

OSTEOPOROSIS



Report from Osteoporosis Canada's first national FLS audit: leading FLS improvement in Canada



September 2018

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Executive summary

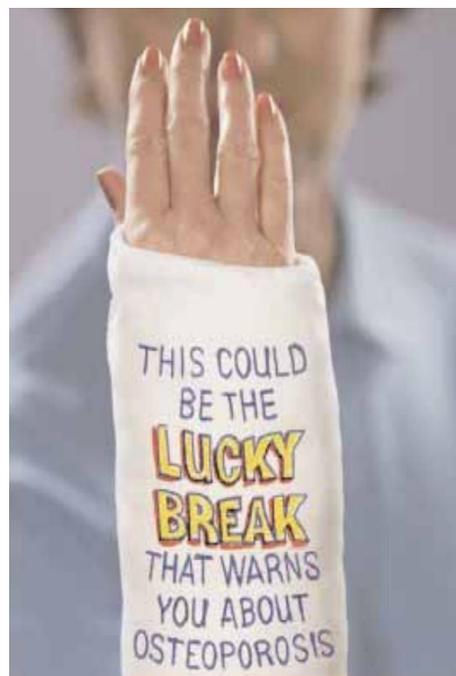
Background

The primary purpose of any Fracture Liaison Service (FLS) is to close the huge post-fracture care gap and ensure that all fragility fracture patients receive the osteoporosis care they need to prevent future fractures.

Despite meticulous internal processes, FLSs are hindered by numerous external barriers and many patients will unknowingly be “left behind”. It is therefore indispensable that the FLS has a rigorous quality improvement program in place to optimize patient outcomes.

In 2017, Osteoporosis Canada (OC) released its very first iteration of key performance indicators for FLSs.¹ The core indicators deemed absolutely essential include:

- **First i:** Identification
 - Of patients presenting to the specific FLS setting (inpatient, outpatient or both), the proportion of fragility fracture patients identified/captured by the FLS
- **Second i:** Investigation
 - Proportion of FLS patients with their first fracture risk determination completed within 3 months of enrollment
- **Third i:** Initiation of treatment
 - Of the high-risk patients in the FLS, proportion on effective osteoporosis treatment within 6 months of enrollment.



Audit results

This report provides an overview of the results from OC's first national FLS audit for the cohort of patients enrolled in Canadian FLSs between April 1 and September 30, 2017. The Ontario Osteoporosis Strategy's (OOS) continuous quality improvement program is provided separately in Appendix A.

The huge post-fracture care gap has been well documented in many Canadian jurisdictions²⁻⁴. Without FLS, less than 25% of fragility fracture patients will be diagnosed and/or treated for their underlying osteoporosis.

The results of this first national FLS audit demonstrate the improved osteoporosis care received by fracture patients managed within an FLS:

- **First i:** Identification
 - 57% of the fracture patients presenting to the appropriate setting (inpatient, outpatient or both, depending on the FLS) are enrolled in the FLS
- **Second i:** Investigation
 - 89% completed the investigations needed to determine their fracture risk within 3 months. This in turn helps determine the patient's need for osteoporosis medication
- **Third i:** Initiation of treatment
 - Of the high-risk patients (those who require treatment), 49% are on first-line osteoporosis medication within 6 months.

These results demonstrate the very positive impact that Canadian FLSs have on the lives of fragility fracture patients. By significantly improving osteoporosis care, FLSs help prevent future fractures, reduce patient suffering and increase their independence.



1. Plan
2. Do
3. Study
4. Act

As expected, the national audit results also reveal that there is still room for improvement for all FLSs. The ability to review these results and compare with the performance of similar Canadian FLSs will be a valuable asset to any FLS operating within a culture of ongoing reflection and quality improvement.

Participating FLSs have received their individual reports detailing their own performance for the 3i's with a comparison to similar Canadian FLSs. They will be able to review their results, determine their strengths and weaknesses and plan for improvement.

It is anticipated that by the time OC conducts its second national FLS audit (planned for 2019/2020), FLSs will be able to demonstrate even better patient outcomes.

Let's make their FIRST break their LAST!

Preamble

As promised with the publication of *Key indicators for Canadian FLSs: setting the foundation for reflective practice and improvement for FLSs*,¹ Osteoporosis Canada has conducted the country's first national FLS audit.

