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# The Economic Cost of Hip Fracture in the UK

Avoiding slips, trips  
and broken hips

The paper was commissioned by Health Promotion England on behalf of the Department of Trade and Industry from Steve Parrott, Research Fellow, Centre for Health Economics, University of York

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## **Introduction**

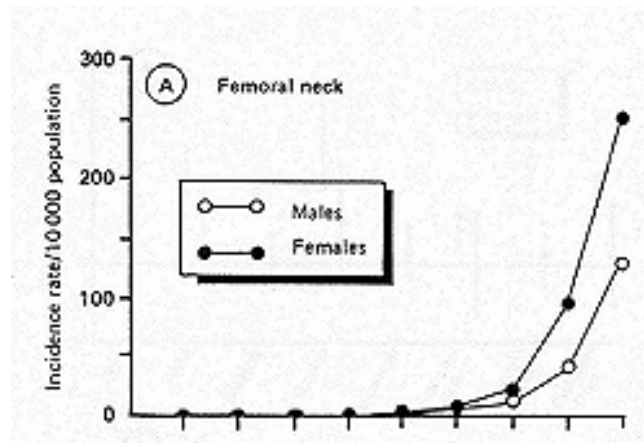
Fractures among the older age groups of the population are a major cause of morbidity and mortality. The UK population is ageing and therefore the cost of falls incurred by the NHS and other agencies is expected to escalate. Fractures of the hip are a common and costly result of falls amongst the elderly sections of the population. Hip fractures account for approximately 20% of orthopaedic bed occupancies in the UK, and based on current population trends, the number of hip fractures may rise to 120,000 per annum by 2015 (Johnell et al, 1992)

The main costs of falls will be upon the NHS in the treatment of injuries from falls, and following periods of convalescence. Social care providers will also incur costs; for example that of long term care. Primary care costs may also be experienced in terms of an increase in GP visits following a fall. In addition, there may be costs associated with time taken off work, although these costs are likely to be small when considering an elderly population.

This paper estimates the costs of falls to these parties, based on existing literature, and bases the cost analysis on fractures of the hip.

The incidence of fractures will be affected by a number of factors, such as the ethnic composition of the population, diet and smoking prevalence.

Donaldson et al (1990) provides an analysis of fractures based on data from a fracture clinic held by the Department of Community Health in Leicester (UK). The study shows an increasing incidence of fractures of the neck of the femur.



Source: Donaldson et al (1990)

This paper will use the costs of fractures of the neck of the femur to approximate the costs of falls, as this type of fracture has been well documented in the literature. Table 1 shows an estimated 47,471 fractures of the neck of the femur in the UK per annum. The total number of fractures of the neck of the femur was estimated by applying the average incidence of fractures listed by Donaldson et al (1990) to the population of the UK.

#### NUMBER OF HIP FRACTURES:

**Table 1: Estimated number of hip fractures per annum, UK (1990)**

Fracture site	Rate per 10,000		Estimated number of fractures	
	Male	Female	Male	Female
Neck of Femur	3.9	12.1	11,255	36,215

Hollingworth et al (1993) published a study of hip fracture, which estimated the length of stay for such a fracture at 42 days. The total cost of this stay was estimated at £5,606 (£7,092 at 1998/99 costs). French et al (1995) estimated a cost of £4,018 (£4,755 at 1998/99 costs) for a stay of 20 days.

## LENGTH OF STAY

The latest UK length of stay estimate for hip fracture is 20 days. This is much less than the Hollingworth study — hence the marginal cost per day is estimated at

$$\mathbf{£7,092 - £4,755 = £106 / day}$$

This figure is then deducted from the Hollingsworth's cost estimate for length of stay

$$22 \text{ days} \times £106 = £2,332$$

$$£7092 - £2332 = £4,760 \text{ per hip fracture}$$

**Table 2: Cost of fractures, UK**

	<b>Cost per hip fracture</b>	<b>No patients</b>	<b>Total Cost</b>
Hospital costs	£4,760	47,471	£225,961,960

## AMBULANCE COSTS:

A further possible cost category may be the costs of bringing patients to hospital using an ambulance. Assuming 50% of fractures require an ambulance call out, using the cost per patient journey of £171 (Netten et al 1999) the total cost of ambulance transport would be:

$$\mathbf{50\% \times 47471 \times £171 = £4,058,770}$$

## SOCIAL CARE:

Table 3 shows the estimated costs of social care following a femoral fracture. Keene et al (1993) takes the proportions of patients in each of the four categories from a study of mortality and morbidity after hip fracture.

