

Key indicators for Canadian FLSs:

setting the
foundation for
reflective practice
and improvement
for FLSs

Broken bones
from
osteoporosis
are more
common
than heart
attack,
stroke and
breast
cancer combined



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Executive summary

Fractures beget fractures. A huge post-fracture care gap exists: less than 20% of fragility fracture patients ever receive the osteoporosis care they need to prevent their next fracture¹⁻⁴. These patients are trapped in a cycle of recurrent and costly fractures.

Although many interventions have been attempted nationally and internationally over the last two decades, only Fracture Liaison Services* (FLS) have been able to show a very meaningful reduction in the post-fracture care gap⁵⁻¹², the incidence of repeat fractures^{6,13-15}, mortality¹⁴, and utilization/costs of healthcare resources^{6,11,15-20}.

It was a real mess before FLS. The care was fragmented between ortho, x-ray, emergency and inpatients. There was no one person to connect all the dots together to make the assessment happen. Almost invariably the patients fell between the cracks and never received the treatment they needed to prevent their next fracture.

Ken Cameron
Family physician, Dartmouth, NS

To be effective, an FLS must first and foremost have the right processes in place (see the Essential elements of FLSs*). One of these crucial processes is the ability of the FLS to monitor its own effectiveness.

The key indicators* presented in this document will be a useful guide for Canadian FLSs. The key FLS indicators provide:

- A way to measure the performance of the FLS at the level of the system
- A useful tool to facilitate on-going continuous quality improvement through Plan-Do-Study-Act (PDSA) methodology* to address any identified care gaps
- The ability for FLSs to compare their performance with that of other FLSs from across Canada

Appreciated thoroughness of bone assessment, education package, time that FLS nurse spent with me and my family to answer all our questions.

Patient with fracture
White Rock, BC

The more experienced and established an FLS is, the better the patient outcomes will be, but the key FLS indicators will set up all FLSs for a much faster path to success.

Osteoporosis Canada's (OC) goal is to help ensure that no fracture patient is ever "left behind" and that each of them will receive the osteoporosis care they need to prevent their next fracture. The *Key indicators for Canadian FLSs* is a crucial part of this endeavour.



Broken bones can be warning signs of osteoporosis

Let's make their FIRST break their LAST!

**these terms are further defined in the Glossary.*

Glossary of terms as used in this document

Fracture Liaison Service:

A Fracture Liaison Service (FLS) is a specific systems-based model of care for secondary fracture prevention where a dedicated coordinator:

- IDENTIFICATION** • systematically and proactively identifies patients aged 50 years and older presenting to a hospital with a new fragility fracture and/or with a newly reported vertebral fracture
- INVESTIGATION** • organizes appropriate investigations to determine the patient's fracture risk
- INITIATION** • facilitates the initiation of appropriate osteoporosis medications

FLS has outperformed all other post-fracture osteoporosis interventions in terms of significant patient outcomes and reduction in healthcare costs^{5,6}.

The “3i’s”:

Identification, Investigation and Initiation of treatment are often referred to as the “3i’s” of FLS, with identification being the first i, investigation the second i and initiation the third i.

Adherence:

The extent to which a person takes medications as prescribed by their health care provider. For osteoporosis medications, this can be complex depending on the type of and/or frequency of dosing of the specific medication and may include:

- The percentage of the prescribed doses actually taken by the patient over a specified period of time
- The timing of the next dose of medication taken (especially for medications with a very long dosing interval, e.g. once a year)
- Taking the medication in the correct manner, e.g. on an empty stomach, etc.

For the purposes of this document which is aimed at PDSA methodology, the indicator for adherence will measure the proportion of patients who are adherent at a set time.

CAROC

A tool to determine fracture risk jointly endorsed by the Canadian Association of Radiologists and Osteoporosis Canada. CAROC incorporates 5 risk factors: age, sex, prior fragility fractures, glucocorticoid use and bone density measurement. CAROC has been validated in the Canadian population²¹. To access the CAROC tool, go to <http://www.osteoporosis.ca/multimedia/FractureRiskTool/index.html#/Home>.

Essential elements of Fracture Liaison Services:

The *Essential elements* were defined by Osteoporosis Canada in September 2015. They are deemed the bare minimum processes necessary to ensure that an FLS will be set up for success, particularly in its ability to have a meaningful impact on the post-fracture care gap at the level of the system. For the complete list of the *Essential elements*, please see Appendix A.

First line osteoporosis medications:

First line osteoporosis medications in this document are defined as per the 2010 Osteoporosis Canada Clinical Practice Guidelines²² and include alendronate, risedronate, zoledronic acid, denosumab, raloxifene, estrogen and teriparatide.

Fragility fracture:

A fragility fracture is a fracture occurring spontaneously or following minor trauma such as a fall from standing height or less. In this document, we focus on those fragility fractures recommended for surveillance by the Canadian Chronic Disease Surveillance System (CCDSS) Osteoporosis Working Group of the Public Health Agency of Canada (PHAC)²³: hip, wrist, shoulder, spine and pelvis.

Excluded from the definition of fragility fracture: traumatic fractures, stress fractures, pathologic fractures, peri-prosthetic fractures, avulsion fractures and atypical femoral fractures (complete or incomplete).

FRAX

A tool to determine fracture risk endorsed by Osteoporosis Canada. FRAX is a computer-driven tool that incorporates many risk factors including age, sex, BMI (Body Mass Index), prior fragility fracture, parental history of a hip fracture, current smoking, high alcohol intake, glucocorticoid use, rheumatoid arthritis and other secondary causes. FRAX can be computed with or without inclusion of a BMD (Bone Mineral Density) measurement. FRAX has been validated in the Canadian population²⁴⁻²⁶. To access the Canadian FRAX tool, go to <https://www.sheffield.ac.uk/FRAX/tool.jsp?country=19>.

