Australian and New Zealand Bone and Mineral Society

Position Paper on Secondary Fracture Prevention Programs: A Call to Action

ANZBMS

April 2015

This Position Paper has been endorsed by the following professional organisations:

Australian & New Zealand Orthopaedic Research Society

Australian & New Zealand Society for Geriatric Medicine

Australian Orthopaedic Association

Australian Rheumatology Association

Endocrine Nurses Society of Australasia

Endocrine Society of Australia

Medical Oncology Group of Australia

New Zealand Rheumatology Association

Royal Australasian College of Physicians

This Position Paper has been endorsed by the following governmental organisations:

Accident Compensation Corporation

Health Quality & Safety Commission New Zealand*

This Position Paper has been endorsed by the following national osteoporosis societies:

Osteoporosis Australia

Osteoporosis New Zealand

Summary

The majority of men and women do not currently receive appropriate preventive care following a fragility fracture. Consequently, a large number of people suffer further debilitating fractures, creating a substantial but avoidable burden for our already strained health care systems. Secondary Fracture Prevention programs (also known as Fracture Liaison Services) address this care gap through the assessment and management of osteoporosis and falls risk. Recent multi-sector efforts internationally, including New Zealand, Europe and North America are driving the nationwide implementation of SFP programs. In Australia, however, less than 20% of hospitals have such programs in place.

This position paper by the Australian and New Zealand Bone and Mineral Society calls for a proactive dialogue between Federal, State and local governments, learned societies, consumer groups and other interested organisations, to develop a process to ensure that Australians and New Zealanders receive the best practice for secondary fracture prevention to optimise bone health and reduce falls risk.

Why secondary fracture prevention matters

Osteoporotic or 'fragility' fractures impose significant morbidity on older people. In 2014, over 24,000 hip fractures occurred in Australia[1], and nearly 4,000 cases were recorded in New Zealand.[2-4] Although hip fractures are associated with the greatest mortality, morbidity and cost, they represent only a minority of all fractures caused by osteoporosis. Thus, the total number of osteoporotic fractures exceeds 140,000 cases per year in Australia, at a direct annual cost of AU$1.6 billion.[1] Direct costs for fracture care in New Zealand have been estimated at NZ$330 million (AU$356 million).[2, 3]

Every fragility fracture increases the risk of future fractures. Half of those who break their hip have presented previously with a minimal trauma (i.e. fragility) fracture.[5-8] The risk of a subsequent hip fracture in these patients is 2-4 times that of their age-matched peers who are fracture-free.[9, 10]

The risk of future fractures can be reduced by up to 80% if the root causes, i.e. osteoporosis and falls risk are appropriately managed by a Secondary Fracture Prevention (SFP) program (also known as Fracture Liaison Services, FLS).[11-19] The majority of symptomatic fractures occur after a fall, highlighting the importance of evidence-based falls reduction strategies. Therefore, prevention of subsequent fractures should have high priority to both the medical community and the government. Currently, this is clearly not the case. The lack of action to reduce the incidence of further fragility fractures in those who have already suffered a fragility fracture is startling and represents a system-wide challenge for the health care system.

Large scale studies in primary[20] and hospital-based care[21] from Australia and overseas[22] demonstrate a universal care gap in secondary fracture prevention.

- **Primary care:** The Australian 'BoneCare Study' evaluated standard practice of care in more than 88,000 women aged over 60 years from 927 primary care physicians.[20] Less than 28% of women with a fracture history received specific treatment for osteoporosis to prevent further fractures.
- **Hospital-based care:** An audit of 16 Australian hospitals found that only 10% of patients presenting with an incident fragility fracture were investigated for osteoporosis, and only 8% were commenced on treatment consistent with currently approved guidelines.[21]

Subsequent studies from Australia[23, 24] and New Zealand[25-28] have confirmed a persistent care gap despite concerted efforts to promote osteoporosis awareness among health professionals and the community. This failure is due to the lack of coordination (fragmentation) of medical care between general practice and specialty disciplines, and, in Australia, is further aggravated by the State-Commonwealth funding divide.

Aim

The purpose of this Position Paper is to advocate and motivate a broad and rapid implementation of systematic secondary fracture prevention. This requires a multi-disciplinary effort where all stake-holders play their role in delivering best practice for men and women who sustain a fragility fracture. In Australia, it is critical to promote inter-jurisdictional engagement between the States and Commonwealth of Australia.

