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Auckland City Hospital's Ortho-Geriatric Service: an audit of patients aged over 65 with fractured neck of femur

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Abstract

Background The process of care of older patients with fractured neck of femur at Auckland City Hospital has recently changed with selected patients "fast-tracked" as soon as possible postoperatively to a specialised Older People's Health (OPH) ward.

Aims The aims of this study were: to evaluate patient characteristics; to analyse process of care; to compare outcomes in those "fast-tracked" patients with those receiving usual care; and to compare this information with previous data from Auckland City Hospital and other centres in New Zealand.

Method Prospective case record audit of patients with fractured neck of femur aged 65 years and over admitted under Orthopaedics over a 4-month period.

Results 115 patients were audited; mean age was 84 years, 77% were female. Inpatient mortality was 5%.

Twenty-four percent of patients had surgery within 24 hours of admission. Of those who did not have surgery within 24 hours, 39% were awaiting operating theatre availability. Median overall length of stay (LOS) was 27 days. Eighty-four percent of patients were transferred to Older Peoples Health. Considering all patients, 70% of those living at home pre-fracture returned home on discharge. However, only 26% of those in Rest Home returned to Rest Home. Overall, 35% of patients were discharged to a higher level of care. Forty-four percent of the group were able to walk unaided prior to hip fracture, but only 1% on discharge. Forty-three patients were "fast-tracked" to Older Peoples Health. Their median overall LOS was 23 days compared to 28 days for those receiving usual care. This was due to the shorter time in Orthopaedics. Thirty-three percent of this group went to a higher level of care on discharge compared to 35% in the group that received usual care.

Conclusions Many patients experience a delay to surgery for non-medical reasons. The percentage transferred to Older Peoples Health is high. Fast-tracking to Older Peoples Health shortens overall length of stay due to fewer days in Orthopaedics. Many patients require a higher level of care after hip fracture, particularly if already resident in Rest Home. Demographics and inpatient mortality are comparable, but total length of stay is longer than similar New Zealand studies due to a longer length of stay in Older Peoples Health. Review of previous data from Auckland City Hospital and from other New Zealand centres shows significant variability in process of care for older patients with hip fracture.

Hip fracture is an important cause of mortality and morbidity in older people. The New Zealand Health Information Service (NZHIS) report on hip fracture services in NZ hospitals 1999–2000 showed that 27% of patients died within 12 months of their

injury.[1] Fransen followed 565 community-dwelling New Zealanders aged 60 and over with a recent hip fracture.[2] By the end of 2 years, 39% of females and 52% of males had died or been institutionalised.

The NZHIS study found that a delay of more than 2 days from hip fracture to surgery is associated with increased mortality.[1] This finding has been corroborated by a large study of NHS hospitals in the United Kingdom, which demonstrated an odds ratio of 1.27 for in hospital mortality in those whose operation was 2 or more days after admission, compared to those who had surgery within the first 2 days.[3]

At Auckland City Hospital, Orthopaedic patients aged 65 and over receive medical input from a Geriatrician or Older Peoples Health Registrar by way of twice-weekly ward rounds. Patients with hip fracture are assessed both pre and postoperatively. Following surgery, those assessed as having potential for rehabilitation are placed on the waiting list for Older Peoples Health. A weekly Ortho-Geriatric Interdisciplinary Team Meeting is held, identifying additional patients who require further rehabilitation via Older Peoples Health.

In 2006 a new initiative was introduced. Selected hip fracture patients are 'fast-tracked' to one particular Older Peoples Health (OPH) ward as soon as possible postoperatively. The aim of this is to provide a specialist care environment for these patients, thereby improving early postoperative management and potentially improving outcomes. The particular OPH ward is one of two that have an enhanced therapy establishment appropriate to rehabilitation of patients with stroke and similar high rehabilitation needs. The decision to 'fast-track' is initiated by the charge nurse on the OPH ward receiving the patient, when a bed is available. The earliest post operative patients are given priority.

Due to limitation of resources, not all hip fracture patients are able to be 'fast-tracked', with the majority receiving 'usual care' i.e. rehabilitation on the Orthopaedic ward and referral to Older Peoples Health for ongoing rehabilitation if required. Patients from Private Hospitals (facilities providing high-level long-term residential care) are not necessarily excluded from transfer to Older Peoples Health, and may be transferred if they have ongoing medical issues which require stabilisation before transfer back to Private Hospital.