Key FLS indicators:

Key indicators for FLSs are sub-classified in this document as “**core**” or “**supplementary**”. In this document, the term “FLS indicators” will refer to all of the key FLS indicators unless specifically identified as either “core” or “supplementary”.

The **core FLS indicators** are deemed absolutely essential. They are kept to an absolute minimum so as to lessen as much as possible the demands on FLS staff’s time in collecting and recording the data required to measure and monitor such indicators.

A longer list of **supplementary indicators** is provided which are strongly recommended for FLSs with sufficient resources. Some FLSs may choose to monitor some, but not all of the supplementary indicators.

The first Osteoporosis Canada FLS audit planned for 2018 will be focused exclusively on the core indicators.

Persistence:

The act of continuing the treatment for the prescribed length of time. For the purposes of this document which is aimed at PDSA methodology, the indicator for persistence will measure the proportion of patients who remain persistent at a set time.

Plan-Do-Study-Act (PDSA) methodology:

Making use of the Institute for Health Improvement (www.ihl.org) framework for quality improvement, this document has developed FLS indicators intended to be used in PDSA cycles. PDSA methodology is a simple yet powerful tool for accelerating quality improvement. The steps in the PDSA cycle are:

- Step 1: Plan - Plan a change or modification of practice, including a plan for collecting data
- Step 2: Do - Try out the change/modification on a small scale or over a short duration
- Step 3: Study - Analyze the data and the results
- Step 4: Act - Refine the model, based on what was learned from Step 3

Point of care

In the context of this document, point of care refers to FLS care provided at the time and place of the patient’s orthopaedic care. The driving notion behind point of care is to bring the FLS care immediately and conveniently to the patient. This is an important enabler for FLSs.

The need for consistent and comparable indicators for FLSs

Without FLS, less than 20% of fragility fracture patients ever receive the osteoporosis care they need to prevent their next fracture¹⁻³. Indeed, recent studies have demonstrated that the post-fracture care gap has worsened in the past few years⁴, in all likelihood partly as a result of media-driven over-blown fears of the very rare risks posed by osteoporosis medications.

28% of women and 37% of men who suffer a hip fracture will die within the following year

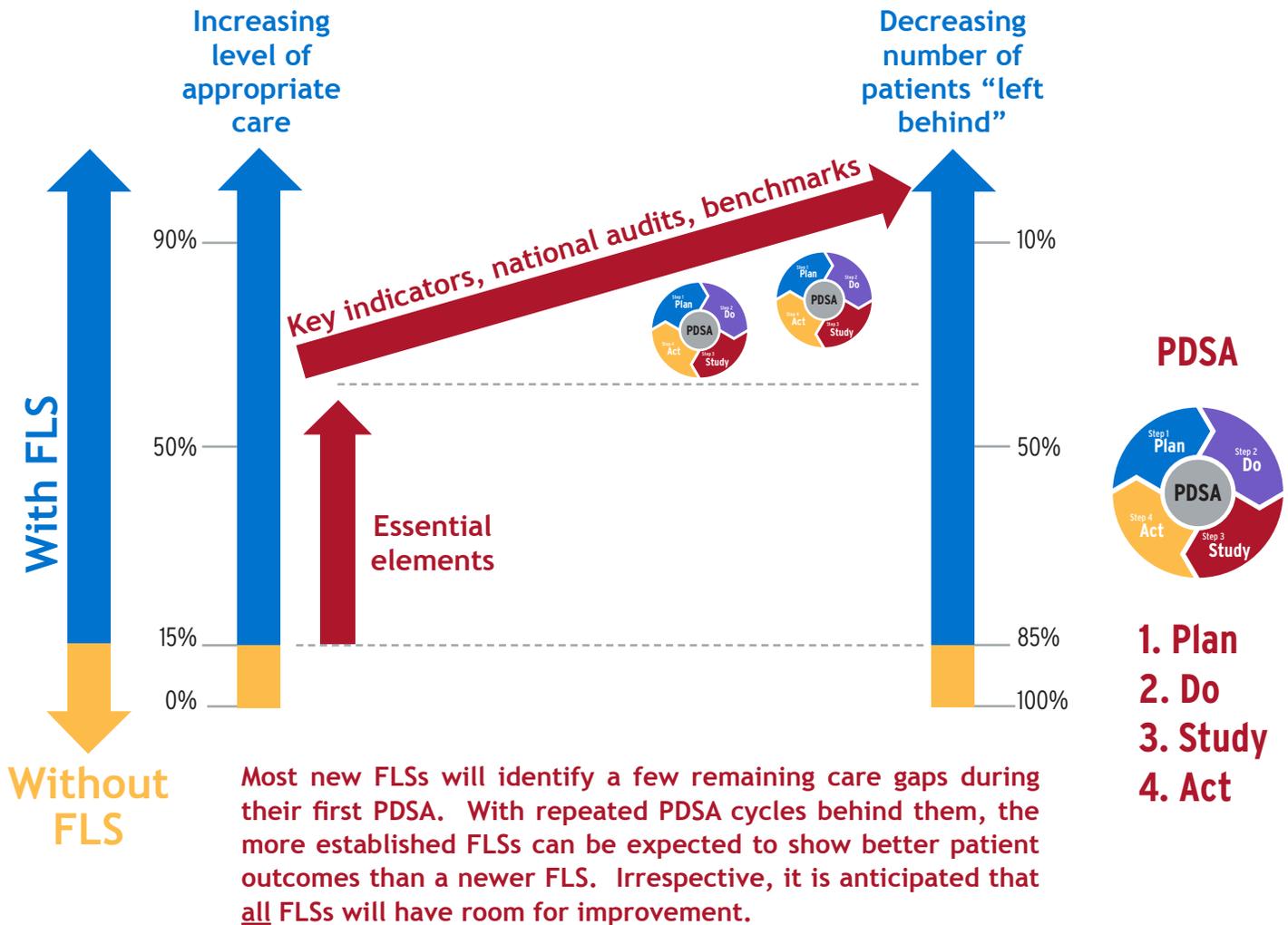
Preventing that next fracture for fragility fracture patients necessitates that the following three indispensable steps are achieved:

1. The FLS must **identify**/capture the fragility fracture patients for their entire catchment/healthcare system.
2. Each fragility fracture patient must be **investigated**/assessed to determine his/her fracture risk.
3. Patients determined to be at higher risk for subsequent fractures must be **initiated** on effective osteoporosis medication.