Secondary Fracture Prevention Programs

During the last 15 years, effective models have been developed in a growing number of countries to deliver secondary preventive care for patients presenting with fragility fractures.[29] The main purpose of a SFP program can be summarised through three '***i***'s', that is to:

- ***I****dentify* patients with osteoporosis.
- ***I****nvestigate* and determine individual fracture risk (including falls risk).
- ***I****nitiate* interventions known to reduce fracture risk.

Different models of SFP programs can be classified according to how many of the '3 ***i***'s' they deliver, whereby rates of BMD testing and osteoporosis treatment initiation are used as surrogate endpoints to assess the effectiveness of such programs.[30] **Table 1** shows the proportion of fracture patients receiving bone mineral density (BMD) testing and treatment for osteoporosis as a function of the intensity of the SFP program attended. Thus, Type A (3i) and Type B (2i) models out-perform the less intensive Type C (1i) and Type D ('Zero i') programs. Thus, as a minimum, an SFP program must ***i***dentify fracture patients, provide them with direct education on osteoporosis and future fracture risk, alert their primary care provider and undertake ***i***nvestigations to determine future fracture risk, ideally including BMD testing.

A key aspect of any Type A or Type B model is the presence of a coordinator who oversees all aspects of the SFP program, from the initial patient contact after their fragility fracture, initial osteoporosis and falls risk assessment, to patient follow-up once interventions have been initiated. In most programs, the fracture liaison coordinator plays a pivotal role in identifying patients with a fragility fracture (through collaboration with the staff of orthopaedic and emergency departments) and the use of hospital databases. Once patients are 'captured', most SFP programs perform a full osteoporosis risk factor assessment, including clinical osteoporosis risk factors, falls risk assessment and bone density testing. Components of falls risk management include vision interventions, foot care, home hazards reduction and medication review (particularly of centrally acting medications).

As shown in **Table 1**, Type A and Type B models address the care gap by increasing treatment initiation. They have also been shown to reduce re-fractures[18, 31] in a clinically and economically effective manner.[31-35] In the US, Kaiser Permanente Southern California estimated savings of US$30.8 million (AU$36.3 million) in 2006 through hip fracture prevention.[31] The SFP program at Concord Hospital, Sydney, was deemed highly cost-effective with a cost of around AU$17,000 per Quality Adjusted Life Year (QALY) gained.[33] The International Osteoporosis Foundation (IOF) 'Capture the Fracture®' campaign website consolidates details of such programs.[36]

Table 1: Secondary Fracture Prevention (SFP) programs and improvement in patient care[30, 37]
(Reproduced with kind permission of Osteoporosis Canada)

Model	Description	Proportion receiving BMD testing	Proportion receiving osteoporosis treatment
Status Quo	Manitoba statistics for major osteoporotic fractures (2007/2008)	13%	8%
Type D (Zero i model)	Only provides osteoporosis education to the fracture patient. Primary care provider (PCP) is not alerted or educated.	No study on BMD testing	8%
Type C (1 i model)	**1. Identification** The PCP is alerted that a fracture has occurred and further assessment is needed. Leaves the investigation and initiation of treatment to the PCP.	43%	23%
Type B (2 i model)	**1. Identification** **2. Investigation** Leaves the initiation of treatment for fragility fracture patients to the PCP.	60%	41%
Type A (3 i model)	**1. Identification** **2. Investigation** **3. Initiation** of osteoporosis treatment where appropriate.	**79%**	**46%**

Major national efforts to implement SFP programs are ongoing in Canada[37], the United Kingdom[38], the United States[39, 40] and other countries.[41, 42] The UK has taken the most pro-active stance through a multi-sector drive to implement SFP programs. Ninety-seven percent of hip fracture patients and 95% of wrist fracture patients were assessed by the Glasgow FLS versus less than 30% for other service configurations.[7] A cost-effectiveness analysis showed that the cost per QALY gained was GBP 5,740 (AU$10,676).[43] In the United States, the National Bone Health Alliance (NBHA) – a public-private partnership on bone health launched in late 2010 – has achieved an unprecedented level of participation and consensus across sectors.[44] The 2014 State of Health Care Quality Report[45] from the National Committee for Quality Assurance (USA) reported the percentage of women 65 – 85 years of age who suffered a fracture and who had either a bone density test or a prescription for a drug to treat osteoporosis in the six months after the fracture. From 2007 to 2010, this measure did not change significantly for Health Management Organisations (from 20.4% in 2007 to 20.7% in 2010). By 2013, three years after launch of the NBHA, the rate had increased to 29.2%, providing evidence at the national level that post-fracture care is improving. In addition, Osteoporosis Canada has launched "*Make the FIRST break the LAST with Fracture Liaison Services*", which aims to drive implementation of SFP programs across all Canadian provinces by 2015.[37]

