Quality-Based Procedures: Indicator Handbook for Hip Fracture

Health Quality Ontario

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Introduction

Purpose

This report template has been prepared by the Ministry of Health and Long-Term Care for the Clinical Expert Advisory Groups to ensure standardization in the domains for which indicators are selected, to precisely document the indicators, their construction, and correct interpretation, as well to direct their data collection, presentation and analysis process. It will help the Ministry and its partners to ensure consistent data collection for constructing the indicators, roll-up of the indicators to a more aggregate level within and across Quality Based Procedures and a consistent interpretation of the indicators collected.

The indicators will support the monitoring and evaluation of the impact of the Quality Based Procedures (QBPs) and provide benchmark information for clinicians and administrators that will enable mutual learning and promote on-going quality improvement.

Context

As of April 1, 2012, the Ministry began with the implementation of Health System Funding Reform (HSFR). Over the fiscal years 2012/13 to 2014/15, HSFR will shift much of Ontario's health care system funding for hospitals and Community Care Access Centres (CCACs) away from the current global funding allocation towards paying for activity and patient outcomes to further support quality, efficiency and effectiveness in the health care system.

HSFR is aligned with the four core principles of the Excellent Care for All (ECFA) Strategy:

- Care is organized around the person to support their health;
- Quality and its continuous improvement is a critical goal across the health system;
- Quality of care is supported by the best evidence and standards of care; and
- Payment, policy and planning support quality and efficient use of resources.

PBF has two key components: Organizational-Level funding, which will be allocated as base funding using the Health Based Allocation Model (HBAM) and Quality Based Procedure (QBP) funding, which will be allocated for targeted clinical areas based on a "price x volume" approach and a global funding approach.

An evidence- and quality-based framework has been created to identify those QBPs that present opportunities for process improvements, clinical re-design, improved patient outcomes, and enhanced patient experience and potential cost savings.

As part of a multi-year implementation strategy, a suite of QBPs have been rolled-out to date:
As of April 2012:

- Primary Unilateral Hip Replacement
- Primary Unilateral Knee Replacement
- Cataract

- Chronic Kidney Disease

As of April 2013:

- Congestive Heart Failure
- Chronic Obstructive Pulmonary Disease
- Stroke
- Non-Cardiac Vascular
- GI Endoscopy
- Chemotherapy – Systemic Treatment.

As implementation evolves, the QBPs will be further expanded to address the continuity of care and greater numbers of QBPs will be introduced, accounting to approximately 30% of total hospital funding.

FY 2012/13 QBPs were identified using an evidence- and quality-based selection framework which identifies opportunity for process improvements, clinical re-design, improved patient outcomes, and enhanced patient experience and potential cost savings.

In addition:

- Early-adopter QBPs were seen as showing significant opportunity to introduce standardized, evidence-based clinical pathways and to reduce both practice and cost variation across the province;
- Care for these services is delivered across many health service providers including hospitals, the Community Care Access Centre, and community-based health care providers; and
- Resources for these services are shared among many service providers.

To support the Ministry in developing evidence-based QBPs, the Clinical Expert Advisory Groups have been set up to:

- Provide recommendations on evidence-informed practices and patient clinical pathways for the respective QBP.
- Develop Clinical Handbooks.[1]
- Develop indicators to monitor, evaluate the impact of the QBP and to provide benchmark information to support on-going quality improvement.

With regard to the indicators, the Ministry is seeking input and advice from the Clinical Expert Advisory Groups on:

[1] Clinical Handbooks serve as a compendium of the evidence-informed rationale and clinical consensus driving the development of the policy framework and implementation approach for fiscal year 2012/13 QBPs. The Handbooks have been developed in collaboration with Clinical Expert Advisory Groups that have assisted in the planning process of fiscal year 2012/13 QBP strategy

- Indicators that are meaningful and measurable (i.e. data is available to measure indicators; there are no unreasonable obstacles or constraints on accessing the information; and the information can be used without restrictions)
- Suggestions for indicators that currently can't be measured due to the absence of data or constraints on accessing the information but are important to measure as they are key for monitoring, evaluating and improvement purposes.

Recognizing the information that needs to be completed as part of the template, it is up to each Clinical Expert Advisory Group's discretion to decide how they will develop the indicators. Important is that the indicators are meaningful for clinicians, administrators in terms of identifying improvement opportunities and rolled-up become meaningful for Local Health Integration Networks (LHINs) and the Ministry to monitor and evaluate the implementation of QBP. A recommended approach would be to use the modified Delphi consensus technique (see the methods section of the report;).

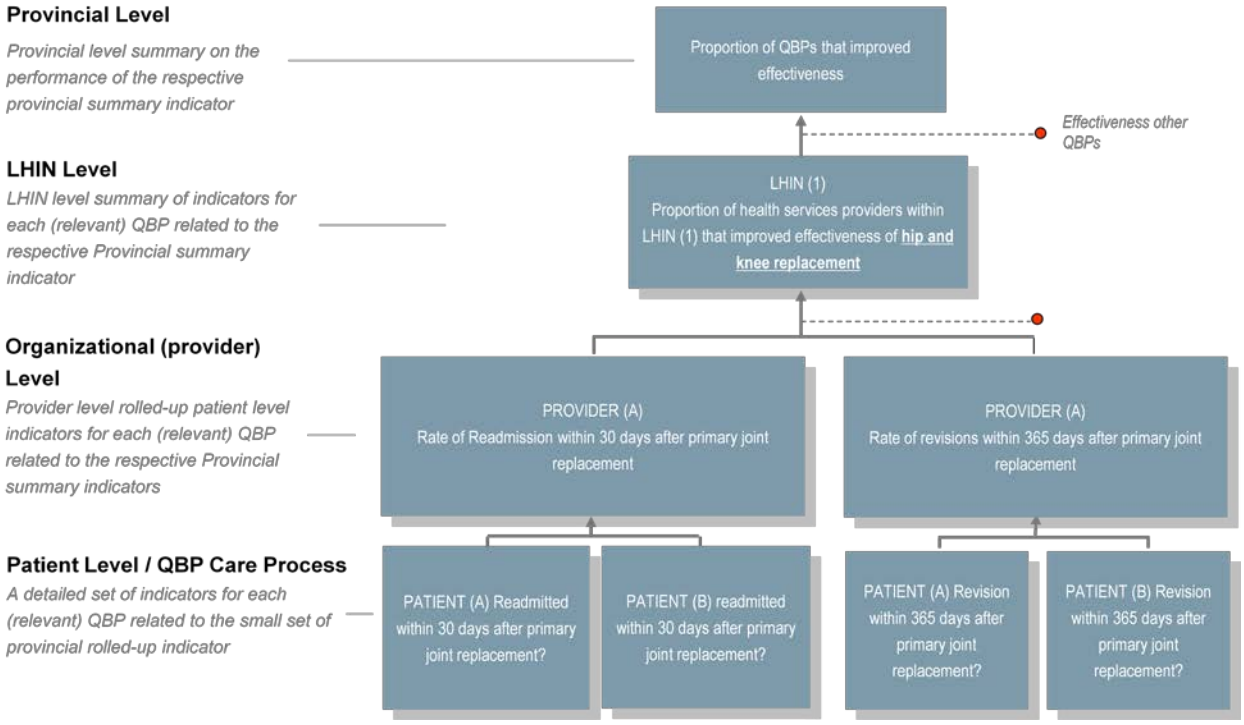
Scorecard

To monitor and evaluate the impact of the QBP and to support on-going improvement, the Ministry has developed a framework/scorecard based on the following guiding principles:

- ***Relevance*** – the scorecard should only measure the response of the system to introducing QBPs.
- ***Importance*** – to facilitate improvement the indicators in the scorecard should be meaningful for the various stakeholders (clinicians, administrators, Local Health Integration Networks, MOHLTC and patients).
- ***Alignment*** – the scorecard should align with other indicator related initiatives where appropriate
- ***Evidence-based*** – the indicators in the scorecard need to be scientifically sound or at least measure what is intended and accepted by the community (clinicians, administrators, patients and/or policy-decision makers).

The scorecard will provide guidance on the indicators that need to be developed for each QBP pending their relevance for the respective QBP. Rolled-up, the results on these indicators will provide an aggregated and summarized view on the impact of QBP at the provincial level while providing benchmark information by QBP at LHIN, organizational and patient-level (*see figure 1 for an example*).

Figure 1: Example of a cascading indicator for effectiveness of hip and knee replacement surgery (*for illustration purpose only*)*



*** NOTE**: For illustration purpose, indicators are adopted from the Provincial Orthopaedic Quality Scorecard – Hip and Knee Replacement Surgery. Performance on patient level indicators will also be available at Provincial/LHIN level too.

Clinical Care Pathway for Hip Fracture

Background

A hip fracture is a femoral fracture that occurs in the proximal end of the femur, near the hip. The vast majority of hip fractures occur in the elderly population as a result of low energy trauma and often damage bones that are already weakened by osteoporosis. A much smaller percentage of hip fractures occur in younger populations due to higher energy trauma such as automobile collisions. Hip fracture incidence increases dramatically with age for men and women, rising from 22.5 and 23.9 per 100,000 population respectively at age 50 years to 630.2 and 1289.3 per 100,000 population respectively by age 80 years.(1) In Ontario, the average age of hip fracture patients admitted to hospital is about 80 years and approximately 70% are women.(2)

For an elderly individual, a hip fracture is often a catastrophic event that can result in serious morbidity, permanent disability, loss of independence and for many, premature mortality. About 20% of people who suffer a hip fracture die within a year,(3) with risk of mortality increasing for men, (4) persons of more advanced age (5) and for people residing in nursing homes.(6) Among patients who were living independently prior to a hip fracture, only about half are able to walk unaided after fracture and about one-fifth require placement in a long-term care facility.(7)

Despite this high burden of illness, researchers around the world have highlighted that evidence-based interventions for hip fracture are often not applied in a consistent fashion, with significant opportunities for improving hip fracture patient outcomes through closer adherence to evidence-based practice. (8) (9) In Ontario, some of this opportunity for improvement is hinted at by the substantial range of regional variation observed in a number of clinical areas; (10) which suggests room for improvement through implementing more consistent standards of practice.

Fortunately, there is a growing evidence base around a broad range of effective practices for the management of hip fracture, spanning the continuum of care from the emergency department (ED) and acute hospital admission through rehabilitation and follow-up in the community. There are now several well-respected international guidelines available for hip fracture care that have been informed by methodologically rigorous systematic reviews.(11) (12) (13) In Canada, the National Hip Fracture Toolkit is a comprehensive national guideline for hip fracture management developed by the cross-provincial Bone and Joint Decade partnership.(14) The Hip Fracture QBP developed by HQO (15) attempts to define best practice across hip fracture care from the time of first hospital contact through to 90 days post discharge. This report identifies key performance indicators (process and outcome) to accompany the Hip Fracture QBP.

Cohort description

The Hip fracture QBP Expert Panel recommended the inclusion of patients aged 18 and older with an index acute inpatient admission for an incident hip fracture, denoted by at least one of the ICD-10-CA diagnosis codes **S72.0*** (with the exception of S72.00), **S72.1*** and **S72.2*** being recorded on the patient's acute inpatient abstract. The panel chose to take a broad perspective on the hip fracture population and include post-admit hip fractures (i.e. resulting from in-hospital falls) and hip fractures

that coexist with other conditions, including admissions where the other condition may have a larger contribution to hospital utilization than the hip fracture. As such, the episode of care cohort includes cases where a hip fracture diagnosis is coded not only as **Most Responsible Diagnosis**, but also as a **Pre-admit Comorbidity,** a **Post-admit Comorbidity,** as well as **Admitting Diagnosis** and **Service Transfer Diagnosis** (which are optionally coded variants of the comorbidity diagnosis type). The cohort does not include cases where one or more of the identified ICD-10-CA codes are present only as a secondary diagnosis**.** (15)

While the Expert Panel was tasked with defining a hip fracture patient cohort for the purposes of analysis and defining best practice care, the Ministry requires a cohort definition for the purpose of the QBP funding model. This requires a definition that will enable each hospital case to be assigned to a single grouping using the Ministry's Health-based Allocation Model (HBAM) Inpatient Grouping (or HIG) methodology, where each patient case funded must be assigned to a mutually exclusive HIG group. For the Ministry's purposes, it has proposed the following modifications to the Expert Panel cohort definition for the QBP funding methodology**:**

A) **The Ministry proposes excluding cases that do not have a Most Responsible Diagnosis of S72.0*, S72.1*, S72.2* from the QBP definition.** In 2011/12, 1,128 cases (8.8% of the total cohort) without a hip fracture-related MRDx would be excluded.

B) **The Ministry proposes excluding cases with a 'qualifying procedure' from the QBP definition.** In 2011/12, 114 cases (0.89% of the total cohort) that had a hip fracture MRDx would be excluded based on the presence of a 'qualifying procedure' that assigns cases to other HIGs.

The Expert Panel was not tasked with developing the actual QBP funding methodology for hip fracture; ultimately, the design of the payment methodology is a policy decision by the Ministry. From the perspective of identifying the best practices for the episode of care as well as critical indicators for measuring adherence to the episode, the Expert Panel's original hip fracture cohort definition is likely to be better suited for defining hip fracture performance measures, particularly if they are intended to support quality improvement.

Episode of care

The Expert Panel defined the scope of analysis for the hip fracture episode of care as initiating with the patient's initial presentation to hospital (any transfers (e.g. from a non-surgical to surgical hospital) are linked back to the initial encounter) with one of the included ICD-10-CA diagnoses and concluding at either 90 days following the initial admission or death (see Figure 2).

