Updated 1-Year Fracture Incidence and Costs of Fragility Fractures in US Post-fracture Patients Based on Commercial Claims Databases

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INTRODUCTION

- Osteoporosis-related fractures are associated with significant clinical and economic burden
- There is a need for updated incidence of fragility fracture (Fx) and related cost data in the United States (US); specifically:
  - Annual incidence of Fx within 2 years and beyond and related direct medical costs following an incident Fx in women or men aged ≥ 50 years
  - Osteoporosis or Fx-related direct medical costs following an incident Fx in women and men aged ≥ 50 years

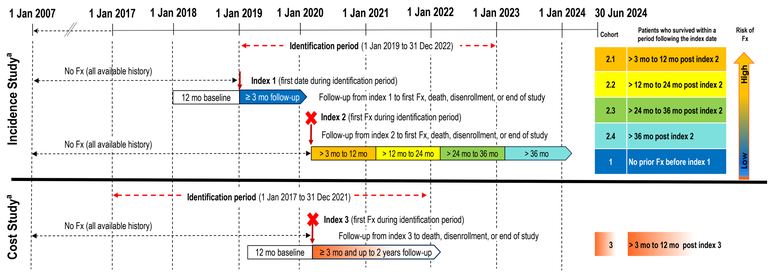
STUDY OBJECTIVE

- This report is an update of the annual incidence of Fx over 4 years and osteoporosis/Fx-related direct medical costs at 6-month intervals (up to 2 years) in patients in the US following an incident Fx in women and men aged ≥ 50 years

METHODS

- This retrospective observational cohort study used US claims data (Optum Clinformatics Data Mart [CDM]) from 1 Jan 2007 to 30 Jun 2024 (for incidence) or 31 Dec 2023 (for costs)
- Inclusion criteria: Age ≥ 50 years on the index dates, ≥ 12 months pre-index and ≥ 3 months post-index enrollment, and initial (index) Fx during 1 Jan 2019 to 31 Dec 2022 (for incidence) or 1 Jan 2017 to 31 Dec 2021 (for costs)
- Exclusion criteria: Metastatic cancer, Paget's disease of bone, use of osteoporosis medications at baseline (for incidence but not costs)
- Study outcomes were stratified by sex, age group (5-year intervals for incidence, 50–64, 65+ for costs), type of Fx outcomes (hip, vertebral, inpatient [IP] vertebral, non-hip nonvertebral [NHNV], composite), follow-up time from the index Fx (for incidence: cohorts of patients survived during the follow-up time [up to 4 years]; for costs: cohorts at 6-month intervals [up to 2 years])
  - 1-year Fx incidence was presented as rates per 1,000 person-years in each of 4 years and osteoporosis/Fx-related direct medical costs were presented in 2024 US$ at 6-month intervals following an incident Fx. A subsequent Fx required a gap of ≥ 90 days from the previous Fx. Sensitivity analyses (SA) were performed to estimate incidence rates with different definitions: (SA1) at the same anatomic site: 180 days; (SA2 or 3) at different anatomic sites: 60 or 180 days
  - Costs consisted of IP, skilled nursing facilities or rehabilitation (SNF/Rehab), outpatient (OP), professional, pharmacy (Rx), and other ancillary

Study Designs



[a]Use of osteoporosis medications at baseline was an exclusion criteria in the incidence analysis to avoid a potential confounding effect on baseline incidence estimates; however, use of osteoporosis medication was allowed in the costs analysis.
Fx; fragility fracture; mo; month; NHNV, non-hip nonvertebral; SD, standard deviation.

