Technical Notes: Recommended Quality Indicators (QI) for Non-Cardiac Vascular QBPs

Cardiac Care Network & Ministry of Health and Long-Term Care

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Revision #1: September 2013

Revision #2: January 2014

Ontario

1 Aortic Aneurysm Repair (Year 1)

A. Risk-Adjusted In-Hospital Mortality Rate

Definition

This indicator measures the rate of deaths in-hospital for patients who were admitted for a planned procedure (same stay) and underwent an intervention(s) for Abdominal/Thoracic Aortic Aneurysm Repair (by type of intervention, surgery or endovascular and by anatomy). The adjusted mortality rates represent the mortality rate that would be expected for a hospital if it had the same case-mix (patient profiles) as the province.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases (non-ruptured) only 7. Deaths occurring during the same admission	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix A and A-1: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L 7. Discharge Disposition = 07, 05/05 (Group/Field)
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = "" 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is recommended by the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Risk Factors

Objective: Inpatient deaths only with the following pre-admit co-morbidities:

1. Age: data available
2. Gender: data available
3. Chronic renal insufficiency: data available
4. Congestive Heart Failure (CHF): data available
5. History of Coronary Artery Disease: data available
6. Chronic Obstructive Pulmonary Disease (COPD): data available
7. Cirrhosis of the Liver: data available
8. Significant Aortic Valve Stenosis: data available
9. Pulmonary Hypertension: data available
10. Peripheral Vascular Disease: data available
11. LV Ejection Fraction (developmental)
12. Ethnicity (developmental)

Note: It is the consensus of the Non-Cardiac Vascular QBP Technical Working Group that going-forward, the Ministry of Health & Long-Term Care (MOHLTC) should ensure that the provincial data sets + covariates (coefficients) are made available to hospitals to monitor and evaluate outcomes. For risk factors under development, it is recommended going-forward that once they are available for capture in a defined administrative database; they should be included in the methodological approach to enhance comparability and robustness.

Methodology

Hierarchal method (patient-level, hospital-level, province-level):

1. Bivariate/multivariate analysis to understand the strength of association between risk factors and the outcome event.
2. Stepwise approach using univariate analysis within a pre-determined order to eliminate risk factors found to be non-significant (e.g. p-value <0.01).
3. Application of logistic regression model to calculate expected outcome event rates with death as the dependent variable (outcome) and independent variables (predictors), adjusted for age, gender and risk factors (as per defined patient demographics and risk factors listed above).
4. Sum of the estimates (regression coefficients) for all discharges within a hospital to total the expected values and compare against the observed values as O/E (observed/expected).
5. Benchmark: To be stratified by pathways (anatomy: thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and by the type of intervention (endovascular, open):
   a) Standard Pathway:
   - EVAR: Provincial average (upper performance standard range, +10%)
   - OPEN: Provincial average (upper performance standard range, +10%)

   b) Moderate Pathway:
   - EVAR: Provincial average (upper performance standard range, +10%)
   - OPEN: Provincial average (upper performance standard range, +10%)

   c) Advanced Pathway:
   - EVAR: Provincial average (upper performance standard range, +10%)
   - OPEN: Provincial average (upper performance standard range, +10%)

Interpretation

This indicator should be interpreted as the mortality rate a hospital would have if their patient case-mix (e.g. clinical complexity and interventions: patient profiles) is similar to the average provincial case-mix. The adjustment allows for comparison across the defined groupings to adjust for variations in age, gender and risk factors. It is a comparison of observed (actual) performance of a hospital versus the expected performance (based on the provincial average mortality).

Data Limitations

Not all risk factors such as ethnicity are currently available. Data is used as submitted to CIHI; the quality of submitted data is not screened beyond normal data quality edit checks employed by CIHI. Current diagnostic and procedural codes for thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified are not completely aligned with proposed pathways (Standard, Moderate, Advanced).

B. Total Length of Stay

Definition

This indicator measures the total length of stay (TLOS) in comparison to the HBAM Inpatient Grouper (HIG) expected length of stay (ELOS) for patients who were admitted to an acute care facility for a planned intervention concerning Abdominal/Thoracic Aortic Aneurysm Repair (by type of intervention, surgery or endovascular, and by anatomy).

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix A: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = “” 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Levels of aggregation (hospital-level, province-level) by pathways (anatomy: thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and by the type of intervention (endovascular, open) within the following benchmarks:

EVAR:

a) Standard Pathway:
- Observed: Actual total length of stay (days - TLOS), from admission to discharge
- Expected: Predicted length of stay (days - ELOS), from admission to discharge

b) Moderate Pathway:
- Observed: Actual total length of stay (days - TLOS), from admission to discharge
- Expected: Predicted length of stay (days - ELOS), from admission to discharge

c) Advanced Pathway:
- Observed: Actual total length of stay (days - TLOS), from admission to discharge
- Expected: Predicted length of stay (days - ELOS), from admission to discharge

OPEN:

a) Standard Pathway:
- Observed: Actual total length of stay (days - TLOS), from admission to discharge
- Expected: Predicted length of stay (days - ELOS), from admission to discharge

b) Moderate Pathway:
- Observed: Actual total length of stay (days - TLOS), from admission to discharge
- Expected: Predicted length of stay (days - ELOS), from admission to discharge

c) Advanced Pathway:
- Observed: Actual total length of stay (days - TLOS), from admission to discharge
- Expected: Predicted length of stay (days - ELOS), from admission to discharge

Interpretation

Based on the recommended Ontario-specific HIG ELOS benchmark for the targeted clinical cohort, this indicator measures the actual total length of stay (TLOS) in comparison to the HIG expected length of stay (ELOS) a patient should be in-hospital, assessing the quality of care provided in addition to resource utilization:

- Good outcome: Equal to target benchmark (HIG ELOS) with a performance standard range (upper range at +10% of target benchmark)
  Note: It is the consensus of the Non-Cardiac Vascular QBP Technical Working Group that going-forward, the Ministry of Health & Long-Term Care (MOHLTC) should ensure that the benchmark be revisited after 1st year implementation and re-evaluated.

Data Limitations

The Ontario-specific HIG ELOS is based on prior year data, the benchmark ELOS is recommended to be refreshed annually to reflect the most current year of data available. The data is used as determined by the CIHI/MOHLTC. To calculate this measure, the quality of the utilized data has not been screened outside normal data quality checks employed by CIHI/MOHLTC. Current diagnostic and procedural codes for thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified are not completely aligned with proposed pathways (Standard, Moderate, Advanced).