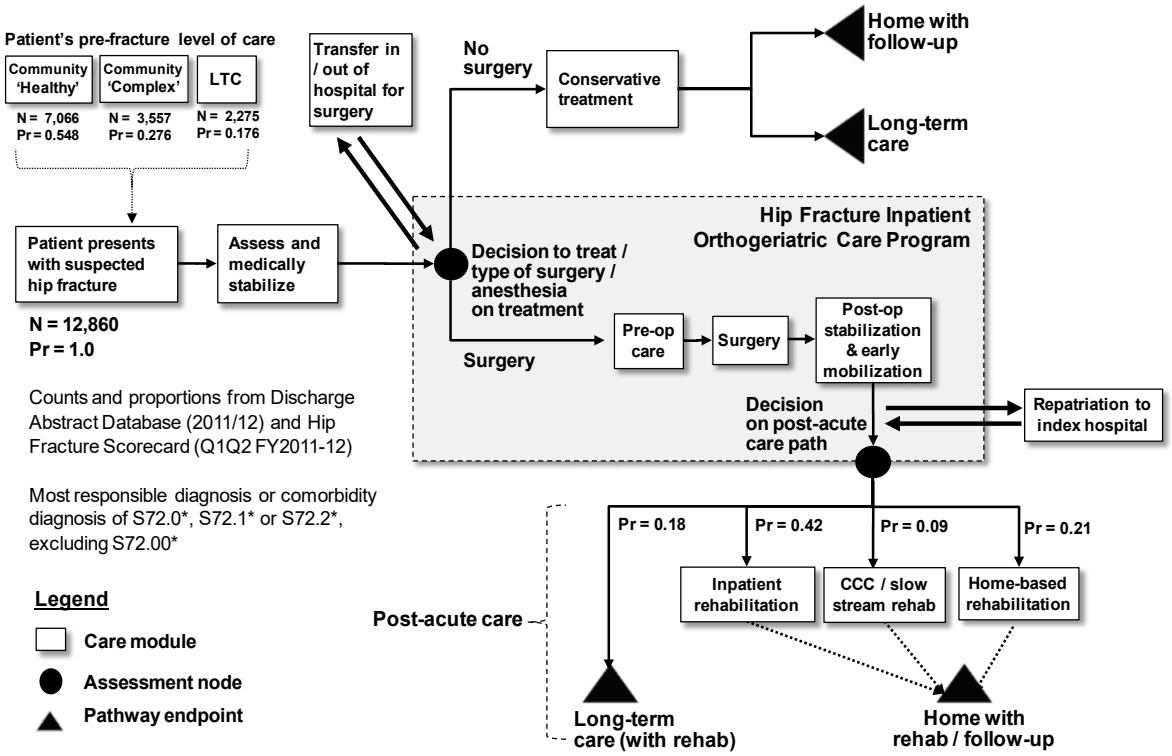


Figure 2: Episode of Care Model for Hip Fracture (15)

The episode of care scope defined by the Expert Panel is intended to represent a more comprehensive, integrated picture of services provided, offers a more appropriate window of analysis for comparison across providers and regions, and can support the move to integrated payment models for hip fracture such as 'bundled payments' for episodes of care.

Hip Fracture Patient Stratification Approach

As a population, patients presenting with hip fracture are heterogeneous. As part of their work, the Expert Panel identified major subpopulations (referred to here as 'patient groups') with similar care pathways and expected resource utilization as well as factors that are associated with variation in patient complexity and resource utilization within these patient groups to assist with measurement and costing methodologies. The Expert Panel came to several core conclusions around the development of an appropriate hip fracture patient stratification methodology based on literature review and empirical analysis. (15)

1. In terms of risk stratifying the hip fracture population, pre-fracture functional status and social factors are critically important variables and significantly influence hip fracture patients' hospital costs and length of stay. These factors are also linked with other variables associated with greater complexity such as comorbidity and are important in determining the clinical pathway and trajectory of care for a patient. For example, hip fracture patients admitted from long-term care homes will have a very different trajectory and expected resource utilization than hip fracture patients admitted from the community who may or may not require an additional level of care following discharge.

2. There is currently a paucity of data collected in standard form at the provincial level on variables related to pre-fracture function or social circumstances for hip fracture patients. The common denominator dataset for hip fracture admissions – the Discharge Abstract Database (DAD) – contains very little information on social or functional factors for these patients. The Expert Panel emphasized the importance of collecting information beyond what is currently collected in the DAD on these types of factors.
3. Despite these significant gaps in Ontario data collection and the need for a strategy to begin to collect primary data on some of these important patient characteristics for hip fracture patients, there may be modest options for interim 'proxy' approaches to capturing some of these characteristics through currently available administrative data. Although not captured in the DAD, patient-level data on pre-fracture functional status and living situation can be captured in other settings (e.g. long-term care, home care) and used to stratify the acute admission by linking record-level information from other datasets (e.g. Activities of Daily Living variables captured in the Continuing Care Reporting System).
4. There are also a number of patient-level variables currently collected in the DAD that *do* influence resource utilization for hip fracture: age, gender, and comorbidities have all been shown in multiple studies around the world to have a significant impact on hip fracture patient costs and utilization. There is a smaller body of evidence for the effect of fracture location on hip fracture costs and length of stay. These factors can also be used to stratify patients by complexity within major subpopulations.

Proposed Hip Fracture Patient Groups

Group #1: Admitted from home (community) – 'Healthy'

These patients are living independently in the community prior to their fracture; with no significant health care community supports or utilization recorded (they may have informal supports not captured in administrative data). In general, they are expected to return to independent living in the community following their acute care and rehabilitation. They tend to be younger and healthier than the more complex patient groups, with higher functional status and fewer comorbidities.

Technical definition: Patients admitted from the community (flag in DAD) with no Resident Assessment Instrument (RAI) data found for the patient in any setting (LTC, complex continuing care or home care) within a year prior to and following the fracture. (15)

Group #2: Admitted from long-term care

These patients tend to be the most complex and frail. A significant proportion of these patients are expected to die within the next year (7). As they are living in long-term care settings prior to the fracture, they are nearly always expected to return to their long-term care home. Hence, while they are generally the sicker patients, their discharge pathway also tends to be fairly well-defined and they have a significantly shorter average length of stay than other patients.

Technical definition: Patient admitted from long-term care (flag in DAD); LTC RAI assessment data for the patient found within a year prior to the fracture. (15)

Group #3: Admitted from home (community) – 'Complex'

These patients are living in the community prior to their fracture, but received some sort of significant formal health care supports either before or after their hospital admission. These patients tend to be the cases that have the highest overall length of stay and hospital utilization. They also tend to have much higher ALC rates than the other populations. During their admission, they are expected to require a higher level of care than the average hip fracture patient, and may require an additional level of care following their discharge. Thus, they may experience a prolonged length of stay in the hospital before they are able to be transferred to an appropriate setting. The Expert Panel noted that 'admitted from home but more complex' patients are the most difficult to identify of hip fracture patient subgroups. The methodology proposed here is not perfect, but the Expert Panel agreed that this definition may be a reasonable proxy for capturing this 'hidden complexity'.

Technical definition: Patients admitted from home (flag in DAD), with RAI assessment data found for the patient in either LTC, complex continuing care or home care either within a year prior to and/or after the fracture. (15)

When measuring the processes and outcomes associated with QBP implementation, it is proposed that the Ministry consider two parallel approaches to hip fracture patient stratification: a long-term approach involving the collection of new data on important patient characteristics, and an interim approach based on currently available data elements. From the perspective of selecting indicators to measure the episode of care, this will allow the identification of indicators that are meaningful but not necessarily ideal while in parallel providing recommendations on new data collection for improved (increased validity and reliability) measurement.

Methods for indicator selection

Indicator sub-panel process

As part of the indicator selection and development work for the QBP, a sub-group of the Expert panel was struck to select important points of measurement across the hip fracture episode of care and to advise on potential indicators that could be used to measure the key processes and outcomes for the clinical pathway (see Appendix 4 for a list of sub-panel participants). Figure 2 describes, at a high level, the process of indicator identification, prioritization and development.

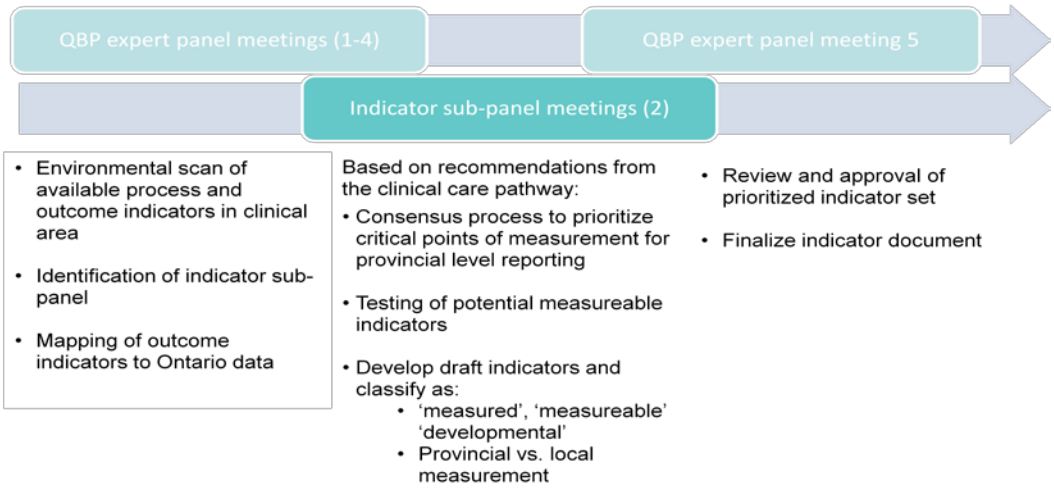


Figure 3. Methodology for QBP indicator selection and development

Objectives

The **objective** of the indicator sub-panel is to advise the Hip Fracture Expert Panel, HQO and the Ministry on the identification and the development of performance indicators aligned to the episode of care. The sub-panel will:

- Identify a limited set of indicators for the comprehensive measurement of the episode of care
- Categorize these indicators as
  - currently **measured** in Ontario or similar health systems (indicator is well-defined and validated)
  - **measureable** with available provincial data (data are available to measure the indicator, but the indicator requires definition and validation)
  - **developmental** (indicator is not well defined and data sources do not currently exist to measure the indicator)
- Categorize the indicators for measurement at
  - the **provincial level** (for system level monitoring and potentially for accountability)
  - the **local level** for institutions to guide on-going quality improvement efforts and enable mutual learning

Results

The panel reviewed all the recommendations from the hip fracture episode of care with the intention of identifying recommendations from the care pathway that were critical for the successful implementation of the episode of care and so should be measured. As the panel reviewed the recommendations, it became clear that there were a number of recommendations that were of critical importance, but not specifically for hip fracture care. These recommendations were categorized as important to clinical care in general and have been grouped under the heading "standard clinical practice". While indicators for these recommendations were not technically defined, the panel stressed the importance of these recommendations for ensuring evidence-based best practice for all patients, including those with hip fractures.

Prioritized recommendations for measurement

Table 1 lists the recommendations from the hip fracture episode of care that were prioritized for measurement of adherence to the care pathway. Note that this does not include those recommendations that the panel deemed important for standard clinical practice, which are presented in section 3 of the results.

Table 1. List of recommendations that were prioritized for hip fracture measurement

Recommendation	Indicator	Process/ outcome	Measureable
Care in the Emergency Department			
3. ED Assessment and Diagnostics	Percentage of hip fracture patients who underwent a comprehensive clinical status assessment and documentation upon presentation to ED	Process	Developmental
	Percentage of hip fracture patients whose social circumstances were assessed and documented upon presentation to ED	Process	Developmental
	Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED	Process	Developmental
	Percentage of hip fracture patients who had their functional status assessed at regular intervals*	Process	Developmental
	Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals*	Process	Developmental
4. Patient Management Within the ED	Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place*	Process	Developmental
6. Presenting to Non-Surgical Hospitals	Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital	Process	Measureable
	Number of hours patients waited to receive hip fracture surgery	Process	Measureable

Pre-operative Management			
7. Pain Management	Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place*	Process	Developmental
11. Delirium Prevention	Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals*	Process	Developmental
12. Osteoporosis Assessment	Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital	Process	Measureable
13. Osteoporosis Treatment	Percentage of hip fracture patients who received appropriate clinical management for the treatment of osteoporosis	Process	Measureable
14. Urinary Catheterization	Rate of catheter associated urinary tract infections	Outcome	Measureable
	Catheter utilization ratio; Percentage of indwelling catheters removed post-operatively	Process	Developmental
16. Inpatient Orthogeriatric Care	Percentage of hip fracture patients who were seen by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care	Process	Developmental
20. Pre-operative Thromboprophylaxis	Percentage of patients who received pre-operative and post-operative thromboprophylaxis	Process	Developmental
21. Time to Surgery	Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital	Process	Measureable
	Number of hours patients waited to receive hip fracture surgery	Process	Measureable
	Percentage of hip fracture patients who were 'home to home' in 30 days*	Outcome	Measureable
23. Anesthesia	Percentage of hip fracture patients who were given regional anesthesia before surgery	Process	Measureable
Surgery			
26. Importance of Weight Bearing & 32. Post-operative Mobilization	Percentage of hip fracture patients who achieved immediate weight bearing as tolerated (WBAT) after surgery	Outcome	Developmental
	Percentage of patients who receive daily mobilization	Process	Developmental
Post-Operative Management			
30. Post-operative Management (General)	Percentage of hip fracture patients who had their functional status assessed at regular intervals*	Process	Developmental
	Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals*	Process	Developmental
31. Post-operative Pain Management	Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place*	Process	Developmental
34. Post-operative Thromboprophylaxis	Percentage of patients who received pre-operative and post-operative thromboprophylaxis	Process	Developmental
36. Patient and Caregiver Education	Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place*	Process	Developmental

Post-acute Care			
38. Timing to Initiation of Rehabilitation	Percentage of hip fracture patients that received comprehensive and multidisciplinary rehabilitation	Process	Developmental
39. Location of Rehabilitation	Percentage of hip fracture patients who were 'home to home' in 30 days*	Outcome	Measureable
40. Optimal Intensity and Key Components of Rehabilitation	Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis	Process	Measureable
	Percentage of hip fracture patients that received comprehensive and multidisciplinary rehabilitation	Process	Developmental
41. Discharge Home and Follow-Up Care	Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital	Process	Measureable
	Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place*	Process	Developmental

* Denotes indicators that are impacted by recommendations across multiple points of care

Indicators

1.0 Measured/Measureable

Surgery (3 indicators)

