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HOUSEHOLD FINANCIAL PROTECTION AGAINST HEALTH RISKS: A SYSTEMATIC REVIEW OF THE DETERMINANTS OF OUT-OF-POCKET HEALTH EXPENDITURES

Aazelarab Boughaleb, Mounir Jerry
Laboratory of Economic Sciences and Public Policy, Ibn Tofail University Kenitra, Morocco

Corresponding Address: Aazelarab Boughaleb**, Affiliation:** Laboratory of Economic Sciences and Public Policy, Ibn Tofail University Kenitra, Morocco. **E-mail:** boughaleb.aazelarab@uit.ac.ma

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Abstract

Introduction: Out-of-pocket (OOP) health expenditures are a major barrier to Universal Health Coverage (UHC), exposing households to financial catastrophe (SDG indicator 3.8.2) and impoverishment. While many determinants are known, a consolidated framework to guide policy action is lacking. This systematic review aims to synthesize the evidence on OOP determinants to develop and apply a novel hierarchical framework for policy analysis. **Methods:** Following the PRISMA 2020 guidelines, a systematic search of academic databases and grey literature published between January 2000 and May 2025 was conducted. The selection process included an AI-assisted thematic screening followed by manual validation. Ultimately, 72 documents were included in the narrative synthesis and quality assessment using JBI tools. **Results:** The findings reveal a four-level "Cascade of Vulnerability." At the systemic level, governance and financing choices notably low public health expenditure as a share of Total Health Expenditure (THE) and the absence of risk-pooling create a high-risk environment. This risk is activated by health shocks such as chronic illnesses and hospitalizations, acting as triggers. The financial impact is ultimately amplified by household-level vulnerabilities, including low socioeconomic status, rural residence, and the presence of elderly members. **Conclusion:** Our synthesis suggests that the level of OOP spending is a measurable reflection of a health system's policy choices rather than an inevitability. Its reduction requires a multidimensional strategy (budgetary, operational, behavioral, and technological). The proposed hierarchical framework provides a foundation for future research based on predictive econometric modeling and scenario simulation to guide reforms toward measurable financial protection targets.

Keywords: Catastrophic Health Expenditure; Determinants; Financial Protection; Health Financing; Out-of-Pocket Health Expenditure; Systematic Review; Universal Health Coverage (UHC)

Introduction

Out-of-pocket (OOP) health expenditures, defined as direct payments made by households at the point of service use [1], represent a major and persistent barrier to achieving Universal Health Coverage (UHC) worldwide [2,3]. Acknowledged as the most inequitable form of health financing [4], OOP payments create severe financial hardship, leading to catastrophic spending, impoverishment, and foregone care [5,6]. In accordance with Sustainable Development Goal (SDG) indicator 3.8.2 [7], financial protection is considered compromised when a household's health spending exceeds a specific threshold of its capacity to pay. The World Health Organization (WHO) estimates that over one billion people are at risk of being pushed into poverty by these payments [3] and considers any health system where OOP exceeds 15–20% of Total Health Expenditure (THE) to be at high risk of financial catastrophe [8].

An in-depth analysis reveals that high OOP spending is not an isolated issue but a symptom of deeper systemic failures shaped by the interaction of multiple forces [9]. The scientific literature has identified a wide range of determinants [10-18]. However, the empirical evidence supporting these factors remains fragmented across single-country studies and diverse methodological approaches.

Recent reviews have provided valuable insights, though often with a specific focus. For instance, Jalali et al. conducted a scoping review focused on identifying strategies to reduce OOP [19], whereas our work aims to synthesize the evidence on the underlying determinants that necessitate such strategies. Other syntheses have adopted a regional lens, such as the narrative review by Derkyi-Kwarteng et al., which

examined OOP payments under insurance schemes specifically in sub-Saharan Africa [20]. Furthermore, several primary econometric studies, like those by Frimpong et al. in sub-Saharan Africa [21] and Kaladharan & Manayath in emerging economies [22], have quantitatively tested the impact of specific financing variables on OOP.

While these studies are crucial, a comprehensive and global systematic review that structures the full range of determinants—from macro-level governance to individual household characteristics—within an integrated policy analysis framework remains a critical gap. Existing literature often presents determinants as a fragmented list or focuses on specific contexts, hindering policymakers from obtaining a consolidated overview of the most effective levers for action.

To address this gap, this systematic review has two main objectives: 1) To systematically identify, assess, and synthesize the global evidence on the determinants of OOP health expenditures published between January 2000 and May 2025; and 2) To develop and apply a novel four-level Hierarchical Framework of Policy Levers (Governance and Financing; Healthcare Delivery; Health Shocks; and Household Vulnerabilities) to structure these determinants. This framework aims to provide a clearer understanding of the causal chain and to map specific policy levers to different levels of the health system, thereby offering a more actionable tool for policymakers and a sound basis for evidence-informed policymaking.

Methods

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [23]. A protocol was developed a priori to ensure methodological transparency.

Eligibility Criteria

Eligibility criteria were defined to guide the selection process. Studies were included if they: (1) substantively addressed the determinants of household OOP health expenditures; (2) provided a quantitative, qualitative, or conceptual analysis of these determinants, including complex economic evaluations (total costs or panel data analyses); (3) were original research articles, literature reviews, academic theses, or institutional reports from international organizations and NGOs; and (4) were published in English or French between January 2000 and May 2025. Editorials, letters to the editor, and commentaries were excluded.