Current implementation in New Zealand

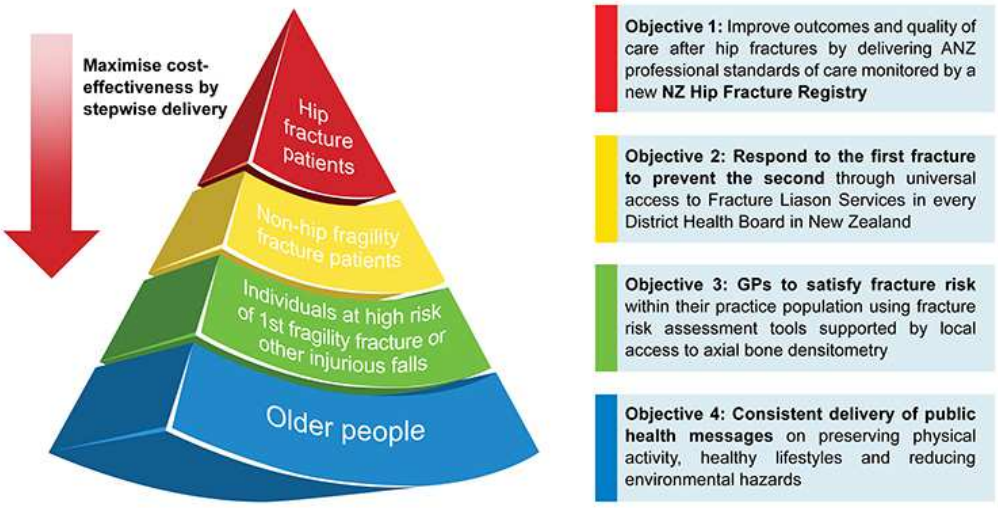
In September 2013, the Australian and New Zealand Hip Fracture Registry Steering Group published findings of a facilities level audit conducted across both countries during 2012[46], in the course of work to establish trans-Tasman guidelines for acute hip fracture care[47] and national hip fracture registries. This audit evaluated various elements of service provision pertaining to hip fracture patients, including the presence of a Fracture Liaison Service (**Table 2**). Accordingly, as of December 2012, less than 20% of Australian hospitals - and no hospitals in New Zealand - had an SFP program established. A second facilities level audit published in 2014 reported that 6 new SFP programs had come into operation across both countries by December 2013.[48]

Table 2. Australian and New Zealand facilities level audit published in September 2013[46] (Reproduced with kind permission of the Australian and New Zealand Hip Fracture Registry Steering Group)

	NSW	VIC	NT	Qld	ACT	WA	TAS	SA	NZ	Overall Total
Number of hospitals performing hip fracture surgery.	37	24	2	13	1	6	3	8	22	116
Hospitals with dedicated orthopaedic bed available	68% (range 14-45)	75% (range 5-44)	50% (32 beds)	85% (range 18-48)	100% (34beds)	83% (range 16-45)	33% (18beds)	50% (range 15-60)	82% (range 10-90)	83/116 (72%)
Hospitals with Geriatric service available	62%	46%	50%	54%	100%	67%	33%	38%	55%	63/116 (54%)
Hospitals which have a fracture liaison service	22%	17%	0%	15%	0%	17%	0%	25%	0%	17/116 (15%)
Collect local hip fracture data.	38%	67%	50%	69%	100%	83%	0%	38%	64%	63/116 (54%)
Barriers to proposed hip fracture service redesign	59%	58%	50%	62%	100%	50%	67%	75%	64%	72/116 (62%)

Since the facilities level audits were conducted, progress has been made in New Zealand. Osteoporosis New Zealand (ONZ) worked collaboratively with the Ministry of Health and the Health Quality and Safety Commission New Zealand (HQSC) to catalyse this change. In December 2012, ONZ published *BoneCare 2020* which highlighted the missed opportunity resulting from an absence of SFP programs across New Zealand.[4] The core elements of *BoneCare 2020* are illustrated in **Figure 1**, which includes universal access to SFP programs (Fracture Liaison Services). In 2013, HQSC featured the strategy in their national *Reducing harm from falls initiative.*[49]

