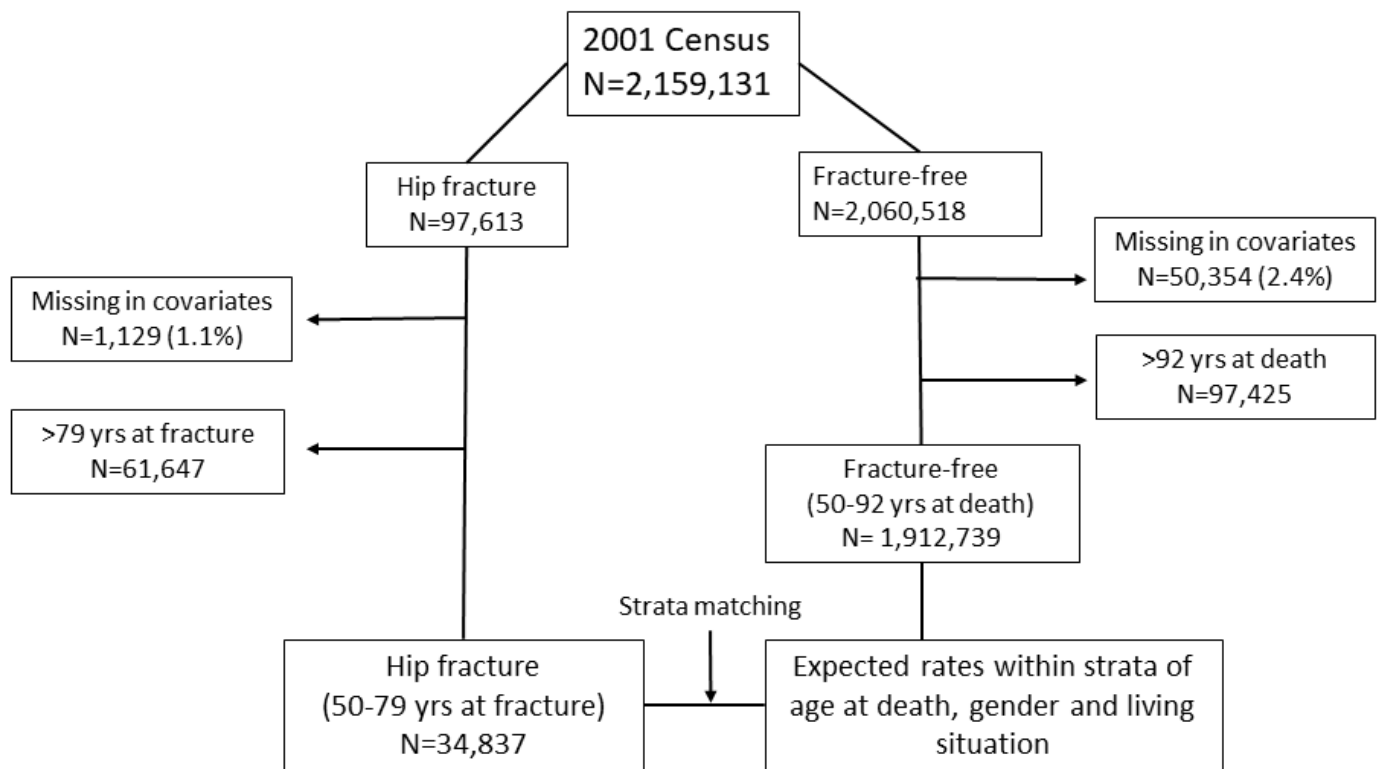


SUPPLEMENTARY MATERIAL

Methods

Supplementary figure 1. Flow chart depicting the number of participants with and without hip fracture included in the study



SUPPLEMENTARY MATERIAL

Variable Family type (categories)

