



Exploring barriers and opportunities to improve osteoporosis care across the acute-to-primary care interface: a qualitative study

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Abstract

Summary This qualitative study interviewed general practitioners, patients, and FLS clinicians and identified key challenges facing stakeholders seeking to improve post-fracture osteoporosis care. Local policies and care pathways as an initial strategy may address information and service delivery issues across the acute-primary care divide.

Introduction Fracture liaison services (FLS) can be effective for secondary fracture prevention, but long-term adherence to therapies remains suboptimal. Few studies have explored how services manage the transition between tertiary and primary post-fracture care. This study mapped service processes and factors influencing integration of post-clinic care, identifying barriers, supports, and opportunities for seamless healthcare.

Methods Qualitative descriptive study using semi-structured interviews with FLS stakeholders at two metropolitan hospitals in New South Wales (NSW) and surrounding general practices.

Results Seven FLS clinicians, 11 general practitioners (GPs), and seven patients were interviewed. *Six key themes* emerged on the transition of patient care from tertiary to primary care (PC). *Interprofessional communication* issues and *role ambiguity* posed threats to seamless care. Delayed, absent, inaccessible, or poor-quality communication frustrated GPs, while FLS clinicians lacked confidence in existing communication systems and desired bidirectional communication with PC. GPs were confident managing osteoporosis, but FLS clinicians had limited confidence that patients would discuss osteoporosis with their GP and that GPs would action recommendations. Effective PC follow-up required a positive *GP–patient relationship* and that patients perceived a need to engage with PC. Patient understanding of osteoporosis (influenced by *patient education, knowledge, beliefs, and health behaviours*) affected PC attendance. Limited public awareness of osteoporosis and *healthcare policy* deficits contributed to care gaps.

Conclusion Key challenges were identified facing stakeholders seeking to improve post-clinic osteoporosis care. Development and implementation of local, integrated acute-community policies and care pathways as an initial intervention may address information and service delivery issues across the acute-PC divide.

Keywords Fracture liaison service · General practitioners · Implementation science · Osteoporosis · Primary care

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Introduction

Osteoporosis is a significant problem worldwide, estimated to affect 18.3% of the global population [1], and 22.8% of women and 5.9% of men over 50 years in Australia [2]. Bone loss is silent until fracture occurs, after which fracture risk doubles [3] and increases with each subsequent fracture, with rising morbidity, mortality, and healthcare costs [4, 5]. Safe and effective medications that reduce fracture risk and improve bone density [6] are widely available. Despite this, an osteoporosis treatment gap is recognised worldwide whereby the majority of people with osteoporosis remain undiagnosed and untreated [7]. In Australia, a retrospective audit of presentations to 16 hospitals with minimal trauma fracture between 2003 and 2005 revealed only 10% of patients underwent investigation for osteoporosis, and 6% were prescribed a bisphosphonate before discharge [8]. Following discharge, 55% of fracture patients were referred for follow-up in orthopaedic fracture clinics but less than 1% were referred to an endocrinologist or metabolic bone clinic. A similar treatment gap has been observed in North America and Europe, with the majority of patients presenting with osteoporotic fractures having their osteoporosis neither diagnosed nor treated [9–11]. Insurance claims data from the United States of America (USA) indicate this gap widened between 2002 and 2011 with the likelihood of receiving anti-osteoporosis treatment within 12 months of hip fracture declining from 40.2 to 20.5% [10]. The pervasive and persistent nature of this treatment gap suggests an aetiology that is complex, multifactorial, and resistant to change.

To break the fracture cycle and address this treatment gap, post-fracture care coordination programs, termed *fracture liaison services* (FLS), were developed in the UK in 2003. Since then, FLS have been implemented in more than 800 centres across 53 countries as part of the International Osteoporosis Foundation's Capture the Fracture global initiative [12]. Several FLS models (classified A to D) have been described varying in complexity [13]. The most common and comprehensive model used in Australia is the type A model, which encompasses case identification, investigation, treatment initiation, and follow-up monitoring [13]. In New South Wales (NSW), to date, 32 hospital-based FLS clinics have been implemented under the NSW Agency for Clinical Innovation (ACI) Model of Care [14, 15]. High-quality evidence shows that FLS can be effective in improving testing and treatment, reducing refracture and mortality rates [16].

To have the greatest impact on reducing secondary fractures, treatments initiated by an FLS must be continued after patients transition to primary care (PC). Long-term patient management is needed to optimise treatment and address any disease- or treatment-related complications or concerns. Follow-up care may be performed by FLS clinics or PC, and the little research

that has examined longer-term management of osteoporosis points to substantial gaps in care. Less than 50% of patients see their general practitioner (GP) within 6 months of a fracture, even when given tailored advice to do so [17]. More than half the potential economic and clinical benefits of treatment are thought to be lost due to poor medication adherence [18]. Osteoporosis medication persistence declines over time and long-term treatment remains suboptimal: 80% persist with treatment to 1 year, 60% to 2 years, and <50% to 5 years [19–21]. Ongoing specialist management through FLS is more costly and has not been shown to significantly improve medication persistence or adherence rates at 2 years [19].

