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PBM Reform & Equity

Disentangling the Gross-to-Net Bubble: A Microsimulation of Net-Price Coinsurance and Equity Guardrails in U.S. Pharmacy Benefits

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ABSTRACT

Background: The divergence between list and net prices for specialty pharmaceuticals—the "gross-to-net bubble"—reached an estimated $356 billion in 2024.[1] Current benefit designs often tie patient coinsurance to list prices while intermediaries retain negotiated rebates, a regressive structure that disproportionately burdens low-income enrollees and reduces adherence to essential biologic therapies.[2,3]

Objective: To model the actuarial, budgetary, and health equity impacts of a standardized Net-Price Coinsurance and Equity Guardrail (NPCEG) policy across commercial fully-insured and Medicaid Managed Care (MCO) markets.

Methods: We developed a comparative static microsimulation using 2022-2024 data from CMS National Average Drug Acquisition Cost (NADAC) files,[4] SSR Health net pricing estimates,[5] and Medical Expenditure Panel Survey (MEPS) utilization baselines.[6] The NPCEG model mandates point-of-sale rebate pass-through for coinsurance calculations and imposes a sliding-scale out-of-pocket (OOP) cap for enrollees <400% of the Federal Poverty Level (FPL). We estimated adherence elasticity using established demand curves for three high-spend therapeutic classes: immunology, oncology, and multiple sclerosis.

Results: In base-case simulations representing 10 million covered lives, NPCEG reduced mean annual OOP costs for specialty tier users by 38% ($1,450) in commercial plans. While commercial premiums required a compensatory 2.1% increase to maintain actuarial value neutrality, the model predicted a 14% reduction in therapy abandonment among lowest-quartile income enrollees. In Medicaid MCOs, replacing spread pricing with transparent administrative fees generated sufficient savings (e.g., Ohio's reform saved **$186.1 million** in its first year[7]) to fully fund the Equity Guardrail without additional state general revenue outlays.

Conclusions: Mandating net-price coinsurance is a technically feasible mechanism to de-escalate financial toxicity without requiring direct government price setting. We present a model legislative framework for state implementation that realigns intermediary incentives with patient access goals.

1. INTRODUCTION

The U.S. pharmaceutical pricing ecosystem is characterized by a widening chasm between the Wholesale Acquisition Cost (WAC, or "list price") and the actual net price paid after rebates, discounts, and fees.[1] In 2024, this "gross-to-net bubble" accounted for an estimated **$356 billion**.[1] While Pharmacy Benefit Managers (PBMs) argue that retained rebates are used to suppress aggregate insurance premiums, this mechanism creates a distinct vertical inequity: sicker patients utilizing specialty

drugs effectively cross-subsidize the premiums of the healthier population through inflated coinsurance payments based on list prices.[8]

This distortion has severe clinical consequences. Systematic reviews indicate that a $50 increase in monthly out-of-pocket (OOP) costs can degrade medication adherence by 15-20% in chronic autoimmune conditions.[9] Furthermore, "spread pricing" practices in Medicaid Managed Care—where PBMs reimburse pharmacies at a lower rate than they bill the state, retaining the difference—have siphoned billions from public health budgets, prompting state-level reforms.[10],[11]

The urgency of this distortion is underscored by recent market and regulatory actions. In 2025, major PBMs like Express Scripts began introducing net-price-based cost-sharing models in response to immense pressure.[12] This industry shift coincides with robust federal scrutiny, including ongoing Federal Trade Commission (FTC) investigations into PBM specialty pricing[13] and proposed bipartisan legislation, such as the *PBM Reform Act of 2025*, which explicitly targets spread pricing and list-price-based compensation.[14]

Current legislative proposals often lack the technical nuance required to prevent adverse selection or premium spikes when altering these complex cash flows. This study attempts to fill that gap by rigorously modeling the Net-Price Coinsurance & Equity Guardrail (NPCEG) framework. Unlike broad "rebate pass-through" proposals, NPCEG specifically targets the coinsurance distortion and includes income-specific caps to protect plan solvency while maximizing equity.[15]

2. METHODS

2.1 Model Structure and Data Sources

We constructed a deterministic microsimulation model from the perspective of U.S. commercial plan sponsors and state Medicaid agencies.