RESULTS

Table 1. Baseline Characteristics

Characteristic	Fx Incidence Study: Cohort 1: No Prior Fx N = 10,537,115[a]	Fx Incidence Study: Cohorts 2.1 to 2.4: Post Incident Fx Total N = 326,904[b]	Fx Cost Study: Cohort 3: Post Incident Fx N = 243,220[a]
Female, n (%)	5,419,347 (51.4)	209,792 (64.2)	172,177 (70.8)
Age category, n (%)			
50 to 64 years	4,227,261 (40.1)	54,180 (16.6)	42,161 (17.3)
≥ 65 years	6,309,854 (59.9)	272,724 (83.4)	201,059 (82.7)
Race, White, n (%)	5,416,563 (51.4)	209,256 (64.0)	192,321 (79.1)
Prior fracture type, n (%)			
Hip	–	78,152 (23.9)	39,334 (16.2)
Vertebral	–	115,988 (35.5)	86,989 (35.8)
NHNV	–	132,764 (40.6)	116,897 (48.1)
Multisite Fx, n (%)	–	39,998 (12.2)	NC
Osteoporosis diagnosis, n (%)	149,543 (1.4)	16,999 (5.2)	24,829 (10.2)
Osteoporosis medications, n (%)	0 (0)	0 (0)	19,834 (8.2)
Glucocorticoids, n (%)	2,447,943 (23.2)	101,294 (31.0)	NC
Thyroid or hormone therapy, n (%)	1,238,609 (11.8)	58,462 (17.9)	NC
N of subjects in subcohorts			
3 mo prior to incident fracture (Cohort 2.1)		280,966	
12 mo prior to incident fracture (Cohort 2.2)		213,346	
24 mo prior to incident fracture (Cohort 2.3)		141,470	
36 mo prior to incident fracture (Cohort 2.4)		74,979	

[a]Includes ≥ 3 mo of follow up. [b]Includes < 3 mo of follow up.
Fx; fragility fracture; mo, months; NC; not collected; NHNV, non-hip nonvertebral.

Table 2. Incidence Rate of First Fx Over All Available Follow-up[a] (All Cohorts)

Cohort	Incidence Rate Per 1,000 Person-Years: Hip Fx	IP Vertebral Fx	Vertebral Fx	NHNV Fx	Any Fx
Women and Men: Cohort 1; No prior Fx, post index 1	**3.58**	**3.01**	**5.51**	**7.48**	**14.14**
Women and Men: Cohort 2.1; > 3 mo to 12 mo post index 2	32.98	41.67	75.49	49.45	141.78
Women and Men: Cohort 2.2; > 12 mo to 24 mo post index 2	25.40	26.30	49.93	38.28	98.55
Women and Men: Cohort 2.3; > 24 mo to 36 mo post index 2	23.34	24.25	42.39	35.74	87.00
Women and Men: Cohort 2.4; > 36 mo post index 2	21.46	22.08	36.38	32.98	77.26
Women: Cohort 1; No prior Fx, post index 1	**4.40**	**3.19**	**6.32**	**10.27**	**17.86**
Women: Cohort 2.1; > 3 mo to 12 mo post index 2	32.81	37.99	71.55	53.74	140.39
Women: Cohort 2.2; > 12 mo to 24 mo post index 2	26.64	25.65	49.48	43.89	103.16
Women: Cohort 2.3; > 24 mo to 36 mo post index 2	24.53	24.46	43.88	41.45	93.34
Women: Cohort 2.4; > 36 mo post index 2	22.86	23.00	37.76	37.26	82.82
Men: Cohort 1; No prior Fx, post index 1	**2.73**	**2.82**	**4.68**	**4.61**	**10.33**
Men: Cohort 2.1; > 3 mo to 12 mo post index 2	33.28	48.49	82.82	41.57	144.35
Men: Cohort 2.2; > 12 mo to 24 mo post index 2	23.12	27.49	50.77	28.00	90.11
Men: Cohort 2.3; > 24 mo to 36 mo post index 2	21.15	23.88	39.63	25.26	75.35
Men: Cohort 2.4; > 36 mo post index 2	18.88	20.38	33.84	25.12	67.06

[a]Follow-up from the cohort entry date to Fx, death, disenrollment, end of data, or initiation of osteoporosis medications.
Fx, fragility fracture; IP, in patient; mo, month; NHNV, non-hip nonvertebral.

