



Establishing consensus recommendations for long-term osteoporosis care for patients who have attended an Australian fracture liaison service: a Delphi study

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Abstract

Summary Coordinating healthcare activities between fracture liaison services (FLS) and primary care is challenging. Using a Delphi technique, we developed 34 consensus statements to support improved care coordination across this healthcare transition.

Purpose Evidence supporting an optimal coordination strategy between fracture liaison services (FLS) and primary care is lacking. This study aimed to develop consensus statements to support consistency and benchmarking of clinical practice to improve coordination of care for patients transitioning from FLS to primary care following an osteoporotic fracture.

Methods A Delphi technique was used to develop consensus among a panel of experts, including FLS clinicians (medical and non-medical), general practitioners (GPs), and consumers.

Results Results of a preparatory questionnaire ($n = 33$) informed the development of 34 statements for review by expert panellists over two Delphi rounds ($n = 25$ and $n = 19$, respectively). The majority of participants were from New South Wales (82%), employed as FLS clinicians (78.8%) and working in metropolitan centres (60.6%). Consensus was achieved for 24/34 statements in round one and 8/10 statements in round two. All statements concerning patient education, communication, and the GP-patient relationship achieved consensus. Expert opinions diverged in some areas of clinician roles and responsibilities and long-term monitoring and management recommendations.

Conclusion We found clear consensus among experts in many key areas of FLS integration with primary care. While experts agreed that primary care is the most appropriate setting for long-term osteoporosis care, overall confidence in primary care systems to achieve this was low. The role of (and responsibility for) adherence monitoring in a resource-limited setting remains to be defined.

Keywords Fracture liaison service · Healthcare integration · Implementation science · Osteoporosis · Primary care

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Introduction

Osteoporosis is a chronic condition of compromised bone strength and increased fracture risk that is estimated to affect 18.3% of the global population [1]. It is asymptomatic until fracture occurs, at which point the risk of subsequent fracture increases twofold or greater [2]. While safe and affordable treatments that reduce fracture risk have been available for more than two decades, the majority of patients with osteoporosis remain undiagnosed and untreated [3, 4]. This issue has been documented in multiple countries and health systems around the world, and addressing it remains a global health challenge [5–7]. This undertreatment carries enormous costs: to individuals, through preventable fracture-related morbidity [8–10] and mortality [11, 12], and to society, through healthcare expenditure [13–15] and loss of productivity [5]. Moreover, all these metrics are expected to worsen with an ageing population [16]. To address the osteoporosis treatment gap, coordinated secondary fracture prevention services termed *fracture liaison services* (FLS) have been implemented at more than 800 sites across 54 countries [17].

FLS are secondary fracture prevention programs that systematically identify patients with a fragility fracture and coordinate investigations into their bone health in order to diagnose osteoporosis, provide bone health education, and commence evidence-based treatments that reduce the risk of further fractures. They have evolved as an adaptable and cost-effective method for addressing the underdiagnosis and undertreatment of osteoporosis globally, and various models exist (types A to D), varying in intensity and complexity. The type A model is the most comprehensive and identifies eligible patients, coordinates investigations into their bone health, and initiates treatment. Type B models perform the same functions as type A but delegate the task of prescribing medication to the patient's general practitioner (GP). Type C models identify patients, provide bone health education, and alert their GP to the need for further assessment. Type D models identify patients and provide education only [18]. Compared with standard care, FLS improve bone mineral density (BMD) testing and treatment initiation rates, and reduce rates of refracture and mortality [19]. The magnitude of improvement in BMD testing and treatment initiation is proportional to FLS service intensity [18], with treatment initiation rates reported at 46%, 41%, 23%, and 8% for type A, B, C, and D models respectively [20]. FLS have been shown to be cost effective compared to standard care in a variety of developed countries with different healthcare systems, regardless of service intensity [21]. Internationally endorsed standards and key performance indications for FLS have been developed by the

International Osteoporosis Foundation, enabling benchmarking of FLS performance at a global level [22]. Additionally, many countries have established local standards enabling national benchmarking and performance tracking for quality improvement [23–25].

The establishment of FLS within the majority of Australian public hospitals was a key objective of the Australian Government's 2019 National Strategic Action Plan for Osteoporosis [26]. FLS are most developed in the state of New South Wales (NSW), where the Agency for Clinical Innovation has championed the implementation of their FLS model of care (known locally as 'Osteoporosis Refracture Prevention services') across 29 of 228 public hospital sites [27, 28]. This model allows for two service configurations: a medically led, coordinated service (type A model FLS) and a GP shared-care service (type B model FLS). Despite this state-sanctioned approach, substantial variation exists in the delivery of services, both between clinics and between clinicians working within the same clinic across NSW [29]. While variation in resources probably accounts for some of the observed inter-service variation, overall there is both a lack of standardisation and a lack of consensus regarding the best approach to many aspects of care for patients after an initial FLS consultation.

For the benefits of FLS to be fully realised, prescribed treatments must be seamlessly continued once patients leave the FLS clinic. Statistical modelling indicates that poor adherence is responsible for halving the clinical benefit and doubling the cost per quality-adjusted life year gained through treatment [30]. Non-persistence with treatment is responsible for more than 90% of this non-adherence burden [30]. Pharmaceutical claims data indicate that osteoporosis medication persistence is suboptimal and declines over time, with 75%, 61%, and 45% of patients persisting with treatment to 1, 3, and 5 years respectively [31].

Many factors influence medication adherence and persistence, and healthcare transitions are a high-risk period for medication misadventure. In their systematic review, Yeam et al. identified multiple therapy-related and health system-related factors (including communication, patient education, healthcare policy, and the doctor-patient relationship) associated with poor osteoporosis treatment adherence and persistence [32]. While these factors can occur at many points in a person's post-fracture journey, the acute-to-primary care transition, an intrinsic feature of the FLS model, creates an opportunity for healthcare fragmentation, potentially leading to suboptimal patient outcomes. Little research has focussed on this transition or the follow-up of patients by GPs after they have attended an FLS. Primary care attendance patterns and long-term outcomes for these patients remain largely unknown. Nonetheless, qualitative research has identified that many factors associated with medication discontinuation and non-adherence emerge at the

FLS to primary care transition, where they act as barriers to seamless post-fracture care [29, 32]. For example, our earlier research highlighted that these can include differences in follow-up recommendations, barriers to communication, and confusion over the relative roles of primary and tertiary service providers [29].

The importance of medication persistence in the post-FLS setting is increasingly recognised and reflected through position statements and clinical practice standards, which in recent years have focussed on enhancing integration of FLS with primary and community care [24, 25, 33–36]. Evidence supporting an optimal FLS-primary care coordination strategy is lacking, and there are no nationally endorsed best practice standards for FLS or its integration with primary care in Australia. Practical local guidance is also lacking, permitting variation in service delivery between facilities and between clinicians working within the same facility. Such variation in services has been reported in Australia and overseas [18, 37]. One method suggested for addressing this issue, which arose from our earlier qualitative study [29], was the development of clinical guidelines for FLS, with a focus on optimising health service integration adapted to the Australian context.