The aims of this study were to: evaluate hip fracture patient characteristics; to analyse process of care; and to analyse outcome measures. We also set out to compare process and outcome measures in those "fast-tracked" patients with those receiving usual care. Finally, we set out to compare this information with previous data from Auckland City Hospital and other centres in New Zealand.

Methods

A prospective case notes audit was undertaken of all patients aged 65 and over with hip fracture admitted under the Orthopaedic service at Auckland City Hospital over a 4-month period from 1 April 2007 to 31 August 2007. Patients were identified at the weekly Ortho-Geriatric Interdisciplinary Meeting and by the Orthopaedic Fractured Neck of Femur Nurse Specialist.

A data collection form was designed to collect the required patient information. Clinical notes were reviewed manually by the principal investigator.

Information recorded included patient demographics, premorbid level of function, the American Society of Anaesthesiology physical status classification (ASA) score, comorbidities, type of fracture, time to operation, operative procedure and anaesthetic type, length of stay in Orthopaedic and Older

Peoples Health wards, time waiting for transfer to Older Peoples Health, total length of stay, complications, whether Deep Vein Thrombosis (DVT) prophylaxis was used, mortality, discharge destination, level of function on discharge and treatment of osteoporosis.

Anonymised data was entered into a secure Microsoft Excel spreadsheet. Approval was gained from the Northern Y Regional Ethics Committee.

Patients under the age of 65 years or with fractures at sites other than the neck of femur were excluded.

Walking aids: frame was defined as low walking frame or super-stroller used without hands-on assistance. Patients requiring a Gutter frame or Arjo frame were grouped with those requiring a wheelchair. Bedbound patients included those only able to transfer from bed to chair with maximal assistance.

The patient's ability to wash (shower/bath), dress and toilet themselves was recorded as personal activities of daily living (ADLs). Information relating to instrumental activities of daily living was recorded, focussing on meal preparation, cooking, housework and clothes laundering. Ability to manage finances, medication administration and transportation was not recorded in this audit. Patients residing in Rest Homes or Private Hospitals were presumed to require assistance with both personal and instrumental ADLs.

Comorbidities were grouped into system categories: cardiac disease (including congestive cardiac failure, arrhythmia, ischaemic heart disease and valvular pathologies), respiratory disease (asthma or Chronic Obstructive Pulmonary Disease (COPD), interstitial lung disease) and documented cognitive impairment.

The ASA score allocated by the anaesthetist was recorded for each patient.

The non weight bearing scheme is an initiative that allows patients whose orthopaedic injury requires them to be non weight bearing to be cared for at a Private Hospital until their Orthopaedic surgeon allows them to weight bear. They usually return to Auckland City Hospital for rehabilitation under Older Peoples Health, although some receive rehabilitation in the community. The time spent on the non weight bearing scheme was not included in length of stay calculations.

Medications considered as DVT prophylaxis included aspirin, low molecular weight heparin, unfractionated heparin and warfarin. DVT prophylaxis was recorded without differentiating whether this was a new prescription or a usual medication for the patient.

Prescribing of osteoporosis prophylaxis including calcium, vitamin D and bisphosphonate (oral or intravenous) was recorded.

Results

Group demographics

115 patients aged 65 and over were admitted with a hip fracture during the 4-month audit period. The median age was 85 years (range 67–100). There were 89 females (78%) and 26 males (23%). The mean age for male patients was 82 years and for females was 85 years.

Measures of functional ability and social situation are reported in outcome measures to demonstrate changes that occurred over the time of the admission with a hip fracture.

Clinical and fracture characteristics

Medical comorbidities—Table 1 shows the number of patients with medical comorbidities in each category. Forty-five patients (39%) had comorbidities from a single category. Forty-four (38%) suffered from diseases in two categories and eleven (10%) in three or more categories. Fifteen patients (13%) had no comorbidities listed. Two patients had also sustained an upper limb fracture at the time of hip fracture.