1.1 Wait time for hip fracture surgery

1.1.1 Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital

INDICATOR DESCRIPTION		
	Indicator name	Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital
	Indicator description	This indicator measures the percentage of hip fracture patients admitted to surgical or non-surgical hospitals that received hip fracture surgery within 48 hours of their initial presentation to hospital *Performance Indicator Type: Process* *Directionality: A greater percentage is better*
	Relevance	Scorecard dimension: Access Relevant for: Province, LHINs, administrators, clinicians, patients
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture:(15) • Patients admitted to non-surgical hospitals should still receive surgery within 48 hours of their initial presentation (rec 6) • Surgery should be performed as early as possible, not to exceed 48 hours of initial presentation (rec 21) A benchmark of hip fracture fixation within 48 hours was set by federal, provincial and territorial governments in December 2005. Administrative data shows that 82% of Ontario hip fracture patients are treated within the 48 hour benchmark, suggesting there is still room for improvement with this target. Guidelines/Evidence Considered: Evidence supports the current 48 hour time to surgery benchmark. Shorter wait time is associated with decreased risk of mortality and other postoperative complications (15) (14) (11) (12) (16) (17) Longer hospital stays have been associated with a delay to hip fracture surgery (15); (18) The recommendation that patients should receive surgery within 48 hours even if they

		are initially admitted to a non-surgical hospital is based on similar recommendations in the National Hip Fracture Toolkit (14) and on Expert Panel Consensus
DEFINTION & SOURCE INFORMATION	Numerator	The number of hip fractures that were surgically treated within 48 hours of first presentation to hospital Note: the wait time is calculated from the admission date/time of the first hospitalization (including ED contact) with a hip fracture diagnosis (index hospitalization) to the procedure date/time of the hip fracture surgery (surgery hospitalization).
	Denominator	All hip fractures that were surgically treated in an acute care hospital in Ontario Exclusions: Records with an invalid admission date or time Records with an invalid discharge date or time Records with an invalid procedure/intervention date or time Discharged as self sign-out or did not return from a pass Transferred patients where the number of days between discharged from one acute facility and admission to another facility is more than 24 hours
	Data source / data elements	CIHI – DAD
	Adjustment risk, age/sex standardization)	Process indicator - report as crude and adjusted rates Risk-adjust for age and sex as a minimum, but also consider adjustment for pre-admission comorbid diagnoses (heart failure, ischemic heart disease, hypertension, chronic obstructive pulmonary disease, diabetes with complications and cardiac dysrhythmia) (3) as well as pre-fracture location (i.e., LTC or community) (1).
Geography and Timing	Timing and frequency of data release	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Index hospital type (surgical and non-surgical) Province, LHIN, and hospital Patient characteristics Pre-fracture location (admission from community or LTC)
	Trending	Yes (data available starting in 2009)
Additional Information	Limitations	Quarterly CIHI-DAD data undergoes data quality processes prior to year end and results after year end closes will be the most accurate
	Comments	This indicator is currently calculated as part of the Ontario Hip Fracture Scorecard (19) by the Health Analytics Branch of the Ministry of Health and Long-Term Care (MOHLTC). The scorecard reports the crude rate stratified by hospital type at the provincial, LHIN, and hospital level. This indicator is also available in the CIHI Health Indicators 2013 ePublication. (18) The ePublication reports the risk-adjusted indicator by province and region from 2009-2011. The technical notes indicate that the indicator is measured only among hip fracture patients aged 65 and older The suggested factors for risk adjustment are based on those applied by CIHI (18) and identified by the sub-panel. A person can have more than one hip fracture and one repair in the reference period; therefore, a person can be included in the indicator more than once (18). *Summary of panel deliberations for choosing this indicator:* this indicator captures efficiency/access at many of the steps along the episode of care and has the potential to drive practice. A patient should undergo surgery within 48 hours regardless of whether they were admitted to a surgical hospital or to a non-surgical hospital. Surgery should occur within 48 hours from initial presentation to ED inclusive of presentation to non-surgical hospital including transfer.

	Alignment	Ontario Hip Fracture Quality Scorecard: The Total Count and Percent of Patients waiting < 48 hours from admission to surgery in non surgical hospital; The Total Count and Percent of Patients waiting < 48 hours from admission to surgery in surgical hospitals (Accessibility Indicator) (19) CIHI Health Indicators 2013: Wait Time for Hip Fracture Surgery (Proportion with Surgery Within 48 hours) (Accessibility Indicator) (18) National Hip Fracture Meeting – Identified "Time to Surgery" as a core indicator (need to capture when they enter the system; 36 and 48 hour target; stratify on type of hospital) (20) *National Hip Fracture Toolkit* Pre-surgery indicator: Percentage of patients waiting < 48 hours from admission to any hospital to surgery; Percentage of patients < 48 hours within same hospital to surgery; Percentage of patients waiting < 48 hours from fracture to surgery (14) The National Hip Fracture Database National Report 2012 (England): Percentage by hospital of eligible patients who were treated with surgery within 48 hours of admission and during normal working hours, excluding patients already in hospital when fracture occurred, patients medically unfit after 48 hours, patients dead within 48 hours, and patients treated without surgery (21)

1.1.2 Number of hours patients waited to receive hip fracture surgery (*this indicator should be reported in conjunction with 1.1.1*)

INDICATOR DESCRIPTION	*Indicator name*	Number of hours patients waited to receive hip fracture surgery
	Indicator description	Reported as the mean, median and 90th percentile wait time, this indicator provides the number of hours patients admitted to surgical or non-surgical hospitals waited to receive surgery after their initial presentation *Performance Indicator Type*: Process *Directionality:* A lower number is better
	Relevance	*Scorecard dimension*: Access *Relevant for*: LHINs, administrators, clinicians, patients
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) • Patients admitted to non-surgical hospitals should still receive surgery within 48 hours of their initial presentation (rec 6) • Surgery should be performed as early as possible, not to exceed 48 hours of initial presentation (rec 21) Measurement of the actual wait time will provide policy makers and providers with a sense of the range of wait times that are currently being experienced across the province. Guidelines/Evidence Considered: Evidence supports the current 48 hour time to surgery benchmark. Shorter wait time is associated with decreased risk of mortality and other postoperative complications (15) (14) (11) (12) (16) (17) Longer hospital stays have been associated with a delay to hip fracture surgery (15); (18) The recommendation that patients should receive surgery within 48 hours even if they are initially admitted to a non-surgical hospital is based on similar recommendations in the National Hip Fracture Toolkit (14) and on Expert Panel Consensus
& SOURCE INFORMATI	*Numerator*	The number of hours (mean, median and 90th percentile) patients admitted to a surgical or non-surgical hospital waited to receive surgery *Wait time is calculated from the admission date/time of the first hospitalization (including*

		ED contact) with a hip fracture diagnosis (index hospitalization) to the procedure date/time of the hip fracture surgery (surgery hospitalization)
	Denominator	All hip fracture patients that were surgically treated in an acute care hospital in Ontario Exclusions: Records with an invalid admission date or time Records with an invalid discharge date or time Records with an invalid procedure/intervention date or time Discharged as self sign-out or did not return from a pass Transferred patients where the number of days between discharged from one acute facility and admission to another facility is more than 24 hours
	Data source / data elements	CIHI – DAD
	Adjustment (risk, age/sex standardization)	Process indicator - report as crude and adjusted rates Risk-adjust for age and sex as a minimum, but also consider adjustment for pre-admission comorbid diagnoses (heart failure, ischemic heart disease, hypertension, chronic obstructive pulmonary disease, diabetes with complications and cardiac dysrhythmia) as well as preadmission status (i.e., LTC or community)
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Index hospital type (surgical and non-surgical) Province, LHIN, and hospital Patient characteristics (age and sex) Pre-fracture location (admission from community or LTC)
	Trending	Yes (data available starting in 2009)
ADDITIONAL INFORMATION	*Limitations*	Quarterly CIHI-DAD data undergoes data quality processes prior to year end and results after year end closes will be the most accurate
	Comments	This indicator is not currently reported but is a core indicator identified during the National Hip Fracture Meeting in June 2013.(20) The indicator is similar to the indicator above measuring the percentage of hip fractures that underwent surgery within 48 hours of initial presentation to hospital; however, assessing the median/average wait time will help to describe the amount of time, in general, that hip fracture patients are waiting for surgery and enable comparisons by hospital and LHIN across the province. The suggested factors for risk adjustment are based on the ones applied by CIHI (18) for the calculation of the percentage of hip fracture patients that underwent surgery within 48 hours as well as factors identified by the sub-panel as potentially important adjusters A person can have more than one hip fracture and one repair in the reference period; therefore, a person can be included in the indicator more than once (18). *Summary of panel deliberations for choosing this indicator:* this indicator captures efficiency/access at many of the steps along the episode of care and has the potential to drive practice. A patient should undergo surgery within 48 hours regardless of whether they were admitted to a surgical hospital or to a non-surgical hospital. Surgery should occur within 48 hours from initial presentation to ED inclusive of presentation to non-surgical hospital including transfer.
	Alignment	National Hip Fracture Meeting – Identified “Time to Surgery” as a core indicator (need to capture when they enter the system; 36 and 48 hour target; stratify on type of hospital) (20)

1.2 Percentage of hip fracture patients who were given regional anesthesia before surgery

INDICATOR DESCRIPTION	*Indicator name*	Percentage of hip fracture patients who were given regional anesthesia before surgery
	Indicator description	This indicator measures the percentage of hip fracture patients who received regional anesthesia before surgery *Performance Indicator Type*: Process *Directionality:* A greater percentage is better
	Relevance	*Scorecard dimension*: Appropriateness *Relevant for*: Administrators, clinicians, patients
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) • Regional anesthesia, where possible, is preferred over general anesthesia, in order to reduce risk of post-operative delirium (rec 23) • Patients should be offered choice of clinically acceptable methods of anesthesia after discussing the benefits and harms with them (rec 23) Guidelines/Evidence Considered: *SIGN* (Good Practice Point) (11) and *Medical Journal of Australia* (12) recommend use of regional anesthesia over general anesthesia
DEFINTION & SOURCE INFORMATION	*Numerator*	The number of hip fracture patients that were surgically treated with regional anesthesia
	Denominator	All hip fracture patients that were surgically treated in an acute care hospital in Ontario
	Data source / data elements	CIHI – DAD OHIP
	Adjustment (risk, age/sex standardization):	Process indicator – report as crude rate
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Province, LHIN, and hospital Patient characteristics (age and sex) Pre-fracture location (admission from community or LTC)
	Trending	Yes
ADDITIONAL INFORMATION	*Limitations*	Quarterly CIHI DAD data undergoes data quality processes prior to year end and results after year end closes will be the most accurate
	Comments	The recommendation in the clinical handbook indicates regional anesthesia, *where possible*, is preferred over general anesthesia. (15) However, this indicator measures the proportion of hip fracture patients who receive regional anesthesia and cannot take into account patient preference or other circumstances. Therefore, although a greater percentage is better for this indicator, 100% would not be expected. *Summary of panel deliberations for choosing this indicator:* There is good evidence that providing regional anesthesia instead of general anesthesia helps reduce the risk of post-operative delirium.
	Alignment	The National Hip Fracture Database National Report 2012 (England): Percentage of patients by hospital that received general anesthesia (GA) only, GA plus nerve block, GA plus epidural anesthesia, GA plus spinal anesthesia, spinal anesthesia (SA) only, SA plus epidural, SA plus nerve block, did not receive any anesthesia, or type of anesthesia is unknown. (21)

Post-operative Management (3 indicators)

1.3 Osteoporosis Assessment and Management[2]

1.3.1 Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital

INDICATOR DESCRIPTION	*Indicator name*	Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital
	Indicator description	This indicator measures the percentage of adults admitted for hip fracture surgery who received an assessment for osteoporosis (OP) before discharge from acute care or rehab hospital *Performance Indicator Type*: Process *Directionality:* A greater percentage is better
	Relevance	*Scorecard dimension*: Appropriateness and Access *Relevant for*: clinicians, patients, and LHINs
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) • Patients should be screened for osteoporosis and risk of fracture. The assessment may include the following investigations (rec 12): - Complete blood count - Creatinine - Electrolytes - Alanine aminotransferase - Alkaline phosphatase - Calcium - Phosphorus - 25-OH Vitamin D - Parathyroid hormone These investigations should be ordered as early as possible during the patient's care in order to allow sufficient time to return results and modify care appropriately (rec 12) Guidelines/Evidence Considered: Assessment investigations based on recommendations from National Hip Fracture Toolkit (14) and 2010 Clinical Guidelines, Osteoporosis Canada (22)
DEFINTION & SOURCE INFORMATION	*Numerator*	The number of hip fracture patients who had surgery who underwent assessment for osteoporosis (OP) prior to hospital discharge
	Denominator	All hip fracture patients who were surgically treated in an acute care hospital in Ontario Exclusion criteria: Patients who died while in hospital
	Data source / data elements	No data source currently available for this indicator; requires chart audit or EMR data; however a similar administrative data indicator was developed by the POWER Study
	Adjustment (risk, age/sex standardization)	Process indicator - report as crude and adjusted rates (age and sex standardized)
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	

[2] Note: these indicators are not measureable in their current form, however the POWER Study reported similar indicators that could be used while the recommended indicator is developed. See the POWER Study Musculoskeletal Conditions chapter for details

	Levels of comparability	Province, LHIN, and hospital Patient characteristics Pre-fracture location (admission from community or LTC)
	Trending	Yes
ADDITIONAL INFORMATION	*Limitations*	The current indicator is not measureable without further information on tests performed in hospital
	Comments	This indicator is not measureable in its current form; however, the Project for an Ontario Women's Health Evidence-Based Report (POWER) Study reported a similar indicator in its chapter on Musculoskeletal conditions;(23) the indicator that can currently be measured is bone mineral density testing within one year of discharge from hospital after a hip fracture. Although the indicators for appropriate clinical management for OP are separated into assessment and treatment, an indicator that captures firstly that the patient was assessed and then received the appropriate treatment would be useful. For instance, a patient whose test for OP was positive and received treatment would be considered as receiving appropriate OP management, as would a patient whose assessment indicated they did not have OP and therefore, did not receive treatment for OP. This indicator cannot currently be calculated.
	Alignment	*Musculoskeletal Conditions*: Osteoporosis Screening indicator described by the Project for an Ontario Women's Health Evidence-Based Report: Percentage of adults aged 50 and older who received bone mineral density testing within one year post-discharge after a low-trauma fracture, in Ontario, 2007/08. Indicator stratified by sex, age, neighbourhood income and LHIN (23) The National Committee for Quality Assurance: Osteoporosis testing in older women: the percentage of Medicare women 65 years of age and over who report ever having received a bone density test to check for osteoporosis (24) Osteoporosis physician performance measurement set: Osteoporosis: Percentage of patients aged 50 years and older treated for a hip, spine or distal radial fracture with documentation of communication with the physician managing the patient's on-going care that a fracture occurred and that the patient was or should be tested or treated for osteoporosis (24) The National Hip Fracture Database National Report 2012 (England): Percentage of patients who were already receiving bone protection medication, started bone protection medication, were assessed for bone protection medication or were awaiting DXA scan or bone clinic assessment. Patients were eligible if they did not die in hospital (21)

