Impact of Out-of-Pocket Costs on Adherence Amongst US Oncology Patients on Oral Anticancer Medications

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Background

- High out-of-pocket (OOP) costs can lead to poor adherence.[1]
- Poor adherence to oral anticancer medications (OAM) is associated with poor clinical outcomes.[2]
- There are limited data characterizing this relationship for OAM across types of cancer, insurance, and age groups in the US.

Objective

To synthesize the published evidence over the last 10 years relating OOP costs to adherence of OAM amongst adult US oncology patients.

Methods

Targeted Literature Review

Inclusion:

- Adult oncology US patients on OAM
- Observational Studies published between January 2014 – August 2024
- Outcomes relating OOP to adherence

Exclusion:

- Population: parenteral anticancer medications, patients on cancer-related anticoagulation, outside of the US, survivors on adjuvant therapy
- Outcome: Did not directly compare OOP with adherence, or did not discuss adherence
- Publication/ study type: Literature reviews, review articles, chemical assays, OOP studies during clinical trials

Search Term:

- ((US) OR ("United States") OR (national)) AND ((ORAL) OR (OAM) OR (oral anticancer medication) OR (drug) OR (medication) OR (therapy) OR (cycle)) AND ((oncology) OR (cancer)) AND ((patient cost) OR (patterns) OR (adherence) OR (nonadherence) OR (persistence) OR (treatment selection) OR (initiation) OR (discontinuation) OR (sustainability) OR (financial toxicity) OR (copay) OR (accessibility) OR (affordability) OR (compliance)) AND (out of pocket)

Results

Table 1. Summary

- 17 Studies that investigated OOP costs and adherence were found **(Figure 1)**
- Sample size ranged from 105 – 38,111 **(Table 2)**
- Date ranges for claims data varied from 2002 – 2018 **(Table 2)**
- OOP Comparisons ranged from 1$ per month to >$2,000 per month **(Table 2)**
- The most common cancer type was Breast Cancer (n=9) **(Figure 2)**
- 12 studies showed that OOP had significant effects on adherence **(Figure 3)**

Figure 1. PRISMA Flow Diagram

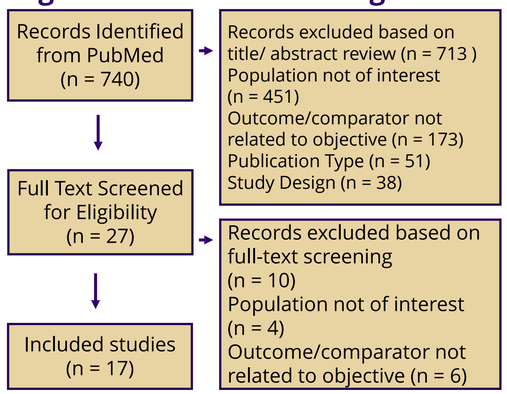
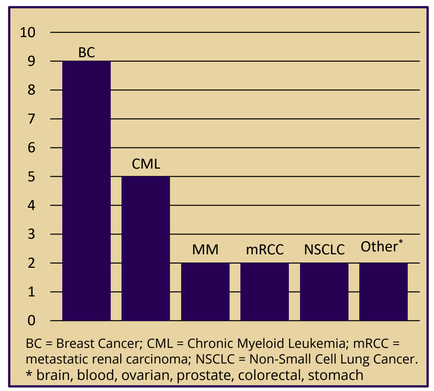
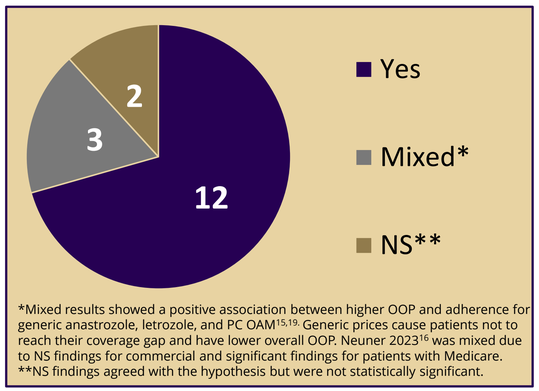