Table 1. Comorbidities (categorised) of patients with hip fracture

Comorbidity	Number
Cardiac	50 (43%)
Respiratory	23 (20%)
Cognitive impairment	49 (43%)

ASA scores—The American Society of Anaesthesiology physical status classification (ASA) score prior to injury was recorded. Seventy-eight patients (68%) were classified as ASA 3, indicating severe systemic disturbance which is not incapacitating or acutely life-threatening.

Table 2. American Society of Anaesthesiology (ASA) scores of hip fracture patients

ASA score	Number
ASA 1	0
ASA 2	19 (17%)
ASA 3	78 (68%)
ASA 4	18 (16%)
Total	**115**

Type of fracture—Table 3 shows the site of hip fractures.

Table 3. Anatomical distribution of hip fractures

Intracapasular fractures	Number	Extracapsular fractures	Number
Subcapital	59	Basal Cervical	4
Midcervical	1	Intertrochanteric	42
		Subtrochanteric	9
Total	**60**		**55**

Type of surgical fixation—Table 7 shows the type of surgical procedure performed.

Table 4. Type of surgical fixation

Procedure	Number
Dynamic hip screw	59
Hemi-arthroplasty	41
Total hip joint replacement	9
Proximal femoral nail	5
Cannulated screw	1
Total	**115**

Of the 60 patients with intracapsular hip fractures, 11 underwent a dynamic hip screw (18%) and 39 had a hemiarthroplasty.

Pathways of care—One patient was transferred to Christchurch postoperatively for rehabilitation, so their final outcome data was unavailable. Overall 108 patients were discharged at the end of their clinical episode and included in this audit.

Ninety-one patients were transferred from Orthopaedic wards directly to Older Peoples Health for medical stabilisation, rehabilitation and discharge planning. Of the others: 17 were discharged directly from Orthopaedics (2 to home, 15 to Private Hospital); one died whilst under the care of Orthopaedics; and one was transferred to Christchurch. Five patients went from Orthopaedics to the non-weight bearing scheme, and all later returned to have rehabilitation under Older Peoples Health. A total of 96 (84%) of the audited group had rehabilitation and treatment by Older Peoples Health.

Two patients went from Older Peoples Health to the non-weight bearing scheme and later returned for further rehabilitation.

Process of care measures

Time from fracture to admission—The time from fracture to admission could not be calculated in 10 patients, for whom either a time of injury or time of admission had not been recorded. For those who had a time of injury recorded, all were admitted within 24 hours of injury.

Time to surgery—Table 5 shows time from admission to surgery.

Table 5. Time from admission to surgery

Time from admission to surgery	Number
<24 hours	27 (24%)
24–48 hours	41
49–72 hours	22
>72 hours	25 (22%)

Two patients were already in hospital for another reason at the time of injury. Sixty-eight patients (59%) had undergone surgery within 48 hours of admission.

Of those 88 patients who did not have surgery within 24 hours of admission, 24 (27%) were delayed because of medically instability or treatment. Thirty (34%) were awaiting further investigation, such as echocardiogram or radiology. The other 34 (39%) were waiting for operating theatre availability.

Length of stay (LOS)—The median and average lengths of stay are shown in Table 6. The average waiting time for Older Persons Health was 1 day (range 0–7).

Table 6. Median and average lengths of stay (LOS)

Length of stay (days)	LOS median (range)	LOS average
Orthopaedics Older Peoples Health (OPH)	7 (1-37) 20 (3-60)	8.8 22.8
Total (Orthopaedics + OPH)	27 (5-71)	28.1

Outcome measures

Mortality—There were 6 inpatient deaths (5%)—one in the Orthopaedic ward and five in Older Peoples Health. Of those who died, 2 were male and 4 were female.

Complications—The most common postoperative complication was anaemia requiring blood transfusion, which occurred in 24% of patients. Delirium was documented in 23%. Pneumonia occurred in 17% of patients and urinary tract infection in 16%. One patient had failure of dynamic hip screw and was re-operated, receiving a hemiarthroplasty.

Living Situation—Table 7 shows the place of domicile of hip fracture patients on admission and at discharge.

Prior to admission, 70 patients (61%) were living at home. On discharge this had dropped to 49 (45%). The number requiring Private Hospital care rose from 10 (9%) on admission, to 46 (43%) on discharge.

