Reducing Healthcare Cost Inefficiencies Through AI-Driven Insurance Plan Navigation

A Policy and Technical Analysis

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> ***Abstract:*** *This paper examines how AI-driven plan analysis can address information asymmetries in U.S. health insurance markets, reduce cost inefficiencies, and improve coverage access for underserved populations. PlanVoyager demonstrates a public-interest technology approach using official government data sources and transparent methodology.*

1. Executive Summary

The U.S. healthcare system faces persistent challenges in cost efficiency and coverage access, with annual expenditures exceeding $4.3 trillion and approximately 31 million Americans remaining uninsured. A significant contributing factor is the complexity of health insurance plan selection, which creates informational barriers that prevent individuals from identifying coverage appropriate to their needs.

PlanVoyager addresses this challenge through an AI-driven plan analysis platform that leverages publicly available Centers for Medicare & Medicaid Services (CMS) data and official Internal Revenue Service (IRS) subsidy calculation methodologies. The platform provides transparent, neutral analysis that helps individuals understand their coverage options without commercial bias—reducing both underinsurance (which leads to inadequate care) and overinsurance (which contributes to unnecessary healthcare spending).

This whitepaper examines the national healthcare cost challenge, describes PlanVoyager's methodology, and analyzes the potential public benefit of AI-assisted insurance navigation at scale.

2. Problem Statement

2.1 The Scale of Healthcare Cost Inefficiency

The United States spends more on healthcare per capita than any other developed nation, yet health outcomes do not proportionally reflect this investment. According to CMS National Health Expenditure data, U.S. healthcare spending reached $4.3 trillion in 2023, representing approximately 18% of gross domestic product. A substantial portion of this spending is attributed to administrative complexity, inappropriate plan selection, and inefficient utilization patterns.

2.2 Information Asymmetry in Insurance Markets

Health insurance markets exhibit significant information asymmetry. Consumers must evaluate complex products involving:

- Premium costs, deductibles, copayments, and coinsurance structures
- Network adequacy and provider availability
- Prescription drug formularies and tier structures
- Service area restrictions and coverage limitations
- Subsidy eligibility and tax credit calculations

Kaiser Family Foundation research indicates that 43% of American adults report difficulty understanding their health insurance options. This complexity disproportionately affects populations without access to employer-sponsored guidance, including self-employed individuals, gig economy workers, early retirees, and rural communities.

2.3 Consequences of Poor Plan Selection

Information barriers lead to two primary adverse outcomes:

Underinsurance

Individuals select lower-cost plans inadequate for their healthcare needs, resulting in delayed care, medical debt, and worse health outcomes.

Overinsurance

Individuals pay for coverage exceeding their actual needs, contributing to household financial strain and system-wide cost inflation.

3. Methodology

3.1 Data Sources

PlanVoyager is built entirely on publicly available government data sources:

- **CMS Exchange Public Use Files (PUFs):** Comprehensive plan attributes, premium rates, service areas, and benefit structures for all ACA marketplace plans
- **IRS Revenue Procedures:** Official Federal Poverty Level tables and Applicable Percentage tables for Premium Tax Credit calculations
- **HHS Poverty Guidelines:** Annual Federal Poverty Level thresholds for subsidy eligibility determination

3.2 Subsidy Calculation Engine

The platform implements deterministic, table-driven subsidy calculations that exactly replicate official IRS methodology. This approach ensures:

- Calculations are auditable and reproducible
- No AI systems are involved in numerical computations
- Results align with official HealthCare.gov estimates
- Annual policy updates are systematically integrated

3.3 AI Application Boundaries

Artificial intelligence is applied exclusively to explanation and translation functions:

- Translating insurance terminology into plain English
- Explaining differences between plan options
- Contextualizing coverage features for individual circumstances

AI systems are explicitly prohibited from generating numerical estimates, determining eligibility, or making coverage recommendations. All AI outputs must reference specific plan attributes from verified data sources.

4. Public Impact

4.1 Cost Efficiency Improvement

By enabling individuals to identify plans appropriately matched to their healthcare utilization patterns, PlanVoyager contributes to national cost efficiency objectives:

- Reducing premium expenditure on unnecessary coverage
- Improving utilization of preventive care benefits
- Decreasing emergency room visits through appropriate primary care coverage
- Supporting optimal deductible/premium tradeoff decisions

4.2 Access Expansion

The platform specifically addresses populations with limited access to insurance guidance:

- **Self-employed individuals:** Approximately 16 million Americans lack employer HR department guidance
- **Gig economy workers:** A growing workforce segment without traditional benefits infrastructure
- **Early retirees:** Individuals between employer coverage and Medicare eligibility
- **Rural communities:** Populations with limited access to licensed insurance brokers

4.3 Preventive Care Support

Improved understanding of coverage options leads to better utilization of preventive services mandated under the ACA, including screenings, immunizations, and wellness visits. This supports national health objectives and long-term cost reduction through early intervention.

5. Scalability & Policy Relevance

5.1 Nationwide Coverage

PlanVoyager's architecture supports all U.S. states and territories where ACA marketplace coverage is available. The CMS data foundation enables analysis of thousands of plans across diverse geographic regions without requiring local customization.

5.2 Policy Adaptability

The platform is designed to accommodate ongoing healthcare policy evolution:

- Annual Federal Poverty Level updates
- Applicable Percentage table modifications
- Plan year data refreshes
- Potential policy expansions (e.g., public option, Medicare eligibility changes)

5.3 Open Data Demonstration

PlanVoyager demonstrates how government open data initiatives can be leveraged to create public-benefit technology. The methodology is documented and reproducible, supporting transparency objectives and potential collaboration with policy researchers.

6. Conclusion

Healthcare plan complexity represents a significant barrier to appropriate coverage and contributes to national cost inefficiencies. PlanVoyager addresses this challenge through transparent, AI-assisted plan analysis built on official government data sources.

The platform's public-interest design—emphasizing neutrality, transparency, and accessibility—aligns with federal healthcare policy objectives including cost containment, preventive care emphasis, and health equity. By reducing informational barriers faced by underserved populations, PlanVoyager contributes to measurable public benefit at national scale.

As healthcare policy continues to evolve, AI-driven navigation tools represent a scalable approach to improving consumer decision-making and system-wide efficiency. PlanVoyager demonstrates the potential of this approach through a working, publicly accessible implementation.

7. References

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