The Impact of Financial **Assistance Programs on Medication Adherence: A Systematic Review With AI-Driven Prediction**

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Background & Significance

- In 2023, U.S. healthcare spending reached \$4.8 trillion (17.6% of GDP), and is estimated to have exceeded \$5 trillion in 2024. Projections suggest it will reach \$7.7 trillion by 2032
- Financial Medication Assistance (FMA) programs aim to reduce out-of-pocket costs and improve access to medications. These encompassing a spectrum of initiatives, including pharmaceutical patient assistance programs, co-pay relief funds, health systemfunded initiatives, and prescription discount cards
- FMA programs have been pivotal in promoting medication adherence, especially for patients managing chronic conditions, and in shifting care models from volume-based to value-based healthcare
- Despite real-world success, program effectiveness varies, prompting the use of AI to simulate broader economic and adherence outcomes under hypothetical scaling scenarios.

Objectives

- Evaluate the role of FMA programs in improving medication adherence and explore their economic impacts in U.S. adult populations with chronic conditions
- Use generative AI (ChatGPT-4) to predict potential adherence improvements and cost savings under hypothetical intervention scenarios.



Scan for **References**, **Supplementary materials**, and **Contact information**

- Adherence improvement ranged from 2% to 49% across FMA interventions
- Healthcare system initiatives reduced inpatient admissions by 39.5% and outpatient visits by 64.4%, saving \$378,183
- Al model predicted that:
 - reaching **81.6%**
 - per patient

Sensitivity analyses confirmed consistent outcomes across baseline cost scenarios (\$15,000–\$25,000).

Table 1: Al-Driven Predictions for FMA Interventions

Baseline	Predicted	
Adherence (%)	Adherence	
	Improvement	
	(%)	
30	31.6	
40	31.6	
50	31.6	

Estimated one-year savings per patient, based on adherence improvements and reduced healthcare resource utilization (e.g., hospitalizations, emergency visits).

Table 2: Sensitivity Analysis for Adherence and Cost Savings

Baseline Adherence (%)	Baseline Costs (\$)	Predicted Adherence Improvement	Post- Interventior Adherence	Cost Savings per Patient (\$)
		(%)	(%)	
30	15000	31.6	61.6	2500
30	20000	31.6	61.6	3250
30	25000	31.6	61.6	4000
40	15000	31.6	71.6	2750
40	20000	31.6	71.6	3500
40	25000	31.6	71.6	4250
50	15000	31.6	81.6	3000
50	20000	31.6	81.6	3750
50	25000	31.6	81.6	4500

Key Results

Expanding vouchers for low-adherence patients (<50%) could improve adherence by **31.6%**,

Associated annual cost savings: \$4,000-\$5,000

Post-Intervention Adherence (%)

Cost Savings per Patient (\$)

61.6	4500
71.6	4750
81.6	5000

- 7 studies.
- Inclusion criteria: U.S.-based adults with chronic conditions receiving long-term medications and FMA support
- Extracted adherence metrics: Medication Possession Rate (MPR), self-reported adherence, abandonment rate
- Al simulations were conducted using data extracted from the included studies: > Baseline adherence, cost, and intervention types modeled
- assumptions.



patient health outcomes.

- By alleviating financial burdens, FMA enhances access to care and adherence to prescribed medications.
- Integrating AI-driven predictions into systematic reviews provides actionable insights, enabling policymakers to optimize resource allocation for adherence-enhancing interventions.
- Further research should prioritize real-world validation of AIderived outcomes to refine FMA program design and maximize patient impact.

Methodology

PRISMA-guided systematic review using PubMed; final inclusion:

- ChatGPT-4 used for synthesis and scenario forecasting
- Sensitivity analyses tested variations in adherence and cost

Conclusion

Financial assistance strategies in the U.S. have positively impacted