Costs of hip fracture

Rehabilitation of 180 patients in primary health care

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Costs related to functional status were calculated for 180 consecutive hip fracture patients (mean age 78 years) who were admitted from their own home and rehabilitated in primary health care. Within 4 months after the fracture, 75 percent of the patients had been discharged to their own home, 9 percent were dead, and the short-term medical treatment costs per patient were SEK 43,000, whereas the total costs including communal help and costs for living accommodations after discharge were twice as high. The total costs per patient for long-term medical treatment (from 4 months up to 3 years after fracture) were 7 percent of the short-term medical treatment costs. Patients with a cervical fracture discharged to their own home and with good functional status consumed only one fifth of the resources that patients with a trochanteric fracture discharged to institutional care and who had reduced functional status consumed. A substantial part of the costs can be saved by improved organization of rehabilitation after discharge from the hospital. A further cost reduction would require a combination of technologic, social, and organizational changes aimed at early discharge and continued follow-up in primary health care.

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Hip fracture in the elderly is the largest diagnostic group treated at an orthopedic department; about one fourth of all orthopedic beds in Sweden are used for hip fractures, and the number of hip fractures will continue to increase (Zain Elabdien et al. 1984, Zetterberg et al. 1984, Jarnlo et al. 1989, Obrant et al. 1989). Some studies (Jensen et al. 1980, Jarnlo et al. 1984, Engesæter and Søreide 1985, Agarwal et al. 1986, Holmberg and Thorngren 1988) have tried to estimate costs of hip fractures. In these studies, costs were mainly calculated as inpatient costs in the acute phase. Little is known today about the economic consequences of the entire rehabilitation process. Studies of costs related to functional status for specific diseases are rare both in Sweden and in other countries.

In the present study, we present a comprehensive report of all the treatment costs associated with hip fractures. The costs were related to functional status during both the acute hospital phase and the rehabilitation phase under the auspices of the primary health care organization.

Patients and methods

Since November 1, 1985, all the hip fracture patients who had been admitted to the hospital from their own home in the Lund University Hospital catchment area were followed prospectively as regards medical, functional, and social parameters. Before this date, all the patients had had a follow-up examination at our orthopedic department and a radiographic examination 4 months after their fracture. To further adapt to the increasing number of hip fracture patients, all the routine follow-up examinations were transferred from the orthopedic department in Lund to the primary health care organization.

An earlier study (Borgquist et al. 1990) has demonstrated that this system gives equally good results provided that patients with pain and walking problems arising from the hip are guaranteed rapid specialist treatment. The main part of the rehabilitation process was completed after 4 months.

This report includes all 180 patients above 50 years of age with a fresh hip fracture who were admitted to the hospital from their own home during the first year of the new rehabilitation program. During the same period, totally 298 patients were admitted with a fresh hip fracture.

The ratio of women to men was 3:1, and the number of cervical and trochanteric fractures was respectively 99 and 81. The mean age of these patients was 78 years. The proportion of patients discharged to their own home was 57 per cent, of whom 75 percent were still residing in their own

Table 1. General table. 180 patients with a hip fracture residing in own home at admittance. All the costs are SEK, thousands