Information Sources and Search Strategy

A comprehensive literature search was conducted in June and July 2025 across multiple electronic databases, including PubMed, Scopus, and Web of Science, supplemented by Google Scholar. To capture relevant grey literature, institutional repositories of the WHO, the World Bank, and the OECD were also searched.

Selection Process and AI Integration

All records were imported into a reference manager, and duplicates were removed. Two authors (A.B. and M.J.) independently screened titles and abstracts. To enhance efficiency, the AI-powered tool ChatPDF was utilized for an initial thematic pre-screening of full texts. The AI's role was limited to rapid keyword detection and preliminary relevance flagging based on standardized prompts (e.g., "Does this document analyze specific determinants of OOP?"). Crucially, the final decision to include or exclude a document was made manually by the authors to mitigate the risk of AI-generated false negatives. This hybrid approach ensures both speed and scientific rigor, in compliance with emerging transparency standards for AI use in evidence synthesis.

Data Extraction and Synthesis

A data extraction form was developed to collect information on references, context, design, and identified determinants. Given the heterogeneity of the data, a narrative synthesis was conducted. The findings were structured according to the novel four-level Hierarchical Framework of Policy Levers developed for this study (Figure 2). This framework, which categorizes determinants into systemic, delivery-related, household-level, and health shock factors, was used to map the causal chain of financial vulnerability.

Risk of Bias Assessment

The methodological quality was independently assessed by two authors (A.B. and M.J.) using the Joanna Briggs Institute (JBI) critical appraisal tools [24]. Studies were categorized as having a low, moderate, or high risk of bias. Discrepancies were resolved through consensus.

Results

This section details the outcomes of the systematic review process. It first presents the study selection flow in accordance with PRISMA 2020 guidelines (Figure 1) [23]. This is followed by a summary of the methodological quality and the key characteristics of the 72 included studies, consolidated in Table 2 (See

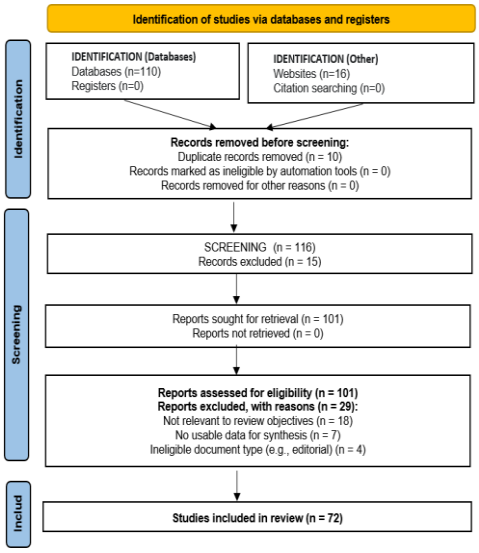
Supplementary Material). The main body of this section provides a comprehensive narrative synthesis of the determinants of out-of-pocket (OOP) health expenditures. To ensure a policy-oriented analysis, the findings are structured according to the "Cascade of Vulnerability" Hierarchical Framework (Figure 2), which maps determinants across four interdependent levels: systemic governance, healthcare delivery, health shocks, and household characteristics.

Study Selection

The study selection process followed a rigorous screening protocol as illustrated in the PRISMA 2020 flow diagram (Figure 1). The initial search across academic databases and grey literature repositories yielded a total of 126 records. After the removal of 10 duplicates, 116 unique records were screened by title and abstract. This stage led to the exclusion of 15 records that did not align with the review's specific objectives.

The full texts of the remaining 101 documents were then assessed for eligibility. Following this detailed evaluation, 29 documents were excluded for the following reasons: not being directly relevant to the core determinants of OOP (n=18), lacking usable data for qualitative or quantitative synthesis (n=7), or being ineligible document types such as editorials or opinion pieces (n=4). Ultimately, 72 studies met all predefined eligibility criteria and were included in the final narrative synthesis.

Figure 1: PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources



Source: Page MJ, et al. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.

Characteristics of Included Studies:

The 72 included documents encompass a diverse and comprehensive evidence base, including original empirical research, reports from international organizations (WHO, World Bank, OECD), national policy evaluations, and academic theses. The temporal scope covers two decades of evidence (2000–2025), providing a longitudinal view of health financing challenges.

Geographically, the evidence is highly heterogeneous, with studies representing diverse socioeconomic contexts:

- Low and Middle-Income Countries (LMICs): Significant representation from Sub-Saharan Africa (e.g., Senegal, Mali, Ivory Coast), South Asia (e.g., India, Pakistan), and Southeast Asia (e.g., Thailand, Mongolia).
- MENA Region: Specific analyses focusing on health reforms in Morocco, Tunisia, and Egypt.
- Emerging and Developed Economies: Evidence from Latin America and Europe regarding the sustainability of insurance schemes.

A detailed summary of each included study—specifying the country of focus, study design, key variables analyzed, and data sources—is provided in Table 2 (See Supplementary Material).