Post-acute gaps in care are thought to arise from poorly defined integrational factors emerging as patients transition from the FLS clinic to PC. The NSW Site Manual for FLS developed by the ACI recognises the need for a protocol at each clinic to direct follow-up, ideally initially at 12 weeks after first FLS consultation [22]. The setting for this initial follow-up, and the timing and form of subsequent follow-up, is flexible and consequently follow-up practices vary between FLS clinics and clinicians. If follow-up is to occur in PC, guidelines recognise the importance of communication between FLS and GP to promote continuity of care. In other countries, guidelines define long-term post-FLS care as a component of an integration strategy with the broader healthcare system, including PC [23, 24]. The UK-based Clinical Standards and the USA-based Best Practice Framework for FLS recommend that FLS clinicians conduct follow-up with patients on two occasions, within 16 weeks and again within 52 weeks of fracture [23, 25]. Following the 52-week review, the UK Clinical Standards stipulate that long-term management be transferred to PC, whereas the USA Best Practice Framework is less detailed, only stating that the FLS team must provide clear plans regarding long-term management. The New Zealand Clinical Standards for FLS stipulate the FLS should act in partnership with GPs to develop long-term management within 12 weeks of fracture [24]. Increasingly, better coordination between tertiary and PC is being recognised as essential for long-term patient benefit [26, 27].

The aims of this study were to map current service processes and integration factors influencing long-term post-clinic care, identifying barriers, supports, and opportunities for seamless healthcare following fragility fracture.

Methods

A qualitative descriptive study used semi-structured interviews to gather information from patients who had attended an FLS clinic, and GPs and FLS clinicians who provide care for such patients. Interview schedules were developed to explore current service processes, patient and clinician

experience of the healthcare transition from FLS clinic to PC, and the barriers, supports, and opportunities for seamless healthcare following fragility fracture.

Setting

Patients and FLS clinicians were recruited from two FLS clinics in major metropolitan teaching hospitals in NSW, Australia. Characteristics of the two FLS study sites are shown in Table 1. GPs were sourced from practices within these hospitals' catchment areas.

Participants and recruitment

All current employees (medical specialists and their trainees, FLS coordinators, and allied health professionals) working

within the two study site FLS clinics were invited to participate. A list of GPs who had received correspondence from the clinic in the previous 12 months, and personal networks, identified eligible GPs who were approached by telephone. Eligible GPs had appropriate medical registration (Fellow of the Royal Australian College of General Practitioners or vocationally registered GP), had worked ≥ 1 h within the study site catchment area in the previous 28 days, and recalled caring for ≥ 1 patient with osteoporosis in the past 6 months.

Medical officers working in FLS clinics identified eligible patients and obtained their consent to be contacted by a researcher. Patients had to be English-speaking, diagnosed with osteoporosis, and attended a follow-up review in an FLS clinic (6 or 12 months after their initial clinic attendance). Patients with impaired decision-making capacity were excluded. Eligible patients who agreed to be contacted were emailed an invitation letter and telephoned 1 week later.

Table 1 Characteristics of the two FLS study sites

Characteristic	Site one	Site two
Active case finding	Yes, by FLS coordinator and endocrinology specialist in training	Yes, by FLS coordinator
Case finding method	Hybrid	Automated until April 2022, manual thereafter
Inclusion criteria	Age > 50 years, and Hospital presentation with fragility fracture (excluding those of hands, feet, or facial bones), and Reside within hospital catchment area	Age > 50 and < 80 years, and Hospital presentation with fragility fracture (excluding those of hands, feet, or facial bones), and Reside within hospital catchment area, and Increased 10y fracture risk: > 5% hip or > 20% major osteoporotic fracture risk ¹
Exclusion criteria	Under the care of an osteoporosis specialist, or Receiving treatment for osteoporosis at time of fracture	Under the care of an osteoporosis specialist, or Receiving treatment for osteoporosis at time of fracture
Accept referrals for non-admitted patients	Yes	Yes
Clinic setting	Outpatient	Outpatient
FLS coordinators; professional specialty	1; physiotherapist	1; physiotherapist
Endocrinologists, <i>n</i> (combined hours/week)	1 (2)	2 (8)
Endocrinology specialists in-training (<i>n</i> (combined hours/week)) and their practicing arrangements	1 (4) Practice independently	2 (8) Practice under direct supervision of clinic endocrinologist/specialist
Supported access to investigations (pathology and BMD testing)	Yes	Yes
Treatment initiation, including medication prescribing	Yes	Yes
Access to follow-up appointments in FLS clinic	Yes, routinely at 12 months for those who commence treatment (or earlier at the discretion of the medical officer)	Yes, at the discretion of the medical officer
Collect clinic activity data ²	Yes	Yes
Collect medication and lifestyle treatment adherence data	Yes	No

FLS, fracture liaison service; BMD, bone mineral density

¹Using the Garvan fracture risk calculator

²Including number of eligible patients, number of patients referred for BMD assessment, and number of eligible patients offered an FLS appointment

All study sites' FLS clinicians were invited to participate; patient and GP recruitment continued until data saturation.

Procedures

Participants nominated an interview time and location at their convenience. Patients could be accompanied by a support person. Informed consent was obtained prior to interview. Semi-structured interviews were conducted in-person or by telephone/videoconference, in a quiet location, and took 20–54 min. At the end of the interview, participants were given an opportunity to clarify or expand upon their comments and ask questions.

Data analysis

Interviews were recorded as digital audio files using an Olympus Professional Dictaphone and transcribed verbatim as text documents. Transcripts were imported into NVivo Pro v12 for inductive content analysis [28]. An initial code list was generated by two researchers independently coding three transcripts and resolving differences through discussion. As data collection progressed, codes were refined and sorted into themes. Following data saturation, a list of themes was agreed and the entire dataset re-analysed to ensure adequate data capture and conformability. A concept map was developed, describing the relationship between themes. Descriptive statistics reported demographic data.

