Quality-Based Procedures Clinical Handbook for Elective Aortic Aneurysm Repair

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

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Ontario

Table of Contents

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1.0 Purpose

This clinical handbook has been created to serve as a compendium of the evidence-based rationale and clinical consensus driving the development of the policy framework and implementation approach for elective aortic aneurysm repair in 2013/ 2014.

The Cardiac Care Network of Ontario (CCN) has taken a leadership role in the planning and development of a Vascular Services Quality Strategy for Ontario. With active participation and support of Ontario's vascular services providers and other stakeholder groups, CCN together with a sub-committee of the CCN Vascular Care Working Group and a working group of technical and health data experts, have played an integral role in the planning and development processes and providing advice on best practice care in non-cardiac vascular surgery across Ontario aimed at improving access to non-cardiac vascular care and non-cardiac vascular health outcomes for Ontarians.

This document has been prepared for informational purposes only. This document does not mandate health care providers to provide services in accordance with the recommendations included herein. The recommendations included in this document are not intended to take the place of the professional skill and judgment of health care providers.

2.0 Introduction

Quality-Based Procedures (QBP) are an integral part of Ontario's Health System Funding Reform (HSFR) and a key component of the Patient-Based Funding (PBF). This reform plays a key role in advancing the government's quality agenda and its ***Action Plan for Health Care***. HSFR has been identified as an important mechanism to strengthen the link between the delivery of high quality care and fiscal sustainability.

Ontario's health care system has been living under a global economic uncertainty for a considerable period of time. At the same time, the pace of growth in health care spending has been on a collision course with the provincial government's deficit recovery plan.

In response to these fiscal challenges and to strengthen the commitment towards the delivery of high quality care, the ***Excellent Care for All Act*** (ECFAA) received royal assent in June 2010. ECFAA is a key component of a broad strategy that improves the quality and value of the patient experience by providing them with the right care at the right time, and in the right place through the application of evidence-informed health care. ECFAA positions Ontario to implement reforms and develop the levers needed to mobilize the delivery of high quality, patient-centred care.

Ontario's ***Action Plan for Health Care*** advances the principles of ECFAA reflecting quality as the primary driver to system solutions, value and sustainability.

2.1 What are we moving towards?

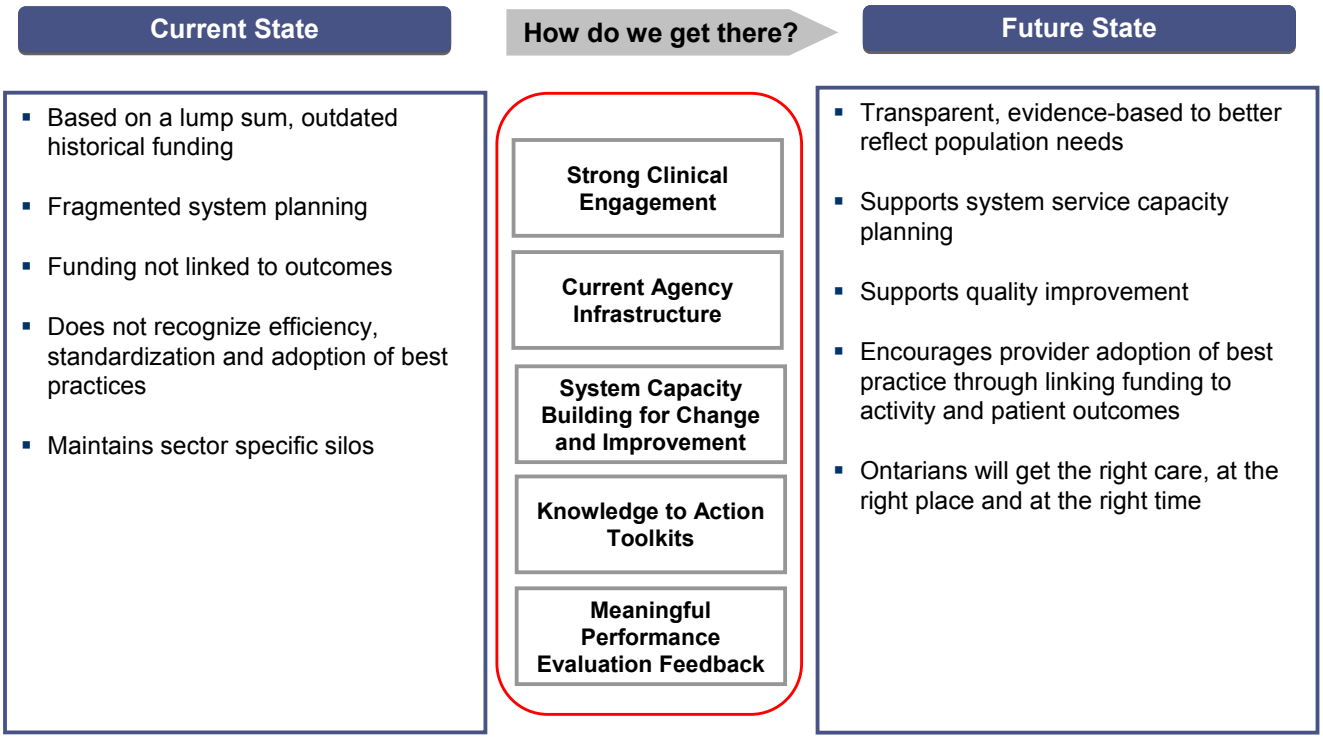
Prior to the introduction of HSFR, a significant proportion of hospital funding was allocated through a global funding approach, with specific funding for some select provincial programs and wait times services. A global funding approach reduces incentives for Health Service Providers (HSPs) to adopt best practices that result in better patient outcomes in a cost-effective manner.

To support the paradigm shift from a culture of 'cost containment' to 'quality improvement,' the Ontario government is committed to moving towards a patient-centred funding model that reflects local population needs and contributes to optimal patient outcomes (Figure 1).

Internationally, PBF models have been implemented since 1983. Ontario is one of the last leading jurisdictions to move down this path. This puts the province in a unique position to learn from international best practices and lessons learned by others to create a funding model that is best suited for Ontario.

PBF supports system capacity planning and quality improvement through directly linking funding to patient outcomes. PBF provides an incentive to health care providers to become more efficient and effective in their patient management by accepting and adopting best practices that ensure Ontarians get the right care, at the right time and in the right place.