OC has gathered information from Canadian FLSs that will help establish a baseline as to the quality of FLS delivery in this country. Such knowledge will help OC identify barriers to success that are frequently encountered by Canadian FLSs and hopefully allow removal of such barriers where possible.

More importantly, this FLS audit provides an opportunity for individual FLSs to compare their performance with that of similar Canadian FLSs (inpatient-only, outpatient-only, combined inpatient/outpatient). Evaluating the FLS's performance is crucial in order to identify relevant strengths and weaknesses.

FLS remains a very rare entity in this country. There are hundreds of hospitals offering orthopaedic fracture care in this country and there were only 45 FLSs in Canada at the time of the audit. The overwhelming majority of Canadians who suffer a fragility fracture still do not have access to an FLS!



Method

The FLSs were asked to provide qualitative and quantitative data for the cohort of patients enrolled in the FLS between April 1 and September 30, 2017, with a follow-up period of 6 months from the time of enrolment in the FLS (to end of March 2018 for end of September 2017 patients of the cohort).

This first national FLS audit is restricted to an assessment of the core FLS indicators as defined in *Key indicators for Canadian FLSs: setting the foundation for reflective practice and improvement for FLSs*.¹ The core FLS indicators are focused on the main functions of the FLS: identification, investigation and initiation of osteoporosis treatment.

A limitation of this audit is that the data is based on FLS self-report rather than data at the patient level. OC is not able to verify the accuracy of the data submitted.

Audit Participation rate

This was a voluntary audit and we are most grateful for the hard work of the many healthcare professionals and administrators who have contributed to this effort.

At the time of the audit, there were 45 FLSs on the OC FLS Registry,⁵ 30 of which are FLSs in the Ontario Osteoporosis Strategy (OOS) Fracture Screening and Prevention Program (FSPP) and 15 of which are non-OOS FLSs. OOS FSPP has operated a very large FLS program since 2007 seeing approximately 8000 persons per year across 36 hospital sites. It carries out its own continuous quality improvement program and has provided a report in Appendix A.

Of the 15 eligible non-OOS FLSs:

- 11 FLSs have provided complete audit data
- 1 FLS has provided partial audit data. This FLS was without an FLS coordinator for a significant portion of the audit cohort's follow-up period and was not able to provide the follow up data for their third i.
- 2 FLSs have their patient data embedded within the hospital's EMR. Unfortunately, both are in the midst of a major merger and the EMR is inaccessible at this time. These 2 FLSs were only able to provide OC with qualitative information.
- 1 FLS did not submit any information.

In the main body of this document, we report on the 12 FLSs which have provided quantitative data. This is an 80% participation rate from the non-OOS FLSs.



Important lessons learned from this first national FLS audit

Although the primary purpose of the audit was to help FLSs evaluate their own effectiveness, it was also the first test run of the new OC FLS indicators launched by the FLS Audit Committee in the fall of 2017.

The OC FLS Audit Committee reviewed the results of the audit with great interest. A few issues have been identified with some of the 2017 FLS indicators themselves which may inadvertently lower a few of the outcomes for some FLSs:

- It had seemed reasonable to allow 3 months for BMD testing to be done and then a subsequent 3 months for primary health care to initiate osteoporosis treatment. Hence the timelines for the indicators for the second and third i's were set at 3 months and 6 months respectively. This unfortunately created a situation where a patient who had his/her BMD testing at 4 months was disqualified from this audit even if he/she was initiated on treatment 5 months post fracture. This issue will be corrected in the next iteration of the FLS indicators to be released soon: the timelines will be set at 6 months for both the second and third i's. In the meantime, the FLSs have provided data conforming to the indicators as defined in the 2017 version of the OC FLS indicators¹ and the results in this report may disadvantage reported outcomes for FLSs where a longer wait time exists for BMD testing.
- As with other countries, OC has anchored the denominator for the first i to hip fracture numbers (hip fractures X 1.2 for inpatient-only FLSs; X 2.2 for outpatient-only FLSs; X 3.2 for combined inpatient/outpatient FLSs). The multipliers were derived from a review of the relative proportion of wrist, shoulder, pelvic and spine fractures seen in orthopaedic services compared to hip fractures. No adjustments were made to account for the different rates of higher impact trauma fractures seen in the different fracture types. Hip fractures (~90% are fragility*) are the most common fracture type seen by inpatient-only FLSs whereas wrist fractures (only ~75% are fragility*) are the most common fracture type of FLSs with an outpatient component. The current indicators will disadvantage FLSs with an outpatient component. OC will explore possible improvements for this indicator in the next iteration.