**Table 3: The estimated social costs of hip fracture**

<b>Cost description</b>	<b>No patients</b>	<b>Cost</b>	<b>Total cost</b>
Long stay hospital care	2374 (5%)	2374 x 345 days x £222*	£181,824,660
Long stay hospital care followed by death, median stay = 52 days	7121 (15%)	7121 x 52 days x £222*	£82,204,824
Long stay residential care after discharge	9494 (20%)	9494 x 345 days x £58	£189,974,940
Discharged home	21362 (45%)	21362 x £1687	£36,037,694
Dead within 20 days	7121 (15%)	£0	
<b>Total</b>			<b>£490,042,118</b>

- £222 taken from cost per inpatient day of generic hospital costs taken from a wide variety of specialities (Netten et al 1999)
- \*\* Cost of local authority residential care for elderly people. Cost per week per permanent resident = £406 (£58/day) taken from Netten et al 1999
- Estimated excess use of social care services per annum = £1687 (source: Dolan et al)

In terms of the costs of GP usage and outpatient appointments, tables 4 and 5 provide estimates of the degree of excess usage.

## EXCESS GP/OUTPATIENT USAGE

**Table 4: Excess GP and outpatient usage amongst hip fracture patients**

		Cases	Controls
GP visits		10.75	1.62
Outpatient			
• Geriatric	Before	2.6	1.2
	After	7.0	2.8
• Orthopaedic	Before	3.0	3.2
	After	32.0	3.6
• Medical	Before	3.4	4.2
	After	11.6	4.4
• Rheumatology	Before	0.4	0.4
	After	0.6	0.4
• Radiology	Before	4.0	5.0
	After	9.0	5.2

Source: Dolan and Torgerson (1998)

**Table 5: GP costs of excess service use amongst hip fracture patients**

	Cost per patient	% increase	Total no of patients	Cost
GP	£164	9.13	30856	£5,060,384

Based on cost per GP consultation of £18 (Netten et al 1999)

In addition to increased inpatient and GP use, research has shown hip fracture patients to use more outpatient services than their controls. Table 6 presents estimates of this excess usage.

**Table 6: Outpatient clinic costs**

	Cost per patient	% increase	Total no of patients	Total Cost
Geriatric	£88	2.8	864	£76,029
Orthopaedic	£55	28.6	8,825	£485,365
Medical	£67	7.8	2,407	£161,253
Rheumatology	£69	0.2	62	£4,258
Radiology	£41	4.8	1,481	£60,725
<b>Total</b>				<b>£787,630</b>

Source: Netten et al (1999) and CIPFA (1996)

A total of 30,856 patients are included in these calculations, as we must deduct the patients who die within 20 days, patients in long term hospital care and those in long stay care who do not survive.

### Other costs

Table 6 shows the number of patients who visit outpatient departments. These patients will incur travel costs when visiting these departments. We therefore assume that each patient visits the department twice, travelling an average distance of 2 miles each way. The total cost of this travel is £18,003 per annum, using an estimated cost per mile of £0.33 as shown in Table 7.

**Table 7: Patient travel costs to outpatient appointments**

	Patients	Miles	Cost/Mile	Cost
Geriatric	864	4	0.33	£1140.48
Orthopaedic	8,825	4	0.33	£11649.00
Medical	2,407	4	0.33	£3177.24
Rheumatology	62	4	0.33	£81.84
Radiology	1,481	4	0.33	£1954.90
<b>Total</b>				<b>£ 18,003.46</b>

## PRODUCTIVITY OF FAMILY

It is plausible that other costs may be associated with hip fractures. One hidden cost is lost productivity if members of a patient's family must take time off work to care for the individual. The above estimates point to 21,362 patients returning home following a hip fracture. Supposing that a member of the family had to give up employment to care for an elderly relative, the estimated productivity loss could be approximated by the wage earned.