An FLS meeting Osteoporosis Canada's 8 *Essential elements* (for more details, see Appendix A) will dramatically reduce the post-fracture care gap, yet will still be only part way to fully closing it. No FLS will be perfect and, even with the best of intentions and resources, some fracture patients, possibly many, will inadvertently be "left behind" at each of the above three steps.

Evaluating the FLS's performance is crucial in order to identify the FLS's weaknesses, and hence any areas for improvement. A database is an absolute necessity for continuous quality improvement of the FLS through a process of Plan-Do-Study-Act (PDSA) within a culture of ongoing reflection and improvement of the program. Ability to compare with similar FLS programs is an opportunity to learn from others and can be used to improve patient outcomes across programs. With on-going PDSA cycles, FLS processes will be tweaked, internal/external barriers will be removed and patient outcomes will gradually improve. More information on PDSA for FLSs can be found in Appendix H of the OC's FLS Toolkit at <http://www.osteoporosis.ca/fls/fls-tools-and-resources/>.

It should therefore not come as any surprise that FLS performance monitoring is an integral recommendation of all existing national and international FLS Clinical Standards documents²⁷⁻²⁹.



Most new FLSs will identify a few remaining care gaps during their first PDSA. With repeated PDSA cycles behind them, the more established FLSs can be expected to show better patient outcomes than a newer FLS. Irrespective, it is anticipated that all FLSs will have room for improvement.

The need for national FLS audits

In order to optimize patient outcomes, an FLS must be able to compare its own performance against that of other similar FLSs (e.g. located in a similar setting such as inpatient orthopaedic ward or outpatient orthopaedic clinics). National FLS audits have become mandatory in the United Kingdom where they provide very useful comparative data for the country's FLSs^{30,31}. In New Zealand, FLSs provide quarterly reports on their performance to the Ministry of Health³².

Osteoporosis Canada will be conducting periodic voluntary national FLS audits starting in 2018 in order to help provide comparative data for Canadian FLSs. Benchmarks to guide FLSs will eventually be established based on these audits.

Development of Osteoporosis Canada's key FLS indicators

The risk of
having a fracture
from osteoporosis
can be reduced
and valuable
healthcare
dollars saved

Osteoporosis Canada's key FLS indicators were developed to provide a standardized overview of an FLS's effectiveness for each of the individual 3i's (identification, investigation and initiation of treatment). The FLS indicators highlight the relative strengths and weakness of the FLS at the level of the system for the purpose of on-going continuous quality improvement through a Plan-Do-Study-Act (PDSA) process.

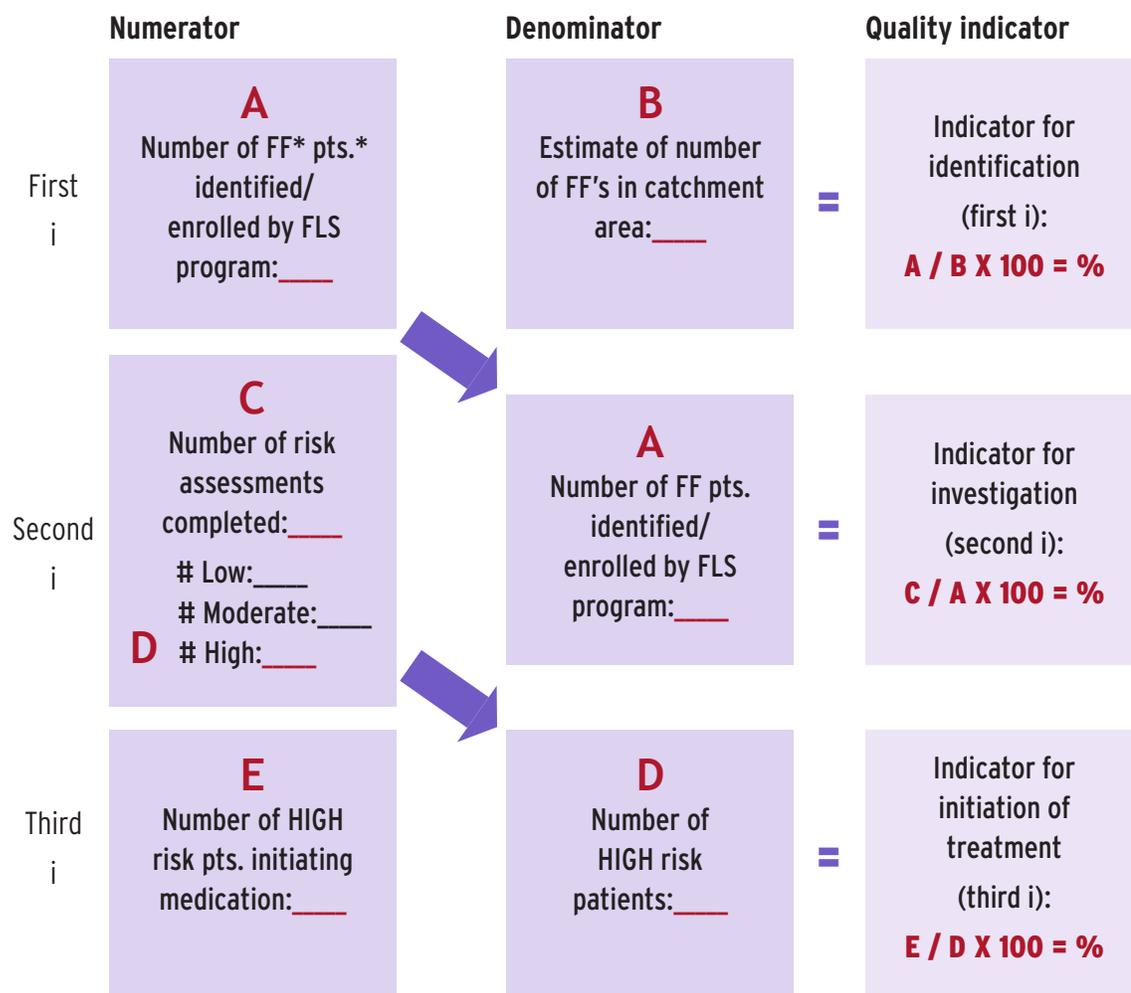
The FLS indicators were developed by a national task force with representation from each province featured on the OC FLS Registry as of May 1st, 2017. The OC Outcomes Task Force strived to focus on the FLS performance measures deemed most critical to an FLS's success, in keeping with OC's *Essential elements*, in order to minimize as much as possible the burden imposed on FLS staff's time in collecting and recording the data required to measure and monitor such outcomes.