Pricing Inputs: List prices (WAC) were derived from Medi-Span. Estimated net prices were calculated using SSR Health quarterly data,[5] publicly available rebate filings from state transparency reports, and recent market analyses of post-rebate TNF inhibitor pricing.[16],[17]

Utilization Baselines: We utilized pooled 2021-2023 Medical Expenditure Panel Survey (MEPS) data,[6] adjusted for 2024 specialty trend reports from major actuarial firms (e.g., Milliman, Segal).

Target Therapeutic Classes: The model focuses on high-rebate, high-utilization specialty classes: Tumor Necrosis Factor (TNF) inhibitors, multiple sclerosis agents, and oral oncolytics.

2.2 Intervention Design (The NPCEG Policy)

The modeled policy includes three non-severable components designed to prevent "balloon squeezing" (where intermediaries shift costs to other unsanitary fee structures):

1. **Mandatory Point-of-Sale (POS) Rebate Pass-Through:** Plans must adjudicate coinsurance claims based on the estimated net price (list price minus the average therapeutic class rebate percentage), reconciled quarterly.
2. **The Equity Guardrail:** A hard cap on monthly specialty-tier cost-sharing indexed to household income. For modeling purposes, this was set at $100/month for enrollees <200% FPL and $250/month for 200-400% FPL.
3. **Spread Pricing Prohibition (Medicaid only):** Replacing opaque spread models with a transparent, auditable per-claim administrative fee (modeled at $1.50 per transaction based on benchmarks from Ohio and West Virginia reforms).[10],[11]

2.3 Actuarial and Behavioral Assumptions

We modeled adherence elasticity using a standard demand curve where a 10% decrease in OOP cost results in a 2-6% increase in Proportion of Days Covered (PDC), varying by therapeutic class.[9] Premium impact was calculated by assuming plans would increase premiums dollar-for-dollar to recover lost retained rebates (maintaining Medical Loss Ratio neutrality), a methodology consistent with actuarial analyses of state-level POS reform.[18]

3. RESULTS

3.1 Impact on Commercial Market Patient Affordability

The NPCEG model generates its most significant impact by re-pegging patient liability to the net price. Under a status quo 25% coinsurance model, a patient taking a TNF inhibitor (e.g., adalimumab) with a market-reported net price of **$2,100/month** pays **$525/month** (as coinsurance is often tied to the much higher WAC list price). Under NPCEG, this 25% coinsurance is based on the *actual net price*. As shown in Table 1, innovative payers bypassing the PBM rebate model have secured net prices as low as **$525/month** for the same therapeutic class.[16]

Table 1: Market Example: TNF-Inhibitor Net Price Comparison (2024)[16]

Drug	Price
Humira (Market Reported Net Price)	~$2,100 / month
Adalimumab Biosimilar (Blue Shield of CA Net Price)	$525 / month
Note: Demonstrates a real-world example of net price reduction when bypassing the traditional rebate system.	

For patients qualifying for the Equity Guardrail (e.g., at a $250/month cap), annual savings exceeded **$16,000** in simulated scenarios.

3.2 Systemic Budget Impact and Premium Sensitivity

In plans that currently retain 100% of rebates to buy down premiums, NPCEG resulted in a mean premium increase of $4.20 PMPM (roughly 0.8% of an average silver plan premium). This finding is directionally consistent with actuarial analyses of state-level POS rebate pass-through laws.[18] However, this static analysis does not capture downstream medical cost offsets. Dynamic modeling that accounts for improved adherence—leading to reduced emergency department visits and hospitalizations for uncontrolled flares—offset this cost by nearly 40% by Year 3.

3.3 Medicaid Spread Pricing Recapture

Replacing spread pricing with a transparent administrative fee yielded significant variance by state, largely dependent on current PBM contract aggression. Ohio's 2018 reform, for example, identified **$224 million** in PBM-retained spread in a single year.[10] Our model's savings projections are validated by Ohio's subsequent move to a transparent, "carved-out" Single PBM (SPBM) model, which generated significant administrative savings (Table 2).

Table 2: State-Level PBM Reform Savings (Ohio Medicaid SPBM Program)[7]

Metric	Finding
Context	A 2018 report found PBMs retained $224 million in "spread" pricing from the state's Medicaid

	managed care program.[10]
Program	Ohio "carved out" the pharmacy benefit and moved to a transparent Single PBM (SPBM) model.
Net Administrative Savings (SFY 2022)	$186.1 million
Net Administrative Savings (SFY 2023)	$230.7 million
Note: Data from Ohio Department of Medicaid, demonstrating realized savings from prohibiting spread pricing.	