Ethics

The study was approved by St Vincent's Hospital Human Research Ethics Committee (Reference: 2021/ETH01388) and study site Governance Officers.

Results

Interviews were conducted with 25 participants: seven FLS clinicians, 11 GPs, and seven patients (Table 2). Two FLS clinicians were allied health professionals employed as FLS coordinators, two were medical specialist trainees, and three were senior endocrinologists. FLS clinicians had a mean age 41 years (± 14 years) with widely ranging experience (0.5 to 26 years) in their current role. GPs were older, 60 (± 9 years), and averaged 31 years' experience. The patients were all female. English was the primary language apart from one GP, who practiced in English. Interview duration was similar for all participant groups: mean 37.6 min ± 9.2 min. Data saturation was achieved in all participant groups.

Analysis mapped post-fracture service processes and identified six key themes affecting the transition of patient

Table 2 Participant characteristics

Variable	Total
All participants, <i>n</i>	25
FLS clinicians, <i>n</i>	7
Response rate, %	88
Age in years, mean (SD), range	41 (14) 28–61
Female, <i>n</i> (% total FLS clinician)	4 (57)
Male, <i>n</i> (% total FLS clinician)	3 (43)
Primary language English, <i>n</i> (%)	7 (100)
Years in current role, mean (SD), range	8.8 (12) 0.5–26
Interview duration in minutes, mean (SD), range	40 (13) 26–46
GPs, <i>n</i>	11
Response rate, %	26
Age in years, mean (SD), range	60 (9) 47–72
Female, <i>n</i> (% total GP)	7 (64)
Male, <i>n</i> (% total GP)	4 (36)
Primary language English, <i>n</i> (%)	10 (91)
Years in current role, mean (SD), range	31 (10) 14–40
Number of GPs in practice, mean (SD), range	9 (3) 1–14
Interview duration in minutes, mean (SD), range	37 (8) 27–51
Patients, <i>n</i>	7
Response rate (%)	39
Age in years, mean (SD), range	69 (8) 58–83
Female, <i>n</i> (% total patients)	7 (100)
Male, <i>n</i> (% total patients)	0 (0)
Primary language English, <i>n</i> (%)	7 (100)
Tertiary education, <i>n</i> (%)	3 (43)
Interview duration in minutes, mean (SD), range	37 (10) 23–51

GP, general practitioner; FLS, fracture liaison service

care from the FLS clinic to PC for long-term management of osteoporosis (Fig. 1). Within each theme, barriers, supports, and opportunities to seamless care were identified (Table 3).

Interprofessional communication

Healthcare providers recognised the importance of effective communication in coordination of care between acute and PC services. Delayed, absent, inaccessible, or otherwise poor-quality interprofessional communication was a frequent source of frustration and perceived as the greatest threat to seamless long-term post-fracture care.

You don't get a letter, so it's more the patient turning up going 'oh, I've been contacted for a bone mineral density test because I fractured my whatever' (GP 5).

For GPs, timeliness and accessibility of written correspondence were the most important components of FLS communication. They preferred electronic delivery for its timeliness and easy upload into electronic medical records.

