Economic evidence on cost-sharing and alternative insurance designs for addressing moral and behavioral hazard in health care: A systematic literature review

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BACKGROUND

- In the context of health insurance, the term "moral hazard" is widely used for the economic intuition that insurance coverage can lead to an inefficient increase of health care use since out-of-pocket (OOP) costs to the consumer are blunted.[1]
- Beneficiary cost-exposure has been promoted as a response to reduce moral hazard in health insurance[2] and experiments have consistently shown that it is effective in reducing health care consumption.[1]
- This has spurred widespread adoption across US benefit designs such as in High-Deductible Health Plans (HDHP) in the US commercial market.[3]
- Individuals obtain insurance to share the uncertain risks associated with sickness and to access healthcare that would otherwise be unaffordable. Efficient allocation of health care resources requires insurance to deter demand for ineffective or unnecessary care, and to incentivize and ensure access to effective and necessary care.
  - Conventional moral hazard theory posits that rational beneficiaries only forgo care with a marginal value less than their OOP price.[4]
  - Recent empirical studies indicate beneficiaries are equally price-sensitive to high and low-value care. Under cost-exposure, they appear to reduce consumption of both indiscriminately, lacking a 'rational' perspective of the health consequences (and resultant costs to the system).[4]
- These findings have led
  - Policy commentators to denounce the 'myth of moral hazard' in healthcare[5-7]
  - Economists to re-define the term,[1,8] declare some of it as efficient[5] and to propose a novel concept of "behavioral hazard"[9]
  - Insurance providers to face pressure to develop more nuanced and dynamic benefit designs.[10]

RESEARCH OBJECTIVES

This study assumes that insurance design should be based on robust economic evidence, yielding two research objectives:

1. To assess how different cost-exposure policies (e.g., deductibles, co-payments, coinsurance)[11], utilization management (UM) strategies (e.g., prior authorization, step edits, quantity limits)[12] as well as behavioral insurance designs impact efficient and inefficient consumption of health care
2. To assess whether behavioral insurance designs differ from traditional cost-sharing approaches at addressing the issue of moral hazard

METHODS

- Study criteria were defined in terms of the population, interventions, comparisons, outcomes, and study design (PICOS) structure.
- Relevant studies were identified by searching the EconLit and PubMed academic databases from 2000 to 2023. Studies identified from each source were merged and duplicate records were removed.
- Studies were selected if they met the following selection criteria:
  1. Evaluate existing or conceptual cost-exposure policies in health care
  2. Include a comparison of policies focused on beneficiary cost-exposure through cost-sharing, utilization management, or other alternative insurance design
- Two experts with graduate training (IB, KB) independently reviewed titles, abstracts and evaluated articles selected for inclusion.
- Additional authors (MG, JWC, JRB) arbitrated discrepancies between reviewers.
- Following title, abstract and full-text screening, information from qualifying studies was extracted and assessed.
- One reviewer (IB) extracted relevant data from the final list of included studies into a pre-specified extraction worksheet, developed by the research team after reviewing the final extraction sample.
- **Limitations:** inherent limitations of SLRs, such as a changing evidence base past the data cut-off, potential publication bias due to missed studies, those published only in abstract form or non-indexed (e.g., employer whitepapers) may impact generalizability of the findings.

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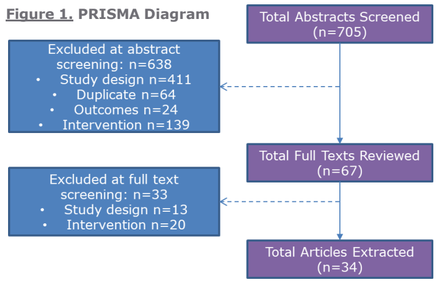
Figure 1. PRISMA Diagram



