

# Quality-Based Procedures: Clinical Handbook for **Knee Arthroscopy**

Health Quality Ontario and  
Ministry of Health and Long-Term Care

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All authors in the Evidence Development and Standards branch at Health Quality Ontario are impartial. There are no competing interests or conflicts of interest to declare.

## About Health Quality Ontario

Health Quality Ontario is an arms-length agency of the Ontario government. It is a partner and leader in transforming Ontario's health care system so that it can deliver a better experience of care, better outcomes for Ontarians, and better value for money.

Health Quality Ontario strives to promote health care that is supported by the best available scientific evidence. Health Quality Ontario works with clinical experts, scientific collaborators, and field evaluation partners to develop and publish research that evaluates the effectiveness and cost-effectiveness of health technologies and services in Ontario.

Based on the research conducted by Health Quality Ontario and its partners, the Ontario Health Technology Advisory Committee (OHTAC)—a standing advisory subcommittee of the Health Quality Ontario Board—makes recommendations about the uptake, diffusion, distribution, or removal of health interventions to Ontario's Ministry of Health and Long-Term Care, clinicians, health-system leaders, and policy makers.

Rapid reviews, evidence-based analyses and their corresponding OHTAC recommendations, and other associated reports are published on the Health Quality Ontario website. Visit <http://www.hqontario.ca> for more information.

## About the Quality-Based Procedures Clinical Handbooks

As legislated in Ontario's *Excellent Care for All Act*, Health Quality Ontario's mandate includes the provision of objective, evidence-informed advice about health care funding mechanisms, incentives, and opportunities to improve quality and efficiency in the health care system. As part of its Quality-Based Funding initiative, Health Quality Ontario works with multidisciplinary Expert Advisory Panels (composed of leading clinicians, scientists, and administrators) to develop evidence-based practice recommendations and define episodes of care for selected disease areas or procedures. Health Quality Ontario's recommendations are intended to inform the Ministry of Health and Long-Term Care's Health System Funding Strategy.

For more information on Health Quality Ontario's Quality-Based Funding initiative, visit <http://www.hqontario.ca>.

## Disclaimer

The content in this document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, the Evidence Development and Standards branch at Health Quality Ontario, and the Expert Advisory Panel on Episode of Care for Patients Undergoing Arthroscopic Knee Surgery. The template for the Quality-Based Procedures Clinical Handbook and all content in the "Purpose" and "Introduction to Quality-Based Procedures" sections were provided in standard form by the Ministry. All other content was developed by HQO with input from the Expert Advisory Panel. As it is based in part on rapid reviews and expert opinion, this handbook may not reflect all the available scientific research and is not intended as an exhaustive analysis. Health Quality Ontario assumes no responsibility for omissions or incomplete analysis resulting from its reports. In addition, it is possible that other relevant scientific findings may have been reported since completion of the handbook and/or rapid reviews. This report is current to the date of the literature search specified in the Research Methods section of each rapid review. This handbook may be superseded by an updated publication on the same topic. A list of all HQO's Quality-Based Procedures Clinical Handbooks is available at: <http://www.hqontario.ca/evidence/publications-and-oh-tac-recommendations/clinical-handbooks>.

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# List of Abbreviations

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<b>ACL</b>	Anterior cruciate ligament
<b>AGREE</b>	Appraisal of Guidelines for Research and Evaluation
<b>CACS</b>	Comprehensive Ambulatory Classification System
<b>CAN</b>	Clinical assessment node
<b>CIHI</b>	Canadian Institute for Health Information
<b>COPD</b>	Chronic obstructive pulmonary disease
<b>ECFAA</b>	<i>Excellent Care for All Act</i>
<b>GRADE</b>	Grading of Recommendations, Assessment, Development, and Evaluation
<b>HBAM</b>	Health-Based Allocation Model
<b>HIG</b>	HBAM Inpatient Grouping
<b>HQO</b>	Health Quality Ontario
<b>HSFR</b>	Health System Funding Reform
<b>IHF</b>	Independent health facility
<b>LOS</b>	Length of stay
<b>NACRS</b>	National Ambulatory Care Reporting System
<b>OHTAC</b>	Ontario Health Technology Advisory Committee
<b>QBP</b>	Quality-based procedure

# Preface

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This document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, Health Quality Ontario (HQO), and HQO's Expert Advisory Panel on Episode of Care for Patients Undergoing Arthroscopic Knee Surgery (Expert Advisory Panel).

The content in the Purpose and Introduction to Quality-Based Procedures sections below were provided in standard form by the Ministry. All other content was developed by HQO with input from the Expert Advisory Panel.

The content of this clinical handbook was developed to conform to the specific deliverables agreed upon by the Ministry and HQO.

In the area of quality-based procedures (QBPs), HQO will:

1. take a provincial leadership role in knowledge translation related to QBP work
2. include in its analyses consultations with clinicians and scientists who have knowledge and expertise in identified priority areas, either by convening a reference group or engaging an existing resource of clinicians/scientists
3. work with the reference group to:
  - a) define the population/patient cohorts for analysis and refine inclusion and exclusion criteria for the QBP, using data to review utilization and length of stay (LOS) trends
  - b) develop clinical best practices for defined QBPs, including transition to the community
  - c) seek consensus on a set of evidence-based clinical pathways and standards of care for each episode of care
4. submit to the Ministry, within the deadlines set by the agreement, a draft report and clinical handbook, including:
  - a) a summary of HQO's clinical engagement process
  - b) guidance on the real-world implementation of the recommended practices contained in the clinical handbook, with a focus on implications for multidisciplinary teams, service-capacity planning considerations, and new data-collection requirements.

The Ministry also asked HQO to make recommendations on performance indicators aligned with the recommended episodes of care, in order to inform the Ministry's QBP Integrated Scorecard and provide guidance on the real-world implementation of the recommended practices in the clinical handbook. The Ministry asked that recommendations focus on implications for multidisciplinary teams, service-capacity planning considerations, and new data-collection requirements.

## Key Principles

Discussions between HQO, the Expert Advisory Panel, and the Ministry established a set of key principles or ground rules to guide this evolving work:

- **The handbook analysis does not involve costing or pricing.** All costing and pricing work related to the QBP funding methodology will be completed by the Ministry using a standardized approach, informed by the content produced by HQO. This principle also extends to the deliberations of the Expert Advisory Panels, where discussions are steered away from considering the dollar cost of particular interventions or models of care and instead focused on quality considerations and non-cost measures of utilization, such as LOS.
- **The scope of this work will extend beyond hospital care to include post-acute and community care.** Recognizing the importance of this issue, the Ministry has communicated that conditions analyzed will span all parts of the continuum of care.
- **Recommended practices, supporting evidence, and policy applications will be reviewed and updated at least every 2 years.** The limited time frame provided for the completion of this work meant that many of the recommended practices in this document could not be assessed with the full rigour and depth of HQO's established evidence-based analysis process. Recognizing this limitation, HQO reserves the right to revisit the recommended practices and supporting evidence at a later date by conducting a full evidence-based analysis or to update this document with relevant newly published research. In cases where the episode-of-care models are updated, any policy applications informed by the models should be similarly updated. Consistent with this principle, the Ministry has stated that the QBP models will be reviewed at least every 2 years.
- **Recommended practices should reflect the best patient care possible, regardless of cost or barriers to access.** HQO and the Expert Advisory Panels have been instructed to focus on defining best practice for an *ideal* episode of care, regardless of cost implications or potential barriers to access. Hence, the resulting cost implications of the recommended episodes of care are not known. However, the Expert Advisory Panels have discussed a number of barriers that will challenge implementation of their recommendations across the province. These include gaps in measurement capabilities for tracking many of the recommended practices, shortages in health human resources, and limitations in community-based care capacity across many parts of the province.

Some of these barriers and challenges are briefly addressed in Implementation of Best Practices, below. However, with the limited time available to address these issues, the considerations outlined here should be viewed only as a starting point for a comprehensive analysis of these challenges.

Finally, HQO and the Expert Advisory Panels recognize that, given the limitations of their mandate, the ultimate effect of the analysis and advice in this document will depend on how the Ministry incorporates it into the QBP policy and funding methodology. This work will be complex, and it will be imperative to ensure that any new funding mechanisms are well-aligned with the recommendations of the Expert Advisory Panels.

In addition to aiding decisions about hospital funding methodology, recommended practices can also provide a basis for broader provincial standards of care for knee arthroscopy patients. These standards could be linked not only to funding mechanisms, but to other health-system change levers, such as guidelines and care pathways; performance measurement and reporting; program planning; and quality improvement.



# Purpose

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*Provided by the Ministry of Health and Long-Term Care*

This clinical handbook offers a compendium of the evidence-based rationale and clinical consensus driving the development of the policy framework and implementation approach for knee arthroscopy patients seen in hospitals.

This handbook is intended for a clinical audience. It is not, however, intended to be used as a clinical reference guide and will not replace existing guidelines and funding applied to clinicians. Evidence-informed pathways and resources have been included in this handbook for your convenience.

# Introduction to Quality-Based Procedures

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*Provided by the Ministry of Health and Long-Term Care*

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

Ontario's health care system has been facing global economic uncertainty for a considerable time. Simultaneously, 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 to high-quality care, the *Excellent Care for All Act* (ECFAA) received royal assent in June 2010. The ECFAA aims to improve the patient experience by providing patients with the right evidence-informed health care at the right time and in the right place. The ECFAA positions Ontario to implement reforms and develop the levers needed to deliver high-quality, patient-centred care.

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

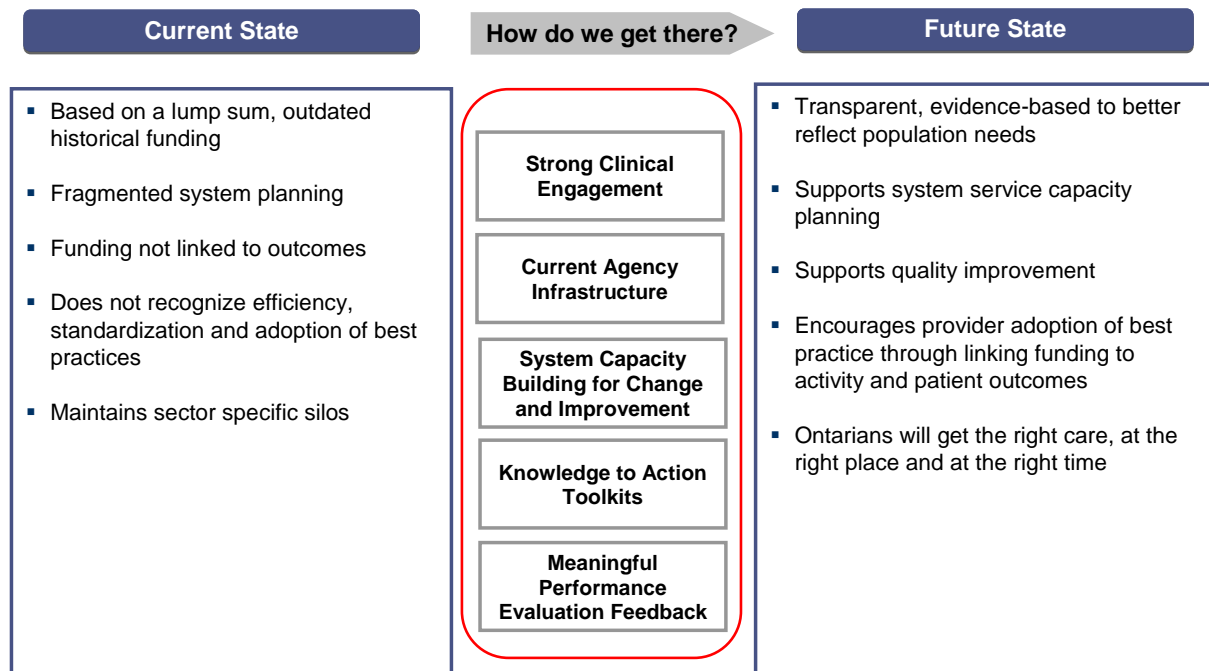
# What Are We Moving Toward?

Before HSFR was introduced, much hospital funding was allocated through a global funding approach, with specific funding for selected provincial programs and wait time services. However, a global funding approach reduces incentives for health service providers to adopt best practices that result in better patient outcomes in a cost-effective manner.

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

Models of patient-based funding have been implemented internationally 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 the lessons others learned during implementation, thus creating a funding model that is best suited for Ontario.

Patient-based funding supports system-capacity planning and quality improvement by directly linking funding to patient outcomes. Patient-based funding 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.



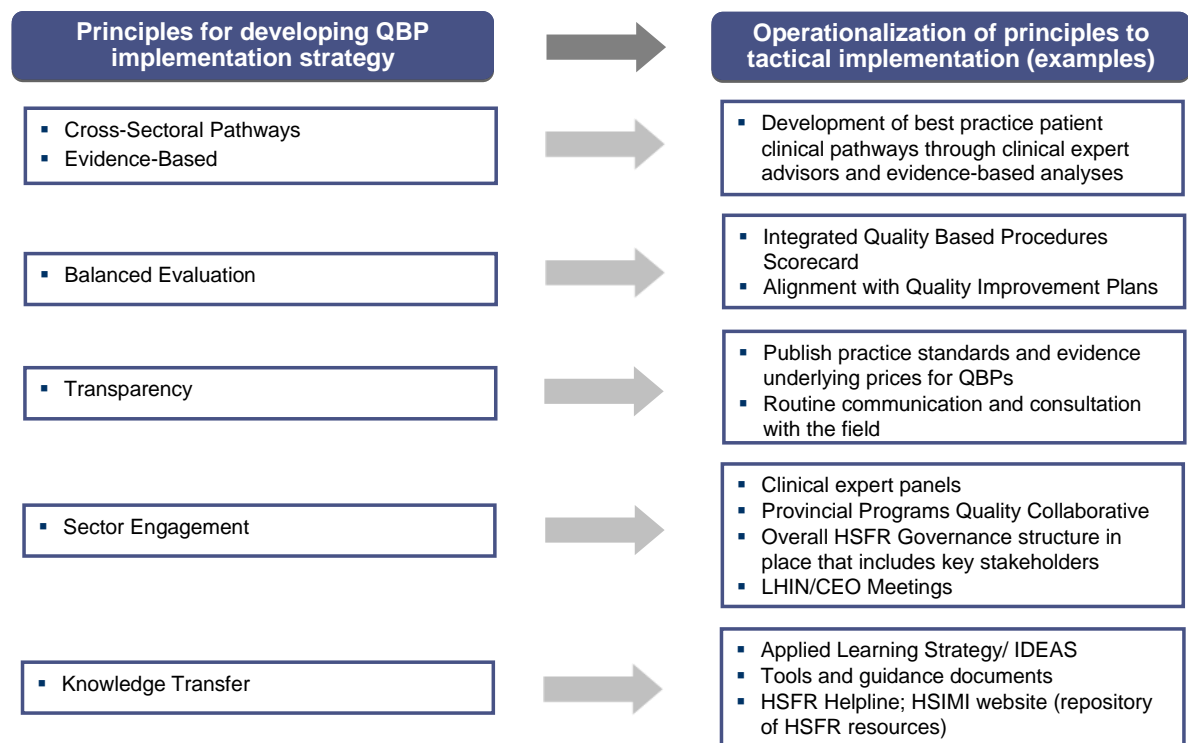
**Figure 1: Current and Future States of Health-System Funding**

# How Will We Get There?

The Ministry of Health and Long-Term Care has adopted a 3-year implementation strategy to phase in a patient-based funding model and will make modest funding shifts starting in fiscal year 2012/2013. A 3-year outlook has been provided to support planning for upcoming funding policy changes.

The Ministry has released a set of tools and guidelines to further support providers adopting the funding model changes. For example, a 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.

Successful transition from the current provider-centred funding model toward 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 (Figure 2).