1.	Single person family, person < 30 years of age
2.	Single person family, person 30-44 years of age
3.	Single person family, person 45-66 years of age
4.	Single person family, person >67 years of age
5.	Married couple without children, oldest person <30 years of age
6.	Married couple without children, oldest person 30-44 years of age
7.	Married couple without children, oldest person 45-66 years of age
8.	Married couple without children, oldest person >67 years of age
9.	Married couple with small children (youngest child 0-5 years of age)
10.	Married couple with older children (youngest child 6-17 years of age)
11.	Married couple with adult children (youngest child ≥18 years of age)
12.	Cohabiting couple without children, oldest person <30 years of age
13.	Cohabiting couple without children, oldest person 30-44 years of age
14.	Cohabiting couple without children, oldest person 45-66 years of age
15.	Cohabiting couple without children, oldest person >67 years of age
16.	Cohabiting couple with small children (youngest child 0-5 years of age)
17.	Cohabiting couple with older children (youngest child 6-17 years of age)
18.	Cohabiting couple with adult children (youngest child ≥18 years of age)
19.	Mother with small children (youngest child 0-5 years of age)
20.	Mother with older children (youngest child 6-17 years of age)
21.	Mother with adult children (youngest child ≥18 years of age)
22.	Father with small children (youngest child 0-5 years of age)
23.	Father with older children (youngest child 6-17 years of age)
24.	Father with adult children (youngest child ≥18 years of age)
25.	Other family types (e.g. several families in one household)

Main exposure: Living situation (binary)

Categories	Original variable categories
Living alone	Family type category 1-4, 19-24
Living with a partner	Family type category 5-18
Missing (1.2%) ^a	Family type category 25 + missing Family type

^a In the main analysis: 71 married women and 69 married men with missing classified as “Living with a partner”; 495 previously/never married men and 1,678 previously/never married women with missing classified as “Living alone”

SUPPLEMENTARY MATERIAL

Sensitivity analysis: Living situation (3 groups)

Categories	Original variable (1) categories	Original variable (2) categories
Living alone	Family type category 1-4	No registered children
Living alone, but have children	Family type category 1-4, , 19-24	≥1 registered child
Living with a partner	Family type category 5-18	Any number of children
Missing	Family type category 25 and missing in Family type	Any number of children

Diagnoses included in the Charlson Comorbidity index (CCI):

AMI (Acute Myocardial Infarction)
CHF (Congestive Heart Failure)
PVD (Peripheral Vascular Disease)
CVD (Cerebrovascular Disease)
Dementia
COPD (Chronic Obstructive Pulmonary)
Rheumatoid Disease
Peptic Ulcer Disease
Mild LD (Liver Disease)
Diabetes
Diabetes + Complications
HP/PAPL (Hemiplegia or Paraplegia)
RD (Renal Disease)
Cancer
Moderate/Severe LD (Liver Disease)
Metastatic Cancer
AIDS (Aquired Immune Deficiency Syndrome)

Charlson Comorbidity index (CCI) by age group (hip fracture patients only):

	CCI=0 ^a	CCI=1 ^b	CCI=2 ^c
50-59 years, N(%)	1,790(72.8)	384 (15.6)	286 (11.6)
60-69 years, N(%)	3,129 (63.4)	1,015 (20.7)	754 (15.4)
70-79 years, N(%)	6,745 (51.1)	3,764 (28.5)	2,702(20.5)

a no additional diagnosis code
b some comorbidity (one additional diagnosis with weight 1)
c severe comorbidity (a score of ≥2)

SUPPLEMENTARY MATERIAL

Results

Supplementary table 1. Comparison of 595,495 men and 628,723 women with and without hip fracture in the 2001 Population and Housing Census (Statistics Norway), ages 50-79 years at time of the Census. Hip fracture registration from the NORHip database (2002-2013), Norwegian Epidemiologic Osteoporosis Studies (NOREPOS)