All FLSs should pay close attention to their results to help determine their individual strengths and weaknesses. ALL FLSs will find some room for improvement.

It should not be forgotten that most FLS weaknesses will be related to external barriers which are unlikely be under the direct control of the FLS. Please see section entitled "Barriers to success commonly encountered in FLSs" later in this document.

*Based on unpublished data from select Canadian FLSs

FLS audit results

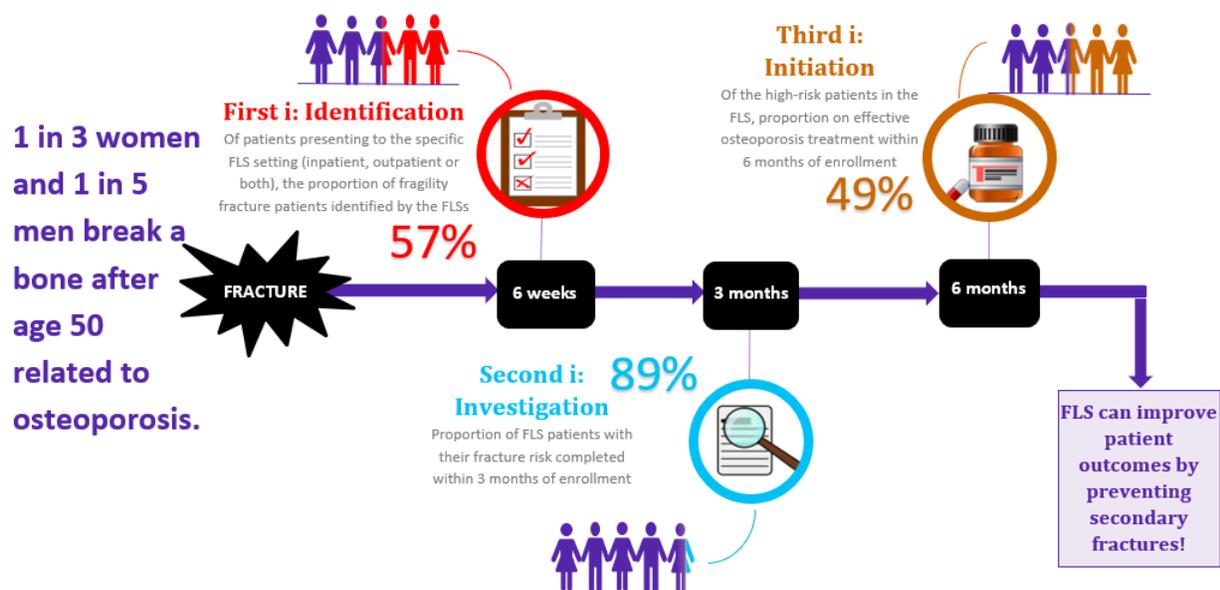
Status quo: natural history of fragility fractures without an FLS

After the first fragility fracture, the risk of a subsequent fracture approximately doubles and any new fractures are most likely to occur within the next 2 years.^{6,7} The risk of another fracture is elevated and imminent. The clock is ticking from the minute that initial fracture occurs and effective osteoporosis medications must be initiated promptly in order to reduce the patient's risk of another fracture.

Unfortunately, less than 20% of Canadians who suffer a fragility fracture ever receive the osteoporosis care they need to prevent their next fracture.²⁻⁴

Many interventions have been tried but only FLS has been able to show a very meaningful reduction in the post-fracture care gap,⁸⁻¹⁵ the incidence of repeat fractures,^{9,16-18} mortality,¹⁷ and utilization/costs of healthcare resources.^{9,14,18-23} Most Canadians who fracture do not have access to an FLS.

Overview of results (combining all non-OOS FLSs)



Results by FLS type

In the table below, we have separated the results based on FLS type. As there is only one single outpatient-only FLS within this audit, we have suppressed their results to preserve confidentiality.