Clinical practice guidelines are widely employed in many fields of medicine to support clinical decision making, helping to standardise care and translate evidence into practice. Clinical practice guidelines provide detailed and prescriptive recommendations for practice, developed through systematic review of current high-level evidence by a multidisciplinary panel of experts, and subjected to extensive external review [38]. By contrast, where high-level evidence is lacking, consensus statements provide informed views or agreed statements on a topic that are developed through expert consensus and informed by limited or lower quality evidence [38]. While the evidence base for consensus statements may be more limited, their development methods should be similarly rigorous and transparent [39].

This study aimed to develop consensus statements intended as recommendations to support consistency and benchmarking of clinical practice to improve coordination of care for patients as they transition from FLS to primary care following an osteoporotic fracture.

Methods

Purpose and rationale

A Delphi study was conducted in which a series of online web-based surveys were administered to a panel of experts with iterative analysis and feedback between each round until consensus was achieved. As a method for formal consensus development, the Delphi technique has several

advantages compared with other methods, such as a consensus development conference, or nominal group technique. It gives each participant's voice equal weight (preventing group conformity or dominant group members biasing results) and allows opinions to be gathered from a diverse range of experts from different backgrounds, fields, and locations. Moreover, the Delphi technique is logistically easier to conduct than face-to-face meetings/conferences and requires a comparably smaller time commitment. It was considered the most appropriate method to address our research question as experts were located across geographically distant sites, were perceived to be time-poor, and belonged to several different specialities/disciplines with different working arrangements that made organising face-to-face meetings challenging. Employing this method also minimised barriers to participation, helping us to maximise participant numbers and diversity.

The study methods and results are presented according to the Recommendations for Conducting and Reporting Delphi Studies (CREDES) [40].

Setting

While all participants were required to live and work in Australia, they were free to complete the online questionnaires from any device or location.

Expert panel

Purposive (targeted solicitation) and non-purposive (advertising through professional societies) recruitment methods were used to assemble an expert panel, which included:

- FLS clinicians: medical specialists (or their registrars), allied health professionals, nurses, or clinic coordinators currently employed by an FLS
- General practitioners currently working in General Practice (minimum 3 years' experience) who recall caring for ≥ 1 patient with osteoporosis in the past year
- Other experts: managerial or executive staff (currently working in or responsible for an FLS or general practice), community nurses or community allied health professionals who provide care to patients who have attended an FLS
- Consumer or community representatives who have a diagnosis of osteoporosis or have attended an FLS.

A letter of invitation including a link to the preparatory questionnaire was sent to relevant professional societies (including the Endocrine Society of Australia, Australian and New Zealand Bone and Mineral Society, Royal Australian College of General Practitioners, Australian Rheumatology Association, Australian and New Zealand Society for

Geriatric Medicine, Pharmaceutical Society of Australia) for distribution to members through their official communiques and noticeboards. The same invitation was sent to the 28 FLS sites with an email address listed on the NSW Agency for Clinical Innovation service directory. Professional networks and contacts were also used to approach relevant experts by email. Consumer and community representatives were recruited through advertisements disseminated by the Sydney Partnership for Health, Education, Research, and Enterprise to their partners and networks.

Procedure

Preparatory round

Study procedures are summarised in Fig. 1. An initial questionnaire was conducted over 4 weeks to recruit a panel of experts and generate a list of statements for circulation in

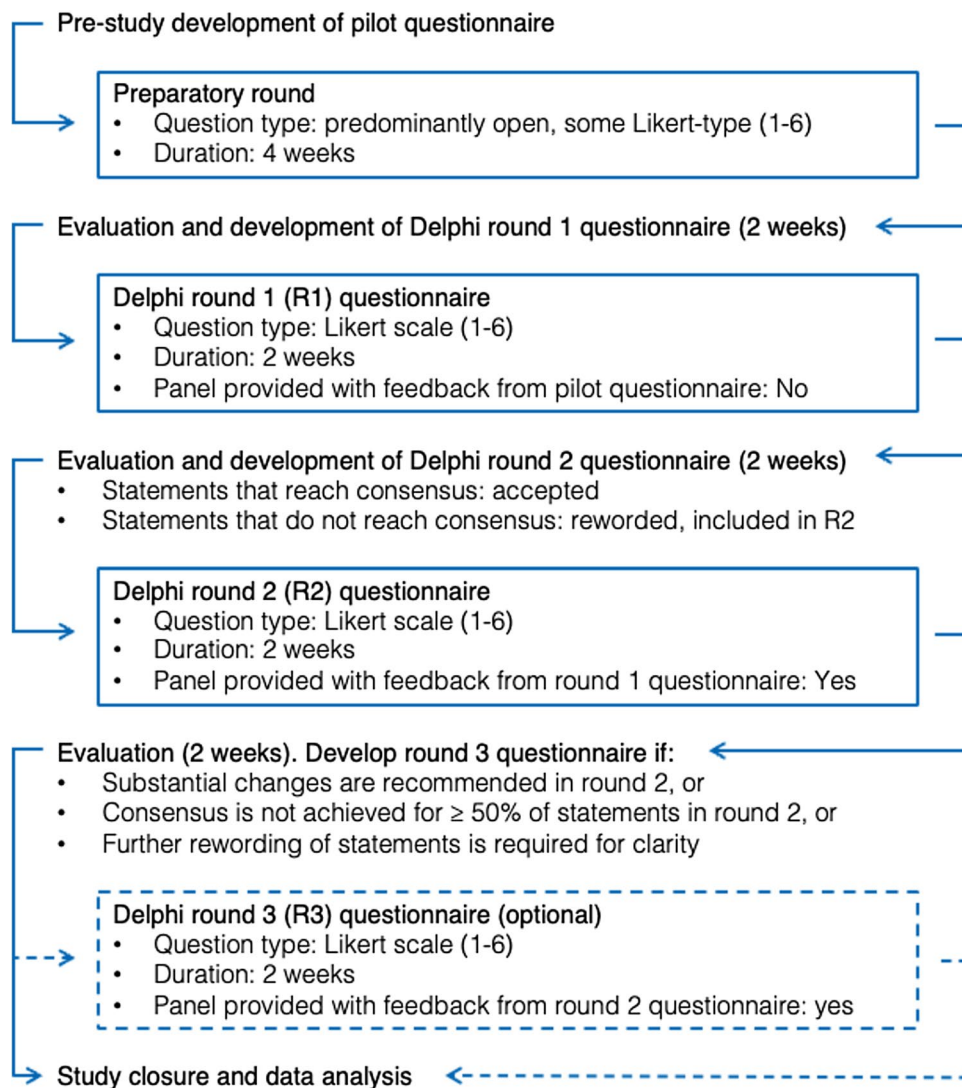
round one. Open questions were used to identify aspects of post-FLS care that could benefit from standardisation as well as the preferred format and means of distribution for consensus statements. Likert-type questions were used to assess the perceived importance of specific issues identified through the authors' earlier research [29]. Participants were invited to provide general comments and feedback to the investigators to capture additional relevant themes.

