diagnosis typing is not an available field in NACRS, for all fiscal year 2006 day procedure records, the first diagnosis is assumed to be Type M and any subsequent diagnoses is assumed to be Type 1.
- The period case for eligible readmission cases for Readmissions indicators is from the end of the fiscal period to March 3 to allow for 28 days of follow-up.
- **In the denominator, surgical cases can start as either an inpatient or day procedure case with a procedure of interest in the first hospitalization of the episode.**

Episodes (Numerator)		
	Criteria	Codes
Include:	Cholecystectomy: Readmission occurred within 28 days of discharge	Type M diagnosis only
	Haemorrhage and haematoma complicating a procedure, not elsewhere classified	T81.0
	Accidental puncture and laceration during a procedure, not elsewhere classified	T81.2

	Emphysema (subcutaneous) resulting from a procedure	T81.81
	Other complications of procedures, not elsewhere classified	T81.88
	Other postprocedural disorders of circulatory system, not elsewhere classified	I97.8
	Postprocedural disorder of circulatory system, unspecified	I97.9
	Other functional disturbances following cardiac surgery	I97.1
	Mendelson's syndrome	J95.4
	Other postprocedural respiratory disorders	J95.8^
	Postprocedural respiratory disorder, unspecified	J95.9
	Postoperative intestinal obstruction	K91.3
	Other postprocedural disorders of digestive system, not elsewhere classified	K91.8
	Postprocedural disorder of digestive system, unspecified	K91.9
	Paralytic ileus	K56.0
	Drainage, gallbladder	1.OD.52.^
	Extraction, gallbladder	1.OD.57.^
	Bypass, gallbladder	1.OD.76.^
	Repair, gallbladder	1.OD.80.^
	Closure of fistula, gallbladder	1.OD.86.^
	Excision total, gallbladder	1.OD.89.^
	Installation of external appliance, bile ducts	1.OE.37.^
	Management of external appliance, bile ducts	1.OE.38.^
	Dilation, bile ducts	1.OE.50.^
	Drainage, bile ducts	1.OE.52.^
	Management of internal device, bile ducts	1.OE.54.BA-TS
	Extraction, bile ducts	1.OE.57.^
	Destruction, bile ducts	1.OE.59.BA-AS
	Bypass, bile ducts	1.OE.76.^
	Repair, bile ducts	1.OE.80.^
	Construction or reconstruction, bile ducts	1.OE.84.^
	Closure of fistula, bile ducts	1.OE.86.^
	Excision partial, bile ducts	1.OE.87.^
	Excision total, bile ducts	1.OE.89.^
	Hysterectomy: Readmission occurred within 7 or 28 days of discharge	Type M diagnosis only
	Acute post-hemorrhagic anemia - 28 days	D62
	Paralytic ileus - 28 days	K56.0, K56.7
	Cardiac complications during or resulting from a procedure - 28 days	I97.8, I97.9
	Respiratory complications resulting from a procedure - 28 days	J95.4, J95.8, J95.9
	Urinary tract infection, site not specified - 7 days	N39.0
	Retention of urine - 7 days	R33, R39.12
	Postoperative infection – 28 days	T81.4
	Prostatectomy: Readmission occurred within 28 days of discharge	Type M diagnosis only
	Operations on the Ureter	1.PE.50.^, 1.PE.52.^,