Please note that for the indicator for the first i, as defined by the 2017 OC FLS indicators, it is expected that those FLSs with an outpatient component will attain a lower score in part due to the following:

- It is much easier to identify hospitalized hip fracture patients compared to identifying non-hip fracture patients in the midst of a very busy outpatient orthopaedic clinic.
- There is a greater proportion of non-fragility cases in non-hip fractures (e.g. wrists ~ 25%) compared to hip fractures (~10%).* FLSs only enroll fragility fracture patients.

| Key performance indicators [§] | Inpatient-only FLSs: national median (range) | Combined inpatient/outpatient FLSs: national median (range) |
|---|--|---|
| First i: identification | 68% (54-75%) | 54% (36-87%) |
| Second i: investigation | 100%* (N/A) | 83% (63-97%) |
| Third i: initiation/continuation of treatment (in high risk patients) | 46% (24-86%) | 50% (50-76%) |

§ For definitions of the FLS indicators, see *2017 Key indicators for Canadian FLSs: setting the foundation for reflective practice and improvement for FLSs* at <http://fls.osteoporosis.ca/indicator/>.

*Hip-only FLSs such as these are expected to reach 100% on this indicator as a fragility fracture of the hip is automatically considered HIGH RISK as per current OC Clinical Practice Guidelines, irrespective of BMD (Bone Mineral Density) results.

*Based on unpublished data from select Canadian FLSs

Barriers to success commonly encountered in FLSs

In May 2018, OC convened a meeting of FLS coordinators from across the country to help identify the most commonly encountered barriers to success in the management of fragility fractures within the context of the FLS.

Barriers to success can be classified as:

- Internal: limitations due to issues specific to the FLS itself (e.g. FLS inclusion/exclusion criteria, algorithms, processes, etc.)
- External: limitations due to issues outside the control of the FLS (e.g. limited access to bone mineral density (BMD) testing, limited access to effective osteoporosis medications on the provincial medical insurance plan, etc.)

Many barriers can be identified that are very specific to one of the 3 main FLS goals of identification, investigation to determine fracture risk and initiation of effective osteoporosis medication in those patients determined to be at high risk (see table 1). Canadian FLS coordinators confirm that one of their biggest challenges is convincing patients and/or their healthcare providers of the need and safety of osteoporosis medications. This is the unfortunate result of repeated media coverage on very rare side-effects of osteoporosis medications such as atypical femoral fractures or osteonecrosis of the jaw.

Some barriers are overarching and will have a broad negative impact on patient outcomes. The most common of these is under-resourcing of the FLSs. It is almost the norm for Canadian FLS that they must function with less than the minimum staffing required to provide optimal care for the fracture population. There will be no choice but to leave some patients behind. This will invariably have a negative impact on one or more of the indicators for that FLS.

Language/translation issues can also cause overarching challenges to an FLS and may be more of a problem for hospitals located in regions with a large multi-ethnic population. It is difficult to explain the concepts of fragility, future fracture risk, benefits/risks of osteoporosis treatment even when dealing with English/French patients. It is extremely difficult to be able to communicate such concepts effectively when the FLS coordinator and the patient do not speak the same language.

The impact of under-resourcing:

Many FLSs in Canada struggle with under-resourcing. A common example is the allocation of insufficient staff time or FTEs (full-time equivalents) to the FLS coordinator position. In such FLSs, very difficult decisions must be made as there are insufficient resources to manage all fragility fracture patients optimally. Sadly, the question that most often needs to be addressed in such FLSs is “which patients will we leave behind?”

A half-time FLS coordinator working at a hospital with busy orthopaedic clinics operating 5 days per week will have no choice but to leave behind all of the Thursday and Friday patients + half of Wednesday's!

It is important for all FLSs to identify their internal and external barriers as this is key to finding solutions and ensuring a successful outcome for their patients. Many barriers will be external and seemingly out of the FLS's control. However, FLS staff can often have a very positive influence on needed improvements in the healthcare system. Having accurate, objective and relevant data readily available is essential when the opportunity to tackle the challenge of external barriers arises. In a patient-centred environment, the patients' health, quality of life and safety will be of paramount importance to all, including non-FLS healthcare professionals and administrators.