For more information on the development of Osteoporosis Canada's key indicators for Canadian FLSs, go to <http://www.osteoporosis.ca/fls/indicator-development/>.



Core FLS indicators (essential)

Overview of core FLS indicators



Making the FIRST break the LAST is an achievable goal through the widespread implementation of FLS

PLEASE NOTE: The numerators and denominators above MUST comply with the full definitions as described further in this document. Some numerators and denominators may vary depending on FLS type, i.e. inpatient-only FLS, outpatient-only FLS or combined inpatient/outpatient FLS.

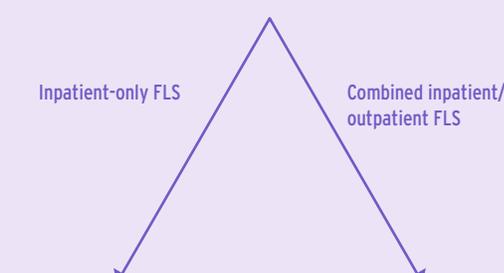
* FF stands for "fragility fracture".
Pts stands for patients.

Patient demographics data to be collected

In the interest of keeping the core measurements at an absolute minimum, only age (at time of fracture) and fracture type (hip, wrist, shoulder, pelvis or spine) are considered “core” demographics.

Key indicator for identification, the “first i”:

Please note that any FLS can and should continue using all of their current protocols which may well exceed the recommendations as outlined in this document. The numerators and denominators in this document were selected specifically to optimize comparability/standardization between FLSs across the provinces. For example, an FLS with protocols allowing enrollment of patients less than age 50 or with fracture types other than hip, wrist, shoulder, pelvis and spine, can continue to provide those services. However, the latter patients (those under age 50 and those with other fracture types) should not be included in the numerators or denominators in the context of a national FLS audit.

	• Inpatient-only FLS	• Combined inpatient/ outpatient FLS	• Outpatient-only FLS
NUMERATOR^{a,b}	Fragility fractures in patients aged 50 and up of the hip (proximal femur), spine (thoracic/lumbar), shoulder (proximal humerus), wrist (distal radial) and pelvis enrolled in the FLS within 6 weeks of the incident fracture. 		Fragility fractures in patients aged 50 and up of the spine (thoracic/lumbar), shoulder (proximal humerus), wrist (distal radial) and pelvis enrolled in the FLS <u>within 6 weeks</u> of the incident fracture. Fragility hip (proximal femur) fracture patients aged 50 and up enrolled in the FLS <u>within 6 months</u> of the incident fracture should be reported separately but will not be included in the numerator for the first i. ^c
DENOMINATOR^a	Admitted hip fractures (from the hospital's administrative database) ^d X 1.2	Admitted hip fractures (from the hospital's administrative database) ^d X 3.2	Admitted hip fractures (from the hospital's administrative database) ^d X 2.2

- The time frame, e.g. 9 months, 1 year, etc. shall be identical for both the numerator and the denominator.
- The above numerators **EXCLUDE**: traumatic fractures, stress fractures, pathologic fractures, peri-prosthetic fractures, avulsion fractures and atypical femoral fractures (complete or incomplete).
- These patients will be incorporated in the subsequent indicators (for the second and third i).
- CRITICAL/ESSENTIAL**: The hip fracture numbers to be used in the calculation of this denominator should be at the level of the entire healthcare system for the FLS's catchment area, typically the number of hip fractures admitted to the hospital annually. It cannot just be the number of hip fractures captured by the FLS or the number of hip fracture referrals received. Systematic and proactive case finding is an integral part of the definition of FLS as endorsed by Osteoporosis Canada. A model receiving its patients through a referral process therefore does not satisfy OC's definition of FLS.

In some regions, hip fracture surgery is concentrated in a few select hospitals. Osteoporosis Canada will guide the adjustments for the denominator for those FLSs.