Figure 1: The Ontario government is committed to moving towards patient-centred, evidence-informed funding that reflects local population needs and incents delivery of high quality care



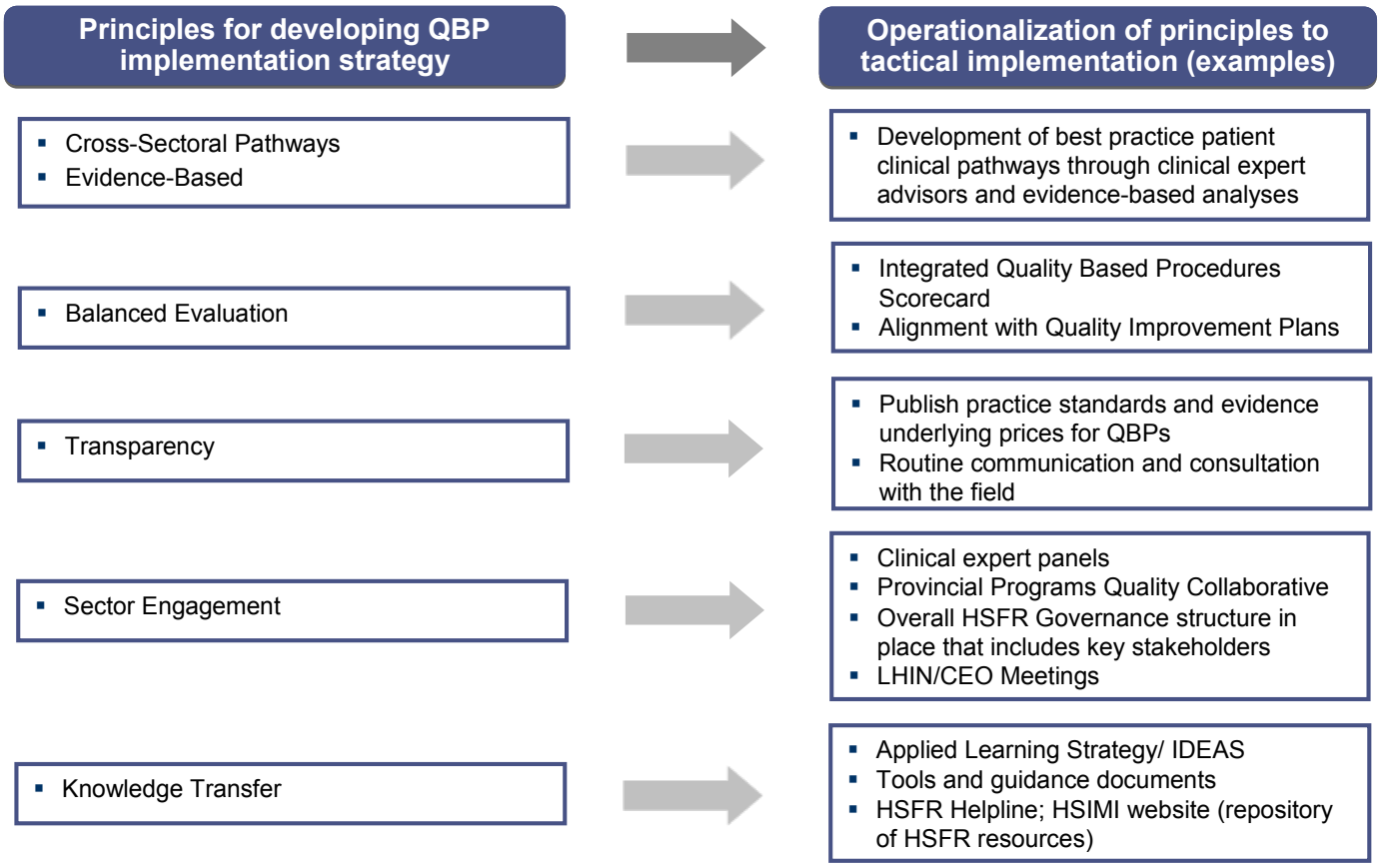
2.2 How will we get there?

The Ministry has adopted a three-year implementation strategy to phase in a PBF model and will make modest funding shifts starting in fiscal year 2012/13. A three-year outlook has been provided to the field to support planning for upcoming funding policy changes.

The Ministry has released a set of tools and guiding documents to further support the field in adopting the funding model changes. For example, a Quality-Based Procedure (QBP) Interim list has been published for stakeholder consultation and to promote transparency and sector readiness. The list is intended to encourage providers across the continuum to analyze their service provision and infrastructure in order to improve clinical processes and where necessary, build local capacity.

The successful transition from the current, 'provider-centred' funding model towards a 'patient-centred model' will be catalyzed by a number of key enablers and field supports. These enablers translate to actual principles that guide the development of the funding reform implementation strategy related to QBPs. These principles further translate into operational goals and tactical implementation, as presented in Figure 2.

Figure 2: Principles guiding the implementation of funding reform related to Quality-Based Procedures



2.3 What are Quality-Based Procedures?

QBPs involve clusters of patients with clinically related diagnoses or treatments. Aortic aneurysms were chosen as a QBP using an evidence and quality-based selection framework that identifies opportunities for process improvements, clinical re-design, improved patient outcomes, and enhanced patient experience and potential cost savings.

The evidence-based framework used data from the Discharge Abstract Database (DAD) adapted by the Ministry of Health and Long-Term Care for its Health Based Allocation Methodology (HBAM) repository. The HBAM Inpatient Grouper (HIG) groups inpatients based on the diagnosis or treatment responsible for the majority of their patient stay. Day Surgery cases are grouped within the National Ambulatory Care Referral System (NACRS) by the principal procedure they received. Additional data was used from the Ontario Case Costing Initiative (OCCI). Evidence such as publications from Canada and other jurisdictions and World Health Organization reports were also used to assist with the patient clusters and the assessment of potential opportunities.

The evidence-based framework assessed patients using four perspectives, as presented in Figure 3. This evidence-based framework has identified QBPs that have the potential to both improve quality outcomes and reduce costs.

Figure 3: Evidence-Based Framework

- Does the clinical group contribute to a significant proportion of total costs?
- Is there significant variation across providers in unit costs/ volumes/ efficiency?
- Is there potential for cost savings or efficiency improvement through more consistent practice?
- How do we pursue quality and improve efficiency?
- Is there potential areas for integration across the care continuum?

- Are there clinical leaders able to champion change in this area?
- Is there data and reporting infrastructure in place?
- Can we leverage other initiatives or reforms related to practice change (e.g. Wait Time, Provincial Programs)?

- Is there a clinical evidence base for an established standard of care and/or care pathway? How strong is the evidence?
- Is costing and utilization information available to inform development of reference costs and pricing?
- What activities have the potential for bundled payments and integrated care?

- Is there variation in clinical outcomes across providers, regions and populations?
- Is there a high degree of observed practice variation across providers or regions in clinical areas where a best practice or standard exists, suggesting such variation is inappropriate?