**Figure 2: Principles Guiding Implementation of Quality-Based Procedures**

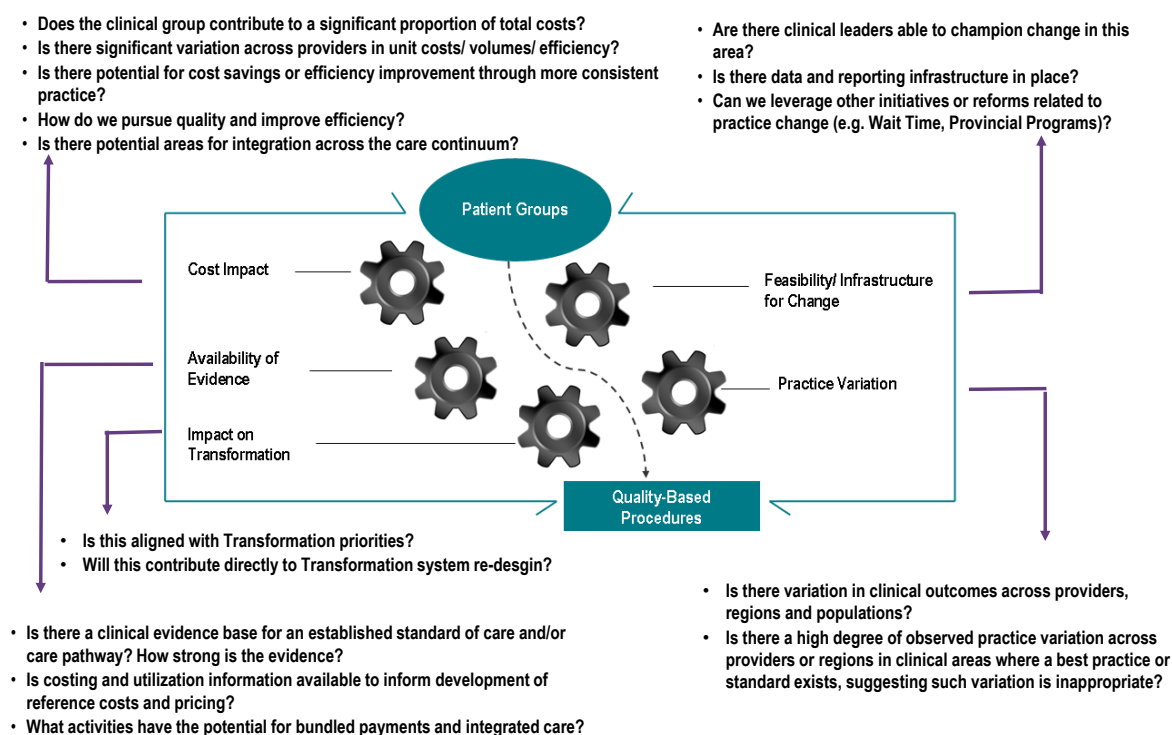
Abbreviations: CEO, chief executive officer; HSFR, Health System Funding Reform; HSIMI, Health System Information Management and Investment; IDEAS, Improving the Delivery of Excellence Across Sectors; LHIN, Local Health Integration Network; QBP, quality-based procedures.

# What Are Quality-Based Procedures?

Quality-based procedures involve clusters of patients with clinically related diagnoses or treatments. Knee arthroscopy was chosen as a QBP using an evidence- and quality-based selection framework that identifies opportunities for process improvements, clinical redesign, improved patient outcomes, enhanced patient experience, and potential cost savings.

The evidence-based framework used data from the Discharge Abstract Database adapted by the Ministry of Health and Long-Term Care for its Health-Based Allocation Model (HBAM) repository. The HBAM Inpatient Grouper (HIG) groups inpatients according to diagnosis or treatment for most of their inpatient stay. Day surgery cases are grouped in the National Ambulatory Care Reporting System (NACRS) by the principal procedure they received. Additional data were used from the Ontario Case Costing Initiative. Evidence in publications from Canada and from other jurisdictions and in World Health Organization reports was also used to determine patient clusters and to assess potential opportunities.

The evidence-based framework assessed patients using 5 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**

## **Practice Variation**

The Discharge Abstract Database stores every Canadian patient discharge, coded and abstracted, for the past 50 years. This information is used to identify patient transition through acute care, including discharge locations, expected LOS, and readmissions for every patient on the basis of their diagnosis and treatment, age, sex, comorbidities and complexities, and other condition-specific data. A demonstrated large practice or outcome variance could represent an opportunity to improve patient outcomes by reducing this practice variation and focusing on evidence-informed practice. A large number of “beyond expected days” for LOS and a large standard deviation for LOS and costs are 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 resource use and cost data by department, by day, and by admission.

## **Availability of Evidence**

Much Canadian and international research has been undertaken to develop and guide clinical practice. By use of these recommendations and those of 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 are integral to 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 provided rationale-for-care pathways and evidence-informed practice.

## **Cost Impact**

The selected QBP should have no fewer than 1,000 cases yearly in Ontario and represent at least 1% of the provincial direct cost budget. While cases that fall below these thresholds could, in fact, represent opportunity for improvement, the resource requirements to implement a QBP can inhibit the effectiveness for such a small patient cluster, even if some efficiencies could be found. Clinicians might still work on implementing best practices for these patient subgroups, especially if they align 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.

## **How Will Quality-Based Procedures Encourage Innovation?**

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 use for the QBPs and further assist in developing evidence-informed pricing.

Implementation of a “price x volume” strategy for targeted clinical areas will motivate providers to:

- adopt best practice standards
- re-engineer their clinical processes to improve patient outcomes
- develop innovative care delivery models to enhance the experience of patients

Clinical process improvement can include better discharge planning, eliminating duplicate or unnecessary investigations and paying greater attention to the prevention of adverse events (e.g., postoperative 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.

# Methods

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## Overview of Episode-of-Care Analysis Approach

To produce this work, HQO has developed a novel method known as an *episode-of-care analysis* that draws conceptually and methodologically from several of HQO’s core areas of expertise:

- **Health technology assessment:** Recommended practices incorporate components of HQO’s evidence-based analysis method and draw from the recommendations of the Ontario Health Technology Advisory Committee (OHTAC).
- **Case-mix grouping and funding methodology:** Cohort and patient group definitions use clinical input to adapt and refine case-mix methods from the Canadian Institute for Health Information (CIHI) and the Ontario HBAM.
- **Clinical practice guidelines and pathways:** Recommended practices synthesize guidance from credible national and international bodies, with attention to the strength of evidence supporting each guideline.
- **Analysis of empirical data:** Expert Advisory Panel recommendations were supported by descriptive and multivariable analysis of Ontario administrative data (e.g., Discharge Abstract Database and NACRS) and data from disease-based clinical data sets (e.g., the Ontario Stroke Audit and Enhanced Feedback for Effective Cardiac Treatment databases). HQO works with researchers and Ministry analysts to develop analyses for the Expert Advisory Panel’s review.
- **Clinical engagement:** All aspects of this work were guided and informed by leading clinicians, scientists, and administrators with a wealth of knowledge and expertise in the clinical area of focus.
- **Performance indicators:** HQO has been asked to leverage its expertise in performance indicators and public reporting to support the development of measurement frameworks to manage and track actual performance against recommended practices in the episodes of care.

The development of the episode-of-care analysis involves the following key steps:

1. defining the cohort and patient stratification approach
2. defining the scope of the episode of care
3. developing the episode-of-care model
4. identifying recommended practices, including the rapid review process

The following sections describe each of these steps in further detail.

### Defining the Cohort and Patient Stratification Approach

At the outset of this project, the Ministry of Health and Long-Term Care provided HQO with a broad description of an assigned clinical population (e.g., “stroke”), and asked HQO to work with Expert Advisory Panels to define inclusion and exclusion criteria for the cohort they would examine using data from routinely reported provincial administrative databases. Each of these populations might encompass multiple distinct subpopulations (referred to as “patient groups”) with varying clinical characteristics. For example, the congestive heart failure population includes subpopulations with heart failure, myocarditis, and cardiomyopathies. These patient groups have very different levels of severity, different treatments, and different distributions of expected resource use. Consequently, these groups could need different funding policies.



Conceptually, the process employed here for defining cohorts and patient groups shares many similarities with methods used around the world for the development of case-mix methodologies, such as Diagnosis-Related Groups or CIHI's Case Mix Groups. Case-mix methodologies have been used since the late 1970s to classify patients by similarities in clinical characteristics and in resource use for the purposes of payment, budgeting, and performance measurement. (1) Typically, these groups are developed using statistical methods such as classification and regression tree analysis to cluster patients with similar diagnoses, procedures, ages, and other variables. After the initial statistical criteria have been established, clinicians are often engaged to ensure that the groups are clinically meaningful. Patient groups are merged, split, and otherwise reconfigured until the grouping algorithm reaches a satisfactory compromise between cost prediction, clinical relevance, and usability. Most modern case-mix methodologies and payment systems also include a final layer of patient complexity factors that modify the resource weight (or price) assigned to each group upward or downward. These can include comorbidity, use of selected interventions, long- or short-stay status, and social factors.

In contrast with these established methods for developing case-mix systems, the approach the Ministry asked HQO and the Expert Advisory Panels to undertake is unusual in that patient classification begins with the input of clinicians rather than with statistical analysis of resource use. The Expert Advisory Panels were explicitly instructed not to focus on cost considerations, and instead to rely on their clinical knowledge of patient characteristics that are commonly associated with differences in indicated treatments and expected resource use. Expert Advisory Panel discussions were also informed by summaries of relevant literature and descriptive tables containing Ontario administrative data.

On the basis of this information, the Expert Advisory Panels recommended a set of inclusion and exclusion criteria to define each disease cohort. Starting with identifying the *International Classification of Diseases*, 10th Revision (Canadian Edition) (ICD-10-CA) diagnosis codes included for the population, the Expert Advisory Panels then excluded diagnoses with treatment protocols that would differ substantially from those of the general population, including pediatric cases and patients with very rare disorders. Next, the Expert Advisory Panels recommended definitions for major patient groups within the cohort. Finally, the Expert Advisory Panels identified patient characteristics that they believed would contribute to additional resource use for patients in each group. This process generated a list of factors ranging from commonly occurring comorbidities to social characteristics, such as housing status.

In completing the process described above, the Expert Advisory Panels encountered some noteworthy challenges:

- **Absence of clinical data elements capturing important patient complexity factors:** The Expert Advisory Panels quickly discovered that several important patient-based factors related to the severity of patients' conditions or to expected resource use are not routinely collected in Ontario hospital administrative data. These include both key clinical measures (such as ratio of forced expiratory volume in 1 second to forced vital capacity for chronic obstructive pulmonary disease [COPD] patients and AlphaFIM<sup>®1</sup> scores for stroke patients) and important social characteristics (such as caregiver status). (2) For stroke and congestive heart disease, some of these key clinical variables have been collected in the past through the Ontario Stroke Audit and Enhanced Feedback for Effective Cardiac Treatment data sets,

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<sup>1</sup> The Functional Independence Measure is a composite measure consisting of 18 items assessing 6 areas of function. These fall into 2 basic domains; physical (13 items) and cognitive (5 items). Each item is scored on a 7-point Likert scale indicative of the amount of assistance required to perform each item (1 = total assistance, 7 = total independence). A simple summed score of 18–126 is obtained where 18 represents complete dependence / total assistance and 126 represents complete independence.

respectively. However, these data sets were limited to a group of participating hospitals and at this time are not funded for future data collection.

- **Limited focus on a single disease or procedure grouping within a broader case-mix system:** While the Expert Advisory Panels were asked to recommend inclusion and exclusion criteria for only specified populations, the patient populations assigned to HQO are a small subset of the many patient groups under consideration for QBPs. Defining population cohorts introduced some additional complications; after the Expert Advisory Panels had recommended their initial definitions (based largely on diagnosis), the Ministry informed the Expert Advisory Panels that several other patient groups that were planned for future QBP funding efforts overlapped with the cohort definitions.

For example, while nearly all patients discharged from hospital with a Most Responsible Diagnosis of COPD receive largely ward-based medical care, a few patients diagnosed with COPD receive much more costly interventions, such as lung transplants or resections. On the basis of this substantially different use of resources, the Ministry's HBAM algorithm assigns these patients to a group different from the general COPD population. Given this methodologic challenge, the Ministry requested that the initial cohorts defined by the Expert Advisory Panels be modified to exclude patients that receive selected major interventions. These patients are likely to be assigned to other QBP patient groups in the future. This document presents both the initial cohort definition defined by the Expert Advisory Panels and the modified definition recommended by the Ministry.

In short, the final cohorts and patient groups described here should be viewed as a compromise based on currently available data and the parameters of the Ministry's HBAM grouping.

## Defining the Scope of the Episode of Care

HQO's episode-of-care analysis draws on a conceptual theory from the emerging worldwide use of episode-based approaches for performance measurement and payment. Averill et al, (1) Hussey et al, (3) and Rosen and Borzecki (4) describe the key parameters required for defining an appropriate episode of care:

- **Index event:** The event or time point triggering the start of the episode. Examples of index events include admission for a particular intervention, presentation at the emergency department, or diagnosis of a particular condition.
- **Endpoint:** The event or time point triggering the end of the episode. Examples of endpoints include death, 30 days after hospital discharge, or a "clean period" with no relevant health care service use for a defined window of time.
- **Scope of services included:** Although an "ideal" episode of care might capture all health and social care interventions received by the patient from index event to endpoint, in reality not all these services may be relevant to the objectives of the analysis. Hence, the episode could exclude some types of services such as prescription drugs or services tied to other unrelated conditions.

Ideally, the parameters of an episode of care are defined on the basis of the nature of the disease or health problem studied and the intended applications of the episode (e.g., performance measurement, planning, or payment). For HQO's work, many of the key parameters of the episode are set in advance by the Ministry through the government's QBP policy parameters. For example, the QBPs currently focus on reimbursing acute care and do not include payments for physicians or other non-hospital providers. These policy parameters limited flexibility to examine non-hospital elements, such as community-based care or readmissions.

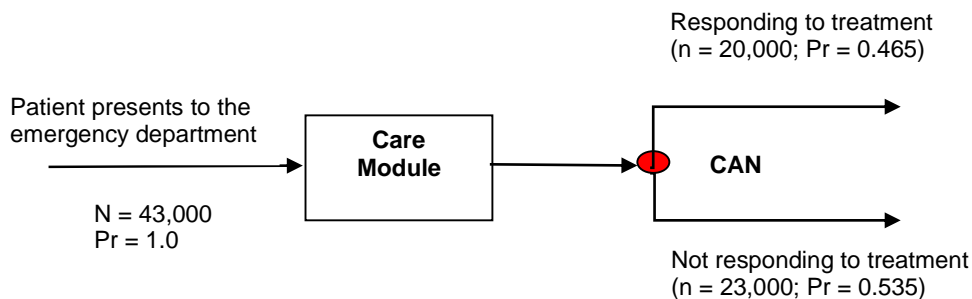
## Developing the Episode-of-Care Model

HQO has developed a model that brings together key components of the episode-of-care analysis through an integrated schematic. The model is structured around the parameters defined for the episode of care, including boundaries set by the index event and endpoints, segmentation (or stratification) of patients into the defined patient groups, and relevant services included in the episode. The model describes the pathway of each patient case included in the defined cohort, from initial presentation through segmentation into one of the defined patient groups on the basis of their characteristics, and finally through the subsequent components of care that patients receive before reaching discharge or endpoints otherwise defined.

Although the model bears some resemblance to a clinical pathway, it is not intended to be used as a traditional operational pathway for implementation in a particular setting. Rather, the model presents the critical decision points (clinical assessment nodes [CANs]) and phases of treatment (care modules) in the episode of care. Clinical assessment nodes provide patient-specific criteria for whether a particular case proceeds down 1 branch of the pathway or another. Once a particular branch is determined, a set of recommended practices is clustered together as a care module. Care modules represent the major phases of care that patients receive during a hospital episode, such as treatment in the emergency department, care on the ward, and discharge planning. The process for identifying the recommended practices within each CAN and care module is described in the next section.

Drawing from the concepts of decision analytic modelling, the episode-of-care model includes crude counts and proportions of cases proceeding down each branch of the pathway model. For the knee arthroscopy clinical handbook, these counts were determined on the basis of utilization data from administrative databases including the Discharge Abstract Database and NACRS. These counts are based on current Ontario practice and are not intended to represent normative or ideal practice. For some clinical populations, evidence-informed targets have been set at certain CANs for the proportions of cases that should ideally proceed down each branch. For example, a provincial target has been set for 90% of hip and knee replacement patients to be discharged home (versus discharged to an inpatient rehabilitation setting) from acute care, on the basis of a 2005 OHTAC recommendation. Where relevant, these targets have been included in the episode-of-care model.

Figure 4 provides examples of a care module and CAN.



**Figure 4: Episode-of-Care Model**

Abbreviations: CAN, clinical assessment node; N, crude count; Pr, proportion.

## Identifying Recommended Practices, Including the Rapid Review Process

### *Consideration of Evidence Sources*

Several evidence sources were considered and presented to the Expert Advisory Panel to develop the episode-of-care model and populate individual modules with best practice recommendations. Preference was given to OHTAC recommendations. Where OHTAC recommendations did not exist, additional evidence sources were sought, including guidelines from other evidence-based organizations, HQO rapid reviews, empirical analysis of Ontario data, and, where necessary and appropriate, expert consensus.

### **OHTAC Recommendations**

The OHTAC recommendations are considered the gold standard of evidence for several reasons:

- **Consistency:** While many guidance bodies issue disease-specific recommendations, OHTAC provides a common evidence framework across all the clinical areas analyzed in all disease areas.
- **Economic modelling:** OHTAC recommendations are often supported by economic modelling to determine the cost-effectiveness of an intervention, whereas many guidance bodies assess only effectiveness.
- **Decision determinants framework:** OHTAC recommendations are guided by a decision determinants framework that considers the clinical benefit offered by a health intervention, in addition to value for money; societal and ethical considerations; and economic and organizational feasibility.
- **Context:** In contrast with recommendations and analyses from international bodies, OHTAC recommendations are developed specifically for Ontario. This ensures that the evidence is relevant to the Ontario health system.