Key indicator for investigation, the “second i”:

	<ul style="list-style-type: none"> • Inpatient-only FLS • Combined inpatient/outpatient FLS 	<ul style="list-style-type: none"> • Outpatient-only FLS
NUMERATOR	<p>Number of hip, spine, shoulder, wrist and pelvic fracture patients aged 50 and up who have a completed fracture risk assessment by a validated fracture risk assessment tool (FRAX with or without BMD or CAROC) <u>within 3 months</u> of enrollment in the FLS.</p> <p>Additionally, provide separately the number of patients determined to be at high risk, moderate risk and low risk from the numerator above.</p> <div style="text-align: center;"> </div>	
DENOMINATOR	<p>Fragility fractures in patients aged 50 and up of the hip (proximal femur), spine (thoracic/lumbar), shoulder (proximal humerus), wrist (distal radial) and pelvis enrolled in the FLS <u>within 6 weeks</u> of the incident fracture.</p>	<p>Fragility fractures in patients aged 50 and up of the spine (thoracic/lumbar), shoulder (proximal humerus), wrist (distal radial) and pelvis enrolled in the FLS <u>within 6 weeks</u> of the incident fracture + fragility fractures in patients aged 50 and up of the hip (proximal femur) enrolled in the FLS <u>within 6 months</u> of the incident fracture.</p>



**At least
1 in 3
women and
1 in 5 men
will suffer
a broken
bone from
osteoporosis
in their
lifetime**

Key indicator for initiation of treatment, the “third i”:

For all FLSs

NUMERATOR	Number of high risk patients initiated ^a and/or still on a first line osteoporosis medication within 6 months of enrollment in the FLS.
DENOMINATOR	Number of high risk patients (after determination of fracture risk by a validated fracture risk determination tool such as FRAX with or without BMD or CAROC).

- a. Initiation may be ascertained by one of the following methods:
- i. FLS providing the prescription to the patient directly.
 - ii. Patient self-report of treatment initiation
 - iii. Medication dispensed as per a pharmaceutical or administrative database

This indicator is specifically measuring “initiation” and/or remaining on treatment if the patient was on first-line osteoporosis treatment prior to the index fracture. Assessment of adherence and persistence are separate measurements (see supplementary indicators).

Supplementary FLS indicators (strongly recommended for FLSs with sufficient resources)

Patient demographics data to be collected:

Over and above the “core” demographics, the following demographic data is strongly recommended:

- Patient sex
- Prior fragility fractures after age 40 including fracture type (hip, spine, wrist, shoulder, pelvis) and number (e.g. 2 prior fragility fractures)
- Number of falls in the last year (including the one that led to the incident fracture). Most vertebral fractures are not precipitated by a fall.
- Treatment status at the time of the fracture (e.g. already on osteoporosis treatment at the time of the fracture)
- Treatment “failure” (e.g. patient has already received a full year or more of appropriate osteoporosis treatment prior to the fragility fracture)

Third i, for subset of patients not already on treatment at the time of incident fracture:

NUMERATOR	Number of high risk patients who are not already on osteoporosis treatment at the time of fracture who are initiated ^a on a first line osteoporosis medication within 6 months of enrollment in the FLS.
DENOMINATOR	Number of high risk patients (after determination of fracture risk by a validated fracture risk determination tool such as FRAX with or without BMD or CAROC) who are not already on osteoporosis treatment at the time of fracture.

- Initiation may be ascertained by one of the following methods:
 - FLS providing the prescription to the patient directly.
 - Patient self-report of treatment initiation
 - Medication dispensed as per a pharmaceutical or administrative database

Appropriate management/medication review for patients already on osteoporosis treatment at the time of their fracture:

It is known that patients who suffer a fragility fracture while on osteoporosis medication represent a subset of patients with much poorer outcomes³³, including a very high risk for future fractures. It is therefore critical that such patients have a comprehensive assessment including a medication review in order to determine if:

- Patient is taking his/her medication as instructed (to identify patients who are taking their medication in an inappropriate manner, e.g. taking most oral bisphosphonates with food and/or with other medications would severely impair their absorption)
- Patient should remain on current medication
- Patient should be switched to a different medication
- Patient should be referred to an osteoporosis specialist for further assessment

Fracture Liaison Services have been shown to be highly cost-effective in Canada and internationally

NUMERATOR	Number of patients who were recommended to remain on current osteoporosis medication ^a	Number of patients who were switched to another osteoporosis medication	Number of patients who were discontinued from osteoporosis medication	Number of patients who were referred to an osteoporosis specialist ^b
DENOMINATOR	Number of patients who suffered an incident fragility fracture while on appropriate osteoporosis treatment			

- Patients may be appropriately recommended to remain on current osteoporosis medication if they have not had a sufficient therapeutic trial (e.g. only one month of treatment prior to incident fracture) or had not been taking the medication as per instructions (e.g. for most oral bisphosphonates, if they had been taking their tablets with breakfast and/or with other medications).
- Please note that referral to a specialist should not be interpreted as automatic success: patient may accept the appointment but not show up; patient may show up for the appointment but reject the treatment recommended by the specialist (much as a patient can reject the treatment recommendations of the FLS).



Adherence and persistence to first line osteoporosis medication:

Adherence is a major issue with all osteoporosis medications, and particularly with oral bisphosphonates. Patients may take their oral bisphosphonate in an inappropriate manner (e.g. with food or with other medications) or may forget some of their medications (e.g. may take only 2 or 3 of their weekly doses each month). Regardless of which osteoporosis medication is used, some doses may be missed or significantly delayed.

Persistence is an issue for all osteoporosis medications. It is known that many patients lose faith in their osteoporosis medications or become concerned about the risk of rare side-effects and decide to stop their medications, often without even consulting with or notifying their healthcare providers.

