

Economic burden of post-ERCP pancreatitis in inpatient setting among adults covered by traditional Medicare or private insurance

Yao Ding, Michael Cangelosi, Sofia Faucher

Boston Scientific Corporation, Marlborough, MA, USA



OBJECTIVE

Pancreatitis is the most common complication associated with endoscopic retrograde cholangiopancreatography (ERCP) procedures.¹⁻⁷ This analysis estimated the economic burden of post-ERCP pancreatitis in the inpatient setting among elderly Medicare beneficiaries or in privately-insured adult population

METHODS

Real-World Data Sources:

- Medicare 100% Standard Analytical Files (SAF) contains the inpatient and outpatient claims of Medicare beneficiaries across all geographic regions of the United States from 2014 to 2022
- MarketScan Commercial Claims database contains the inpatient, outpatient, and outpatient prescription drug experience of employees (and their dependents) from over 300 employers, covered under a variety of fee-for-service and managed care health plans from 2006 to 2021

Patient Cohort Selection:

- We identified individuals who underwent inpatient ERCP from the above data sources with the index date considered the first observed ERCP procedure date. The study period for each individual covers 6 months pre-index through the end of the post-index 6 months. We excluded individuals who were not continuously enrolled during their study period or had a prior diagnosis of pancreatitis (Figure 1)

Analyses and Outcome Measures:

- Incidence of post-ERCP pancreatitis
- Time to post-ERCP pancreatitis
- Costs of pancreatitis and length of stay during the index ERCP procedure (Figure 1)
- Subgroup analyses by Medicare beneficiaries vs. privately-insured population