### **Clinical Guidelines**

Published Canadian and international guidelines that encompass the entirety of the knee arthroscopy pathway were searched with guidance from HQO medical librarians. Additionally, the Expert Advisory Panel was further consulted to ensure all relevant guidelines were identified.

The methodological rigour and transparency of clinical practice guidelines were evaluated by use of the Appraisal of Guidelines for Research and Evaluation (AGREE) II instrument. (5) AGREE II comprises 23 items organized into 6 quality domains—scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence. (5) The AGREE II domain scores provide information about the relative quality of the guideline. A score of 1 indicates an absence of information or poor reporting; a score of 7 indicates exceptional reporting that meets all criteria. Guidelines were selected for inclusion on the basis of individual AGREE scores, with an emphasis on the rigour of development score, which reflects the methods used to assess the quality of evidence supporting the recommendations. The final selection of guidelines aims to include a minimum of 1 contextually relevant guideline (i.e., a Canadian guideline) and 3 to 4 highest quality guidelines, when available.

The contextually relevant guideline served as the baseline and was directly compared with the other included guidelines. The quality of the evidence supporting each recommendation, as assessed and reported by the published guidelines, was identified, and inconsistencies and gaps between recommendations were noted for potential further evaluation.

### **Rapid Reviews**

Where there was inconsistency between guidelines, disagreement among Expert Advisory Panel members, or uncertainty about evidence, an HQO evidence review was considered. Recognizing that a full evidence-based analysis would be impractical for all topics, a rapid review of evidence was used to identify the best evidence within the compressed timeframe of developing the entire episode-of-care pathway (rapid reviews for the Clinical Handbook for Knee Arthroscopy are available online at <http://www.hqontario.ca/evidence/evidence-process/episodes-of-care#knee-arthroscopy>). Where a rapid review was deemed insufficient or inappropriate to answer the research question, a full evidence-based analysis was considered.

### **Analysis of Administrative and Clinical Data**

In addition to evidence reviews of the published literature, the Expert Advisory Panel also examined the results of descriptive and multivariable regression analysis using Ontario administrative and clinical data sets. Analyses modelling such patient characteristics as age, diagnoses, and procedures were developed for their association with such outcomes of interest as LOS, resource use, and mortality. Dependent (outcome) and independent variables for analysis were identified by Expert Advisory Panel members on the basis of their clinical experience and their review of summaries of the literature evaluating the association between patient characteristics and a range of outcomes. The Expert Advisory Panel also provided advice on the analytical methods used, including data sets included and the most functional forms of the variables.

Other analyses reviewed included studies of current utilization patterns, such as average hospital LOS and regional variation across Ontario in admission practices and hospital discharge settings.

### **Expert Consensus**

The Expert Advisory Panel assessed the best evidence for the Ontario health care system to arrive at the best practice recommendations (see Recommended Practices for Knee Arthroscopy, below). Where the available evidence was limited or nonexistent, recommendations were made on the basis of consensus agreement by the Expert Advisory Panel.

# Description of Knee Arthroscopy

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Damage to the soft tissues of the knee joint, such as the menisci and ligaments, can lead to significant pain and limited ability to participate in everyday activities and sport. (6;7) Arthroscopic surgery of the knee is a minimally invasive procedure that may be 1 treatment option for appropriate patients. (8) It involves the use of a fibre-optic scope inserted into the knee through a small incision; the image is projected onto a screen and is used to guide the surgeon. (8) The most common arthroscopic procedures include removal or repair of the meniscal cartilage and reconstruction of a torn anterior cruciate ligament (ACL) (see Knee Arthroscopy Cohort Definition and Utilization Analysis, below). Other arthroscopic knee procedures include removal of loose fragments of bone or removal of inflamed synovial tissue. (8)

In Ontario, approximately 32,000 knee arthroscopies are conducted annually, of which approximately 97% are conducted in an outpatient setting (see Knee Arthroscopy Cohort Definition and Utilization Analysis, below).

# Knee Arthroscopy Cohort Definition and Utilization Analysis

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## Knee Arthroscopy Cohort Definition

Health Quality Ontario established a definition for the knee arthroscopy patient cohort using data elements routinely recorded in Ontario hospital administrative datasets. To inform the recommended cohort, HQO worked with the Expert Advisory Panel to review a range of analyses drawn from international literature and Ontario-based administrative data, including lists of CIHI procedure codes and descriptive data on the characteristics of the knee arthroscopy population.

From these descriptive analyses, we stratified patients using characteristics such as diagnosis and procedure code. We also assessed demographic and utilization information for all strata, including age; sex; relative proportion of day surgery and inpatient admissions for each procedure; and average cost per case as reported in the Ontario Case Costing Initiative (9) and through standardized measurement units of expected cost derived from the CIHI Comprehensive Ambulatory Classification System (CACS) and CIHI Case Mix Groups Plus (CMG+) methodologies. (10)

As an elective surgical procedure, arthroscopic knee surgery cases are chiefly identified in hospital administrative data by the presence of a procedure code designating an arthroscopic knee intervention. Many types of surgical knee interventions are performed arthroscopically, including meniscectomy, debridement, and ligament repairs. Within this procedure-based population, patients may receive operations for a number of different primary diagnoses, including ligament tears, meniscal tears, osteoarthritis, degenerative meniscal disorders, and other disorders.

Through the iterative process previously described in the Methods section, the Expert Advisory Panel arrived at several key decisions regarding the knee arthroscopy cohort definition:

- 1. Exclude non-elective knee arthroscopies:** Most arthroscopic knee procedures are elective. A relatively small number of arthroscopic knee surgeries are urgent or emergent (nearly always on an inpatient basis), but these tend to have significantly higher case costs, longer inpatient LOS, and a higher proportion of traumatic diagnoses. The Expert Advisory Panel agreed that the episode of care for urgent and emergent cases was substantially different than that of elective cases, and opted to exclude urgent and emergent cases from consideration.
- 2. Include all age ranges:** While the average age of all patients undergoing knee arthroscopy procedures in 2012/2013 was 48.1 years, patients receiving meniscus and knee joint procedures averaged 51.7 years of age and patients undergoing ligament and patella procedures averaged 28.9 years of age. (11) Ligament procedures are most often performed to treat recent sports or work injuries, while meniscus and knee joint procedures are most often performed to treat long-standing degenerative conditions.
- 3. Subdivide the overall population into 2 major groups—meniscus and knee joint procedures (Group 1), and ligament and patella procedures (Group 2):** After reviewing a range of descriptive subgroup analyses (see Analysis of Patient Characteristics and Utilization Patterns, below), a consistent theme emerged in comparisons: patients who received arthroscopic knee surgery to repair ligament disorders (mainly affecting the ACL but also including posterior cruciate ligament and collateral ligament) tended to have significantly higher costs than other groups, particularly the more common meniscal procedure group. (11) This finding held true regardless of whether the ligament disorder subgroup was identified by ligament procedure code or by ligament-related diagnosis. These analytic results were consistent with the Expert Advisory

Panel's clinical experience that ligament repair cases are more complex than others (including post-acute rehabilitation). The Expert Advisory Panel also opted to include patella procedures in this "more complex" category (a much smaller subgroup).

- 4. Do not subdivide the population beyond the 2 major groups identified above:** The Expert Advisory Panel reviewed other potential procedure-based subgroupings (e.g., subdividing the meniscal population into patients who receive meniscus-only versus knee joint-only versus combined meniscus and knee joint procedures), but found that these slight refinements were not clinically relevant overall; the trajectories of care were similar, and further subdivision did not reveal significant differences in costs beyond those already captured in the 2 groups described above. For example, combined ligament and meniscus procedures were not significantly more costly than ligament-only procedures.

### Scope of the Episode of Care

Although the episode of care selected for analysis begins before the patient's admission to hospital for surgery (starting at referral for an orthopedic knee consultation, instead), the Expert Advisory Panel's recommendations apply mainly to patients who are eventually admitted to hospital for surgery. Patients who do not receive surgery (e.g., who are referred for an orthopedic consultation but deemed unfit for surgery or elect not to proceed with surgery) were not included in the cohort definition. For the purposes of this analysis, we established the episode of care by working backwards from a hospital record that met the inclusion and exclusion criteria of the cohort definition.

While previous episodes of care developed by HQO established a fixed time frame for the episode of care (e.g., 90 days following a patient's presentation at hospital with hip fracture) the Expert Advisory Panel decided that the duration of the knee arthroscopy episode of care would depend largely on the outcomes of interest. For example, physiotherapy or exercise following the procedure would likely be completed within 30 days, but long-term outcomes such as reoperation rates might be examined for up to 2 years post-procedure.

## Recommended Knee Arthroscopy Patient Groups

The knee arthroscopy cohort definition included cases with the procedure-listed codes below as either the Main Intervention in NACRS (day surgery cases) (11) or the Principal Procedure in the Discharge Abstract Database (inpatient cases), (11) with the following exclusions:

- **Non-elective cases:** The Expert Advisory Panel opted not to include urgent or emergent cases (see Knee Arthroscopy Cohort Definition, above).
- **Cases that were not assigned to 1 of the following case-mix groups:**
  - HIG groups 323, 325, 332, 342 (inpatient cases)
  - CACS group C301, 302, 303 (day surgery cases)

These criteria excluded a small percentage of cases (< 2% in fiscal year 2012/2013) that typically receive other major procedures in addition to knee arthroscopic procedures (e.g., amputations and osteotomies) and therefore have different clinical and cost profiles. (11) The Ministry of Health and Long-Term Care's HIG and CACS case-mix group definitions provided a practical way of excluding these cases, as they were assigned to different case-mix groups from a core set used for the vast majority of knee arthroscopy procedures.

As noted above, the Expert Advisory Panel recommended that the overall knee arthroscopy population be subdivided into 2 major patient groups based on the type of procedure performed:



- **Group 1:** Meniscus and knee joint procedures
- **Group 2:** Ligament and patella procedures

The following subsections outline the Canadian Classification of Interventions (12) procedure codes that define the 2 patient groups.

### **Knee Arthroscopy Patient Group 1: Meniscus and Knee Joint Procedures**

#### ***Pharmacotherapy (Local), Knee Joint***

- 1.VG.35.DA-D1
- 1.VG.35.DA-D2
- 1.VG.35.DA-D3

#### ***Drainage, Knee Joint***

- 1.VG.52.DA

#### ***Removal of Device, Knee Joint***

- 1.VG.55.DA-NW

#### ***Procurement, Knee Joint***

- 1.VG.58.DA

#### ***Release, Knee Joint***

- 1.VG.72.DA

#### ***Reduction, Knee Joint***

- 1.VG.73.DA

#### ***Fixation, Knee Joint***

- 1.VG.74.DA-NV
- 1.VG.74.DA-KD
- 1.VG.74.DA-NW

#### ***Repair, Knee Joint***

- 1.VG.80.DA
- 1.VG.80.DA-XX-A
- 1.VG.80.DA-XX-Q
- 1.VG.80.DA-XX-K
- 1.VG.80.DA-XX-N
- 1.VG.80.FY
- 1.VG.80.FY-XX-A
- 1.VG.80.FY-XX-Q
- 1.VG.80.FY-XX-K

- 1.VG.80.FY-XX-N
- 1.VG.80.GZ
- 1.VG.80.GZ-XX-K

***Transfer, Knee Joint***

- 1.VG.83.DA-XX-A
- 1.VG.83.DA-XX-P

***Excision Partial, Knee Joint***

- 1.VG.87.DA
- 1.VG.87.GB

***Repair, Meniscus of Knee***

- 1.VK.80.DA
- 1.VK.80.DA-XX-A
- 1.VK.80.DA-W3
- 1.VK.80.DA-XX-K
- 1.VK.80.DA-FH

***Excision Partial, Meniscus of Knee***

- 1.VK.87.DA

***Excision Total, Meniscus of Knee***

- 1.VK.89.DA

***Inspection, Knee Joint***

- 2.VG.70.DA

***Biopsy, Knee Joint***

- 2.VG.71.DA

***Biopsy, Meniscus of Knee***

- 2.VK.71.DA

**Knee Arthroscopy Patient Group 2: Ligament and Patella Procedures**

***Repair by Decreasing Size, Cruciate Ligaments of Knee***

- 1.VL.78.DA-KK
- 1.VL.78.FY-KK

***Repair, Cruciate Ligaments of Knee***

- 1.VL.80.DA-XX-A
- 1.VL.80.FY-XX-A

- 1.VL.80.DA-KD-A
- 1.VL.80.FY-KD-A
- 1.VL.80.DA-NW-A
- 1.VL.80.FY-NW-A
- 1.VL.80.DA-FH-A
- 1.VL.80.FY-FH-A
- 1.VL.80.DA-XX-K
- 1.VL.80.FY-XX-K
- 1.VL.80.DA-KD-K
- 1.VL.80.FY-KD-K
- 1.VL.80.DA-NW-K
- 1.VL.80.FY-NW-K
- 1.VL.80.DA-FH-K
- 1.VL.80.FY-FH-K
- 1.VL.80.DA-XX-N
- 1.VL.80.FY-XX-N
- 1.VL.80.DA-KD-N
- 1.VL.80.FY-KD-N
- 1.VL.80.DA-NW-N
- 1.VL.80.FY-NW-N
- 1.VL.80.DA-FH-N
- 1.VL.80.FY-FH-N
- 1.VL.80.DA-XX-Q
- 1.VL.80.FY-XX-Q
- 1.VL.80.DA-KD-Q
- 1.VL.80.FY-KD-Q
- 1.VL.80.DA-NW-Q
- 1.VL.80.FY-NW-Q
- 1.VL.80.DA-FH-Q
- 1.VL.80.FY-FH-Q
- 1.VL.80.DA-FH
- 1.VL.80.FY-FH
- 1.VL.80.DA

***Excision Partial, Cruciate Ligaments of Knee***

- 1.VL.87.DA
- 1.VL.87.GB

***Repair by Decreasing Size, Collateral Ligaments of Knee***

- 1.VM.78.DA-KK
- 1.VM.78.FY-KK

***Repair, Collateral Ligaments of Knee***

- 1.VM.80.DA-XX-A
- 1.VM.80.DA-KD-A
- 1.VM.80.DA-NW-A
- 1.VM.80.DA-FH-A
- 1.VM.80.DA-XX-K
- 1.VM.80.DA-KD-K
- 1.VM.80.DA-NW-K
- 1.VM.80.DA-FH-K
- 1.VM.80.DA-XX-N
- 1.VM.80.DA-KD-N
- 1.VM.80.DA-NW-N
- 1.VM.80.DA-FH-N
- 1.VM.80.DA-XX-Q
- 1.VM.80.DA-KD-Q
- 1.VM.80.DA-NW-Q
- 1.VM.80.DA-FH-Q
- 1.VM.80.DA-FH
- 1.VM.80.DA
- 1.VM.80.FY-XX-A
- 1.VM.80.FY-KD-A
- 1.VM.80.FY-NW-A
- 1.VM.80.FY-FH-A
- 1.VM.80.FY-XX-K
- 1.VM.80.FY-KD-K
- 1.VM.80.FY-NW-K
- 1.VM.80.FY-FH-K
- 1.VM.80.FY-XX-N
- 1.VM.80.FY-KD-N
- 1.VM.80.FY-NW-N
- 1.VM.80.FY-FH-N
- 1.VM.80.FY-XX-Q
- 1.VM.80.FY-KD-Q
- 1.VM.80.FY-NW-Q
- 1.VM.80.FY-FH-Q
- 1.VM.80.FY-FH

***Excision Partial, Collateral Ligaments of Knee***

- 1.VM.87.DA
- 1.VM.87.GB

***Repair by Decreasing Size, Cruciate With Collateral Ligaments of Knee***

- 1.VN.78.DA-KK
- 1.VN.78.FY-KK

***Repair, Cruciate With Collateral Ligaments of Knee***

- 1.VN.80.DA-XX-A
- 1.VN.80.DA-KD-A
- 1.VN.80.DA-NW-A
- 1.VN.80.DA-FH-A
- 1.VN.80.DA-XX-K
- 1.VN.80.DA-KD-K
- 1.VN.80.DA-NW-K
- 1.VN.80.DA-FH-K
- 1.VN.80.DA-XX-N
- 1.VN.80.DA-KD-N
- 1.VN.80.DA-NW-N
- 1.VN.80.DA-FH-N
- 1.VN.80.DA-XX-Q
- 1.VN.80.DA-KD-Q
- 1.VN.80.DA-NW-Q
- 1.VN.80.DA-FH-Q
- 1.VN.80.DA-FH
- 1.VN.80.DA
- 1.VN.80.FY-XX-A
- 1.VN.80.FY-KD-A
- 1.VN.80.FY-NW-A
- 1.VN.80.FY-FH-A
- 1.VN.80.FY-XX-K
- 1.VN.80.FY-KD-K
- 1.VN.80.FY-NW-K
- 1.VN.80.FY-FH-K
- 1.VN.80.FY-XX-N
- 1.VN.80.FY-KD-N
- 1.VN.80.FY-NW-N
- 1.VN.80.FY-FH-N

- 1.VN.80.FY-XX-Q
- 1.VN.80.FY-KD-Q
- 1.VN.80.FY-NW-Q
- 1.VN.80.FY-FH-Q
- 1.VN.80.FY-FH

***Excision Partial, Cruciate With Collateral Ligaments of Knee***

- 1.VN.87.DA
- 1.VN.87.GB

***Release, Patella***

- 1.VP.72.DA

***Repair, Patella***

- 1.VP.80.DA

***Excision Partial, Patella***

- 1.VP.87.DA

***Biopsy, Patella***

- 2.VP.71.DA

***Biopsy, Cruciate With Collateral Ligaments of Knee***

- 2.VN.71.DA

## **Analysis of Patient Characteristics and Utilization Patterns**

To inform their recommendations, the Expert Advisory Panel reviewed a number of different analyses of the knee arthroscopy patient population that were developed using Ontario administrative data. The following section presents some of the key analyses reviewed by the Expert Advisory Panel, along with their interpretation of the results. These analyses were developed iteratively over the course of 4 Expert Advisory Panel meetings, in parallel with finalizing the cohort definition; thus, the definitions and groupings used for knee arthroscopy diagnoses and procedures differed slightly between analyses.