	Adherence	Persistence
NUMERATOR	Number of patients adherent with their prescribed osteoporosis medication ^a	Number of patients who are still on first line osteoporosis medication (whether it is still the original one, or switched to an alternate one) at 12 months from enrollment into the FLS (18 months for zoledronic acid).
DENOMINATOR	Number of patients initiated and/or recommended to remain on osteoporosis medication	Number of patients initiated and/or recommended for continued first line osteoporosis medication

- a. Adherence is defined differently depending on each therapeutic agent:
 - i. For daily teriparatide or raloxifene, taking 80% or more of their prescribed doses
 - ii. For weekly or monthly oral bisphosphonates, taking 80% or more of their prescribed doses AND also taking as per instructions (e.g. on empty stomach where warranted)
 - iii. For denosumab, no delays longer than 7 months between doses
 - iv. For zoledronic acid, no delays longer than 15 months between doses



Doing post-fracture osteoporosis care well is a lot cheaper than doing it occasionally, or not at all

Falls prevention:

The incidence of falls in seniors is significant, as is the number of fractures that have occurred as a result of a fall. Therefore, it is particularly important to focus on future fall prevention strategies in this population. Alongside osteoporosis medication, identification of falls risk and subsequent referrals to appropriate services can further act to reduce secondary fractures. Fall prevention referrals may include, but are not limited to, geriatric assessments, balance and strength training classes, vision care, medication reviews, and home safety assessments.

NUMERATOR

Number of patients who were referred to a falls prevention program

DENOMINATOR

Number of patients enrolled by the FLS who were deemed to be at higher risk of falls

Repeat/subsequent fractures:

An effective FLS can be expected to reduce the number of repeat/subsequent fractures within 1 to 2 years. For FLSs with sufficient resources, an even longer follow up period is recommended.

NUMERATOR

Number of enrolled FLS patients who have suffered a new fracture of the **hip** (proximal femur), **spine** (thoracic/lumbar), **shoulder** (proximal humerus), **wrist** (distal radial) or **pelvis** within a specified time frame (e.g. one year or two years)

DENOMINATOR

Number of FLS patients for whom the FLS has follow up data (either through continued contact with the patient or via other means such as access to diagnostic imaging studies) within a specified time frame (e.g. one year or two years)

For this indicator, it will be important to also state clearly the FLS's rate of patient follow-up, i.e. the proportion of high risk patients for whom there is longer term data to ascertain whether or not there has been a subsequent fracture.

Interpretation of the key indicators for FLSs

The key FLS indicators should NEVER be used in isolation to determine or describe an FLS's effectiveness.

Caution must be exercised when interpreting the key FLS indicators. The FLS indicators are designed to look at the care gap (or patients “left behind”) at the level of the system, but keeping in mind the setting of the FLS (e.g. inpatient-only FLS). The indicators’ main objective is to provide Canadian FLSs with a standardized tool for the purpose of on-going continuous quality improvement of their FLS model through PDSA. This tool must also allow comparison with other Canadian FLSs that are similar to their own.

FLSs which discover a major weakness for any of the individual 3i's may require more comprehensive performance measurements than recommended in this document to further analyze and identify the specific barriers. The identified weaknesses of the individual FLS may be a reflection of intrinsic and/or extrinsic barriers. See the FLS case studies below where barriers that may significantly impact FLS outcomes can be identified.

The effect of under-resourcing:

Unfortunately, most Canadian FLSs struggle with under-resourcing and it is impossible to have a completely effective FLS without adequate funding. As a result of under-resourcing, difficult decisions have to be made to restrict some of the FLS services in order to maximize outcomes with the limited resources allocated. In other words, many FLSs have had the perverse task of having to determine which patients the FLS will automatically have to “leave behind”.

Vertebral fractures:

The current version of the key FLS indicators is designed to assess FLSs implemented in the orthopaedic settings only (inpatients and/or outpatients), but the reality is that very few vertebral fractures are ever seen in those settings. The current version of the key indicators is effectively “leaving behind” the overwhelming majority of the vertebral fracture patients. This will be addressed in a future version of this document.

Weakness in any of the key indicators should **NEVER** be automatically interpreted as reflecting a problem with the FLS itself until a full analysis is completed.





Case study A

FLS A is an inpatient-only FLS focusing exclusively on hip fracture patients. It has an older patient population. At the end of its first year of operation, it assesses its performance for the core indicators:

First i: 81%

Second i: 100% ←

Third i: 32%

In reviewing the results for the third i, the following external barriers are identified:

- a) Limited coverage for first line osteoporosis medications on the provincial formulary.

PLAN: the FLS will approach the administrators of the Provincially Funded Drug Plan to explore the possibility of expanding coverage for osteoporosis medications for the fracture patients.

- b) Several of the primary care providers of the region are misinformed and/or confused about the benefits vs risks of osteoporosis medications. Some erroneously believe that it takes many years for osteoporosis medications to become effective when in fact it only takes one year for these medications to reduce fracture risk. Despite the FLS's recommendations, some fracture patients are not offered effective osteoporosis medications based on this type of misinformation.

PLAN: develop a fact sheet on *Management of osteoporosis in the elderly* to accompany the FLS's treatment recommendations sent to the patients' primary care providers. Review the FLS performance again 6 months after this change is implemented.

A fragility fracture of the hip is automatically considered HIGH RISK. A BMD test is not needed for fracture risk determination.

In this FLS, only the few patients contacted for follow-up can be included in this numerator. The FLS does not have clear insight into its true performance for the third i. Without this insight, quality improvement is impossible.

Case study B

FLS B is an outpatient-only FLS at a hospital with very busy orthopaedic clinics Monday through Friday (10 half-day clinics each week, with more than one orthopaedic surgeon present at all times). The FLS B team has determined that at least one full-time (1.0 FTE) FLS coordinator is needed to screen and manage all of the fracture patients, however the hospital has only allocated a half-time (0.5 FTE) position to the role.

The clinics are so busy that the FLS coordinator spends the majority of her time with the identification and investigation of fracture patients, and there is no time left for her to do the necessary follow-up to see if the patients are initiated on treatment. At the end of its first year of operation, the FLS assesses its performance for the core indicators:

First i: 41%
Second i: 94%
→ Third i: 14%

In reviewing the results for the first i, it is identified that inadequate funding of the FLS is the major barrier. The 0.5 FTE coordinator is only able to cover 5 of the 10 ortho clinics. The FLS completely misses the fracture patients seen in the clinics on days when the FLS coordinator is not working. Due to the limited coverage of the clinics, the maximum score the FLS could possibly achieve for the first i would be 50%.