1.3.2 Percentage of hip fracture patients who received appropriate clinical management for the treatment of osteoporosis

INDICATOR DESCRIPTION	*Indicator name*	Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis
	Indicator description	This indicator measures the percentage of hip fracture patients aged 65 and older that received appropriate treatment of osteoporosis (OP). ▪ *Performance Indicator Type*: Process ▪ *Directionality:* A greater percentage is better
	Relevance	*Scorecard dimension*: Effectiveness and Access *Relevant for*: clinicians, patients, LHINs
	Importance	As a follow up to the recommendation on screening for OP (indicator 1.3.2 above), the panel also recommended measuring the effective management for patients. HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) The following are recommended for treatment of OP in hip fracture patients (rec 13): - Calcium - Vitamin D

		- Antiresorptive agents[3] - Selective estrogen receptor modulator[3] Rather than attempt to recommend a comprehensive range of therapies for management of osteoporosis in this Clinical Handbook, the Expert Panel recommends that providers refer to the Diagnosis and Management of Osteoporosis in Canada (22) (rec 13) It is recommended that hip fracture patients be initiated on appropriate osteoporosis medication during their hospital stay in order to increase the likelihood of continuing therapy in the community and reduce the risk of future fractures (rec 13) Regardless of setting, post-acute rehabilitation for hip fracture patients should include osteoporosis management and education (rec 40) Guidelines/Evidence Considered: Assessment investigations based on recommendations from *National Hip Fracture Toolkit.* The *Toolkit* recommends calcium, vitamin D, and bisphosphonate as effective treatments.(14) Also, the *Toolkit* recommends osteoporosis management and education as components of rehabilitation.(14) OHTAC Recommendation: *Aging in the Community* (2008)*:* A combination of vitamin D and Calcium in elderly women is effective at reducing likelihood of falls *Medical Journal of Australia* finds that effective treatments include vitamin D, vitamin D with calcium supplements*,* annual infusion of zoledronic acid*,* oral alendronate and oral risedronate*,* strontium in women aged 74 years or older and finds that a perioperative inpatient program, involving patient education and a list of questions for GP, may increase appropriate therapeutic intervention by GPs (12) Expert Panel Consensus on importance of initiating osteoporosis medication during hospital stay
DEFINTION & SOURCE INFORMATION	*Numerator*	The number of hip fracture patients aged 65 and older who received appropriate drug therapy for OP post discharge[4]
	Denominator	All hip fracture patients who were surgically treated in an acute care hospital in Ontario Exclusion criteria Died in hospital after their hip fracture surgery Less than or equal to 65 years old because of access to provincially funded drug benefits (ODB) in adults aged 65 and older
	Data source / data elements	CIHI-DAD RPDB Ontario Drug Benefits (ODB) database (for prescription medications only)
	Adjustment (risk, age/sex standardization)	Process indicator - report as crude and adjusted rates (age and sex standardized)
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Province, LHIN, and hospital Patient characteristics Pre-fracture location (admission from community or LTC)
	Trending	Yes
NAL INF OR	*Limitations*	It is not possible to collect information on the use of calcium and vitamin D supplements for patients, however the use of prescription medication in adults aged 65 and older is collected through the ODB

[3] These drugs can be captured using data in the Ontario Drug Benefits (ODB) database

[4] Refer to the Diagnosis and Management of Osteoporosis in Canada for appropriate treatment recommendations

	Comments	Although the indicators for appropriate clinical management for OP are separated into assessment and treatment, an indicator that captures firstly that the patient was assessed and then secondly received the appropriate treatment would have greater clinically validity. For instance, a patient whose test for OP was positive and received treatment would be considered as receiving appropriate OP management, as would a patient whose assessment indicated they did not have OP and therefore, did not receive treatment for OP.
	Alignment	*Musculoskeletal Conditions*: Osteoporosis Treatment indicator described by the Project for an Ontario Women's Health Evidence-Based Report (POWER) Study: Percentage of adults aged 66 and older who suffered a low-trauma fracture who received neither bone mineral density testing nor treatment within one year post-discharge, in Ontario, 2007/08 (23) *National Hip Fracture Toolkit* Post-operative acute care, Rehabilitation, and Outcome indicator: Percentage of hip fracture patients requiring OP treatment who started osteoporosis treatment (14) National Hip Fracture Meeting – Identified "OP Med Prescription" as a potential core indicator (20) The National Hip Fracture Database National Report 2012 (England): Percentage of patients who were already receiving bone protection medication, started bone protection medication, were assessed for bone protection medication or were awaiting DXA scan or bone clinic assessment. Patients were eligible if they did not die in hospital. (21) The National Hip Fracture Database National Report 2012 (England): Percentage of eligible patients who received both bone protection medication and falls assessment. Patients were eligible if they did not die in hospital. (21) The National Committee for Quality Assurance: Osteoporosis management in women who had a fracture: percentage of women 67 years of age and older who suffered a fracture and who had either a bone mineral density (BMD) test or prescription for a drug to treat or prevent osteoporosis in the six months after the fracture. (24) Osteoporosis physician performance measurement set: Osteoporosis: Percentage of patients aged 50 years and older treated for a hip, spine or distal radial fracture with documentation of communication with the physician managing the patient's on-going care that a fracture occurred and that the patient was or should be tested or treated for osteoporosis (24)

1.4 Rate of catheter associated urinary tract infections (measureable)

INDICATOR DESCRIPTION	*Indicator name*	Rate of catheter associated urinary tract infections (CAUTI) per 1000 catheter-days or per 1000 patient-day
	Indicator description	This indicator measures the percentage of hip fracture patients who developed a catheter associated UTI ▪ *Performance Indicator Type*: Process ▪ *Directionality:* A lower percentage is better
	Relevance	*Scorecard dimensions*: Appropriateness, effectiveness *Relevant for*: administrators, clinicians, patients
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Urinary catheterization (rec 14) o Avoid indwelling catheters where possible to decrease risk of urinary tract infections o Intermittent catheterization is preferable and has been shown not to increase incidence of urinary tract infections Guidelines/Evidence Considered: SIGN (Good Practice Point) and National Hip Fracture Toolkit recommend avoiding indwelling catheters Instrumentation of the urinary tract; and catheter-associated UTI (CAUTI) has been linked with increased morbidity (25) Indwelling catheters are a common cause for UTI (26) Intermittent catheterization is preferred over indwelling to decrease the risk of UTI (26) (25) For patients who indicate a need for an indwelling catheter, removal should take place

		as soon as possible post-operatively—preferably within 24 hours (25)
DEFINTION & SOURCE INFORMATION	*Numerator*	The number of hip fracture patients who developed a catheter associated UTI (patients with a recorded type 2 diagnosis [post-admit] of T83.5 (Infection and inflammatory reaction due to prosthetic device, implant and graft in urinary system or more general UTI complication) or N39.0 (Urinary tract infection, site not specified)
	Denominator	Number of days that hip fracture patients had a urinary catheter
	Data source / data elements	CIHI-DAD
	Adjustment (risk, age/sex standardization)	Process indicator - report as crude and adjusted rates (age and sex standardized)
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	LHIN, and hospital Patient characteristics
	Trending	Yes
ADDITIONAL INFORMATION	*Limitations*	
	Comments	
	Alignment	Guideline for Prevention of Catheter-Associated Urinary Tract Infections (25)

Post-Acute Care (1 indicator)

1.5 Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital

INDICATOR DESCRIPTION	*Indicator name*	Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital
	Indicator description	This indicator measures the percentage of hip fracture patients that were seen by a primary care provider within two weeks of their discharge from acute or rehab hospital *Performance Indicator Type*: Process *Directionality:* A greater percentage is better
	Relevance	*Scorecard dimension*: Integration, Effectiveness *Relevant for*: Province, LHINs, administrators, clinicians and patients
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) The family physician or community care provider should be informed about the pending discharge and follow-up appointment made within 2 weeks of discharge (rec 41) Guidelines/Evidence Considered: *National Hip Fracture Toolkit* recommendations on coordination of post-discharge services, medication, appointments and follow-up care Expert Panel Consensus on 2-week follow-up with primary care, follow-up with orthopedic program, and need for hospitals to connect patients to a primary care provider if they do not have one
DEFINTION & SOURCE INFORMATION	*Numerator*	Hip fracture patients discharged from acute or rehab hospitals who had a primary care physician visit within 14 days of discharge Inclusion: ▪ Ontario physician visits taking place in office, home, or long-term care (LTC) ▪ Physician visits occurring between days 0 to 14 post-discharge (i.e., includes date of discharge) Exclusion: ▪ Negated OHIP claims, duplicate claims and lab claims

	Denominator	Hip fracture patients who were surgically treated in an acute care hospital in Ontario and discharged alive from acute or rehab hospitals Exclusion: ▪ Patients who died in hospital ▪ Records with missing or invalid data on discharge/admission date, health number, age and gender.
	Data source / data elements	CIHI – DAD OHIP RPDB
	Adjustment (risk, age/sex standardization)	Process indicator - report as crude rate May also want to report rates adjusted for age, sex and admit from LTC
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Annual; but can also be calculated on a quarterly basis (HAB reports in quarterly reports (3))
	Levels of comparability	Province, LHIN, provider Patient characteristics (age, sex, rural/urban status, SES) Pre-fracture location (admission from community or LTC)
	Trending	Yes (data available starting in 2009)
ADDITIONAL INFORMATION	*Limitations*	Limited to primary care providers that bill or where shadow billing data are available; cannot capture NPs (NPLC or in other settings). Can only capture billed visits; cannot capture appointments made but not kept
	Comments	The numerator and denominator were defined based on the definition used by the Health Analytics Branch at the Ministry (19) in order for this indicator to be consistent with the Ministry reported indicator on follow up for patients discharged from hospital. This indicator includes only primary care providers. *Summary of panel deliberations for choosing this indicator:* The accountability piece for this indicator will be challenging, but it is very important to include specifically for measuring the hip fracture episode of care. The indicator puts some onus on hospitals that may not have good mechanisms in place to inform primary care providers. The patient should not be responsible for securing an appointment with their family physician within two weeks of surgery. The expectation is that hip fracture patients see their surgeon within six weeks after surgery, but they should have seen their primary provider before their appointment with the surgeon, because there are many issues that need to be managed earlier than the patient visit with their surgeon.
	Alignment	Health Care System Quarterly: Percent of patients that saw a physician within 7 days after discharge from an acute care hospital for selected conditions (by LHIN, discharge disposition, and clinical condition) (19) National Hip Fracture Meeting – Identified “Community Linkages” as a potential indicator. Community Linkages would include follow-up with primary care within 7-14 days of discharge, as well as social services set up and caregiver support provided, as needed (20)

Outcomes (3 indicator)

1.6 Percentage of hip fracture patients who were ‘home to home’ in 30 days

INDICATOR DESCRIPTION	*Indicator name*	Percentage of hip fracture patients who were ‘home to home’ in 30 days
	Indicator description	This indicator measures the percentage of hip fracture patients who underwent surgery and returned to their pre-fracture location within 30 days of initial presentation to hospital with a hip fracture (1). This indicator also captures the total length of stay, including acute care, ALC and in hospital rehab care. ▪ *Performance Indicator Type*: Outcome ▪ *Directionality:* A greater percentage is better
	Relevance	*Scorecard dimension*: Appropriateness, Effectiveness, Integration *Relevant for*: Province, LHINs, administrators, clinicians, patients
	Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15)

		Surgery should be performed as early as possible, not to exceed 48 hours of initial presentation (rec 21) Hip fracture patients that are medically stable, cognitively intact and able to mobilize short distances benefit from early supportive discharge home to receive a community-based rehabilitation program (rec 39) Discharge of hip fracture patients to community based rehabilitation should not result in extended acute care lengths of stay for these patients compared to discharge to inpatient rehabilitation (rec 39) Guidelines/Evidence Considered: Time to Surgery: HQO Rapid Review: *Optimal Timing of Hip Fracture Surgery* shows that evidence supports the current 48 hour time to surgery benchmark and that shorter wait time is associated with decreased risk of mortality (15) *National Hip Fracture Toolkit* supports 48 hour target (14) SIGN (11) and *Medical Journal of Australia* (12) recommend against delay of surgery and impact on patient mortality HQO Rapid Review: *Community Versus Inpatient Rehabilitation in Hip Fracture Patients* showed that healthier, cognitively intact hip fracture patients achieved better 1 month post-discharge FIM through home-based rehabilitation compared to inpatient rehabilitation (15) Expert Panel Consensus on importance of home-based rehabilitation not extending acute LOS
DEFINTION & SOURCE INFORMATION	*Numerator*	Hip fracture patients who were discharged alive from acute or rehab hospital after admission for a hip fracture who returned to their pre-fracture location within 30 days of initial presentation to hospital
	Denominator	All hip fracture patients discharged alive from acute or rehab hospitals in Ontario Exclusion ▪ Patients who died in hospital ▪ Patients with post-admit hip fractures ▪ Records with missing or invalid data on discharge/admission date, health number, age and gender.
	Data source / data elements	CIHI – DAD RPDB CIHI-NRS
	Adjustment (risk, age/sex standardization):	Outcome indicator - report as crude and adjusted rates Risk-adjust for age, sex, comorbid conditions and admission from community or LTC
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Province, LHIN, and hospital Pre-fracture location (admission from community or LTC)
	Trending	Yes
ADDITIONAL INFORMATION	*Limitations*	The indicator may not account for readmissions; would have to allocate hospital days to the appropriate reasons (i.e., if patient had complications in hospital, 30 days may not be appropriate)
	Comments	Summary of panel deliberations for choosing this indicator: The indicator touches on several important performance indicators, including: return to pre-functional status, length of stay, discharge destination, and return to previous environment. Reporting this indicator has the potential to drive system change.
	Alignment	National Hip Fracture Meeting – Identified “Length of Stay” and “Discharge Destination or Return to Previous Environment” as core indicators (20) *National Hip Fracture Toolkit* Rehabilitation (patient discharged destination, rehabilitation length of stay), and patient outcomes (variance to discharge from pre living) (14) The National Hip Fracture Database National Report 2012 (England): Length of acute

		and post-acute Trust stay (Total mean length of stay (mean acute stay plus mean post-acute stay)) and Discharge destination from Trust (Percentage of patients who were discharged to their own home or sheltered housing) (21)