Practice Variation

The DAD has every Canadian patient discharge, coded and abstracted for the past 50 years. This information is used to identify patient transition through the acute care sector, including discharge locations, expected lengths of stay and readmissions for each and every patient, based on their diagnosis and treatment, age, gender, co-morbidities and complexities and other condition specific data. A demonstrated large practice or outcome variance may represent a significant opportunity to improve patient outcomes by reducing this practice variation and focusing on evidence-informed practice. A large number of 'Beyond Expected Days' for length of stay and a large standard deviation for length of stay and costs, were flags to such variation. Ontario has detailed case costing data for all patients discharged from a case costing hospital from as far back as 1991, as well as daily utilization and cost data by department, by day and by admission.

Availability of Evidence

A significant amount of research has been completed both in Canada and across the world to develop and guide clinical practice. Working with the clinical experts, best practice guidelines and clinical pathways can be developed for these QBPs and appropriate evidence-informed indicators can be established to measure performance.

Feasibility/ Infrastructure for Change

Clinical leaders play an integral role in this process. Their knowledge of the patients and the care provided or required represents an invaluable component of assessing where improvements can and should be made. Many groups of clinicians have already formed and provided evidence and the rationale for care pathways and evidence-informed practice.

Cost Impact

The selected QBP should have no less than 1,000 cases per year in Ontario and represent at least 1 per cent of the provincial direct cost budget. While cases that fall below these thresholds may in fact represent improvement opportunity, the resource requirements to implement a QBP may inhibit the effectiveness for such a small patient cluster, even if there are some cost efficiencies to be found. Clinicians may still work on implementing best practices for these patient sub-groups, especially if it aligns with the change in similar groups. However, at this time, there will be no funding implications. The introduction of evidence into agreed-upon practice for a set of patient clusters that demonstrate opportunity as identified by the framework can directly link quality with funding.

2.4 How will QBPs encourage innovation in health care delivery?

Implementing evidence-informed pricing for the targeted QBPs will encourage health care providers to adopt best practices in their care delivery models, and maximize their efficiency and effectiveness. Moreover, best practices that are defined by clinical consensus will be used to understand required resource utilization for the QBPs and further assist in the development of evidence-informed prices. Implementation of a 'price X volume' strategy for targeted clinical areas will incent providers to:

- Adopt best practice standards;
- Re-engineer their clinical processes to improve patient outcomes; and
- Develop innovative care delivery models to enhance the experience of patients.

Clinical process improvement may include the elimination of duplicate or unnecessary investigations, better discharge planning, and greater attention to the prevention of adverse events, i.e. post-operative complications. These practice changes, together with adoption of evidence-informed practices, will improve the overall patient experience and clinical outcomes, and help create a sustainable model for health care delivery.

3.0 Description of elective aortic aneurysm repair as a quality based procedure

Describe the elective aortic aneurysm repair population group (i.e. inclusion/exclusion criteria).

An aortic aneurysm is a localized bulge or weakness of the aorta which can result in rupture and death. Any artery can be involved but aneurysms most commonly involve the infra renal aorta.

Aortic aneurysm (AA) can occur in both men and women but are more common in men with a male: female ratio of approximately 5:1. Abdominal aortic aneurysms (AAA) are present in 5-10% of men >65 years and are most often asymptomatic. AAA are 5 or 6 fold more common in those with a history of smoking compared to non-smokers.

The major complication is aneurysm rupture, which requires emergency surgery to prevent death. In the United States ruptured AAA is the 13th leading cause of death. The mortality rate after rupture is high – about 50% of patients die before reaching hospital. Of those who reach the hospital alive, approximately 40% die following emergency surgery.

Elective surgical repair of AA aims to prevent death from rupture. AA can be repaired by an open operation (open AA repair) or by a less invasive technique called endovascular aneurysm repair (EVAR).

This QBP is for the provision of the elective repair of non-ruptured aortic aneurysms. Aneurysm repair is separated into 3 groups based on level of anatomical and/or interventional complexity.

The 3 groups are defined as follows:

1. **Standard:** The majority of aneurysms are in this group and are those that involve the infrarenal aortoiliac segment (AAA). Standard aortic aneurysm repair can be identified by a) use of a clamp below the renal arteries during open repair; or, b) use of a standard (non-fenestrated) endograft for EVAR.
2. **Moderate:** Aneurysms requiring moderately advanced open or endovascular techniques and perioperative care. These include aneurysms in the following locations:
    a. Thoracic aorta
    b. Juxtarenal aorta. Juxtarenal aortic aneurysm repair can be identified by a) use of a clamp above the renal arteries during open repair; or, b) use of fenestrated endovascular grafts for EVAR.
    c. Abdominal and iliac aneurysms that require iliac branched devices for repair with or without iliac femoral bypass or aortofemoral bypass.

3. **Advanced:** Aneurysms requiring advanced open or branched endovascular techniques and perioperative care. These include aneurysms in the following locations:
    a. Aortic arch
    b. Thoracoabdominal aorta, i.e. involving both the thoracic and abdominal aorta.

Elective aortic aneurysm repair population.

Most Responsible Diagnosis (MRDx) and Principal Intervention (Tx) codes have been used to identify the patient groups that are best aligned to the definitions for standard, moderate and advanced aortic aneurysm repair. Diagnosis and Intervention codes are from the 2011 Canadian Code Classifications, ICD10-CA MRDx codes and CCI Tx codes.

Inclusion Criteria:

- Only the acute phase of clinical care for both open surgery and endovascular intervention will be addressed.
- Typical and atypical cases.
- Patients equal to or over 20 years of age.
- Both genders and those cases indicated as unknown.
- Ontario resident reported cases that have been performed within an Ontario hospital (acute facility).
- All cases defined as planned/elective admissions, assigned to an inpatient bed, have been diagnosed with the appropriate "most responsible" diagnosis and have received treatment as per the determined "principal" intervention. Applicable diagnosis and intervention codes are provided herein and align with the 3 repair groups described above:

MRDx Codes:
MCC Branch Code = 05, MCC Partition = I:

a) Standard Pathway:
- (I714) – Abdominal Aortic Aneurysm without Rupture: Standard Pathway

b) Moderate Pathway:
- (I712) – Thoracic Aortic Aneurysm without Rupture: Moderate Pathway
- (I719) – Aortic Aneurysm Unspecified Site without Rupture: Moderate Pathway

c) Advanced Pathway:
- (I716) – ThoracoAbdo Aortic Aneurysm without Rupture: Advanced Pathway
  *Note: This pathway includes aneurysms involving the aortic arch.

Principal Tx Codes:

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

Exclusion Criteria:

- Urgent and emergent repair of aortic aneurysms.*
- Post-discharge care.
- Cases reporting no birthdates or discharge dates.
- Ruptured cases with a most responsible diagnosis:
  - (I711) Thoracic Aortic Aneurysm Ruptured;
  - (I713) Abdominal Aortic Aneurysm Ruptured;
  - (I715) Thoracoabdo Aortic Aneurysm Ruptured;
  - (I718) Aortic Aneurysm Unspecified Site Ruptured;
- Out-of-Hospital Interventions.