Case	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	86	3	3	7	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12.2	0.0	0.0	0.0	0.0	12.2
2	1	86	16	3	1	1	2	1	2	1	1	1	1	2	2	3	1	1	2	2	33.4	0.0	0.7	0.0	0.0	34.1
3	2	86	25	1	4	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	55.2	0.0	0.7	1.1	56.4	113.4
4	1	85	10	1	5	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	30.7	0.0	0.0	0.0	231	261.7
5	2	86	29	1	1	1	1	2	1	2	1	1	1	2	3	3	1	1	2	2	61.7	0.0	1.5	5.5	0.0	68.7
6	2	85	23	3	2	1	1	2	1	2	1	2	1	1	1	3	1	2	1	3	44.9	0.0	0.5	0.0	7.7	53.1
7	2	86	25	1	4	4	1	2	1	2	1	1	1	3	1	3	1	1	1	2	55.2	0.0	0.8	0.0	150	206.0
8	2	85	17	1	4	4	2	–	2	3	1	2	1	3	1	3	1	2	2	3	42.1	0.0	1.3	0.0	150	193.4
9	2	85	20	2	1	3	1	1	1	1	1	2	1	3	1	3	1	2	1	3	47.0	1.7	0.1	3.3	60.0	112.1
10	2	85	18	1	4	4	1	2	1	2	1	2	2	3	2	3	1	2	1	3	43.8	0.0	0.8	0.0	150	194.6
11	2	85	15	1	4	1	2	1	2	1	1	2	3	3	3	3	2	2	2	2	38.9	0.0	1.3	0.0	18.8	59.0
12	2	85	21	3	3	1	1	1	1	1	1	1	1	2	1	3	1	1	2	1	41.6	0.0	0.3	0.0	25.7	67.6
13	1	85	10	3	1	1	1	1	1	1	2	1	3	1	3	1	2	1	1	1	23.6	0.8	0.6	0.0	0.0	25.0
14	2	84	13	3	1	1	2	1	2	1	1	3	1	3	2	3	1	–	1	2	28.5	0.0	0.7	0.0	0.0	29.2
15	2	84	15	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	2	38.9	0.0	0.6	0.0	0.0	39.5
16	2	84	20	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	40.0	0.0	0.6	0.0	0.0	40.6
17	2	84	20	1	4	1	1	1	1	1	1	1	1	3	3	1	1	2	2	2	47.0	0.0	1.8	3.3	18.8	70.9
18	2	84	16	1	3	1	1	2	1	2	1	2	1	2	1	3	1	2	1	2	40.5	0.0	1.1	5.5	8.6	55.7
19	2	84	18	1	4	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	43.8	0.0	0.2	0.0	56.4	100.4
20	2	84	12	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26.9	0.0	0.6	2.2	0.0	29.7
21	2	84	14	1	4	4	2	2	2	2	2	2	3	3	3	3	2	2	3	3	37.2	0.0	1.1	0.0	150.4	188.7
22	2	84	15	3	4	1	2	2	2	2	1	1	3	3	3	3	2	1	2	2	31.8	0.0	1.5	0.0	18.8	52.1
23	2	83	31	1	4	1	1	1	1	1	1	1	1	1	2	3	1	1	2	1	65.0	0.0	0.4	13.2	112.8	191.4
24	1	84	6	3	7	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	17.1	0.0	0.0	0.0	0.0	17.1
25	2	84	31	1	4	4	–	–	3	3	1	2	3	3	3	3	–	2	–	3	65.0	0.8	0.0	0.0	150.4	216.2
26	2	84	21	1	1	1	1	2	1	2	1	1	1	2	1	3	1	1	1	2	48.7	0.0	0.7	11.0	0.0	60.4
27	2	83	25	3	2	3	2	1	2	1	1	2	2	3	1	3	1	2	1	2	93.4	0.8	1.1	0.0	65.8	161.1
28	2	83	16	3	1	1	1	2	1	2	1	1	1	1	1	3	1	1	2	2	33.4	0.0	0.6	17.7	0.0	51.7
29	2	83	26	1	4	1	2	1	2	1	2	2	2	2	3	3	1	2	1	1	56.8	0.0	0.5	0.0	56.4	113.7
30	2	83	33	1	4	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	68.3	0.0	0.0	0.0	112.8	181.1
31	2	83	30	1	2	1	2	2	2	2	1	1	1	1	3	3	1	1	1	3	63.4	0.0	1.4	1.1	23.0	88.9
32	2	83	28	1	4	4	1	2	1	2	1	2	2	3	3	3	1	2	1	3	60.1	0.0	0.0	0.0	150.4	210.5
33	2	83	17	3	4	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	35.1	0.0	0.4	0.0	56.4	91.9
34	2	83	30	1	3	3	2	1	2	1	1	1	1	3	1	3	1	1	1	1	63.4	0.0	0.0	0.0	68.5	131.9
35	2	82	17	3	5	7	2	–	2	–	1	–	1	–	3	–	1	–	3	–	35.1	0.0	0.2	0.0	96.9	132.0
36	2	82	12	1	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	34.0	0.0	0.7	5.0	7.7	47.4
37	1	82	19	1	1	7	–	–	3	–	2	–	3	–	3	–	2	–	3	–	45.4	0.0	0.4	0.0	0.0	45.8
38	2	82	14	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30.2	0.0	1.7	0.0	0.0	31.9
39	1	82	22	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	50.3	0.0	0.7	0.0	0.0	51.0
40	2	82	10	1	4	1	1	2	1	2	1	2	1	2	3	3	1	2	2	2	30.7	0.0	0.4	5.5	112.8	149.4
41	1	82	10	3	4	1	2	–	2	–	1	2	3	3	3	3	1	2	2	3	23.6	0.0	1.4	0.0	56.4	81.4
42	1	82	15	3	2	3	1	2	1	2	1	1	1	2	3	3	1	1	1	2	31.8	0.0	0.2	0.0	50.5	82.5
43	1	82	22	3	1	1	2	1	2	1	1	1	3	2	3	3	1	1	2	2	43.2	0.0	4.3	0.0	0.0	47.5
44	2	82	25	1	1	1	1	2	1	2	1	1	2	1	3	3	1	1	2	2	55.2	0.0	1.6	0.0	0.0	56.8
45	2	82	14	3	1	1	2	1	2	1	1	1	1	1	1	3	1	1	2	2	30.2	0.0	0.7	0.0	0.0	30.9
46	2	82	15	3	4	4	–	2	3	2	1	1	3	3	3	3	2	1	3	2	31.8	0.0	0.0	0.0	150.4	182.2
47	2	82	14	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30.2	0.0	0.6	8.8	0.0	39.6
48	2	81	54	3	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	95.6	1.4	0.5	0.0	64.6	162.1
49	2	81	15	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	31.8	0.0	1.1	8.8	0.0	41.7
50	2	81	7	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18.7	0.0	1.0	0.0	0.0	19.7
51	2	81	27	2	2	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	58.5	0.0	0.4	0.0	23.0	81.9
52	2	81	13	3	1	1	–	1	3	1	1	1	1	2	1	2	1	1	1	1	28.5	0.0	0.6	0.0	0.0	29.1
53	2	80	13	1	4	1	2	2	2	2	1	1	1	2	2	3	1	1	1	2	35.6	0.0	0.5	2.2	112.8	151.1
54	2	80	20	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	40.0	0.0	0.5	0.0	0.0	40.5
55	2	80	15	3	4	4	2	2	2	2	2	2	3	3	3	3	1	2	2	2	31.8	0.0	0.8	0.0	150.4	183.0
56	2	80	24	1	4	3	2	2	2	2	1	1	1	1	1	3	1	1	1	2	53.6	0.0	1.1	0.0	78.8	133.5
57	2	80	14	3	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	30.2	1.4	0.5	0.0	0.0	32.1
58	2	80	10	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23.6	0.0	1.0	0.0	0.0	24.6
59	2	80	22	1	2	1	1	1	1	1	1	1	1	1	1	3	1	1	2	2	50.3	0.0	1.1	3.3	7.7	62.4
60	2	80	14	1	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	37.2	0.0	0.5	0.0	0.0	37.7
61	1	80	15	3	4	1	2	1	2	1	1	1	3	2	3	3	2	1	2	2	31.8	0.0	1.0	0.0	112.8	145.6
62	2	80	20	1	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	47.0	0.0	1.0	0.0	0.0	48.0
63	2	80	23	3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	44.9	0.0	0.5	0.0	112.8	158.2
64	2	79	19	3	2	4	1	2	1	2	1	1	1	3	1	3	1	1	2	3	178.4	0.8	1.9	0.0	142.1	323.2
65	2	79	18	1	1	1	–	1	–	1	1	1	2	2	3	2	1	1	2	2	43.8	0.0	0.7	0.0	0.0	44.5
66	2	80	13	1	2	3	–	1	–	1	1	1	2	3	1	3	1	1	1	2	35.6	0.0	0.0	0.0	67.6	103.2
67	2	79	9	1	4	4	1	2	1	2	1	2	3	3	3	3	1	2	2	3	29.0	0.0	0.0	0.0	150.4	179.4
68	2	79	9	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	29.0	0.0	0.5	0.0	0.0	29.5
69	2	78	12	3	4	1	2	–	2	–	1	–	2	–	1	–	1	–	1	–	72.1	2.5	2.7	0.0	112.8	190.1
70	2	79	17	1	1	1	1	–	1	–	1	1	1	3	1	3	1	1	1	3	117.3	1.4	0.6	0.0	0.0	119.3
71	2	79	15	3	1	1	1	1	1	1	1	1	1	2	1	2	2	1	3	2	31.8	0.0	1.5	4.4	0.0	37.7
72	2	78	13	3	4	1	1	2	1	2	1	2	3	3	3	3	1	2	2	3	80.3	2.7	1.6	0.0	56.4	141.0
73	2	78	31	1	4	4	2	2	2	2	1	1	2	3	1	3	1	1	1	3	65.0	1.7	0.8	0.0	150.4	217.9
74	2	77	12	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	26.9	0.0	0.6	0.0	0.0	27.5
75	2	77	16	3	2	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	33.4	0.0	0.2	0.0	45.9	79.5
76	2	78	13	1	1	1	2	1	2	1	1	1	1	1	1	3	1	1	1	2	35.6	0.0	0.5	0.0	0.0	36.1
77	2	77	10	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23.6	0.8	0.5	0.0	0.0	24.9
78	2	78	5	3	1	7	–	–	3	–	2	–	3	–	3	–	2	–	3	–	15.4	0.0	0.0	0.0	0.0	15.4
79	2	78	10	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	23.6	0.8	0.9	8.8	0.0	34.1
80	2	77	10	3	1	1	1	1	1	1	1	1	1	2	1	2	1	1	2	2	23.6	0.6	0.5	0.0	0.0	24.7
81	2	77	18	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	36.7	0.0	0.5	0.0	0.0	37.2