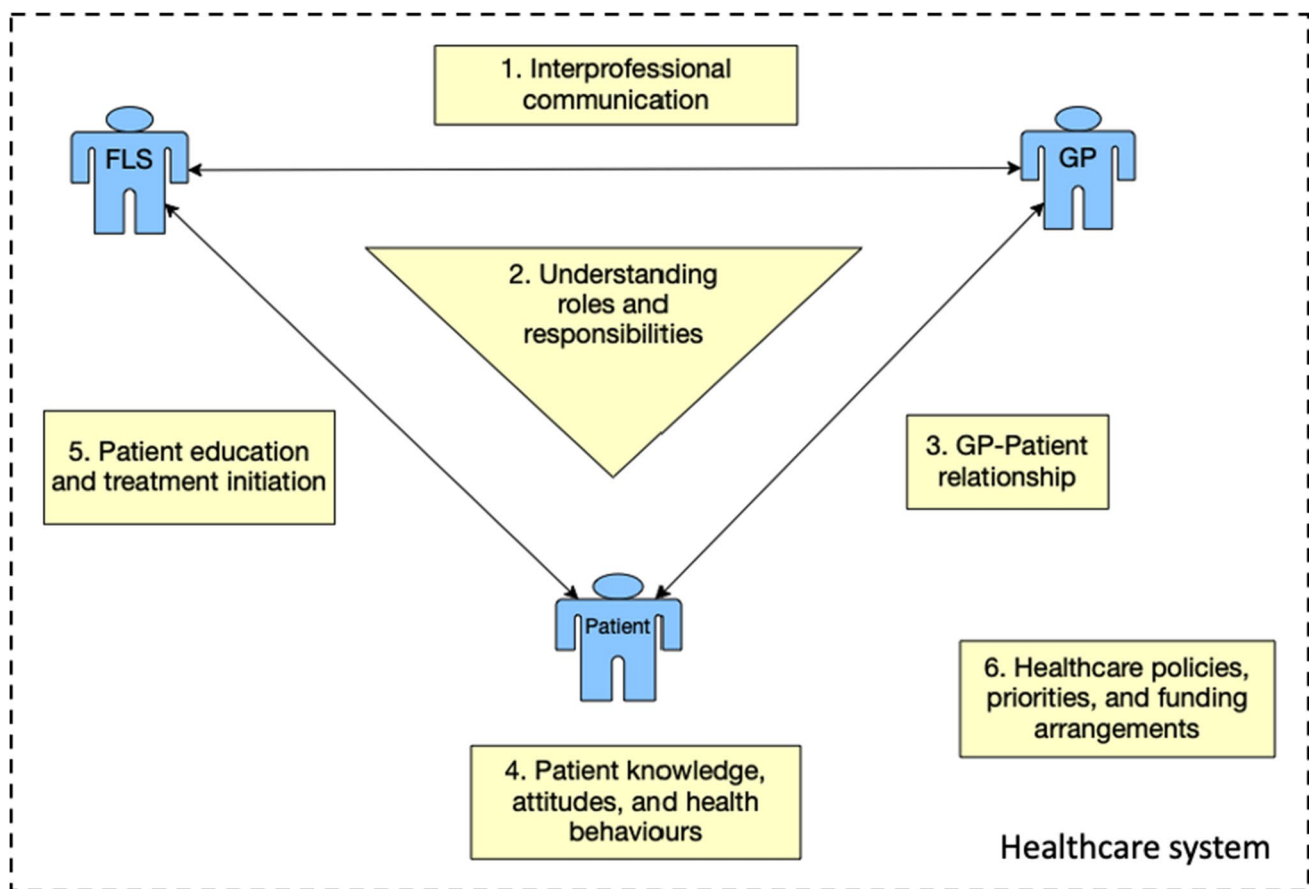


Fig. 1 Factors influencing long-term post-fracture care after an FLS clinic encounter

It takes a while, there is delay, it usually takes a month, and in our age when there is electronic communication it shouldn't take that long (GP 3).

GPs suggested that giving patients a copy of clinic correspondence for their GP would ensure clinical information was delivered promptly to the correct recipient. Patients felt this would also improve their engagement and self-management of osteoporosis.

The perceived quality of the correspondence from the FLS clinic varied greatly; some GPs found the content succinct and useful, while for others, it lacked sufficient detail or contained unnecessary material. A standardised format for FLS correspondence was recommended by GPs and FLS clinicians to improve the efficiency and utility of communication. A focus on “this is the problem, this is what we’re doing about it” (GP 11), identifying “patient goals” (GP 1), and including a copy of the bone densitometry report were considered important.

Both GPs and FLS clinicians identified instances where direct ad hoc communication between healthcare professionals (HCPs) was necessary to ensure effective post-clinic care; however, access was challenging. Existing avenues, namely telephone and letter, were considered inadequate for busy clinicians. The transitory nature of hospital staff made it difficult for GPs to know where to direct their enquiry. Without a direct phone line to the FLS clinic, the hospital switchboard remained the only point of access, which GPs found frustrating and time consuming. FLS clinicians experienced similar delays contacting GPs by telephone and were therefore reluctant to do so. Corresponding by mail was only an option for non-urgent enquires.

I feel like GPs can always call us through the hospital switchboard if they want to. I appreciate that there is a delay being on hold to the hospital switchboard, which I think is less than the delay being on the phone to the GP practice (FLS clinician 5).

Table 3 Barriers, supports, and opportunities for seamless post-FLS care

Theme	Barriers	Supports	Opportunities
Interprofessional communication	Inconsistent use of recall and reminder systems by GPs FLS clinician confidence in information technology, communication systems, and follow-up care processes Quality of written communication; timely, standardised, accessible, clear Clinician inaccessibility and unavailability for ad hoc communication GPs feeling undervalued as a member of the healthcare team	Widespread uptake of electronic practice management systems in primary care with embedded recall and reminder systems	Provide patients with a copy of clinic correspondence Timely electronic transmission of clinic correspondence Implement bidirectional communication systems between primary care and FLS Standardise correspondence (e.g., use of templates) tailored to the needs of the GP
Understanding roles and responsibilities	Healthcare practitioner role ambiguity GP confidence prescribing certain treatments (e.g., zoledronic acid), perceived to be “specialist” medications	Patients experienced with GP-led chronic disease management High levels of GP-reported confidence and willingness to manage osteoporosis	Develop and implement local guidelines or policies for post-FLS care GP education to increase awareness of FLS and role in post-clinic care
GP–patient relationship	Patients’ pattern of primary care utilisation; acute v chronic, proactive v reactive Interpersonal factors influencing trust, rapport, and confidence Variation in GP knowledge and interest in osteoporosis	Patients with strong GP–patient relationship, characterised by trust, confidence, and rapport	Assessing the quality of the GP–patient relationship during FLS encounter GP education to increase awareness of long-term osteoporosis management
Patient knowledge, attitudes, and health behaviours	Level of healthcare engagement and motivation Understanding of the healthcare system	Experience with GP-led chronic disease management	Provide patients with a copy of clinic correspondence
Patient education and treatment initiation	Understanding and appreciation of the seriousness of osteoporosis and its complications Medication aversion, health beliefs, and personality factors	Experience with osteoporosis, e.g., knowing a friend or family member with symptomatic osteoporosis	Educational “roadmap” for post-FLS care
Healthcare policies, priorities, and funding arrangements	Limited public awareness of osteoporosis Limited GP awareness of FLS Corporatisation of primary care and funding arrangements that favour high-throughput low value care	Access to cost-free GP consultations	Financial incentives supporting quality health-care transitions Awareness-raising public health campaigns

GP, general practitioner; FLS, fracture liaison service

Barriers to interprofessional communication weakened relationships between GPs and FLS clinicians and promoted more convenient relationships between GPs and private sector clinicians. Most GPs were deterred from contacting FLS clinicians with clinical questions, instead favouring private endocrinologists with whom they had established professional relationships. Compared with FLS clinicians, private endocrinologists were perceived as having “a vested interest in keeping GPs happy” (GP 3) as GPs were a source of income-generating referrals. Consequently, lines of communication between GPs and private endocrinologists had evolved to be more direct and accessible.