Table 1 presents patient characteristics for the 2 recommended patient groups, highlighting significant differences between them. In fiscal year 2012/2013, over 6 times as many meniscus and knee joint procedures as ligament and patella procedures were performed. (11) As well, nearly 5 times as many patients undergoing ligament and patella procedures were under the age of 18, consistent with the traumatic injury diagnoses (e.g., sports- or work-related injuries) that characterize much of the ligament procedure population.

The data describing the utilization profiles of these 2 groups supported the Expert Advisory Panel's initial clinical intuition that ligament and patella procedures are more complex and costly. Ligament and patella procedures were conducted on an inpatient basis more than 4 times as often as meniscal procedures (9.8% versus 2.3%, respectively). (11) In the day surgery cases that made up the majority

of both groups, the average case cost of ligament and patella procedures was more than twice that of meniscus and knee joint procedures. Interestingly, there was less difference between average costs for inpatient procedures; Expert Advisory Panel members suggested that inpatient costs were likely to be similar for Group 1 and Group 2 because both procedure types involve a similar LOS (typically 1 day), and much of the inpatient cost is driven by nursing and other services that are similar for both; day surgery costs are driven mainly by the cost of implants and operating room time.

**Table 1: Knee Arthroscopy Patient Characteristics (FY 2012/2013)**

	<b>Group 1: Meniscus and Knee Joint Procedures</b>	<b>Group 2: Ligament and Patella Procedures</b>
Total cases	27,542	4,462
Males	15,730 (57.1%)	2,762 (61.9%)
<b>Age</b>		
< 18	714 (2.6%)	648 (14.5%)
18–35	3,417 (12.4%)	2,626 (58.9%)
36–45	4,392 (15.9%)	786 (17.6%)
46–55	8,640 (31.4%)	349 (7.8%)
56–65	6,959 (25.3%)	49 (1.1%)
> 65	3,420 (12.4%)	4 (0.1%)
<b>Mean Case Cost<sup>1</sup></b>		
Inpatient	\$4,171	\$4,900
Day surgery	\$1,358	\$3,254
<b>Most Responsible Diagnosis</b>		
Osteoarthritis	3,284 (11.9%)	27 (0.6%)
Degenerative disorders	15,538 (56.4%)	187 (4.2%)
Ligament injury	331 (1.2%)	3,080 (69.0%)
Recent trauma	1,628 (5.9%)	821 (18.4%)
Treatment/device complication	110 (0.4%)	107 (2.4%)
Chondropathies	1,297 (4.7%)	31 (0.7%)
Other derangement/disorder of knee	5,161 (18.7%)	205 (4.6%)
Other	193 (0.7%)	4 (0.1%)

Abbreviation: CIHI, Canadian Institute for Health Information; FY, fiscal year.

<sup>1</sup>All costs in Canadian dollars.

Source: CIHI National Ambulatory Care Reporting System and Discharge Abstract Database, retrieved from CIHI. (11)

Note: Parts of this material are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions, and statements expressed herein are those of the author, and not necessarily those of the Canadian Institute for Health Information.

Table 1 illustrates the composition of the 2 patient cohorts by diagnosis, illustrating dramatic differences in diagnostic profiles: not surprisingly, the ligament and patella group was dominated by diagnoses related to ligament injuries and recent trauma, but these diagnoses made up relatively small proportions of the meniscal procedures group. The majority of patients receiving meniscus and knee joint procedures had “degenerative” or progressively worsening meniscal disorders. There may be some ambiguity in assignment between the subgroup with degenerative disorders and the next

largest diagnosis group by volume: those with derangements or disorders of the meniscus or other anatomy around the knee. Osteoarthritis patients made up the next largest group.

Before establishing the 2 recommended patient groups, the Expert Advisory Panel reviewed analyses that compared measures of utilization among a wider range of subgroups. Table 2 describes a set of 8 patient subgroups: 5 meniscus and knee joint procedures and 3 ligament and patella procedures. (11) Based on these data, the Expert Advisory Panel determined that there were no significant cost differences between types of meniscus and knee joint procedures, or combinations of ligament and patella procedures.

**Table 2: Knee Arthroscopy Patient Subgroups, Day Surgery Only (FY 2012/2013)**

Procedure Group (NACRS Main Intervention)	N	% of Cases	% of Total Costs	Average Cost per Case (OCCI 2010/2011) (9)
1. Meniscus <b>and</b> knee joint procedure	18,615	58.1%	52.7%	\$1,329
2. Meniscus procedure <b>only</b>	4,351	13.6%	12.1%	\$1,293
3. Knee joint procedure <b>only</b>	4,596	14.3%	13.0%	\$1,326
4. Ligament <b>and</b> meniscus procedure	2,502	7.8%	13.0%	\$3,348
5. Ligament procedure <b>only</b>	1,487	4.6%	7.7%	\$3,066
6. Diagnostic <b>only</b>	309	1.0%	0.9%	\$1,275
7. Patella procedure	91	0.3%	0.3%	\$1,712
8. Other procedure	77	0.2%	0.2%	Censored

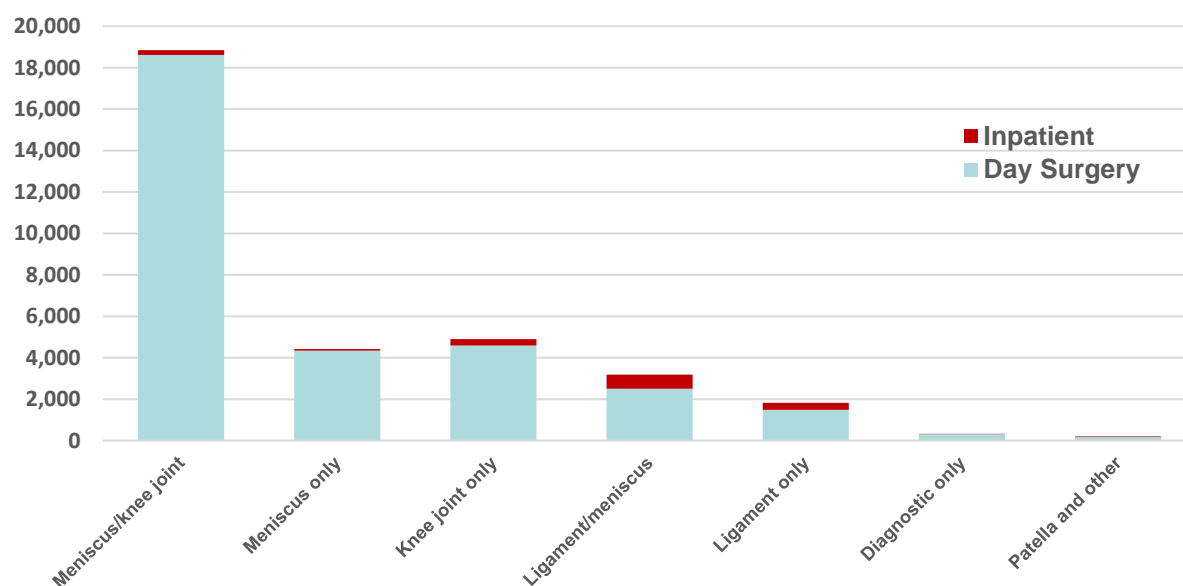
Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year; OCCI, Ontario Case Costing Initiative; NACRS, National Ambulatory Care Reporting System.

Source: CIHI National Ambulatory Care Reporting System, retrieved from CIHI. (11)

Note: Parts of this material are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions, and statements expressed herein are those of the author, and not necessarily those of the Canadian Institute for Health Information.



The Expert Advisory Panel noted that each of the procedure subgroups described in Table 2 had a different mix of inpatient and day surgery cases. Figure 5 illustrates these differences by proportion of total volume. While meniscus and knee joint procedures had larger overall volumes than ligament procedures, they had fewer inpatient cases relative to ligament procedures. (11)



**Figure 5: Knee Arthroscopy Procedure Subgroups: Inpatient vs. Day Surgery (FY 2012/2013)**

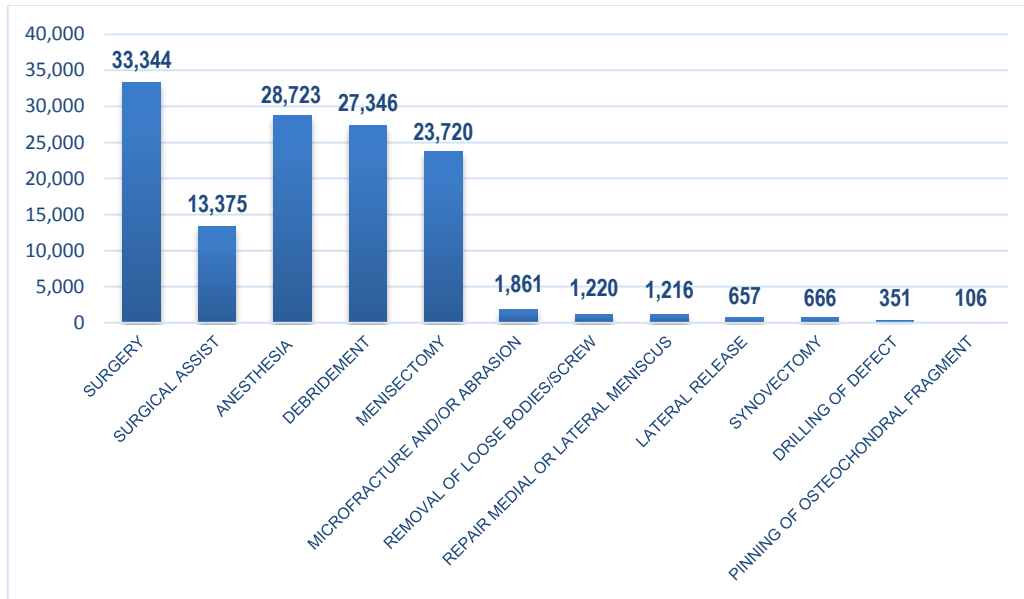
Abbreviation: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System and Discharge Abstract Database, retrieved from CIHI. (11)

Note: Parts of this material are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions, and statements expressed herein are those of the author, and not necessarily those of the Canadian Institute for Health Information.

The tables and figures above present knee arthroscopy patient and utilization data extracted from the day surgery and acute inpatient hospital datasets, but members of the Expert Advisory Panel commented early in their deliberations that many of the CIHI Canadian Classification of Interventions procedure codes were not meaningful to the typical orthopedic surgeon, who is used to the procedure classifications used in the Ontario Health Insurance Plan (OHIP) Schedule of Benefits for physician billing. (13) Figure 6 presents an analysis of fiscal year 2011/2012 physician billing codes related to knee arthroscopy procedures, limited to those used only in conjunction with knee arthroscopy. Ligament repair procedures were not included, because their billing codes did not differentiate between arthroscopic and open-approach surgeries.

It should be noted that the first 3 codes in Figure 6 (Surgery, Surgical Assist, Anesthesia) are those associated with the base knee arthroscopy setup, while the codes following (e.g., Debridement, Meniscectomy) are billed in conjunction with the setup codes. Debridement and meniscectomy were the highest-volume knee arthroscopy procedures billed in 2011/2012. (11) Other procedures, such as microfracture repair and synovectomy, were billed far less frequently.

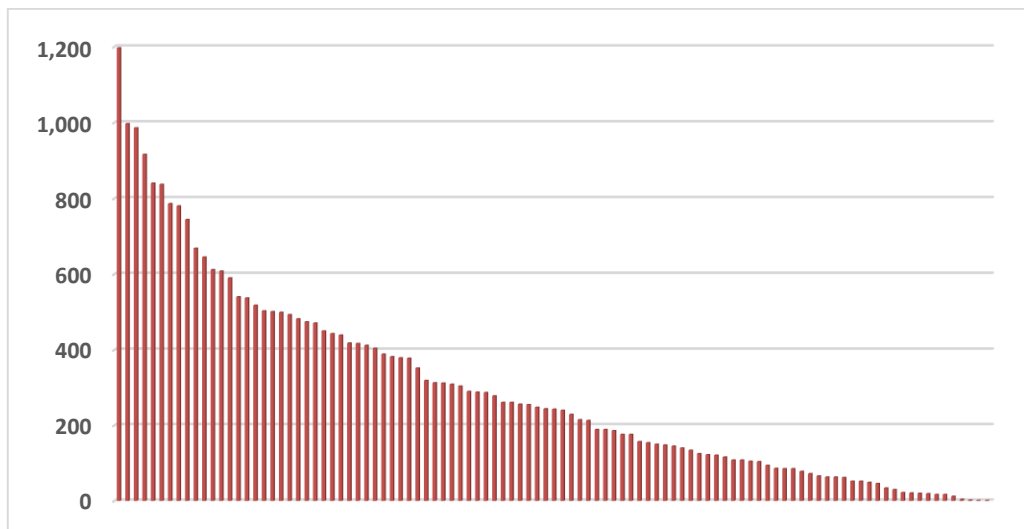


**Figure 6: Knee Arthroscopy Procedures by OHIP Physician Billing Code (FY 2011/2012)**

Abbreviations: FY, fiscal year; OHIP, Ontario Health Insurance Plan.

Source: Ontario Health Insurance Plan Medical Services Table, retrieved from IntelliHealth. (13)

Expert Advisory Panel members were interested in the distribution of knee arthroscopy volumes across Ontario hospitals. In 2012/2013, 103 different facilities provided at least 1 procedure. (11) Unlike some more complex surgical procedures (which tend to be highly centralized in a few hospitals), knee arthroscopies were performed in varying volumes across a wide variety of hospital types (Figure 7).