During the preparatory round, baseline demographic data were collected, including age, gender, location, primary language, level of education, current role, and level of experience.

Round one

Preparatory data were used by study investigators to develop a list of 34 statements in five themes: defining roles and responsibilities, long-term monitoring and management

Fig. 1 Study procedure flow-chart



recommendations for patients with osteoporosis, patient education, optimising communication, and the GP-patient relationship. Participants were invited to rate their level of agreement using a six-point Likert-type scale (no neutral response) with the option to explain their response or change the statement to more accurately reflect their views. The round one questionnaire closed after 2 weeks, after which investigators evaluated participant responses applying pre-defined consensus criteria (see below). Statements that did not reach consensus were reworded and included in subsequent rounds, whereas statements that reached consensus were accepted and did not progress to subsequent rounds. A quantitative summary (mean, median, maximum, and minimum values) of group data from round one was provided to participants between rounds one and two.

Round two

Participants who responded to ≥ 1 statement in round one were invited to participate in round two, which was conducted in a similar manner to round one. Participants had two weeks to complete the questionnaire in which they indicated their level of agreement with a series of statements and were free to provide comment or alternative wording. Data from round two were evaluated in the same manner as in round one.

Investigators had the option to conduct a third-round questionnaire in the following circumstances: if substantial changes were recommended to statements in round two (defined as $> 25\%$ of responses for each statement include a free-text recommendation to change ≥ 1 elements of the statement), or consensus was not achieved for $\geq 50\%$ of statements in round two, or all investigators agreed that further rewording of ≥ 1 statements was required for clarity. The reasons for conducting a third round were provided to participants along with a quantitative summary of data from round two. Statements that reached consensus in round two and did not require rewording for clarity were accepted and did not enter round three.

Round three

Participants completed the round three questionnaire in the same manner as earlier rounds and had two weeks to submit their responses.

Study completion

At the conclusion of the study, participants were provided with a summary of the results and invited to provide feedback.

Data analysis and definition of consensus

Descriptive statistics were used to describe expert panel characteristics and their responses from each round. Likert responses were assigned the following values; strongly disagree (1), disagree (2), somewhat disagree (3), somewhat agree (4), agree (5), and strongly agree (6). Statements were classified as reaching consensus (mean score ≥ 5.0 and ≤ 1 outlier), near consensus (mean score ≥ 4.5 and ≤ 2 outliers), or no consensus (mean score < 4.5 or > 2 outliers) in a similar manner to that described by Rosenfeld et al. [38]. Values were classified as outliers if they were ≥ 2 Likert items from the mean.

Ethics

This study was determined to meet the requirements of the National Statement on Ethical Conduct in Human Research (2007) and was approved by the University of New South Wales Human Research Ethics Committee on 31 January 2023 (Reference: HC220800). Consent was obtained electronically from all individual participants.

Results

Thirty-seven participants enrolled in the preparatory round, of which 33 completed ≥ 1 study questions and were invited to participate in round one. The majority of participants were from NSW (81.8%), employed as FLS clinicians (78.8%), and working in metropolitan centres (60.6%). Two GPs completed the preparatory round questionnaire, but neither participated in round 1 (R1) or round 2 (R2). Demographic data for participants who completed each round are summarised in Table 1.

Round 1

Twenty-five participants completed R1. Of the 34 statements reviewed in R1, 24 reached consensus and 10 were reworded and redistributed in R2 (Table 2). Of these ten statements, six reached the threshold for “near consensus” and four did not reach consensus in R1. Almost all statements within the theme of communication (8/9) achieved consensus in R1.

Round 2

Nineteen participants completed R2. The age, location (state and location classification), experience, and level of education was similar to participants in R1. The mean Likert score increased for all statements between R1 and R2 (Table 3). The majority of statements circulated in R2 concerned long-term monitoring and management

Table 1 Participant panellists' demographic data

Variable	Preparatory round	Round 1	Round 2
Participants ¹ , <i>n</i>	33	25	19
Gender, <i>n</i> (%)			
Female	15 (45.5)	13 (52.0)	11 (57.9)
Male	17 (51.5)	11 (44.0)	8 (42.1)
Other ²	1 (3.0)	1 (4.0)	0
Age (years), mean (SD)	47.5 (14.1)	50.4 (15.3)	48.1 (15.1)
Primary language, <i>n</i> (%)			
English	31 (93.9)	25 (100.0)	19 (100.0)
State, <i>n</i> (%)			
NSW	27 (81.8)	24 (96.0)	18 (94.7)
SA	1 (3.0)	0	0
VIC	1 (3.0)	1 (4.0)	1 (5.3)
Unknown	4 (12.1)	0	0
Location classification, <i>n</i> (%)			
Metropolitan	20 (60.6)	17 (68.0)	12 (63.2)
Inner regional	4 (12.1)	5 (20.0)	3 (15.8)
Outer regional	5 (15.1)	1 (4.0)	1 (5.3)
Rural	3 (9.1)	2 (8.0)	3 (15.8)
Remote	1 (3.0)	0	0
Current role, <i>n</i> (%)			
FLS clinician (medical specialist)	12 (36.4)	12 (48.0)	8 (42.1)
FLS clinician (registrar)	2 (6.1)	1 (4.0)	1 (5.3)
FLS clinician (non-medical)	12 (36.4)	8 (32.0)	7 (36.8)
General practitioner	2 (6.1)	0	0
Hospital-based physiotherapist	3 (9.1)	3 (12.0)	2 (10.5)
Patient/consumer	2 (6.1)	1 (4.0)	1 (5.3)
Year working in current role, mean (SD)	9.6 (11.5)	10.4 (11.0)	8.1 (9.6)
Highest level of education, <i>n</i> (%)			
Bachelor degree	16 (48.5)	12 (48.0)	9 (47.4)
Graduate diploma or certificate	2 (6.1)	2 (8.0)	2 (10.5)
Post-graduate degree	15 (45.5)	11 (44.0)	8 (42.1)

NSW New South Wales, SA South Australia, VIC Victoria, *N* number, *SD* standard deviation

¹Participants who completed ≥ 1 survey question (excluding demographic questions) were included

²“Other” participant identified as an FLS treatment/infusion clinic nurse

recommendations (4/10) and defining roles and responsibilities (3/10). A complete list of all statements that achieved the threshold for consensus are shown in Table 4.

Following R2, eight statements reached consensus, one statement did not reach consensus (statement 1.1.2: defining the role of the GP) and one statement reached “near consensus” (statement 2.1.4: FLS-led adherence monitoring and GP-led clinical review) (Table 5). Statements 3.1.1. and 4.1.1. elicited the highest level of agreement, with mean Likert scores of 5.7 ± 0.6 each, and no outlying values. These statements concerned patient education (3.1.1) and the importance of written correspondence between the FLS and primary care (4.1.1).