TABLE 1: Examples of Intrinsic and Extrinsic barriers

| | Intrinsic barriers | Extrinsic barriers |
|----------|--|--|
| First i | <ul style="list-style-type: none"> • FLS’s inclusion criteria are too restrictive and/or FLS has too many exclusion criteria (the more exclusion criteria, the greater the number of patients “left behind”). • FLS does not provide point of care assessment, necessitating that the patient return to the hospital or to a community clinic for an additional appointment separate from those already scheduled for their required orthopaedic care. • Identification process occurring in a setting with limited scope for fracture patients (e.g. identification of fragility fracture patients strictly on the rehabilitation unit would “leave behind” all those fracture patients who do not require transfer to that unit). • FLS misses patients who are admitted to non-surgical/non-orthopaedic units | <ul style="list-style-type: none"> • Insufficient FLS funding (e.g. FLS requires a full time FLS coordinator but funding is only available to cover a half time position). • Lack of cooperation from key external stakeholders (e.g. rare orthopaedic surgeons who may not be welcoming of an FLS coordinator in their work environment) • Difficulty obtaining information and/or consent from those patients with cognitive impairments/dementia. • Difficulty obtaining information or consent from those patients who do not speak English or French • Hospitalized fracture patient is miscoded and missed by the FLS • No replacement for FLS coordinator during his/her holidays or medical leave • Language/translation issues |
| Second i | <ul style="list-style-type: none"> • FLS cannot complete a fracture risk determination in patients who cannot attend an appointment for a Bone Mineral Density (BMD) measurement or in patients who do not have a measurable femoral neck BMD (e.g. bilateral hip replacements). This affects FLSs using CAROC as their fracture risk determination tool. FRAX has the flexibility of allowing determination of fracture risk without BMD if needed. | <ul style="list-style-type: none"> • Patient declines BMD test • Patient unable to understand the importance of the BMD test because of language issues • Poor access to Bone Mineral Density (BMD) equipment (either because of geographic distance or long wait times) • BMD report’s fracture risk does not concur with the FLS’s comprehensive fracture risk determination • Inability to provide point of care BMD testing. • Patient denial of the “fragility” nature of their fracture; most are convinced the fracture occurred because they “fell hard”. • Inability to complete follow-up in patients with cognitive impairments/dementia • Language/translation issues |

| | Intrinsic barriers | Extrinsic barriers |
|---------|---|---|
| Third i | <ul style="list-style-type: none"> • FLS has only one or very few interactions with the fracture patients (it typically takes more than one interaction for the FLS coordinator to educate and reassure fracture patients on the importance and safety of osteoporosis medications). • Conversely, the FLS requires too many non-point of care in-person visits for the patient (in which case some patients may choose not to attend and will be lost to follow-up). • FLS collects only limited/single patient contact information, in which case it may be impossible to connect with patients for follow-up should they move (e.g. to spend a few months with a relative while recovering or move permanently to a long-term care facility). • Patient is quickly discharged from the FLS's primary unit and FLS is unable to follow-up with the patient or the patient's primary care provider to make the recommendation to initiate treatment. | <ul style="list-style-type: none"> • Patient denial of fragility fracture; most are convinced the fracture occurred because they "fell hard" and hence believe they do not need any osteoporosis treatment. • Over-blown fears, fueled by the media, of the very rare risks of osteoporosis medications, e.g. atypical femoral fractures and osteonecrosis of the jaw cause patients and their relatives to be fearful of osteoporosis medications. Some family physicians and other healthcare providers (e.g. orthopaedic surgeons, geriatricians, dentists, pharmacists, etc.) advise their patients against osteoporosis medications. • Misinformed beliefs by some primary care providers, family members and some of the patients themselves that elderly patients should not be offered effective osteoporosis medications; obsolete beliefs that it takes very long (5-10 years) for osteoporosis medications to effectively reduce fracture risk • Some family physicians will not initiate osteoporosis medications for any patients with dementia/cognitive issues and/or residents in long term care facilities despite such patients having the greatest risk of imminent repeat fractures and most in need of osteoporosis treatment. • Misinformed primary care providers may believe that it is always best to discontinue osteoporosis medications after 5 years of use, no matter how high risk the patient's risk of imminent fracture. • Poor access to effective osteoporosis medications on the province's publicly funded insurance plan. • Poor access to infusion clinics to administer some of the effective intravenous osteoporosis medications. • Inability to complete follow-up in patients with cognitive impairments/dementia. • Inability to complete follow-up or provide information to patients who speak a foreign language. • Some patient sub-sets are contraindicated most of the osteoporosis medications (e.g. renal dialysis patients). • Insufficient FLS funding may result in the inability of the FLS to follow-up patients sufficiently to measure the key performance indicator for the third i. • Language/translation issues. |

Next steps

Canadian FLSs are to be congratulated for their interest in ensuring quality osteoporosis care for fragility fracture patients. The high participation rate in this **voluntary** audit is a testament to their commitment.