Figure 1: BoneCare 2020: A systematic approach to hip fracture care and prevention for New Zealand[4] (Reproduced with kind permission of Osteoporosis New Zealand)



New Zealand's 20 District Health Boards (DHBs) undergo a District Annual Planning process with the Ministry of Health every year which determines local and national priorities. For the health service

year July 2013 – June 2014, implementation of a Fracture Liaison Service (FLS) was a requirement for all DHBs[50], which has been continued in health service year July 2014 – June 2015.[51] The first SFP program in New Zealand was established in December 2013 by Waitemata DHB which serves the population of North and West Auckland.[52] At the time of writing, a further 5 SFP programs have been established serving over half of New Zealand's population, and progress in all other DHBs is ongoing.[51, 53]

SFP Programs in Australia

In Australia, osteoporosis has been a National Health Priority Area since 2002.[54] However, to date, all hospital-based SFP programs were developed by individuals 'championing' the cause of patients after a minimal trauma fracture. The New South Wales (NSW) government is currently attempting to integrate and standardise post-fracture care through the Agency for Clinical Innovation (ACI). There is also an ongoing initiative by the ACI and ANZBMS to develop secondary fracture prevention programs in the primary care setting. The governments of South Australia[55] and Western Australia[56] have also published strategy documents which call for implementation of SFP programs. The Australian Commission on Quality and Safety in Health Care (http://www.safetyandquality.gov.au/) is developing standards for hip fracture care. Consistent with previous standards published by the Commission, there will be a number of agreed standards and a set of quality indicators to help evaluate practice. It is anticipated that auditing of these indicators will be possible through the ANZ Hip Fracture Registry.

There are a number of clinician-initiated SFP programs in Australia[18, 19, 35, 57-63] (mostly 'Type A' models). Since Medicare Australia is a comprehensive tax-funded health care system and subsidises all aspects of care, even comprehensive SFP programs result in no or minimal expense to the patient. Although not yet implemented nationally, these programs already demonstrate benefits in the Australian setting over up to 7 years of follow-up.[18, 64] The rate of BMD testing in those attending the SFP programs ranged from 83% to 100%, which contrasts the 10% uptake rate of BMD testing in an information-based intervention ('Type D').[59] Lih and colleagues reported treatment rates of 79% in the intervention group compared to 31% in the control group consisting of those who did not attend the program.[18] Vaile and colleagues reported treatment rates of 51% in the intervention group compared to 11% in a historical control group.[35] The clinical effectiveness of the Type A model is demonstrated by a reduction in re-fracture rates which ranges between 69%[19] and 80%.[18, 64] Moreover, a formal cost-effectiveness analysis of a SFP program at a tertiary referral centre in Sydney revealed that the service was cost-effective within the Australian context.[33]

Next steps for implementation of Secondary Fracture Prevention in Australia and New Zealand

A broad consensus exists on the need for the implementation of SFP programs to provide effective care to patients who present with a fragility fracture. We propose the following as the next steps to make secondary fracture prevention a reality for all older Australians and New Zealanders:

In Australia:

- Initiate interdisciplinary and inter-jurisdictional engagement and collaboration to promote the implementation of effective SFP programs across the nation. A 'Secondary Fracture Prevention Summit', called by ANZBMS in conjunction with other interested parties, will draw together all stakeholders, including representatives from leading health professional and patient organisations as well as State and Federal health ministries. This Summit should be held in 2015 and follow the example of a similar meeting in the United States in 2008[65] which led to formation of the U.S. National Bone Health Alliance.[44]

- The Summit would lead to a specific costed-action plan which identifies funding mechanisms endorsed by both State and Federal governments to implement SFP programs in healthcare localities in Australia.
- The Summit would also initiate establishment of an Australian National Fracture Prevention Alliance to monitor and evaluate nationwide implementation of SFP programs during the period 2015-2020. Reports will be published on an annual basis against pre-agreed timelines for specific levels of implementation.