C. % of Post-Operative Myocardial Infarction (MI) Complications

Definition

The proportion of patients that underwent an intervention for Abdominal/Thoracic Aortic Aneurysm Repair (by type of intervention, surgery or endovascular and by anatomy, and eventually Standard, Moderate, Advanced); and was subsequently diagnosed with a post-procedural complication of myocardial infarction (MI), acute unspecified or subendocardial. Post-procedural complications are defined as being conditions that are directly attributable to the initial intervention within an unbroken episode of care; linkage(s) of a defined cause/effect relationship are identified through chart information.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix A and A-2: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* Appendix B-2: TBD 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = "" 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Levels of aggregation (hospital-level, province-level) that are stratified by pathways (anatomy: thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and by the type of intervention (endovascular or open):

Numerator:

Using unique ID for each case, select all cases who reported a post-intervention complication defined as an MI that occurred within the same abstract (unbroken episode of care)

Denominator:

Total number of cases within the defined clinical cohort within the same given reporting period

Variance:

Actual % of MI versus the recommended benchmark, stratified by pathways (anatomy: thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and by the type of intervention (endovascular or open):

a) **Standard Pathway:**
   - EVAR: Provincial average (upper performance standard range, + 10%)
   - OPEN: Provincial average (upper performance standard range, +10%)

b) **Moderate Pathway:**
   - EVAR: Provincial average (upper performance standard range, + 10%)
   - OPEN: Provincial average (upper performance standard range, +10%)

c) **Advanced Pathway:**
   - EVAR: Provincial average (upper performance standard range, +10%)
   - OPEN: Provincial average (upper performance standard range, +10%)

Interpretation

The lower the rate, the more indicative of the desired clinical outcome as patients who received treatment for abdominal/thoracic aortic aneurysm repair are at a significant risk of post-operative cardiac conditions; acute unspecified or subendocardial MI. Typically, patients who are determined as “high-risk” are identified by clinical characteristics and non-invasive testing (e.g. dobutamine stress echocardiography, DSE). One of the distinguishing characteristics of these patients is that they are likely to experience cardiac complications during treatment or shortly after undergoing treatment. Consequently, it is appropriate to ensure that patient management protocols include a standardized approach to assess peri-operative cardiac risks (e.g. risk management strategies to reduce risks).

Data Limitations

Data is used as submitted to CIHI; the quality of submitted data is not screened beyond normal data quality edit checks employed by CIHI. Current diagnostic and procedural codes for thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified are not completely aligned with proposed pathways (Standard, Moderate, Advanced).

D. % of Red Blood Cell Transfusions

Definition

This indicator measures the percentage of patients that underwent a planned intervention for Abdominal/Thoracic Aortic Aneurysm Repair (by type of intervention, surgery or endovascular and by anatomy), that also had a red blood cell transfusion during their inpatient stay.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases :	
	1. >=20 years of age	1. Age as listed on discharge date;
	2. All genders (excluding none reported)	2. 03/04 (Group/Field) = M or F
	3. All cases regardless of place of residence	3. All Discharges/Cases
	4. Cases as per defined codes for AAA/Thoraco Repair	4. See Appendix A and A-3: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)*
	5. Acute institution only	5. Institution Type = AP/AT *(Master Numbering System)*
	6. Elective cases only	6. Admission Category = L
Exclude	1. Cases with no birthdates/discharge dates	1. 05/01 (Group/Field) = “”
	2. Cases with a discharge status or cadavers	2. 05/05 (Group/Field) = 08
	3. Out-of-hospital interventions	3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Levels of aggregation (hospital-level, province-level); stratified by pathways (anatomy: thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and by the type of intervention (EVAR versus OPEN):

Numerator:

Using unique ID for each case, select all cases who reported a red blood cell transfusion that occurred within the same abstract

Denominator:

Total number of cases within the defined clinical cohort within the same given reporting period

Variance:

Actual % of red blood cell transfusions versus the recommended benchmark:

a) EVAR:

- **Standard**: Provincial average (upper performance standard range, + 10%)
- **Moderate**: Provincial average (upper performance standard range +10%)
- **Complex**: Provincial average (upper performance standard range, + 10%)

b) Open:

- **Standard**: Provincial average (upper performance standard range at +10%)
- **Moderate**: Provincial average (upper performance standard range, + 10%)
- **Complex**: Provincial average (upper performance standard range, + 10%)

Interpretation

Transfusions are performed with the intention to increase/restore arterial oxygen content for patients experiencing critically impaired oxygen supply (oxygen delivery to the tissues). The optimal outcome is to improve the survival of patients with critical impairment of tissue oxygenation. Depending on the clinical profile of cases, standard versus moderate versus complex, the percentage of transfusion rates will differ accordingly and will reflect the adoption of blood conservation strategies.

Data Limitations

The data is used as submitted to CIHI. To calculate this measure, the quality of the utilized data has not been screened outside normal data quality checks employed by CIHI. Current diagnostic and procedural codes for thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified are not completely aligned with proposed pathways (Standard, Moderate, Advanced).

2 Aortic Aneurysm Repair (Future Years - Developmental)

A. Re-Operative Rates

Definition

The ratio of patients who received a second (or more) unplanned intervention(s) within the Operating Room (OR) in-hospital (during the same stay) related to the same condition due to a post-admit complication regarding Abdominal/Thoracic Aortic Aneurysm Repair (by type of intervention, surgery or endovascular and by anatomy and eventually Standard, Moderate, Advanced). The following unplanned interventions have been determined to relate to the first initial intervention:

1. Bleeding
2. Abdominal dehiscence
3. Mesenteric ischemia
4. Limb ischemia
5. Acute graft infection (rare)
6. Bowel obstruction

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases: 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only 7. >= 2 intervention events (unplanned) during the same admission for the same condition	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix A: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)*, Appendix A-4: TBD 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L 7. Intervention Event Codes = 2 or 3
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital intervention	1. 05/01 (Group/Field) = “” 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI): TBD

Methodology

Levels of aggregation (hospital-level, provincial-level); stratified by (thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and by type of intervention (EVAR versus OPEN):

Variable X:

a) Using unique ID for each case, select only cases with an intervention event > 1 that occurred within the same abstract
b) Filter for only cases within the selected cohorts with a post-admit complication/co-morbidity associated with the first procedure

Variable Y:

a) Total number of cases that align with the targeted clinical cohorts/criteria for the same given reporting period.

Ratio:

a) Variable X to Variable Y (X:Y)
b) Define X & Y then X/Y

Interpretation

The lower the rate, the more indicative of the desired clinical outcome:

1. Preventing aneurysm rupture risk
2. Decreasing elective operative mortality risk
3. Improving life quality/expectancy

Data Limitations

TBD. Current diagnostic and procedural codes for thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified are not completely aligned with proposed pathways (Standard, Moderate, Advanced).