FLS clinicians also expressed a strong desire for bidirectional communications systems between GPs and FLS clinicians which could improve FLS clinician confidence in PC follow-up care processes. With greater confidence and the security of knowing their recommendations were received and actioned, FLS clinicians might be more willing to handover patients to GPs for long-term osteoporosis management.

At times I spend so much time generating letters and I sometimes wonder at the wasted time. I'd really like some metrics on ... effective communication because if I knew that I was making a difference ... um, you know, I'd be more enthusiastic about the communications I send (FLS clinician 3).

A limitation of these FLS clinic models was that they did not enable two-way communication between healthcare providers. While GPs received a letter summarising their patient's FLS encounter, no formal avenues existed for responding to letters or engaging in real-time case discussion.

The tone of communication also influenced the relationship between FLS clinicians and GPs. Several GPs felt undervalued or marginalised in the correspondence from FLS and hospital outpatient clinics generally. FLS clinicians also expressed frustration and lack of confidence in current communication systems. Many questioned whether their correspondence reached intended recipients, was read, and actioned by GPs. With no way of knowing the effect of their correspondence, some FLS clinicians were pessimistic and felt treatments may not be endorsed or continued by GPs once patients left the FLS clinic.

I think then also there'd be concern that the GPs themselves would not be integrating this care into the management plans or sometimes correspondence may not have got to them and therefore, there seemed to be a lack of, not trust but, there would be concern that continuation of care, or the lines of communication would be, um, maybe interrupted or lost (FLS clinician 6).

Lacking confidence in the hospital communication systems and with no means to gauge the effectiveness of PC follow-up processes, many FLS clinicians were reluctant to discharge patients from the FLS clinic to PC. Instead, patients were advised to return to the FLS clinic for long-term monitoring and management of their osteoporosis. This work-around solution, intended to address perceived systemic communication deficits, became self-defeating, consuming already stretched clinic resources and extending waiting time for new patients.

I think I'd rather have them back and do it myself, which is why my clinic's so full and has a six-month waiting list (FLS clinician 1).

By capturing patients without a GP referral, FLS clinicians felt that traditional lines of communication and expectations of PC were bypassed and this potentially affected GP engagement in post-fracture care. Concerns that unsolicited advice would be perceived as burdensome by GPs were reported as unfounded; most GPs generally expressed appreciation for the FLS service, provided its recommendations were communicated to them.

Understanding roles and responsibilities

Poorly defined roles and responsibilities of FLS clinicians and GPs in long-term management of these patients resulted in variation in follow-up practices between individuals and institutions. GPs' awareness of the FLS clinic was limited, even among those who had received its correspondence and provided patients with post-clinic care. Among those who were aware of the clinic, its role in osteoporosis management beyond initial diagnosis and treatment decisions was felt to be ambiguous and required clarification.

Who's managing this? Do you want me to manage it or not?... I think that's part of the issue. I don't know what the hospital sees its role is ... I don't have a problem in terms of seeing this as a condition that most of the time I could manage quite happily, so I don't necessarily see a role for the hospital clinic (GP 4).

GPs reported high levels of confidence managing osteoporosis and were comfortable prescribing most medications and monitoring long-term post-fracture care. They cited continuity of care and their holistic approach as features distinguishing them from secondary/tertiary care providers. They considered themselves chiefly responsible for osteoporosis management and welcomed the opportunity to be clinical leaders in this area. They were cognisant of their limitations and could identify, with internal consistency, indications for specialist referral. Some FLS clinicians were aware of these views.

A few GPs, er, have reluctance for them to have someone else manage their client's osteoporosis or be guided by that. I feel like they want to manage it themselves (FLS clinician 4).

While GPs were comfortable monitoring and prescribing most osteoporosis medications, they lacked confidence prescribing intravenous bisphosphonates and felt specialists were principally responsible for overseeing this treatment. FLS clinicians generally agreed with this.

Opinions regarding the role of the FLS clinic in the long-term management of patients with osteoporosis varied greatly among FLS clinicians; some saw the clinic as responsible for ongoing care, others felt this responsibility fell on PC. With no formal guidelines, institutional protocols, or even consensus to inform post-FLS clinic follow-up care, individuals had vastly different practices.

*We have our recommendations, we give our education, and then it's back to primary care, which I think, um, in the long run is going to be what's needed (FLS clinician 2).
At the current time the [FLS] clinic doesn't really have a good long-term follow-up plan (FLS clinician 6).
It's ongoing care... my thinking, is that I should be continuing to see them (FLS clinician 1).*

FLS clinicians felt obliged to ensure patients received ongoing osteoporosis care but, with no way of ensuring this would occur in PC, some took on the role of chronic care provider to be certain that their recommendations were enacted. FLS clinicians' perceptions of GP knowledge and interest in osteoporosis and their confidence in GP follow-up processes influenced their own follow-up practices, and overall, there was limited-to-variable confidence in the perceived willingness and ability of GPs to lead osteoporosis management. One GP acknowledged that interest in a particular condition, like osteoporosis, may affect how proactive GPs are in identifying and managing it.