Case	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
82	1	77	55	3	5	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	97.2	0.0	0.2	0.0	193.8	291.2
83	2	77	46	1	4	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	89.5	0.0	2.3	0.0	56.4	148.2
84	2	77	8	3	1	1	1	–	1	–	1	1	1	1	1	3	1	1	1	2	20.4	0.0	0.6	0.0	0.0	21.0
85	2	76	15	1	1	1	1	1	1	1	1	–	1	–	1	–	1	–	2	–	38.9	0.6	1.0	2.2	0.0	42.7
86	2	77	12	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26.9	0.0	0.5	0.0	0.0	27.4
87	2	76	14	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30.2	1.7	1.4	0.0	0.0	33.3
88	2	76	18	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	–	36.7	2.1	0.5	0.0	0.0	39.3
89	2	77	18	2	1	1	1	1	1	1	1	1	1	1	3	2	1	1	2	1	43.8	0.0	1.3	0.0	0.0	45.1
90	2	76	17	1	1	1	2	1	2	1	1	1	1	2	1	3	1	1	2	2	42.1	0.0	0.5	0.0	0.0	42.6
91	2	76	39	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	71.0	0.0	0.6	0.0	0.0	71.6
92	1	75	25	1	4	1	2	2	2	2	1	2	3	3	1	3	1	2	1	2	55.2	0.0	0.6	0.0	18.8	74.6
93	2	75	27	2	4	3	1	2	1	2	1	2	2	3	3	3	1	2	2	3	58.5	2.5	1.3	0.0	129.9	192.2
94	1	75	13	3	1	1	1	–	1	–	1	1	1	1	1	1	1	1	1	1	28.5	0.0	0.5	0.0	0.0	29.0
95	1	75	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34.0	0.0	0.6	0.0	0.0	34.6
96	2	74	12	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26.9	0.0	0.6	0.0	0.0	27.5
97	1	74	8	3	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	2	20.4	2.3	0.7	4.4	0.0	27.8
98	1	74	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	40.5	0.0	0.6	0.0	0.0	41.1
99	2	74	32	3	4	4	2	2	2	2	1	1	2	3	3	3	2	1	3	3	114.6	0.8	0.1	0.0	150.4	265.9
100	2	74	12	3	1	1	2	2	2	2	1	1	2	2	2	3	1	1	1	2	26.9	0.0	0.6	22.1	0.0	49.6
101	1	73	14	3	5	7	2	–	2	–	2	–	3	–	3	–	1	–	2	–	30.2	0.0	0.0	0.0	32.3	62.5
102	1	73	20	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	2	47.0	0.0	0.6	0.0	0.0	47.6
103	2	73	16	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	33.4	0.0	1.2	8.3	7.7	50.6
104	2	73	16	2	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	40.5	0.0	0.5	0.0	0.0	41.0
105	2	73	7	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18.7	2.1	1.3	6.6	0.0	28.7
106	2	73	28	1	5	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	60.1	0.0	0.0	0.0	96.9	157.0
107	2	73	12	1	1	1	1	–	1	3	1	1	2	2	3	3	2	2	2	2	34.0	0.0	0.5	4.4	0.0	38.9
108	1	72	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34.0	0.0	0.6	0.0	0.0	34.6
109	2	72	17	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	2	2	35.1	0.0	1.3	0.0	0.0	36.4
110	2	72	32	1	4	1	1	2	1	2	1	1	1	1	1	3	1	1	1	1	66.7	0.0	0.1	0.6	112.8	180.2
111	2	72	22	1	4	1	2	2	2	2	2	2	3	3	3	3	1	2	2	3	50.3	0.0	1.5	0.0	112.8	164.6
112	2	72	11	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	25.3	0.0	0.5	0.0	0.0	25.8
113	1	71	7	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	25.8	0.0	0.7	0.0	0.0	26.5
114	2	71	9	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	22.0	0.0	0.5	0.0	0.0	22.5
115	1	71	10	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	23.6	0.0	1.4	0.0	0.0	25.0
116	2	70	10	3	1	1	2	1	2	1	1	1	1	1	1	1	1	–	1	2	23.6	0.0	0.6	0.0	0.0	24.2
117	2	70	18	3	3	3	2	–	2	3	–	1	1	3	2	3	1	1	2	2	36.7	0.0	0.0	0.0	68.5	105.2
118	1	70	8	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	20.4	0.0	0.5	0.0	0.0	20.9
119	2	69	29	3	4	1	–	–	3	–	1	–	3	–	3	–	1	–	–	–	54.7	0.8	0.2	19.9	112.8	188.4
120	2	69	9	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	22.0	0.0	1.9	0.0	0.0	23.9
121	2	70	15	3	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	3	31.8	0.0	0.6	0.0	0.0	32.4
122	2	69	7	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18.7	0.0	1.3	6.6	0.0	26.6
123	2	69	9	3	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22.0	0.8	0.6	0.0	0.0	23.4
124	2	69	13	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	28.5	0.0	0.6	0.0	7.7	36.8
125	2	69	8	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	27.4	0.0	0.6	0.0	0.0	28.0
126	1	69	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	38.9	0.0	0.5	0.0	0.0	39.4
127	2	68	10	1	1	7	2	–	2	–	1	–	1	–	1	–	1	–	1	–	30.7	0.0	0.2	0.0	0.0	30.9
128	1	68	6	3	1	1	1	1	1	1	1	2	3	3	3	3	1	2	2	2	17.1	0.6	0.6	0.0	0.0	18.3
129	2	68	17	1	1	7	2	–	2	–	1	–	2	–	3	–	1	–	3	–	42.1	0.0	0.2	0.0	0.0	42.3
130	2	67	13	3	1	1	2	2	2	2	1	1	1	1	1	2	1	1	1	2	28.5	1.4	1.1	0.0	0.0	31.0
131	1	67	14	1	4	1	–	2	3	2	1	2	3	3	2	3	1	2	2	2	37.2	0.0	0.3	0.0	56.4	93.9
132	1	66	15	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	31.8	0.0	0.7	0.0	0.0	32.5
133	2	66	15	3	1	1	1	–	1	–	1	–	1	–	1	–	1	–	1	–	31.8	0.0	0.8	0.0	0.0	32.6
134	2	66	26	1	1	1	2	–	2	–	2	–	3	–	3	–	2	–	3	–	56.8	0.0	0.7	2.2	0.0	59.7
135	1	65	11	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25.3	1.2	0.6	0.0	0.0	27.1
136	1	65	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	27.4	0.0	0.6	0.0	0.0	28.0
137	2	65	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35.6	0.0	0.6	0.0	0.0	36.2
138	1	65	11	3	1	1	1	–	1	–	1	–	1	–	1	–	1	–	1	–	25.3	0.0	0.6	0.0	0.0	25.9
139	2	65	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	47.0	0.0	1.6	0.0	0.0	48.6
140	2	63	6	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17.1	0.0	0.5	4.4	0.0	22.0
141	2	64	16	3	1	1	1	1	1	1	1	1	1	2	1	3	1	1	1	2	33.4	0.0	0.7	13.2	0.0	47.3
142	1	64	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	37.2	0.0	1.1	0.0	0.0	38.3
143	2	63	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22.5	0.0	0.5	0.0	0.0	23.0
144	2	63	13	3	1	1	2	1	2	1	1	1	1	1	3	3	2	1	3	3	28.5	0.0	1.4	2.2	0.0	32.1
145	2	62	16	3	2	1	2	1	2	1	1	1	1	1	3	1	1	1	2	1	33.4	0.0	0.7	0.0	7.7	41.8
146	2	62	9	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	22.0	0.0	0.6	0.0	0.0	22.6
147	2	62	10	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	23.6	1.7	3.0	0.0	0.0	28.3
148	2	62	13	3	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	28.5	0.0	1.6	0.0	0.0	30.1
149	2	62	25	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	55.2	0.8	0.5	0.0	0.0	56.5
150	2	60	12	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26.9	1.2	0.8	0.0	0.0	28.9
151	2	58	11	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25.3	0.0	0.7	0.0	0.0	26.0
152	1	57	28	1	5	1	1	1	1	1	1	1	1	3	1	3	1	1	1	2	60.1	0.0	0.9	0.0	69.9	130.9
153	1	57	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	32.3	2.5	0.5	0.0	0.0	35.3
154	1	55	7	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18.7	0.0	1.3	0.0	0.0	20.0
155	2	54	8	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20.4	0.0	1.7	0.0	0.0	22.1
156	2	98	54	3	3	3	1	2	1	2	1	1	1	3	2	3	1	1	2	3	95.6	1.2	0.1	0.0	116.0	212.9
157	2	97	20	3	4	7	1	–	1	–	1	1	1	1	1	2	1	1	1	1	40.0	0.0	0.0	0.0	56.4	96.4
158	2	91	15	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	31.8	0.0	0.7	0.0	0.0	32.5
159	2	91	15	3	2	1	1	2	1	2	1	2	1	2	1	3	1	2	1	3	31.8	0.0	1.3	8.8	23.0	64.9
160	1	91	25	1	1	1	2	1	2	1	1	1	1	3	1	3	1	1	2	1	55.2	0.0	0.6	0.0	0.0	55.8
161	2	90	34	1	4	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	69.9	0.0	0.0	0.0	150.4	220.3
162	2	90	48	1	4	1	–	2	3	2	1	1	3	1	3	3	1	1	3	3	92.8	0.0	1.3	0.0	139.8	233.9
163	2	89	33	1	1	1	1	–	1	–	1	–	1	–	1	–	1	–	1	–	68.3	0.0	0.5	0.0	0.0	68.8
164	1	89	17	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	2	2	42.1	0.0	1.1	0.0	0.0	43.2