In New Zealand:

- Ongoing implementation of SFP programs in accordance with the DHB District Annual Planning process requirements for 2014-15[51] will be monitored by the Ministry of Health.
- Osteoporosis New Zealand will collaborate with the Ministry of Health to undertake a review of progress towards the national objective of universal access to SFP programs by June 2015. All leading health professional organisations will contribute to this review process.
- Ongoing monitoring of the performance of SFP programs in New Zealand should feature in the 2015-16 District Annual Planning process.

Conclusion

The majority of older Australians[20, 21, 23, 24] and New Zealanders[25-28] who suffer from osteoporosis, and as a consequence sustain fragility fractures, do not receive the care required to prevent such fractures. Recent collaborative initiatives in New Zealand should lead to universal access to secondary fracture prevention programs within the next year. A similar, government-supported approach is needed in Australia as most patients at high risk of suffering debilitating and costly fragility fractures do not receive appropriate management of their disease. This system-wide failure has led to an unacceptable care gap for some of the most vulnerable members of our society, the old and elderly.

The Australian and New Zealand Bone and Mineral Society calls on the Australian Commonwealth and State governments to join the leading health professional and patient organisations to agree to a process which will make secondary fracture prevention available for all older Australians.

References

1. Watts JJ, Abimanyi-Ochom J, Sanders KM. *Osteoporosis costing all Australians A new burden of disease analysis – 2012 to 2022.* Glebe, NSW: Osteoporosis Australia; 2013.

2. Brown P, McNeill R, Radwan E, Willingale J. *The Burden of Osteoporosis in New Zealand: 2007-2020.* Auckland: School of Population, Health University of Auckland; 2007.

3. Brown P, McNeill R, Leung W, Radwan E, Willingale J. Current and future economic burden of osteoporosis in New Zealand. *Appl Health Econ Health Policy.* Mar 1 2011;9(2):111-123.

4. Osteoporosis New Zealand. *Bone Care 2020: A systematic approach to hip fracture care and prevention for New Zealand.* Wellington 2012.

5. Gallagher JC, Melton LJ, Riggs BL, Bergstrath E. Epidemiology of fractures of the proximal femur in Rochester, Minnesota. *Clin Orthop Relat Res.* Jul-Aug 1980(150):163-171.

6. Port L, Center J, Briffa NK, Nguyen T, Cumming R, Eisman J. Osteoporotic fracture: missed opportunity for intervention. *Osteoporos Int.* Sep 2003;14(9):780-784.

7. McLellan A, Reid D, Forbes K, et al. *Effectiveness of Strategies for the Secondary Prevention of Osteoporotic Fractures in Scotland (CEPS 99/03)*: NHS Quality Improvement Scotland; 2004.

8. Edwards BJ, Bunta AD, Simonelli C, Bolander M, Fitzpatrick LA. Prior fractures are common in patients with subsequent hip fractures. *Clin Orthop Relat Res.* Aug 2007;461:226-230.

9. Chapurlat RD, Bauer DC, Nevitt M, Stone K, Cummings SR. Incidence and risk factors for a second hip fracture in elderly women. The Study of Osteoporotic Fractures. *Osteoporos Int.* Apr 2003;14(2):130-136.

10. Johnell O, Kanis JA, Oden A, et al. Fracture risk following an osteoporotic fracture. *Osteoporos Int.* Mar 2004;15(3):175-179.

11. Harris ST, Watts NB, Genant HK, et al. Effects of risedronate treatment on vertebral and nonvertebral fractures in women with postmenopausal osteoporosis: a randomized controlled trial. Vertebral Efficacy With Risedronate Therapy (VERT) Study Group. *JAMA.* Oct 13 1999;282(14):1344-1352.

12. Black DM, Thompson DE, Bauer DC, et al. Fracture risk reduction with alendronate in women with osteoporosis: the Fracture Intervention Trial. FIT Research Group. *J Clin Endocrinol Metab.* Nov 2000;85(11):4118-4124.

13. Harrington JT, Ste-Marie LG, Brandi ML, et al. Risedronate rapidly reduces the risk for nonvertebral fractures in women with postmenopausal osteoporosis. *Calcif Tissue Int.* Feb 2004;74(2):129-135.

14. Cranney A, Papaioannou A, Zytaruk N, et al. Parathyroid hormone for the treatment of osteoporosis: a systematic review. *CMAJ.* Jul 4 2006;175(1):52-59.