B. Maintenance of Renal Function In-Hospital

Definition

This indicator measures the proportion of patients who have maintained post-operative renal function of the total cases in-hospital, after undergoing treatment for Abdominal/Thoracic Aortic Aneurysm Repair (by type of intervention, surgery or endovascular and by anatomy).

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix A and A-5: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L
Exclude	1. Cases with no birthdates/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = "" 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source
TBD

Methodology
Levels of aggregation (patient-level, hospital-level and province-level), stratified by type of pathway (anatomy: thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified and eventually Standard, Moderate, Advanced) and type of intervention (EVAR versus OPEN):

Numerator
Procedures to be grouped according to anatomy (e.g. thoracic, abdominal, etc.) who's post-operative serum Creatinine level is within 44.2 umol/L of their pre-operative value or who have not required new onset dialysis in the post-operative in -patient period.

Denominator
Total number of procedures in accordance with each targeted clinical cohort (anatomy)

Benchmark
TBD. Recommended benchmark may be provincial average - 10% as with other aneurysm related quality indicators.

Interpretation
The lower the percentage, the more indicative of higher rates of post-operative renal dysfunction as outcomes are poor for patients who suffer post-operative renal dysfunction. Ideally, the rate should be 100%. Post-operative acute kidney injury may result in long-term dialysis, high burden of death and end-stage renal disease. Maintenance of renal function in-hospital would involve managing the patient's creatinine levels to ensure no significant increases. Changes in renal function can be tracked and measured by the following criteria:

1. None
2. New increase in creatinine by 44.2 umol/L
3. New dialysis includes peritoneal dialysis, hemodialysis and hemo-filtration
   Note: Reporting of dialysis would only apply in this QI for patients who were NOT dialysis-dependent pre-operatively (not applicable to patients previously on dialysis prior to surgery).

Data Limitations
TBD. Current diagnostic and procedural codes for thoracic, abdominal, thoraco/abdominal and aorta aneurysm unspecified are not completely aligned with proposed pathways (Standard, Moderate, Advanced). Post-operative creatinine levels are not currently easily available for data extraction.

C. Compliance with Deep Vein Thrombosis (DVT) Prophylaxis

Definition
This indicator calculates the percentage of patients who have received standard treatment for the prevention of deep vein thrombosis post-operatively, composed of pharmacological therapy and/or early ambulation, unless otherwise contra-indicated for patients who underwent treatment for Abdominal/Thoracic Aortic Aneurysm Repair by type of intervention, surgery or endovascular.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders excluding none reported 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	TBD *(Collected in-hospital, Medication Administration Record, but not submitted externally)*

Exclude	1. Cases with no birthdates/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	TBD *(Collected in-hospital, Medication Administration Record, but not submitted externally)*

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source
TBD

Methodology
Levels of aggregation (hospital-level, province-level):

1. Using unique ID for each case, select all cases who reported the provision of DVT prophylaxis that occurred after the procedure
2. Divide the number of cases with DVT prophylaxis from the total cases
3. Comparison to recommended benchmark 100% with performance standard range (lower range -10%);

Interpretation
Achievement close to or equal to 100% would be defined as the optimal provision of quality of care. Appropriate use of prophylaxis against DVT for hospital inpatients is important in the reduction of risk to patients; fatal and non-fatal pulmonary embolism and post-thrombotic complications. The standard treatment provided post-operatively is pharmacological therapy (e.g. anti-coagulants) and/or early ambulation.

Data Limitations
TBD. Compliance with DVT prophylaxis is not currently reported.

D. Surgical Site Infection

Definition
This indicator measures the percentage of cases reporting a post-procedural infection at the surgical/puncture site for patients who underwent treatment in-hospital for AAA/Thoraco repair by type of intervention (surgery or endovascular and by anatomy and eventually Standard, Moderate, Advanced), within the same stay. It is defined as skin, subcutaneous tissue and deep muscle tissue and fascia of the incision that includes muscle layers (e.g. purulent discharge, positive culture, localized pain/tenderness or fever, diagnosis of attending physician, abscess, and incision dehiscence, etc.).

General Criteria

	Criteria Category	**Data Element Criteria**
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	TBD
Exclude	1. TBD	TBD

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that this QBP be re-visited at a later date to include urgent/emergent cases and further data capture specificity (see recommendations in Appendix for further details) going-forward.

Data Source
TBD

Methodology
TBD

Interpretation
The lower the percentage, the more indicative of procedural success as surgical/puncture site infections continue to be a problem in surgery; the most common reported is nosocomial infection. Infections occurring at or near the surgical site post-procedure contribute significantly to in-hospital surgery outcomes such as morbidity/mortality, length of stay, readmission rates and utilization of outpatient wound services. The establishment of appropriate prevention protocols can reduce outcomes such as appropriate operative technique, timely dispensation of proper pre and post-operative antibiotics, etc.; to ensure the reduction of potential risk of bacterial, viral and fungal contamination.

Data Limitations
TBD

3 Lower Extremity Occlusive Disease (Year 1): Peripheral Artery Disease (PAD)

A. Risk-Adjusted In-Hospital Mortality Rate

Definition
This indicator measures the rate of deaths in-hospital for patients who were admitted for a planned procedure (same stay) and underwent an intervention(s) for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD). The adjusted mortality rates represent the mortality rate that would be expected for a hospital if it had the same case-mix (patient profiles) as the province.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only 7. Deaths occurring during the same admission	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix B and B-1: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L 7. Discharge Disposition = 07
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = “” 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Risk Factors

Objective: Inpatient deaths with the following pre-admit co-morbidities:

1. Age: data available
2. Gender: data available
3. Chronic renal insufficiency: data available
4. Congestive Heart Failure (CHF): data available
5. History of Coronary Artery Disease: data available
6. Chronic Obstructive Pulmonary Disease (COPD): data available
7. Cirrhosis of the Liver: data available
8. Significant Aortic Valve Stenosis: data available
9. Pulmonary Hypertension: data available
10. Indication for Surgery (developmental):
    a. Claudication versus critical limb ischemia
11. LV Ejection Fraction (developmental)

    Note: It is the consensus of the Non-Cardiac Vascular QBP Technical Working Group that going-forward, the Ministry of Health & Long-Term Care (MOHLTC) should ensure that the provincial data sets + covariates (coefficients) are made available to hospitals to monitor and evaluate outcomes. For risk factors under development, it is recommended going-forward that once they are available for capture in a defined administrative database; they should be included in the methodological approach to enhance comparability and robustness.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Hierarchal method (patient, hospital and province-level); stratified by type of disease (Aortoiliac and Infrainguinal and eventually by Claudication and Critical Limb Ischemia pathways):

1. Bivariate/multivariate analysis to understand the strength of association between risk factors and the outcome event.
2. Stepwise approach using univariate analysis within a pre-determined order to eliminate risk factors found to be non-significant.
3. Application of logistic regression model to calculate expected outcome event rates with death as the dependent variable (outcome) and independent variables (predictors), adjusted for age, gender and risk factors (as per defined patient demographics and risk factors listed above).
4. Sum of the estimates (regression coefficients) for all discharges within a hospital to total the expected values and compare against the observed values as O/E (observed/expected).