Risk of Bias Assessment Results

The methodological quality assessment, conducted using the Joanna Briggs Institute (JBI) critical appraisal tools [24], indicates a robust foundation for this synthesis. The distribution of study quality was as follows:

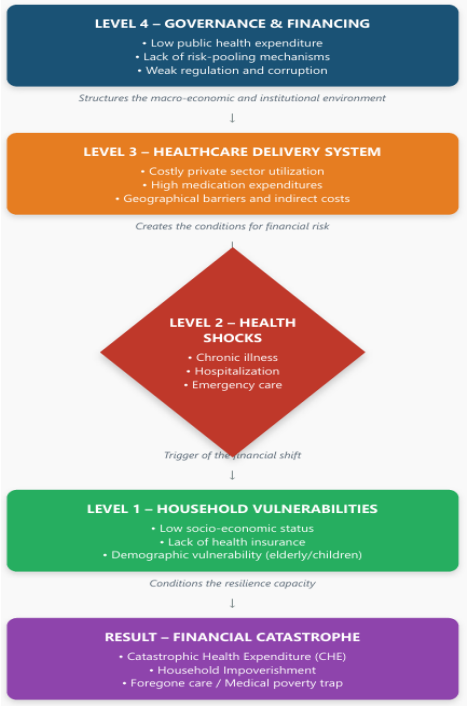
- 48 studies (67%) were classified as having a low risk of bias, featuring high transparency in data collection and sound statistical or conceptual modeling.
- 19 studies (26%) were considered to have a moderate risk of bias, primarily due to limitations in methodological reporting or small sample sizes.
- 5 studies (7%) were assessed as having a high risk of bias, often due to significant documentation gaps, yet they were retained for their unique thematic insights.

The predominance of high-quality studies reinforces the reliability of the conclusions and the validity of the proposed hierarchical framework.

Narrative Synthesis of Determinants

The analysis of the 72 included studies identifies a recurring set of determinants that influence the level and impact of OOP expenditures. To provide a clear, structured, and policy-relevant interpretation, these factors are organized according to the "Cascade of Vulnerability" Hierarchical Framework (Figure 2). This framework demonstrates that OOP spending is not the result of a single isolated factor but stems from a chain of causality starting at the systemic level.

Figure 2: Hierarchical Framework - Cascade of Vulnerability



Source: Prepared by the authors

Level 4: The Governance and Financing Environment

The evidence strongly suggests that macro-level policy choices are the foundational determinants of the OOP burden. A recurrent theme across the literature is the inverse relationship between public health spending and the share of OOP within the Total Health Expenditure (THE). Health systems that are heavily reliant on direct payments are associated with a disproportionate financial burden on households [4, 11, 25-29].

This is particularly acute in low- and middle-income countries where public financing is often insufficient [30, 31], forcing households to cover a large portion of care costs at the point of service [1, 4]. Consequently, the absence of robust, solidarity-based prepayment and risk-pooling mechanisms, such as Social Health Insurance (SHI), constitutes a major systemic vulnerability [12, 32, 33]. Furthermore, the fragmentation of existing insurance schemes or their limited benefit packages leaves many households exposed. Governance failures—including weak price regulation for medical acts, the prevalence of informal payments (corruption), and a lack of effective institutional reforms—further exacerbate the financial risk for citizens [17, 36-38].

Level 3: The Healthcare Delivery System

Systemic financing decisions directly shape the operational environment where care is delivered. A key determinant identified is the quality (real or perceived) of public health services. When public facilities are perceived as low-quality, patients are often "pushed" toward the more expensive private sector, which tends to significantly increase their OOP expenditures [39-41].

The generosity of the benefits package is another critical factor; services or products not covered by insurance must be paid for directly, a frequent driver of catastrophic spending as defined by SDG indicator 3.8.2 [13]. Across various contexts, medication costs represent one of the largest and most persistent components of OOP payments [42, 43]. Furthermore, indirect costs, such as transportation to health facilities and the resulting loss of household income, represent a significant but often overlooked burden, particularly for rural and impoverished populations [44, 45].

Level 2: Household Characteristics and Vulnerabilities

The impact of systemic and delivery-level failures is modulated by household-level characteristics. Socio-economic status is consistently identified as the most critical modulating factor; poor households devote a significantly larger proportion of their income to health and are the most vulnerable to impoverishment following health shocks [5, 6, 46, 47].Geographic location is also a key determinant, with rural

households systematically facing higher total costs due to transportation barriers and limited access to subsidized public services [48, 49]. Demographic composition plays a crucial role: households with elderly members [14, 50, 24] or young children have higher inherent health needs. Similarly, larger households [51, 52] and those headed by women or unemployed individuals [50, 53] appear to be at higher risk of financial vulnerability. Finally, the education level of the household head can have an ambivalent effect [54, 55], while overall resilience is further undermined by factors such as food insecurity [56] or reliance on precarious, informal livelihoods [57].

Level 1: Health Shocks and Service Utilization

The immediate trigger for OOP spending is a health event requiring care. The literature consistently highlights the onset of a chronic illness [15, 58] and the need for hospitalization [59, 60] as the primary triggers for catastrophic health expenditure. These health shocks act as a "stress test," revealing the fragility of a household's financial protection. In this cascade, a health shock (Level 1) is transformed into a financial crisis only when it meets a household with high vulnerability (Level 2), a delivery system with high costs (Level 3), and a governance environment lacking adequate risk-pooling (Level 4).