Case	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
165	2	89	18	1	4	4	1	2	1	2	1	2	1	3	1	3	1	2	1	2	43.8	0.0	0.8	0.0	150.4	195.0
166	1	89	17	1	4	4	2	2	2	2	1	2	1	3	1	3	1	2	2	2	42.1	0.0	1.1	0.0	150.4	193.6
167	2	89	32	3	2	2	2	2	2	2	1	3	1	3	1	3	1	2	1	3	108.6	0.0	2.0	0.0	61.2	171.8
168	1	89	70	2	4	4	1	2	1	2	1	2	1	3	1	3	1	2	1	3	128.8	0.0	1.1	0.0	177.4	307.3
169	1	88	18	3	1	1	1	1	1	1	1	1	1	2	1	3	1	1	1	3	36.7	0.0	1.2	0.0	0.0	37.9
170	1	89	22	1	4	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	50.3	0.0	0.0	0.0	150.4	200.7
171	2	89	12	3	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	26.9	0.0	0.9	0.0	0.0	27.8
172	1	89	12	3	1	1	2	1	2	1	1	1	2	1	3	3	1	1	2	2	26.9	0.0	0.6	0.0	0.0	27.5
173	1	88	16	3	7	7	2	–	2	–	3	–	3	–	3	–	2	–	3	–	33.4	0.0	0.0	0.0	0.0	33.4
174	1	88	16	3	1	7	2	–	2	–	1	–	2	–	2	–	1	–	1	–	33.4	0.0	0.4	0.0	0.0	33.8
175	2	87	15	1	4	1	–	–	3	3	1	1	1	3	3	1	1	3	1	1	38.9	0.0	0.6	0.0	18.8	58.3
176	2	87	16	3	4	7	2	–	2	–	1	–	1	–	1	–	1	–	2	–	33.4	0.0	0.0	0.0	18.8	52.2
177	2	87	18	3	4	1	1	1	1	1	1	1	1	2	3	3	1	1	2	2	36.7	0.0	0.8	3.3	18.8	59.6
178	2	86	26	1	4	3	1	–	1	3	1	1	2	2	3	3	2	1	2	2	56.8	0.0	0.1	0.0	99.2	156.1
179	2	86	23	1	4	7	1	–	1	–	1	–	3	–	3	–	1	–	3	–	51.9	0.0	0.0	0.0	112.8	164.7
180	1	86	16	3	4	1	–	2	3	2	1	1	3	3	3	3	1	1	2	2	33.4	0.0	1.0	0.0	112.8	147.2