15. Black DM, Delmas PD, Eastell R, et al. Once-yearly zoledronic acid for treatment of postmenopausal osteoporosis. *N Engl J Med.* May 3 2007;356(18):1809-1822.

16. Cummings SR, San Martin J, McClung MR, et al. Denosumab for prevention of fractures in postmenopausal women with osteoporosis. *N Engl J Med.* Aug 20 2009;361(8):756-765.

17. Papapoulos S, Chapurlat R, Libanati C, et al. Five years of denosumab exposure in women with postmenopausal osteoporosis: results from the first two years of the FREEDOM extension. *J Bone Miner Res.* Mar 2012;27(3):694-701.

18. Lih A, Nandapalan H, Kim M, et al. Targeted intervention reduces refracture rates in patients with incident non-vertebral osteoporotic fractures: a 4-year prospective controlled study. *Osteoporos Int.* Mar 2011;22(3):849-858.

19. Van der Kallen J, Giles M, Cooper K, et al. A fracture prevention service reduces further fractures two years after incident minimal trauma fracture. *Int J Rheum Dis.* Feb 2014;17(2):195-203.

20. Eisman J, Clapham S, Kehoe L, Australian BoneCare S. Osteoporosis prevalence and levels of treatment in primary care: the Australian BoneCare Study. *J Bone Miner Res.* Dec 2004;19(12):1969-1975.

21. Teede HJ, Jayasuriya IA, Gilfillan CP. Fracture prevention strategies in patients presenting to Australian hospitals with minimal-trauma fractures: a major treatment gap. *Intern Med J.* Oct 2007;37(10):674-679.

22. Akesson K, Mitchell PJ. *Capture the Fracture: A global campaign to break the fragility fracture cycle.* Nyon,: International Osteoporosis Foundation; 2012.

23. Chen JS, Hogan C, Lyubomirsky G, Sambrook PN. Management of osteoporosis in primary care in Australia. *Osteoporos Int.* Mar 2009;20(3):491-496.

24. Hollingworth SA, Gunanti I, Nissen LM, Duncan EL. Secondary prevention of osteoporosis in Australia: analysis of government-dispensed prescription data. *Drugs Aging.* Mar 1 2010;27(3):255-264.

25. Stracey-Clitherow H, Bossley C. Osteoporosis intervention by New Zealand orthopaedic units: A multi-centre audit. *J Bone Joint Surg Br.* 2009;91-B(SUPP II):342.

26. Stracey-Clitherow HD, Bossley CJ. *Osteoporosis Intervention by New Zealand Orthopaedic Departments in Patients with Fragility Fractures: A multi-centre audit.* Wellington 2009.

27. Bloomfield K, Singh J. Secondary prevention of vertebral fractures in a large New Zealand District Health Board. *N Z Med J.* Nov 4 2011;124(1345):26-33.

28. Health Quality and Safety Commission. Atlas of healthcare variation: Falls. http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/falls/. Accessed 2 April 2015.

29. Mitchell PJ. Best practices in secondary fracture prevention: fracture liaison services. *Curr Osteoporos Rep.* Mar 2013;11(1):52-60.

30. Ganda K, Puech M, Chen JS, et al. Models of care for the secondary prevention of osteoporotic fractures: a systematic review and meta-analysis. *Osteoporos Int.* Feb 2013;24(2):393-406.

31. Dell R, Greene D, Schelkun SR, Williams K. Osteoporosis disease management: the role of the orthopaedic surgeon. *J Bone Joint Surg Am.* Nov 2008;90 Suppl 4:188-194.

32. Sander B, Elliot-Gibson V, Beaton DE, Bogoch ER, Maetzel A. A coordinator program in post-fracture osteoporosis management improves outcomes and saves costs. *J Bone Joint Surg Am.* Jun 2008;90(6):1197-1205.

33. Cooper MS, Palmer AJ, Seibel MJ. Cost-effectiveness of the Concord Minimal Trauma Fracture Liaison service, a prospective, controlled fracture prevention study. *Osteoporos Int.* Jan 2012;23(1):97-107.

34. Marsh D, Akesson K, Beaton DE, et al. Coordinator-based systems for secondary prevention in fragility fracture patients. *Osteoporos Int.* Jul 2011;22(7):2051-2065.

35. Vaile J, Sullivan L, Bennett C, Bleasel J. First Fracture Project: addressing the osteoporosis care gap. *Intern Med J.* Oct 2007;37(10):717-720.