Interpretation

This indicator should be interpreted as the mortality rate a hospital would have if their patient case-mix (e.g. clinical complexity and interventions: patient profiles) is similar to the average provincial case-mix. The adjustment allows for comparison across the defined groupings to adjust for variations in age, gender and risk factors. It is a comparison of observed (actual) performance of a hospital versus the expected performance (based on the provincial average mortality).

Note: Should the developmental risk factors be captured within an authoritative database going-forward, it is recommended that the risk factors be included into the statistical model (e.g. step-wise approach to determine significance), particularly indications for surgery. For arterial occlusion(s) of lower extremities (PAD), expectations will be very different depending on indication, critical limb ischemia versus claudicators.

Data Limitations

Not all risk factors such as ethnicity are currently available. Data is used as submitted to CIHI; the quality of submitted data will not be screened beyond normal data quality edit checks employed by CIHI. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

B. Total Length of Stay

Definition

This indicator measures the total length of stay (TLOS) in comparison to the HBAM Inpatient Grouper (HIG) expected length of stay (ELOS) for patients who were admitted to an acute care facility for a planned intervention concerning arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD). The clinical cohort is further stratified to be linked to disease (Aortoiliac and Infrainguinal) and intervention type (ENDO vs Open):

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix B: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = "" 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Levels of aggregation (hospital-level, province-level) stratified by disease (Aortoiliac and Infrainguinal and eventually by Claudication and Critical Limb Ischemia pathways) and intervention type:

1. **Aortoiliac disease:**
   - a) **ENDO:**
     - Observed: Actual total length of stay (days - TLOS), from admission to discharge
     - Expected: Predicted length of stay (days - ELOS), from admission to discharge
   - b) **OPEN:**
     - Observed: Actual total length of stay (days - TLOS), from admission to discharge
     - Expected: Predicted length of stay (days - ELOS), from admission to discharge
2. **Infrainguinal disease:**
   - a) **ENDO:**
     - Observed: Actual total length of stay (days - TLOS), from admission to discharge
     - Expected: Predicted length of stay (days - ELOS), from admission to discharge
   - b) **OPEN:**
     - Observed: Actual total length of stay (days - TLOS), from admission to discharge
     - Expected: Predicted length of stay (days - ELOS), from admission to discharge

Interpretation

Based on the recommended Ontario-specific HIG ELOS benchmark for the targeted clinical cohort, this indicator measures the actual total length of stay (TLOS) in comparison to the HIG expected length of stay (ELOS) a patient should be in-hospital, assessing the quality of care provided in addition to resource utilization:

- Good outcome: Equal to target benchmark (HIG ELOS) with a performance standard range (upper range at +10% of target benchmark)

  Note: It is the consensus of the Non-Cardiac Vascular QBP Technical Working Group that going-forward, the Ministry of Health & Long-Term Care (MOHLTC) should ensure that the benchmark be revisited after 1st year implementation and re-evaluated. Additionally, it is recommended that should data capture by presentation, claudication and critical limb ischemia, be made available in-future, that this PAD QI be revised going-forward to include these groupings by indication.

Depending on type of indication, the TLOS will vary significantly. TLOS is linked to indication for intervention and type of intervention; therefore further stratification by intervention is required for aorto iliac disease and femoral popliteal disease.

Data Limitations

The Ontario-specific HIG ELOS is based on prior year data, the benchmark ELOS is recommended to be refreshed annually to reflect the most current year of data. The data is used as determined by the CIHI/MOHLTC. To calculate this measure, the quality of the utilized data will not be screened outside normal data quality checks employed by CIHI/MOHLTC. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

C. % of Post-Operative Myocardial Infarction (MI) Complications

Definition

The ratio of patients that underwent an intervention for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD); and was subsequently diagnosed with a post-procedural complication of myocardial infarction (MI), acute unspecified or subendocardial. Post-procedural complications are defined as being conditions that are directly attributable to the initial intervention within an unbroken episode of care; linkage(s) of a defined cause/effect relationship are identified through chart information.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix B and B-2: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = “” 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Levels of aggregation (hospital-level, provincial-level):

Numerator:

Using unique ID for each case, select all cases who reported a post-intervention complication defined as a subendocardial MI that occurred within the same abstract (unbroken episode of care)

Denominator:

Total number of cases within the defined clinical cohort within the same given reporting period

Variance:

Actual % of subendocardial MIs versus the recommended benchmark:

1. **Aortoiliac disease:**
   a) ENDO: Provincial average (upper performance standard range, + 10%)
   b) OPEN: Provincial average (upper performance standard range, +10%)
2. **Infrainguinal disease:**
   a) ENDO: Provincial average (upper performance standard range, +10%)
   b) OPEN: Provincial average (upper performance standard range, +10%)

Note: It is recommended that should data capture by presentation, claudication and critical limb ischemia, be made available in-future, that this PAD QI be revised going-forward to include these groupings by indication.

Interpretation

The lower the rate, the more indicative of the desired clinical outcome as patients who received treatment for lower extremity occlusive disease are at a significant risk of post-operative cardiac conditions; acute unspecified or subendocardial MI. Typically, patients who are determined as "high-risk" are identified by clinical characteristics and non-invasive testing (e.g. dobutamine stress echocardiography, DSE). One of the distinguishing characteristics of these patients is that they are likely to experience cardiac complications during treatment or shortly after undergoing treatment. Consequently, it is appropriate to ensure that patient management protocols include a standardized approach to assess peri-operative cardiac risks (e.g. risk management strategies to reduce risks).