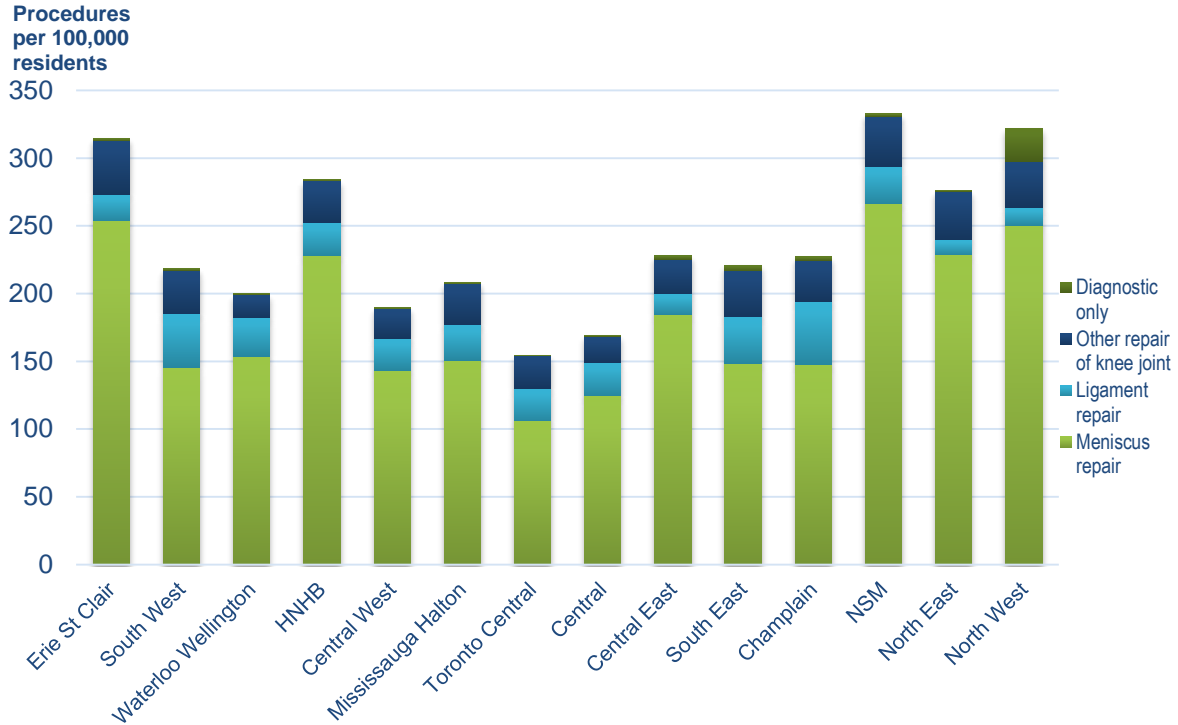
**Figure 7: Annual Total Volume of Knee Arthroscopy Day Procedures by Hospital (FY 2012/2013)**

Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System, retrieved from CIHI. (11)

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The Expert Advisory Panel was also interested in the distribution of knee arthroscopy volumes by region. Figure 8 shows 2012/2013 knee arthroscopy volumes by Local Health Integration Network of the patient receiving the procedure. (11) These figures are not standardized for age and sex, but they do suggest significant regional variation in procedure rates.



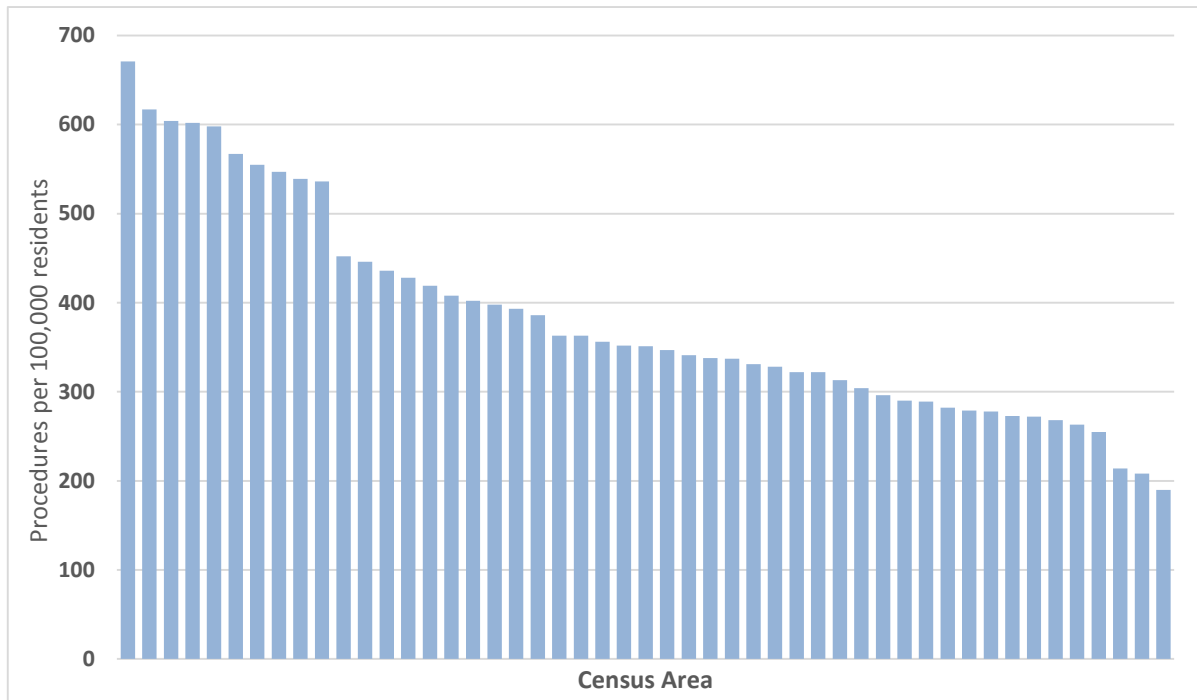
**Figure 8: Volume of Knee Arthroscopy Day Procedures by LHIN of Patient Residence (FY 2012/2013)**

Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year; HNHB, Hamilton Niagara Haldimand Brant; LHIN, Local Health Integration Network; NSM, North Simcoe Muskoka.

Source: CIHI National Ambulatory Care Reporting System, retrieved from CIHI. (11)

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Figure 9 presents age-/sex-standardized rates of meniscus and knee day procedures by resident census area. (11) The graph suggests that even with demographic standardization, there is a more than 3-fold variation in knee arthroscopy rates across Ontario regions.



**Figure 9: Age-/Sex-Standardized Rates of Meniscus/Knee Day Procedures by Census Area (FY 2012/2013)**

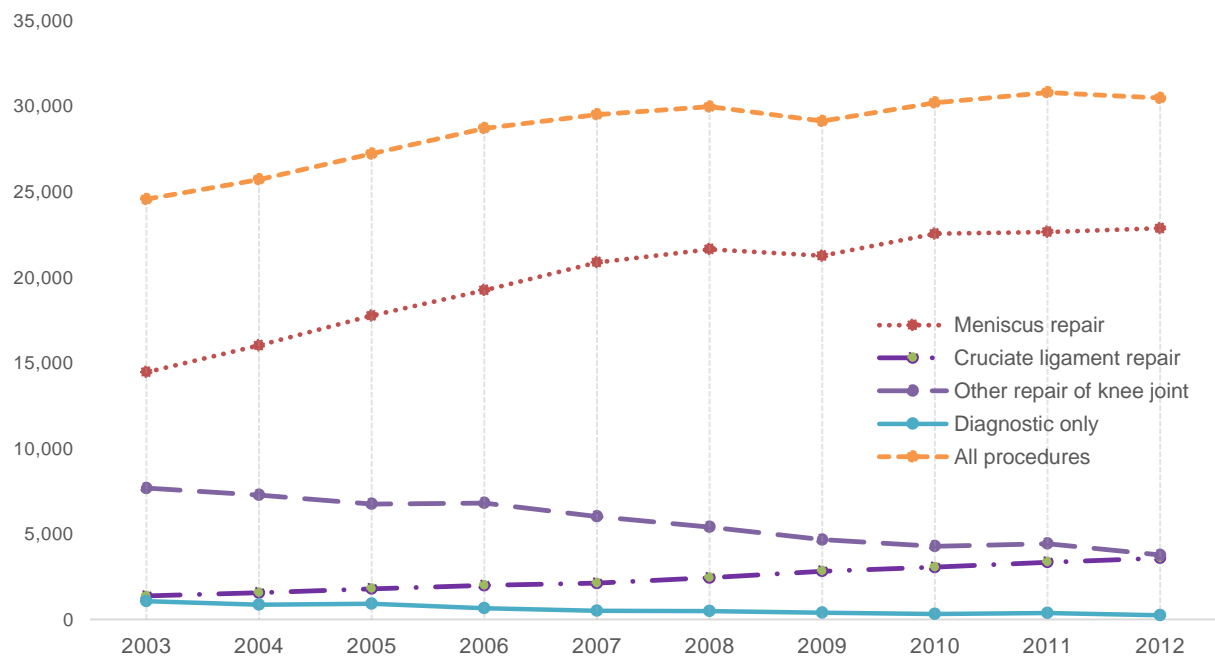
Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System, retrieved from CIHI. (11)

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## Historical Utilization Trends

To inform their recommendations about the ideal “future state” of knee arthroscopy in Ontario, the Expert Advisory Panel sought information about historical trends in knee arthroscopy utilization. Figure 10 illustrates historical trends in knee arthroscopy day procedures in Ontario, from fiscal years 2003/2004 to 2012/2013. (11) While the overall annual volume of knee arthroscopy procedures increased by 24% over those 10 years, trends differed by procedure: meniscus procedures increased by 58%, while other types of knee joint repair decreased by 50% over the same period. Most dramatically, the annual volume of arthroscopic ligament repairs increased by 161%; the Expert Advisory Panel noted that over this period there was a significant shift from inpatient to day surgery for these procedures. The use of knee arthroscopy for diagnostic-only purposes dropped by 76%; the Expert Advisory Panel commented that with the wider availability of diagnostic imaging (such as magnetic resonance imaging and computed tomography scans) there is now very little reason to use knee arthroscopy for diagnosis.



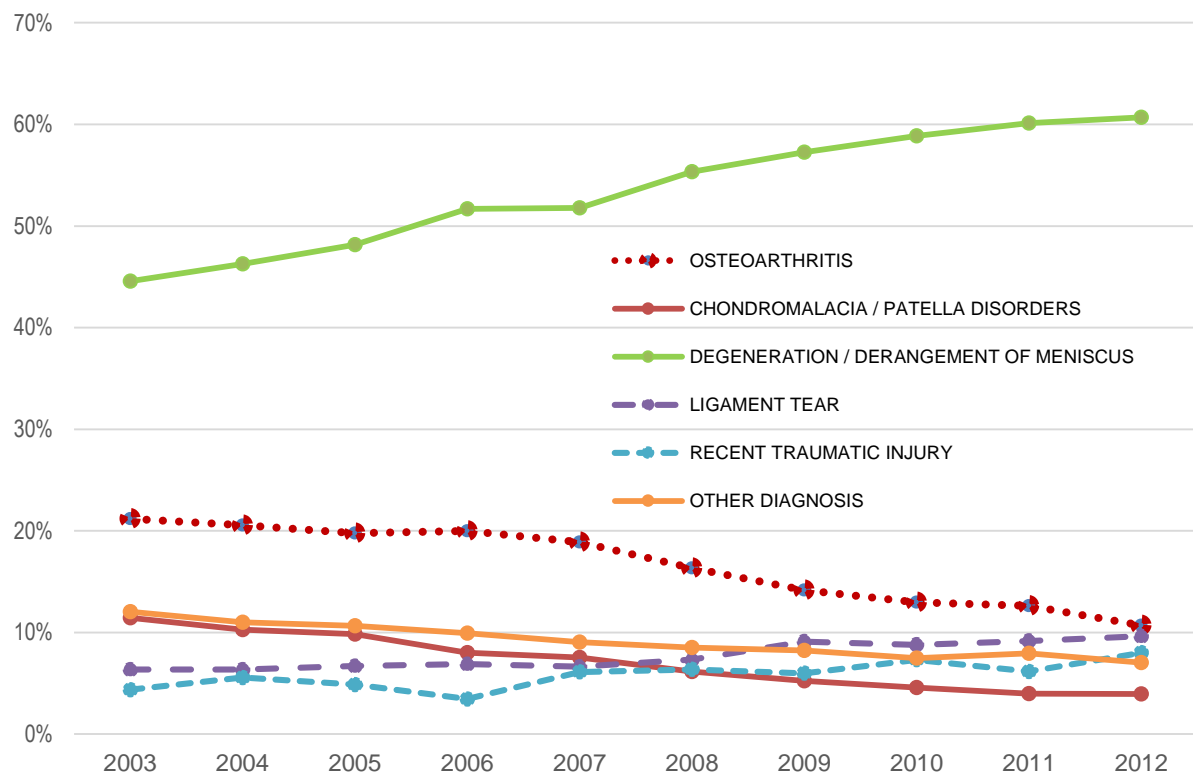
**Figure 10: Knee Arthroscopy Day Surgery Procedures: 10-Year Trend (FY 2003/2004 to FY 2012/2013)**

Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System, retrieved from CIHI. (11)

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In parallel with the longitudinal shifts in volume of different arthroscopic knee procedures, there have also been historical changes in primary diagnoses for patients receiving knee arthroscopy. Figure 11 illustrates the diagnoses coded for arthroscopic knee day procedures over the same decade (fiscal years 2003/2004 to 2012/2013). (11) Notably, the figure illustrates an increase in the proportion of cases coded with degeneration or derangement of meniscus and a dramatic decrease in the proportion of cases coded with osteoarthritis. The Expert Advisory Panel commented that during this period, several highly influential clinical trials were published that raised doubts about the effectiveness of knee arthroscopy to treat osteoarthritis; in 2005, an OHTAC recommendation made similar conclusions. These changes may indicate a shift in practice away from providing arthroscopic knee surgery for patients with osteoarthritis, but they may also be suggestive of a change in diagnostic coding, as many patients with underlying osteoarthritis also present with signs of degeneration or derangement of the meniscus and may have been increasingly assigned degenerative/derangement diagnoses.



**Figure 11: Knee Arthroscopy Day Surgery Procedures by Proportion Coded in Each Diagnosis: 10-Year Trend (FY 2003/2004 to FY 2012/2013)**

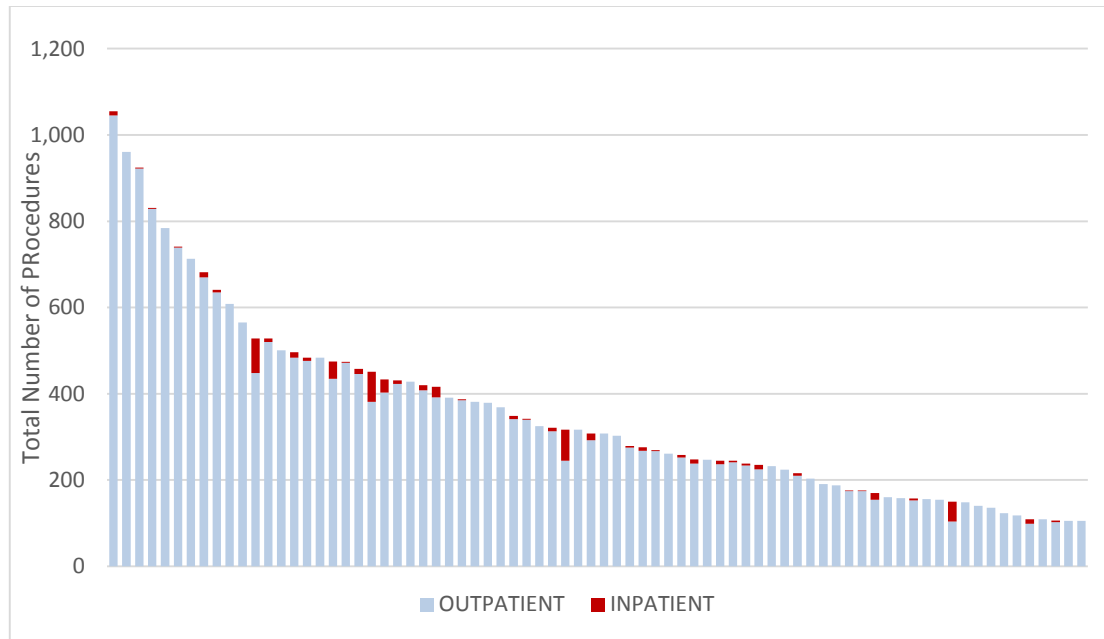
Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System, retrieved from CIHI. (11)

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## Inter-Hospital Variation in Use of Inpatient and Day Surgery Settings

We investigated possible variation between hospitals in the use of inpatient and day surgery for knee arthroscopy procedures. Figure 12 suggests that the vast majority of hospitals performed nearly all meniscus and knee procedures as day surgeries; (11) hospitals with elevated rates of inpatient procedures may represent an opportunity for further investigation. Similarly, Figure 13 suggests that most hospitals performed nearly all ligament procedures as day surgeries, although several hospitals had elevated rates of inpatient procedures, including 1 larger-volume hospital where nearly  $\frac{3}{4}$  of all procedures were performed in an inpatient setting. (11)

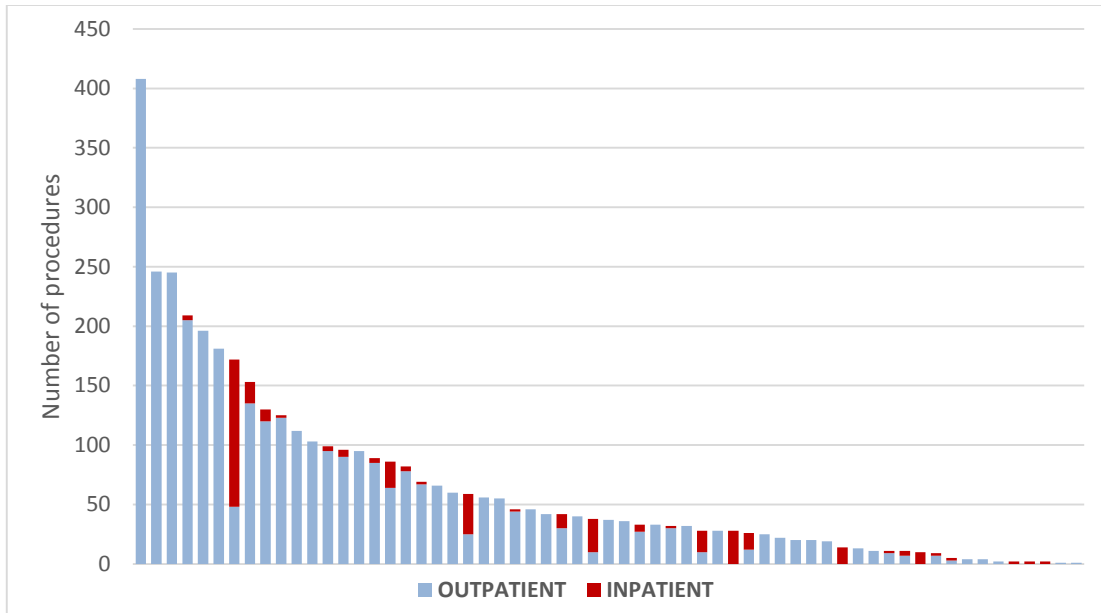


**Figure 12: Arthroscopic Meniscus and Knee Procedures: Total and Percent Inpatient/Outpatient Cases by Hospital (FY 2012/13)**

Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System and Discharge Abstract Database, retrieved from CIHI. (11)

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**Figure 13: Arthroscopic Ligament Procedures: Total and Percent Inpatient/Outpatient Cases by Hospital (FY 2012/13)**

Abbreviations: CIHI, Canadian Institute for Health Information; FY, fiscal year.