The pre-defined criteria for performing round three were not met following the completion of R2, and therefore a third round was not conducted.

Theme 1: defining roles and responsibilities

Respondents identified FLS clinicians and GPs as having distinct roles in a patient's post-fracture journey. FLS clinicians within a type A service identified themselves as treatment “initiators” and GPs as treatment “continuers”. The former role involved patient identification, investigation, education, and issuing an initial prescription for

Table 2 Number of statements reaching consensus in each round

	Theme	Total rounds <i>n</i>	Statements per theme <i>n</i> (% total for round)		Statements reaching consensus <i>n</i> (% reaching consensus per round in each theme)	
			Round		Round	
			One	Two	One	Two
1	Defining roles and responsibilities	2	9 (26.5)	3 (30)	6 (66.7)	2 (66.7)
2	Long-term monitoring and management recommendations	2	13 (38.2)	4 (40)	9 (69.2)	3 (75.0)
3	Patient education	1	1 (2.9)	0	1 (100.0)	0
4	Optimising communication	2	9 (26.5)	1 (10)	8 (88.9)	1 (100.0)
5	Considering the GP-patient relationship	2	2 (5.9)	2 (20)	0	2 (100.0)
	Total		34	10	24 (70.6)	8 (80.0)

All statements were included in round one. Statements that did not reach consensus in round one were reworded and included in round two

Table 3 Outcome and change in mean Likert score between R1 and R2 for statements that did not achieve consensus in R1

Statement	Round 1		Round 2		% change in mean Likert score
	Likert score, mean	Outcome	Likert score, mean	Outcome	
1.1.1	4.9	No consensus	5.2	Consensus	6.1
1.1.2	4.2	No consensus	4.7	No consensus	11.9
1.4.1	4.6	Near consensus	5.2	Consensus	13.0
2.1.4	5.1	Near consensus	5.3	Near consensus	3.9
2.1.1	5.1	Near consensus	5.3	Consensus	3.9
2.2.2	4.9	Near consensus	5.3	Consensus	8.2
2.3.1	5.0	Near consensus	5.2	Consensus	4.0
4.1.2	5.0	Near consensus	5.2	Consensus	4.0
5.1.1	4.6	No consensus	5.3	Consensus	15.2
5.1.2	5.1	No consensus	5.5	Consensus	7.8

osteoporosis medication (or delegation of prescribing in the case of a type B service), whereas the latter role involved adherence monitoring, biochemical and radiological monitoring, ongoing education, managing adverse effects, and coordinating referrals. One exception to this division of labour was the use of intravenous medications (e.g. zoledronic acid). Some FLS medical officers reported difficulty accessing infusion services outside their hospital, and chose to retain patients within the FLS, performing the role of treatment “continuer” for the duration of the treatment course. One respondent lacked confidence that GPs would continue zoledronic acid prescriptions and was therefore reluctant to discharge such patients to primary care. Developing flexible referral pathways in line with local service availability and ensuring effective communication between FLS and primary care were seen as important for managing role ambiguity in this area.

FLS should be aware of availability or not of infusion centres in making treatment recommendations to GPs. (expert 3; R1; endocrinologist)

GP’s will not monitor or prescribe zoledronic [acid], preferring to switch patients to 6 monthly sub-cutaneous [denosumab] as part of their business model. (expert 9; R1; nurse consultant)

The first iteration of statement 1.4.1 identified the prescriber as the person responsible for the management of treatment-related adverse events. While Likert responses indicated only two participants disagreed with this statement, six of seven free-text comments were consistent with general disagreement. Experts identified the FLS clinician as being responsible for medication counselling and detailing the risks and benefits of treatment, with the GP chiefly responsible for the identification and assessment of treatment-related adverse effects, which in some circumstances

Table 4 Statements that met criteria for consensus

Theme (<i>description</i>), subtheme, statement	Responses, n	Mean (SD)	Outliers
1.0 Defining roles and responsibilities <i>FLS clinicians and GPs require a clear understanding of each other's roles and responsibilities to function as an effective healthcare team. Role ambiguity can create healthcare gaps, which adversely affect patient continuity of care. The allocation of roles and responsibilities will vary between sites depending on available resources and skills. The following statements serve to flag aspects that require clarification at a local level. Where uncertainty arises, effective two-way communication is needed to negotiate and clarify roles</i>			
1.1 Role of the FLS			
1.1.1 Hospital-based FLS services are designed to: (a) identify all patients who have required acute management of a fragility fracture at a particular hospital, and (b) coordinate subsequent investigation of patient's bone health in order to diagnose osteoporosis and commence timely evidence-based fracture risk-reducing treatments. Under a type A model of care, this function is performed independently by the FLS service. Under a type B model of care, this function is delegated to primary care	18	5.2 (0.7)	0
1.2 Prescribing			
1.2.1 To reduce barriers and delays to treatment, it is preferable for the FLS clinician to provide the initial prescription for pharmacotherapy rather than delegating this responsibility to a patient's GP. Compared with other models of care, this "type A model" of secondary fracture prevention has been shown to achieve the highest treatment initiation rate	23	5.3 (1.1)	1
1.2.2 Ongoing prescribing of first-line osteoporosis treatments (including bisphosphonates, denosumab, raloxifene, and menopause hormone therapy) fall within the scope of general practice	23	5.1 (0.9)	1
1.3 Administering parenteral treatments			
1.3.1 Primary care is the most appropriate setting to administer osteoporosis treatments that require subcutaneous delivery (e.g. denosumab, romosozumab)	23	5.3 (0.7)	0
1.3.2 When considering potential primary care settings for administration of medications with time-critical or long dosing schedules (i.e. denosumab, romosozumab, or zoledronic acid): (a) Encourage patients to have one prescriber and attend the same practice for each dose, so that dosing records are complete and opportunities for discontinuous care are minimised, and (b) Specifically recommend the patient's GP initiate an automated patient reminder message at an appropriate time prior to the next scheduled dose to minimise the risk of missed or delayed doses. Automated reminder systems are an important component of the quality use of these medications and responsibility for using them rests with the administering clinician	23	5.6 (0.5)	0
1.3.3 The most appropriate setting to administer osteoporosis treatments that require intravenous delivery (e.g. zoledronic acid or pamidronate) will depend on local service availability and may include: primary care, community infusion centres, or hospital infusion clinics. It is important that FLS clinicians develop referral pathways in line with local service availability	23	5.5 (0.6)	0
1.4 Managing treatment-related adverse events			
1.4.1 The management of treatment-related adverse events is generally the responsibility of the patient's General Practitioner, who may choose to liaise with the FLS clinician (or other relevant specialist), if needed, for advice Atypical femoral fracture and medication-related osteonecrosis of the jaw are late treatment-related adverse events that warrant prompt multidisciplinary specialist input	18	5.2 (0.6)	0
1.4.2 "Brief assessments" conducted by the FLS service (typically by telephone) within 12 weeks and again 12 months after treatment initiation provide an opportunity to identify, report, and manage early treatment-related adverse effects. Depending on clinical resources, FLS services may assess and manage these adverse effects or advise patients to attend their GP for management	23	5.0 (0.9)	1
2.0 Long-term monitoring and management recommendations <i>Osteoporosis is a chronic condition of reduced bone quality and increased fracture risk. Like many other chronic conditions, it benefits from a lifelong approach to monitoring and management, which includes pharmacological and non-pharmacological elements. The risks of fracture and treatment-related adverse effects can differ between individuals and change over time, necessitating a tailored and dynamic approach to management spanning different clinical settings</i>			
2.1 FLS-led adherence monitoring and GP-led clinical review			