Synthesis of Determinants

Table 1 provides a consolidated summary of the key determinants identified in this review. To enhance policy relevance, these factors are categorized according to the four levels of the Hierarchical Framework (Figure 2). The table highlights the primary mechanisms through which these determinants influence OOP spending and household financial vulnerability.

Table 1: Summary of Determinants of Out-of-Pocket Health Expenditures
Source: Compiled by the authors based on the literature

Determinant Category	Specific Determinant	Mechanism of Influence and Impact on OOP
Household Level: Socio-demographic	**Age**	↑ Health needs among elderly and young children, leading to increased expenditures.
	Place of residence (Rural)	↑ Due to transportation costs, limited access to public services, and weaker insurance coverage.
	Household size and composition	↑ More members imply higher probability of illness and care needs.
	Education level	Ambivalent effect: may ↑ expenses via greater health awareness or ↓ through preventive behaviors.
	Gender of household head (Female)	↑ Risk of catastrophic spending, often linked to socioeconomic inequalities.
Household Level: Economic	**Low socioeconomic status**	↑ Relative burden of OOP; poor households devote a larger share of income to health and are more vulnerable.
	Lack of health insurance	↑ Direct increase in spending, as households must cover the full cost of care—major risk factor.
	Employment status (Unemployment/Precarity)	↑ Risk due to income loss and possibly loss of contributory health coverage.
Health Status and Service Use	**Presence of chronic illness**	↑ Structural and recurrent spending due to ongoing care needs (medications, consultations).
	Hospitalization	↑ Major increase in spending; leading cause of catastrophic expenditure.
	Use of private sector	↑ Costs, as prices are generally higher than in public sector.
	Medication costs	↑ Significant share of OOP, often the largest component.
Health System and Governance	**Low public health expenditure**	↑ Household burden due to shifted financing responsibilities from public system.
	Perceived quality of public services	Low quality prompts households to bypass public system for costlier private providers, increasing OOP.
	Informal payments (Corruption)	↑ Illicit but direct increase in OOP; undermines trust and raises actual care costs.
	Lack of effective regulation	↑ Costs due to the state's inability to control prices (medications, fees) and practices.

This synthesis strikingly illustrates that out-of-pocket health expenditures are not driven by a single isolated cause but result from a complex cascade of vulnerabilities extending from macro-political structures to individual household dynamics. The evidence reveals that systemic weaknesses—such as chronic underfunding of the public health sector or poor regulatory oversight of medication prices and private sector fees [11, 61]—do not merely exist in isolation; they directly amplify the financial risks faced by households. This "high-risk environment" created at the systemic level ensures that when a health event occurs, its financial impact is maximized, particularly for populations already marginalized by low income, chronic illness, or advanced age [48, 50, 58].

Two critical nodes emerge as the primary drivers within this causal chain. The first is the absence or fragmentation of prepayment mechanisms (e.g., social health insurance), which acts as the foundational structural gap [34, 35]. Without effective risk-pooling, households lose their primary financial shield, leaving them directly exposed to the full, unmitigated cost of care at the point of service. The second node is the occurrence of a major health shock, such as a sudden hospitalization or the onset of a chronic condition requiring long-term therapy [59, 60]. These events act as the immediate triggers that "activate" the underlying systemic and household vulnerabilities, often pushing spending beyond the catastrophic thresholds defined by SDG indicator 3.8.2.

The interplay of these factors often culminates in a vicious cycle of medical impoverishment. In this "medical poverty trap," high OOP spending forces households to divert resources from basic needs like nutrition and education, which in turn leads to deteriorating living conditions and an increased susceptibility to future health problems [6, 15]. Consequently, the level of OOP health expenditure should not be viewed as an independent economic variable, but rather as a measurable symptom of deeper structural deficiencies. It serves as a direct reflection of a health system's performance, its commitment to equity, and the ultimate effectiveness of its social protection policies. These complex interdependencies suggest that reducing the OOP burden requires more than isolated technical fixes; it necessitates a multidimensional policy response that addresses each level of the identified cascade.

Discussion

This systematic review synthesized global evidence from 72 documents to identify the multidimensional determinants of household out-of-pocket (OOP) health expenditures. Our findings suggest that high OOP spending is not an isolated issue but a complex phenomenon emerging at the intersection of systemic failures and individual vulnerabilities. By interpreting these results through the lens of our novel 'Cascade of Vulnerability' Hierarchical Framework, this discussion maps the causal chain of financial risk, outlines actionable policy implications, and proposes a strategic roadmap to guide future evidence-informed reforms toward achieving Universal Health Coverage (UHC).

Interpretation of Key Findings: A Cascade of Vulnerabilities

The analysis of determinants, organized within our Hierarchical Framework of Policy Levers (Figure 2), reveals not merely a list of isolated factors but a distinct cascade of causality. This synthesis demonstrates how weaknesses at the systemic level progressively exacerbate risks for households, transforming manageable health events into financial crises.