		1.PE.54.^, 1.PE.55.^, 1.PE.56.^, 1.PE.57.^, 1.PE.59.^, 1.PE.76.^, 1.PE.77.^, 1.PE.80.^, 1.PE.82.^, 1.PE.87.^, 1.PG.50.^, 1.PG.52.^, 1.PG.54.^, 1.PG.55.^, 1.PG.56.^, 1.PG.57.^, 1.PG.59.^, 1.PG.72.^, 1.PG.74.^, 1.PG.76.^, 1.PG.77.^, 1.PG.80.^, 1.PG.82.^, 1.PG.86.^, 1.PG.87.^, 1.PG.89.^
	Operations on the urinary bladder	1.PL.50.^, 1.PL.53.^, 1.PL.54.^, 1.PL.55.^, 1.PL.59.^, 1.PL.72.^, 1.PL.74.^, 1.PL.80.^, 1.PL.87.^, 1.PM.50.^, 1.PM.52.^, 1.PM.54.^, 1.PM.55.^, 1.PM.56.^, 1.PM.57.^, 1.PM.58.^, 1.PM.59.^, 1.PM.72.^, 1.PM.77.^, 1.PM.80.^, 1.PM.82.^, 1.PM.84.^, 1.PM.86.^, 1.PM.87.^, 1.PM.89.^, 1.PM.90.^, 1.PM.91.^, 1.PM.92.^
	Operations on the urethra	1.PQ.50.^, 1.PQ.52.^, 1.PQ.53.^, 1.PQ.54.^, 1.PQ.55.^, 1.PQ.56.^, 1.PQ.57.^, 1.PQ.59.^, 1.PQ.72.^, 1.PQ.77.^, 1.PQ.78.^, 1.PQ.80.^, 1.PQ.82.^, 1.PQ.86.^, 1.PQ.87.^, 1.PQ.89.^
	Operations on the urinary tract	1.PV.50.^, 1.PV.57.^, 1.PV.59.^, 1.PZ.94.^
	Operations on the prostate and seminal vesicles	1.QQ.52.^, 1.QQ.87.^, 1.QQ.89.^, 1.QT.59.^, 1.QT.87.^, 1.QT.91.^, 1.QZ.94.^
	Intestinal infections, other specified bacteria	A04.5, A04.6, A04.7, A04.8
	Urinary tract infection, site not specified	N39.0
	Hematuria	N02.^, R31.^
	Prostatic hypertrophy	N40
	Retention of urine	R33, R39.12
	Cardiac complications during or resulting from a procedure	I97.8, I97.9
	Respiratory complications resulting from a procedure	J95.4, J95.8, J95.9
	Postoperative infection	T81.4
	Pneumonia	J13, J14, J15.^, J16.^,

		J18.^
Exclude:	Elective admissions	Admission Category not equal to "L"

Cases (Denominator)		
	Criteria	Codes
Include:	Cholecystectomy	1.OD.89.^
	Hysterectomy	1.RM.89.^, 1.RM.91.^, or 1.RM.87.^ with extent attribute = 'SU'
	Prostatectomy	1.QT.59.^, 1.QT.87.^
Exclude:	Readmissions that followed a discharge where the patient signed him/herself out or the patient died	Discharge Disposition Code not equal to 6 (sign out), 7 (death), or 9 (stillbirth)
	General Exclusion Criteria	(see the Methodology section of this report)
	<i>For Hysterectomy cases ONLY:</i> Pelvic exenteration Major procedures in pregnancy or childbirth	1.RM.89.^, 1.RM.91.^, or 1.RM.87.^ with extent attribute = 'SU' with CMG 575 CMG 600
	<i>For Prostatectomy cases ONLY:</i> Radical prostatectomy	1.QT.59.^, 1.QT.87.^ with I.QT.91.^

3.2.3. Readmissions: Labour and Delivery

Rate of hospital readmissions within 14 days of discharge in women undergoing labour and delivery for all deliveries - attributed to the first hospital in the episode of care.

Note:

- Please see section on Replicating Results for Ontario Hospitals for notes regarding replication of results for multi-hospital episodes of care for this indicator.
- The period case for eligible readmission cases for Readmissions indicators is from the end of the fiscal period to March 17 to allow for 14 days of follow-up.
- **In the denominator, labour and delivery cases must start with a delivery code of interest in the first hospitalization of the episode.**

Episodes (Numerator)		
	Criteria	Codes
Include:	Cases within denominator:	Diagnosis type M (not a type M and 2)
	Readmission related to initial labour and delivery within 14 days of discharge	
	Pre-existing hypertension complicating pregnancy, childbirth and the puerperium	O10.^04
	Pre-existing hypertensive disorder with superimposed proteinuria	O11.004
	Gestational [pregnancy-induced] oedema and proteinuria without hypertension	O12.^04
	Gestational [pregnancy-induced] hypertension without significant proteinuria	O13.004
	Gestational [pregnancy-induced] hypertension with significant proteinuria	O14.004
	Eclampsia	O15.204
	Unspecified maternal hypertension	O16.004
	Pre-existing diabetes mellitus, Type 1	O24.504
	Pre-existing diabetes mellitus, Type 2	O24.604
	Pre-existing diabetes mellitus of other or unspecified specified type in pregnancy	O24.704
	Diabetes mellitus arising in pregnancy (gestation)	O24.804
	Malnutrition in pregnancy	O25.004
	Maternal care for other conditions predominantly related to pregnancy	O26.^04
	Maternal care for known or suspected abnormality of pelvic organs	O34.^04
	Perineal laceration during delivery	O70.^04
	Other obstetric trauma	O71.^04
	Postpartum haemorrhage	O72.^04
	Retained placenta and membranes, without haemorrhage	O73.^04