Table 4 (continued)

Theme (<i>description</i>), subtheme, statement	Responses, n	Mean (SD)	Outliers
2.1.1 Where local resources permit, a “brief assessment” by an FLS coordinator, typically by telehealth, within 12 weeks of treatment initiation, and again 12 months after treatment initiation, aims to reinforce key treatment messages, assess medication tolerability, address any patient concerns, and record medication adherence and persistence data	18	5.3 (0.5)	0
2.1.2 GP-led clinical review 6 months after commencing treatment (or 12 months for those prescribed zoledronic acid) aims to reinforce key treatment messages, assess medication tolerability, address any patient concerns, and issue further prescriptions. Subsequent clinical review every 1–2 years aims to review treatment response and promote adherence to pharmacological and lifestyle interventions	22	5.1 (1.1)	1
2.2 Monitoring bone density			
2.2.1 Serial DXA bone density measurements can be valuable for assessing patient response to anti-osteoporosis treatments and promoting medication persistence	22	5.0 (0.8)	1
2.2.2 In most cases, bone density can be measured again 1–2 years after treatment initiation. Due to the limited comparability of values obtained from different instruments, serial measurements should be ideally performed on the same instrument (or at least the same model). If no significant decline in bone density is seen, the frequency of further DXA scans can be individualised based on risk factors	18	5.3 (0.8)	1
2.2.3 Consider more frequent bone density monitoring (i.e. yearly) in those with risk factors for ongoing bone loss (such as prolonged high-dose glucocorticoid therapy, hyperparathyroidism, hyperthyroxinaemia)	22	5.1 (0.8)	1
2.2.4 If refracture occurs while a patient is adherent to appropriate osteoporosis treatment, a further DXA scan can be informative in assessing for treatment failure and suitability for anabolic therapy	22	5.1 (0.8)	1
2.3 Biochemical monitoring			
2.3.1 Following treatment initiation, at least, annual measurement of renal function, 25-hydroxyvitamin D, and albumin-corrected calcium by the patient’s General Practitioner is clinically appropriate. More frequent measurements and testing of additional biochemical parameters are based on individual patient circumstances	18	5.2 (1.0)	1
2.3.2 More frequent biochemical monitoring may be required for patients with significant renal impairment or a history of hypocalcaemia	22	5.4 (0.6)	0
2.3.3 The measurement of bone turnover markers (e.g. c-terminal telopeptide of type 1 collagen, n-terminal telopeptide of type 1 collagen, bone-specific alkaline phosphatase) in primary care is generally limited to the assessment of suspected malabsorption or non-adherence to oral antiresorptive therapy. Routine use of these tests in primary care is not encouraged unless the results will influence treatment decisions	22	5.4 (0.5)	0
2.4 Duration of therapy considerations			
2.4.1 The risk–benefit profile of antiresorptives will differ between patients and will change over time. The risk of certain serious adverse effects (e.g. osteonecrosis of the jaw, atypical femoral fracture) increases with ongoing treatment, whereas fracture risk reduces with treatment and rises when treatment is stopped. It is important that GPs periodically reassess the risks and benefits of bisphosphonate treatment, typically every 2 years and prior to planning a break in treatment, as this will principally inform treatment duration. Conversely, denosumab treatment cannot be interrupted without loss of bone density, and breaks in treatment (“drug holidays”) are generally contraindicated	22	5.4 (0.6)	0
2.4.2 Discontinuation of denosumab results in a rapid rise in bone turnover, subsequent loss of the bone density accrued during treatment, and increased fracture risk. Bisphosphonate use has not been shown to completely attenuate this effect, and the optimal method for preserving bone density after denosumab discontinuation is unknown. For these reasons, denosumab treatment is generally reserved for older patients at high fracture risk for whom lifelong continuous treatment is anticipated. Timely specialist advice is recommended if it becomes necessary to discontinue denosumab therapy	22	5.3 (0.9)	1
2.5 Indications for specialist referral			

Table 4 (continued)

Theme (<i>description</i>), subtheme, statement	Responses, n	Mean (SD)	Outliers
2.5.1 There are many circumstances that GPs may encounter in the long-term monitoring of patients with osteoporosis where it would become appropriate to refer a patient for a specialist opinion. In particular, if: (a) Re-fracture occurs after 12 months of continuous treatment, or (b) Significant bone loss occurs ($\geq 5\%$ in lumbar spine or total hip over 2 years) despite adherence to treatment, or (c) Ongoing treatment with a particular agent becomes contraindicated (e.g. due to adverse effects, declining renal function, or emerging comorbidities) and advice is needed to select a suitable alternative, or (d) The need to discontinue denosumab treatment arises, or (e) Management decisions exceed the scope or practice of the individual GP	22	5.5 (0.5)	0
3.0 Patient education <i>Patient education, initially provided by the FLS clinician, serves an important role in improving understanding of osteoporosis, allowing patients to appreciate the impact of the condition on their health and prioritise it accordingly. A meaningful and personally resonant understanding of the consequences of osteoporosis is thought to be a prerequisite for treatment initiation and adherence to long-term follow-up recommendations</i>			
3.1 Comprehensive patient education			
3.1.1 Comprehensive patient education provided by the FLS service will include the following: (a) Osteoporosis education: what is osteoporosis? What are the risk factors? How does it affect health? Lifelong and silent nature of the condition (b) Fracture risk: interpretation of bone density results and explanation of absolute fracture risk (c) Non-pharmacological management strategies: optimising nutrition (protein and calcium intake), vitamin D, muscle strength and balance, smoking cessation and alcohol moderation, and minimising falls risk (d) Pharmacological treatment: risks and benefits of individual agents, rationale for the recommended agent, importance of medication adherence and persistence, and where to obtain subsequent prescriptions (e) Monitoring recommendations: what, when, why, and by whom? (f) Individual goals of treatment (g) Roles of healthcare providers: FLS clinician, GP, and others (h) Contingency plan: what to do if the management plan is not working? What to do if adverse treatment effects occur?	21	5.7 (0.5)	0
4.0 Optimising communication <i>Successful FLS communication strategies will ensure comprehensive and concise clinical information is shared with patients and their GPs in a timely and accessible manner, while supporting the flexible exchange of information from primary-to-acute care when case discussion, clarification, or further advice is needed</i>			
4.1 Correspondence: content			
4.1.1 Written correspondence from an FLS clinician to a patient's GP, summarising a patient's encounter and detailing their individualised long-term bone health management plan supports continuity of care across the acute-to-primary care interface	21	5.7 (0.5)	0
4.1.2 The use of a state-wide template that can be locally modified to meet the needs of recipients (patients and GPs) could be considered by individual FLS services as a means to promote correspondence that is concise, consistent, comprehensive, and fit-for-purpose	18	5.2 (0.7)	1
4.1.3 Comprehensive clinical correspondence summarising the outcomes of the FLS consultation will include the following elements: (a) The diagnosis, when and how it was made (b) Individual patient risk factors for osteoporosis (c) DXA results (if performed) and a quantification of absolute fracture risk (e.g. FRAX or Garvan fracture risk calculation) (d) Any outstanding investigations and how they will be reviewed and actioned (e) Treatment recommendations, anticipated duration of treatment and rationale for choice of treatment (f) Degree of patient agreement with treatment recommendations (g) Short- and long-term follow-up/monitoring recommendations including who will be responsible for performing these tasks (h) Indications for specialist referral and available avenues for referral by GPs (i) Contact details and the preferred method by which GPs can contact the FLS clinician to discuss points for clarification or seek ad hoc advice	21	5.4 (0.6)	0