A Sex: 1 male, 2 female
B Age
C Days of hospitalization
D Type of fracture
  1 trochanteric
  2 basocervical
  3 cervical
E Habitat at discharge
  1 own home
  2 convalescent home
  3 old people's home
  4 nursing home
  5 acute hospital
  6 orthopedic department
  7 deceased
F Habitat at 4 months, see E
G Living with someone before fracture: 1 yes, 2 no
H Living with someone at 4 months after fracture:
  1 yes, 2 no
I Able to visit someone before fracture
  1 yes, 2 no, 3 do not remember
J Able to visit someone at 4 months after fracture, see I
K ADL before fracture: 1 manage, 2 partly, 3 no
L ADL at 4 months, see K
M Cleaning/cooking before fracture: 1 yes, 2 partly, 3 no
N Cleaning/cooking at 4 months after fracture, see M
O Shopping before fracture, see M
P Shopping at 4 months after fracture, see M
Q Climbing stairs before fracture: 1 yes, 2 no
R Climbing stairs at 4 months after fracture: 1 yes, 2 no
S Outdoor walking before fracture
  1 > 500 m, 2 < 500 m, 3 not at all
T Outdoor walking at 4 months after fracture, see S
Costs (SEK, thousands)
U Orthopedic inpatients
V Orthopedic outpatients
W Primary health care
X Communal home help
Y Habitat
Z Total costs within 4 months

home after 4 months, and another 9 percent died during the 4-month period (Table 1).

All the patients were operated on with hook-pin osteosynthesis for a cervical fracture and sliding screw-plate for a trochanteric fracture. Immediate weight bearing was encouraged. Radiographs were obtained directly on the operating table postoperatively and after a few days of weight bearing. Additional radiographic and follow-up examinations at the orthopedic department were omitted unless necessary owing to hip pain.