- Abandoned interventions (status = A).

*Urgent and emergent cases have been excluded since treatment of urgent/ emergent cases may deviate from the described best-practice clinical pathways; moreover, the associated clinical outcomes are often much poorer than what is expected following an elective procedure. Should the scope of this QBP be expanded to include urgent and emergent cases then strategies must be developed to adjust for costs associated with deviation from the described clinical pathway and to adjust the expected outcome. Access to clinical outcomes data captured prospectively in a mandatory non-cardiac vascular outcomes registry will vastly improve the ability to benchmark with the appropriate adjustments.

Describe the evidence-based rationale for choosing elective aortic aneurysm repair as a QBP.

Elective AA repair has been identified as a QBP using the evidence-based selection framework as presented in figure 4.

Figure 4. Evidence-based framework for elective aortic aneurysm repair.

Cost Impact	Feasibility/Infrastructure for Change
In 2010/11YE, there were 1,776 elective AA repairs in Ontario adults at a cost of over $41M. *Note: Costs are based on a provincial costing average of select OCCI hospitals' data.* • There is significant variation of average length of stays and costs for these services (typical patients only). In 2010/11YE the average total repair costs for elective AA repair (AAA and TAAR combined) was $23,148 and the min/max case costs were <$1,000 and >$300,000 respectively. These data include open and endovascular procedures. • Costs of AA repair by EVAR are driven by device costs. Currently, device costs are not uniform across the province. • Due to a wide variation in average lengths of stay and costs between hospitals, following best practices and models of care may initiate cost savings while improving quality and efficiency in the delivery of care to patients. • Centralization of non-cardiac vascular services may be a feasible option as it will create centres of excellence for patients, ensure clinical competency of operators by maintaining a core minimum of cases performed, encourage economies of size and standardize models of care.	• There are clinical leaders in vascular care who are willing to act as champions for positive change. • CCN is building infrastructure and relationships with vascular care providers in the development of a provincial Vascular Care Network. • CCN has MOHLTC support to develop a non-cardiac vascular clinical outcomes registry. • Select elective vascular surgery procedures have been part of the provincial wait times strategy since 2009.

Availability of Evidence	Practice Variation
• Access to EVAR in Ontario: Observations and Recommendations; submitted to the MOHLTC, October 2011. • A Vascular Services Quality Strategy for Ontario: Observations and Recommendations; submitted to the MOHLTC, May 2012. • The Vascular Society of Great Britain and Ireland, AAA Quality Improvement Programme • ACC/AHA Practice Guidelines for the Management of Patients with Peripheral Artery Disease • Canadian Cardiovascular Society Consensus Document on the Management of Peripheral Artery Disease. • Authoritative sources for case costing /unit pricing and clinical utilization data is available for reference. • Payments and integrated care may potentially be bundled by clinical complexity and by case-by-case provisioning for the cost of custom grafts when required.	• Data from 2010/11 YE indicates considerable variation in wait times, case volumes and outcomes: • Hospital AAA case volumes ranged from 1 to 228 procedures. • Hospital TAA case volumes ranged from 1 to 20 procedures. • 13 LHINs offer AA repair with 9 offering both open and endovascular techniques. • Hospital utilization of EVAR ranged from 0% to 76% of all AA cases in 2010/11. • The provincial average total length of stay (LOS) following open AAA repair was 10.2 days and ranged from 3.1 - 12.5 days across hospitals. Following EVAR for AAA the provincial average total LOS was 7.3 days and ranged from 3.0 -11.1 days across hospitals. • The provincial average total LOS following open TAA repair was 11.6 days and ranged from 8.1 – 24.0 days across hospitals. Following EVAR for TAA the provincial average total LOS was 9.43 days and ranged from 3.0 -14.0 days across hospitals. • The average SCU stay following open AAA repair was 68.5 hours and ranged from 14.4 to 130.9 hours across hospitals. Following EVAR for AAA the average SCU stay was 15.8 hours, ranging from 1.6 to 59 hours across hospitals. • The average SCU stay following open TAA repair was 73.8 hours and ranged from 35.7 to 144 hours across hospitals. Following EVAR for TAA the average SCU stay was 52 hours, ranging from 0 to 113.3 hours across hospitals.

	• The identified practice variations would benefit from a provincial strategy that is based on best practices and standards of care. Non-cardiac vascular services would benefit from a coordinated and standardized network environment where providers can collaborate, develop and implement innovative optimized care delivery models to enhance patient outcomes. Essential to the successful deployment of such coordinated action would be a prospectively maintained provincial database to follow designated quality indices.

Describe the application of the evidence-based framework.

Analysis of recent administrative data from Ontario hospitals suggests that there are variations across the province with respect to wait times for elective abdominal aortic aneurysm (AAA) repair, availability and/or utilization of endovascular technology and risk-adjusted clinical outcomes.

Wait Times

Wait time data are an important indicator of patterns of patient access to surgical services. Recommended maximum wait times are established based on patient clinical priority or urgency ranking. Patients are assigned a clinical priority ranking using a defined set of evidence-based criteria. The surgeon assigns the patient a priority based on the criteria and the urgency of the situation (priority 1-4) which indicates the urgency in which intervention is needed. Priority 1 indicates that emergency surgery is required within the next 24 hours – these data are not tracked in the current wait times data. Priorities 2-4 are for non-emergency patients, where the recommended maximum wait time for priority 2 is ≤ 14 days and for priority 3 is ≤ 56 days and priority 4 is ≤ 182 days. In fiscal year 2010/2011 there were 199 priority 2 AAA repairs and 827 priority 3 repairs in Ontario; a priority 3: priority 2 ratio of approximately 4:1. Priority 3: priority 2 ratios across LHINs ranged from 16:1 to 0.8:1. These results may reflect variation in surgeons' allocation of AAA patients to the different priority categories. The average provincial wait time for a priority 2 patient awaiting AAA repair was 40 days and the average wait time ranged from 12 days to 105 days. The average provincial wait time for a priority 3 patient was 48 days, where the average wait time range was 26 days to 245 days.

Risk-Adjusted Clinical Outcomes

To examine variation in clinical outcomes across LHINs, standardized outcome ratio analyses were completed. A standardized ratio (SR) is the ratio of actual outcomes to the number of outcomes that would be expected for a hospital given the demographics and clinical complexities of their patients; where, a SR greater than 1.0 indicates that the outcome, following adjustments for age and comorbidity, occurred at a greater frequency than the provincial average; a SR less than 1.0 indicates that the outcome occurred at a frequency less than the provincial average.