Table 4 (continued)

Theme (<i>description</i>), subtheme, statement	Responses, n	Mean (SD)	Outliers
4.1.4 Correspondence summarising the results of FLS “brief assessments” (performed within 12 weeks of treatment initiation and again 12 months after treatment initiation) will include the following elements: (a) A medication tolerability statement: has the patient experienced any adverse effects or barriers to taking/administering treatment? (b) A medication adherence statement: is the patient following the treatment regimen (pharmacological and non-pharmacological) as prescribed? (c) A medication persistence statement: have treatments (pharmacological and non-pharmacological) been commenced and continued by the patient? (d) Any other issues identified during the assessment	21	5.1 (0.6)	0
4.2 Correspondence: timing			
4.2.1 To ensure clinical information is available to GPs at the time of patient care, it is critical that FLS clinic correspondence be sent as soon as possible (and no later than 2 weeks) after a patient has completed an FLS assessment	21	5.6 (0.5)	0
4.3 Correspondence: delivery and accessibility			
4.3.1 To support accessibility, wherever possible, correspondence is delivered electronically and via channels that are preferred by local GPs	21	5.4 (0.7)	0
4.4 Correspondence: including and empowering patients			
4.4.1 Providing patients (or their delegates) with a copy of FLS correspondence helps to reinforce messages, aid the transfer of information between acute and primary care, and support patient engagement in the management of their bone health	21	5.2 (0.9)	1
4.5 Enabling bidirectional communication			
4.5.1 Preferred methods of communication vary among practitioners and practices. To address this, it is desirable for General Practices and FLS services to have multiple avenues available for interprofessional communication (e.g. telephone, email, videoconference)	21	5.2 (0.6)	0
4.5.2 FLS clinics can support bidirectional communication by: (a) Having a local communications procedure specifying local routes for contact and communication between primary care and the FLS service, and (b) Prioritising and responding to enquiries from GPs, and (c) Including in all clinic correspondence: an invitation to initiate two-way dialogue, details of the preferred avenue for contacting the clinic, and the name of the clinic contact (typically the fracture liaison coordinator), and (d) Allocating time for clinic staff to respond to enquiries and participate in interprofessional communication	21	5.3 (0.6)	0
5.0 Considering the GP-patient relationship <i>Strong GP-patient relationships, characterised by trust and positive longitudinal encounters, are associated with adherence and patient satisfaction</i>			
5.1 Promoting strong GP-patient relationships			
5.1.1 Assessing the nature of a patient’s relationship with their GP is an important component of the FLS clinical assessment. Patients who lack a trusting relationship with a GP (or group of GPs within a practice) may be at risk of poor-quality healthcare transition and medication non-adherence. FLS clinicians can help promote strong GP-patient relationships by counselling patients on the role of the GP in chronic disease management and the benefits of a trusting therapeutic relationship with a GP	18	5.3 (0.6)	0
5.1.2 For patients who do not have a relationship with a GP, it is beyond the scope of the FLS clinic to assume the role of primary care by providing long-term follow-up monitoring and chronic disease management and such patients should be encouraged to seek a consultation with a local GP	18	5.5 (0.6)	0

Introductory statement (italicised) for each theme were not subject to expert review and are included solely to provide summary and contextual information. Likert responses were assigned the following values: strongly disagree (1), disagree (2), somewhat disagree (3), somewhat agree (4), agree (5), and strongly agree (6)

Table 5 Statements that did not meet criteria for consensus

Theme, subtheme, statement	Responses, n	Mean (SD)	Outliers
1.0 Defining roles and responsibilities			
1.1 Defining the role of the GP			
1.1.2 Australian primary care aims to provide accessible, comprehensive, continuing, and coordinated care for patients with chronic diseases and is the most appropriate setting for the long-term monitoring and management of patients with osteoporosis For patients requiring specialist input after an FLS encounter, referral to an appropriate hospital outpatient clinic or private specialist is best initiated from primary care following discussion with the patient	18	4.7 (1.2)	3
2.0 Long-term monitoring and management recommendations for patients with osteoporosis			
2.1 FLS-led adherence monitoring and GP-led clinical review			
2.1.4 FLS coordinators and general practitioners both have a role in monitoring and promoting long-term patient adherence and persistence with pharmacological and non-pharmacological therapies for osteoporosis	18	5.3 (0.9)	2

Likert responses were assigned the following values: strongly disagree (1), disagree (2), somewhat disagree (3), somewhat agree (4), agree (5), and strongly agree (6)

will require referral for acute or specialist management (e.g. atypical femoral fracture, medication-related osteonecrosis of the jaw). Having accessible avenues for communication between GPs and FLS clinicians (or other relevant specialists) was seen to be especially important in these circumstances.

If a GP identifies a side effect after specialist initiation that isn't readily resolved, I would like to think the GP liaises with the specialist to explore the issue and work together to resolve it. (expert 14; R1; FLS coordinator)

The roles of FLS clinician and GP, while discrete, were seen as complementary and comments emphasised the importance of teamwork and cooperation between them, underscored by strong communication and professional education.

Theme 2: long-term monitoring and management recommendations

Preparatory round respondents sought standardised recommendations for both the frequency and type of follow-up activities (including BMD and biochemical testing, adherence monitoring, identification and management of adverse effects, and coordinating referrals) to be performed by GPs post FLS discharge. A particular area of contention was the use of serial BMD testing to monitor treatment response. Some considered BMD testing the “gold standard” for monitoring treatment response and favoured performing scans at defined time intervals after treatment initiation. Others felt the utility of serial BMD testing was limited to a subset of patients and that testing frequency should be individualised based on the potential to alter management. Regional variation in access to DXA scanning was a deciding factor for one participant.