Characteristic		Hip fracture (1 st) N= 60,654	General population N=1,163,564
Number of deceased 2002-2014 (%)		32,307 (53.3)	265,932 (22.9)
Age at census mean (SD)		70.0 (7.7)	61.7 (8.5)
Gender N (%)	Men	19,919 (32.8)	575,576 (49.5)
	Women	40,735 (67.7)	587,988 (50.5)
Living situation N (%)	Living with a partner	33,548 (55.3)	830,578 (71.4)
	Living alone	27,106 (44.7)	332,986 (28.6)
Marital status N (%)	Married	332,553 (53.4)	785,500 (67.5)
	Never married	5,205 (8.6)	86,463 (7.4)
	Previously married	22,896 (37.8)	291,601 (25.1)
Number of children N (%)	0	11,565 (19.1)	178,075 (15.3)
	1	8,624 (14.2)	132,496 (11.4)
	≥2	40,315 (66.5)	841,719 (72.3)
Education level N (%)	<12 years	27,905 (46.0)	365,745 (31.4)
	12years	25,897 (42.7)	567,911 (48.8)
	>12 years	6,310 (10.4)	217,096 (18.7)
Urbanization category N (%)	Rural	4,374 (7.2)	84,085 (7.2)
	Semirural	14,479 (23.9)	274,995 (23.6)
	Urban	41,801 (68.9)	1 804,484 (69.1)

SUPPLEMENTARY MATERIAL

Supplementary table 2. Association (Hazard ratio, 95% Confidence Interval) between living situation and post-fracture mortality in 20,582 hip fracture patients 50-79 years at the time of fracture. Living alone versus living with a partner (reference). Subset of NORHip database (2002-2008) with mortality follow-up from the National Population Register to 31 Oct. 2014.

	Adjusted for age at Census, education level, urbanization degree and number of children	Additional adjustment for comorbidity level
Men		
0-30 days post fracture	1.25 (1.01, 1.56)*	1.27 (1.02, 1.58)*
1-12 months post-fracture	1.34 (1.17, 1.53)***	1.33 (1.16, 1.52)***
>1 -5 years post-fracture	1.45 (1.31, 1.60)***	1.44 (1.30, 1.59)***
>5 -12 years post fracture	1.60 (1.29, 1.98)***	1.58 (1.28, 1.97)***
Women		
0-30 days post fracture	1.20 (0.97, 1.49)	1.14 (0.91, 1.42)
1-12 months post-fracture	1.10 (0.98, 1.23)	1.05 (0.94, 1.18)
>1 -5 years post-fracture	1.36 (1.25, 1.48)***	1.34 (1.24, 1.46)***
>5 -12 years post fracture	1.19 (1.03, 1.38)*	1.19 (1.02, 1.37)*
*$p < 0.05$, ***$p < 0.001$		

SUPPLEMENTARY MATERIAL

Supplementary table 3. Association^a (Hazard ratio, 95% Confidence Interval) between living situation and post-hip fracture mortality, within levels of comorbidity (Charlson index). Subset of NORHip database (2002-2008) with mortality follow-up from the National Population Register to 31 Oct. 2014., N=20,582 hip fractures.

Comorbidity level	Age-standardized mortality (95% Confidence interval) per 10,000 personyears	Men	Women
		HR (95% CI) alone vs. not alone	HR (95% CI) alone vs. not alone
0	60.6 (58.5, 62.8)	1.93 (1.70, 2.18)***	1.30 (1.18, 1.43)***
1	141.0 (135.4, 146.6)	1.19 (1.03, 1.37)*	1.12 (1.0, 1.25)*
2^b	380.1 (365.4, 394.7)	1.10 (0.95, 1.26)	1.11 (0.98, 1.25)

*** $p < 0.05$, *** $p < 0.001$**

^aadjusted for: age at Census, education level, degree of urbanization and number of children

^b N smallest group (men): 435 not dying in the period 2002-2014

SUPPLEMENTARY MATERIAL

Supplementary table 4. Association^a (Hazard ratio, 95% Confidence Interval) between living situation in 3 categories and post-hip fracture mortality at different follow-up times. 34,837 men and women 50-79 years at fracture, NORHip database (2002-2013) with mortality follow-up from the National Population Register to 31 Oct. 2014.