Standardizing outcome ratios allows for meaningful comparisons between hospitals or regions. Here we report standardized ratios for in-hospital mortality, length-of-stay and 30-day readmission. For these analyses, inpatient data from fiscal years 2008/09 and 2009/10 for all patients older than 17 years were used.

The standardized mortality ratio (SMR) for elective EVAR ranged from 0.9 to 3.4. For open repair the SMR ranged from 0.4 to 1.6.

The standardized length-of-stay ratio (SLR) for elective EVAR ranged from 0.7 to 1.4 and from 0.8 to 1.8 for open repair.

The standardized 30-day readmission ratio (SRR) for elective EVAR ranged from 0.7 to 2.9 and from 0.5 to 1.6 for open repair.

Centralization

There is a large body of literature indicating improved clinical outcomes of elective aortic aneurysm repair when done in high-volume dedicated vascular centers.

- Hospital AAA case volumes in Ontario ranged from 1 to 228 procedures in 2010/11.

Technology Utilization

In Ontario, 13 of 14 LHINs have at least one hospital that performs AA repair. The North West LHIN does not have any hospitals that perform AA repair. Of the 13 LHINs with hospitals that perform AA repair, all 13 LHINs have at least one hospital that perform open AA repair compared to only 9 LHINs that contain a hospital that performs EVAR. Hospital utilization of EVAR ranged from 0% to 76% of elective AAA cases.

Ontario data indicates that increasing the proportion of minimally invasive endovascular repair results in:

- Lower in-hospital mortality (0.6% for EVAR; 2 % for open repair);
- Lower length of stay (7.3 days following EVAR for AAA; 10.2 days following open repair of AAA);
- Reduced SCU resource utilization following AAA repair (an average of 15.8 hours per case following EVAR; an average of 68.5 hours per case following open repair);
- Higher proportion of patients being discharged home (95% following EVAR; 89% following open repair).

Inclusion of AA repair as a QBP provides opportunities to ensure equitable access to standardized non-cardiac vascular care across Ontario. Moreover, it provides opportunities to ensure patients receive the best possible care and achieve optimal outcomes. The QBP initiative is in-line with many of the recommendations that were submitted to the MOHLTC in May 2012 by CCN and its Ontario Vascular Services Advisory Committee in the report “A Vascular Services Quality Strategy for Ontario: Observations and Recommendations”.

Quality improvement requires the ability to define the quality indicators to be measured; develop a platform for measurement; and benchmark and track the measured indicators for change. During development of the Vascular Services Quality Strategy for Ontario it was identified that existing data sources are ineffective for this purpose due to the wide variation in coding practices between hospitals and the limitations of contemporary administrative data.

Fundamental to the implementation of the described framework is the ability to continuously monitor and report on outcomes for selected non-cardiac vascular procedures at a hospital, regional and provincial level by way of a clinical non-cardiac vascular outcomes registry. Outcomes should be risk-adjusted to enable meaningful comparisons with common standards and benchmarks as well as comparisons between providers.

A non-cardiac vascular outcomes registry will support the acquisition of data to determine current procedural volumes, case cost and develop projections of future volumes. It will provide a quality tool to aid clinical decision-making, service delivery planning and will be valuable resource for research initiatives.

There is a strong interest within the vascular community and the Cardiac Care Network of Ontario to work together with the Ministry, LHINs and other provincial programs on the development and implementation of a program model that will leverage current expertise, resources, infrastructure and established networks to ensure non-cardiac vascular care is able to fully benefit from provincial oversight and management.

Describe the key objectives of the elective aortic aneurysm repair QBP.

The key objectives of the elective AA repair QBP are to:

- Improve health outcomes of AA patients;
- Manage the cost of surgical and endovascular care for the treatment of AA on the healthcare system;
- Be accountable to patients with AA;
- Ensure equitable access to standardized care for the treatment of AA across Ontario;
- Address service gaps and/or need for capacity and infrastructure management

How will elective aortic aneurysm repair be documented? Is there a need for a new data collection process?

Currently all elective AA repairs performed in Ontario are documented in administrative databases by conventional chart abstraction methods; however, a recent analysis of Ontario hospital administrative data showed remarkable variability in coding and documentation practices. This variability inherently weakens the quality and reliability of data. Moreover, outcomes indicators are limited making it difficult to identify areas in which to focus quality improvement efforts. Recommendations to improve data collection are:

- Provider coding - Vascular surgeons should be classified separately from general surgery, general medicine, cardiac surgery, transplant surgery and thoracic surgery.
- Diagnostic coding - Should be improved to reflect clearly the anatomical location of the aortic aneurysm (e.g. aortic arch, thoracic, thoracoabdominal, abdominal/ infrarenal or aortoiliac segment), whether side arteries are involved (e.g. the renal, visceral or iliac arteries), whether the patient has associated occlusive aortoiliac disease and whether the intervention was to repair a non-rupture aneurysm (elective) or a ruptured aneurysm (emergency).
- Procedure coding - There should be a standard code for open AA repair and a standard code for EVAR. Current open AA repair intervention code definitions include open approach for AA repair, bypass or extraction. Coding should also reflect the complexity of repair, i.e. Standard, Moderate or Advanced as earlier described in this document.
- Collection of patient comorbidities should be improved and correlate with increased costs of hospitalization. Preoperative patient comorbidities and aneurysm morphologic factors that may increase the difficulty of the intervention and the risk of postoperative complications should be documented prospectively in a standardized provincial non-cardiac vascular outcomes registry.

This approach is achievable through the development of a non-cardiac vascular outcomes registry. Adoption of existing North American vascular databases or creation of a risk adjusted Ontario vascular database (that includes AA) is required.

How will clinical documentation change? What are the implications on physician charting on billing and elective AA repair funding?

Currently there are no standardized guidelines or recommendations regarding information recorded onto patient charts by physicians. There have been observations of extreme variability and inaccuracies in the detail included in charts, ultimately impacting the quality of data input into provincial databases. To ensure collection of a predefined data set it is recommended that a coding system be employed and completed by the surgeon or designated individual at the time of intervention. This observation supports the need for a provincial non-cardiac vascular registry.

How were the clinicians engaged? Please describe the process for clinical engagement.

The provincial discharge abstract database was used as the primary source of evidence to describe practice and outcomes variation across Ontario for AA repair. This work was conducted to support the Vascular Services Quality Strategy for Ontario that was submitted by CCN to the MOHLTC in May, 2012. The clinical significance of these data was validated by consensus of the Ontario Vascular Services Advisory Committee which had a membership of vascular surgeons, interventional radiologists and hospital administrators from across Ontario. Subsequent to the work of the Ontario Vascular Services Advisory Committee, CCN convened a Vascular Care Working Group to act on the recommendations of the strategy. The clinical expert panel formed to advise on this QBP was a subcommittee of the Vascular Care Working Group. The most recent available administrative data was used to support the recommendations of this clinical handbook. The clinical expert panel were engaged in this QBP process through face to face meetings, teleconference and email exchange where there was opportunity to review all relevant data and provide input into the content of this handbook. Recommendations of clinical care best practices were derived from available evidence, experience and consensus.