Of those living at home on admission, 70% returned home. Of the 35 people originally living in Rest Homes, 25 (71%) were discharged to Private Hospital after their hip fracture. All of the 10 patients living in Private Hospitals were discharged back to Private Hospitals.

Overall 35% of patients went to a higher level of care on discharge.

Table 7. Place of domicile on admission and on discharge following hip fracture

Living situation Pre-fracture	Number	Living situation On discharge	Number (%)
Home	70	Home Rest Home Private Hospital Died Other[1]	49 (70%) 4 11 5 1
Rest Home	35	Rest Home Private Hospital Died	9 (26%) 25 1
Private Hospital	10	Private Hospital	10
Total	**115**		**115**

[1] One patient transferred to Christchurch Hospital.

Mobility—Table 8 shows patient's requirements for walking aids before hip fracture and on discharge. Fifty patients (44%) did not use any gait aid prior to their hip

fracture. Only one patient was able to walk unaided at discharge; 60 (56%) required a walking frame.

Table 8. Walking aids on admission and at discharge

Walking aid	On admission	On discharge
No walking aid required	50 (44%)	1 (1%)
Walking stick or crutch	20 (17%)	13 (12%)
Walking frame	42 (37%)	60 (56%)
Gutterframe/wheelchair	0	16 (15%)
Bedbound	3 (3%)	18 (17%)
Total	**115**	**108**

Activities of daily living (ADLs)—Table 9 shows that prior to their hip fracture 93 patients (80%) received assistance with one or more instrumental activities of daily living. Sixty-two (54%) required assistance with one or more personal activities of daily living. On discharge, 86% of patients received help with personal ADLs, and 93% received help with instrumental ADLs.

Table 9. Need for assistance with activities of daily living—on admission and at discharge

Activities of daily living (ADLs)	Need for assistance – admission	Need for assistance – discharge
Personal ADLs	62 (54%)	93 (86%)
Instrumental ADLs	93 (80%)	100 (93%)

Prescriptions for prevention

DVT prophylaxis—DVT prophylaxis was prescribed in 89 (77%).

Osteoporosis treatment—Table 10 shows that on discharge 68 patients (63%) were treated with a bisphosphonate (weekly oral Alendronate or annual zolendronate infusion).

Of those who did not receive a bisphosphonate, inappropriate clinical context was cited in 28 patients. The reason given in four of these patients was age less than 75 years, therefore requiring a DEXA scan to qualify for bisphosphonate. Of the others considered to be in the inappropriate clinical context group by their treating geriatrician, three were of advanced age (93, 94 and 95 years respectively) and [21] were in private hospital care.

Allowing for this, overall compliance with osteoporosis prescribing guidelines for bisphosphonates was 93%, for calcium was 89% and for vitamin D was 88%.

Table 10. Prescribing of osteoporosis treatment on discharge

Bisphosphonate	No bisphosphonate	Had a reason for not prescribing	
68 (63%)	40	Yes No	32 8
Calcium 81 (75%)	No calcium 27	Yes No	15 12
Vitamin D 83 (76%)	No Vitamin D 25	Yes No	12 13

Of the 15 patients who were not prescribed calcium, inappropriate clinical context was cited in 14: one patient had documented hypercalcaemia, 13 were discharged to a Private Hospital. For those not prescribed Vitamin D, inappropriate clinical context was cited in 12 (48%); no reason was documented in the other 13 patients.

Comparison of "fast-tracked" with "usual care" patients

Thirty-nine patients were "fast-tracked" on the day of surgery or Day 1 postoperatively, constituting 43% of all Orthopaedic patients transferred to Older Peoples Health. See Table 11 for comparative demographics and Table 12 for fracture type and surgical fixation. These appear broadly similar.

Table 11. Demographics and fracture sites of patients fast-tracked compared with usual care

Demographic	Fast tracked	Usual care
Number	39	57
Age – median (years)	86.0	84.5
Female	34 (87%)	41 (72%)
Male	4	16
ASA 3	27 (69%)	40 (70%)
ASA 4	4	9

Table 12. Type of fracture and surgical fixation of patients fast-tracked

Fracture or procedure type	Fast tracked	Usual care
Intracapsular fracture	25(64%)	23(40%)
Extracapsular fracture	14	34
Dynamic hip screw	19(49%)	33(58%)
Hemiarthroplasty	16	16
Total hip joint replacement	4	3
Proximal femoral nail	0	5

Table 13 shows comparative length of stay data for fast-tracked patients versus those receiving usual care.