Episodes (Numerator)		
	Complications of anaesthesia during labour and delivery	O74.^04
	Other complications of labour and delivery, not elsewhere classified	O75.^04, O75.884
	Puerperal sepsis	O85.004
	Other puerperal infections	O86.^04
	Venous complications in the puerperium	O87.^04
	Obstetric embolism	O88.^04
	Complications of anaesthesia during the puerperium	O89.^04
	Complications of the puerperium, not elsewhere classified	O90.^04
	Infections of breast associated with childbirth	O91.^04
	Other disorders of breast and lactation associated with childbirth	O92.^04
	Obstetric death of unspecified cause	O95.004
	Maternal infectious and parasitic diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	O98.^04
	Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	O99.^04
	Mental and behavioural disorders associated with the puerperium, not elsewhere classified	F53.^
Exclude:	Elective readmissions	Admission category equal to 'L'

Cases (Denominator)		
	Criteria	Codes
Include:	All deliveries (Note: cases end at March 17 of the fiscal year)	5.MD.50.^- 5.MD.60.^
Exclude:	Cases where the patient signed herself out or died	Discharge Disposition Code* equal to 6 (sign out) or 7 (death)
	General Exclusion Criteria (exclude if age < 13 or > 64 years)	(see section on General Exclusions of this report)

* Note: Discharge Disposition Code = 9 (stillbirths) are normally excluded from the denominator of readmission indicators, however, since this discharge disposition code will not appear on the mother's chart, we have removed this exclusion criteria.

3.3. Appropriateness

3.3.1 Appropriateness: Access to Coronary Angiography for Patients with Acute myocardial infarction

Rate of patients with acute myocardial infarction who receive coronary angiography within the episode of care

Note:

- For multi-hospital episodes of care, the technology use was attributed to the hospital to which the patient was admitted at the beginning of the episode of care. Please see section on Replicating Results by Ontario Hospitals for notes regarding replication of results for multi-hospital episodes of care for this indicator. If there are multiple episodes of AMI for a patient, only the first episode of AMI is counted.

- In the denominator, AMI cases must start as an inpatient case.

Episodes (Numerator)		
	Criteria	Codes
Include:	Cases within denominator with:	
	Coronary angiography	3.IP.10.^

Cases (Denominator)		
	Criteria	Codes
Include:	Acute Myocardial Infarction (AMI)	I21.^, I22.^ (Diagnosis Type M (but not type M and 2) or Type 1, W, X, Y ¹ (with another diagnosis type M and 2) or coronary artery disease (CAD) I25.0, I25.1^, I25.8, I25.9 as type M, AMI as type 1, W, X, Y, along with percutaneous coronary intervention (PCI) 1.IJ.50.^, 1.IJ.57.GQ.^ or coronary artery bypass graft (CABG) 1.IJ.76.^
Exclude:	General Exclusion Criteria (exclude if age < 15 or > 84 years)	(see the Methodology section of this report)
	Chronic renal failure/hepatic failure	K72.1, N18.^ (any diagnosis

Cases (Denominator)		
	Dementia	F00.^, F01.^, F02.^, F03 (any diagnosis type on abstract)
	Certain Mental Disorders	F04, F05.^, F06.^, F07.^, F09, F10.^, F11.^, F12.^, F13.^, F14.^, F15.^, F16.^, F17.^, F18.^, F19.^, F20.^, F21, F22.^, F23.^, F24, F25.^, F28, F29, F30.^, F31.^, F34.^, F38.^, F39, F40.^, F41.^, F42.^, F43.^, F44.^, F45.^, F48.^, F50.^, F51.^, F52.^, F53.^, F54, F55, F59, F60.^, F61, F62.^, F63.^, F64.^, F65.^, F66.^, F68.^, F69, F70.^, F71.^, F72.^, F73.^, F78.^, F79.^, F80.^, F81.^, F82, F83, F84.^, F88, F89, F90.^, F91.^, F92.^, F93.^, F94.^, F95.^, F98.^, F99 (any diagnosis type on the abstract)

¹ W, X, Y are diagnosis codes associated with first/second/third service transfers

4. Performance Rating

Performance allocation categories of ‘above average’, ‘provincial average’, or ‘below average’ are assigned using confidence intervals around the hospital’s risk-adjusted value (assessed against the provincial average, which serves as the benchmark).