4.0 Best practices[1] guiding the implementation of elective aortic aneurysm repair as a quality based procedure

How were the best practices defined?

Describe the process

Best practice for AA repair was defined using a combination of expert consensus and evaluation of available guidelines and literature (eg. The Vascular Society of Great Britain and Ireland, AAA Quality Improvement Programme; ACC/AHA Practice Guidelines for the Management of Patients with Peripheral Artery Disease; Canadian Cardiovascular Society Consensus Document on the Management of Peripheral Artery Disease).

Provide the 'agreed-upon' pathway for patient treatment

Best Practice Clinical Pathway – Aortic Aneurysm Repair

The following recommended best-practice clinical pathway for AA repair applies to the following patient population:

1. **Standard:** The majority of aneurysms are in this group and are those that involve the infrarenal aortoiliac segment (AAA). Standard aortic aneurysm repair can be identified by a) use of a clamp below the renal arteries during open repair; or, b) use of a standard (non-fenestrated) endograft for EVAR.
2. **Moderate:** Aneurysms requiring moderately advanced open or endovascular techniques and perioperative care. These include aneurysms in the following locations:
    a. Thoracic aorta
    b. Juxtarenal aorta. Juxtarenal aortic aneurysm repair can be identified by a) use of a clamp above the renal arteries during open repair; or, b) use of fenestrated endovascular grafts for EVAR.
    c. Abdominal and iliac aneurysms that require iliac branched devices for repair.
3. **Advanced:** Aneurysms requiring advanced open or endovascular techniques and perioperative care. These include aneurysms in the following locations:
    a. Aortic arch
    b. Thoracoabdominal aorta, i.e. involving both the thoracic and abdominal aorta.

[1] Best practice refers to a combination of best available evidence and clinical consensus

The following recommended best-practice clinical pathway does not apply to repair of ruptured aortic aneurysms.

The patient clinical pathway is not a treatment practice guideline. It is meant to be used by multidisciplinary teams and is focused on quality, coordination and the efficiency of care. The pathway does not replace clinical decision-making.

Comprehensive aneurysm care includes:

Pre-Pathway:

Recommendation to establish protocols and procedures to support population based screening for AAA and surveillance for small aneurysms. As described in the *Vascular Services Quality Strategy for Ontario* other jurisdictions have shown that implementation of a systematic abdominal aortic aneurysm screening program can detect these aneurysms in at-risk patients before they rupture and thus reduce the significant mortality rate from rupture and the high costs associated with treating ruptured aneurysms. Ontario should implement an abdominal aortic aneurysm screening program and educate primary care providers in the guidelines for screening.

Pathway:

A complete assessment of the individual patient is undertaken prior to recommending repair of their aneurysm. This assessment includes physiologic and patient specific factors as well as the anatomic features of the aneurysm itself. Elective repair of aneurysms is a prophylactic procedure to prevent rupture. In order for a patient to benefit from such a prophylactic procedure, they must have a certain life expectancy and the aneurysm must pose sufficient risk to warrant repair. Life expectancy is predicated on comorbidities and generally a minimum 2 year life expectancy is required in order for a patient to benefit from such a prophylactic repair. Predicting risk of aneurysm rupture is an inexact science. There are many variables that contribute; however, the easiest to measure is maximum aortic diameter which is directly related to the risk of aneurysm rupture. Generally, in the average operative risk patient, (Standard infrarenal AAA , as defined previously) elective repair is recommended when the effected aorta reaches 55 mm in largest diameter (50 mm for women), at which point the risk of aneurysm rupture exceeds the perioperative mortality risk. There is less robust data to support diameter thresholds for repair in other areas of the aorta (i.e. aortic arch, thoracic, thoracoabdominal or Moderate or Advanced as defined previously), however a larger diameter (i.e. 60 mm) is generally chosen as the size threshold at which point repair is recommended. Once repair is recommended the choice of technique (open or EVAR) considers patient factors (physiologic and perioperative risk, comorbidities, age, life expectancy, patient choice) and aneurysm factors (anatomy, which is a marker for procedural success and durability).

Pre-Operative:

1. Appropriate physiologic risk assessment/ management of co-morbidities:
    a. Cardiac risk assessment and stratification
        i. Testing could include: 12-lead ECG in patients with documented clinical risk factor(s); LV function test in patients with dyspnea or prior heart failure (HF); non-invasive stress testing in patients with poor (less than 4 METs) or unknown functional capacity and 3 or more clinical risk factors, where clinical risk factors include: ischemic heart disease, compensated or prior HF, diabetes mellitus, renal insufficiency, and cerebrovascular disease.
        ii. Identification of any of the following active cardiac conditions warrants delay or cancellation of non-emergent vascular intervention until cardiac condition improves/ has been stabilized: unstable coronary syndromes, unstable or severe angina, recent MI (within 1-month of planned intervention), decompensated (HF), significant arrhythmias, severe valvular disease.
    b. Respiratory/ pulmonary
        i. Respiratory assessment could include: patient history, physical examination, determination of functional capacity, response to bronchodilators, arterial blood gas analysis.
    c. Renal
        i. Renal function assessment could include: Serum creatinine, creatinine clearance and/ or glomerular filtration rate.
    d. Assessment of atherosclerotic risk factors.
    e. Appropriate anaesthetic/ other specialist assessment as required.
2. Appropriate anatomical imaging must be available, including available CT workstation(s) that allow centerline measurements and multiplanar CT reconstructions.
3. Patient consultation & informed consent. Standardized consent forms would insure that all patients in Ontario receive consistent information from which to inform their decision.

Intra-operative (Standard):

1. Appropriate pre-operative antibiotic delivery and DVT prophylaxis.
2. Procedure undertaken or supervised by an appropriately trained & certified practitioner.
3. Anaesthesia provided by practitioner who is experienced in non-cardiac vascular intervention.
4. Dedicated vascular nurses trained in endovascular procedures.
5. Appropriately equipped and accredited hospital, including: Appropriate endovascular facilities – portable or fixed angiographic imaging unit, floating angiographic table, complete inventory of endovascular equipment.
6. Completion of a pre-operative checklist.
7. Access to sufficiently resourced blood bank & blood conservation tools.

Intra-operative (Moderate and Advanced):

1. Includes those features listed above in Intra-operative (Standard).
2. Access to bypass standby, spinal cord drains and expertise to employ, spinal cord monitoring.
3. Nursing staff appropriately trained in vascular care.