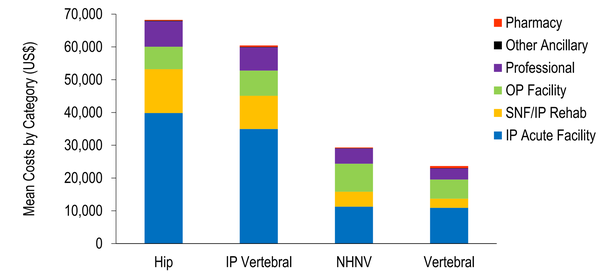
Scan the QR code for incidence rate by age group (5-year intervals)

Table 3. Mean Osteoporosis-related Fx Costs by Fx Type, Sex, and Age Group in Cohort 3 (Post Incident Fx)

Cohort by Age Group, Years	N	Baseline Osteoporosis Medications %	Osteoporosis-related Fx Costs 2024 US$, Mean (SD): 6-Month Baseline	1–6 Months	7–12 Months	13–18 Months	19–24 Months
Any Fx							
Women 50–64	27,078	4.80	645 (6,773)	21,342 (32,702)	2,236 (31,199)	2,549 (95,760)	3,306 (192,398)
Women 65+	145,099	9.98	967 (7,833)	28,947 (39,690)	5,324 (88,849)	5,313 (89,228)	4,925 (105,846)
Men 50–64	15,083	0.82	379 (4,953)	24,952 (43,304)	2,456 (43,329)	2,366 (62,825)	3,317 (203,875)
Men 65+	55,960	1.81	452 (5,111)	3,825 (47,138)	4,421 (78,930)	4,292 (106,480)	3,333 (61,081)
Hip Fx							
Women 50–64	1,308	7.11	944 (9,687)	48,399 (39,404)	6,825 (49,481)	3,878 (27,114)	3,305 (22,112)
Women 65+	25,825	8.00	818 (6,688)	61,816 (41,299)	6,438 (97,320)	7,131 (91,032)	5,944 (89,732)
Men 50–64	993	1.41	180 (3,934)	49,433 (47,425)	8,264 (135,273)	1,354 (12,999)	1,536 (11,721)
Men 65+	11,208	1.42	173 (2,624)	6,844 (45,439)	4,984 (62,025)	6,494 (174,863)	5,513 (9,329)
NHNV Fx							
Women 50–64	19,297	4.05	445 (3,977)	2,193 (323)	167 (1,899)	252 (11,116)	215 (8,909)
Women 65+	68,920	9.21	676 (4,935)	2,528 (3,548)	404 (5,870)	398 (846)	352 (7,675)
Men 50–64	8,817	0.47	269 (1,916)	2,649 (417)	192 (2,858)	187 (5,609)	167 (724)
Men 65+	19,863	1.20	373 (3,061)	2,715 (454)	379 (8,778)	312 (8,650)	236 (4,994)
Vertebral Fx							
Women 50–64	6,473	6.58	1,179 (11,198)	14,118 (35,145)	3,032 (5,668)	2,440 (21,080)	9,673 (412,255)
Women 65+	50,354	12.05	1,443 (1,963)	17,103 (35,053)	6,566 (115,744)	6,422 (10,422)	7,479 (153,785)
Men 50–64	5,273	1.29	600 (7,813)	17,762 (45,545)	2,253 (22,818)	3,469 (78,458)	8,122 (367,882)
Men 65+	24,889	2.48	641 (6,933)	2241 (47,184)	4,681 (78,190)	4,292 (73,949)	3,822 (64,748)
IP Vertebral							
Women 50–64	787	5.97	1,732 (2,146)	54,584 (71,137)	4,600 (44,225)	2,556 (15,798)	54,077 (1,195,733)
Women 65+	7,755	11.00	1,691 (12,242)	51,297 (58,210)	9,151 (207,092)	11,124 (195,968)	9,862 (1,7154)
Men 50–64	1,013	0.49	127 (1,687)	65,120 (81,937)	2,311 (15,902)	2,221 (23,852)	1,176 (1,649)
Men 65+	5,099	1.84	267 (3,899)	59,689 (81,780)	4,251 (27,266)	4,555 (9339)	4,227 (63,665)