We took it out of the hands of the GPs because it was being done so poorly ... I don't think GPs actively try and you know go against what you've recommended, but I do think education forms a very, um, fundamental base (FLS clinician 1).

FLS clinicians also lacked confidence that patients would see their GP to discuss osteoporosis following their clinic encounter. Patient understanding of their condition was seen as a leading determinant of PC follow-up.

*Most of them see their GP within that six months for some reason. Do they see them for osteoporosis or is the osteoporosis brought up? That's the wicked question (FLS clinician 3).
Do I trust GPs to implement? I actually trust the GPs more than I trust the patient (FLS clinician 3).*

Generally, while GPs saw themselves as principally responsible for osteoporosis management and FLS clinicians said they adopted the role out of necessity, patients saw their FLS clinician as the sole leader of their long-term osteoporosis care, with little to no role for their GP. This situation appeared to derive from poor patient understanding of the role of PC in general and lack of encouragement by FLS clinicians to engage with PC.

*What [would I see my GP] for? I speak to [FLS clinician] when I've seen them... I mean there's no reason for me to go and see the GP (Patient 3).
I suspect that a lot [of patients] will sort of think, you know, 'the FLS is looking after this aspect' and I suspect that that's part of where things fall off at the end (FLS clinician 7).*

Patients expressed a clear preference for specialist-led over GP-led care. The continuity of seeing the same clinician at each encounter (at least at one FLS site), the convenience of having investigations coordinated by the clinic, and the additional expertise provided by a sub-specialty service were seen as distinct advantages. Conversely, GP-led care was considered “messy” as it was associated with an increased number of healthcare transitions, which may be particularly challenging for older persons. Interpersonal factors may also have influenced patient preferences, with most patients feeling “very comfortable,” “very confident,” and “really liked” one particular FLS clinician. Patients generally felt that the current FLS system worked well for them and they were reluctant to entertain the idea of transitioning to GP-led osteoporosis care.

GP–patient relationship

The type and quality of a patient's relationship with their GP was seen as an important influence on PC attendance. Follow-up recommendations by FLS clinicians were often based on their subjective assessments of the GP–patient relationship. The quality of this relationship included trust, confidence, and rapport; components seen to be enhanced through positive longitudinal encounters with the same GP and influenced by the personality traits of patients and GPs. Both patients and GPs had experienced encounters where long-term osteoporosis management was adversely affected by personality factors.

Patients reported trust and confidence as leading relationship factors affecting their response to healthcare advice and their ultimate decision to engage in PC-based osteoporosis management. Patient two, for example, described a negative experience meeting with an endocrinologist shortly after her diagnosis of osteoporosis 12 years ago:

He was so rude and so abrasive, that I walked out of there with a really bad attitude and I've decided not to do anything about it (Patient 2).

She disengaged from her bone health and, with limited trust and confidence in her GP, her osteoporosis remained untreated for 5 years. When her GP retired, her new GP raised the issue of her bone health, and:

Because I had so much faith in this GP, I decided to do something about it (Patient 2).

Patient seven told a similar story of increased engagement in her bone health following her transition to a new GP.

I had to go and see another GP... and I realised, yeah, you can have perhaps a more informative relationship with you GP (Patient 7).

The presence of a strong GP–patient relationship was perceived by clinicians as promoting follow-up in PC. However, FLS clinicians thought that few FLS clinic attendees had such relationships. Routinely assessing the type and quality of a patient's relationship with their GP during the FLS consultation may help identify those at greater risk of poor adherence or lower engagement in long-term osteoporosis management in PC.

Patient knowledge, attitudes, and health behaviours

Patients' understanding of osteoporosis and its perceived seriousness with regard to their health influenced their decision to seek follow-up care with their GP. Knowledge of osteoporosis, enhanced through education by a trusted provider or a family history of osteoporosis, supported greater appreciation of the seriousness of the condition. Conversely, factors identified as adversely affecting patient understanding of their disease included poor health literacy, misinformation and conflicting healthcare advice, cognitive and sensory impairment, personality factors, previous negative healthcare experiences, and the silent nature of osteoporosis.

Patients with comorbid chronic diseases, and hence experience with GP-led chronic care, were perceived as more engaged in PC and health maintenance behaviours, and therefore more likely to visit their GP. Even when osteoporosis was not the primary purpose, the interaction provided GPs an opportunity to raise bone health and review the patient's osteoporosis management.

Most of the people I see, they just come back all the time, ... allow[ing] me opportunistically to say 'hey, you know, what's happening with, what's happening with your bones...' (GP 8).

For patients who lack frequent contact with their GP, recall and reminder programs (proactive follow-up to a preventative

or clinical activity) may provide an effective prompt to initiate a consultation, and all GP respondents had these within their practice management systems. While potentially useful for triggering consultations and minimising gaps in follow-up, inconsistent use limited their effectiveness.

Usually you just go tick, tick, tick, and see the next patient, but if you're thorough you might put in a diagnosis and a recall, otherwise it might wait until the patient turns up (GP 7).

Patients' attitudes towards treatment, informed in part by their experiences, beliefs, and personality traits, complicated post-clinic treatment. Suspicion and aversion of medications by a subset of patients was a common source of frustration for GPs. Such patients were viewed as having fixed attitudes and "resistance" to advice. Education was not expected to bring about meaningful change in their knowledge or health behaviour.

Patient education and treatment initiation

Patient education, initially provided by the FLS clinician, served an important role in improving understanding of osteoporosis, allowing patients to appreciate its impact on their health and prioritise it accordingly. A meaningful and personally resonant understanding of the consequences of osteoporosis was seen as a prerequisite for treatment initiation and long-term adherence.