Data Limitations

Data is used as submitted to CIHI; the quality of submitted data is not screened beyond normal data quality edit checks employed by CIHI. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

4 Lower Extremity Occlusive Disease (Future Years - Developmental): Peripheral Artery Disease (PAD)

A. Re-Operative Rates

Definition

The ratio of patients who received a second (or more) unplanned intervention(s) within the Operating Room (OR) in-hospital (during the same stay) related to the same condition due to a post-admit complication regarding for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD). The following unplanned interventions have been determined to relate to the first initial intervention:

1. Bleeding
2. Limb ischemia/graft occlusion
3. Amputation (same limb in cases of unilateral procedures) other than toes or mid foot
4. Infection
5. Lymph leak

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only 7. >= 2 intervention events (unplanned) during the same admission for the same condition	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix B: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx)* Appendix B-3: TBD 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L 7. Intervention Event Codes = 2 or 3
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = "" 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI): TBD

Methodology

Levels of aggregation (hospital-level, provincial-level):

Variable X:

1. Using unique ID for each case, select only cases with an intervention event > 1 that occurred within the same abstract
2. Filter for only cases within the selected cohorts with a post-admit complication/co-morbidity associated with the first procedure

Variable Y:

1. Total number of cases that align with the targeted clinical cohorts/criteria for the same given reporting period

Ratio:

1. Variable X to Variable Y (X:Y)
2. Define X & Y then X/Y

Note: It is recommended that should data capture by presentation, claudication and critical limb ischemia, be made available in-future, that this PAD QI be revised going-forward to include these groupings by indication.

Interpretation

The lower the rate, the more indicative of the desired clinical outcome:

1. Resolution of symptoms risk
2. Revascularization of compromised limb and limb salvage
3. Decreasing elective operative mortality risk
4. Improving life quality/expectancy

Data Limitations

TBD. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

B. Major amputation (AKA & BKA)

Definition

This indicator measures the percentage of amputations performed (above the knee or below the knee/above ankle) within 2 months of a prior case history of an initial intervention concerning for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD).

- The number of legs treated for claudication or critical limb ischemia with revascularization.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	1. Age as listed on discharge date; 2. 03/04 (Group/Field) = M or F 3. All Discharges/Cases 4. See Appendix B: *Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx),* Appendix B-4: TBD 5. Institution Type = AP/AT *(Master Numbering System)* 6. Admission Category = L
Exclude	1. Cases with no birth/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	1. 05/01 (Group/Field) = “” 2. 05/05 (Group/Field) = 08 3. 11/13 (Group/Field) = Y

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Risk Factors

The main risk factors for requiring amputation after revascularization should be the presence of gangrene or tissue loss, kidney failure requiring dialysis, preoperative ABI less than 0.4 and previous vascular procedures in the same limb. Lesser risk factors may be age, gender, diabetes. Patients requiring amputation for trauma or tumors usually do not have a preceding revascularization procedure and would not be part of this group.

Data Source

Discharge Abstract Database (DAD) - Canadian Institute for Health Information (CIHI)

Methodology

Levels of aggregation (hospital-level, province-level):

1. Using unique ID for each case, select all cases who reported an amputation (AKA or BKA) that occurred within 2 months of the initial intervention for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD).
2. Divided by the number of total cases as defined in the targeted clinical cohort
3. Benchmark: TBD (data from other jurisdictions may be available to guide an appropriate benchmark for Ontario, this work is in progress)

Interpretation

The lower the amputation rates, the more indicative of procedural success. The provision of high-quality care is conducive to improved limb salvage rates, thereby resulting in a greater number of post-procedural outcomes reporting patients with intact legs. A low major amputation rate after revascularization procedures are performed indicates that the vascular interventions were well-planned and well-executed.

Data Limitations

The data will be used as submitted CIHI. To calculate this measure, the quality of the utilized data has not been screened outside normal data quality checks employed by CIHI. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

C. Compliance with DVT prophylaxis

Definition

This indicator calculates the percentage of patients who have received standard treatment for the prevention of deep vein thrombosis post-operatively, composed of pharmacological therapy and/or early ambulation unless otherwise contra-indicated for patients who underwent treatment for occlusion(s) of lower extremities (Peripheral Artery Disease, PAD).

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders excluding none reported 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	TBD *(Collected in-hospital, Medication Administration Record, but not submitted externally)*
Exclude	1. Cases with no birthdates/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	TBD *(Collected in-hospital, Medication Administration Record, but not submitted externally)*

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Data Source

TBD

Methodology

Levels of aggregation (hospital-level, province-level):

1. Using unique ID for each case, select all cases who reported the provision of DVT prophylaxis that occurred after the procedure
2. Divide the number of cases with DVT prophylaxis from the total cases
3. Comparison to recommended benchmark 100% with performance standard range (lower range -10%)

Note: It is recommended that should data capture by presentation, claudication and critical limb ischemia, be made available in-future, that this PAD QI be revised going-forward to include these groupings by indication.

Interpretation

Achievement close to or equal to 100% would be defined as the optimal provision of quality of care. Appropriate use of prophylaxis against DVT for hospital inpatients is important in the reduction of risk to patients; fatal and non-fatal pulmonary embolism and post-thrombotic complications. The standard treatment provided post-operatively is pharmacological therapy (e.g. anti-coagulants) and/or early ambulation.

Data Limitations

TBD. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

D. Graft patency / Improved Ankle-Brachial Indices (ABI)

Definition

This indicator measures the effectiveness of a graft procedure for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD) by comparing the pre-procedural ankle-brachial indices (ABI) to the initial post-operative ABI. This is to identify either procedural success (e.g. procedure patency which should result in improved limb functionality or limb salvage/resolution of symptoms) or those cases that have failed or require revision in the follow-up interval.

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD) 5. Acute institution only 6. Elective cases only	TBD
Exclude	1. Cases with no birthdates/discharge dates 2. Cases with a discharge status or cadavers 3. Out-of-hospital interventions	TBD

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Risk Factors

The main risk factors for failure after revascularization are a) the presence of gangrene or tissue loss; b) kidney failure requiring dialysis; c) preoperative ABI less than 0.4; d) hypercoagulability and; e) previous vascular procedures in the same limb. Lesser risk factors may be age, gender, diabetes or pre-operative risk factors.

Data Source

TBD

Methodology

Levels of aggregation (hospital-level, province-level):

1. Using unique ID for each case, select all cases who reported an ABI <= 0.9 (within the defined clinical cohort) of the total cases within the defined clinical cohort
2. Benchmark: An increase in ABI (or TBI) >=0.15 compared with pre-operative status
   - Patency should be evaluated by the highest applicable modality such as the following:
     a) Doppler only used
     b) Palpable distal pulse: clearly palpable pulse beyond the graft (not by Doppler)
     c) Palpable Graft Pulse: pulse felt over the graft
     d) Duplex: duplex scanner used

Note: It is recommended that should data capture by presentation, claudication and critical limb ischemia, be made available in-future, that this PAD QI be revised going-forward to include these groupings by indication.

Interpretation

A bypass graft is considered to be patent when the post-operative ABI is significantly improved, the patency of the vascular reconstruction should be documented by appropriate evaluation methodology. Cases reporting less than 0.9 in the follow-up interval should be followed more closely for early detection of correctable lesions before the onset of graft thrombosis. A revascularization procedure should result in symptom resolution/improvement (e.g. alleviation of pain or improved walking distance).