Fx, fragility fracture; IP, inpatient; NHNV, non-hip nonvertebral; SD, standard deviation.

12-Month Mean Osteoporosis-related Fx Costs in Women Aged 65+ Years by Treatment Facility Type in Cohort 3 (Post Incident Fx)



	Hip	IP Vertebral	NHNV	Vertebral
Pharmacy	0.4%	0.8%	0.7%	2.8%
Other Ancillary	0.2%	0.2%	0.3%	0.2%
Professional	11.4%	11.7%	15.9%	14.4%
OP Facility	10.1%	12.7%	29.1%	24.7%
SNF/IP Rehab	19.6%	16.7%	15.5%	11.7%
IP Acute Facility	58.4%	57.8%	38.4%	46.1%

IP, inpatient; NHNV, non-hip nonvertebral; OP, outpatient; SNF/Rehab, skilled nursing facilities or rehabilitation.

DISCUSSION

- This study estimated that at least 1.72 million Fx (any type) occurred in 2023 in subjects aged ≥ 50 years without a prior fracture,[1] which equals ≥ 197 new fractures per hour
- In post-Fx patients, 1-year incidence rates of the first subsequent Fx:
  - Were numerically highest at 1 year and 2 years following an incident Fx
  - Declined over time but were still relatively significant beyond 3 years
  - Were more common in women vs men
  - Generally increased with increasing age
- In general, total post-Fx costs were:
  - Numerically higher during months 1–6 than during months 7–24
  - Numerically highest for hip Fx than IP vertebral, NHNV, and vertebral Fx for the first 6-months; follow-up costs were generally similar beyond 6 months
  - Numerically higher in men vs women
  - Numerically higher in patients ≥ 65 vs 50–64 years

Strengths

- This study reported updated data on the baseline risk of subsequent Fx (by type of Fx outcomes and additional subgroups) and cost (at 6-month intervals) in post-Fx patients in the US. Data in these subgroups could support the Health Economics and Outcomes Research models and studies
- Use of osteoporosis medications at baseline was an exclusion criteria in the incidence analysis to avoid a potential confounding effect on baseline incidence estimates; however, use of osteoporosis medication was allowed in the costs analysis

Limitations

- Retrospective claims data may not fully capture asymptomatic or non-clinical vertebral fractures; the incidence rates and related costs may be under-estimated
- The generalizability of the study data may be limited to post-Fx patients enrolled in US commercial plans available in the Optum CDM

Calculations: 121,843,541 x 0.01414 = 1,722,868. Then 1,722,868 / (365 x 24) = 197 per hour. The incidence rates and total number of fractures would be higher than current estimates if all subsequent fractures beyond the first fracture were captured.

Reference: 1. The 2023 US population size aged > 50 years was 121,843,541. US Census, 2023 American Community Survey (ACS), https://data.census.gov/table/ACSST1Y2023.S0101, accessed April 16, 2025.

CONCLUSIONS

- The clinical and economic burden in post-Fx patients remained significant in 2024 in the US
- Osteoporosis medications remained underutilized and accounted for < 2.8% of total healthcare costs

DISCLOSURES

- E Yeh, S Vititoe, and M McDermott are employees of and hold stock in Amgen
- Amgen Inc. and UCB Pharma funded this study. Lisa Humphries, PhD, of Amgen Inc. and Martha Mutomba, PhD, on behalf of Amgen Inc. provided medical writing support

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