Table 13. Length of stay (LOS) in days – fast-track and usual care

Median number of days	Fast-Track	Usual Care
Orthopaedics	2	11
Older Peoples Health	20	21
Total LOS	23	28

Outcomes for fast-tracked patients are shown in Table 14 and for those receiving usual care in Table 15. For fast-tracked patients: 74% of patients originally living at home returned home; 15% of Rest Home patients returned to Rest Home; 33% of patients went to a higher level of care on discharge. For usual care patients: 65% of patients originally living at home returned home; 31% of Rest Home patients returned to Rest Home; 35% of patients went to a higher level of care on discharge.

Table 14. Discharge destination for patients fast-tracked

Living situation Pre-fracture	Number	Living situation on discharge	Number (%)
Home	23	Home Private Hospital Died	17 (74%) 3 3
Rest Home	13	Rest Home Private Hospital Died	2 10 (77%) 1
Private Hospital	3	Private Hospital	3
Total	**39**		**39**

Table 15. Discharge destination for patients receiving usual care

Living situation Pre-fracture	Number	Living situation on discharge	Number (%)
Home	34	Home Rest Home Private Hospital Died Other	22 (65%) 3 6 2 1[1]
Rest Home	16	Rest Home Private Hospital	5 11 (69%)
Private Hospital	7	Private Hospital	7
Total	**57**		**57**

[1] One patient transferred to Christchurch.

Comparative data from previous audits at Auckland City Hospital

Table 16 shows data from previous audits of hip fracture patients aged 65 years and over at Auckland City Hospital.

Table 16. Comparative data – Auckland City Hospital

Patients 65 Years and Over with Hip Fracture	1993	1996	2002	2007
% Living at home pre-fracture	66	60		61
% Transfer to OPH	45	67	60	84
Mean Wait Time for OPH (days)	8	4	2	1
Mean LOS Orthopaedics (days)	13	9	12	9
Mean LOS total (days)	45	38		28
% Surgery in <24hrs	50	49	59	24
% From home returning home post fracture	63	82		70

Note: Orthopaedic services in greater Auckland region were reconfigured in 2003/04 and the new Auckland City Hospital opened in late 2003.

Discussion

This prospective audit of a busy Ortho-Geriatric unit showed that Auckland City Hospital provides its population with a service broadly comparable to other major centres. However, there has been a significant decline in the number of patients undergoing surgery for hip fracture within 24 hours of admission. Lack of operating resources explained why 39% did not receive surgery in this time frame.

The transfer rate to Older Peoples Health from Orthopaedics is higher than other centres, and the overall length of the episode of care is longer. The innovation of "fast-tracked" patients achieved similar outcomes to those receiving usual care, but shorter lengths of stay in the Orthopaedic ward and overall.

Patient age and gender distribution and pre-admission place of residence were comparable to those in a similar audit by Thwaites et al from Christchurch in 2005 [5].

Of the 115 patients with hip fracture in this audit, inpatient mortality was 5%. This is comparable with an in-patient mortality of 8% in a Christchurch study by Elliot et al in 1996,[4] and 5% mortality during the initial hospital episode in the NZHIS study.[1] Several recent studies have shown an increased mortality in male patients following hip fracture.[2,6] The higher inpatient mortality for females in our study (66% of deaths) may be due to smaller sample size and shorter follow-up time.

There is evidence suggesting that delay to operation in hip fracture increases mortality, even when adjustments are made for comorbidities.[1,3] The New Zealand Guidelines Group guideline for acute management and rehabilitation after hip fracture recommends that surgical fixation should take place within 24 hours of admission.[7] There is, however, evidence that mortality is increased when hip fracture surgery is undertaken as a night-time emergency.[8]

In this audit, time to surgery was comparable to the NZHIS study, which reported 73% of patients undergoing surgery on the day of admission or the day after, (27% and 46% respectively).[1] Individual centres, however, have reported better performance in this area.