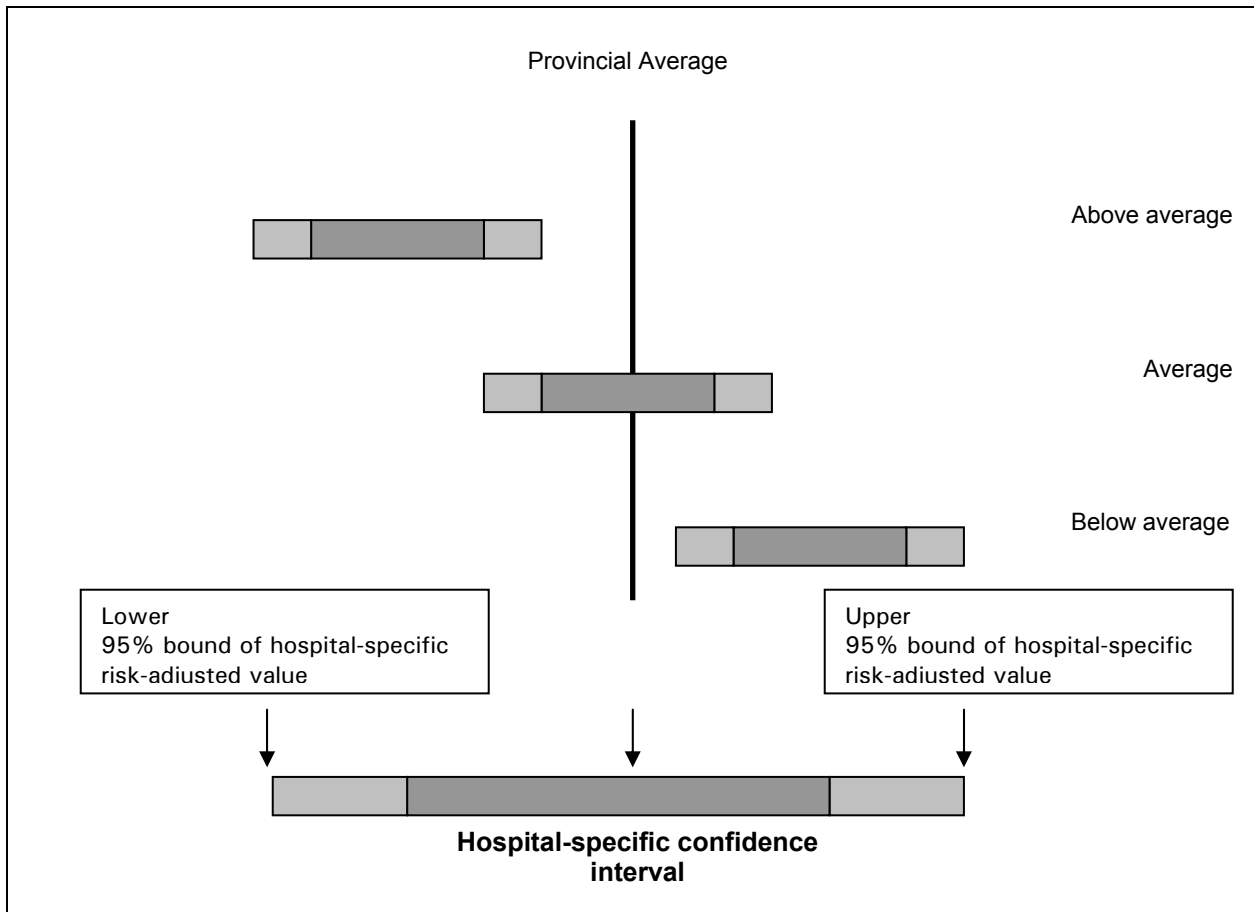
For these indicators, a lower value indicates better performance (except Access to Angiography, where a higher rate is preferable). However, no single set of measures should be taken as representative of overall hospital performance. For all indicators except Access to Angiography, performance allocations are assigned as follows:

- If the lower bound of the confidence interval of the hospital’s specific risk-adjusted value is above the provincial average, that hospital is classified as having *below average performance*.

- If the upper and lower bounds of the confidence interval of the hospital's specific risk-adjusted value surround the provincial average value, the hospital is classified as having *average performance*.
- If the upper bound of the confidence interval of the hospital's specific risk-adjusted value is below the provincial average value, that hospital is classified as having *above average performance*.

The reverse is true for the Access to Angiography indicator (i.e. when the lower bound of the confidence interval is greater than the provincial average, the hospital is considered to be '*above average performance*'). Figure 1 illustrates the methods used for assigning performance for these indicators.