At the apex of this chain lie governance and health system architecture. Our review indicates that the macro-level health financing structure is a foundational determinant of the OOP burden. The synthesized evidence suggests a strong inverse relationship between public health spending and the share of OOP in Total Health Expenditure (THE); health systems heavily reliant on direct payments [1, 4] appear to be associated with the highest financial risks for citizens [45, 52]. Prepayment mechanisms and risk pooling, such as social health insurance, serve as the primary institutional shields against financial hardship [12, 51]. Their absence or fragmentation as documented in Morocco prior to recent reforms [53] or in Senegal [44] leaves households directly exposed to the full cost of care. Furthermore, governance failures manifesting as poor price regulation, low perceived quality of public services [46], or the prevalence of informal payments (corruption) [17] often "push" users toward the more expensive private sector, further inflating the actual cost of care.

While systemic weaknesses create this high-risk environment, health status and service utilization act as the immediate triggers for actual expenditures. The literature consistently identifies the onset of chronic diseases [15, 31, 34] and the need for hospitalization [35, 36] as the primary drivers of catastrophic health expenditure (SDG 3.8.2). These health events function as stress tests that expose the fragility of household financial protection. In many contexts, medication costs emerge as a central and often unavoidable component of OOP [37, 39], though their weight varies across regions depending on national pharmaceutical pricing and reimbursement policies.

Finally, household socio-economic and demographic characteristics modulate the final impact of these shocks. Socio-economic status is the most frequently cited factor in the evidence base. Our findings support the consensus that poor households and those living near the poverty line [6, 73] are systematically the most affected; for these populations, any health expense represents a disproportionately large share of their budget, frequently leading to a vicious cycle of impoverishment [5].

The vulnerability to these shocks is further amplified by specific demographic profiles, including rural residence [25, 26], the presence of elderly household members with complex care needs [14, 77], and large household sizes [27, 28]. Additionally, households headed by women or unemployed individuals [77, 31] are often identified as having the lowest resilience capacity. This "cascade" logic implies that reducing the OOP burden cannot be achieved by addressing household characteristics alone; it requires a structural response that addresses the systemic failures at the top of the chain.

Policy Implications: A Multidimensional Strategy

The convergence of these findings highlights that mitigating the burden of out-of-pocket health expenditures requires an integrated, multidimensional strategy that addresses policy levers at every level of the health system hierarchy. To move toward Universal Health Coverage (UHC) and protect households from catastrophic spending (SDG 3.8.2), we propose a four-pronged strategic approach:

Strategic Control: Budgetary and Financial Innovation

This foundational lever entails strengthening political commitment to shift the financing paradigm from regressive direct payments toward solidarity-based prepayment mechanisms [55, 56]. Practically, this involves increasing the share of the national budget allocated to health to reduce the OOP share of Total Health Expenditure (THE). Beyond mere budget increases, policy efforts should focus on developing innovative financing mechanisms and reinforcing strategic purchasing to improve spending efficiency and ensure that pooled funds are used to maximize health gains [13, 50].

Operational Control: Rationalizing Healthcare Supply

This lever aims to optimize the quality, appropriateness, and efficiency of healthcare delivery. Key interventions should include the development of evidence-based treatment protocols and stricter regulation of prescription practices, particularly for high-cost medications which represent a major component of OOP. Furthermore, strengthening primary care coordination is essential to prevent avoidable hospitalizations—a primary trigger for financial shocks. Implementing standardized national pricing for medical acts, particularly in the private sector, is also critical to reduce the cost variance that often penalizes uninformed users [49].

Demand-Side Control: Empowering Citizens

Focusing on healthcare demand, this lever seeks to empower citizens as active, informed agents in their own health. Effective strategies include targeted education programs, health literacy campaigns, and the promotion of preventive lifestyles. By improving access to transparent health information, households can navigate the health system more effectively and make informed choices, thereby reducing the costs and risks associated with information asymmetry between providers and patients [47, 48].

System Optimization: Technological Innovation and AI Integration

Modern technology offers transformative opportunities for system-wide optimization. Telemedicine can serve as a powerful tool to mitigate geographical and transportation barriers, which currently impose a significant indirect financial burden on rural and remote populations [41, 42]. Additionally, the integration of shared electronic health records can improve care coordination and reduce redundant testing. Finally, Artificial Intelligence (AI) holds significant potential to support early diagnosis, personalize treatment pathways, and optimize resource management, all of which contribute to the overall efficiency and financial sustainability of the health system.

Future Research Directions: A Decision-Support Framework

This systematic review has successfully identified and structured the key determinants of OOP health expenditures within a hierarchical framework. However, to bridge the gap between academic evidence and effective policymaking, the critical next step is to transition from descriptive analysis to the development of prescriptive and predictive tools. We propose an integrated analytical framework designed to translate these qualitative and quantitative findings into a strategic dashboard for policymakers.

Modeling Policy Levers: A Multi-Level Econometric Approach

We suggest the development of a multi-level econometric model to quantify the individual and

combined impact of each identified determinant on the national share of OOP within the Total Health Expenditure (THE). Such a model would allow for the estimation of the elasticity of the OOP share in relation to specific policy levers. Key variables to be modeled include public health expenditure (as a % of GDP), the effective health insurance coverage rate (%), and multidimensional governance indices (including price regulation and transparency metrics). By measuring the relative weight of each factor across different national contexts, research can provide a more nuanced understanding of which levers offer the highest return on investment for financial protection.

Simulating Reform Pathways: Evidence-Based Scenario Planning

Moving beyond static analysis, a robust decision-support framework should incorporate simulation modeling to allow policymakers to evaluate potential reform scenarios. This approach enables the estimation of the magnitude of change required across various levels of the health system to reach specific financing targets.