Source: CIHI National Ambulatory Care Reporting System and Discharge Abstract Database, retrieved from CIHI. (11)

Note: Parts of this material are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions, and statements expressed herein are those of the author, and not necessarily those of the Canadian Institute for Health Information.

## Post-Surgery Admissions and Intensive Care Unit Utilization

The Expert Advisory Panel examined acute admissions immediately following or within several days of arthroscopic knee day procedures. An inpatient admission shortly after an arthroscopic knee day procedure may suggest that a complication or other unexpected event occurred during or following the surgery. Such instances may include patients who have difficulty returning to consciousness after general anesthesia; patients who experience intraoperative or postoperative complications, such as pain; or patients who require a prolonged recovery period for other reasons. Understanding the incidence of such events in the overall population and each subgroup can inform the structure of the episode-of-care model and serve as a potential performance indicator for monitoring outcomes between hospitals.

Guided by the Expert Advisory Panel, HQO worked with staff from the Methods and Modelling Unit of the Ministry’s Health Analytics Branch to develop an analysis linking index day surgeries in fiscal year 2012/2013 with subsequent unplanned (urgent or emergent) acute inpatient admissions within 5 days after the surgery (Table 3). (The 5-day time period was selected as one during which subsequent hospital admissions might reasonably be expected to be related to the index day surgery.) The population admitted following surgery was also examined to determine the proportion admitted to the intensive care unit during hospitalization.



**Table 3: Acute Admissions Within 5 Days Following Knee Arthroscopy Day Surgery (FY 2012/2013)**

Patient Groups	Day Surgery Arthroscopy Volume*	Day Surgery Arthroscopy Followed by Inpatient Admission		Day Surgery Arthroscopy Followed by ICU Admission	
		Volume	Proportion	Volume	Proportion
Ligament procedures	2,961	42	1.4%	NA <sup>1</sup>	0.1%
Meniscus, knee joint, patella, and diagnostic	29,420	213	0.7%	8	0.0%
<b>Total</b>	<b>32,381</b>	<b>255</b>	<b>0.8%</b>	<b>10</b>	<b>0.0%</b>

Abbreviations: DAD, Discharge Abstract Database; FY, fiscal year; ICU, intensive care unit.

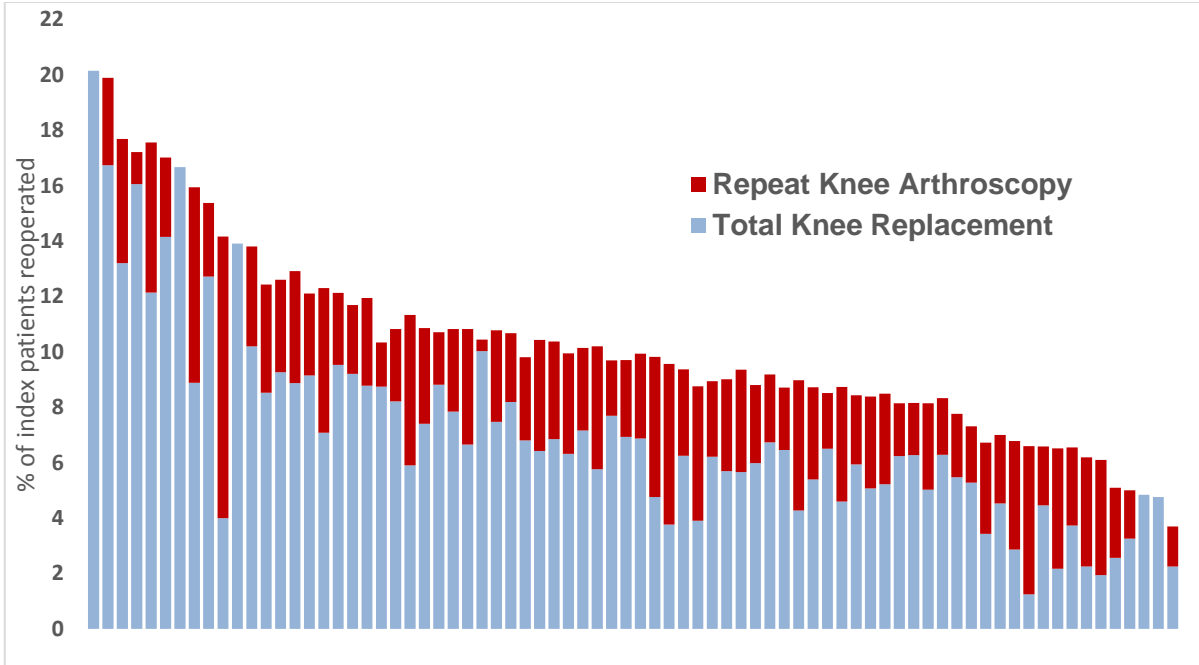
<sup>1</sup>Count suppressed due to small cell size.

Source: Personal communication, Health Analytics Branch, Ministry of Health and Long-Term Care Methods and Modelling Unit, 2014.

Of cases with subsequent acute admissions, the 2 most common Most Responsible Diagnosis codes at discharge were “Convalescence following surgery” (ICD-10-CA code Z54.0; 38.8% of the population; 101 cases) and “Acute pain” (ICD-10-CA code R52.0; 5.8% of the population; 14 cases). These findings were consistent with the Expert Advisory Panel’s hypothesis that arthroscopic knee day surgery cases with subsequent acute admissions were likely to have encountered complications during recovery. However, the very low rates of these observed events suggested that they were not likely to be suitable as a performance indicator for inter-hospital comparison.

### **Knee Arthroscopy Reoperation Rates**

The Expert Advisory Panel was interested in examining reoperation rates following knee arthroscopy procedures. Knee operations (either repeat knee arthroscopy or total knee replacement) that occur within 2 years of an initial knee arthroscopy may be regarded as a marker of either inappropriate patient selection or quality issues related to the index procedure. In collaboration with the Health Analytics Branch of the Ministry of Health and Long-Term Care, we completed a comprehensive analysis of knee arthroscopy reoperation rates. This analysis revealed that meniscus and knee procedures were associated with much higher reoperation rates than ligament procedures, and that there was marked variation between hospitals, including high-volume hospitals. Figure 14 presents 2-year reoperation rates by hospital, illustrating the wide degree of variation observed. The full reoperation rate analysis, which also examined patient factors associated with reoperation, will be released as part of a separate report.



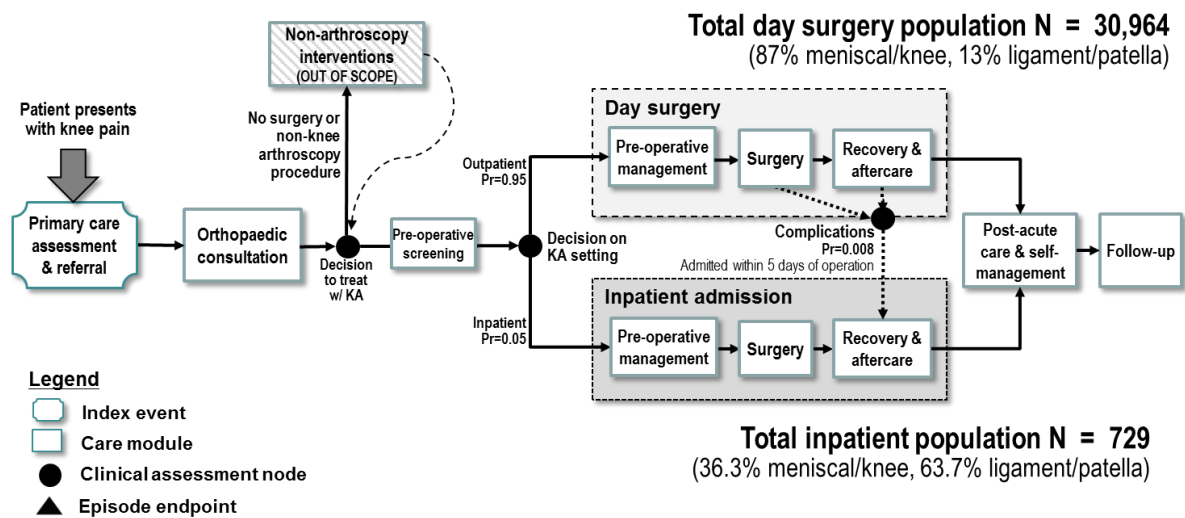
**Figure 14: Meniscus and Knee Arthroscopy 2-Year Reoperation Rates by Hospital (FY 2007/2008 to FY 2012/2013)**

Abbreviation: FY, fiscal year.

Source: Health Analytics Branch, Ministry of Health and Long-Term Care Methods and Modelling Unit, 2014.

# Episode-of-Care Model

The knee arthroscopy episode-of-care model in Figure 15 was developed by the Expert Advisory Panel and served as a working model to develop the components of this clinical handbook. Beginning as a simplified sketch of key phases in the knee arthroscopy episode of care (e.g., orthopedic consultation, surgery, follow-up), the model has been updated to reflect the key elements of the pathway determined by the Expert Advisory Panel.



All procedures are elective knee arthroscopy cases  
 Day surgery patient counts from 2012-13 NACRS  
 Inpatient patient counts from 2012-13 DAD

**Figure 15: Episode-of-Care Model for Knee Arthroscopy**

Abbreviations: KA, knee arthroscopy; Pr, proportion.

# Recommended Practices for Knee Arthroscopy

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## Sources Used to Develop Recommended Practices

### HQO Evidence-Based Analyses and OHTAC Recommendations

One HQO evidence-based analysis and corresponding OHTAC recommendation directly evaluated the effectiveness of arthroscopic debridement and lavage for osteoarthritis of the knee:

- Arthroscopic lavage and debridement for osteoarthritis of the knee (2005) (14)

The Expert Advisory Panel advised HQO that new research has developed in the area of arthroscopic debridement, and as such requested an update and expanded scope to the 2005 analysis and OHTAC recommendation. HQO has accepted this request, and the analysis is currently in progress.

Additionally, 3 HQO evidence reviews with corresponding OHTAC recommendations and 1 HQO clinical handbook that did not directly evaluate the knee arthroscopy population but was related to the current episode of care were also considered:

- Preoperative consultations: OHTAC recommendation (2014) (15)
- Preoperative resting echocardiography for noncardiac surgery: OHTAC recommendation (2014) (16)
- Preoperative cardiac stress tests for noncardiac surgery: OHTAC recommendation (2014) (17)
- Quality-based procedures: clinical handbook for primary hip and knee replacement (2013) (18)

Recommendations from the HQO clinical handbook for hip and knee replacement were considered, given the similarities of the clinical pathways, and the Expert Advisory Panel determined which recommendations were clinically and contextually relevant. Similarly, OHTAC recommendations for preoperative consultations and assessments were applicable to the knee arthroscopy pathway, as they were targeted at intermediate-risk, noncardiac surgeries. While knee arthroscopy could be classified as a low-risk surgery, the Expert Advisory Panel thought the recommendations were relevant to the cohorts of the knee arthroscopy episode of care.

### HQO Rapid Reviews

Rapid reviews were conducted on specific topics requested by the Expert Advisory Panel or where gaps or inconsistencies in the evidence were identified:

- Preoperative Shower or Bath With Antiseptics Before Knee Arthroscopy: A Rapid Review
- Pre-emptive Oral Non-Steroidal Anti-Inflammatory Drugs or Acetaminophen for Knee Arthroscopy: A Rapid Review
- Peripheral Nerve Blocks for Post-Operative Pain Relief After Arthroscopic Knee Ligament Reconstruction: A Rapid Review
- Intra-Articular Analgesia After Knee Arthroscopy: A Rapid Review
- Physiotherapy After Knee Arthroscopy: A Rapid Review
- Bracing After Knee Arthroscopy: A Rapid Review

The conclusions from the rapid reviews are included in each of the episode-of-care modules, with Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) quality assessments where applicable. As stated by the GRADE Working Group, (19) the final GRADE quality score can be interpreted using the following definitions:

<b>High</b>	High confidence in the effect estimate—the true effect lies close to the estimate of the effect
<b>Moderate</b>	Moderate confidence in the effect estimate—the true effect is likely to be close to the estimate of the effect, but may be substantially different
<b>Low</b>	Low confidence in the effect estimate—the true effect may be substantially different from the estimate of the effect
<b>Very Low</b>	Very low confidence in the effect estimate—the true effect is likely to be substantially different from the estimate of effect

## **Clinical Guidelines**

No clinical guidelines were identified that focused specifically on knee arthroscopy. Given the lack of knee arthroscopy guidelines, we conducted an expanded search for guidelines providing any recommendations related to knee arthroscopy and identified 9 guidelines related to various aspects of care.

### ***Knee Disorders, Injury, or Surgery***

- New Zealand Guidelines Group. The diagnosis and management of soft tissue knee injuries: internal derangements. Best practice evidence-based guideline (2003) (6)
- American College of Occupational and Environmental Medicine. Occupational medicine practice guidelines, 3rd ed. Chapter 15, Knee disorders (2011) (20)
- Guideline on anterior cruciate ligament injury: a multidisciplinary review by the Dutch Orthopaedic Association (2012) (21)
- Orthopedic section of the American Physiotherapy Association. Knee pain and mobility impairments: meniscal and articular cartilage lesions (2010) (7)
- Haute Autorité de Santé. Clinical practice guidelines for the management of meniscal lesions and isolated lesions of the anterior cruciate ligament of the knee in adults (2009) (22)

### ***Venous Thromboembolism Prevention***

- American College of CHEST Physicians evidence-based clinical practice guidelines. Antithrombotic therapy and prevention of thrombosis, 9th ed. (2012) (23)
- National Health and Medical Research Council. Clinical practice guideline for the prevention of venous thromboembolism in patients admitted to Australian hospitals (2009) (24)

### ***Acute Pain Management***

- Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. Acute pain management: scientific evidence, 3rd ed. (2010) (25)

### ***Antimicrobial Prophylaxis***

- American Society of Health-System Pharmacists. Clinical practice guidelines for antimicrobial prophylaxis in surgery (2013) (26)

### ***Other Relevant Guidelines***

One additional guideline that was not specific to knee arthroscopy but was considered applicable to specific components of the knee arthroscopy episode of care was also referenced:

- 2009 update to 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (2009) (27)

### ***Quality Assessment***

Quality assessment for each of the guidelines using the AGREE domain scores is presented in Table 4 (in order of scores for the Rigour of Development domain). Given the limited number of guidelines identified for each topic and the variation in cohorts and topics included, all guideline recommendations were included for consideration by the Expert Advisory Panel.

**Table 4: AGREE II Scaled Domain Scores for Knee Arthroscopy Guidelines**

Guideline, Year	AGREE II Domain (Scaled Domain Score %)					
	Scope and Purpose	Stakeholder Involvement	Rigour of Development	Clarity of Presentation	Applicability	Editorial Independence
ACCP, 2012 (23)	78	78	<b>94</b>	100	48	100
NHMRC, 2009 (24)	100	92	<b>76</b>	100	54	96
NZGG, 2003 (6)	81	72	<b>73</b>	81	44	75
ACOEM, 2011 (20)	75	58	<b>64</b>	72	20	67
AU and NZ, 2010 (25)	44	56	<b>58</b>	72	28	46
ASHSP, 2013 (26)	61	31	<b>49</b>	78	28	17
DOA, 2012 (21)	64	31	<b>47</b>	78	16	0
APTA, 2010 (7)	64	47	<b>46</b>	67	12	0
HAS, 2009 (22)	83	61	<b>42</b>	56	4	0

Abbreviations: ACCP, American College of CHEST Physicians; ACOEM, American College of Occupational and Environmental Medicine; AGREE, Appraisal of Guidelines for Research & Evaluation; APTA, American Physiotherapy Association; ASHSP, American Society of Health-System Pharmacists; AU and NZ, Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine; DOA, Dutch Orthopaedic Association; HAS, Haute Autorité de Santé; NHMRC, National Health and Medical Research Council; NZGG, New Zealand Guideline Group.