1.7 Mortality, 30 and 90 day

INDICATOR DESCRIPTION	*Indicator name*	Mortality, 30 and 90 day
	Indicator description	This indicator measures the mortality rate for hip fracture patients after hip fracture surgery within 30 and 90 days of initial presentation to hospital for hip fracture *Performance Indicator Type*: Outcome *Directionality:* A lower rate is better
	Relevance	*Scorecard dimension*: Effectiveness *Relevant for*: Province, LHINs, clinicians, patients
	Importance	As the elderly population increases, there is a growing rate of hip fracture cases (27) (28) (29) (14); which are associated with an increased risk of mortality (27) (14) (22) (11) (30) Mortality rates are a good indicator of the quality of care;(23) looking specifically for a reduction, which has been linked to better processes of care (18) Mortality rates continually grow post-discharge (27) There is a significant rate of mortality within the first year when controlling for different underlying causes other than osteoporosis (22)
DEFINTION & SOURCE INFORMATION	*Numerator*	The number of patients who died within 30 days and within 90 days of being admitted to hospital for a hip fracture
	Denominator	All patients who were admitted to hospital for hip fracture surgery in Ontario Exclusion: Patients who died before being treated (i.e., not treated for their hip fracture) Post admit hip fracture patients
	Data source / data elements	CIHI-DAD RPDB
	Adjustment (risk, age/sex standardization)	Outcome indicator - report as crude and adjusted rates Risk-adjust for age, sex, comorbid conditions, and pre-fracture location
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Provincial, LHIN, provider Patient characteristics
	Trending	Yes
ADDITIONAL INFORMATION	*Limitations*	Difficult to identify accountability, as the indicator includes multiple provider groups Mortality within 30 days and within 90 days may have different meanings Mortality rate is commonly reported currently as 1-year mortality, but 30-day and 90-day mortality aligns with future reporting
	Comments	*Summary of panel deliberations*: Mortality is easier to measure than readmission rate, and since there is such a high incidence of mortality in this population, the indicator can make noticeable change over time. A change in indicator rate is interpretable and meaningful to patients, clinicians, and administrators. 90-day mortality rate is a better measure than 1-year mortality rate because after 6 months, the mortality rate is similar among age and gender matched controls of hip fracture and non-hip fracture surgical patients. The attributable risk of mortality due to variation in hip fracture surgery practices occurs within the first 90 days.
	Alignment	National Hip Fracture Meeting – Identified “Mortality within 30 days” as a core indicator and “Mortality within 90 days” as a potential indicator (20) National *Hip Fracture Toolkit* Patient outcomes indicator “Mortality at 1 year” (14) *Musculoskeletal Conditions*: Mortality indicator described by the Project for an Ontario Women’s Health Evidence-Based Report: One-year mortality rate (percentage) among adults aged 50 and older treated in hospital for a hip fracture, by sex and age group, in Ontario, 2007/08 (23)

1.8 Re-fracture rate 1 year post-discharge / post surgery

INDICATOR DESCRIPTION	*Indicator name*	Re-fracture rate 1 year post- surgery
	Indicator description	This indicator measures the percentage of hip fracture patients who suffered a subsequent fracture to the same hip within one year of surgery date for the first hip fracture *Performance Indicator Type*: Outcome *Directionality:* A lower rate is better
	Relevance	*Scorecard dimension*: Effectiveness *Relevant for*: Province, LHINs, providers, patient
	Importance	Measure of longer-term effectiveness of care following patients' index fractures
DEFINTION & SOURCE INFORMATION	*Numerator*	The number of hip fracture patients who were admitted to hospital for a hip fracture and suffered a subsequent hip fracture within one year of discharge from initial hip fracture surgery
	Denominator	All hip fracture patients discharged alive from acute or rehab hospitals in Ontario Exclusion: Patients who died within one year of hospital discharge Records with missing or invalid data on discharge/admission date, health number, age and gender.
	Data source / data elements	CIHI – DAD RPDB
	Adjustment (risk, age/sex standardization)	Outcome indicator - report as crude and adjusted rates Risk-adjust for age, sex, comorbid conditions, and pre-fracture location
GEOGRAPHY AND TIMING	*Timing and frequency of data release*	Data are available quarterly, but are interim; CIHI data are closed annually and as such would recommend annual reporting
	Levels of comparability	Province, LHIN
	Trending	Yes
ADDITIONAL INFORMATION	*Limitations*	
	Comments	
	Alignment	National Hip Fracture Meeting – Identified "Re-Fracture within 1 year" as a core indicator. This indicator includes hip, pelvis, humerus, and distal forearm fractures, whereas the one recommended for the hip fracture episode of care includes only re-fracture of the same hip. (20) National *Hip Fracture Toolkit* Patient outcomes indicator "Refracture rate 1 year post surgery" (14)

2.0 Developmental

Care in the Emergency Department (3 indicators)

2.1 Percentage of hip fracture patients who underwent a comprehensive clinical status assessment and documentation upon presentation to ED

Indicator	Percentage of hip fracture patients who underwent a comprehensive assessment between ED and inpatient pre-surgical care and had documentation for clinical status. Assessment and documentation may include reason for the fall, fluid balance, pressure sore risk, hydration and nutrition, pain, temperature, other collateral injuries, blood work, x-rays, comorbid conditions, current drug therapy, continence, pre-fraction functional ability and mobility, physical and functional level, mental state based on pre-morbid functioning level, and social circumstances
Relevance	*Scorecard dimensions:* Effectiveness, appropriateness *Relevant for*: clinicians, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Assess and document the following information while patient is in the ED to inform treatment and discharge decisions: (rec 3) o Reason for the fall o Fluid balance o Pressure sore risk o Hydration and nutrition o Pain[5] o Temperature o Other collateral injuries o Tests for appropriate blood work o X-rays o Assess comorbid conditions o Current drug therapy, including any anticoagulants o Continence o Pre-fracture functional ability and mobility o Physical and functional level o Mental state based on pre-morbid functioning level, using a validated screening tool such as MMSE, MOCA, or CAM o Social circumstances, including caregiver status, existing community supports, family involvement ▪ Hip Fracture Patient Intake Questionnaire- Expert Panel Consensus for a validated standard provincial questionnaire to be developed and administered to hospitalized hip fracture patients to capture data elements on patients' pre-fracture functional status, pre-fracture cognitive status, pre-fracture living situation, caregiver status, and other factors that are important for determining the patient's trajectory of care following the acute discharge. (rec 44) Guidelines/Evidence Considered: Recommended diagnostics and questions for patient are based on diagnostic tests recommended by National Hip Fracture Toolkit, (14) SIGN,(11) and Expert Panel Consensus SIGN recommends MRI as the investigation of choice where there is doubt regarding the diagnosis. If MRI is not available or feasible, a radioisotope bone scan or repeat plain radiographs (after a delay of 24-48 hours) should be performed(11) *Summary of deliberations by sub-panel:* Many of the assessments listed in the recommendation are documented in a medical history. For example. Pressure ulcer risk is assessed in most hospitals using the Braden score and pain and

[5] Assessment of pain, functional status, mental status and delirium should be assessed at multiple points across the spectrum of care and appear as such

	temperature are part of the vital signs. All of the elements in the recommendation should be part of the care pathway, which already includes a medical and nursing assessment. A checklist could be used or completion of a couple of the elements could be measured and used as a proxy for measuring implementation of the entire checklist. Assessment and management of some of the individual elements were identified by the sub-panel as important to be measured separately and are described in the subsequent three indicators for Care in the Emergency Department.
Alignment	▪ Some of the assessment information may be available through chart audit, HOBIC, RAI-AC, FIM, Senior friendly hospital pilot indicators

2.2 Percentage of hip fracture patients whose social circumstances were assessed and documented upon presentation to ED (a subset of 2.1)

Indicator	Percentage of hip fracture patients whose social circumstances, including caregiver status, existing community supports, and family involvement were assessed and documented in the ED or inpatient period
Relevance	*Scorecard dimensions:* Effectiveness, appropriateness, integration *Relevant for:* administrators, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Assess and document the patient's social circumstances, including caregiver status, existing community supports, and family involvement while the patient is in the ED to inform treatment and discharge decisions (rec 3) ▪ Hip Fracture Patient Intake Questionnaire- Expert Panel Consensus for a validated standard provincial questionnaire to be developed and administered to hospitalized hip fracture patients to capture data elements on patients' pre-fracture functional status, pre-fracture cognitive status, pre-fracture living situation, caregiver status, and other factors that are important for determining the patient's trajectory of care following the acute discharge. (rec 44)
Alignment	National Hip Fracture Meeting – Identified "Community Linkages" as a potential indicator for Post-Acute Care. Indicator includes social services set up as needed and caregiver support provided as needed. (20)

2.3 Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED (a subset of 2.1)

Indicator	Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED for hip fracture surgery
Relevance	*Scorecard dimensions*: Appropriateness, integration *Relevant for*: administrators, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: ▪ Assess and document the patient's social circumstances, including caregiver status, existing community supports, and family involvement while the patient is in the ED to inform treatment and discharge decisions (rec 3)
Alignment	National Hip Fracture Meeting – Identified "Falls Prevention Education & Intervention" as a potential indicator for Post-Acute Care (20) The National Hip Fracture Database National Report 2012 (England): "Percentage of patients who had received or were awaiting a falls assessment" and "Percentage of patients who received both bone protection medication and a falls assessment" (21)

Pre-operative Management (1 indicator)

2.4 Percentage of hip fracture patients who were seen by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care

Indicator	Percentage of hip fracture patients who were seen (received a consult) by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care
Relevance	*Scorecard dimensions*: Access, Appropriateness *Relevant for*: Province, LHINs, administrators, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Hospital care for hip fracture patients should follow the principles of good seniors/geriatric care (rec 16) Guideline / Evidence considered Evidence suggests that all patients presenting with a fragility fracture should be managed on an orthopaedic ward with routine access to acute orthogeriatric medical support (11) (12) Hip fractures increase the risk of mortality and morbidity (22) (30) After hip fracture, patients are at risk for future fractures leading to further health concerns; and present data suggests that many high risk patients do not receive appropriate treatment and assessment to prevent such complications (22) Early geriatric consultation and care plan can reduce the risk of future fractures, in-hospital mortality, and institutionalization (14) (31) Summary of deliberations by sub-panel for choosing this indicator: Evidence suggests that early multidisciplinary daily geriatric care reduces in-hospital mortality after hip fracture surgery. In Ontario, there are few geriatricians, so review of care pathway by geriatrician would be unrealistic in some locations where there may not be a geriatrician. What is important is that the care pathway should follow principles of geriatric care and overarching senior family strategy should be in place. The patient's care plan should be reviewed by a clinician with geriatric training.
References	The Health Analytics Branch ran this indicator and found that less than 5% of patients had a geriatrician visit (consult or admission) coded. Capturing clinicians who have geriatric training is not currently possible with administrative data. Measuring this indicator using geriatrics codes is likely not valid at this time. An initial investigation into the possibility of measuring this indicator shows that using only geriatrician does not work (see Appendix 5 for crude indicator results) National Hip Fracture Meeting – Identified "Geriatrics/IM Consult" as a core indicator (20) The National Hip Fracture Database National Report 2012 (England): "Percentage of patients who underwent any preoperative medical assessment by a geriatrician" (21)
Alignment	Senior friendly hospital strategy (http://seniorfriendlyhospitals.ca/)

Surgery (0 indicators)

Post-operative Management (4 indicators)

2.5 Percentage of patients who received pre-operative and post-operative thromboprophylaxis

Indicator	For hip fracture patients that underwent surgery >24 hours after presentation, percentage of patients who received pre-operative thromboprophylaxis >12 hours before surgery and received post-operative thromboprophylaxis The indicator calculation should exclude hip fracture patients who received thromboprophylaxis before admission and patients who underwent surgery within 24 hours. Indicator may be calculable using administrative data sources (CIHI – DAD, OHIP)
Relevance	*Scorecard dimensions:* Appropriateness *Relevant for*: Clinicians, patients

Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Pre-operative (rec 20) : o Refer to the most recent CHEST guidelines for guidance on use of anticoagulants (Available at: http://journal.publications.chestnet.org/ss/guidelines.aspx) o Thromboprophylaxis has been shown to be highly effective in preventing VTE and should be ordered at time of admission in preparation for surgery o Thromboprophylaxis should not occur within 12 hours of surgery o If surgery is likely to be delayed more than 24 hours, it is recommended to start thromboprophylaxis with an anticoagulant that has a short half-life so as not to interfere with regional anesthesia decisions or intraoperative bleeding o Options for thromboprophylaxis include: ▪ LMWH (dalteparin, enoxaparin, tinzaparin) ▪ Heparin (5000 units subcutaneously twice a day) o Use mechanical prophylaxis in patients for whom anticoagulants and antiplatelet agents are contraindicated o Do not use pressure gradient stockings ▪ Post-operative (rec 34): o Following surgery, hip fracture patients should receive routine anticoagulation for 35 days or as per the most recent CHEST guidelines (available at: http://journal.publications.chestnet.org/ss/guidelines.aspx) o LMWH is effective in the prevention of DVT and should be used routinely after surgery. If the patient has a nerve block catheter in situ (i.e., epidural catheter), the anesthesiologist should be made aware prior to anticoagulation o Mechanical thromboprophylaxis should be restricted to patients where chemical anticoagulation is contraindicated Guidelines/Evidence considered Among hip fracture patients, pre-operative thromboprophylaxis has been highly effective in preventing venous thromboembolism (VTE); however thromboprophylaxis should not occur within 12 hours of surgery. (14) The incidence of thrombosis may be reduced by mechanical, however it can be labour intensive, expensive and poorly tolerated. DVT and PE can be reduced with pharmacological prophylaxis; however there is a small risk of bleeding complications. (11) There is evidence of a reduced risk of thromboembolism when fondaparinux was administered either twelve hours before surgery or six hours after prompt surgery (within 24 hours of admission). (11) Evidence of hip fracture patient benefits with extended post-operative thromboprophylaxis, for at least 2 weeks after surgery. (14) (11)
Alignment	CHEST Guidelines

2.6 Indwelling catheter use

Indicator	Catheter utilization ratio (urinary catheter/patient days x 100); or Percentage of indwelling catheters removed post-operatively
Relevance	*Scorecard dimensions*: Effectiveness, Appropriateness *Relevant for:* LHINs, administrators
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Urinary catheterization (rec 14) o Avoid indwelling catheters where possible to decrease risk of urinary tract infections o Intermittent catheterization is preferable and has been shown not to increase incidence of urinary tract infections Guidelines/Evidence Considered: SIGN (Good Practice Point) (11) and National Hip Fracture Toolkit (14) recommend avoiding indwelling catheters Instrumentation of the urinary tract; and catheter-associated UTI (CAUTI) has been linked with increased morbidity (25) Indwelling catheters are a common cause for UTI (26) Intermittent catheterization is preferred over indwelling to decrease the risk of UTI (26) (25) (14)

	For patients who indicate a need for an indwelling catheter, removal should take place as soon as possible post-operatively—preferably within 24 hours (25)
Alignment	Guideline for Prevention of Catheter-Associated Urinary Tract Infections (25)