In Weatherall's study, 94% of patients had been operated on within 48 hours of admission [9]. North Shore Hospital in Auckland reported 58% of hip fracture patients undergoing surgery within 24 hours of admission in a recent audit, although

Middlemore Hospital experienced similar delays to our study due to demand for operating theatre time.[10]

Surgery may need to be delayed in order to treat medical conditions and reduce operative risk. However in this audit 38% of those delayed were not unstable or awaiting investigation, suggesting that access to surgical resources is a key factor. The percentage of patients having surgery within 24 hours of admission at Auckland City Hospital was stable between 1993 and 2002, but approximately halved between 2002 and 2007. We postulate that changes in operating theatre access as a result of completion of the new Auckland City Hospital in late 2003 have lead to increased delays for older patients with hip fractures. Further audit of the orthopaedic service is needed to clarify the reasons for this deterioration in service.

Determining an optimal length of stay for patients after hip fracture is difficult. It is not always clear how best to balance the cost of inpatient hospital stay against maximising functional outcomes through rehabilitation.

In this study, median overall length of stay was 15% longer than that found by Thwaites et al in Christchurch.[5] Weatherall et al in Waikato reported 19.9 days,[9] and an audit of Middlemore and North Shore Hospitals reported mean lengths of stay of 22 and 17 days respectively.[10] The median length of stay in orthopaedics was comparable between these studies, showing that time in rehabilitation is the main variation across different centres. See Table 17.

Table 17. Comparative data – other New Zealand centres

Patients 65 years and over with fractured neck of femur (NOF)	Auckland City Hospital 2007	North Shore Hospital 2004 [10]	Middlemore Hospital 2004 [10]	Christchurch 2005 [5]
Orthopaedics LOS (mean)	9	9	13	8*
Total LOS (mean)	28	17	22	23*
% Transfer to Older Peoples Health	84	75	52	
% Home-home	70	81	81	87

* = median.

A longer length of stay may be justifiable if improved patient outcomes are observed. In the audited population 35% of patients went to a higher level of care on discharge. Of patients living at home prior to their hip fracture, only 70% returned home. This is a lower percentage than that reported in similar studies (see Table 16), where between 81 and 87% of patients from home returned home following hip fracture.[5,9,10] Differences in criteria for inpatient rehabilitation between different centres may account for some of this variation.

Rest Home patients made a disproportionately poor recovery, with the majority (71%) moving to Private Hospital care. This percentage was higher than those of Middlemore and North Shore Hospitals, which reported 49% of patients from Rest Home returning to Rest Home.[10] Rest Home patients in Christchurch and Waikato fared much better,[5,9] which may indicate differences in populations. Ethnicity or socioeconomic factors may be important in these regional differences. However, a

more cogent explanation is that the dependency levels of people in residential care in the Auckland region have significantly increased over the last 20 years [20].

Hip fracture patients with more comorbidities have a higher risk of postoperative complications and mortality.[11] Geriatrician input has been shown to improve these outcomes,[12] hence the development of the fast-track system we have described. These patients had a 15% shorter total length of stay due to a shorter stay in orthopaedics, but time in Older Peoples Health was unchanged. Our small sample size makes it difficult to comment on the effect on complications and mortality for the patients who are fast-tracked. However these patients seem to do no worse in terms of requiring a higher level of care on discharge.

The percentage of hip fracture patients transferred to Older Peoples Health was high, at 84%. Weatherall et al reported 57% of patients were transferred to rehabilitation wards,[9] Middlemore was lower at 51%, and North Shore Hospital reported 75% transferred [10]. This demonstrates that a more open approach to selecting patients for rehabilitation is being used at Auckland City Hospital. By not excluding Private Hospital patients, the frailty of this group is increased, and a larger proportion of patients are likely to make a less complete recovery.

The ASA score, which has been shown to reliably predict perioperative morbidity and mortality, has not been recorded in all studies, making comparison difficult.[13] Eighty-four percent of patients in this audit had ASA scores of 3 or 4, compared to 69% and 75% in a similar audit of hip fractures at North Shore Hospital and Middlemore Hospitals, respectively.[10] The low inpatient mortality rate (0.7%) and high proportion of patients returning home after hip fracture in the Christchurch study[5] may suggest a more robust population.