Figure 2. Number of Cancers



BC = Breast Cancer; CML = Chronic Myeloid Leukemia; mRCC = metastatic renal carcinoma; NSCLC = Non-Small Cell Lung Cancer.
* brain, blood, ovarian, prostate, colorectal, stomach

Figure 3. Supporting Hypothesis



*Mixed results showed a positive association between higher OOP and adherence for generic anastrozole, letrozole, and PC OAM[15,19]. Generic prices cause patients not to reach their coverage gap and have lower overall OOP. Neuner 2023[16] was mixed due to NS findings for commercial and significant findings for patients with Medicare.
**NS findings agreed with the hypothesis but were not statistically significant.

Table 2. Data Extraction Results

#	Author (Year)	Study Design	Data Period	n	Age	Cancer	Insurance	Results	OOP Amounts	Supports Association
1	Chin (2019)[3]	Retrospective Cohort Study	2007-2014	6,900	18-64	BC	Commercial	Nonadherence risk increase 1.006 (p<0.001)	1$	Yes
2	Cole (2019)[4]	Retrospective Cohort Study	Jan 2011 - Jun 2018	856	<35-64	CML	Commercial	Achieving 80% or 90% adherence: generic (86%, 78%); brand (75%, 64%)	OOP generic mean $139; brand mean $304	Yes
3	Dinan (2022)[5]	Retrospective Cohort Study	2007-2015	905	≥65	mRCC	Medicare	Adherence OR 0.68 (CI 0.47-0.98)	>200$	Yes
4	Doshi (2018)[6]	Retrospective claims-based study	2014-2015	38,111	Mean 68.2 (SD 11.4)	Top 5 (70%): CLL, CML, MM, metastatic prostate, mRCC	Medicare and Commercial	Abandonment rates for each OOP group: 10.0%, 13.5%, 31.7%, 41.0%, 49.4%	≤$10; $50.01-$100; $100.01-$500; $500.01-$2,000; >$2,000	Yes
5	Dusetzina (2020)[7]	Observational Administrative Claims	2008-2017	5,408	<65	CML or MM	Commercial	TKI adherence pre- vs. post-parity aDD RR 1.02 (CI 0.91 - 1.15)	Parity	NS
6	Dusetzina (2014)[8]	Database Analysis	2002-2011	1,541	18-64	CML	Commercial	Nonadherence for 75th-percentile vs. 25th: aRR, 1.42 (CI 1.19-1.69)	Copay: 75th $53; 25th $17	Yes
7	Farias (2017)[9]	Retrospective Cohort Study	2007-2009	8,688	≥65	BC	Medicare	OR 0.65 (CI 0.56-0.76) (30-day OOP)	$10.01-$41.25 vs. ≤ $2.65	Yes
8	Farias (2016)[10]	Retrospective cohort study	2007-2011	6,863	18-64	BC	Commercial	30-day OOP >$20: 8.6% lower PDC (CI 2.8-14.4)	>$20 vs $0-$9.99	Yes
9	Farias (2018)[11]	Retrospective Cohort Study	2007-2011	6,863	<65	BC	Commercial	Nonadherence (aRR (CI)): (0.93 (0.88-0.98); 0.92 (0.85–0.98); 0.94 (0.89–0.99)	<$4.9 vs. $10–$14.99; $15.00–$19.99; $20	Yes
10	Goulart (2021)[12]	Retrospective Cohort Study	2010-2015	105	Mean 68 (SD 12)	NSCLC	Medicare and Commercial	TKI adherence Q1-3 vs. Q4: (65.4% vs. 33.3%; aOR 0.28; CI 0.10-0.76)	90-day OOP: Q1-3 $1,431; Q4 $2,888	Yes
11	Hershman (2014)[13]	Retrospective Database Analysis	2007-2012	5,511	≥50	BC	Medicare and Commercial	Adherence vs. copay <$15: $15-30 OR 0.74 (CI 0.59-0.92); >$30 OR 0.51 (CI 0.41-0.65)	<$15; $15-30; >$30	Yes