Based on an average gross wage of £399.50 per week, the average lost earnings per annum would be approximately £20,774, which would approximate to the value of lost production. Table 8 shows a range of estimates based on different percentages of carers having to give up work. Obviously these simply represent a range of feasible values of production costs. As no studies of the time taken off work to care for such patients could be found, these are not included in the final figure.

Production losses incurred as a result of the injured party no longer being able to work are assumed to be low due to low rates of labour force participation and are not included.

A further possibility is that carers may have to reduce their hours of work in order to care for elderly relatives. Thus the figures can be calculated using the average hourly wage of £9.53 per hour.

**Table 8: Possible output loss costs - an illustration**

Proportion of carers giving up work	Productivity loss
0.01	£4,437,742
0.05	£22,188,709
0.1	£44,377,419
0.2	£88,754,838

## Summary

The treatment of hip fractures as a result of falls in the UK imposes a considerable cost upon the NHS and society. Table 9 summarises these costs.

**Table 9: The cost of hip fracture in the UK**

Cost category	Estimated cost per annum
Hospital costs	£225,961,960
Ambulance costs	£4,058,770
Social care costs	£490,042,118
GP costs	£5,060,384
Outpatient costs	£787,630
Travel costs to outpatients	£18,003
<b>Total</b>	<b>£725,928,865</b>

The total estimated cost to society is almost £726 million per annum. Over half of the cost is attributed to social care of patients recovering from a broken hip. These estimates *exclude* potential costs incurred if carers must either stop working or reduce their hours of employment in order to care for relatives impaired as a result of a hip fracture (see Table 8).

Table 10 estimates the cost of a single hip fracture patient assumed to survive following a fracture and spending a year in long stay residential care. The estimate shows a typical hip fracture to cost approximately £25,424. This *excludes* possible costs incurred by the family in caring for the patient or associated travel costs of the patient travelling to a health care provider.

**Table 10: Cost of an individual hip fracture**

Category	Cost
Hospital care	£4,760
Ambulance	£171
Long stay residential care	£20,010
GP use	£164
Outpatient use	£319
	£25,424

### **Conclusions**

The treatment of hip fractures places a heavy burden on the NHS and social care services. As the UK population ages, the cost of falls is expected to escalate. Therefore, measures to reduce the incidence of falls will generate significant savings to the NHS and society as a whole.

### **References**

- CIPFA Health Database 1996. Health Services Financial Database. London: CIPFA 1996
- Dolan, P & Torgerson, DT (1998) The cost of treating osteoporotic fractures in the UK female population *Osteoporosis International*, 8, pp611-617
- Donaldson, LJ, Cook, A & Thomson, RG (1990) Incidence of fractures in a geographically defined population. *Journal of Epidemiology and Community Health*, 44, pp241-245
- French, F, Torgerson, DJ & Porter, RA (1995) A cost analysis of hip fracture. *Age and Ageing*, 24, pp185-189

- Hollingsworth, W. Todd, C, Parker, M, Roberts, JA & Williams, R (1993) Cost analysis of early discharge after hip fracture. *British Medical Journal*, 9 October 1993, 307, pp903-6.
- Johnell, O, Gullberg, B, Allander, JA, Kanis, JA & the MEDOS Study Group (1992) The apparent incidence of hip fracture in Europe: A study of national register sources. *Osteoporosis International*, 2, pp298-302
- Keene, GS, Parker, MJ & Pryor, GA Mortality and morbidity after hip fractures *British Medical Journal*, 13 November 1993, 307, pp1248-50
- Netten, A, Dennett, J & Knight, J. *Unit Costs of Health and Social Care 1999*. Canterbury: PSSRU, University of Kent.