Data Limitations

TBD. Indication regarding indication for surgery (claudication versus critical limb ischemia is not captured currently).

E. Surgical Site Infection

Definition

This indicator measures the percentage of cases reporting a post-procedural infection at the surgical/puncture site for patients who underwent treatment in-hospital for arterial occlusion(s) of lower extremities (Peripheral Artery Disease, PAD) within same stay. Defined as skin, subcutaneous tissue and deep muscle tissue and fascia of the incision that includes muscle layers (e.g. purulent discharge, positive culture, localized pain/tenderness or fever, diagnosis of attending physician, abscess, and incision dehisces, etc.).

General Criteria

	Criteria Category	Data Element Criteria
Include	All acute inpatient cases for patients using a unique ID to exclude duplicate cases : 1. >=20 years of age 2. All genders (excluding none reported) 3. All cases regardless of place of residence 4. Cases as per defined codes for AAA/Thoraco Repair 5. Acute institution only 6. Elective cases only	TBD
Exclude	TBD	TBD

Note: It is the recommendation of the Non-Cardiac Vascular QBP Technical Working Group that further data capture specificity is implemented (see recommendations in Appendix for further details) going-forward.

Data Source

TBD

Methodology

TBD

Interpretation

The lower the percentage, the more indicative of procedural success as surgical/puncture site infections continue to be a problem in surgery; the most common reported is nosocomial infection. Infections occurring at or near the surgical site post-procedure contribute significantly to in-hospital surgery outcomes such as morbidity/mortality, length of stay, readmissions and use of outpatient wound and nursing services. The establishment of appropriate prevention protocols can reduce outcomes such as appropriate operative technique, timely dispensation of proper pre and post-operative antibiotics, etc.; to ensure the reduction of potential risk of bacterial, viral and fungal contamination.

Data Limitations

TBD

Recommendation 1: The following Canadian Code Classifications, ICD10-CA Most Responsible Diagnosis (MRDx) codes and CCI Principal Interventions (Tx), are based on the 2011 version. These codes are recommended to be mapped to the most current Canadian Institute for Health Information (CIHI) classifications when required going-forward.

Recommendation 2: Further data specificity should be captured and standardized going-forward; collected within an authoritative database regarding the following:

1. **Data Variable – Group/Field:**
    - Ethnicity
    - LV Ejection Fraction
2. **Abdominal Aortic Aneurysm (AAA) assigned individual "Anatomy Site" codes (to reflect Standard, Moderate, Advanced Pathways):**
    - Infrarenal aorta;
    - Juxtarenal aorta (including renal arteries);
    - Aortic bifurcation;
    - Iliac arteries with abdominal aorta or associated with iliac occlusive disease;
3. **Arterial Occlusion of Lower Extremities (PAD) assigned individual codes:**
    - Claudication
    - Critical limb Ischemia (CLI)
4. **Intervention (Tx) Codes – Abdominal Aortic Aneurysm (AAA) assigned individual "Qualifier 2, Section 1" codes (to align with Standard, Moderate, Advanced Pathways):**
    a. **AAA involving renal arteries (juxtarenal):**
        - ENDO: Fenestrated EVAR
        - ENDO: Standard EVAR
        - OPEN: Aortic clamp placement above renal arteries
        - OPEN: Standard infrarenal clamp placement

    b. **AAA involving iliac arteries or associated with iliac occlusive disease:**
        - ENDO: Standard EVAR
        - ENDO: Iliac branched graft + EVAR
        - OPEN: Aorto-iliac/aortofemoral bifurcated graft
        - OPEN: Standard aortic tube graft

Most Responsible Diagnosis (MRDx): Pathways - Thoracic/Abdominal AAA (non-ruptured):

- (I712) – Thoracic Aortic Aneurysm without Rupture: Moderate Pathway
- (I714) – Abdominal Aortic Aneurysm without Rupture: Standard Pathway
- (I716) – ThoracoAbdo Aortic Aneurysm without Rupture: Advanced Pathway

*Note: This pathway includes aneurysms involving aortic arch.

- (I719) – Aortic Aneurysm Unspecified Site without Rupture: Moderate Pathway

Intervention Codes: Pathways - Arterial Occlusion(s) of Lower Extremities (Peripheral Artery Disease, PAD):

The discharge abstract database CMG+ or HIG levels 182, 183 and 185 were used to identify cases of lower extremity occlusive disease that are in-line with this QBP and provide data to support the recommendations presented within this clinical handbook.

HIG Definitions:

- (182) Bypass/Extraction of Vein/Artery of Limb;
- (183) Amputation of Hand/Foot;
- (185) Other Miscellaneous Vascular Intervention.

To increase clinical homogeneity, interventions have been grouped by anatomical location of the occlusion and by surgical (open) or endovascular (endo) approach. The two groupings are: 1. Aortoiliac segment, which includes inflow arteries and 2. Infrainguinal segment, that includes, outflow and runoff vessels.

Appendix A: Thoracic/Abdominal Aortic Aneurysm Repair (non-ruptured)

1. **Standard Pathway: I714 - Abdominal Aortic Aneurysm Repair without Rupture**
    a. **Intervention Type: EVAR**
        - (1KA80GQNRN) REPAIR ABD AORTA ART PTA INSERT STENT & SYNTH GRAFT
        - (1KE80GQNRN) REPAIR ABD ART PTA &STENT &SYN MAT
        - (1KA50GQOA) DILATE ABD AORTA PTA BALLOON & STENT
        -
        - (1KE50GQBD) DILATE ABD ART PTA &BALLOON
        -
        - (1KE50GQOA) DILATE ABD ART PTA BALLOON & STENT
    b. **Intervention Type: OPEN**
        - (1KA80LAXXN) REPAIR ABD AORTA OA SYNTH MATER
        - (1KA76MZXXN) BYPASS ABD AORTA TO LEG VES SYNTH MATER
        - (1KA80LAXXQ) REPAIR ABD AORTA OA COMBO TIS
        - (1KA87LAXXN) EXCISE PRT ABD AORTA OA SYNTH MATER
        - (1KA76NBXXN) BYPASS ABD AORTA TO AORTA SYNTH MAT
        - (1KA80LAXXA) REPAIR ABD AORTA OA AUTOGR
        - (1KA80LA) REPAIR ABD AORTA OA
        - (1KA80LAXXK) REPAIR ABD AORTA OA HOMOGR
        - (1KA76MZXXA) BYPASS ABD AORTA TO LEG VES AUTOGR
        - (1KA76NBXXA) BYPASS ABD AORTA TO AORTA AUTOGR
        - (1KA76MZXXK) BYPASS ABD AORTA TO LEG VES HOMOGR
        - (1KA76MZXXQ) BYPASS ABD AORTA TO LEG VES COMBO TIS
        - (1KA87LAXXA) EXCISE PRT ABD AORTA OA AUTOGR
        - (1KA76NBXXK) BYPASS ABD AORTA TO AORTA HOMOGR
        - (1KA87LA) EXCISE PRT ABD AORTA OA
        - (1KA55LANRN) REMOVE DEV ABD AORTA OA SYN MAT STENT
        - (1KE76MZXXN) BYPASS ABD ART TO LEG VES SYN MAT
        - (1KA76NBXXQ) BYPASS ABD AORTA TO AORTA COMBO TIS