2.7 Weight Bearing

2.7.1 Percentage of hip fracture patients who achieved immediate weight bearing as tolerated after surgery

Indicator	Percentage of hip fracture patients who achieved weight bearing as tolerated (WBAT) within 24 hours after surgery
Relevance	Scorecard dimensions: Effectiveness Relevant for: Province, LHINs, clinicians, administrators, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: ▪ Surgery for all previously ambulatory hip fracture patients should be planned to achieve immediate weight bearing after surgery. This may involve choice of surgical technique and/or implants that allow for stable fracture fixation or replacement arthroplasty to allow immediate weight bearing (rec 26) • Post operative mobilization (rec 32) o Patients should be mobilized as soon as medically stable (i.e., within 12 to 24 hours of surgery) o Mobility should progress to standing within 24 hours of surgery o Weight-bearing status should be “as tolerated” o Patients should receive 7-day-a-week mobilization by all staff Guidelines/Evidence Considered: Expert Panel Consensus emphasized the importance of surgery that allows for immediate weight bearing National Hip Fracture Toolkit emphasizes important of early post-operative mobilization and weight bearing (14) SIGN recommends mobilization within 24 hours post-operatively and immediate weight bearing (Good Practice Point) (11) *Medical Journal of Australia:* Early assisted ambulation begun within 48 hours of surgery is effective (12) No particular mobilization strategies can be recommended over others Surgical fixation to allow immediate weight-bearing as tolerated post-operatively is recommended for individuals with frail health or with impaired cognition. (14) Immediate weight-bearing is critical for patients admitted from home or who were previously mobile. Immediate weight-bearing has shown to decrease medical complications and mortality, as well as increase functional recovery and functional outcome. Immediate weight-bearing is also associated with an increased likelihood of transfer to a rehabilitation setting and earlier discharge from acute care, with eventual return home/independent living. (14) Immediate weight-bearing does not increase the implant failure rate, even among unstable fracture patterns with traditional implants. (14) It is recommended that weight-bearing status be ‘as tolerated’ for post-operative mobilization. (14) Weight-bearing ‘as tolerated’ has been associated with a greater likelihood of discharge to home; and has similar functional outcomes to restricted weight-bearing. (32) *Summary of panel deliberations*: There exists a care gap for immediate WBAT because some surgeons are not mobilizing their patients within 24 hours. Education is required to inform surgeons of recommendations for immediate WBAT after surgery.
Alignment	*National Hip Fracture Toolkit* Post-operative acute care indicators: “Percentage ‘weight bearing’ as tolerated ordered post surgery” (Effectiveness) and “Percentage of patients mobilized on day 1 (out of bed with assistance) “(14) National Hip Fracture Meeting – Identified “Percent Mobilizing Day1 postoperatively” as an indicator that requires further exploration of its utility (20)

2.7.2 Percentage of patients who receive daily mobilization

Indicator	Percentage of patients who receive daily mobilization
Relevance	Scorecard dimensions: Access, effectiveness, appropriateness Relevant for: Administrators, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Surgery for all previously ambulatory hip fracture patients should be planned to achieve immediate weight bearing after surgery. This may involve choice of surgical technique and/or implants that allow for stable fracture fixation or replacement arthroplasty to allow immediate weight bearing (rec 26) • Post operative mobilization (rec 32) o Patients should be mobilized as soon as medically stable (i.e., within 12 to 24 hours of surgery) o Mobility should progress to standing within 24 hours of surgery o Weight-bearing status should be "as tolerated" o Patients should receive 7-day-a-week mobilization by all staff Guidelines/Evidence Considered: Expert Panel Consensus emphasized the importance of surgery that allows for immediate weight bearing National Hip Fracture Toolkit emphasizes important of early post-operative mobilization and weight bearing (14) SIGN recommends mobilization within 24 hours post-operatively and immediate weight bearing. (11) *Medical Journal of Australia:* Early assisted ambulation begun within 48 hours of surgery is effective (12) No particular mobilization strategies can be recommended over others Surgical fixation to allow immediate weight-bearing as tolerated post-operatively is recommended for individuals with frail health or with impaired cognition. (14) Immediate weight-bearing is critical for patients admitted from home or who were previously mobile. Immediate weight-bearing has shown to decrease medical complications and mortality, as well as increase functional recovery and functional outcome. Immediate weight-bearing is also associated with an increased likelihood of transfer to a rehabilitation setting and earlier discharge from acute care, with eventual return home/independent living. (14) Immediate weight-bearing does not increase the implant failure rate, even among unstable fracture patterns with traditional implants. (14) It is recommended that weight-bearing status be 'as tolerated' for post-operative mobilization. (14) Weight-bearing 'as tolerated' has been associated with a greater likelihood of discharge to home; and has similar functional outcomes to restricted weight-bearing. (32) Summary of panel deliberations: This indicator captures a problem with the structure of a 5-day versus a 7-day model within a hospital. Patients who undergo surgery on a Friday generally have longer lengths of stay compared to patients who arrive early in the week because there is not as large a staff presence available to mobilize patients over the weekend even though this is important for the patients' recovery. Also, there is currently a five day a week service for rehab. Changing this would require a high level strategy.
Alignment	*National Hip Fracture Toolkit* Post-operative acute care indicators: "Percentage 'weight bearing' as tolerated ordered post surgery" and "Percentage of patients mobilized on day 1 (out of bed with assistance)" (14) National Hip Fracture Meeting – Identified "Percent Mobilizing Day1 postoperatively" as an indicator that requires further exploration of its utility. (20)

Post-acute Care (1 indicator)

2.8 Percentage of hip fracture patients that received comprehensive and multidisciplinary rehabilitation

Indicator	Percentage of hip fracture patients that received comprehensive and multidisciplinary rehabilitation delivered by regulated health professionals with the overall goal to reach pre-fracture status
Relevance	Scorecard dimensions: Access, Integration Relevant for: LHINs, administrators, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Hospital care pathways should adopt the goal of active rehabilitation commencing no later than Day 6 following the patient's surgery (rec 38) ▪ Regardless of setting, post-acute rehabilitation for hip fracture patients should be provided by a multidisciplinary team and include the following components (rec 40): ○ Therapies to improve independence in self-care, transfers, ambulation, and ADLs (e.g., dressing, washing, toileting) to allow patients to return to their pre-fracture living environment ○ Balance and gait training and assessment ○ Nutritional supplementation (high energy protein, vitamins, and minerals) ○ Education on safety and falls prevention for patient, family, and caregivers ○ Provision of a maintenance exercise program ○ Environmental modification ○ Osteoporosis management and education ○ Medication management Guidelines/Evidence Considered: HQO Rapid Review: *Optimal Timing to Begin an Active Rehabilitation Program After a Hip Fracture*: Insufficient evidence for optimal timing to begin rehabilitation. (15) Day 6 target from the *National Hip Fracture Toolkit* adopted as a goal for hospital care pathways in lieu of high quality evidence on optimal timing or consensus on organization performance targets. (14) HQO Rapid Review: *Intensity of Rehabilitation After Hip Fracture*: No evidence identified for optimal intensity of rehabilitation. (15) OHTAC Recommendation: *Aging in the Community* (2008): Long-term exercise programs for mobile seniors and environmental modifications to seniors' homes are effective in reducing falls. SIGN: Supplementing the diet of hip fracture patients in rehabilitation with high energy protein preparations containing minerals and vitamins should be considered. (11) Summary of panel deliberations: An unforeseen consequence of the QBP may be a shift towards larger numbers of people receiving home-based care and without a system to measure patient outcomes at home, any change to the outcome rates could not be measured. A multidisciplinary rehabilitation team would consist of different professions, including as a minimum physiotherapist, occupational therapist, nurse, and doctor)
Alignment	OACCAC developing outcome based pathway for hip fracture patients. The pathway described by the OACCAC may provide context

Full Episode of Care (3 indicators)

2.9 Percentage of hip fracture patients who had their functional status assessed at regular intervals

Indicator	Percentage of hip fracture patients who had their functional status assessed at regular intervals Functional status should be assessed using a standardized tool (ideally the same tool for all assessment points) at the following points: ▪ Pre-fracture (to establish a baseline for return to functional status) ▪ 2 days post-operatively ▪ At discharge ▪ 6-months post discharge (to assess return to pre-fracture functional status)

Relevance	Scorecard dimensions: Effectiveness, Access Relevant for: Province, LHINs, clinicians, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Assess and document pre-fracture functional ability and mobility and physical and functional level while the patient is in the ED to inform treatment and discharge decisions (rec 3) ▪ Functional status should be assessed 2 days post-operatively using standardized tools (e.g., FIM) (rec 30) ▪ A validated standard, provincial questionnaire should be developed and administered to hospitalized hip fracture patients to capture data elements on patients' pre-fracture functional status, cognitive status, pre-fracture living situation, caregiver status and other factors that are important for determining the patient's trajectory of care following the acute discharge (rec 44) Guidelines/Evidence Considered: Recommended diagnostics and questions for patient are based on diagnostic tests recommended by National Hip Fracture Toolkit, (14) SIGN, (11) and Expert Panel Consensus The patient's treatment goals should focus on progressing ambulation, transfer, and daily living activities; and should be set daily accordingly with their pre-fracture capacity. (14) A coordinated, multidisciplinary rehabilitation program should be offered to patients with hip fracture with a focus on helping them return to their pre-fracture living arrangements. (12) The use of standardized tools (e.g. FIM) to assess functional status 2 days post-operatively may help determine appropriate destinations for discharge. (National Hip Fracture Toolkit, 2011). *Summary of deliberations by sub-panel:* The overall goal is to have patients return to pre-fracture functional status after surgery, but measuring the patient functional status at several points along the episode of care will provide an informative indicator that is useful for the patient, hospital, and system. Knowing the functional status at various points helps at next triage point to determine treatment or care. The tool that is used to measure functional status should be consistent across the episode of care for assessments within the hospital, for post-acute care, and in follow-up care. Outstanding requirements before indicator can be measured: ▪ Need to define time period ▪ Need a reporting system (Some rehab databases may have a discharge functional status but not a specified time period) ▪ Need standardized functional status assessment tool (Consider RAI-inpatient, FIM, HOBIC assessment of functional status (used across sectors), Frailty scales, senior friendly hospital indicators)
Alignment	*National Hip Fracture Toolkit.* Pre surgery indicator: "Pre fracture function". Rehabilitation indicators: "Admission function (physical and cognitive)" and "Discharge function (physical and cognitive)". Patient outcomes indicator: "Patient reported outcomes (function/pain improvement from pre-surgery)" (14) National Hip Fracture Meeting – Identified "Functional Status / Mobility" as a potential core indicator; "Frailty" as an indicator that requires further exploration for its utility. (20)
Comments	Not currently assessment comprehensively, but measured by Senior Friendly Hospital (SFH). Outcome indicators: 1) Percentage of hospitalized patients (65 and older) receiving assessment of ADL function with a validated tool at both admission and discharge; and 2) Percentage of patients (65 and older) with no decline in ADL function from hospital admission to hospital discharge as measured by a validated tool. SFH suggested validated tools: Barthel Index, Health Outcomes for Better Information in Care (HOBIC) – ADL Section, and Alpha-FIM Tool

2.10 Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals

Indicator	Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals Delirium and mental status should each be assessed using a standardized screening tool at regular intervals across the continuum of care including

Relevance	Scorecard dimensions: Effectiveness, appropriateness Relevant for: Administrators, clinicians, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Delirium prevention strategies should start in the ED, including assessment of symptoms using a delirium screening tool (rec 11) ▪ Assess and document mental state based on pre-morbid functioning level using a validated screening tool such as MMSE, MOCA, or CAM while the patient is in the ED to inform treatment and discharge decisions (rec 3) ▪ Mental status should continue to be assessed daily using a standard tool such as MMSE, CAM, or MOCA (rec 30) Guidelines/Evidence Considered: Recommended diagnostics and questions for patient are based on diagnostic tests recommended by National Hip Fracture Toolkit, (14) SIGN, (11) and Expert Panel Consensus Outstanding requirements before indicator can be measured: ▪ Need to define time period ▪ Need a reporting system ▪ Need standardized validated delirium assessment tool (Consider MMSE, MOCA, or CAM)
Alignment	*National Hip Fracture Toolkit.* Bone and Joint Decade Canada. Rehabilitation indicators: "Admission function (physical and cognitive)" and "Discharge function (physical and cognitive)"; Patient outcomes indicator: "Patient reported outcomes (function/pain improvement from pre-surgery)" Post operative acute care indicator: "Adverse events 30 days post discharge: pressure sores, inclusive, infection, fall, delirium" (14) National Hip Fracture Meeting – Identified "Delirium, Depression & Dementia Screening & Treatment" as a post-acute care potential indicator. (20)
Comments	Measured by Senior Friendly Hospital (SFH) and being piloted across Ontario. Process indicators: 1) Percentage of patients (65 and older) receiving delirium screening using a validated tool upon admission to hospital; and 2) Incidence of delirium in patients (65 and older) acquired over the course of hospital admission. SFH suggested validated tool: Confusion Assessment Method (CAM) for inpatient and CAM-ICU or Intensive Care Delirium Screening Checklist (ICDSC) for intensive/critical care units.