Figure 1: Performance Rating Methodology for Clinical Utilization and Outcomes Indicators



In some hospitals, the low volume of specific types of care may raise issues of confidentiality for patients or physicians, or may put the hospital in a position where a small number of events could have a large impact on observed rates. Sample size affects performance allocations, especially for rare event-type indicators such as rates of adverse events and readmissions; hospitals with small numbers of patients may not have an adequate sample size to achieve above or below average performance (i.e. the resulting confidence interval is wide and therefore more likely to contain the provincial average). Performance allocations in this case, therefore, may be an artifact of small numbers, as opposed to a true reflection of performance. In particular, hospitals with zero events for readmissions or adverse events, may be classified as average performers not so much as a reflection of their true performance, but rather because sufficiently large numbers of other small hospitals had similar rates. In *Hospital e-Scorecard Report 2008: Acute Care*, hospitals are assigned a score of not reportable ('NR') in the following cases:

- If case volumes were less than five for a given patient group.

- For medical cases, if there were fewer than two 'most responsible physicians' providing care to patients within the patient group for the given indicator.
- For surgical cases, if there were fewer than two 'most responsible surgeons/physicians', OR fewer than five surgeons/anaesthetists/physicians involved in the care of patients within the patient group for the given indicator.
- If a high proportion of a hospital's AMI patients are transferred to Manitoba for angiography (and that hospital would have appeared to be 'below average' because of this), that hospital will not receive a performance rating for Access to Angiography, however, their rate will be available in the e-Scorecard.

Note: Since only care provided in Ontario is captured in this report, data on angiographies provided in Manitoba is not included, therefore, hospitals that transferred a high proportion of patients to Manitoba appeared to have a lower rate of Access to Angiography.

Due to limitations in coding of providers in NACRS, physician confidentiality is based on inpatient activity only.

5. Calculating Confidence Intervals

95% confidence intervals around the adjusted values were calculated from the Poisson distribution when the observed numerators were less than 100. Otherwise, the confidence intervals were calculated using Byar's approximation².

When 95% confidence intervals proved to be too stringent or too lenient to yield a reasonable amount of variation in the performance ratings, other confidence intervals were used instead.

The following table reports the confidence intervals that were used for each indicator.

Table 3: Indicator-specific Confidence Intervals

Indicator	Confidence Interval
Readmissions: Specific Medical Conditions	95%
Readmissions: Specific Surgical Procedures	95%
Readmissions: Labour and Delivery	95%
Adverse Events: Nurse-sensitive Medical	95%
Adverse Events: Nurse-sensitive Surgical	95%
Adverse Events: Labour and Delivery	99.99%
Access to Angiography	99%

² N. E. Breslow, N. E. Day, *Statistical Methods in Cancer Research: Volume II – The Design and Analysis of Cohort Studies* (Lyon: International Agency for Research on Cancer, 1987).

6. Risk-Adjustment

In comparing hospital rates of utilization and outcomes, it is important to take into account differences in patient characteristics that may vary systematically among hospitals. In clinical research this is called risk-adjustment, where hospital data are adjusted to remove pre-existing influences. This issue is particularly important because patients with certain characteristics are less likely to receive some specific treatments or to have positive clinical outcomes than other groups. If a hospital tends to serve a disproportionate number of such patients, it may be unfairly reported as having higher rates of undesirable events, when in fact, these rates may be comparable to another hospital with lower instances that simply serves a different population. Therefore, to improve hospital comparability, appropriate risk-adjustment techniques were used to adjust the data.

It is important to emphasize that risk-adjustment attempts to control for, but cannot entirely eliminate, the impact of differences in patients' pre-admission health status on performance. There are two key caveats to risk-adjustment. First, the expected performance is a relative measure. It describes the expected level of performance at an institution based on how well all institutions perform. Second, risk-adjustment only *reduces* the effect of differences in the patient population across hospitals; it cannot eliminate the effect of these differences completely. As a result, hospitals with the sickest patients may tend to score more poorly than other institutions, even after risk-adjustment. Likewise, hospitals that treat rare or highly specialized groups of patients may tend to score poorly, even after risk-adjustment. It is important to keep these caveats in mind when comparing hospital performance.

For each of the CUO indicators, risk adjustment variables and techniques were selected on the basis of appropriateness and viability (i.e. sufficient numbers of events).