The quality-assessment tools used by each guideline are summarized in Table 5. The Expert Advisory Panel reviewed the guideline recommendations to inform their recommendations and identify gaps or inconsistencies in the evidence that may have required an evidence review to inform the relevant recommended practices.

**Table 5: Evidence Assessments and Recommendations Used by Included Guidelines**

<b>Organization</b>	<b>Grade of Recommendation/Level of Evidence</b>
ACCP, 2012 (23)	<p><b>1A:</b> Strong recommendation, high quality evidence</p> <p><b>1B:</b> Strong recommendation, moderate quality evidence</p> <p><b>1C:</b> Strong recommendation, low or very low quality evidence</p> <p><b>2A:</b> Weak recommendation, high quality evidence</p> <p><b>2B:</b> Weak recommendation, moderate quality evidence</p> <p><b>2C:</b> Weak recommendation, low or very low quality evidence</p>
NHMRC, (2009) (24)	<p><b>A:</b> Body of evidence can be trusted to guide practice</p> <p><b>B:</b> Body of evidence can be trusted to guide practice in most situations</p> <p><b>C:</b> Body of evidence provides some support for recommendation(s) but care should be taken in its application</p> <p><b>D:</b> Body of evidence is weak and recommendation must be applied with caution</p> <p><b>NA:</b> Not applicable—unable to grade body of evidence</p> <p><b>GPP:</b> Good practice point—consensus-based</p>
NZGG, 2003 (6)	<p><b>A:</b> Supported by good evidence</p> <p><b>B:</b> Supported by fair evidence</p> <p><b>C:</b> Supported by expert opinion only, level 4 evidence in text and expertise</p> <p><b>I:</b> No recommendation can be made due to insufficient evidence</p>
ACOEM, 2011 (20)	<p><b>A:</b> Strong evidence base: 2 or more high quality studies</p> <p><b>B:</b> Moderate evidence base: at least 1 high quality study, or multiple lower quality studies relevant to the topic and the working population</p> <p><b>C:</b> Limited evidence base: at least 1 study of intermediate quality</p> <p><b>I:</b> Insufficient evidence: evidence is insufficient or irreconcilable</p>
AU and NZ, 2010 (25)	<p><b>I:</b> SR of all relevant RCTs</p> <p><b>II:</b> At least 1 properly designed RCT</p> <p><b>III-1:</b> Well-designed pseudo-RCTs</p> <p><b>III-2:</b> Cohort, case-control studies or interrupted time series with control</p> <p><b>III-3:</b> Comparative studies with historical control, 2 or more single-arm studies, or interrupted time series without a parallel control group</p> <p><b>IV:</b> Case series, either post-test or pre-test and post-test</p>
ASHSP, 2013 (26)	<p><b>I:</b> Large, well-conducted RCTs or a meta-analysis</p> <p><b>II:</b> Small, well-conducted RCTs</p> <p><b>III:</b> Well-conducted cohort studies</p> <p><b>IV:</b> Well-conducted case-control studies</p> <p><b>V:</b> Uncontrolled studies that were not well-conducted</p> <p><b>VI:</b> Conflicting evidence that tends to favour the recommendation</p> <p><b>VII:</b> Expert opinion or data extrapolated from evidence for general principles and other procedures</p>
DOA, 2012 (21)	<p><b>A1:</b> SR/MA of at least 2 independently conducted studies of A2 level</p> <p><b>A2:</b> Randomized, double-blind trial with good study quality and an adequate number of study participants</p> <p><b>B:</b> Clinical trial, but without all the features mentioned for level A2 (including case-control study, cohort study)</p> <p><b>C:</b> Non-comparative studies</p> <p><b>D:</b> Expert opinion</p>

Organization	Grade of Recommendation/Level of Evidence
APTA, 2010 (7)	<b>A:</b> Strong evidence (a preponderance of level I and/or II studies) <b>B:</b> Moderate evidence (single high quality RCT or preponderance of level II studies) <b>C:</b> Weak evidence (a single level II or a preponderance of level III and IV studies) <b>D:</b> Conflicting evidence (high quality studies disagree) <b>E:</b> Theoretical/foundational evidence <b>F:</b> Expert opinion
HAS, 2009 (22)	<b>A:</b> High-level evidence (high-power RCT free of major bias, MAs of RCTs, or decision analyses based on level 1 trials) <b>B:</b> Intermediate level of evidence (RCT with some bias, MAs with questionable methodology, well-conducted non-RCTs or cohort studies) <b>C:</b> Lower level of evidence (case-control studies, retrospective studies, case series or comparative studies with considerable bias)

Abbreviations: ACCP, American College of CHEST Physicians; ACOEM, American College of Occupational and Environmental Medicine; ASHSP, American Society of Health-System Pharmacists; APTA, American Physiotherapy Association; AU and NZ, Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine; DOA, Dutch Orthopedic Association; HAS, Haute Autorité de Santé; MA, meta-analysis; NHMRC, National Health and Medical Research Council; NZGG, New Zealand Guidelines Group; RCT, randomized controlled trial; SR, systematic review.

## Language Used to Reference Relevant Guidelines and Evidence Sources

For clarity and transparency, the following terms were consistently applied to describe how the various evidence sources were used when developing the episode-of-care recommended practices.

<i>Taken from</i>	The best practice recommendation was taken directly from another source.
<i>Modified</i>	Minor modifications from the source materials were made when developing the best practice recommendation.
<i>Consistent with</i>	The best practice recommendation was consistent with other sources, but wording of the recommendations was developed by the Expert Advisory Panel.
<i>Based on Expert Advisory Panel Consensus</i>	The best practice recommendation was largely derived from Expert Advisory Panel consensus.

## Episode-of-Care Recommended Practices

Several recommendations in the episode-of-care pathway refer to events that may begin or end in different modules. Modules should be considered collectively rather than as individual components. Individual health care networks should work to minimize duplication of efforts.

Recommendations refer to the collective knee arthroscopy cohort unless specified in the recommendation. Some recommendations may refer to only patients who received meniscus and knee joint procedures (Group 1), while other recommendations may reference only patients who received ligament or patella procedures (Group 2).



# Module 1: Primary Care Assessment and Referral

This module identifies recommended practices for the initial assessment and referral of patients for knee arthroscopy in the primary care setting.

Recommended Practice	Relevant Guidelines and Evidence
<b>Process for Referral</b>	
<p><b>1.1 The primary care provider should make the referral for surgery consultation and be the coordinator of patient care</b></p>	Taken from the HQO clinical handbook for hip and knee replacement (18)
<p><b>1.2 Referrals should be made using a standardized template that includes the reason for referral, radiographs of the affected joint(s), and relevant patient comorbidities</b></p>	Taken from the HQO clinical handbook for hip and knee replacement (18)
<b>Diagnostics and Radiographs</b>	
<p><b>1.3 The referring practitioner should provide a clinical exam and standard investigations of the affected joints</b></p> <ul style="list-style-type: none"> <li>• A standard knee radiograph is recommended</li> <li>• Additional knee radiographs may be ordered by the surgeon as part of presurgical planning</li> </ul>	<p>Consistent with the HQO clinical handbook for hip and knee replacement, HAS, NZGG, ACOEM, APTA, and DOA (6,7,18,20-22)</p> <p>Consistent with the HQO clinical handbook for hip and knee replacement, HAS (professional agreement), APTA (level I evidence), ACOEM (I strength of evidence) (7,18,20,22)</p>
<p><b>1.4 Knee MRI should not be routinely ordered, as it is indicated for only a limited number of conditions</b></p>	Consistent with HAS (professional agreement), NZGG (grade C evidence), ACOEM (I strength of evidence), APTA (level I), DOA (level 2 evidence) (6,7,20-22)

Abbreviations: ACOEM, American College of Occupational and Environmental Medicine; APTA, American Physiotherapy Association; DOA, Dutch Orthopaedic Association; HAS, Haute Autorité de Santé; HQO, Health Quality Ontario; MRI, magnetic resonance imaging; NZGG, New Zealand Guideline Group.

<b>Implementation Considerations</b>	
<b>Potential barriers</b>	<ul style="list-style-type: none"> <li>• Develop evidence-based provincial standards for appropriate patient referral and work-up, including appropriate diagnostic imaging guidelines and patient comorbidities</li> <li>• KTE through the Ontario College of Family Physicians regarding referral for assessment and postoperative care should be considered</li> <li>• Primary care providers to refer to handbook for referral requirements. A package for primary care provider referral will have to be developed, and KTE to primary care providers is required</li> </ul>
<b>Potential levers</b>	<ul style="list-style-type: none"> <li>• Currently there is no standardized provincial knee arthroscopy referral protocol or electronic health record to support it</li> <li>• Many primary care providers do not provide an adequate referral package</li> <li>• While some hospitals and surgeons have their own standard knee arthroscopy referral templates, even primary care providers who have access to these do not always use them</li> <li>• Many primary care providers do not provide radiographs of the affected joint, and those who do at times provide inappropriate/low quality radiographs with referrals</li> <li>• Many primary care providers continue to perform unnecessary MRIs of affected joints</li> </ul>

Abbreviations: KTE, knowledge transfer exchange; MRI, magnetic resonance imaging.

## Module 2: Orthopedic Consultation

This module identifies recommended practices for the initial assessment of patients by the orthopedic surgeon and communication back to the primary care provider.

Recommended Practice	Relevant Guidelines and Evidence
<b>2.1 Patients need to be assessed by a surgeon to make the final decision regarding appropriateness for surgery</b>	Taken from the HQO clinical handbook for hip and knee replacement (18)
<b>2.2 The risks and benefits of surgery should be explained to the patient, and the patient should be charged with the decision whether or not to proceed with surgery</b>	Taken from the HQO clinical handbook for hip and knee replacement (18)
<b>2.3 Results of the assessment and a plan for treatment should be communicated back to the patient's primary care provider</b>	Taken from the HQO clinical handbook for hip and knee replacement (18)

Abbreviations: HQO, Health Quality Ontario.

Implementation Considerations	
<b>Potential barriers</b>	<ul style="list-style-type: none"><li>• Measure wait time for all patients referred for consultation from referral to assessment in surgeon's office. Currently all wait times are collected but reported only for those patients requiring surgery and not for those who do not go on to a surgical procedure</li></ul>
<b>Potential levers</b>	<ul style="list-style-type: none"><li>• A standardized education package should be developed to ensure patients have sufficient information on which to base their decision to proceed/not proceed with surgery</li></ul>

## Module 3: Preoperative Screening

This module identifies recommended practices for preoperative assessment and medical testing of patients prior to arthroscopic knee surgery. The recommendations include the appropriate identification of patients who require a preoperative assessment clinic visit, as well as the selection of patients who are safe for outpatient arthroscopic knee surgery. Current practice in Ontario is for patients to undergo knee arthroscopy surgery as outpatients rather than as inpatients, unless they are deemed to be at high risk for complications. This module also covers preoperative patient planning, which includes patient education and provisional discharge planning.

Recommended Practice	Relevant Guidelines and Evidence
<b>Preoperative Assessment</b>	
<p><b>3.1 Preoperative assessments should be conducted. Routine preoperative clinic visits to determine suitability for anesthesia are not required. An assessment tool should be used to determine which patients require preoperative assessment clinic visits</b></p>	<p>Based on Expert Advisory Panel consensus and alignment with the 2014 OHTAC recommendations on preoperative consultations (15):</p> <ul style="list-style-type: none"> <li>□ OHTAC recommends a field evaluation be developed based on the recommendations of the Preoperative Assessment Expert Advisory Panel to include:               <ul style="list-style-type: none"> <li>- province-wide assessment to understand variation across hospitals and other health care settings in how preoperative care is being organized and arranged to meet patients' needs and taking into account duplication in care pathways</li> <li>- validating screening questionnaires in a variety of hospital settings to address heterogeneity, such as research hospitals, large and small community hospitals, rural, urban, etc. This would ensure that patients who are in need of consultations are appropriately screened</li> </ul> </li> </ul>
<b>Preoperative Medical Testing</b>	
<p><b>3.2 If preoperative assessment clinic visits are necessary, they should be conducted in an appropriate time frame prior to the surgery date to avoid unnecessary cancellations and improve efficiency</b></p>	<p>Based on the HQO clinical handbook for hip and knee replacement and modified by the Expert Advisory Panel (18)</p>

Recommended Practice	Relevant Guidelines and Evidence
<p><b>3.3 Routine medical testing is not required, unless indicated by the assessment tool or if additional information from the tests would inform clinical decision-making</b></p> <ul style="list-style-type: none"> <li>• This recommendation is in accordance with the OHTAC recommendation on preoperative resting echocardiography and noninvasive cardiac tests prior to noncardiac elective surgery with intermediate cardiac risk, which are as follows: <ul style="list-style-type: none"> <li>- On the basis of expert consensus, OHTAC does not recommend the use of resting echocardiography for routine preoperative screening purposes prior to noncardiac elective surgery with intermediate cardiac risk</li> <li>- OHTAC does not recommend the routine use of noninvasive cardiac stress tests for preoperative screening purposes prior to noncardiac, intermediate-risk, elective surgery</li> <li>- OHTAC recommends that the selective use of these tests be guided based on patients' clinical risk factors for perioperative cardiac complications, as well as whether information from the test would inform clinical decision-making</li> </ul> </li> </ul>	<p>Based on Expert Advisory Panel consensus and alignment with the 2014 OHTAC recommendations on preoperative cardiac consultations (16,17), which agrees with the ACC/AHA guidelines on preoperative cardiac testing for noncardiac surgery (level B evidence) (27)</p>
<b>Appropriateness for Day Surgery</b>	
<p><b>3.4 The surgeon and/or anesthesiologist should determine the appropriateness for day surgery versus inpatient admission, with consideration of patient medical status</b></p>	<p>Based on Expert Advisory Panel consensus</p>
<p><b>3.5 Standardized medical assessment tools should be used to determine clinical conditions that identify patients who require an inpatient admission</b></p>	<p>Based on Expert Advisory Panel consensus</p>
<b>Discharge Planning</b>	
<p><b>3.6 Patients must fit institutional criteria for discharge. Discharge planning should begin at the time of the decision to treat</b></p> <ul style="list-style-type: none"> <li>• The patient's home should be prepared for their safe return and recovery following acute care</li> <li>• The availability of support persons to assist the patient before and after surgery should be identified</li> </ul>	<p>Taken from the HQO clinical handbook for hip and knee replacement (18)</p>
<b>Patient Education</b>	
<p><b>3.7 Patients should receive education addressing the entire continuum of care</b></p>	<p>Taken from the HQO clinical handbook for hip and knee replacement (18)</p>

Abbreviations: ACC/AHA, American College of Cardiology/American Heart Association; HQO, Health Quality Ontario; OHTAC, Ontario Health Technology Advisory Committee.

## Implementation Considerations

<b>Potential barriers</b>	<ul style="list-style-type: none"><li>• Currently, there is no standardized provincial preoperative assessment tool for fitness for surgery</li><li>• While many hospitals now have routine clinical pathways, they are not all consistently developed, with gaps in the evidence and uneven rigour behind the pathways</li><li>• Patient education materials vary in terms of telling them on what to expect; preoperative patient education materials vary throughout the province</li><li>• No mechanism exists to share the clinical handbook with primary care providers</li></ul>
<b>Potential levers</b>	<ul style="list-style-type: none"><li>• Align hospital clinical practice to evidence-based recommendations and standards in the clinical handbook</li><li>• Develop provincial standards that hospitals, surgeons, and anesthesiologists are to include in preoperative assessments</li><li>• Develop key elements that are to be included in all patient education materials</li><li>• Hospitals should adopt the new health transformation discharge-planning standards</li><li>• All hospitals/providers should have an orthopedic surgery safety checklist</li><li>• A standardized tool should be developed for assessment for appropriateness for day surgery and implemented province-wide</li></ul>

## Assessment Node: Decision to Treat With Knee Arthroscopy

The HQO (formerly the Medical Advisory Secretariat) 2005 report *Arthroscopic Lavage and Debridement for Osteoarthritis of the Knee: An Evidence-Based Analysis* (14) and the resulting recommendations should be considered when making the decision to treat with knee arthroscopy:

### Arthroscopic Lavage

OHTAC made the following recommendation:

- Arthroscopic lavage of the knee alone (without debridement) is not recommended for any stage of osteoarthritis. (14)

### Arthroscopic Debridement

The Expert Advisory Panel advised HQO that new research has developed in the area of arthroscopic debridement. In response, an update with an expanded scope to the 2005 analysis was conducted.