	0-30 days	1- 12 months	>1 -5 years	5-12 years
Men				
Living with a partner (children or no children ^b)	Reference	Reference	Reference	Reference
Living alone (have children ^b)	1.25 (1.03, 1.52)*	1.28 (1.13, 1.44)***	1.40 (1.28, 1.54)***	1.53 (1.33, 1.76)***
Living alone (have no children ^b)	1.24 (1.0, 1.53)	1.18 (1.03, 1.36)*	1.31 (1.18, 1.45)***	1.59 (1.37, 1.84)***
Women				
Living with a partner (children or no children ^b)	Reference	Reference	Reference	Reference
Living alone (have children ^b)	1.14 (0.96, 1.36)	1.13 (1.02, 1.25)*	1.27 (1.18, 1.35)***	1.19 (1.09, 1.29)***
Living alone (have no children ^b)	1.00 (0.75, 1.35)	1.23 (1.05, 1.43)**	1.35 (1.21, 1.49)***	1.31 (1.15, 1.48)***

*** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$**

^a adjusted for age at Census, education level and urbanization degree

^b in the household or elsewhere

SUPPLEMENTARY MATERIAL

Supplementary table 5. Association^a (Hazard ratio, 95% Confidence Interval) between living situation and post-hip fracture mortality at different follow-up times. Sensitivity analysis restricted to 11,984 men and women 50-79 years at fracture with hip fracture from 1 January 2002- 31 December 2005 (NORHip database) with mortality follow-up from the National Population Register to 31 Oct. 2014.

	0-30 days	1- 12 months	>1 -5 years	5-12 years
Men				
Living with a partner	Reference	Reference	Reference	Reference
Living alone	1.25 (0.96, 1.65)	1.25 (1.04, 1.49)*	1.40 (1.24, 1.58)***	1.68 (1.46, 1.92)***
Women				
Living with a partner	Reference	Reference	Reference	Reference
Living alone	1.23 (0.92, 1.64)	1.06 (0.90, 1.23)	1.39 (1.26, 1.54)***	1.21 (1.10, 1.32)***

*** $p < 0.05$, ** $p < 0.01$ ***, $p < 0.001$**

^a adjusted for age at Census, education level and urbanization degree and number of children

SUPPLEMENTARY MATERIAL

Supplementary table 6. Hazard ratios with 95% confidence intervals^{a, b} for mortality after hip fracture in persons living alone vs. living with a partner (reference), according to time after hip fracture. 95,887 patients 50-107 years of age. The NOREPOS Hip Fracture Database (2002-2013) with mortality follow-up from the National Population Register to 31 Oct. 2014.

	Number of deaths (50-107 years of age)	HR (95% CI), ages 50-107 years at fracture	HR (95% CI), ages 50-70 at fracture ^c
Men			
0-30 days post fracture	3,383	1.01 (0.94, 1.09)	1.25 (1.05, 1.48)**
1-12 months post-fracture	6,060	1.09 (1.03, 1.15)**	1.28 (1.16, 1.43)***
>1 -5 years post-fracture	8,129	1.13 (1.08, 1.19)***	1.36 (1.26, 1.48)***
>5 -12 years post fracture	2,476	1.21 (1.11, 1.32)***	1.59 (1.41, 1.78)***
Women			
0-30 days post fracture	4,166	1.09 (1.01, 1.17)*	1.13 (0.96, 1.33)
1-12 months post-fracture	10,068	1.08 (1.03, 1.13)**	1.15 (1.05, 1.26)**
>1 -5 years post-fracture	19,741	1.10 (1.06, 1.13)***	1.29 (1.21, 1.37)***
>5 -12 years post fracture	8,433	1.14 (1.08, 1.19)***	1.22 (1.13, 1.32)***

*** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$**

a Flexible parametric survival analysis

b Adjusted for age at Census, education level, urbanization degree and number of children

c Main analysis for comparison