Local FLS teams will review their results to identify areas for improvement and will be better equipped to identify barriers and adopt solutions to enhance patient outcomes. The results of their confidential FLS KPI Status Report will assist them in developing a quality improvement plan to help their FLS reach its full potential. It will help the FLSs develop greater effectiveness and efficiency.

OC plans to conduct a second national FLS audit in 2019/2020 which may provide evidence of progressive improvement for many FLSs.

Finally, it needs to be re-emphasized that the quality care highlighted in this report is restricted to patients being assessed and managed by an FLS. There are hundreds of Canadian hospitals offering orthopaedic fracture care. But with only 47 FLSs on the OC FLS Registry as of September 1, 2018, the overwhelming majority of fragility fracture patients in Canada still do not have access to this proven model of care. Without FLS, it is well documented that 80% of fragility fracture patients will not receive the osteoporosis care they need to prevent their next fracture. Canada needs many more FLSs to meet the needs of Canadians!

Let's make their FIRST break their LAST!

References

1. Osteoporosis Canada. Key Indicators for Canadian FLSs. <http://fls.osteoporosis.ca/indicator/>. Accessed August 8, 2018.
2. Bessette L, Ste-Marie LG, Jean S, et al. The care gap in diagnosis and treatment of women with a fragility fracture. *Osteoporos Int*. 2008;19(1):79-86.
3. Leslie WD, Giangregorio LM, Yogendran M, et al. A population-based analysis of the post-fracture care gap 1996-2008: The situation is not improving. *Osteoporos Int*. 2012;23(5):1623-1629.
4. Jean S, Gamache P, Brown JP et al. Temporal trends analysis of post-fracture management: a population-based study, 2002-2014. *J Bone Min Res*. 2016;31 Suppl 1.
5. Osteoporosis Canada. FLS Registry. FLS Hub. <http://fls.osteoporosis.ca/canadian-fls-registry/>. Published 2017. Accessed August 7, 2018.
6. Kanis JA, Johnell O, De Laet C, et al. A meta-analysis of previous fracture and subsequent fracture risk. *Bone*. 2004;35(2):375-382.
7. Huntjens KMB, Kosar S, Van Geel TACM, et al. Risk of subsequent fracture and mortality within 5 years after a non-vertebral fracture. *Osteoporos Int*. 2010;21(12):2075-2082.
8. Sale JEM, Beaton D, Posen J, Elliot-Gibson V, Bogoch E. Systematic review on interventions to improve osteoporosis investigation and treatment in fragility fracture patients. *Osteoporos Int*. 2011;22(7):2067-2082.
9. Ganda K, Puech M, Chen JS, et al. Models of care for the secondary prevention of osteoporotic fractures: A systematic review and meta-analysis. *Osteoporos Int*. 2013;24(2):393-406.
10. Bogoch ER, Elliot-Gibson V, Beaton DE, Jamal SA, Josse RG, Murray TM. Effective initiation of osteoporosis diagnosis and treatment for patients with a fragility fracture in an orthopaedic environment. *J Bone Jt Surg - Ser A*. 2006;88(1):25-34.
11. Majumdar SR, Beaupre LA, Harley CH, et al. Use of a case manager to improve osteoporosis treatment after hip fracture: results of a randomized controlled trial. *Arch Intern Med*. 2007;167(19):2110-2115.
12. Majumdar SR, Johnson JA, Bellerose D, et al. Nurse case-manager vs multifaceted intervention to improve quality of osteoporosis care after wrist fracture: Randomized controlled pilot study. *Osteoporos Int*. 2011;22(1):223-230.
13. McLellan AR, Gallacher SJ, Fraser M, McQuillian C. The fracture liaison service: Success of a program for the evaluation and management of patients with osteoporotic fracture. *Osteoporos Int*. 2003;14(12):1028-1034.