36. International Osteoporosis Foundation. Capture the Fracture: Break the worldwide fragility fracture cycle. http://www.capturethefracture.org/. Accessed 18 August 2014.

37. Osteoporosis Canada. *Make the FIRST break the LAST with Fracture Liaison Services* 2013.

38. National Osteoporosis Society. The Falls and Fractures Alliance. http://www.nos.org.uk/page.aspx?pid=1247. Accessed 18 August 2014.

39. National Bone Health Alliance. Fracture Prevention CENTRAL. http://www.nbha.org/fpc. Accessed 18 August 2014.

40. Tosi LL, Gliklich R, Kannan K, Koval KJ. The American Orthopaedic Association's "own the bone" initiative to prevent secondary fractures. *J Bone Joint Surg Am.* Jan 2008;90(1):163-173.

41. González MA, Bouzón CA, Abella CC, et al. *Libro Azul de la Fractura Osteoporótica en España*: Sociedad Española de Fracturas Osteoporóticas (SEFRAOS); 2012.

42. Chandran M, Tan MZ, Cheen M, Tan SB, Leong M, Lau TC. Secondary prevention of osteoporotic fractures--an "OPTIMAL" model of care from Singapore. *Osteoporos Int.* Nov 2013;24(11):2809-2817.

43. McLellan AR, Wolowacz SE, Zimovetz EA, et al. Fracture liaison services for the evaluation and management of patients with osteoporotic fracture: a cost-effectiveness evaluation based on data collected over 8 years of service provision. *Osteoporos Int.* Jul 2011;22(7):2083-2098.

44. Lee DB, Lowden MR, Patmintra V, Stevenson K. National Bone Health Alliance: an innovative public-private partnership improving America's bone health. *Curr Osteoporos Rep.* Dec 2013;11(4):348-353.

45. National Committee for Quality Assurance. *The State of Health Care Quality 2014.* Washington DC 2014.

46. Australian and New Zealand Hip Fracture Registry. *Facility level audit of hospitals in Australia and New Zealand performing surgery for hip fracture 2013.* Sydney 2013.

47. Australian and New Zealand Hip Fracture Registry (ANZHFR) Steering Group. *Australian and New Zealand Guideline for Hip Fracture Care: Improving Outcomes in Hip Fracture Management of Adults.* Sydney: Australian and New Zealand Hip Fracture Registry Steering Group; 2014.

48. Australian and New Zealand Hip Fracture Registry. *Australian and New Zealand Facility Level Audit of Hospitals Performing Surgery for Hip Fracture 2014.* Sydney 2014.

49. Health Quality and Safety Commission. Topic 6: Why hip fracture prevention and care matters. http://www.hqsc.govt.nz/our-programmes/reducing-harm-from-falls/10-topics/topic-6/. Accessed 18 August 2014.

50. Ministry of Health. 2013/14 Toolkit Annual Plan with statement of intent. Wellington.; 2012.

51. Ministry of Health. Annual Plan Guidance: Working draft 2014/15 Toolkit Annual Plan with statement of intent. Wellington.; 2013.

52. Waitemata District Health Board. Board Meeting Agenda; 2013.

53. Mitchell PJ, Cornish J, Milsom S, et al. BoneCare 2020: A systematic approach to hip fracture care and prevention for New Zealand. *3rd Fragility Fracture Network Congress 2014*. Madrid, Spain.; 2014.

54. Australian Government: Australian Institute of Health and Welfare. Health Priority Areas. http://www.aihw.gov.au/national-health-priority-areas/. Accessed 18 August 2014.

55. Statewide Orthopaedic Clinical Network and Rehabilitation Clinical Network. Models of Care for Orthopaedic Rehabilitation - Fragility Fractures General Orthopaedic Trauma and Arthroplasty. In: Government of South Australia, SA Health, eds. Adelaide; 2011.

56. Government of Western Australia. Osteoporosis Model of Care. In: Department of Health Musculoskeletal Diabetes & Endocrine Falls Prevention and Aged Care Health Networks (WA), ed. Perth; 2011.

57. Jones G, Warr S, Francis E, Greenaway T. The effect of a fracture protocol on hospital prescriptions after minimal trauma fractured neck of the femur: a retrospective audit. *Osteoporos Int.* Oct 2005;16(10):1277-1280.