Post-operative:

1. Access to a special care unit or step-down unit.
2. Access to ventilation.
3. Access to inpatient dialysis.
4. Access to inpatient critical care services.
5. Access to interventional cardiology.
6. 24/7 on call coverage by an appropriately trained & experienced surgical practitioner.
7. Access to vascular nurse practitioner, allied health care services and diagnostic services.

Transitional Care:

1. Patient consultation regarding discharge and follow-up planning.
2. Discharge.
3. Access to appropriate community support.

Follow-up:

1. Staple or suture removal.
2. Follow-up visit with most responsible practitioner at 4-6 weeks following procedure. For patients who have had EVAR, a recommended component of the 4-6 week follow-up visit is CT imaging to monitor for graft related complications.
3. Following EVAR, radiologic surveillance should be completed on an annual basis.
4. Following open AA repair, CT imaging should be completed after 5 years.

How does the elective aortic aneurysm repair best practice pathway improve patient outcomes?

The recommendations provided in the elective AA repair QBP pathway will improve patient outcomes by providing provincial standards for care, including minimum resource standards at centres providing services. Implementation of a population based AAA screening program may increase the volume of elective AAA repair; however, will reduce the risk of death due to aortic rupture and reduce the high costs/ poor outcomes associated with ruptured AAA repair. Adopting a standardized best-practice clinical pathway for elective AA repair may reduce the volume of unnecessary testing, both pre and post repair. Risk and anatomic stratification will identify patients who are very high risk and for whom surgery should be avoided since they would be unlikely to benefit and more likely to have complications. For patients considered eligible for repair, risk and anatomic stratification will help determine the most appropriate approach for repair (open or EVAR) that will offer the lowest risk of adverse outcomes for the patient. Appropriate DVT prophylaxis reduces post operative complication of deep vein thrombosis and pulmonary embolism. Improved and standardized postoperative care and discharge planning in dedicated vascular units may result in reduced average length of stay and an increased percentage of patients discharged home. Moreover, mandatory participation in a provincial non-cardiac vascular outcomes registry will enable ongoing surveillance of clinical outcomes and correction of significant variances through continual sharing of best practices. A patient-centric approach will increase communication between health care providers and patients thereby providing opportunities for discussion and will inform patients of next steps and expected outcomes. In other jurisdictions, a focus on HCP-patient communication has improved patient outcomes by reducing patient isolation.

Describe the expert panel chosen to identify and reach consensus on the best practices.

The clinical expert panel formed to identify and reach consensus on the best practices recommended in this QBP handbook was a subcommittee of the CCN Vascular Care Working Group and consisted of vascular specialists from academic and community hospitals in Ontario whom are recognized leaders in non-cardiac vascular care.

5.0 Implementation of best practices

How should the best practices be implemented to ensure standardized and optimal patient care delivery?

Although there is already a high level of care provided to patients having elective AA repair, there are variability's in outcomes and indicators of efficiency across Ontario suggesting opportunities for improvements in the delivery of this core non-cardiac vascular service.

In May 2012, the *Vascular Services Quality Strategy for Ontario* was submitted by CCN to the MOHLTC. This document highlighted some key areas of variability that may be improved through implementation of standardized best practices coupled with appropriate benchmarking and measurement. Results of standardized ratio analyses showed areas of practice and outcome variability for the following: length of stay, 30-day readmission rates, operative mortality and availability and utilization of technology for endovascular intervention. Implementation of standardized best practices may improve system efficiencies and reduce the regional disparities in clinical outcomes, benefiting patients and the health-care system. As a system support to ensure the implementation of best practices for AA repair and other non-cardiac vascular services, formation of a network of non-cardiac vascular care is proposed with the primary goals to enhance quality of care and outcomes and provide timely access for both emergent and elective non-cardiac vascular care. The network should include stakeholders involved in the delivery of services, including multidisciplinary care providers in hospitals and outpatient centers, administrators with a standard approach to support evidence-based and effective diagnostic and therapeutic management for non-cardiac vascular patients and organizations with expertise in emergency referral and management.

A plan for site specific implementation may include:

- A gap assessment of the current standard practice and the recommended best practice recognising the need(s) for change.
- An assessment of the readiness of the institution and possible barriers to implementation.
- Identification of the stakeholders and their required involvement.
- Dedicated individual(s) to provide support for education and implementation.
- Timelines for implementation.
- Forums for discussion and education.
- Roll out plans focused around the unique areas identified for change.
- Follow-up evaluation of progress.
- Participation in a formal provincial non-cardiac vascular network and registry.
- A sustainability plan for maintaining the Best Practice Standards.

Describe data management implications.

Data management would be impacted should there be agreement to mandatory participation in a non-cardiac vascular outcomes registry. The magnitude of an impact is largely dependent on the scale and detail of the registry and whether participation in an existing registry is a suitable option.

6.0 What does it mean for multi-disciplinary teams?

Will elective aortic aneurysm repair have any implication on multi-disciplinary teams (i.e. physicians, nurses, allied health, health records etc.)?

A move towards standardization of best practices for treatment of AA will require individual hospitals to consider a coordinated multidisciplinary approach to non-cardiac vascular care involving a network of care providers with various expertise including but not limited to surgeons, radiologists, nurse practitioners, internal medicine practitioners, anesthesiologists, intensive care practitioners, technologists, pharmacists and allied health provider's to facilitate continuity of inpatient and outpatient care and chronic disease management. Innovative solutions are required to plan for and meet the future non-cardiac vascular care human resource needs and maintain levels of service delivery.

How does the elective aortic aneurysm repair pathway align with clinical practice?

The elective aortic aneurysm repair pathway has been derived from current national guidelines such as those described within the Vascular Society of Great Britain and Ireland, AAA Quality Improvement Programme; the ACC/AHA Practice Guidelines for the Management of Patients with Peripheral Artery Disease and the Canadian Cardiovascular Society Consensus Document on the Management of Peripheral Artery Disease. Also, current elective aortic aneurysm repair protocols in place in Ontario hospitals and the collective experience of the clinical advisory committee shaped the development of the pathway recommended herein. Alignment of these recommendations with current clinical practice will vary across institutions; however, it is felt that many hospitals are currently following similar practices.

Will adoption of the elective aortic aneurysm repair pathway change current clinical practice?

Smaller hospitals that provide vascular services including elective aortic aneurysm repair and those hospitals that only offer open surgical repair may have to adjust their clinical practice if the recommended pathway is adopted. The extent of change to clinical practice will vary based on the individual circumstances of each hospital. Hospitals that perform the highest volumes of elective aortic aneurysm repair are least likely to have to change their clinical practice to adopt the recommended pathway.

7.0 Service capacity planning

How will clinical volume management be affected by QBP funding and/or affect hospital elective aortic aneurysm repair volumes?
How will the new model of budget planning include clinicians?