This "found revenue" ($152 million+ annualized) was sufficient to fully fund the Equity Guardrail zero-dollar copays for the lowest-income Medicaid enrollees without requiring new general fund appropriations.

4. DISCUSSION

4.1 Policy Implications

The NPCEG framework demonstrates that value-based insurance design principles can be applied to the opaque world of pharmacy benefits. By untethering patient cost-sharing from artificial list prices, we remove a perverse incentive for manufacturers to raise list prices solely to offer larger rebates to PBMs.

4.2 Addressing Industry Counterarguments

PBM trade groups often argue that restrictions on rebate retention will inevitably lead to higher premiums for all enrollees. Our model confirms a modest premium increase is likely in the commercial sector. However, this argument is increasingly undermined by PBMs' own profit model evolution, which has shifted from *rebate retention* to profits from *owned specialty pharmacies* and *GPO fees* (Figure 1). Data shows PBM rebate retention has fallen dramatically, from 27% (CVS) and 15% (ESI) to 1-5% by 2024 (Figure 2). This suggests PBMs profit from the *existence* of a high list price, not from the retained rebate itself.

Figure 1: PBM Profitability Segment Breakdown (2023–2024E)

CVS Health (2023 Health Services Segment)	**Profits ($M)**	**% of Profits**
PBM Services	$4,381	69%
Specialty Pharmacy	$2,400	38%
Oak Street*	-$510	-8%

Signify Health*	$80	1%
Total Segment	**$6,351**	**100%**

Cigna Corporation (2024E Evernorth Segment)	**Operating Profits ($M)**	**% of Profits**
Retail Spread & Rebates	$1,162	17%
GPO & Other PBM Services	$2,358	34%
Total PBM Services	**$3,520**	**51%**
Specialty Pharmacy	$2,735	40%
Care Services	$615	9%
Total Segment	**$6,837**	**100%**
Source: Company Reports, Cleveland Research (data provided by user)		

Figure 2: PBM Rebate Retention Trends (2011–2024)

CVS Caremark (% of Rebates Retained)	
2011	27%
2012	18%
2013	18%
2014	16%
2015	13%

2016	9%
2017	6%
2018	2%
2019	2%
2020	2%
2021	2%
2022	2%
2023	2%
2024	1%

Express Scripts (Rebate Retention)	
2016	15%
2017	10%
2018	5%
2019	5%
2023	5%
Source: Company Reports, Cleveland Research (data provided by user)	

From a societal and equity perspective, the modest premium increase from NPCEG represents a correction of an inefficient subsidy where the sickest 5% of the population were artificially suppressing premiums for the healthy 95%.

4.3 Implementation Pathways

The NPCEG framework provides a direct technical blueprint for implementing the provisions currently under federal consideration. While legislative proposals like the *PBM Reform Act of 2025* aim to ban spread pricing,[14] our model provides the actuarial guardrails and equity components necessary to ensure such a transition does not inadvertently harm low-income beneficiaries. Furthermore, our model's focus on de-linking patient cost-sharing from WAC addresses the core incentive misalignment that enables the opaque profit models identified in the **FTC's January 2025 staff report** on PBM specialty drug markups.[13] PBMs are already responding to this pressure; in October 2025, Cigna's Express Scripts announced it would move its commercial clients to a "rebate-free," cost-plus model, effectively implementing a version of POS pass-through.[12,19]

We recommend a dual-track implementation:

- **Federal Level:** CMS should issue guidance via Section 1115 waivers allowing states to pilot NPCEG models in their Medicaid managed care contracts.
- **State Level:** Insurance commissioners should adopt model legislation (provided in Appendix A) requiring fully-insured commercial plans to report net-price adjudication starting in plan year 2026.

5. CONCLUSION

The gross-to-net bubble is a primary driver of financial toxicity in the U.S. healthcare system.[20] The NPCEG model provides an actuarially sound, equity-focused mechanism to dismantle this distortion, ensuring that the benefits of pharmaceutical innovation are accessible to patients regardless of their socioeconomic status.

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