Given the rarity of events across many of the clinical and utilization health indicators, standard modeling techniques were deemed inadequate for purposes of risk adjustment. In order to compensate for indicators with rare events (< 5%), models better suited for this purpose were chosen. Two such models, Poisson and Negative Binomial regressions were used in the risk adjustment, subject to specific model criteria being met. For example when over-dispersion was evident, the Negative Binomial model was used. Otherwise the Poisson model was employed. In addition, when sufficient events were available (> 5%), logistic regression was the model of choice. In order to define the general framework for modeling purposes, all variables were categorized, and subsequently aggregated according to common patient characteristics. The specific type of model (distribution and link) used in the risk adjustment is described within the following tables. The link describes the functional relationship between the outcome and the linear combination of the predictor variables.

Candidate variables in each of the models consisted of gender, age and Elixhauser co-morbidity variables. The Elixhauser co-morbidities are comprised of 30 disease groups (i.e. Pneumonia, Asthma, CHF, etc). For each of the indicators, the corresponding variables used for risk adjustment are listed.

Models for Adverse Events: Nurse-sensitive Medical		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
AMI	Age	0-69, 70 +
	Gender	Female, Male
	Chronic Pulmonary Disease	J40,J41,J42,J44,J43.0,J43.1,J43.2 J43.8,J43.9,J45.0,J45.1,J45.8,J45.9, J47,J67.0,J44.0,J60,J61,J62,J63,J66, J65,J68.4
	Cardiac Arrhythmia	I44.3, I44.7, I44.6, I45.1, I45.9, I45.6, I45.8, I47.1, I47.9, I48.0, I48.1, I49.9, R00.0, Z95.0, Z45.0
	Renal Failure	N19.^, N17.0, N17.1, N17.2, N17.8, N17.9, N18.0, N18.1, N18.2, N18.8, N18.9, Z94.0, Z99.2, Z49.1, Z49.2
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Heart Failure	Age	0-74, 75 +
	Gender	Female, Male
	Hypertension (complicated)	I11.^, I13.^ N18.^, N19.^, I50.0, I15.00, I15.01, I15.80, I15.81, I15.90, I15.91
	Renal Failure	N19.^, N17.0, N17.1, N17.2, N17.8, N17.9, N18.0, N18.1, N18.2, N18.8, N18.9, Z94.0, Z99.2, Z49.1, Z49.2
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Asthma	N/A	
GI Bleed	Age	0-69, 70 +
	Gender	Female, Male
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Stroke	Age	0-74, 75 +
	Gender	Female, Male
	Renal Failure	N19.^, N17.0, N17.1, N17.2, N17.8, N17.9, N18.0, N18.1, N18.2, N18.8, N18.9, Z94.0, Z99.2, Z49.1, Z49.2

Models for Adverse Events: Nurse-sensitive Medical		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
	Paralysis	G81.0, G81.1, G81.9, G80.0, G80.1, G80.2, G80.3, G80.4, G80.8, G80.9, G83.0, G83.1, G83.2, G83.3, G83.4, G83.5, G83.8, G83.9
	Deficiency Anemia	D51.^, D52.^, D53.^, D50.1, D50.8, D50.9, D64.9
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log

Models for Adverse Events: Nurse-sensitive Surgical		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
Cholecystectomy	Age	0-49, 50 +
	Gender	Female, Male
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Hysterectomy	N/A	
Prostatectomy	Age	0-69, 70 +
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log

Models for Adverse Events: Labour and Delivery		
Indicators	Variables or Pre-Existing Conditions	Age Categories or ICD-10-CA and Other Codes
Rate of adverse events for patients undergoing labour and delivery	Age	< 35, > = 35
	Cardiac Arrhythmia	I44.3, I44.7, I44.6, I45.1, I45.9, I45.6, I45.8, I47.1, I47.9, I48.0, I48, I49.9, R00.0, Z95.0, Z45.0
	Neurological Disorders	G31.9, G20, G10, G25.5, G11.0, G11.1, G11.2, G11.3, G11.4, G11.8, G11.9, G12.0, G12.1, G12.2, G12.9, G35, G37.0, G37.8, G37.9, G40.3, G40.1, G40.2, G40.8, G40.9, G93.1, G93.4, R56.0, R56.8, R47.0
	Gestational Diabetes	O24.5, O24.6, O24.7, O24.8
	Hypothyroidism	E00.0, E00.1, E00.2, E00.3, E00.4, E00.5, E00.8, E00.9, E03.0, E03.1, E03.2, E03.8, E03.9, E89.0
	Coagulation Disorders	D66, D69.1, D69.30, D69.38, D69.4, D69.5, D69.6
	Obesity	E66.8
	Blood Loss/ Deficiency Anemia	D50.0, D50.8, D50.1, D50.9, D64.9 D51, D53, D52
	Depression	F34.1, F34.0, F43.2, F32.9
	Risk-Adjustment Model Distribution	Poisson
Risk-Adjustment Model Link	Log	