12	Hess (2017)[14]	Retrospective Analysis	Jan 2008 - Jun 2013	1,452	18-89	NSCLC	Medicare	Erlotinib adherence: OR 0.97 (CI 0.95-0.98)	Per 100$ copay	Yes
13	Kaisaeng (2014)[15]	Cross Sectional	2008	3,781	≥65	BC	Medicare	aOR (p) Imatinib 1.012 (0.0001); erlotinib 1.013 (0.0001); thalidomide 1.018 (0.0021); anastrozole 0.970 (0.0001); letrozole 0.971 (0.0001)	Odds of discontinuation or delay per 1$ increase per month	Mixed
14	Neuner (2023)[16]	Retrospective Cohort Study	2007-2015	22,405	≥18	BC	Medicare and Commercial	Adherence aOR (CI): commercial <$5 1.04 (1.00–1.08). Medicare <5$ 1.31 (1.21–1.42); $5–9.99 1.30 (1.20 – 1.41); $10–19.99 1.25 (1.13–1.38)	Vs. >$20	Mixed
15	Neuner (2015)[17]	Quasi-Experimental Prepost Design	2006-2007	16,462	≥65	BC	Medicare	Adherence (OR (CI)): anastrozole Q1, 1.08 (1.02-1.14) ; Q4, 1.51 (1.44 to 1.58). Exemestane/ letrozole no difference in quarters, but pre-post GAI 1.47 (1.40-1.55)	Avg copay Q1 vs. Q4 without subsidy: $183 vs. %15 for no-LIS patients	Yes
16	Spargo (2021)[18]	Retrospective Cohort Study	2007-2017	1,887	18-64	CML	Commercial	Non-significant increase in PDC odds for FIHP and SFHP pre- vs. post-parity (0.85 to 0.87; 0.87 to 0.90)	NS increase FIHP vs. SFHP was 34$ per 30 days.	NS
17	Vyas (2022)[19]	Retrospective Cohort Study	2010-2018	37,938	≥18	Blood (BL), brain (BR), BC, colorectal (CR), liver, lung, ovarian (OV), PC, renal, stomach (ST)	Medicare and Commercial	Higher OOP is significantly associated with nonadherence*. (aOR (95%CI)) Renal 3.91 (2.80-5.47); BC 1.26 (1.13-1.41); Liver 3.03 (1.86 -4.96); BL 2.89 (2.48-3.37); BR 1.41 (1.00-1.99); CR 1.66 (1.44-1.91); Lung 3.03 (1.86-4.93); OV 3.01 (1.23 -7.40); PC 0.84 (0.76-0.93); ST 1.86 (1.02-3.38)	Compared quartiles 1-3 of spending to quartile 4.	Mixed

aOR = adjusted odds ratio; aDD = adjusted difference in difference; BAI = branded aromatase inhibitor; BC = breast cancer; CI = 95% confidence interval; CML = chronic myeloid leukemia; FIHP = fully insured health plan; GAI = generic aromatase inhibitor; LIS = low income subsidy; MM = multiple myeloma; mRCC = metastatic renal cell carcinoma; NS = not significant; NSCLC = non-small cell lung cancer; OOP = out of pocket; OR = odds ratio; PDC = percentage of days covered; Q# = quarter number; RR = risk ratio; SD = standard deviation; SFHP = self funded health plan; TKI = tyrosine kinase inhibitor

Conclusions

- Higher OOP costs negatively impacted adherence for patients with Medicare and commercial insurance
- Monthly OOP increases of 1$ showed statistically significant reductions in adherence
- Cancers with low-cost generics (prostate and breast) can have mixed results[15,19]
- 11 Different cancer types showed that higher out-of-pocket costs negatively impacted adherence

References and Contact Info

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