Patients admitted from their own home had a mean hospitalization of 18 days, and cervical and trochanteric hip fractures 15 and 21 days, respectively.

The rehabilitation scheme has been presented elsewhere (Ceder 1980, Jarnlo et al. 1984). All the surviving patients were visited in their own home at 1, 2, and 4 months postoperatively by primary health care personnel, usually the district physiotherapists. Contacts in addition to the follow-up program with both the orthopedic department and the primary health care team as regards the hip fracture were recorded. Information about the patients' visits within 4 months and after 4 months in primary health care, as well as home visits made by primary health care personnel and visits at the orthopedic department (including radiographs) were extracted from the medical records (Table 2). Medical records belonging to the orthopedic department for 5 of the patients, however, were missing in the long-term follow-up. The frequency of contacts with primary health care related to hip fracture was also obtained from the medical records of the primary health care authority. Out of 180 patients, 131 had received medical care in primary care, and the medical records of these patients were available there—e.g., 84 patients who regularly visited the primary health care center because of chronic diseases such as hypertension, heart problems, diabetes, and the like.

Functional status

The follow-up at both the orthopedic department and the primary health care centers included questions on hip function, functional, social, and psychological status. Most of the questions (the

Table 2. Outpatient contacts with the orthopedic department and the primary health care organization within and 4 months after hip fracture for the 180 patients admitted from their own home

	Orthopedic department		Primary health care		Total	
Month	< 4	> 4	< 4	> 4	< 4	> 4
District physiotherapist	0	0	33	36	33	36
Visits	46	105	46	42	92	147
Radiographs	36	76	17	23	53	99
Orthopedic specialist	0	0	2	11	2	11

answers to which were recorded by the health care personnel) were divided into two categories (yes or no) and some into three categories (yes, partly, no). On all the three routine follow-up visits, the follow-up scheme was applied. The functional status 4 months after the hip fracture—which included activities of daily living (ADL), such as dressing and personal hygiene, the ability to clean/cook, shop, climb stairs, and walking capacity—was compared with the prefracture status.

Table 3. Type of costs within 4 months for 180 consecutive hip fracture patients who had been residing in their own home at the time of admittance

Type of costs		Costs per activity (SEK)	Number of patients	Total costs (SEK, thousands)
Inpatients				
ECG		125	180 +5*	23
Radiographs	Lungs	195	180 +5	36
	Hip	260	180 +5	48
Surgery				
Anesthesia time	Cervical	4,800 (60 min)	99	475
	Trochanteric	9,600 (120 min)	81	778
	Total prosthesis	12,000 (150 min)	5	60
Material	LIH	976	99	97
	Richards plate	2,661	81	216
	Prosthesis	7,711	5	39
Radiographs		390	180 +5	72
Weight-bearing radiographs		455	180 +5	84
Blood	Trochanteric	445	81	36
	Total prosthesis	890	5	4
X-test	Trochanteric	132	81	11
	Total prosthesis	264	5	1
Blood group test		69	180 +5	13
"Hotel" costs	Osteosynthesis	1,635	180 (3,198 days)	5,229
	Total prosthesis	1,635	5 (214 days)	350
Total				7,572
Outpatients				
Orthopedic department				
Extraction		585	1	1
Visits		585	29 (46 visits)	27
Radiographic examination		260	25 (36 exams.)	9
Scintigraphy		1,241	5	6
Total				43
Primary health care				
District physiotherapist				
Regular visit at home		188	142 (375 visits)	70
Extra visit		208	5 (33 visits)	7
Orthopedic consultation		150	4	1
GP visit		482	36 (46 visits)	22
Radiographs		260	16 (17 exams.)	4
Technical aids		309	99	31
Total				135
Communal home help				
Cost per hour		138	33 (1,594 hours)	220
Habitat				
Convalescent home		510	525 days	268
Old people's home		571	960 days	548
Nursing home/geriatric hospital		1,253	3,780 days	4,736
Acute hospital		1,635	465 days	1,001
Total				6,553
Total				14,523

* Five patients with a total hip replacement within 4 months.

Table 4. Type of costs (SEK, thousands) within 4 months after fracture (N 180)

Type of costs	Total costs	Costs per patient
Orthopedic department	7,614	42.3
Nursing home	4,736	26.3
Acute hospital	1,001	5.6
Old people's home	548	3.0
Convalescent home	268	1.9
Communal home help	220	1.2
Primary health care	135	0.8
Total	14,523	81.1

Table 5. Mean medical treatment costs (SEK, thousands) per patient. Costs for communal home help and habitat are excluded. Number of patients are shown within brackets

Age	Cervical (99)	Trochanteric (81)	Total (180)
51–65	26.7 (13)	41.9 (8)	32.1
66–80	38.8 (48)	47.1 (34)	42.3
81–	39.3 (38)	54.3 (39)	46.9
Mean			
< 4 months	37.4	49.9	43.0
> 4 months	4.8	1.3	3.2
Total	42.2	51.2	46.3

Costs

Costs in the acute phase (surgery and mobilization at the orthopedic department) were calculated separately and related to the hospital stay. These costs were directly allocatable and included preoperative costs (ECG, radiographs of the lungs and hips), surgery (type of operation), and bed costs (Table 3). Costs in the rehabilitation phase included those for the three home visits made by a district physiotherapist in the routine case. When there was hip pain or other problems related to the hip, costs of visits at a primary health care center, outpatient visits at the orthopedic department, and hip radiographs were calculated. Technical aids including canes, and roller and four-legged aids were recorded separately.