2. **Moderate Pathway: I712 – Thoracic Aortic Aneurysm Repair without Rupture**
    a. **Intervention Type: EVAR**
        - (1IC80GQNRN) REPAIR THOR AORTA PTA &STENT SYNTH MATER
        - (1IC50GQNR) DILATE THOR AORTA PTA &STENT
    b. **Intervention Type: OPEN**
        - (1IC80LAXXN) REPAIR THOR AORTA OA SYNTH MATER
        - (1IC87LAXXN) EXCISE PRT THOR AORTA OA SYNTH MATER
        - (1IC76NBXXA) BYPASS THOR AORTA TO AORTA AUTOGR
        - (1IC80WC) REPAIR THOR AORTA OA W FENESTRATION
        - (1IC80LAXXQ) REPAIR THOR AORTA OA COMBO TIS
        - (1IC80LAXXL) REPAIR THOR AORTA OA XENOGR

3. **Moderate Pathway: I719 - Aortic Aneurysm Unspecified Site without Rupture**
    a. **Intervention Type: EVAR**
        - (1KE51GQW0) OCCLUDE ABD ART PTA &SYN AGNT
    b. **Intervention Type: OPEN**
        - (1KE80LAXXN) REPAIR ABD ART OA SYN MAT
        - (1KE76MUXXN) BYPASS ABD ART TO ABD VES SYNTH MAT
        -

- (1KE80LA) REPAIR ABD ART OA
- (1KE76MUXXA) BYPASS ABD ART TO ABD VES AUTOGR
- (1JY80LAXXN) REPAIR THOR VES OA SYN MAT
- (1KE87LAXXA) EXCISE PRT ABD ART OA AUTOGR
- (1KE87LA) EXCISE PRT ABD ART OA

4. Advanced Pathway: I716 – ThoracoAbdo Aortic Aneurysm Repair without Rupture

a. Intervention Type: EVAR

- (1IB80GQNRN) REPAIR ARCH AORTA PTA &STENT SYNTH TISSUE
- (1ID80GQNRN) REPAIR AORTA PTA &STENT SYNTH TISSUE
- (1ID50GQOA) DILATE AORTA ART PTA BALLOON & STENT

b. Intervention Type: OPEN

- (1ID80QFXXN) REPAIR AORTA THOR/ABD OA SYNTH MATER
- (1ID80QFXXQ) REPAIR AORTA THOR/ABD OA COMBO TIS
- (1ID80QFXXA) REPAIR AORTA THOR/ABD OA AUTOGR
- (1ID87QFXXN) EXCISE PRT AORTA THOR/ABD OA SYNTH MATER
- (1ID80LAXXN) REPAIR AORTA OA SYNTH MATER
- (1ID87LAXXN) EXCISE PRT AORTA OA SYNTH MATER
- (1ID80LA) REPAIR AORTA OA
- (1ID80LAXXA) REPAIR AORTA OA AUTOGR
- (1ID80LAXXK) REPAIR AORTA OA HOMOGR
- (1ID80LAXXQ) REPAIR AORTA OA COMBO TIS
- (1ID76MUXXN) BYPASS AORTA TO ABD VES SYNTH MAT

Appendix A-1: Thoracic/Abdominal Aortic Aneurysm Repair (non-ruptured)

QI: Risk-Adjusted In-Hospital Mortality Rate

1. Age: Group/Field - 03/09
2. Gender: Group/Field – 03/04
3. Chronic renal insufficiency: Diagnosis Type 1, Dx - I12
4. Congestive Heart Failure (CHF): Diagnosis Type 1, Dx - I50
5. History of Coronary Artery Disease: Diagnosis Type 1, Dx - I20
6. Chronic Obstructive Pulmonary Disease (COPD): Diagnosis Type 1, Dx - J449
7. Cirrhosis of the Liver: Diagnosis Type 1, Dx - K746
8. LV Ejection Fraction: *developmental as data element not captured*
9. Significant Aortic Valve Stenosis: Diagnosis Type 1, Dx - I350
10. Pulmonary Hypertension: Diagnosis Type 1, Dx - I270 + I272
11. Peripheral Vascular Disease: Diagnosis Type 1, Dx - I738 + I739

Note: It is the consensus of the Non-Cardiac Vascular QBP Technical Working Group that going-forward, the Ministry of Health & Long-Term Care (MOHLTC) should ensure that the provincial data sets + covariates (coefficients) are made available to hospitals to monitor and evaluate outcomes. For risk factors under development, it is recommended going forward that once they are available for capture in a defined administrative database; they should be included in the methodological approach to enhance comparability and robustness.

Appendix A-2: Thoracic/Abdominal Aortic Aneurysm Repair (non-ruptured)

QI: % of Subendocardial Myocardial Infarction (MI) Complications

- Numerator Codes: Diagnosis Type 2 (post-admit co-morbidity/complication)
  1. (I214) AC Subendocardial Myocardial Infarction
  2. (I219) Acute Myocardial Infarction Unspecified

Appendix A-3: Thoracic/Abdominal Aortic Aneurysm Repair (non-ruptured)

QI: Percentage of Red Blood Cell Transfusion

- Field/Group: 17/01 to 17/07 with Red Blood Cell Indicator listed (Field Number 44) = Y.