2.11 Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place

Indicator	Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place Pain should be assessed using a standardized screening tool at the following points: ▪ At admission (rec 3, 4) ▪ pre-operative period (rec 7) ▪ Post-operative period (rec 31) ▪ Post acute care
Relevance	Scorecard dimensions: Effectiveness, Appropriateness Relevant for: Clinicians, patients
Importance	HQO Quality-Based Procedures: Clinical Handbook for Hip Fracture: (15) ▪ Assess and document pain while patient is in the ED to inform treatment and discharge decisions (rec 3) ▪ Steps should be taken within the ED to manage patients' hydration, pain, risk of delirium and risk of pressure sores (rec 4) ▪ During the pre-operative period, evidence-based pain assessment tools and pain scales (including non-verbal scales) should be used to assess the patient's pain levels. Consider pre-hospital pain conditions and pain medications (rec 7) ▪ Pre-hospital long acting pain medications should usually be continued to ensure adequate analgesia (rec 7) ▪ Multimodal analgesia (e.g., acetaminophen in combination with opiods) should be considered whenever possible, as it may provide better pain relief with fewer side effects

	(rec 7) ▪ Regional nerve blocks (i.e., fascia iliaca block) should be considered as an adjunct to analgesia, especially for those who poorly tolerate systemic analgesics or who are at high risk for delirium (rec 7) ▪ Analgesics are recommended for the first 72 hours post-operatively and thereafter as needed (rec 31) ▪ Multimodal analgesia concepts should be employed post-operatively. The goal of pain management is to make the patient comfortable and promote activity, not to sedate the patient and reduce activity levels (rec 31) ▪ Intravenous Patient Controlled Analgesia (IVPCA) devices may be inappropriate in cases of delirium and dementia. If used, IVPCA devices should be used for a short time with patients transitioned from IV to oral opioid medications when tolerated (rec 31) ▪ Regional anesthesia (i.e., fascia iliaca block, epidural anesthesia) should be considered for post-operative analgesia, especially for those who are at high risk for delirium (rec 31) ▪ Educational information on medication, mobility, expected progress, and pain control should be given to the patient, caregiver, and families (rec 36 and 41) Guidelines/Evidence Considered: Recommended diagnostics and questions for patient are based on diagnostic tests recommended by National Hip Fracture Toolkit, (14) SIGN, (11) and Expert Panel Consensus Recommended pain management based on National Hip Fracture Toolkit recommendations. Pain relief and hydration also included in SIGN, (11) HQO Rapid Reviews - *Nerve Blocks for Pain Management in Patients With Hip Fractures*: (15) ▪ Significant reduction in post-operative pain for hip fracture patients who received a pre-operative nerve block versus systemic analgesic ▪ No significant difference in additional pain medications required by patients who received nerve block compared to patients who did not ▪ Significant difference in mental status in favour of patients who received a nerve block anywhere in their hip fracture care versus patients who did not ▪ Significant reduction in post-operative pain for hip fracture patients who received a pre-operative nerve block versus systemic analgesic ▪ No significant difference in additional pain medications required by patients who received nerve block compared to patients who did not ▪ Significant difference in mental status in favour of patients who received a nerve block anywhere in their hip fracture care versus patients who did not *National Hip Fracture Toolkit* recommends use of pain scales, continuation of long-term medications, consideration of multimodel analgesia and regional nerve blocks. (14) *Medical Journal of Australia* recommends use of 3-in-1 nerve blocks as an effective method of analgesia (12) SIGN emphasizes importance of appropriate pain relief before transfer, and if necessary, pain relief provided using IV opiate analgesia, titrated for effect. If this is impossible then consider analgesia using entonox (11) *National Hip Fracture Toolkit* recommends use of multimodal analgesia, regional nerve blocks. (14) *Medical Journal of Australia* recommends use of 3-in-1 nerve blocks as an effective method of analgesia (12) Educational information recommendations for post-operative management and post-acute care are from National Hip Fracture Toolkit (14) *Summary of panel deliberations:* One of the goals of the episode of care is for hip fracture patients who undergo surgery to be pain free or low pain following surgery. A post-operative measure that captures both pain and function is important since pain and function are sometimes at opposite ends of the scale.
Alignment	*National Hip Fracture Toolkit.* Bone and Joint Decade Canada. Patient outcomes indicator: "Patient reported outcomes (function/pain improvement from pre-surgery)" (14) *National Hip Fracture Meeting* – Identified "Pain Assessment" as a post-acute care potential indicator (20)

3.0 Standard Clinical Practice

The following are recommendations from the Quality-Based Procedures: Clinical Handbook for Hip Fracture (May 2013) that were identified by the performance indicator selection sub-panel to be considered for potential indicator development across all QBPs because they were not specific to the hip fracture episode of care. The number listed after each recommendation corresponds to the recommendation number in the Clinical Handbook.

3.1 Care in the Emergency Department

Care Pathway (Recommendation #1)

Every hospital should have a care pathway that clearly specifies perioperative patient goals by day of stay

Inpatient Admission (Recommendation #5)

90% of patients should be admitted within 4 hours spent in the ED

3.2 Pre-operative Management

Oxygen Therapy (Recommendation #8)

Monitor oxygen through oximetry and vital signs and apply oxygen to maintain levels at 92% or higher, or as appropriate if patient has COPD

Hydration (Recommendation #9)

Intravascular intervention and hydration should be assessed carefully and continuously

Nutritional Status (Recommendation #10)

The use of pre-operative protein and energy feeds may reduce unfavourable outcome. However, these may be considered a “light meal” therefore potential for delay of surgery needs to be considered

Pressure Ulcer Prevention (Recommendation #15)

Take Braden scores on admission and every 72 hours thereafter. Should a pressure sore be observed, daily Braden scores should be performed

Patients, particularly those judged to be at high risk of pressure ulcers, should be nursed on a pressure-relieving foam mattress in all settings (including ED, inpatient acute, inpatient rehabilitation and LTC)

Techniques to alleviate pressure ulcers include: providing a bed with an air mattress, turning the patient every 2 hours, following good skin care, and providing fluids

Inspect and record condition of pressure points, perineum, and general skin condition on admission and at least twice daily

Ensure regular repositioning and early, frequent mobility. Stretchers and beds should have a pressure reduced surface from admission, to emergency, in transit, in the operating room, and on the patient care unit. Consider using heel protective devices

Pre-operative Traction (Recommendation #22)

Routine use of pre-operative traction (either skin or skeletal) is not appropriate

Antibiotic Prophylaxis (Recommendation #24)

All hip fracture patients undergoing surgery should receive intravenous antibiotic prophylaxis

Antibiotic prophylaxis should be administered in a single dose at induction of anesthesia and 2 additional doses within 24 hours

Antibiotic use should not be administered in the ED as prolonged use prior to surgery is of no proven benefit for preventing wound infection

Topical antibiotics are not recommended for preventing wound infection

3.3 Surgery

Surgical Safety (Recommendation #25)

Skin around the surgical site should be cleaned with antiseptic

Minimize hair removal if possible

Maintain perioperative glucose control and normothermia

Restrict skin pressure during surgery

Ensure the correct surgical site is identified and initialed by the surgeon and confirmed by the patient before surgery

3.4 Post-operative Management

Post-operative Management (Recommendation #30)

Monitor and manage risk factors including cardiac instability, fluid overload, electrolyte disturbances, anaemia, malnutrition, constipation

Post-operative Nutrition (Recommendation #35)

Patients' families and/or caregivers are encouraged to bring in patients' preferred foods in order to ease patients' nutritional intake

Provide high energy protein supplements if required

Patient and Caregiver Education (Recommendation #36)

Provide the patient and family with education around optimal home environment, risk factors, mobilization, stairs, elimination of trip and slip hazards, activities of daily living supports, how to foster health and avoid readmission

Educational information on medication, mobility, expected progress and pain control should be given to the patient, caregiver and families

3.5 Post-acute Care

Discharge Home and Follow-up Care (Recommendation #41)

Prior to a patient's discharge from hospital (whether acute or rehabilitation), services need to be coordinated in the community and sufficient notice must be given to allow patients and caregivers time to make arrangements and set up the care for patients to return home

Educational information on medication, mobility, expected progress and pain control should be given to the patient, caregiver and families

A schedule of appointments as well as relevant contact information needs to be provided to patients and caregivers

Patients without a regular primary care provider should be attached to one (e.g. through the hospital's CCAC care coordinator, HealthCare Connects, Health Links, local FHTs, CHC or NP-led clinics)

Patients should receive at least one follow-up appointment related to their orthopaedic surgery

3.6 Outcome Indicators

Adverse events 30 days post-surgery

Appendix 1: Indicator domain definitions and evaluation questions

Indicator Domain	Definition	Evaluation Questions
Effectiveness	Degree of achieving desirable outcomes given the correct provision of evidence-based healthcare services to all who could benefit, but not to those who would not benefit. Note: Effectiveness includes safety which means that people should not be harmed by an accident or mistakes when they receive care.	Did the health service provider achieve the predefined therapeutic goals? Did the patients' subjective perceptions of their own physical and emotional state improve? Did the prevalence of adverse events decrease with the introduction of QBP?
Appropriateness	Degree to which provided healthcare is relevant to the clinical needs, given the current best evidence.	Is there variation in QBP utilization among providers? Is there a shift in "admission" categories (inpatient surgeries, outpatient surgeries or first day surgeries)? Is there a shift to less invasive procedures? Did patients receive adequate information for each alternative treatment and were they involved in the decision about their treatment (shared-decision making)?
Integration	Degree to which all parts of the health system are organized, connected and work with one another to provide high quality care.	Are patients and families engaged in the discharge process? Do patients receive the needed follow-up care on a timely basis? Does effective communication happens between the receiving and sending care providers along the continuum of care?
Efficiency	System's best use of available resources to yield maximum benefits or results.	Did the weighted costs for QBP decline? Are activities included within the funding for the QBP moved out into the community? To what extent are medical and service outcomes being achieved without excess costs? Has the cost forecasting for the QBP improved?
Access	Ease with which health services are reached.	Do patients receive care along the full clinical pathway outlined for the respective QBP on a timely basis? Does the introduction of the QBP, impede patients access for health services that are not a QBP? Is there equitable access regardless of who people are were they live? Has the number of hospital performing this QBP decreased?

Appendix 2: Prioritized indicators mapped to Ministry KPIs

Domain (QBP Goal)*	Key provincial indicators	QBP level indicator
Improve *effectiveness* by reducing variation in clinical outcomes	Proportion of QBPs that improved outcomes (as defined by the expert panel for the respective QBP) Proportion of QBPs that reduced variation in outcome (risk-adjusted differences in outcome across hospitals) Proportion of (relevant) QBPs that reduced rates of adverse events and infections	1.3.2 Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis 1.5 Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital 1.6 Percentage of hip fracture patients who were 'home to home' in 30 days 1.7 Mortality, 30 and 90 day 1.8 Re-fracture rate 1 year post-discharge / post surgery 2.1 Percentage of hip fracture patients who underwent a comprehensive clinical status assessment and documentation upon presentation to ED 2.2 Percentage of hip fracture patients whose social circumstances were assessed and documented upon presentation to ED 2.6.1 Rate of catheter associated urinary tract infections 2.6.2 Indwelling catheter use 2.7.1 Percentage of hip fracture patients who achieved immediate weight bearing as tolerated after surgery 2.7.2 Percentage of patients who receive daily mobilization 2.9 Percentage of hip fracture patients who had their functional status assessed at regular intervals 2.10 Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals 2.11 Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place

Improve *appropriateness* by reducing practice variations and variations in volumes	Proportion of QBPs that reduced variation in utilization (age-gender adjusted) Proportion of (relevant) QBPs that saw a substitution from inpatient to outpatient/day surgery Proportion of (relevant) QBPs that saw a substitution to less invasive procedures Increased rate of patients being involved in treatment decision Proportion of (relevant) QBPs that saw an increase in discharge dispositions into the community Proportion of QBPs that showed a reduction in LOS	1.2 Percentage of hip fracture patients who were given regional anesthesia before surgery 1.3.1 Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital 1.6 Percentage of hip fracture patients who were 'home to home' in 30 days 2.1 Percentage of hip fracture patients who underwent a comprehensive clinical status assessment and documentation upon presentation to ED 2.2 Percentage of hip fracture patients whose social circumstances were assessed and documented upon presentation to ED 2.3 Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED 2.4 Percentage of hip fracture patients who were seen by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care 2.5 Percentage of patients who received pre-operative and post-operative thromboprophylaxis 1.4 Rate of catheter associated urinary tract infections 2.6 Indwelling catheter use 2.7.2 Percentage of patients who receive daily mobilization 2.10 Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals 2.11 Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place
Improve *integration* across the continuum of care	30-day readmissions rate Improved access to appropriate care providers for diagnosis/ treatment/ follow-up care, primary and community care including for example psychosocial support (e.g. personal, family, financial, employment and/or social needs)	1.5 Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital 1.6 Percentage of hip fracture patients who were 'home to home' in 30 days 2.2 Percentage of hip fracture patients whose social circumstances were assessed and documented upon

		presentation to ED 2.3 Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED 2.8 Percentage of hip fracture patients that received comprehensive and multidisciplinary rehabilitation
Improve *efficiency* by reducing unwarranted variation in resource utilization (costs)**	Proportion of QBPs with actual costs ≤ QBP price Cost overruns on in-year reconciliations for QBP allocations	
Access (to measure unintended response)	Wait times for QBPs / for specific populations for QBP Wait times for other procedures Distance patients have to travel to receive the appropriate care related to the QBP Proportion of providers with a significant change in resource intensity weights (RIW)	1.1.1 Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital 1.1.2 Number of hours patients waited to receive hip fracture surgery 1.3.1 Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital 1.3.2 Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis 2.4 Percentage of hip fracture patients who were seen by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care 2.7.2 Percentage of patients who receive daily mobilization 2.8 Percentage of hip fracture patients that received comprehensive and multidisciplinary rehabilitation 2.9 Percentage of hip fracture patients who had their functional status assessed at regular intervals

Appendix 3: Alignment of indicators to other strategies

	Name of Indicator Source	Name of QBP Indicator
Ontario Hip Fracture Quality Scorecard – Health Analytics Branch, Ministry of Health and Long-Term Care (19)	• The total count and percentage of patients waiting < 48 hours from admission to surgery in non surgical hospital • The total count and percentage of patients waiting < 48 hours from admission to surgery in surgical hospitals	• Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital • Number of hours patients waited to receive hip fracture surgery
The Quarterly – Health Analytics Branch, Ministry of Health and Long-Term Care	• Percent of patients that saw a physician within 7 days after discharge from an acute care hospital for selected conditions (by LHIN, discharge disposition, and clinical condition)	• Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital
National Hip Fracture Toolkit—Key Performance Indicators (14)	• Percentage of hip fracture patients requiring OP treatment who started osteoporosis treatment	• Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis
	• Pre-fracture function	• Percentage of patients who had their functional status assessed at regular intervals
	• Percentage of patients waiting < 48 hours from admission to any hospital to surgery • Percentage of patients waiting < 48 hours within same hospital to surgery • Percentage of patients waiting < 48 from fracture to surgery	• Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours of first presentation to hospital
	• Percentage "weight bearing as tolerated" ordered post surgery	• Percentage of hip fracture patients who achieved immediate weight bearing as tolerated after surgery • Percentage of patients who receive daily mobilization
	• Percentage of patients mobilized on day 1 (out of bed with assistance)	
	• Admission function (physical and cognitive)	• Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals • Percentage of patients who had their functional status assessed at regular intervals
	• Discharge function (physical and cognitive)	• Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals • Percentage of patients who had their functional status assessed at regular intervals
	• Patient discharged destination • Rehabilitation length of stay • Variance to discharge from pre living	• Percentage of hip fracture patients who were 'home to home' in 30 days
	• Mortality at 1 year	• Mortality, 30 and 90 days
	• Refracture rate 1 year post surgery	• Refracture rate 1 year post-discharge/post-surgery
	• Adverse events 30 days post discharge: pressure sores, inclusive, infection, fall, delirium	• Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals
	• Patient reported outcomes (function/pain improvement from pre-surgery	• Percentage of patients who had their functional status assessed at regular intervals • Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place
National Hip Fracture Data Meeting (20)	• OP Med Prescription	• Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis

	• Community Linkages	• Percentage of hip fracture patients who were seen by a primary care provider within two weeks of discharge from hospital • Percentage of hip fracture patients whose social circumstances were assessed and documented upon presentation to ED
	• Time to surgery (need to capture when they enter the system; 36 and 48 hour target; stratify on type of hospital)	• Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours • Number of hours patients waited to receive hip fracture surgery
	• Length of stay (need to capture total episode of care) • Discharge to destination or return to previous environment	• Percentage of hip fracture patients who were 'home to home' in 30 days
	• Refracture within 1 year	• Refracture rate 1 year post-discharge/post-surgery
	• Mortality (30 days; 90 days)	• Mortality, 30 and 90 days
	• Geriatrics/IM consult	• Percentage of hip fracture patients who were seen by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care
	• Falls Prevention Education & Intervention	• Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED
	• Functional status/mobility • Frailty	• Percentage of patients who had their functional status assessed at regular intervals
	• Delirium, Depression & Dementia Screening & Treatment	• Percentage of hip fracture patients who received assessment for delirium and mental health status at regular intervals
	• Pain Assessment	• Percentage of hip fracture patients whose pain was assessed at regular intervals using an evidence-based tool and with an appropriate pain management strategy put in place
	• Percent of mobilizing day 1 postoperatively	• Percentage of hip fracture patients who achieved immediate weight bearing as tolerated within 24 hours after surgery • Percentage of patients who receive daily mobilization
Project for an Ontario Women's Health Evidence-Based Report (POWER) Study: Musculoskeletal Conditions (23)	• Percentage of adults aged 50 and older who received bone mineral density testing within one year post discharge after a low-trauma fracture, by sex and age group, in Ontario, 2007/08	• Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital
	• Percentage of adults aged 66 and older who suffered a low-trauma fracture who received neither bone mineral density testing nor treatment within one year post-discharge, in Ontario, 2007/08	• Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis
	• One year mortality rate (percentage) among adults aged 50 and older treated in hospital for a hip fracture, by sex and age group, in Ontario 2007/08	• Mortality, 30 and 90 days
Canadian Institute for Health Information Health Indicators Report (18)	• Wait time for hip fracture surgery (proportion with surgery within 48 hours)	• Percentage of patients requiring hip fracture surgery that underwent surgery within 48 hours
National Hip Fracture	• Surgery within 48 hours and during normal	• Percentage of patients requiring hip fracture

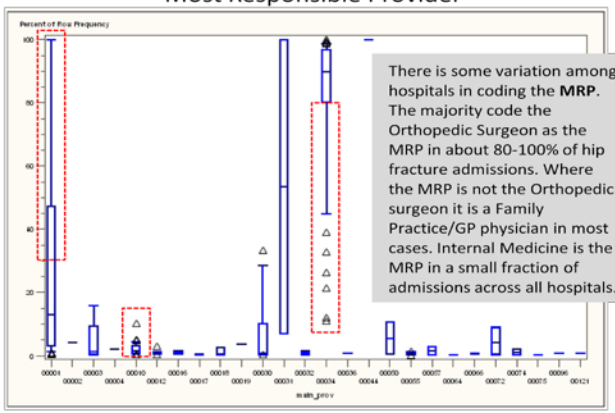
Database National Report (England) (21)	working	surgery that underwent surgery within 48
	• Type of anesthesia (percentage of patients that received general anesthesia either alone or in combination) hours	• Percentage of hip fracture patients who were given regional anesthesia before surgery hours
	• Percentage of patients who were already receiving bone protection medication, started bone protection medication, were assessed for bone protection medication or were awaiting DXA scan or bone clinic assessment. Patients were eligible if they did not die in hospital.	• Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital • Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis
	• Percentage of eligible patients who received both bone protection medication and a falls assessment. Patients were eligible if they did not die in hospital)	• Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis
	• Percentage of patients who had received or were awaiting a falls assessment • Percentage of patients who received both bone protection medication and a falls assessment	• Percentage of hip fracture patients whose reason for their fall was documented upon presentation to ED
	• Percentage of patients who underwent any preoperative medical assessment by a geriatrician	• Percentage of hip fracture patients who were seen by a geriatrician or other provider with geriatric experience and received care consistent with the principles of good geriatric care
	• Length of acute and post acute trust stay (total mean length of stay; mean acute plus mean post acute stay) • Discharge destination from trust (percentage of patients who were discharged to their own home or sheltered housing)	• Percentage of hip fracture patients who were 'home to home' in 30 days
Agency for Healthcare Research & Quality (United States of America) (24)	• Osteoporosis testing in older women: the percentage of Medicare women 65 years of age and over who report ever having received a bone density test to check for osteoporosis	• Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital
	• Percentage of patients aged 50 years and older treated for a hip, spine or distal radial fracture with documentation of communication with the physician managing the patient's on-going care that a fracture occurred and that the patient was or should be tested or treated for osteoporosis	• Percentage of hip fracture patients who were assessed for osteoporosis before discharge from hospital
	• The National Committee for Quality Assurance: Osteoporosis management in women who had a fracture: percentage of women 67 years of age and older who suffered a fracture and who had either a bone mineral density (BMD) test or prescription for a drug to treat or prevent osteoporosis in the six months after the fracture.	• Percentage of hip fracture patients that received appropriate clinical management for the treatment of osteoporosis
	• Mortality rate for patients with hip fracture	• Mortality post hip fracture (30 and 90 days)

Appendix 4: Indicator sub-panel membership

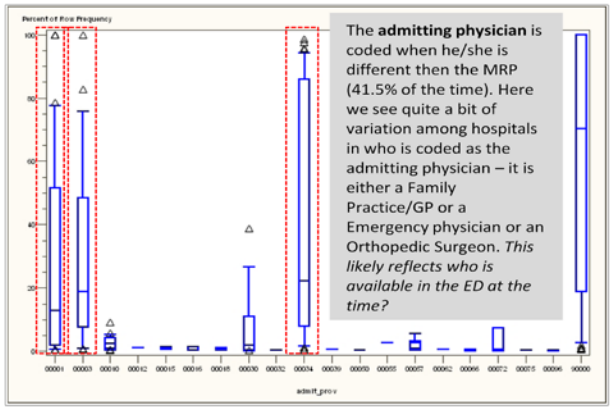
Name	Role	Organization
Chair		
Dr. Susan Jaglal	Research Chair	Toronto Rehabilitation Institute, University of Toronto
Dr. James Waddell	Orthopedic Surgeon	St. Michael's Hospital
Dr. Hans J. Kreder	Professor, Orthopedic Surgery	University of Toronto
Dr. Allan Liew	Orthopedic Surgeon	Department of Surgery, University of Ottawa
Charissa Levy	Executive Director	GTA Rehab Network
Dr. Peter Nord	Vice President, Chief Medical Officer and Chief of Staff	Providence Healthcare
Dr. Valerie Palda	Associate Professor, Department of Medicine and Institute of Health Policy, Management and Evaluation	University of Toronto
Ravi Jain	Director, Ontario Osteoporosis Strategy	Osteoporosis Canada
Rhona McGlasson	Executive Director	Bone and Joint Canada

Appendix 5: Analysis of Geriatric Care for Hip Fracture Patients

Most Responsible Provider



There is some variation among hospitals in coding the **MRP**. The majority code the Orthopedic Surgeon as the MRP in about 80-100% of hip fracture admissions. Where the MRP is not the Orthopedic surgeon it is a Family Practice/GP physician in most cases. Internal Medicine is the MRP in a small fraction of admissions across all hospitals.



The **admitting physician** is coded when he/she is different then the MRP (41.5% of the time). Here we see quite a bit of variation among hospitals in who is coded as the admitting physician – it is either a Family Practice/GP or a Emergency physician or an Orthopedic Surgeon. *This likely reflects who is available in the ED at the time?*

MRP	Freq
Family Practice/GP	829
Community	8
Emergency	18
Trauma Medicine	5
Internal Medicine	163
Cardiology	23
Nephrology	9
Neurology	2
Respirology	6
Rheumatology	8
General Surgery	86
Cardiac Surgery	3
Neurosurgery	6
Ortho Surgery	9213
Thoracic Surgery	3
Pedi Ortho Surgery	1
Obs/Gynecology	3
Critical Care	16
Anaesthesiology	2
Psychiatry	1
Hematology	3
Geriatric Medicine	45
Medical Oncology	7
Radiation Oncology	1
Infectious Diseases	1
Palliative Medicine	1
Total	10463

Admitting	Freq
Family Practice/GP	525
Emergency Medicine	892
Internal Medicine	115
Cardiology	3
Gastroenterology	3
Nephrology	4
Respirology	4
General Surgery	45
Neurosurgery	1
Orthopedic Surgery	2715
Urology	1
Obs/Gynecology	1
Critical Care Medicine	7
Anaesthesiology	9
General Surgery	1
Cardiac Surgery	1
Orthopedic Surgery	3
Plastic Surgery	1
Vascular Surgery	2
Urology	2
Obs/Gynecology	1
Critical Care Medicine	2
Anaesthesiology	1
Otolaryngology	1
Psychiatry	1
Hematology	1
Rehabilitation	1
Geriatric Medicine	1
Medical Oncology	1
Infectious Diseases	1
Not Coded	6117
Total	10463

Other Responsible	Freq
Family Practice/GP	733
Community	10
Emergency Medicine	367
Internal Medicine	312
Immunology and Allergy	2
Cardiology	29
Dermatology	1
Endoc & Metabolism	1
Gastroenterology	14
Nephrology	14
Neurology	2
Respirology	17
Rheumatology	1
General Surgery	16
Pediatrics	1
General Surgery	108
Neurosurgery	9
Orthopedic Surgery	891
Plastic Surgery	1
Vascular Surgery	1
Urology	1
Obs/Gynecology	1
Critical Care Medicine	30
Anaesthesiology	220
Otolaryngology	1
Psychiatry	3
Hematology	56
Rehabilitation	2
Geriatric Medicine	11
Medical Oncology	3
Infectious Diseases	1
Not Coded	7721
Total	10463

Consultant	Freq
Family Practice/GP	150
Community	24
Emergency Medicine	55
Internal Medicine	2962
Immunology and Allergy	4
Cardiology	316
Dermatology	2
Endoc & Metabolism	48
Gastroenterology	109
Nephrology	68
Neurology	53
Respirology	111
Rheumatology	102
Pediatrics	2
General Surgery	108
Neurosurgery	9
Orthopedic Surgery	1274
Plastic Surgery	18
Thoracic Surgery	6
Vascular Surgery	1
Urology	124
Obstetrics and Gynecology	9
Critical Care Medicine	61
Anaesthesiology	748
Otolaryngology	14
Ophthalmology	11
Psychiatry	135
Hematology	362
Rehabilitation	128
Geriatric Medicine	269
Medical Oncology	33
Radiation Oncology	6
Diagnostic Radiology	1
Infectious Diseases	49
Palliative Medicine	13
Dentistry	3
Dental Surgery	1
Oral Surgery	3
Not Coded	3071
Total	10463

Resident/Intern	Freq
Family Practice/GP	18
Trauma Medicine	1
Internal Medicine	96
Cardiology	24
Dermatology	2
Endoc & Metabolism	5
Gastroenterology	8
Nephrology	9
Neurology	5
Respirology	4
Rheumatology	1
General Surgery	88
Neurosurgery	1
Orthopedic Surgery	52
Urology	10
Obs/Gynecology	1
Critical Care Medicine	16
Anaesthesiology	67
Otolaryngology	1
Psychiatry	23
Hematology	2
Rehabilitation	7
Geriatric Medicine	12
Radiation Oncology	1
Gynecologic Oncology	1
Infectious Diseases	1
Palliative Medicine	1
Not Coded	1
Total	1

Allied Professional	Freq
Dentistry	1
Physiotherapy	319
Occupational Therapy	183
Respiratory Therapy	68
Assistant Therapy	52
Speech Pathology	10
Assistant Physio	17
Assist Occup. Therapy	21
Nutritional Therapy	60
Nursing Group	14
RN Nursing	172
Practitioner Nursing	51
Social Work	214
Pharmacy	35
Psychology	6
Religious Counselling	3
HS/HC Therapy	22
Not Coded	9215
Total	10463

Hospitalist	Freq
Family Practice/GP	263
Community	9
Emergency	5
Internal Medicine	178
Cardiology	4
Ortho Surgery	19
Not Coded	9985

Physician Assist.	Freq
Family Practice/GP	1
Emergency	2
Internal Medicine	19
Orthopedic Surgery	153
Not Coded	10288
Total	10463

Transfer Physician	Freq
Family Practice/GP	633
Community	5
Emergency Medicine	26
Trauma Medicine	1
Internal Medicine	182
Cardiology	27
Gastroenterology	3
Nephrology	6
Neurology	1
Respirology	5
Rheumatology	5
Pediatric Cardiology	1
General Surgery	35
Cardiac Surgery	1
Neurosurgery	1
Orthopedic Surgery	2289
Urology	4
Obs/Gynecology	1
Critical Care Medicine	2
Psychiatry	2
Hematology	1
Rehabilitation	1
Geriatric Medicine	101
Radiation Oncology	1
Infectious Diseases	1
Not Coded	7128
Total	10463

Geriatric Medicine is coded as the MRP, Admitting, Other Responsible Physician in 0.3% -0.4%, of admissions while they are coded as Consultant and Transfer Physician in 3.6% and 3.0%, of admissions, respectively. *This identifies physicians with Geriatric Medicine as a specialty but not other providers with geriatric care experience.*

Looking across provider types (i.e. MRP, Admitting, Other Responsible and Transfer Physician) coded for hip fracture admissions, **Family Practice/GP, Emergency Medicine, Internal Medicine and Orthopedic Surgery** (one or more of these types) comprise the basic 'team' involved in patient care. Complexity of these patients is suggested by the involvement in many of these admissions (70.6%) of a consultant which may be; Internal medicine, Cardiology, Gastroenterology, Respirology, Rheumatology, Urology, Psychiatry, Hematology or Geriatric Medicine. A Family Practice/GP or Internal Medicine Hospitalist is coded in a small number of admissions (4%) suggesting few orphaned patients among this patient population.

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