I feel it [DXA] is a great monitoring and motivational tool for patients. Not everyone gets the same benefit from medications, so a DXA at two years can help ascertain some degree of success/compliance. (expert 14; R1; FLS coordinator)

While some respondents felt that FLS-led adherence monitoring was “desirable”, many acknowledged that it was simply not feasible with current resources.

Theme 3: optimising patient education

All preparatory round participants felt it was “moderately”, “very”, or “extremely” important to have a statement regarding patient education in follow-up recommendations. The developed statement (3.1.1) achieved consensus in R1 attracting the fewest number of free text comments (two) of any statement. Both comments were supportive of the initial wording, with one statement suggesting complementing FLS-based patient education with a written management plan, developed with patient input.

Theme 4: optimising communication

Effective interprofessional communication was perceived as “essential” to the success of FLS. When asked what aspects were most important to ensure seamless patient transition between FLS and primary care, 25 of 33 free-text responses included reference to “communication” or written correspondence. While statements concerning the content of correspondence (statements 4.1.3. and 4.1.4) attracted little comment and achieved high levels of agreement with no outlier responses, statements concerning the use of templates (4.1.2) and providing patients with a copy of clinic correspondence (4.4.1) had more varied responses. Most

experts favoured the use of templates as a means to optimise consistency, efficiency, and completeness of written correspondence, although some respondents felt templates were burdensome and difficult to implement. Most respondents were enthusiastic about providing patients with a copy of FLS correspondence, while a minority expressed reservation around the need to ensure appropriate wording, and potential for “unwanted effects, both on the patient’s side and GP’s side” (expert 21; R1; endocrinologist).

Theme 5: considering the GP-patient relationship

During the preparatory round, 82% (23/28) of respondents felt that FLS clinicians should “assess the nature/quality of a patient’s relationship with their GP” and 91% (21/23) agreed this should “influence the follow-up recommendations made by FLS clinicians”. The lack of an established GP-patient relationship was perceived to be a risk factor for medication non-adherence and FLS clinicians were reluctant to prescribe certain treatments (e.g. denosumab) to such patients. Respondents agreed that FLS clinicians should specifically explain to patients the role their GP plays in their long-term bone health management; however, for resourcing and logistical reasons, it was beyond the scope of the FLS to assist patients with finding a suitable GP. In particular, FLS staff felt it was difficult to maintain an up-to-date knowledge of local medical practices and that patients were in the best position to find a GP that met their individual needs. Some respondents felt that requiring GP referral to access FLS ensured patients at least had a GP and an avenue for long-term care.

For patients who report not having a relationship with a GP, all respondents agreed that it was beyond the scope of the FLS to assume the role of primary care by providing long-term monitoring and management. However, one participant felt that expanded FLS interactions may be warranted, on a case-by-case basis, for individuals with persistent barriers to GP attendance. How best to provide long-term care for patients who do not have a relationship with a GP remained unclear.

Analysis of statements that did not achieve consensus

Statement 1.1.2 had the greatest number of outlier responses and the greatest number of free-text comments of any statement in both R1 and R2. Despite revision, the mean Likert response changed minimally between R1 (4.2 ± 1.4) and R2 (4.7 ± 1.2) and remained below the threshold for consensus.

Both versions of statement 2.1.4 maintained a mean Likert score (5.1 ± 1.3 for R1 and 5.3 ± 0.9 for R2) above the consensus threshold but the number of outlier responses remained unchanged between rounds and the statement failed to achieve consensus.

Free-text comments relating to statement 1.1.2 and 2.1.4 were analysed for emergent themes. Both statements sought to clarify the roles and responsibilities of GPs with regard to long-term monitoring and management of patients with osteoporosis. Commenting on statement 2.1.4, experts felt the responsibility for long-term adherence monitoring was largely confined to primary care, and FLS lacked resources to perform this task.

FLS do not have the capacity/manpower to monitor adherence, however desirable that would be. (expert 3; R1; rheumatologist)

Long-term [adherence monitoring] should not be the FLS coordinator - FLS coordinator should do the initial and short term [monitoring], and then long term it goes to GP or specialist. (expert 13; R2; endocrinologist)

Osteoporosis is a silent disease and needs follow up with a GP to monitor appropriate management. (expert 12; preparatory round; GP)

One expert felt the goals of adherence monitoring differed between FLS and primary care. Brief adherence checks by FLS coordinators, typically performed by telephone at defined time points after a patient attended the clinic, sought to capture data for the purpose of measuring and improving clinic performance. Conversely, adherence monitoring and counselling by GPs was more holistic and patient-focussed, leveraging the therapeutic relationship to promote long-term medication adherence.

Ideally it would be a regular GP who followed up the patient re[garding] adherence and persistence with medication as this builds GP-patient relationship and engagement of both. The fracture coordinators need to check at agreed times in part to see if the programme is working and if not, it needs to be reviewed but the main driver of this should be the GP. (expert 15; R2; endocrinologist)

While experts agreed that primary care was the most appropriate setting for long-term monitoring and management of patients with osteoporosis, they lacked confidence in primary care systems to deliver the desired outcomes. FLS clinicians described a “crisis” affecting Australian primary care, in which care was becoming increasingly unaffordable, inaccessible (especially outside metropolitan centres), and discontinuous. These factors challenged the appropriateness of primary care as the optimal setting for long-term post-FLS care.

Some patients can’t afford to pay to see their GP - hospital based FLS services are free. I have had feedback for patients receiving monthly subcutaneous injections, that they have to pay to see GP before

practice nurse gives the injection. (expert 6; R1; FLS coordinator)

Due to the current GP crisis with lack of GPs available, minimal GPs bulk-billing, primary care is becoming less affordable, less accessible and less continuity of care. (expert 15; R1; FLS coordinator)

Several FLS clinicians felt that individual variation in GP knowledge affected the consistency of post-FLS care and eroded their confidence in the primary care system to continue the management plans they initiate. On the other hand, others felt FLS had an opportunity, and indeed a responsibility, to provide education and support to GPs working in this area.

There are significant variations in regional areas re[garding] access to GPs and also variation in the knowledge of GPs re[garding] osteoporosis and variable treatments. Part of FLS service should be to provide education and support of GPs. (expert 20; R1; endocrinologist)

[GPs] may not always be aware of current best practice and may not prescribe optimum therapy. (expert 23; R1; rehabilitation specialist)

Opinions regarding the role of the GP and FLS in the long-term monitoring and management of patients who have attended an FLS remained divided. Experts acknowledged that FLS are insufficiently resourced to perform longitudinal monitoring and that primary care remains the most appropriate setting for this activity; however, primary care faces its own challenges in this regard and overall confidence in system performance was low.

Discussion

This study generated 32 expert consensus statements intended to support the standardisation and coordination of care for patients transitioning from FLS to primary care for long-term osteoporosis management. Statements fell into five themes: (1) defining roles and responsibilities, (2) long-term monitoring and management recommendations, (3) patient education, (4) optimising communication, and (5) considering the GP-patient relationship. Consensus was achieved for all statements concerning education, communication, and the GP-patient relationship, whereas some statements concerning clinician roles and responsibilities and management recommendations remained controversial.