During the first 4 months after hip fracture, costs arising because of different kinds of habitat were also calculated and divided into the following: convalescent home, old people's home, nursing home (including geriatric hospital), and acute hospital. In the calculation of the present value of long-term costs, a discount rate of 5 percent has been used, which is the present practice in Sweden.

All the costs were recorded per patient (Table 1) in 1989 prices. At that time, the exchange rate for USD and SEK was 1:6.

The Student's *t*-test, chi-square test, and stepwise multiple regression analysis were used.

Results

Total short-term costs (within 4 months) after hip fracture for all the patients are tabulated according to type of costs (Table 3), and amounted to SEK 14.5 millions for all 180 patients, i.e., SEK 81,000 (12,000–323,000) per patient. Half of this sum was related to the stay at the orthopedic department (SEK 42,000). Visits to the general practitioner in primary health care was a small part of the total costs (Table 4). A considerable amount was referred to type of habitat after discharge (SEK 31,000). Nursing homes dominated the habitat costs.

Mean short-term medical treatment costs for all the patients were SEK 43,000. Cervical fractures had lower costs (SEK 37,000) compared with trochanteric fractures (SEK 50,000).

Total long-term medical treatment costs between 4 months and 3 years after hip fracture were low, and amounted to SEK 3,211 per patient (Table 5). It is noteworthy that the majority of the long-term costs were referred to the cervical hip fractures; the costs of the trochanteric fractures were almost negligible in the long run.

Sex and age

Cervical and trochanteric fractures divided into men and women differed in cost structure within 4 months after the fracture, habitat included. Trochanteric fractures in women were by far the most costly (SEK 108,000 per patient). Men with a trochanteric fracture had a cost of SEK 89,000 per patient. A cervical fracture in men consumed the least amount (SEK 56,000), and women with a cervical fracture had a cost of SEK 64,000 per patient, habitat included. Trochanteric fractures had both higher inpatient hospital costs and higher habitat costs per patient. Costs in primary health care were low and uniformly distributed between cervical and trochanteric fractures. Cervical and trochanteric fractures divided into age groups showed lower costs for the youngest category (Table 5).

Habitat

Patients discharged to an institution were three and a half times more expensive ($P < 0.001$) when com-

Table 6. Mean total costs (SEK, thousands) within 4 months per patient discharged to their own home and to institutions. Number of patients within brackets

	Discharged to		Living after 4 months in	
Type of costs	Own home (103)	Institution (77*)	Own home (135)	Institution (45**)
Orthopedic department	34.6	52.6	38.6	53.4
Primary health care	0.8	0.7	0.9	0.4
Communal home help	1.4	1.1	1.6	0.1
Habitat				
convalescent home	0	3.5	1.2	2.4
old people's home	0.6	6.3	0.3	11.4
nursing home	0	61.5	12.9	66.4
acute hospital	0.6	12.2	2.6	14.4
Total	38.0	137.9	58.1	148.5

*Three patients deceased.
**Sixteen patients deceased.

Table 7. Costs (SEK, thousands) related to functional status at 4 months after fracture

	n	Total costs	Costs per patient
ADL			
Yes	116	7,463	64
Partly/No	28	3,823	137
Outdoor walking			
> 500 m	56	2,607	47
Short/No	87	8,640	990
Climbing stairs			
Yes	115	7,424	65
No	28	3,833	137
Cleaning/cooking			
Yes	80	3,882	49
Partly/No	64	7,403	116
Shopping			
Yes	41	1,495	36
Partly/No	103	9,791	95

Table 8. Mean total costs, habitat included (SEK, thousands) for subgroups of patients within 4 months after hip fracture. Patients discharged to their own home or institutions and the ability to walk outdoors

Subsets		Walking	Costs	n
Cervical	Own home	Yes	28.7	30
		No	34.0	25
	Institution	Yes	60.6	4
		No	139.0	19
Trochanteric	Own home	Yes	37.7	15
		No	56.8	14
	Institution	Yes	133.9	7
		No	150.1	29

pared with patients discharged to their own home (Table 6). The differences depended both on the lower direct medical costs and on the type of habitat after discharge.

Functional status

Patients with reduced functions within 4 months had higher costs ($P < 0.001$; Table 7).

Patients with a cervical hip fracture, discharged to own home, and with a good functional status (walking outdoors within 4 months after fracture) were the least resource consuming, with an average cost of SEK 29,000 versus SEK 150,000 for a patient with a trochanteric fracture, discharged to an institution, and with a poor functional status (Table 8).

In a stepwise multiple regression analysis where total costs within 4 months were the dependent variable, age, cleaning/cooking before fracture, type of fracture, and sex were the most discriminating factors among the prefracture background variables.

Discussion

Costs arising from contacts with the health-care system illustrated here were derived from the natural course of rehabilitation after a hip fracture. Already before the fracture, the majority of the patients were known to the primary health care system because of chronic disease associated with advanced age.

Direct medical treatment costs for the hip fracture patients within 4 months amounted to SEK 43,000 per patient. Similar results of the acute medical treatment care have been reported from other studies (Jensen et al. 1980, Holmberg and Thorngren 1988, Mellström 1989). However, costs including rehabilitation and long-term costs are not available in previous studies. Long-term medical costs due to complications were rather low, about 7 per cent of treatment costs; and they mainly referred to cervical fractures. At present, the incidence of hip fracture in

Sweden is about 2,000/million population (personal communication from the Swedish Board of Health and Welfare, 1990). The total annual costs for these 16,000 patients in Sweden would be SEK 688 million within 4 months after fracture. This figure may be underestimated because of longer hospitalizations in other parts of Sweden. Also, in other countries, including Denmark, Norway, Spain, and the U.S.A., the acute treatment costs of hip fractures are considerable (Jensen et al. 1980, Engesæter and Søreide 1985, Diez-Perez et al. 1989, Cummings et al. 1990). The annual medical treatment costs for hip fracture patients are comparable to other resource-consuming diseases in Sweden: viz., hypertension, SEK 1,100 millions (Johannesson et al. 1990), and diabetes, SEK 1,230 millions (Jönsson 1983).