Upon reviewing the evidence from the report *Arthroscopic Debridement of the Knee: an Evidence Update* (28) OHTAC made the following recommendations (**recommendations are currently in DRAFT form and may change prior to final publication; this handbook will be updated at that time**):

- OHTAC recommends against arthroscopic debridement for patients with uncomplicated (without meniscal tears) osteoarthritis of the knee.
- OHTAC also recommends against arthroscopic surgery as a first line of treatment for patients with degenerative meniscal tears with or without osteoarthritis. However, OHTAC recommends a field evaluation be conducted to determine the clinical effectiveness and cost effectiveness of arthroscopic meniscectomy as an alternative to ongoing non-surgical management (e.g., physical therapy) for patients who do not improve sufficiently after an initial 6-month period of non-surgical management. Pending the results of the field evaluation, OHTAC recommends that if non-surgical treatment fails after at least 6 months arthroscopic meniscectomy be considered.

## Module 4: Preoperative Management

This module identifies recommended practices for the clinical preparation of patients prior to surgery, including medical optimization.

Recommended Practice	Relevant Guidelines and Evidence
<b>4.1 Patients should be medically optimized before elective surgery</b>	Taken from the HQO clinical handbook for hip and knee replacement (18)

Abbreviations: HQO, Health Quality Ontario.

### Implementation Considerations

No potential levers or barriers were identified for this module

## Module 5: Surgery

This module identifies recommended practices for patients after admission to and during the surgical procedure. Included are recommendations for surgical safety, appropriate anesthesia, and infection and venous thromboembolism prevention.

Recommended Practice	Relevant Guidelines and Evidence
<b>Surgical Safety</b>	
<p><b>5.1 The World Health Organization surgical safety checklist, in addition to other surgical safety tools and supports, should be referenced prior to surgery</b></p> <ul style="list-style-type: none"> <li>The checklist is available at: <a href="http://www.who.int/patientsafety/safesurgery/ss_checklist/en">http://www.who.int/patientsafety/safesurgery/ss_checklist/en</a></li> </ul>	Taken from the HQO clinical handbook for hip and knee replacement (18)
<b>Anesthesia</b>	
<p><b>5.2 The choice of anesthesia should involve the anesthesiologist and surgeon, as well as patient preference</b></p>	Taken from the HQO clinical handbook for hip and knee replacement (18)
<b>Infection Prevention</b>	
<p><b>5.3 Antimicrobial prophylaxis with antibiotics should not be routinely used, unless implantation of foreign materials is anticipated</b></p>	Consistent with the ASHSP (level C evidence) (26)
<p><b>5.4 There is insufficient evidence to recommend for or against the routine use of showers or baths with skin antiseptics prior to elective knee arthroscopy</b></p>	<p><b>Based on a HQO rapid review on the <a href="#">effectiveness of showers or baths with skin antiseptics</a>:</b></p> <ul style="list-style-type: none"> <li>No literature was identified that evaluated the use of preoperative showers or baths with antiseptic skin solutions prior to knee arthroscopy</li> <li>Scoping of the literature in the broader surgical population identified 3 systematic reviews suggesting the evidence does not support, or is inconclusive in regards to, the use of chlorhexidine showers or baths prior to surgery to prevent surgical site infections. It is unknown whether these results can be generalized to the knee arthroscopy population, and further evidence is required</li> </ul>
<b>VTE Prevention</b>	
<p><b>5.5 For patients undergoing knee arthroscopy without a history of prior VTE, no thromboprophylaxis is recommended unless the patient has additional VTE risk factors</b></p>	Consistent with ACCP (moderate quality evidence) (23) and NHMRC (grade C evidence) (24)

Abbreviations: ACCP, American College of CHEST Physicians; ASHSP, American Society of Health-System Pharmacists; HQO, Health Quality Ontario; NHMRC, National Health and Medical Research Council; VTE, venous thromboembolism.

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**Implementation Considerations**

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**Potential barriers**

- Currently, there is no KTE strategy to share recommendations in this handbook
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**Potential levers**

- KTE is needed for change in infection prevention related to ligament and patella procedures (Group 2)
  - All providers should have a standardized surgical checklist used by all surgeons in that institution
  - Surgeons should advise patients that they will discuss anesthetic options with the anesthesiologist prior to surgery
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## Module 6: Recovery and Aftercare

This module identifies recommended practices for patient recovery after surgery. The recommendations emphasize the need for appropriate postoperative pain management.

Recommended Practice	Relevant Guidelines and Evidence
<b>Postoperative Pain Management—General Recommendation</b>	
<b>6.1 The decision for pain management modalities should include consideration of the complexity of surgery and the clinical presentation. A multimodal approach to postoperative pain management may be employed</b>	Based on HQO clinical handbook for hip and knee replacement and modified by the Expert Advisory Panel (18)
<b>Postoperative Pain Management—Specific Recommendations</b>	
<b>6.2 There is insufficient evidence to recommend for or against the use of pre-emptive oral NSAIDs or acetaminophen</b>	<b>Based on a HQO rapid review on the <a href="#">effectiveness of pre-emptive analgesics</a>:</b> <ul style="list-style-type: none"><li>• Based on 2 RCTs with serious limitations due to risk of bias, there were inconsistent results regarding the effectiveness of pre-emptive oral celecoxib, a selective COX-2 inhibitor NSAID, for postoperative pain control in patients undergoing knee arthroscopy</li><li>• No evidence was identified that evaluated the oral pre-emptive use of acetaminophen or conventional NSAIDs for postoperative pain in patients undergoing knee arthroscopy</li></ul>
<b>6.3 There is insufficient evidence to recommend for or against the use of peripheral nerve blocks for postoperative pain relief following arthroscopic knee ligament reconstruction</b>	<b>Based on a HQO rapid review on the <a href="#">effectiveness of peripheral nerve blocks</a>:</b> <ul style="list-style-type: none"><li>• Based on very low quality evidence, there were inconsistent results regarding the effectiveness of femoral nerve block for postoperative pain control</li><li>• Based on very low quality evidence, there was no significant difference in the time to functional discharge for patients who received a femoral nerve block compared to those who did not receive a femoral nerve block</li></ul>

Recommended Practice	Relevant Guidelines and Evidence
<p><b>6.4 There is insufficient evidence to recommend for or against the use of IA analgesics at the conclusion of the knee arthroscopy procedure</b></p>	<p><b>Based on a HQO rapid review on the <a href="#">effectiveness of IA analgesia</a>:</b></p> <p>Based on results from 2 systematic reviews that were limited by their ability to meta-analyse because of their heterogeneous studies and outcome measures, the following conclusions were made in regards to IA analgesia for knee arthroscopy:</p> <ul style="list-style-type: none"> <li>• There is very low quality evidence of an improvement in pain with IA-bupivacaine or IA-morphine in comparison to placebo</li> <li>• There is low to very low quality evidence of a reduction in the number of additional analgesics required with IA-bupivacaine or IA-morphine in comparison to placebo</li> </ul> <p>Consistent with AU and NZ (level 1 evidence) (25)</p>

Abbreviations: AU and NZ, Australia and New Zealand; HQO, Health Quality Ontario; IA, intra-articular; NSAID, non-steroidal anti-inflammatory drug.

Implementation Considerations
<p>No potential levers or barriers were identified for this module</p>

# Module 7: Post-Acute Care

This module identifies recommended practices for the rehabilitation of patients after surgery. This includes home exercise, physiotherapy, and indications for the use of postoperative bracing.

Recommended Practice	Relevant Guidelines and Evidence
<b>Rehabilitation</b>	
<p><b>7.1 Postoperative physiotherapy is not recommended for knee arthroscopy patients receiving meniscus and knee joint procedures (Group 1)</b></p>	<p><b>Based on a HQO Rapid Review on <a href="#">physiotherapy versus no physiotherapy</a>:</b> Based on a systematic review including studies with serious limitations to risk of bias, the evidence does not support the effectiveness of physiotherapy versus home exercise alone among patients who have received arthroscopic partial meniscectomy</p>
<p><b>7.2 Knee arthroscopy patients receiving ligament and patella procedures (Group 2) should receive postoperative physiotherapy rehabilitation after surgery</b></p>	<p>Expert Opinion based on an absence of literature identified in HQO rapid review <b>HQO Rapid Review on <a href="#">physiotherapy versus no physiotherapy</a>:</b> No literature was identified which examined the effectiveness of physiotherapy versus no physiotherapy among patients who have received arthroscopic knee ligament surgery</p>
<p><b>7.3 A structured home exercise program should be provided to all patients after knee arthroscopy</b></p>	<p>Based on Expert Advisory Panel consensus and aligns with APTA (level D evidence) (7)</p>
<p><b>7.4 The routine use of rehabilitative bracing in the postoperative period is not recommended for knee arthroscopy patients receiving ligament and patella procedures (Group 2)</b></p>	<p><b>Based on a HQO Rapid Review on the <a href="#">effectiveness of bracing versus no bracing</a>:</b></p> <ul style="list-style-type: none"> <li>Based on 1 systematic review comprising studies with serious risk of bias, there was no significant difference in functional status, pain, or complication rates among patients receiving a postoperative knee brace, in comparison with no knee brace, during the early rehabilitation stage after arthroscopic ACL reconstruction</li> <li>No studies were identified that reported on return to activity or sport as an outcome measure</li> </ul> <p>Consistent with the DOA (level 1 evidence) and the ACOEM (grade C evidence) (20,21)</p>
<p><b>7.5 The routine use of rehabilitative bracing in the postoperative rehabilitation period is not recommended for knee arthroscopy patients receiving meniscus and knee joint procedures (Group 1)</b></p>	<p>Expert Opinion based on an absence of literature identified in HQO rapid review <b>HQO Rapid Review on the <a href="#">effectiveness of bracing versus no bracing</a>:</b> No studies were identified that evaluated the use of postoperative knee bracing after meniscal procedures</p>

Abbreviations: ACL, anterior cruciate ligament; ACOEM, American College of Occupational and Environmental Medicine; APTA, American Physiotherapists Association; DOA, Dutch Orthopaedic Association; HQO, Health Quality Ontario.

## Implementation Considerations

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**Potential barriers**

- Some surgeons continue to refer all patients to rehabilitation post-surgery, regardless of patient cohort
- There is significant variation in access to and types of rehabilitation programs available to Ontarians depending on residence
- There are very little provincial-level data on local availability for different forms of rehabilitation (outpatient clinics, home care, etc.). There is no provincial directory of the locations of rehabilitation programs
- There are incomplete provincial data on the number of patients enrolled in rehabilitation programs
- Hospitals are not required to report on outpatient rehabilitation clinic activity. This is a significant gap in provincial information systems
- Key components of rehabilitation programs should be standardized so that all patients in the province receive access to standardized options for rehabilitation
- Not all patients receive a structured home exercise program as component of discharge plan

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**Potential levers**

- Develop a minimum data set for outpatient rehabilitation clinics, with results to be publicly reported
  - Develop a directory of available rehabilitation resources in each community
  - Ensure patients receive a home exercise program as a component of discharge planning
  - Develop postoperative patient exercise education materials that are consistent, easily understood and used by all health providers
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## Module 8: Follow-up

This module identifies recommended practices for the follow-up period after surgery and rehabilitation.

Recommended Practice	Relevant Guidelines and Evidence
<b>8.1 The surgeon should follow up with knee arthroscopy patient receiving meniscus and knee joint procedures (Group 1) at least once, and barring no complications, patients should be referred back to their primary care provider</b>	Based on Expert Advisory Panel consensus
<b>8.2 The surgeon should follow up with knee arthroscopy patients receiving ligament and patella procedures (Group 2) for as long as necessary</b>	Based on Expert Advisory Panel consensus

### Implementation Considerations

No potential levers or barriers were identified for this module.

# Implementation of Best Practices

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The Expert Advisory Panel believes that implementation of best practices related to knee care will require significant investment. The following points highlight some of the key issues for and barriers to the successful implementation of the knee arthroscopy best practices discussed.

- It will not be possible to promote the movement of appropriate patients to community or ambulatory care and achieve the associated cost efficiencies without addressing out-of-hospital incentives for best practices and adequate outpatient rehabilitation services post-discharge.
- Consider shifting knee arthroscopy procedures to an alternative community-based setting.
- Develop a knowledge transfer strategy to disseminate recommendations made in this handbook.
- A transitional approach to funding is recommended to enable the building of capacity in the community and avoid the consequences of patients receiving no service.
- A standardized province-wide knee arthroscopy referral protocol is needed, along with an electronic health record to support the protocol.
- Transportation supports will need to be in place to support access to rehabilitation services, particularly when an outpatient- or facility-based rehabilitation program is the optimal model.
- Provincial standards or protocols should be developed for nonsurgical management of patients and be easily accessible by primary care providers.
- Patient education materials should be standardized and available in multiple languages.
- All providers of knee arthroscopy should align their pathways with the evidence-based recommendations made in this report.
- All hospitals should adopt the forthcoming health transformation discharge-planning standards.
- Preoperative screening and diagnosis should align with provincial standards of appropriateness (see, for example, the HQO panel on preoperative diagnosis).
- All hospitals should be required to have a surgical safety checklist that complies with Accreditation Canada requirements.
- Provincial standardized criteria for referral to rehabilitation need to be developed and monitored.
- Access to rehabilitation services for ligament and patella procedures (Group 2) should be readily available.
- Key components of a rehabilitation program should be developed so that all patients receive access to rehabilitation whether at home or at community rehabilitation clinics.
- Stakeholders have repeatedly raised concerns over using the top performing/best practice facilities as a benchmark for QBP, in that some hospitals may be unfairly punished and not given the opportunity to improve.

# Independent Health Facilities

The MOHLTC should consider shifting knee arthroscopy procedures from the hospital setting to community-based independent health facilities (IHF).

## Barriers to IHFs

- Capital investment would be required by private investors.
- IHFs may be considered a revenue generator by providers. Limiting the procedure to patients who meet province-wide standardized referral criteria must be ensured and monitored.
- There is the potential for increased cost to the system.
- Reducing knee arthroscopy procedures in a small hospital may impact those hospitals' ability to keep costs for all surgical procedures to a provincial benchmark, as fixed costs would have to be spread across fewer surgical procedures.

## Levers to IHFs

- IHFs would improve access/reduce wait times for knee arthroscopy.
- With reduction in hospital-based knee arthroscopy, larger hospitals may improve wait times for other surgical procedures (i.e., increase operating room capacity for other surgeries).
- There would be a reduction in hospital-based elective surgical procedures.
- Full implementation and monitoring of the Choosing Wisely program must be maintained to ensure that patients are not receiving unnecessary surgery in an IHF.
- College of Physicians and Surgeons of Ontario guidelines for IHFs should be fully enforced; there is the potential to go 1 step further, with annual review of IHFs against the guidelines.
- IHFs have the benefit of a 1-stop shop for patients: pre- and post- visits plus standardized education materials.

The Ministry of Health and Long-Term Care will develop and monitor a scorecard where types of surgery, volumes, and wait times are captured and reported.

# Expert Advisory Panel Membership

## HQO's Expert Advisory Panel on Episode of Care for Patients Undergoing Arthroscopic Knee Surgery

Name	Affiliation(s)	Appointment(s)
<b>Chair</b>		
Dr James Waddell	St. Michaels Hospital University of Toronto	Orthopedic Surgeon Professor, Division of Orthopedic Surgery
<b>Orthopedic and Reconstructive Surgery</b>		
Dr Mark MacLeod	Victoria Hospital, London Health Sciences Centre	Orthopedic Surgery
Dr Steven Charles Reed	Humber River Regional Hospital	Orthopaedic Surgery
Dr John Semple	Women's College Hospital	Chief of Surgery
<b>Primary Care</b>		
Dr Christopher Jyu	Rouge Valley Health System The Scarborough Hospital	Primary Care Lead
<b>Anesthesiology</b>		
Dr Nick Lo	St. Michael's Hospital University of Toronto	Staff Anesthesiologist Assistant Professor
Dr Jean Wong	Women's College Hospital University Health Network	Staff Anesthesiologist
<b>Physiotherapy and Rehabilitation</b>		
Rhona McGlasson	Bone and Joint Canada North Simcoe Muskoka LHIN	Executive Director Surgical Coordinator
Anne-Marie MacLeod	Holland Musculoskeletal Program, Sunnybrook Health Science Centre	Operations Director
<b>Executive Administration</b>		
Tiziana Silveri	North Bay Regional Health Centre	Vice President of Clinical Services
Leslie Gauthier	Hamilton Health Sciences	Director, Perioperative Services
Winnie Doyle	St Joseph's Healthcare, Hamilton	VP President Patient Services, Chief Nursing Executive



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