Dementia was a common comorbidity and was more frequent in this study than in a similar population at Middlemore and North Shore Hospitals.[10] This may impact on a patient's ability to rehabilitate from hip fracture, and could be a contributing factor to the longer length of stay and higher level of dependency seen on discharge in this study.

Patients depend upon therapist input, and changes in staffing levels may affect length of stay and outcomes. Local differences in Rest Home care and availability of Private Hospital beds may also lead to more patients moving to a higher level of care.

Comparative data from earlier audits of hip fracture patients in Auckland City Hospital shows that a similar percentage of patients were living at home prior to their fracture in 1993 and 1996 as in 2007. The length of stay in orthopaedics is similar between these audits, but the mean overall length of stay has reduced from 45 days in 1993 to 28 days in 2007. This is most likely to be a reflection of trends across all hospital inpatients towards earlier discharge. The proportion of patients transferred to Older Peoples' Health post hip fracture has almost doubled between 1993 and 2007, but the average waiting time has dropped from over a week to one day. A similar percentage of patients are able to return home following their hip fracture in 2007 as in 1993.

Further study into the factors contributing to length of stay in Older Peoples Health is required, as improvements in this area would have significant cost implications. It is also important that readmission rates are recorded in future studies of this service, as

this would determine whether longer length of stay increases the frequency of successful discharges.

Although there is good evidence to support the use of osteoporosis treatment in prevention of further fractures, rates of prescribing are often low.[14–18] In this study, no explanation was given in 20% of those not prescribed a bisphosphonate and this was even higher for calcium and vitamin D, suggesting that this is omission rather than conscious decision. Protocols have been shown to be effective in improving osteoporosis prescribing,[19] and other strategies could include the use of a drug-chart "sticker" or discharge check-list.

This audit provides short-term data on outcomes of older hip fracture patients managed by Orthopaedics and Geriatric Medicine at Auckland City Hospital. It is limited by size and duration and has limitations when comparing with other studies and trials due to widely varying aims, methods and outcome measures between the studies. Developing a standardised approach in New Zealand to future audits would help with comparisons. For example adopting the audit tool used for the National Hip Fracture Database in the UK (http://www.nhfd.co.uk) would enhance both local and international comparison.

Conclusion

This audit demonstrates a significant delay to surgery for patients with hip fractures. The percentage of these patients being transferred to Older Peoples Health wards from Orthopaedics is high at 84%. "Fast-tracking" to Older Peoples Health wards shortens overall length of stay due to fewer days in Orthopaedics. Many patients require a higher level of care after hip fracture, particularly if already resident in Rest Home.

Changing structures within hospital systems have the potential to adversely affect older patients with complex care needs. The 'fast-track' process described in this audit was designed to both maximise use of beds on the orthopaedic wards and also to improve care by providing earlier care by a specialist service for older people.

It is reassuring to find that moving older patients with hip fractures to Older Peoples Health on day 1 postoperatively does not seem to disadvantage them in terms of discharge outcomes.

The reduction in the number of patients receiving surgery within 24 hours of admission is a comparatively recent phenomenon coinciding with the reconfiguration of the Auckland regional Orthopaedic services and the opening of the new Auckland City Hospital. It appears that these structural changes have had an unintended adverse effect.

Demographics and inpatient mortality are comparable, but total length of stay is longer than similar New Zealand studies due to a longer length of stay in Older Peoples Health. Patients presenting with hip fracture are a large and heterogeneous group, with variations in age, mobility, living situation and comorbidities. Their outcomes in the different studies are dependent on case mix and the many other factors mentioned.

In addition, in Auckland the dependency levels of people in residential care have significantly increased over the last 20 years. These factors may account for some of the differences compared to audits from other New Zealand centres.

Review of previous data from Auckland City Hospital and from other New Zealand centres shows significant variability in process of care for older patients with hip fracture. Developing a standardised approach in New Zealand to future audits would help with comparisons.

Further research into the reasons for delay to operation and long length of stay in Older Peoples Health is needed to improve the process of care. The application of quality improvement principles and ongoing audit of the whole patient journey is needed to allow continuous improvement of the Ortho-Geriatric Service.

Competing interests: None.

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