Patients tend to, follow-up a little bit more if it hurts or if they actually think it's important (GP 1).

[My GP] said 'we really have to do something, it's important'. I mean, I didn't really think it was all that big of deal but now I know how severe it can become... I thought 'so what, I've got brittle bones'. I didn't really understand the consequences of falling over and breaking something (Patient 2).

While neither HCPs nor patients recommended specific ways to improve patient education, HCPs sought greater patient counselling on the lifelong nature of osteoporosis, and the GP role in its long-term management. The timing of patient education was seen as crucial to its success. Clinicians felt that patients were more receptive to education during an acute event, where the physical manifestations of their condition provided an immediate, visible, and personal demonstration of the consequences of osteoporosis and a powerful impetus to reduce fracture risk.

Given the previously mentioned deficiencies in patient understanding of GPs' role in their long-term osteoporosis management, explicit patient education, and recommendations for GP follow-up at specific intervals, a so-called "roadmap" for the patient (FLS clinician 5), given at the FLS clinic, was suggested as a strategy to improve transition across the acute-to-PC interface.

Healthcare policies, priorities, and funding arrangements

Low levels of public awareness and lack of government investment in osteoporosis promotion and treatment initiatives were identified as issues contributing to care gaps in the pre- and post-FLS clinic landscape. Relative to other chronic diseases, GPs felt that osteoporosis does not receive the same level of public health attention and policy prioritisation, despite a large burden of disease-related morbidity and mortality. This results in a general lack of awareness and underappreciation of the impact of osteoporosis among patients and HCPs.

I think, there's not a lot of general publicity about it, you know, everyone's focussed on cancer, and that, you know, which is obviously important, but I think people significantly underestimate the associated morbidity with osteoporosis (GP 4).

Some GPs expressed concern about the “corporatisation” (GP 10) of PC in Australia and the rise of high-throughput, profit-focussed, “medical centre” medicine. GPs identified heterogeneity in PC services; some clinics routinely provided longer consultations, perceived as necessary for comprehensive care, while others provided shorter consultations. GPs working in the former setting perceived the latter as an “abuse” of the Australian public healthcare Medicare payment system, which provides proportionally less remuneration for longer consultations thereby incentivising “high volume” medicine, and substandard care.

If you're working in a practice where your minimum appointment is six minutes, which is generally terrible medicine, which is what you see in some of the clinics in the area (GP 5).

Changing the structure of remuneration systems and incentivising quality care were suggested to improve osteoporosis follow-up care consultations in PC. Introducing a billing code (based on a similar model used for cardiovascular disease) through which GPs could be remunerated for performing a bone health assessment could encourage GPs to prioritise osteoporosis and bring about a consistent and proportional level of attention to the disease relative to its burden on society. Incentivising two-way interprofessional communication between GPs and FLS clinicians, such as through a specific billing code for interprofessional case conferencing, may promote development of stronger and more accessible channels of communication and improve the flow of clinical information across the acute-to-PC interface.

Developing protocols for post-FLS osteoporosis care was seen as a potential policy-based solution to improve and standardise post-fracture care. The Antenatal Shared Care Model was cited as an example of a successful intervention

for clearly defining roles and responsibilities and improving collaboration between hospital clinics and PC.

There's a protocol that says you see the patient at various times and then there are specific times when they go to the clinic for specific treatments. So, something along those lines could work but there would need to be, um, a protocol that says, you know, again, it's the demarcation of who's responsible for doing what (GP 4).

GPs, and to a lesser extent FLS clinicians, were generally ambivalent about upskilling and enhancing the role of other members of the healthcare team to improve resource efficiency and address gaps in services. While some clinicians were open to the idea of expanding the role of practice nurses and community pharmacists to conduct osteoporosis consultations, others felt it would “confuse the patients” (GP 4) and foresaw logistical and financial barriers.

Discussion

This study mapped service processes and integration factors influencing long-term post-clinic care, and identified barriers, supports, and opportunities for seamless healthcare following fragility fracture. For HCPs, interprofessional communication issues and role ambiguity were the main barriers, whereas for patients, the absence of a strong GP–patient relationship, lack of perceived need to engage with PC, and poor understanding of osteoporosis (influenced by patient education, knowledge, and beliefs) were key factors affecting their PC attendance. External system factors, including limited public health promotion and policy prioritisation of osteoporosis, were also regarded as contributing to care gaps in the pre- and post-FLS clinic landscape.

This study is unique in that it provides a system-wide perspective on the barriers and supports affecting the key stakeholders (patients, FLS clinicians, and GPs) across the healthcare continuum. Previous qualitative studies exploring perceptions of post-fracture FLS care have largely focussed on the experiences of one or two stakeholder groups within a service: hospital clinicians [29], patients [30], or GPs [31] alone, or patients and GPs [32]. These and other studies [33] have highlighted a lack of communication, coordination, and cooperation between acute and PC [29, 31, 34]. Likewise, a longitudinal study of 50 patients, 26 surgeons, and 8 GPs exploring PC follow-up after orthopaedic fracture clinic attendance found similar failures of interprofessional communication adversely affected GP follow-up care [32]. Another study highlighted hospital clinicians' concerns that GPs lacked consistent commitment to osteoporosis treatment, owing to variable experience and interest in the condition, which affected the implementation of secondary fracture prevention services [34]. Studies of patient experience have also reported perceptions

of provider-level barriers to secondary fracture prevention, including ambiguous messaging and failure to communicate fracture risk by GPs [30].