RESULTS

Figure 1. Study Design and Outcome Measures

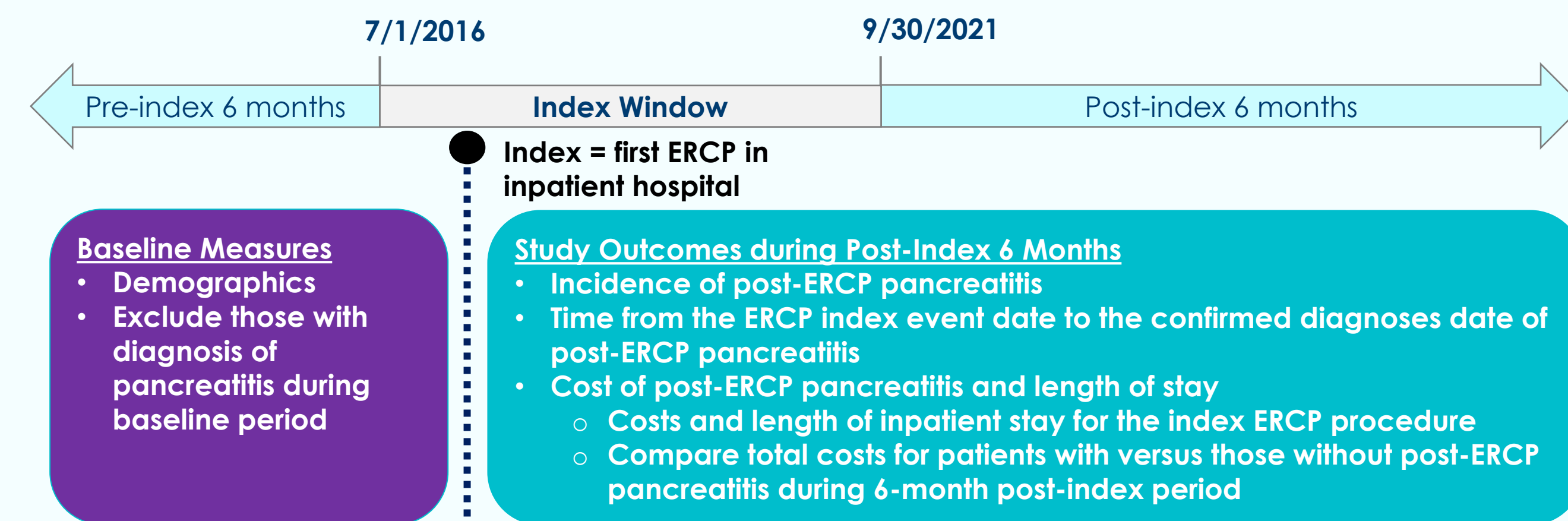


Table 1. Patient Selection Results by Cohort

| Attrition Table | Medicare beneficiaries | | Privately-insured | |
|---|------------------------|---------------|-------------------|---------------|
| | N | % | N | % |
| Individuals who underwent ERCP procedure in inpatient hospital during a study period between 1/1/2016-3/31/2022, with the index date considered the first observed ERCP procedure date ^A | 311,346 | 100.0% | 29,442 | 100.0% |
| And were continuously enrolled during pre-index 6 months and post-index 6 months | 266,293 | 85.5% | 18,171 | 61.7% |
| And were above the age of 65 years for Medicare beneficiaries, or between the age of 18 and 64 years for privately-insured | 194,494 | 62.5% | 17,875 | 60.7% |
| And without a prior diagnosis of pancreatitis in pre-index 6-month baseline period | 186,618 | 59.9% | 16,611 | 56.4% |
| Total Eligible Patients | 186,618 | 100.0% | 16,611 | 100.0% |
| Cohort for patients with post-ERCP pancreatitis [†] | 16,881 | 9.0% | 2,399 | 14.4% |
| Cohort for patients without post-ERCP pancreatitis | 169,737 | 91.0% | 14,212 | 85.6% |

^A Individuals with at least one claim for ERCP procedure codes, including ICD-10 procedure codes, CPT or HCPCS codes, were identified.
[†] Individuals with at least two claims for pancreatitis diagnosis codes on different days in post-index 6 months were defined as patients who developed post-ERCP pancreatitis.

Table 2. Patient Demographic Characteristics

| Demographic | Medicare beneficiaries | | Privately-insured | |
|-------------------------------------|------------------------|---------------------------|------------------------|---------------------------|
| | ERCP with pancreatitis | ERCP without pancreatitis | ERCP with pancreatitis | ERCP without pancreatitis |
| N (total number of patients) | 16,881 | 169,737 | 2,399 | 14,212 |
| Age on Index Procedure Date | | | | |
| Mean (SD) [Median] | 77.0* (7.9) [76] | 76.87 (7.8) [76] | 48.9*** (11.5) [52] | 46.9 (12.5) [50] |
| Sex, N (%) | | | | |
| FEMALE | 9,357 (55.4%***) | 90,426 (53.3%) | 1,420 (59.2%***) | 8,970 (63.1%) |
| MALE | 7,524 (44.6%) | 79,311 (46.7%) | 979 (40.8%) | 5,242 (36.9%) |
| Race, N (%) | | | | |
| CAUCASIAN | 14,736 (87.3%***) | 145,967 (86.0%) | N/A | N/A |
| BLACK | 706 (4.2%) | 8,687 (5.1%) | N/A | N/A |
| OTHER RACE ^A | 1,439 (8.5%) | 15,083 (8.9%) | N/A | N/A |
| Region, N (%) | | | | |
| SOUTH | 5,601 (33.2%***) | 61,368 (36.2%) | 986 (43.3%*) | 6,055 (44.7%) |
| MIDWEST | 4,672 (27.7%) | 41,054 (24.2%) | 572 (25.1%) | 2,998 (22.2%) |
| NORTHEAST | 3,435 (20.4%) | 33,292 (19.7%) | 366 (16.1%) | 2,331 (17.2%) |
| WEST | 3,142 (18.7%) | 33,633 (19.9%) | 351 (15.4%) | 2,151 (15.9%) |

^A Other race includes Hispanic, Asian, American Indian, etc.
 *p<.05 and ***p<.0001. Chi-square tests were used to compare categorical variables and t-test to compare age between patients with vs. those without post-ERCP pancreatitis.

Summary of Results:

Incidence rate of post-ERCP pancreatitis

- Medicare beneficiaries (age≥65 years): 9.0% in 6 months following ERCP; Privately-insured (age between 18 and 64 years): 14.5% in 6 months following ERCP (Table 1 and Table 3)

Patient demographic characteristics

- The mean age of those who developed post-ERCP pancreatitis is slightly higher than those who did not for both Medicare and privately-insured population. 55.4% of Medicare beneficiaries who developed post-ERCP pancreatitis are female, and 87.3% of them are Caucasian. 59.2% of privately insured who developed post-ERCP pancreatitis are female (Table 2)

Cost and length of stay (LOS)