By transforming the findings of this review into a dynamic, evidence-based tool, future research can equip decision-makers with the ability to evaluate reform options, assess potential trade-offs, and define a realistic and measurable trajectory toward achieving Universal Health Coverage (UHC). This shift from diagnosis to simulation will transform the goal of reducing OOP from a distant aspiration into a strategically planned and achievable political target.

Conclusion

This systematic review of 72 documents supports the view that high out-of-pocket (OOP) health expenditures are not an inevitability, but rather a measurable symptom of structural deficiencies within a health system. Our analysis reveals a striking convergence of evidence, suggesting that the financial burden on households is fundamentally shaped by macro-level policy choices rather than isolated demographic factors. The findings, structured by our novel "Cascade of Vulnerability" Hierarchical Framework, illustrate how systemic failures such as weak governance, chronic underfunding of public health (low % of THE), and the absence of robust risk-pooling mechanisms create a high-risk environment. This environment allows health shocks particularly chronic diseases and hospitalizations to escalate into financial crises for citizens. This burden disproportionately affects the poor, rural populations, and households with elderly members, often pushing them beyond the catastrophic thresholds defined by SDG indicator 3.8.2.

In light of these findings, the path toward financial protection and Universal Health Coverage (UHC) becomes clearer. Reducing OOP cannot be accomplished through isolated measures but requires an integrated, multidimensional approach. It calls for strong political commitment to replace regressive direct payments with solidarity-based prepayment mechanisms. This necessitates a significant and efficient increase in public health spending, the expansion of protective health insurance coverage, and stricter system regulation. This budgetary and institutional control must be complemented by medical, behavioral, and technological strategies—including the responsible integration of AI and digital health to ensure the relevance, quality, and efficiency of care delivery. Ultimately, this study moves beyond diagnosis to issue a call to action and outline a roadmap for future research. By transitioning from a descriptive analysis of determinants to predictive modeling and simulation of policy levers, research can equip decision-makers with the tools needed to guide reforms in an evidence-informed manner. Quantifying the impact of various policy options offers a unique opportunity to design targeted reform trajectories, transforming the goal of reducing OOP from a distant aspiration into a strategically planned and achievable political target.

References

1. Schieber G, Fleisher L, Gottret P. Health financing revisited: A practitioner's guide. Washington, DC: World Bank; 2006.
2. Wagstaff A, Flores G, Smitz MF, et al. Progress on catastrophic health spending in 133 countries: A retrospective observational study. Lancet Glob Health. 2018;6(2):e169–e179. doi: 10.1016/S2214-109X(17)30429-1
3. World Health Organization. World health statistics 2024: Monitoring health for the SDGs. Geneva: WHO; 2024.
4. Organisation mondiale de la Santé. Rapport sur la santé dans le monde : le financement des systèmes de santé : le chemin vers une couverture universelle. Genève: OMS; 2010.
5. Xu K, Evans DB, Kawabata K, et al. Household catastrophic health expenditure: A multicountry analysis. The Lancet. 2003;362(9378):111–117. doi: 10.1016/S0140-6736(03)13638-3
6. Leive A, Xu K. Coping with out-of-pocket health payments: Empirical evidence from 15 African countries. Bull World Health Organ. 2008;86(11):849–856. doi: 10.2471/BLT.07.049403
7. United Nations. Sustainable Development Goals: SDG indicator 3.8.2 on financial protection. New York: UN Statistics Division; 2023.
8. Gottret PE, Schieber G. Financer la santé : une nouvelle approche. Washington, DC: Banque mondiale; 2006.