The aim of the rehabilitation activities for the hip fracture patients is their return to their own home, managing ADL, and other important functions provided the patient was able to manage these functions before his or her fracture. Patients managing these functions were also the least resource-consuming ones in this study. Cervical hip fractures were the least expensive subgroup, and men were less expensive than women. In addition, men had no costs for communal home help. Men at this age were, to a greater extent, living with someone ($P < 0.01$). Patients between 50 and 65 years of age were less resource consuming (Table 5), and patients discharged to their own home were much less cost consuming than patients who were discharged to an institution (Table 6). Patients managing functions like ADL and outdoor walking within 4 months were also less resource consuming. A previous study in the USA found that prefracture functional status was important as regards the length of the hospital stay (Campion et al. 1987). In our study, age, cleaning/cooking before fracture, type of fracture, and sex were the most discriminating prefracture factors in relation to costs. Studies relating function to costs are rare. However, in rheumatoid arthritis good functional status has been related to low medical treatment costs (Liang et al. 1984, Jonsson et al. 1990).

In sum, the present investigation showed that functional status before and after hip fracture, age, sex, type of fracture, and habitat were important parameters in estimating costs for hip fracture treatment.

During the last few decades, there have been different ways to economize hip-fracture treatment. In the 1950s and the 1960s, the nonweight-bearing period was reduced several weeks, which had a corresponding impact on hospitalization (Borgquist 1974). Because of a fixed nonweight-bearing period, there was, during the 1960s, a systematic discharge of hip fracture patients to other institutions to save hospital beds (Bauer 1985, Ceder et al. 1987). In 1970, the nonweight-bearing period totally ceased, and hospitalization was further reduced. At the end of the 1970s, a rehabilitation program in primary care was worked out (Ceder 1980). Since 1985, the rehabilitation program has been widely used among primary health care centers in the catchment area of Lund University Hospital.

The rehabilitation program in primary health care illustrated in this study was a further step in reducing costs at the orthopedic outpatient department, and at the same time providing better social care. However, our economic evaluation of this rehabilitation program shows small economic savings, about SEK 108,000 each year for all the surviving patients (n 164). This sum is based on one saved radiograph (SEK 260/radiograph) at 4 months after fracture and one saved visit at the orthopedic department (SEK 585/visit) minus one extra visit at home by the district physiotherapist 4 months after the fracture (SEK 188/visit). The cost analysis used here could be classified as a cost minimization analysis according to Drummond et al. (1987). Even if the economic savings are small, the alternative use of resources at the outpatient orthopedic department have increased in favor of, e.g., patients with degenerative hip disease. Besides, social and psychologic aspects of active home rehabilitation may be as important as the economic savings (Holmberg et al. 1989). In addition, the primary health care organization has been established all over Sweden during the last two decades. One of the main groups needing comprehensive treatment are the elderly patients, especially those above 80 years of age. This group is also prone to hip fractures and suitable to be taken care of in a decentralized health care system.

There may be other ways to save costs. About half of the total costs were due to the care outside the hospital. It is not quite unrealistic to presume that patients discharged to their own home could further reduce the length of hospitalization. Patients discharged to their own home (103 patients) had an average hospital stay of 14 (7–21) days. This wide range means that there might be opportunities for a further reduction of hospitalization provided help was available at home. If the hospital stay could be reduced by 3 days for patients with a good prognosis, this would give economic savings of about SEK 210,000 each year provided that the patients discharged to their own home received walking instructions and more home help in the beginning of their

convalescence. This sum is based on the savings from 103 patients for 3 days at the acute hospital (hospital costs = SEK 1,635/day) minus costs of communal home help for 1 week 2 hours a day (SEK 138/hour) minus one visit by a district-physiotherapist for 1 week (SEK 188/visit).

Another way of saving costs could be to use a different technology than nailing. In countries outside Scandinavia, a total prosthesis is used in the acute phase. However, it is questionable whether this technology will save long-term costs by preventing future reoperations. Long-term costs are not high (Table 5), and therefore the costs to be saved when a total prosthesis is used to prevent fracture reoperations will be low. Besides, long-term complications from the prosthesis will arise, such as dislocation and loosening. Further, the operation costs were much higher for an arthroplasty than for an osteosynthesis as regards both material and time (Table 3). The total average costs of a reoperation of a hip fracture patient with complications were, in this study, SEK 200,000 compared with SEK 80,000 for a patient without complications. Thus, a complicated hip fracture was 2.5 times more expensive now compared with 3.2 times more expensive in Stockholm in the mid-1970s (Holmberg and Thorngren 1988).

In conclusion, during the last few decades, great improvements in the treatment of hip fracture patients have been made. Many ways of reducing costs have been applied. Still, the hip fracture patients are very resource consuming both at the acute hospital and in the rehabilitation program outside the hospital. A substantial part of the costs consists of institutionalized rehabilitation after discharge from the acute hospital. A decentralized follow-up system in primary care has proved to somewhat reduce the costs. Active home rehabilitation is the least expensive alternative. Future cost reductions should concentrate on a combination of changes for specific patient groups related to habitat and functional status (Thorngren et al. 1988). New technologies, improvements in functional and social parameters, as well as organizational cooperation between the the orthopedic department, primary health care personnel, and social authorities, will be possible ways to reduce the overall costs.

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