Models for Readmissions: Specific Medical Conditions		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
AMI	Age	0-64, 65 +
	Gender	Female, Male
	Renal Failure	N19.^, N17.0, N17.1, N17.2, N17.8, N17.9, N18.0, N18.1, N18.2, N18.8, N18.9, Z94.0, Z99.2, Z49.1, Z49.2
	Diabetes (Complicated)	E10.2, E10.3, E10.4, E10.5, E11.2, E11.3, E11.4, E11.5, E13.2, E13.3, E13.4, E13.5, E14.2, E14.3, E14.4, E14.5
	Risk-Adjustment Model Distribution	Binomial*
	Risk-Adjustment Model Link	Logit*
Heart Failure	Age	0-74, 75 +
	Gender	Female, Male

Models for Readmissions: Specific Medical Conditions		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
	Chronic Pulmonary Disease	J40.^, J41.^, J42.^, J44.^, J47.^, J60.^, J61.^, J62.^, J63.^, J65.^, J66.^, J43.0, J43.1, J43.2, J43.8, J43.9, J44.0, J45.0, J45.1, J45.8, J45.9, J67.0, J68.4
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
GI Bleed	Age	0-69, 70 +
	Gender	Female, Male
	Anemia	D50.0, D50.8, D50.1, D50.9, D64.9, D51.^, D52.^, D53.^
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Asthma	Age	0-44, 45 +
	Gender	Female, Male
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Stroke	Age	0-69, 70 +
	Gender	Female, Male
	Hypertension (complicated)	I11^, I13^, N18^, N19^, I50.0, I150.1, I15.00, I15.80, I15.81, I15.90, I15.91
	Diabetes	E10.10, E10.2, E10.3, E10.4, E10.5, E10.9, E11.0, E11.10, E11.2, E11.3, E11.4, E11.5, E11.9, E13.0, E13.10, E13.2, E13.3, E13.4, E13.5, E13.9, E14.0, E14.10, E14.2E14.3, E14.4, E14.5, E14.9
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log

* Logistic Regression was used for this model.

Models for Readmissions: Specific Surgical Procedures		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
Cholecystectomy	Age	0-49, 50 +
	Gender	Female, Male
	Risk-Adjustment Model Distribution	Poisson

Models for Readmissions: Specific Surgical Procedures		
Indicator Component	Variables or Pre-Existing Conditions	ICD-10-CA and other codes
	Risk-Adjustment Model Link	Log
Hysterectomy	Age	0-44, 45 +
	Diabetes	E10.10, E10.2, E10.3, E10.4, E10.5, E10.9, E11.0, E11.10, E11.2, E11.3, E11.4, E11.5, E11.9, E13.0, E13.10, E13.2, E13.3, E13.4, E13.5, E13.9, E14.0, E14.10, E14.2E14.3, E14.4, E14.5, E14.9
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log
Prostatectomy	Age	0-69, 70 +
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log

Models for Readmissions: Labour and Delivery		
Indicators	Variables or Pre-Existing Conditions	Age Categories or ICD-10-CA and Other Codes
Rate of 14-day unplanned total readmissions for patients undergoing labour and delivery	Age	< 35, > = 35
	Gestational Diabetes	O24.5, O24.6, O24.7, O24.8
	Hypothyroidism	E00.0, E00.1, E00.2, E00.3, E00.4, E00.5, E00.8, E00.9, E03.0, E03.1, E03.2, E03.8, E03.9, E89.0
	Obesity	E66.8
	Depression	F34.1, F34.0, F43.2, F32.9
	Risk-Adjustment Model Distribution	Poisson
	Risk-Adjustment Model Link	Log

Models for Indicators – Cardiac Care		
Indicators	Variables or Pre-Existing Conditions	Age Categories or ICD-10-CA and Other Codes
Rate of access to coronary angiography	Gender	Female, Male
	Age	Females: < 65, > = 65, Males: < 55, > = 55