9. Marmot M, Friel S, Bell R, et al. Closing the gap in a generation: health equity through action on the social determinants of health. The Lancet. 2008;372(9650):1661-1669. doi: 10.1016/S0140-6736(08)61690-6
10. Braveman P, Egerter S, Williams DR. The Social Determinants of Health: Coming of Age. Annu Rev Public Health. 2011;32:381-398. doi: 10.1146/annurev-publhealth-031210-101218
11. Hoffmann R, Muttarak R. Learn from the past, prepare for the future: Impacts of education and experience on disaster preparedness. World Dev. 2017;96:32–51. doi: 10.1016/j.worlddev.2017.02.023
12. Xu K, Evans DB, Carrin G, et al. Protecting households from catastrophic health spending. Health Aff (Millwood). 2007;26(4):972-983. doi: 10.1377/hlthaff.26.4.972
13. O'Donnell O, Propper C. Equity in the finance and delivery of health care. In: Handbook of Health Economics. Vol 1B. Elsevier; 1991:1863–1932.
14. Kutzin J, Witter S, Jowett M, et al. Développer une stratégie nationale de financement de la santé publique. Genève: Organisation mondiale de la Santé; 2018.
15. Grangier J, Solard J. Les facteurs démographiques contribuent à la hausse des dépenses de santé de 2011 à 2015. DREES. 2017;(1025).
16. Organisation mondiale de la Santé. Orientations stratégiques pour améliorer le financement des soins de santé. 2010.
17. OCDE. Panorama de la santé 2023 : Indicateurs de l'OCDE. Paris: Éditions OCDE; 2023.
18. Behera DK, Rahut DB, Dash U. Fiscal policy determinants of health spending in India: State versus center. Asian Dev Rev. 2023;40(1):328-347. doi: 10.1142/S011611052350013X
19. Jalali FS, et al. Strategies for reducing out of pocket payments in the health system: a scoping review. Cost Eff Resour Alloc. 2021;19(1):47. doi: 10.1186/s12962-021-00301-1
20. Derkyi-Kwarteng ANC, et al. A Narrative Synthesis Review of Out-of-Pocket Payments under Insurance Regimes. Int J Health Policy Manag. 2021;10(7):443-461. doi: 10.34172/ijhpm.2020.147
21. Frimpong AO, et al. Effects of public and external health spending on out-of-pocket payments in sub-Saharan Africa. Health Policy Plan. 2022;37(9):1129-1137. doi: 10.1093/heapol/czac050
22. Kaladharan S, Manayath D. Out-of-pocket healthcare expenditure in emerging economies: Evidence from panel data analysis. J Med Access. 2024;8. doi: 10.1177/27550834241243534
23. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71. doi: 10.1136/bmj.n71
24. Joanna Briggs Institute. Critical Appraisal Tools for Use in JBI Systematic Reviews. Adelaide: JBI; 2024.
25. Banque mondiale. Programme de réforme de la santé au Maroc (P179014). Rabat: Documents de projet; 2023.
26. Chadelat JF. Les enjeux du financement de la santé. Rapport de la Commission des comptes de la santé; 2004.
27. Caussat L. Quel financement pour la santé et la protection sociale ? J Droit Santé Assur Maladie. 2013;(3):19-27.
28. World Bank Group. Financement de la santé en RDC : Étude sur l'espace budgétaire. Washington, DC: The World Bank; 2019.
29. Ministère de la Santé (RDC). Rapport de l'analyse du financement de la santé en RDC. MSPHP; 2023.
30. Drouin A. Méthodes de financement des soins de santé : utilisation rationnelle des mécanismes. Genève: Bureau international du Travail; 2008.
31. Boughaleb A, Jerry M. Economic Measures for Risk Control and Cost Containment in Healthcare in Morocco. Data and Metadata. 2025;4:627. doi: 10.48031/msunj.economics.2025.4.3
32. Raynaud D. Les déterminants individuels des dépenses de santé : influence de la catégorie sociale. Études et résultats. 2005;378.
33. Seck I, Sagna O, Leye MM, et al. Déterminants de l'adhésion et de la fidélisation aux mutuelles de santé (Sénégal). Santé Publique. 2017;29(1):105-114. doi: 10.3917/spub.171.0105
34. Ministère des Solidarités et de la Santé. Vers un modèle de paiement combiné : Réformes et régulation. Paris; 2018.
35. El Moussali MN, Ouarraoui B. Les apports du Nouveau Modèle de Développement pour la réforme de santé au Maroc. Dossiers Rech Econ Gest. 2022;10(1):11-29.
36. Dossou JP, et al. Analyse du caractère inclusif des cadres de dialogue politique au Bénin. Results for Development; 2022.
37. Saksena P, Xu K, Elovainio R. Utilization and expenditure at public and private facilities in 39 low-income countries. Trop Med Int Health. 2012;17(1):23-35. doi: 10.1111/j.1365-3156.2011.02894.x
38. Yang C, Cai W, Li Z, et al. Disparities in out-of-pocket inpatient expenditures in rural China. Trop Med Int Health. 2018;23(6):661-667. doi: 10.1111/tmi.13063
39. Ismaïl S, Zaouali N. Santé et assurance maladie en Tunisie : les enjeux de la réforme. East Mediterr Health J. 2022;28(6):444-453. doi: 10.26719/emhj.22.062
40. Teyeb H, Marzougui M, Bouallegue O, et al. Impact of Covid 19 on Primary healthcare in Tunisia. Tunis Med. 2024;102(1):49-53. doi: 10.62438/tunismed.v102i1.4649
41. Raban MZ, et al. Catastrophic health expenditure in India. Bull World Health Organ. 2013;91(10):726–735. doi: 10.2471/BLT.12.113100
42. Arsenault C. Accès aux soins obstétricaux d'urgence au Mali: dépenses catastrophiques [Mémoire]. Montréal: Université de Montréal; 2012.
43. Guillon M, Audibert M, Mathonnat J. Mesure de l'efficience des centres de santé en zone rurale en Mongolie. Econ Dev. 2023;333:33-58.
44. WHO, World Bank. Global Monitoring Report on Universal Health Coverage 2023. Geneva; 2023.
45. WHO, World Bank. Tracking Universal Health Coverage: First Global Monitoring Report. Geneva; 2014.
46. Ezzrari A. Les dépenses catastrophiques de santé et impact sur l'appauvrissement au Maroc. Rabat: Haut-Commissariat au Plan; 2022.