14. Dell R, Greene D, Schelkun SR, Williams K. Osteoporosis Disease Management: The Role of the Orthopaedic Surgeon. *J Bone Jt Surg Am.* 2008;90(Supplement 4):188-194.
15. Boudou L, Gerbay B, Chopin F, Ollagnier E, Collet P, Thomas T. Management of osteoporosis in fracture liaison service associated with long-term adherence to treatment. *Osteoporos Int.* 2011;22(7):2099-2106.
16. Lih A, Nandapalan H, Kim M, et al. Targeted intervention reduces refracture rates in patients with incident non-vertebral osteoporotic fractures: A 4-year prospective controlled study. *Osteoporos Int.* 2011;22(3):849-858.
17. Huntjens KMB, Van Geel TCM, Geusens PP, et al. Impact of guideline implementation by a fracture nurse on subsequent fractures and mortality in patients presenting with non-vertebral fractures. *Injury.* 2011;42(SUPPL. 4):539-543.
18. Sander B, Elliot-Gibson V, Beaton DE, Bogoch ER, Maetzel A. A coordinator program in post-fracture osteoporosis management improves outcomes and saves costs. *J Bone Jt Surg - Ser A.* 2008;90(6):1197-1205.
19. Majumdar SR, Lier DA, Beaupre LA, et al. Osteoporosis case manager for patients with hip fractures: Results of a cost-effectiveness analysis conducted alongside a randomized trial. *Arch Intern Med.* 2009;169(1):25-31.
20. Dell R. Fracture prevention in Kaiser Permanente Southern California. *Osteoporos Int.* 2011;22(SUPPL. 3):457-460.
21. McLellan AR, Wolowacz SE, Zimovetz EA, et al. Fracture liaison services for the evaluation and management of patients with osteoporotic fracture: A cost-effectiveness evaluation based on data collected over 8 years of service provision. *Osteoporos Int.* 2011;22(7):2083-2098.
22. United Kingdom: Department of Health. *Fracture Prevention Services An Economic Evaluation.* HMSO 2009.
23. Cooper MS, Palmer AJ, Seibel MJ. Cost-effectiveness of the Concord Minimal Trauma Fracture Liaison service, a prospective, controlled fracture prevention study. *Osteoporos Int.* 2012;23(1):97-107.

APPENDIX A: Ontario Osteoporosis Strategy-Fracture Screening and Prevention Program (FSPP)

OSTEOPOROSIS



Background and overview

The Ontario Osteoporosis Strategy (OOS) is a patient-centred, multidisciplinary approach integrated across health-care sectors, aimed at reducing morbidity, mortality and costs resulting from osteoporotic fractures. The Strategy has multiple stakeholders including Osteoporosis Canada and is structured to achieve its objectives by changing practices at the health systems level (*Fracture Prevention* priority), educating health-care practitioners (*Professional Education and Outreach* priority) and educating and empowering patients (*Patient Education and Self-Management* priority). Operational funding for the OOS is provided by the Ontario Ministry of Health and Long-Term Care.

The Fracture Screening and Prevention Program (FSPP) was initiated in 2007 within the *Fracture Prevention* priority as a scalable model focused on quality improvement within the outpatient orthopaedic environment anticipating expansion to cover all hospital sites in Ontario. The FSPP is now operating in 36 medium and high-volume Ontario hospital fracture clinics and has evolved from a basic screening and education initiative, into a more intensive FLS which leverages clinical and diagnostic support available at each site through Fracture Prevention Coordinators (FPC) who are centrally trained and supervised.

The FSPP enrolls 8000–8500 fracture patients annually across 36 sites and currently has over 82,000 patients in the program database.

Program protocol and screening pathways

The FPC's identify and screen fragility fracture patients presenting in out-patient fracture clinics, provide education to the patient regarding bone health and arrange individualized diagnostic and clinical follow-up appropriate for each patient according to Clinical Practice Guidelines. Patients (or their caregiver, family, SDM on their behalf) have to provide their consent to participate in the screening program and to permit the utilization of the data collected for quality improvement purposes.

The program enrolls men and women aged ≥ 50 years who present in outpatient fracture clinics with a fragility fracture of the wrist, elbow, shoulder, clavicle, vertebra, pelvis, proximal and distal femur, and tibia/fibula. Patients are excluded if they sustained a fracture greater than 1 year prior to identification, or are unable to or decline to participate.

The program has two distinct pathways for screened patients. Patients who are on pharmacotherapy when screened are referred to local osteoporosis specialists, where available, or sent back to their Primary Care Provider (PCP) with a screening summary and recommendations for follow up care.

Patients not on pharmacotherapy when screened are sent for bone mineral density testing (BMD) where available and if they are eligible. BMD reports including fracture risk assessments, once received back from diagnostic imaging, are entered and verified against CAROC/FRAX algorithm installed in the FSPP database. Subsequently, patients at high risk of refracture are referred to local osteoporosis specialists, where available, or sent back to their PCP. Patients with low/moderate risk assessments are referred back to their PCP.