The impact that QBP based funding will have on hospital volumes of AA repair remains to be determined; however, health service providers (clinicians and administration) will need to continue volume planning. Factors that could affect elective AA repair volumes include population screening for AA as well as a change in the number of hospitals providing AA repair services. Where service providers observe large changes in their desired volumes there should be collaboration between administrators and health care practitioners to determine the appropriate strategies to address new volume targets. The geographic locations of the hospitals that provide non-cardiac vascular services are widely distributed throughout the province; however, the distribution does not necessarily match population density or other demographic factors. The inequality in the provision of non-cardiac vascular services will require re-evaluation regarding resource location and allocation as well as consideration of models of care that can service larger areas with expertise and efficiency such as a “hub and spoke” model or a “Centres of Excellence” model, which is already in place in some regions.

8.0 Performance evaluation and feedback

It is the opinion of our expert work group that the provincial health abstract databases have been designed to capture primarily administrative and procedural information. This design limits the application of these databases to provide valuable information on the quality of clinical outcomes and service provided. To ensure that the most informative data are collected enhancements to the current databases will be necessary or clinical outcomes registries should be developed. The Cardiac Care Network of Ontario and its Vascular Care Work Group (VCWG) have initiated processes to establish a provincial, prospective non-cardiac vascular outcomes database that could be used in a collaborative manner to track standardized performance and to inform development of future non-cardiac vascular quality indicators. CCN and the VCWG are committed to continue to review and develop indicators and methods for collecting standardized data.

Describe the evaluation metrics including quality indicators for elective aortic aneurysm repair.

Currently the quality of care provided to vascular patients who require elective AA repair in Ontario is high, with outcomes comparable or superior to other Canadian and international jurisdictions; however, there are regional discrepancies in the quality of care provided throughout the province. In order to better understand the regional differences, services in need of improvement and to achieve and maintain the highest level of care possible it is imperative that a mechanism is in place to continuously monitor and report outcomes from which improvement strategies can be developed. For this QBP, our expert panel endeavoured to identify quality indicators that will provide the largest insights into areas for care improvement and cost restriction. Four quality indicators (QI's) are recommended that could be implemented immediately (i.e. the data are available and are high quality). As well, other QI's that are important for monitoring quality of care but for which data may not currently be available or, current data appears to contain inherent weaknesses are suggested for future development. The proposed indicators align with the Integrated Quality Based Procedure Scorecard developed by the MOHLTC Health Quality Branch. Detailed technical descriptions of each of the QI's are provided in the accompanying document entitled: *Technical Notes, Recommended Quality Indicators, Non-Cardiac QBPs.*

Quality Indicators for Immediate Implementation:

1. Risk adjusted in-hospital mortality rate.
2. Total length of stay.
3. Percentage of post-operative myocardial infarctions.
4. Peri-operative red blood cell transfusion rates.
5. New dialysis (in-hospital, post-procedure). This QI does not include patients that required dialysis treatments prior to admission for repair of their aortic aneurysm.

Quality Indicators for Future Development:

1. Re-operative rates (those that occur during the incident hospital admission, are unplanned and are required in order to address the aortic aneurysm repair).
2. Maintenance of renal function.
3. Compliance with DVT prophylaxis protocols.
4. Surgical site infection rates.

The QI's recommended herein focus primarily on the QBP scorecard effectiveness and value dimensions. Development of a comprehensive QI program that has the capacity to track and evaluate numerous indicators across each of the ministry scorecard dimensions with high specificity and data quality would be best achieved through the development of a provincial non-cardiac vascular outcomes registry that is tied together with the provincial wait times database. Mandatory participation in the wait times database and a provincial non-cardiac vascular outcomes registry will enable ongoing surveillance of access to care, integration of services across the care continuum, appropriateness of services provided, clinical effectiveness and will enable reliable on-going evaluation of the value of services provided. Moreover, the output of a provincial registry will be relevant and meaningful to clinicians, hospital administrators and government payers.

9.0 Support for Change

Will there be additional supports deployed by the agency/ relevant partners to support adoption of the new funding policy?

Vascular specialists and other health care professionals that provide care for AA patients are highly enthusiastic to create a network within Ontario that will foster and support collaboration, continuous quality improvement and increase efficiencies in non-cardiac vascular care. In 2011 the Cardiac Care Network of Ontario together with Ontario's non-cardiac vascular services providers and other stakeholder groups formed the Ontario Vascular Services Advisory Committee and developed an evidence and consensus-based framework for a provincial quality strategy aimed at improving access to non-cardiac vascular care and non-cardiac vascular health outcomes for Ontarians. The strategy, entitled: "A Vascular Services Quality Strategy for Ontario" was submitted to the MOHLTC in May, 2012.

Development of a provincial non-cardiac vascular care network will have direct and measurable benefit to patients, providers and the government including support of the QBP funding initiative and will:

- Support the aims of ground-breaking quality legislation including the Excellent Care for All Act, 2010.
- Provide a provincially unified focus aimed to improve patient access and outcomes in non-cardiac vascular care and drive quality and accountability of non-cardiac vascular service delivery.
- Create coordinated planning, clinical networks, access, quality reporting and data management resulting in equitable and timely delivery of quality non-cardiac vascular services that are standardized and evidence-based.
- Provide timely baseline and prospective data on the utility of non-cardiac vascular services enabling informed estimates of future needs for these services and understanding of actual and anticipated costs, resulting in focused spending for services.
- Increase systems efficiencies and result in high quality outcomes for non-cardiac vascular patients across Ontario.
- Create a network that will foster an environment where providers can partner to identify and develop evidence-based best practices/standards of care protocols.

CCN remains a committed partner in the efforts to develop a non-cardiac vascular care network and to continue to provide input into the HSFR strategy and lead the change management related to the QBP for elective AA repair.

10.0 Frequently Asked Questions

11.0 Membership

Include membership of the Clinical Expert Advisory Groups and of any relevant supporting/ advisory groups who have assisted in the development of the elective aortic aneurysm QBP.

Vascular Care Clinical & Technical Working Group QBP Sub-Committee	
Dr. Thomas Forbes (Clinical Group Chair)	London Health Sciences Centre
Dr. Andrew Dueck	Sunnybrook Health Sciences Centre
Dr. Thomas Lindsay	University Health Network, Toronto General Hospital
Dr. Marc Pope	Trillium Health Centre
Ms. Nancy Hunter (Technical Group Chair)	Cardiac Care Network of Ontario
Mr. Darren Gerson	Rouge Valley Health System
Ms. Karen Orescanin	Hamilton Health Sciences Centre
Ms. Filomena Travassos	Trillium Health Centre
Ms. Linda Welham	Southlake Regional Health Centre
Ms. Kori Kingsbury	Cardiac Care Network of Ontario
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