47. Djessou FMH, N'Kongon YJ. Accessibilité aux infrastructures sanitaires et dépenses de santé en Côte d'Ivoire. Int J Econ Stud Manag. 2023;3(5).
48. Pandey A, et al. Catastrophic health expenditure in India. Bull World Health Organ. 2018;96(1):18–28. doi: 10.2471/BLT.17.193052
49. Mohanty P, et al. Out-of-pocket expenditure and its predictors for illness of under-five children. J Family Med Prim Care. 2021;10(10):3892-3898. doi: 10.4103/jfmpc.jfmpc_232_21
50. Kruk ME, Goldmann E, Galea S. Borrowing and selling to pay for health care in LMICs. Health Aff (Millwood). 2009;28(4):1056–1066. doi: 10.1377/hlthaff.28.4.1056
51. Sriram S, Albadrani M. A study of catastrophic health expenditures in India: 2014-2018. F1000Research. 2022;11:141. doi: 10.12688/f1000research.75231.1
52. Dugee O, et al. Economic impacts of chronic conditions in a country with high population coverage: Mongolia. Trop Med Int Health. 2019;24(6):715–726. doi: 10.1111/tmi.13231
53. Rizvi SAF. Health expenditures and financing: a macro determinant perspective for developing countries [PhD Thesis]. Clermont-Ferrand: Université Clermont Auvergne; 2023.
54. Elhaj Mustafa Ali M, et al. Révision des déterminants et de l'impact des dépenses de santé au Soudan. Nairobi: CREA; 2022.
55. Bédard A. Exploration du phénomène d'insécurité alimentaire chez les ménages à revenu moyen [Mémoire]. Québec: Université Laval; 2005.
56. Aminou F, et al. Pluriactivité et risque de perte de métier : cas des agriculteurs au Bénin. Revue AME. 2022;4(2):783-803.
57. Alouki K, et al. Analyse des coûts médicaux directs des soins du diabète de type 2 au Mali. Rev Epidemiol Sante Publique. 2017;65(1):41–51. doi: 10.1016/j.respe.2016.12.012
58. Limwattananon S, et al. Catastrophic and poverty impacts of health payments in Thailand. Bull World Health Organ. 2007;85(8):600-606. doi: 10.2471/BLT.06.033332
59. Tripathy JP, et al. NCD hospitalisation costs in India. Trop Med Int Health. 2016;21(8):1019-1028. doi: 10.1111/tmi.12726
60. McIntyre D, Kutzin J. Diagnostic pour le financement de la santé : les bases d'une stratégie. Genève: OMS; 2017.
61. Songhai K, Evlo K. Dimension éthique du comportement médical et consommation de soins au Togo. Rev Econ Gest Soc. 2021;1(29):1-26.
62. Moustatraf A, Touhami F. L'accès à l'information en santé au Maroc : défis pour la CSU. Int J Account Fin Audit Manag Econ. 2024;5(4):516-535. doi: 10.5281/zenodo.10931558
63. Goudge J, et al. Affordability, availability and acceptability barriers to health care in South Africa. BMC Health Serv Res. 2009;9:75. doi: 10.1186/1472-6963-9-75
64. World Health Organization Regional Office for Europe. Behavioural and cultural insights: annual progress report 2022. Copenhagen; 2023.
65. O'Donnell O, van Doorslaer E, Wagstaff A. Analyzing health equity using household survey data. Washington, DC: World Bank; 2008.
66. World Health Organization. Global expenditure on health: Public spending on the rise?. Geneva: WHO; 2021.
67. Cusset PY. Les déterminants de long terme des dépenses de santé en France. Paris: France Stratégie; 2017.
68. Ridde V, editor. Vers une couverture sanitaire universelle en 2030 ? Réformes en Afrique. Québec: Éditions Science et Bien commun; 2023.
69. Organisation mondiale de la Santé. Protection contre les risques financiers en Afrique (AFR/RC72/6). Brazzaville; 2022.
70. Kahindo Mbeva JB, et al. Enjeux et défis de couverture santé universelle en RDC. Sante Publique. 2023;66(1):44-54. doi: 10.3917/spub.231.0044
71. Mbaye S, et al. L'Approche du Coaching : Les Apprentissages de SPARC au Burkina Faso. 2023.
72. Nauleau M, Destremau B, Lautier B. La santé globale, nouveau laboratoire de l'aide internationale ? Rev Tiers Monde. 2013;(215):129-147. doi: 10.3917/rtm.215.0129
73. Fonds mondial. Rapport 2024 sur les résultats et l'impact. Genève; 2024.
74. Pan American Health Organization. Advancing the Sustainable Health Agenda for the Americas. Washington, DC; 2019.
75. Health Policy Plus. Morocco: Strengthening Financial Protection for Universal Health Coverage. Washington, DC: Policy Brief; 2019.
76. Boughaleb A, Jerry M. Pratiques technico-politiques de financement de la CSU au Maroc. Sante Publique. 2025;37(2):245-262. doi: 10.3917/spub.252.0245
77. USAID. Policy Brief on Health Reform and Solidarity in Emerging Countries. 2019.

Note on database results: The initial search across all academic databases (PubMed, Scopus, Web of Science) and Google Scholar yielded a combined total of 110 unique records for screening, as stated in the manuscript and Figure 1. The individual count per database is not reported as duplicates were removed before the final count.

Standardized Queries for AI-Assisted Full-Text Screening (ChatPDF)

This appendix lists the standardized set of English-language queries used to interrogate each full-text document via the ChatPDF tool. The primary purpose of these queries was to rapidly assess whether a document met the core inclusion criteria of the systematic review. The responses generated by the tool were used as a preliminary screening indicator, with the final inclusion/exclusion decision confirmed manually by the authors.