- When comparing patients with post-ERCP pancreatitis versus those without – mean (median) LOS were 8 (6) versus 6 (5) days for Medicare beneficiaries and 8 (6) versus 6 (4) days for privately insured; Mean medical costs per person during the post-index period were \$43,108 versus \$34,632 for Medicare beneficiaries and \$94,586 versus \$71,862 for privately insured (Table 4). On average, post-ERCP pancreatitis is associated with \$8,476 higher medical costs in Medicare beneficiaries, and \$22,183 higher medical and pharmacy costs for privately-insured in 6 months of follow up

Table 3. Time to Post-ERCP Pancreatitis

| Measure | Medicare beneficiaries with post-ERCP pancreatitis | | Privately-insured with post-ERCP pancreatitis | |
|---|--|---------|---|--|
| | N | 16,881 | 2,399 | |
| Time to Post-ERCP Pancreatitis, days^A | | | | |
| Mean (SD) | | 36 (33) | 28 (31) | |
| Percentile 25 | | 13 | 10 | |
| Median | | 24 | 17 | |
| Percentile 75 | | 45 | 31 | |
| Cumulative incidence rate in 6 months of follow up | | 9.0% | 14.5% | |

^A Time to Post-ERCP Pancreatitis was defined as length between the ERCP index date and the date of the second pancreatitis diagnoses claim, as the confirmed event date, in a 6-month follow-up period. We required at least two claims with pancreatitis diagnosis codes on different days to confirm patients who developed post-ERCP pancreatitis in post-index 6 months. Please note: **51,263 out of 186,618 (27.4%) had at least one claim of post-ERCP pancreatitis diagnosis. Of those 51,263 patients, 47,443 (93%) had the first claim of pancreatitis diagnosis code on the index date of the ERCP procedure.**

Table 4. Distribution of Per-Person Cost and Length of Stay

| Measure | Medicare beneficiaries | | Privately-insured | |
|--|------------------------|---------------------------|-------------------------|---------------------------|
| | ERCP with pancreatitis | ERCP without pancreatitis | ERCP with pancreatitis | ERCP without pancreatitis |
| N (total number of patients) | 16,881 | 169,737 | 2,399 | 14,212 |
| Total medical costs^A per person during post-index 6 months, 2021 US\$ | | | | |
| Mean (SD) | \$43,108*** (\$42,812) | \$34,632 (\$37,517) | \$94,586*** (\$147,424) | \$71,862 (\$133,250) |
| Pctl 25 | \$18,379 | \$13,621 | \$33,198 | \$26,404 |
| Median | \$30,121 | \$22,243 | \$51,222 | \$39,440 |
| Pctl 75 | \$53,044 | \$42,812 | \$92,610 | \$68,774 |
| Total medical costs^A per person during index hospitalization for ERCP, 2021 US\$ | | | | |
| Mean (SD) | \$19,207*** (\$23,109) | \$17,003 (\$20,998) | \$51,354*** (\$95,500) | \$44,029 (\$98,252) |
| Pctl 25 | \$11,003 | \$9,188 | \$22,109 | \$20,042 |
| Median | \$14,269 | \$12,737 | \$32,751 | \$28,612 |
| Pctl 75 | \$20,397 | \$18,054 | \$50,059 | \$42,260 |
| Length of stay (LOS) for index ERCP hospitalization, days | | | | |
| Mean (SD) | 8*** (9) | 6 (9) | 8*** (13) | 6 (12) |
| Pctl 25 | 4 | 3 | 4 | 3 |
| Median | 6 | 5 | 5 | 4 |
| Pctl 75 | 9 | 7 | 8 | 6 |

^A Total medical costs for Medicare beneficiaries include inpatient and outpatient costs, but not include pharmacy (outpatient prescription drug) costs; Pctl: percentile.
 ***p<.0001 for all mean comparisons. Wilcoxon-Mann-Whitney (non-parametric) tests were used for mean costs and LOS variables with skewed distribution.

CONCLUSIONS

- We found a higher incidence rate of post-ERCP pancreatitis in privately insured than Medicare beneficiaries. This is consistent with a previous study that patients aged ≥65 had lower rates of post-ERCP pancreatitis than younger patients⁸
- Patient demographics in this study are comparable to those reported from prior literature³⁻⁴
- On average, individuals who developed post-ERCP pancreatitis had higher costs and longer length of inpatient stay than those who did not

LIMITATIONS

- The administrative claims data are subject to data coding limitations and data entry error
- The results in this study may not be generalizable to patients covered with insurances other than traditional Medicare or private insurance collected by MarketScan data

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