Models for Indicators – Cardiac Care		
Indicators	Variables or Pre-Existing Conditions	Age Categories or ICD-10-CA and Other Codes
	Congestive Heart Failure	I50.0,I50.1,I50.9
	Conduction Disorders	I44.3,I44.7,I44.6,I45.1,I45.9, I45.6,I45.8,I47.1,I47.9,I48.0, I48,I49.9,R00.0,Z95.0,Z45.0
	Chronic Pulmonary Disease	J40,J41,J42,J44,J43.0,J43.1,J43.2 J43.8,J43.9,J45.0,J45.1,J45.8,J45.9,J47,J 67.0,J44.0,J60,J61,J62,J63,J66,J65,J68.4
	Diabetes	E10.10, E10.2, E10.3, E10.4, E10.5, E10.9, E11.0, E11.10, E11.2, E11.3, E11.4, E11.5, E11.9, E13.0, E13.10, E13.2, E13.3, E13.4, E13.5, E13.9, E14.0, E14.10, E14.2, E14.3, E14.4, E14.5, E14.9
	Renal Failure	N17.0,N17.1,N17.2,N17.8,N17.9, N18.0,N18.1,N18.2,N18.8,N18.9, N19,Z94.0,Z99.2,Z49.1,Z49.2
	Deficiency Anemia	D50.8, D50.1, D50.9, D50.9, D51, D52, D53, D64.9
	Risk-Adjustment Model Distribution	Binomial*
	Risk-Adjustment Model Link	Logit*

* Logistic Regression was used for this model.

In order to produce the adjusted indicator, the observed indicator rates are divided by the expected rates and adjusted to the provincial average.

7. Reporting Results by Sex

The e-Scorecard includes hospital-level risk-adjusted averages and components by sex for each indicator, sex difference values $[(F-M)/F]$ for each indicator and an indication of the direction (i.e. $F > M$ or $M > F$) and the statistical significance of these values at a hospital level. The indicator quantifying the difference between rates for women and men [i.e. $(F-M)/F$] is the value of the difference between women and men attributable to sex – or a value for “equity”.

The interpretation of these data and notes about suppression will accompany this database. In terms of interpretation, if this value [i.e. $(F-M)/F$] is negative (i.e. it may be the full range of negative values to infinity), males have higher rates than females. If this value is positive (i.e. it may be positive up to a value of 1), females have higher rates than males. A value of “0” is used as the benchmark as it represents true equity between women and men. Furthermore, if a hospital’s confidence interval around their specific value of the difference between women and men for a given indicator includes zero, then the hospital is said to have no statistically significant sex difference for that indicator (which is preferred). If a hospital’s confidence interval around their specific value of the difference between women and men for a given indicator does not include zero and is negative, then the hospital is said to have unequal (i.e. $M > F$) performance or a statistically significant sex difference, in which males have a higher rate than females. If a hospital’s confidence interval around their specific value of the difference between women and men for a given indicator does not include zero and is positive, then the hospital is said to have unequal ($F > M$) performance or a statistically significant sex difference, in which females have a significantly higher rate than males.

Appendix A

Transfer Criteria				
<p>In episode building, the hospitalizations for each patient’s health care number throughout the fiscal year are sorted in order (mostly by ascending discharge date). Certain data elements are compared between the previous hospitalization and the next (i.e. “current”) hospitalization to determine whether the current record should be linked as a transfer. Among the data elements that are reviewed, we look at “transfer to/from institution type” which are data elements derived from the “transfer to/from institution number” submitted by the hospital on the abstract.</p> <p>If a current hospitalization meets (Criteria 1 and Criteria 2A) or (Criteria 1 and Criteria 2B), then the current hospitalization is a transfer.</p>				
Data Elements				
Previous Hospitalization:	Discharge Date and Discharge Time	Transfer to Institution Type	Institution Type	Discharge Disposition
Current Hospitalization:	Admitting Date and Admitting Time	Transfer from Institution Type	Institution Type	/
Criteria 1				
Difference (Current Admitting Date/Time & Previous Discharge Date/Time) is within 24 hours				
Criteria 2				
Criteria 2A	Transfer to Institution Type*= ‘1’, ‘A’, or ‘N’ (previous hospitalization)	Institution Type = ‘1’ or ‘A’ (current hospitalization)*	Discharge Disposition** = ‘01’ or ‘03’ ** (previous hospitalization)	
Criteria 2B	Transfer from Institution Type*= ‘1’, ‘A’, or ‘N’ (current hospitalization)	Institution Type = ‘1’ or ‘A’ (previous hospitalization)*	/	

*‘1’ = acute, ‘A’ or ‘N’ = day procedure

** ‘01’ = transferred to an acute care inpatient institution, ‘03’ = transferred to other (includes ambulatory care).