Referrals for diagnostic testing and pharmacotherapy

Referral to OP specialists as well as BMD requisitions, where applicable, are usually signed off by the orthopaedic surgeon(s) at the FSPP site. In some sites, BMD requisitions are arranged directly by the OP specialist. Although the program expedites referral to an OP specialist and for BMD's, these arrangements are subject to receiving patient consent.

Patients are provided information about local fall prevention programs, chronic disease self-management programs as well as seniors education and exercise programs where available. Regional partnerships with primary and community care providers are in place to integrate post fracture care pathways after discharge from the hospital. In addition, bone health educational collaborations as well as tools and resources designed for health-care professionals, patients and caregivers are available to support the program.

Data collection and program evaluation

The FPC screens and arranges referral through a live, interactive cloud-based database accessed using a secure network through a handheld device (tablet). Use of the electronic screening and referral database allows FSPP to integrate data quality checks within the screening process itself. For instance, validation checks are built-in so data entry errors or incorrect information, such as data outside a reference range, can be corrected in real time.

Patient self-report data is collected during the initial screening (baseline data). The database contains an algorithm which routes patients to the appropriate care pathway based on patient response to the screening questions and generates an appropriate referral letter. The FPC also conducts follow up directly with specific groups of patients after a few weeks to determine whether recommended diagnostic and follow-up care was received (follow up data).

Program strengths and limitations

There are processes in place within the FSPP to identify, assess and correct care gaps along the intervention pathway. The program is managed at the provincial level, where inter-hospital and regional comparisons are analysed for constructive feedback to improve program performance. Resource allocation is periodically readjusted at a regional or provincial level to enhance efficiency. The FSPP is adding telephone and telemedicine screening which can be cost-effective in remote and less-populated regions.

The FSPP has limitations of which the most important is that the program screens outpatient fracture clinics and does not have resources to screen all inpatients admitted at the FSPP sites. FPC’s only screen those inpatients who return to fracture clinic for follow-up. In some sites, alternate arrangements are in place to screen in-patients who do not (or cannot) appear for their follow up appointment in the outpatient fracture clinic. These in-patients might be screened over the phone or through telemedicine.

The program cannot enrol patients without their consent. Since the FPC is not an employee of the hospital(s) in which they work, the program has agreements with each hospital allowing the FPC to operate within certain limitations, especially with regard to accessing hospital electronic records.

Program outcome data included in this report is limited to data collected from patients during follow up. FSPP recently started obtaining written patient consent to enable linkage to the provincial patient databases for long-term tracking of patient status, treatment and refracture rates.

Fracture Screening and Prevention Program

Data for FY 2016-17 (April 1, 2016 – March 31, 2017)

Table A1: Key program statistics for reporting period

| FY 2016-2017 | |
|--|--------------------|
| Number of FSPP sites operational: | 36 |
| Total screened and enrolled within FSPP: | 8065 |
| - Of which hip fractures | 18.16% (1465/8065) |
| Treatment status at baseline: | |
| - Reported being on treatment at baseline | 19.99% (1612/8065) |
| Patients sent for BMD testing ¹ : | 2351 |
| Patients without PCP (%): | 3.06% (247/8065) |

Notes:

1. Represents requisitions provided for patients not on pharmacotherapy at screening, eligible for BMD as per provincial reimbursement rules and having a family physician for follow up.

Table A2: Program outcomes based on follow up data reported by patients at 6 months from baseline:

| | FY 2016-2017 |
|--|--------------------|
| A. Total number of patients with follow up data¹ | n=3224* |
| Pharmacotherapy prescription rate overall ² | 36.97% (1192/3224) |
| - Prescription rates among patients referred to OP Specialist | 53.38% (585/1096) |
| - Prescription rates among patients seen by their PCP | 29.07% (605/2081) |
| B. Number of hip fracture patients with follow up data³ | n=404* |
| Pharmacotherapy prescription rate in hip fracture patients: | 50.74% (205/404) |
| - Prescription rates among hip fracture patients referred to OP Specialist | 71.33% (107/150) |
| - Prescription rates among hip fracture patients seen by their PCP | 39.51% (98/248) |

* includes 47 patients (6 hip fracture patients) with missing data on PCP/specialist path

Notes:

1. Data collected from follow ups on patients screened during FY 2016-17 who were not on pharmacotherapy at baseline. Includes patients with any follow up data.
2. Prescription rates are for patients across all fracture risk categories combined. This includes patients who were categorized as high risk, moderate risk or low risk based on CAROC/FRAX.
3. Subset analysis from overall follow up data (A)