In reviewing the results for the third i, the major barrier is again inadequate funding of the FLS. Asking the FLS coordinator to do follow-ups would be a no-win trade off as it would take her away from the identification and investigation roles. Many new fracture patients would be “left behind” instead. The only viable solution is increasing the FTE allocation for the FLS coordinator.

PLAN: Review the FLS’s performance results with hospital administrators, highlighting the dire need for increased funding support for the FLS. Osteoporosis Canada’s FLS team may be able to offer some help (e.g. assistance in preparing a business case, etc.)

Case study C

FLS C is a combined inpatient/outpatient FLS where the allocation for the FLS nurse of 1 FTE was based on the estimation provided by the OC FLS toolkit. Given the fracture volume seen at that hospital, one full-time FLS coordinator should be able to provide reasonably good FLS care for most/all of the fracture patients. The FLS coordinator is supported by a 0.2 FTE (one day a week) administrative assistant.

A PDSA is completed after the first year of operation:

- First i: 83%
- Second i: 78%
- Third i: 82%

At the end of the first year, because of budget cut-backs, the **administrative assistant** for the FLS has been reassigned to another position. The FLS nurse must now absorb the many clerical duties such as:

- scheduling patient appointments (e.g. for BMD testing and/or osteoporosis education sessions) and contacting the patients to inform them of those appointments
- collating the educational packages for the fracture patients
- dealing with correspondence (e.g. looking up the addresses and/or fax numbers for the patients' primary care providers in order to send communications)
- managing the FLS's database (FLS coordinator now has to enter all of the patients' data herself).
- maintaining the patient follow-up schedule and updating the data again in the FLS database.

The performance of the FLS is re-evaluated at the end of the second year:

- First i: 68%
- Second i: 63%
- Third i: 41%

In comparing the results of the first and second years, it is obvious that many patients are being "left behind" when the FLS coordinator is taken away from doing her clinical work to perform clerical duties. More importantly, the fracture patients are the ones suffering the consequences - without appropriate diagnosis and/or treatment, their next fracture cannot be prevented.

PLAN: Review and compare the FLS's performance results pre- and post-clerical support with hospital administrators, highlighting the obvious need to reinstate clerical support for the FLS. This would be the simplest and most economically efficient solution.

Administrative support is as important to an FLS as it is to any other clinical service in the hospital. Allocating the required administrative resources to the FLS will allow the FLS coordinator to use his/her time more efficiently to address the patients' unmet clinical needs.

What Canada needs now!

'Fracture prevention makes sense in Kaiser because it is considerably less expensive to prevent a hip fracture than to manage it, simple as that.'

Richard Dell MD,
Orthopaedic
Lead, Kaiser Healthy
Bones
Program, U.S.A.

Based on overwhelming evidence, FLS is quickly becoming the standard of care for fragility fracture patients in Canada and internationally. In order to ensure that an FLS effectively closes the care gap and provides quality osteoporosis care for fracture patients, it is vital for Canadian FLSs to monitor their performance and continuously improve on their processes (e.g. through Plan-Do-Study-Act cycles).

The OC FLS Registry (<http://www.osteoporosis.ca/fls/canadian-fls-registry/>) was launched in May 2015 to profile Canadian hospitals offering FLSs meeting the 8 *Essential elements*. As of October 1st, 2017, there were 45 FLSs featured on the Registry. This is a good base from which to obtain comparative data.

In 2018, Osteoporosis Canada will be launching a voluntary national audit of the FLSs on the OC FLS Registry, restricted to the “core” indicators. This will be the first time that Canadian FLSs will have the opportunity to compare their performance with that of other Canadian FLSs located in similar settings (inpatient-only FLSs, outpatient-only FLSs and combined inpatient/outpatient FLSs).

Canadian FLSs focused on continuous quality improvement will be better equipped to identify barriers to success and to adopt solutions to enhance their patient outcomes. Every FLS that participates in the OC FLS audits will be making a contribution to closing the post-fracture care gap, not only at the local level, but also on a national scale.

What Canadian FLSs need now is the opportunity to reach their full potential and the key FLS indicators will be a critical part of that success. Optimally effective FLSs will become the standard to be emulated by future Canadian FLSs.

Osteoporosis Canada's goal is to ensure that no fragility fracture patient is “left behind” and that every Canadian has access to appropriate post-fracture care. Together, we can be successful and help **make every fracture patient's FIRST break their LAST!**

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Outcomes Task Force

Chair: Brigadier General (retired) Hilary Jaeger, MSc, MD

Dorcas Beaton, PhD, MSc, BScOT, *Ontario*

Josée Delisle, BScN, MSc, *Québec*

Shannon Falsetti, RN, BScN, GNC (C), *Alberta*

Sonia Singh, MD, MHSC, *British Columbia*

Diane Theriault, MD, FRCPC, CCD, *Nova Scotia*

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A nationwide post-fracture osteoporosis care gap exists throughout Canada which is leaving Canadians needlessly at risk of suffering future fractures and resulting in an enormous avoidable expenditure on fracture care. Access to Fracture Liaison Services for all Canadians will transform the delivery of postfracture care and result in significant financial savings.