Consistent with our earlier research, communication was perceived to be the leading factor determining the quality of the FLS to primary care transition [29]. There was strong and early agreement regarding the essential components of written communication. A need for two-way exchange

between FLS clinicians and GPs was recognised, although preferred methods (telephone, email, videoconferencing) varied and a flexible approach enabling access to multiple modalities was ultimately endorsed. Patient education was seen to be an important intervention for improving osteoporosis treatment uptake and long-term adherence and experts were unanimous in their support for the proposed components of FLS-led patient education (statement 3.1.1). Experts perceived the absence of a strong GP-patient relationship as a risk factor for medication non-adherence and saw value in supporting patients to develop a trusting and longitudinal therapeutic relationship with one GP (or a small group of GPs within a practice). However, FLS clinicians felt it was impractical and beyond their scope to refer patients to particular GPs or medical centres or assume the role of primary care by providing long-term follow-up monitoring and chronic disease management services. While experts broadly agreed that primary care is the most appropriate setting for the long-term care of patients who have attended FLS, many FLS clinicians had limited confidence in primary care systems to deliver the necessary care in an affordable, accessible, and sustained manner. Furthermore, the role of FLS in adherence monitoring remained uncertain with FLS clinicians considering it beneficial but prohibitively resource intensive.

Our earlier research, and that of other authors [41], identified healthcare practitioner role ambiguity as a leading factor affecting the quality of the FLS to primary care transition for patients with osteoporosis. Our current study sought to address this by seeking consensus on the roles of FLS and GPs in both a type A and type B models of care. Experts had a unified view of the role of the FLS (statement 1.1.1) but could not reach consensus with regard to the role of GPs in this setting (statement 1.1.2). UK FLS guidelines support the handover of patient care from FLS to primary care for long-term management [24], and within Australia, there have been recent calls for GPs to be recognised as the group principally responsible for bone health [33]. This is not a new idea and is supported by national guidelines to assist GPs manage osteoporosis, which have been available since 2010 [42]. For the large part, our panellists agreed that primary care is the most appropriate setting for long-term monitoring and management of osteoporosis but disagreed with the claim that primary care could provide affordable, accessible, and sustained care for patients. Clinicians viewed GP involvement in the FLS model as arising from economic necessity as FLS are not designed or funded to provide long-term care. Overall, there was low confidence in the ability of primary care systems to reliably deliver the desired level of care for these patients. Until this crisis of confidence is addressed, top-down approaches to role clarification are unlikely to resolve role ambiguity or improve care coordination at the FLS to primary care interface.

Evidence supporting an optimal FLS-primary care coordination strategy is lacking and there are no nationally endorsed best practice standards for FLS or its integration with primary care in Australia. To address a similar situation in Spain, Naranjo et al. conducted a consensus workshop with local FLS experts to review FLS practices and their integration with primary care and develop a best practice document (BPD) [43]. Like our consensus statements, the BPD focused on optimising communication between the FLS and primary care, and establishing clear roles and responsibilities for FLS clinicians and GPs with regard to long-term patient follow-up. Unlike our consensus statements, this BPD is more prescriptive with regard to providing recommendations for action, links key recommendations to performance indicators, and includes some unique recommendations, including primary care involvement in patient educational workshops and stipulating time intervals for FLS-led adherence monitoring (within 3 months) and primary care-led follow-up (within 6 months of treatment initiation). Our consensus statements have the advantages of providing a broader view on FLS-primary care integration, of considering the quality of the GP-patient relationship and circumstances in which ongoing specialist follow-up might be desirable, and of acknowledging the need for flexibility with regard to adherence monitoring in resource-limited environments. Additionally, they provide detailed recommendations regarding specific long-term monitoring activities, guidance with regard to the use of parenteral therapies, a suggested approach to the management of adverse events, and indicative content for FLS-based patient education.

Within Australia, FLS remain in their infancy. As the model is scaled up and rolled out to new centres, integration with primary care will become increasingly important to maximise health benefits to patients and cost savings to policy makers and society. Consensus statements supporting improved FLS-primary care coordination, tailored to the Australian healthcare setting, may prove useful in achieving these aims, but first require dissemination to and confirmation by the wider osteoporosis service community and endorsement by relevant professional bodies prior to implementation. Consensus statements could also be disseminated by FLS champion organisations as part of a suite of tools designed to support the development of new FLS. Statements may be useful to researchers and policy makers for developing local standards for FLS care and key performance indicators for FLS. Such standards have been developed in other countries [24, 25, 44], where they support benchmarking of service processes and performance metrics.

This study has several strengths. Firstly, it targeted a specific area of need, identified through earlier qualitative research. Secondly, it employed a rigorous methodology,

in line with the Recommendations for Conducting and Reporting Delphi Studies (CREDES) [40], including using a pre-defined threshold for consensus. Thirdly, statements are comprehensive, logically arranged by key themes, and sufficiently flexible to be applied to different FLS models of care. Finally, recommendations provide advice for clinicians that is tailored to context, resources, and capabilities of the Australian healthcare system.

Limitations of this study include restricted GP and consumer representation; reliance on experts to assess their own eligibility (no attempts were made to verify participant credentials or experience during study enrolment); paucity of geographical diversity among participants (the majority of experts were from NSW); and participant dropout between rounds.

A full range of stakeholder engagement is essential for the development of robust consensus statements and clinical guidelines. Each expert brings a unique perspective and expertise that collectively shapes the research output to improve quality, credibility, relevance, and implementability. Only two patients and two GPs participated in the preparatory round questionnaire, one patient and no GPs participated in DR1 and DR2. Future Delphi studies on this topic should focus on achieving greater GP and consumer representation, in a way that promotes diversity, equity, and inclusivity.

In summary, coordinating healthcare activities between FLS and primary care in a way that ensures seamless care for patients remains challenging. To address this, we developed 32 consensus statements to support consistency and benchmarking of clinical practice in this setting. We found clear consensus among experts in many key areas of FLS integration with primary care. Experts agreed that FLS lack capacity to provide long-term care for patients with osteoporosis and primary care is the most appropriate setting for this activity. However, confidence in GPs and primary care systems to provide this care was lacking. FLS clinicians perceived GP knowledge of osteoporosis to be variable, and a recent workforce “crisis” was making primary care increasingly unaffordable, inaccessible, and fragmented. Moreover, the role (and responsibility for) adherence monitoring in a resource-limited setting remains to be determined. Our consensus statements seek to improve the delivery of FLS within Australia by advancing understanding of service integration and providing practical guidance to clinicians to optimise patient care coordination across the acute-to-primary care FLS transition. Our work adds to growing calls for the development of national clinical standards for FLS within Australia.

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Data availability The data underlying this article will be shared on reasonable request to the corresponding author.

Declarations

Ethics approval This study has been approved by The University of New South Wales Human Research Ethics Committee, 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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