58. Vaile JH, Sullivan L, Connor D, Bleasel JF. A Year of Fractures: a snapshot analysis of the logistics, problems and outcomes of a hospital-based fracture liaison service. *Osteoporos Int.* Oct 2013;24(10):2619-2625.

59. Kuo I, Ong C, Simmons L, Bliuc D, Eisman J, Center J. Successful direct intervention for osteoporosis in patients with minimal trauma fractures. *Osteoporos Int.* Dec 2007;18(12):1633-1639.

60. Giles M, Van Der Kallen J, Parker V, et al. A team approach: implementing a model of care for preventing osteoporosis related fractures. *Osteoporos Int.* Aug 2011;22(8):2321-2328.

61. Bliuc D, Eisman JA, Center JR. A randomized study of two different information-based interventions on the management of osteoporosis in minimal and moderate trauma fractures. *Osteoporos Int.* 2006;17(9):1309-1317.

62. Inderjeeth CA, Glennon DA, Poland KE, et al. A multimodal intervention to improve fragility fracture management in patients presenting to emergency departments. *Med J Aust.* Aug 2 2010;193(3):149-153.

63. Diamond T, Lindenberg M. Osteoporosis detection in the community. Are patients adequately managed? *Aust Fam Physician.* Aug 2002;31(8):751-752.

64. Ganda K, Schaffer A, Seibel MJ. Predictors of re-fracture amongst patients managed within a secondary fracture prevention program: a 7-year prospective study. *Osteoporos Int.* Feb 2015;26(2):543-551.

65. National Coalition for Osteoporosis and Other Bone Diseases. *National Action Plan on Bone Health: recommednation from the Summit for a National Plan on Bone Health 2008* 2008.

Acknowledgements and Disclosures

This position paper has been drafted by Paul J Mitchell, Kirtan Ganda and Markus J Seibel in October/November 2014. It has been reviewed by the membership of the Australian and New Zealand Bone & Mineral Society in November/December 2014. A revised version of the paper was then provided to numerous organisations and learned societies in Australia and New Zealand for review and potential endorsement.

As of 27th April 2015, the following individuals provided input: A/Prof Mark Bolland, A/Prof Rory Clifton-Bligh, Prof Jacqueline Close, Prof Mark Cooper, Prof Emma Duncan, Prof John Eisman AO, Prof Mark Forwood, Prof Matthew Gillespie, Dr Kara Holloway, Prof Graeme Jones, Dr Sandra Juliano, Prof Lyn March, A/Prof Vasi Naganathan, Carmela Petagna, A/Prof Nicholas Pocock, A/Prof Kerrie Sanders, Prof Ego Seeman, A/Prof Natalie Sims, Prof Maria Fiatorone Singh, and Prof Helena Teede.

The organisations and learned societies endorsing this position paper are listed on pages 2 and 3 of this document.

Paul J Mitchell is an Adjunct Senior Lecturer in the School of Medicine, Sydney Campus, at The University of Notre Dame Australia. He is the Chairman of the Board of Trustees of Osteoporosis New Zealand and Managing Director of Synthesis Medical NZ Limited in New Zealand. During the last decade, Synthesis has undertaken consultancy work on systematic approaches to fragility fracture prevention which has been funded by patient societies, professional organisations, policy teams in national governments and private sector companies. He reports no conflicts of interest relating to the content or his co-authorship of this article.

Kirtan Ganda is a Consultant Endocrinologist at Concord Repatriation General Hospital, Sydney, and Lecturer at the University of Sydney. He reports no conflicts of interest relating to the content or his co-authorship of this article.

Markus J Seibel is Professor of Endocrinology at the University of Sydney and a Senior Consultant in Endocrinology at Concord Repatriation General Hospital, Sydney. He is the current President of the Australian and New Zealand Bone & Mineral Society (ANZBMS). He reports no conflicts of interest relating to the content or his co-authorship of this article.

None of the authors or advisors have received any honoraria for the work involved with this position paper and co-author this article as members of ANZBMS.

* The national expert advisory group, overseeing the Reducing Harm from Falls Program, which is led by the Health Quality & Safety Commission in NZ, is pleased to endorse this position paper. The program strongly supports initiatives such as Fracture Liaison Services, and the establishment of the Hip Fracture Registry into New Zealand, as part of integrated approaches to improve the care for vulnerable people at risk of frailty, fragility, fracture and falls.