Appendix:

Osteoporosis Canada's Essential Elements of Fracture Liaison Services (FLS)

The 8 *Essential Elements* are:

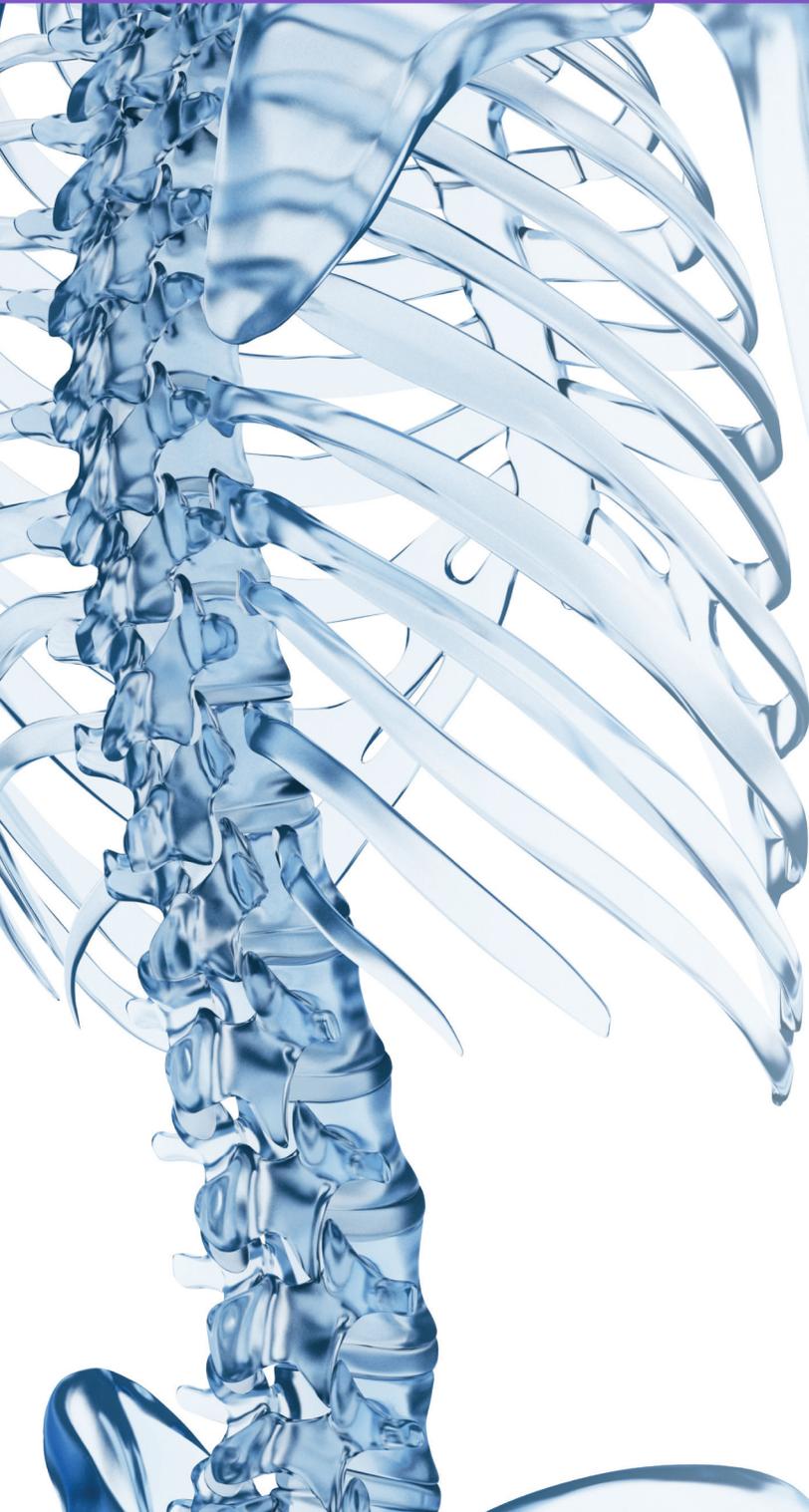
1. A dedicated coordinator is central to the FLS model of care^{5,6}. The clearly designated FLS coordinator is:
 - a. exclusively responsible and accountable for all the FLS functions
 - OR
 - b. exclusively responsible and accountable for the first FLS function (identification) and for the transfer of the second and/or third FLS functions (investigation and initiation) to a clearly designated osteoporosis expert or osteoporosis specialty team.
2. Pro-active, system-wide case finding of new fragility fractures and/or newly reported vertebral fractures:
 - a. For non-spine fractures, the pro-active case finding must be from the hospital's orthopaedic inpatient and/or orthopaedic outpatient service or an equivalent administrative database.
 - b. For radiologic vertebral fractures, the pro-active case finding must be through comprehensive screening of **ALL** of the reports issued directly from the hospital's Diagnostic Imaging Department.
3. The FLS must target at least one of the WHO major osteoporotic fracture types (hip, spine, wrist, shoulder).
4. The FLS model must be at least 2i (identification and investigation) or 3i (identification, investigation and initiation). Flexibility may be needed for FLS models targeting radiological spine fractures where provincial privacy legislation may restrict certain FLS processes from occurring for these particular patients.
5. The FLS must determine the patient's fracture risk by a validated fracture risk assessment tool.
6. First line osteoporosis medications must be initiated (3i FLS) or recommended (2i FLS) for high risk patients.
7. Integration with primary care is a critical component of any FLS: written communication to the patient's primary care provider must include the patient's fracture risk and all osteoporosis treatments initiated and/or recommended for the patient.
8. Data must be collected to determine the FLS's ability to close the post-fracture care gap, especially in regard to the proportion of high risk patients initiated on first-line osteoporosis medications.

All FLSs featured on the Osteoporosis Canada FLS Registry have met the 8 *Essential elements* for FLS. An FLS should strive to go beyond the *Essential elements* and attain all of the "Quality Standards for Fracture Liaison Services in Canada"³⁶.

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 **OSTEOPOROSIS**
CANADA



1200 Eglinton Ave East, Suite 500
Toronto, Ontario M3C 1H9

Tel: (416) 696-2663

Fax: (416) 696-2673

1-800-463-6842 (M-F, 10-4 ET)

www.osteoporosis.ca

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