Strong GP–patient relationships and a perceived need to see a GP were important facilitators of PC follow-up for patients. Strong doctor–patient relationships have been reported as formed and maintained through “longitudinal care” and “consultation experience” [35]. Similarly, study patients also cited trust, confidence, and rapport, enhanced through positive longitudinal encounters with the same GP. Other authors have emphasised the central importance of trust in the doctor–patient relationship in giving intrinsic meaning to the relationship and achieving therapeutic outcomes [36]. Trust has also been associated with adherence and patient satisfaction [37, 38]. However, while 19 instruments are available to assess the doctor–patient relationship in clinical research, none has an established place in clinic practice [39]. Use of such instruments in the FLS clinic may help identify patients at risk of adverse PC transition who may be appropriately targeted for additional follow-up.

Patient understanding of osteoporosis and its impact on their health was seen to influence their PC engagement and treatment adherence. HCPs believed that patients who understood their condition as “severe” or “feared” its consequences were more likely to follow treatment and monitoring recommendations and this could be enhanced through education provided by a trusted HCP. This was supported by a 2007 meta-analysis demonstrating adherence positively correlated with perceived disease threat [40]. Understanding the severity of disease can be considered at both a general and personal level; Besser et al. showed that while 14 women with osteopenia or osteoporosis attending a tertiary hospital all reported osteoporosis to be a serious condition, many reported their personal condition as not severe [41]. Links between knowledge, beliefs, and behaviours are similarly complex; adherence to medications, for example, has been conceptualised using more than 100 different models [42]. Reasons for medication non-adherence are multifactorial and individual-specific [43], and successful interventions may be condition-specific [44].

These results should be considered within the broader context of healthcare transitions and integrated care. A *healthcare transition* describes the movement of a patient between one healthcare provider or setting to another [45]. Traditionally applied to moving patients from hospital inpatient to community outpatient environments, it has more recently been used more widely. Healthcare transitions have been extensively researched and are recognised as high-risk periods for patient safety [46]. Poor-quality transitions result in adverse patient outcomes (morbidity, mortality, loss to follow-up), rising healthcare costs, and HCP dissatisfaction [46]. While the factors responsible for poor-quality healthcare transitions are numerous, poor communication

is frequently cited [47–50], as in this study. Several interventions have been shown to improve interprofessional communication including standardising the quality of correspondence (e.g., using templates), improving timeliness of communication (e.g., through electronic transmission and providing patients with copies of clinic letters), and implementing bidirectional communication systems that improve access to clinicians and enable feedback and queries. Similar recommendations have been proposed by other authors [51] where interactive communication between GPs and specialists improved patient outcomes [52].

Communication is also required for understanding of each other’s roles. Role ambiguity arises when workers have insufficient information to perform their roles effectively. Role ambiguity is associated with detrimental outcomes (including lower satisfaction, commitment, and performance), which improve following role clarification [53, 54]. In the present context, GPs and FLS clinicians lacked sufficient information to define each other’s roles, and expectations were unclear. Role negotiation and clarification were hampered by the lack of effective two-way communication systems between the hospital and PC. The clinical responsibilities and expectations of HCPs with regard to the long-term post-clinic care of patients need to be clearly defined and communicated. For practitioners, this could be achieved through two-way information exchange, and development and implementation of acute-community integrated clinical practice guidelines or care pathways. For patients, improved education regarding the roles of clinic and PC at the time of their FLS clinic encounter is needed.

Study limitations

This study has several limitations. The study sites operate from large metropolitan teaching hospitals, in locations with relatively low socioeconomic disadvantage, high educational attainment, and GP accessibility. Stakeholders in regional, rural, and lower socioeconomic areas likely have different experiences. Patients who did not speak English or attend a follow-up appointment were excluded from the study. Such patients may be at high risk for poor-quality healthcare transition and their exclusion may have biased findings. All patients interviewed were female and non-female patients may experience unique barriers to care not captured in this study. GPs were older, experienced practitioners, predominantly working in small, private-billing, academic group practices, engaged in GP training and education, with high self-reported confidence in managing osteoporosis. Several GPs raised concerns about care provided by “medical centres”; however, we were unable to recruit any GPs from such centres. Finally, our recruitment strategy relied upon FLS clinicians briefing patients and obtaining consent for

investigators to approach them. While a script was used to standardise this process, interpersonal characteristics of FLS clinicians may have affected the response rate and outcomes. Future research could focus on the barriers to seamless post-clinic care experienced by HCPs and patients in regional areas, with greater gender, linguistic, and cultural diversity.

Conclusion

FLS services have helped to close the osteoporosis treatment gap, whilst also introducing a healthcare transition between acute and PC. This has created barriers to seamless care. The full potential of FLS services to reduce fractures and associated costs remains constrained by barriers to integration with PC, particularly affecting interprofessional communication, understanding of roles and responsibilities, GP–patient relationships, patients’ understanding of osteoporosis, and the need for ongoing post-clinic GP-led care. Multifaceted interventions are needed to address such information and service delivery issues, and will need to be cost effective, tailored to local resources and settings, and acceptable to all stakeholders. Further research is needed to implement and evaluate such strategies in the post-FLS clinic setting.

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Declarations

Ethical approval This study has been approved by the St Vincent’s Hospital HREC (Reference: 2021/ETH01388) and all procedures performed in studies involving human participants were in accordance with the ethical standards of the institution and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Conflicts of interest None.

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