Appendix A-4: Thoracic/Abdominal Aortic Aneurysm Repair (non-ruptured)

QI: Re-Operative Rates

- TBD

Appendix A-5: Thoracic/Abdominal Aortic Aneurysm Repair (non-ruptured)

QI: Maintenance of Renal Function In-Hospital

- Numerator Codes: Diagnosis Type 2 (post-admit co-morbidity/complication)
  1. (N178) Other Acute Renal Failure
  2. (N179) Acute Renal Failure Unspecified

Appendix B: Arterial Occlusion(s) of Lower Extremities (Peripheral Artery Disease, PAD)

1. **Aortoiliac Pathway:**
    a. **Intervention Type: ENDO**
        - (1KE50GQOA) DILATE ABD ART PTA BALLOON & STENT
        - (1KT50GQBD) DILATE VES PELV PERIN & GLUT PTA &BALLOON
        -
        -
        - (1KE50GQBD) DILATE ABD ART PTA &BALLOON
        - (1KT50GQOA) DILATE VES PELV PERIN & GLUT PTA BALLOON &STENT
        - (1KE80GQNRN) REPAIR ABD ART PTA &STENT &SYN MAT
        - (1KE50GQBP) DILATE ABD ART PTA & DILATOR
        - (1KT50GQBP) DILATE VES PELV PERIN & GLUT ART PTA &RIG DILATOR
        -
    b. **Intervention Type: OPEN**
        - (1KE76MZXXK) BYPASS ABD ART TO LEG VES HOMOGR
        - (1JM76MIXXN) BYPASS ART ARM TO ART LEG AXLLFEMRL & SYN MAT
        - (1KE76MZXXN) BYPASS ABD ART TO LEG VES SYN MAT
        - (1KT76MZXXN) BYPASS VES PELV PERIN & GLUT TO LEG VES OA SYN MAT
        - (1KE76MZXXA) BYPASS ABD ART TO LEG VES AUTOGR
        - (1JM76MIXXA) BYPASS ART ARM TO ART LEG AXLLFEMRL & AUTGR
        - (1KT76MZXXA) BYPASS VES PELV PERIN & GLUT TO LEG VES OA AUTOGR
        - (1KT76MZXXQ) BYPASS VES PELV PERIN & GLUT TO LEG VES OA COMB TIS
        - (1KE80LAXXN) REPAIR ABD ART OA SYN MAT
        - (1KE76MUXXA) BYPASS ABD ART TO ABD VES AUTOGR
        - (1KE76MZXXQ) BYPASS ABD ART TO LEG VES COMB TIS
        - (1KE80LA) REPAIR ABD ART OA
        - (1KE76MUXXN) BYPASS ABD ART TO ABD VES SYNTH MAT
        - (1KE80LAXXA) REPAIR ABD ART OA AUTOGR
        - (1KT50LABP) DILATE VES PELV PERIN & GLUT OA &DILATOR
        - (1KE50LABD) DILATE ABD ART OA &BALLOON
        - (1KE50LABP) DILATE ABD ART OA &DILATOR
2. **Infrainguinal Pathway:**
    a. **Intervention Type: ENDO**
        - (1KG50GQBD) DILATE ART LEG ART PTA &BALLOON
        - (1KY50GPBD) DILATE ART & VN PTA &BALLOON
        - (1KG50LAOA) DILATE ART LEG OA BALLOON & STENT
        - (1KG80GQNRN) REPAIR ART LEG PTA & STENT &SYN MAT
        - (1KG50GQOA) DILATE ART LEG PTA BALLOON &STENT
        -
        -
        - (1KG50GQBF) DILATE ART LEG ART PTA &BALLOON &LASR
        - (1KG50GQBP) DILATE ART LEG ART PTA &RIG DILATOR
    b. **Intervention Type: OPEN**
        - (1KG76MIXXA) BYPASS ART LEG TO ART LEG AUTOGR
        - (1KG76MIXXN) BYPASS ART LEG TO ART LEG SYN MAT
        - (1KG76MIXXQ) BYPASS ART LEG TERM ART LEG & COMB TIS
        - (1KG76MZXXA) BYPASS ART LEG TO LEG VN AUTOGR
        - (1KG76MZXXN) BYPASS ART LEG TO LEG VN SYN MAT

- (1KG80LAXXN) REPAIR ART LEG OA SYN MAT
- (1KG87LAXXN) EXCISE PRT ART LEG OA SYN MAT
- (1KG80LAXXA) REPAIR ART LEG OA AUTOGR
- (1KG87LA) EXCISE PRT ART LEG OA
- (1KG80LA) REPAIR ART LEG OA
- (1KG87LAXXA) EXCISE PRT ART LEG OA AUTOGR
- (1KG87LAXXL) EXCISE PRT ART LEG OA XENOGR
- (1KY80LAXXN) REPAIR ART & VN OA SYN MAT
- (1KV80LAXXA) REPAIR ART NEC OA AUTOGR
- (1KG50LABP) DILATE ART LEG OA &DILATOR
- (1KG50LABD) DILATE ART LEG OA &BALLOON

Appendix B-1: Arterial Occlusion(s) of Lower Extremities (Peripheral Artery Disease, PAD)

QI: Risk-Adjusted In-Hospital Mortality Rate

1. Age: Group/Field - 03/09
2. Gender: Group/Field – 03/04
3. Chronic renal insufficiency: Diagnosis Type 1, Dx - I12
4. Congestive Heart Failure (CHF): Diagnosis Type 1, Dx - I50
5. History of Coronary Artery Disease: Diagnosis Type 1, Dx - I20
6. Chronic Obstructive Pulmonary Disease (COPD): Diagnosis Type 1, Dx - J449
7. Cirrhosis of the Liver: Diagnosis Type 1, Dx - K746
8. Significant Aortic Valve Stenosis: Diagnosis Type 1, Dx - I350
9. Pulmonary Hypertension: Diagnosis Type 1, Dx - I270 + I272
10. Peripheral Vascular Disease: Diagnosis Type 1, Dx - I738 + I739
11. LV Ejection Fraction: *developmental as data element not captured*
12. Indication for Surgery: *developmental as data element not captured*
    - Claudication versus critical limb ischemia

Note: It is the consensus of the Non-Cardiac Vascular QBP Technical Working Group that going-forward, the Ministry of Health & Long-Term Care (MOHLTC) should ensure that the provincial data sets + covariates (coefficients) are made available to hospitals to monitor and evaluate outcomes. For risk factors under development, it is recommended going forward that once they are available for capture in a defined administrative database; they should be included in the methodological approach to enhance comparability and robustness.

Appendix B-2: Arterial Occlusion(s) of Lower Extremities (Peripheral Artery Disease, PAD)

QI: % of Post-Operative Myocardial Infarction (MI) Complications

- Numerator Codes: Diagnosis Type 2 (post-admit co-morbidity/complication)
  1. (I214) AC Subendocardial Myocardial Infarction
  2. (I219) Acute Myocardial Infarction Unspecified

Appendix B-3: Arterial Occlusion(s) of Lower Extremities (Peripheral Artery Disease, PAD)

QI: Re-Operative Rates

- TBD

Appendix B-4: Arterial Occlusion(s) of Lower Extremities (Peripheral Artery Disease, PAD)

QI: Major amputation (AKA & BKA)

- TBD