RESULTS & FINDINGS

- Initial searches in PubMed and EconLit yielded 705 unique abstracts; 34 were extracted **(Figure 1)**.
- Of the 34 extracted papers, there were 22 retrospective claims data analyses, 6 natural experiments, 3 economic models, 2 difference in differences model and 1 computer simulation.
- 24 studies were conducted in the United States, 5 in Canada, 3 in the Netherlands, 1 in Spain, and 1 in Germany.
- Only 6 studies covered the concept of behavioral hazard, framed primarily as underuse of essential or highly efficient care.[16,17,22,26,42,44]
- **Table 1** lists all mechanisms to address moral hazard that are studied in the peer-reviewed literature we reviewed.
- Only 2 studies explicitly compared a beneficiary-facing cost-exposure policy (copay, cost-sharing) to a UM strategy (prior authorization), finding that minimizing cost-exposure was more effective in driving use of generic medicines than UM.[24,43]
- Most papers (20) discussed impacts on pharmaceuticals in a general population or chronic disease setting (e.g., diabetes, type 2 diabetes, and hypertension).
- 14 papers discussed impacts on health service utilization in a general population, screening, imaging, or preventative services.

Utilization/health impact:

- 29 of 34 papers examined how changes in cost exposure impacted utilization.[13-17,19-21,23-31,33,34,36,38-46]
- Results are consistent with another recent systematic review on drug treatments[48] showing that increases in cost-exposure are associated with lower adherence.
- To drive a change in utilization, deductibles (negative behavioral incentives) were found to have a greater effect than beneficiary rebates (positive incentives) across multiple studies.[13,16,27,29,30]
- While numerous studies examined utilization, the overall impact of traditional cost-exposure mechanisms on health outcomes and long-term expenditures remains uncertain.

Table 1. Studied strategies for addressing moral hazard

Mechanism	Description	Sources	Primary Focus (see Fig. 2)
Cost-sharing	Passes along some portion of the cost of treatment to the beneficiary to pay out of pocket (examples include copays, deductibles, and coinsurance)	13,16,19,25,27,35,38,43,45	Demand-side
Deductible	Defines a minimum threshold of spend paid out of pocket by the beneficiary before the insurer begins to pay	13,15,18,19,22,26,34,36,37,41	Demand-side
Coinsurance	Defines a percentage of costs that a beneficiary pays out of pocket	14,17,18,20,21,23,28,29,32,33,35,39,40,42,44	Demand-side
Copay	Creates a fixed amount paid out of pocket by the beneficiary	14,17,18,20,23,24,26,28,30-32,34,38-42,44	Demand-side
(Beneficiary) rebate	Provides money back to the beneficiary for lower health care utilization	15,22,37	Mixed
Tiers	Places drugs into different tiers of coverage based on criteria as determined by insurer	25,27,29-31,33	Mixed
Value-based insurance design (VBID)	Model to align healthcare cost with value of service rather than cost of acquisition, and lowers barriers to effective services	16,21,36	Mixed
Prior authorization	Requirement for pre-approval from the insurer for prescriptions to qualify for coverage	24,43,46	Supply-side
Step therapy	Requirement to use select more preferred therapies by the insurer for a given condition before "stepping up" to other, less preferred therapies	24,46	Supply-side
Quantity limits	Limits coverage of a treatment to a certain amount over a set period of time	46	Supply-side
Reference pricing	Sets reimbursement rates based on a specific reference point rather than based on provider's charge	45	Supply-side

- Implementing a VBID model led to improved access and adherence to high value medication and improved health outcomes, compared to traditional mechanisms of greater cost exposure.[14,16,17,21,23,36,39,40]
- One study assessed the impact of VBID model on life expectancy, suggesting that applying VBID more broadly could result in substantially greater gains in life expectancy from health care.[16]
- Additionally, lowering copays for high-value services within a VBID model had the largest effect on life expectancy.[16]

Efficiency/societal welfare impact

- Only 7 of 34 studies discussed outcomes in relation to value (e.g., high vs. low value, efficient vs. inefficient).[13,16,21,25,26,35,37]
- One study suggested consumption of low value care was a key driver of U.S. health care expenditures,[16] and another study suggested low-value care was more prevalent in settings with low beneficiary cost-exposure.[25]
- Examples of low value care included sleep studies, advanced imaging services, endoscopies, and surgeries,[21] and studies found consumption for these services to be more sensitive to price changes than consumption of pharmaceuticals.[26,35,37]
- Benefit designs that implemented differential cost-exposures (e.g., through a tiered design) based on perceived value to the health system saw greater reductions in utilization of low value care.[13,16,27,29,30]

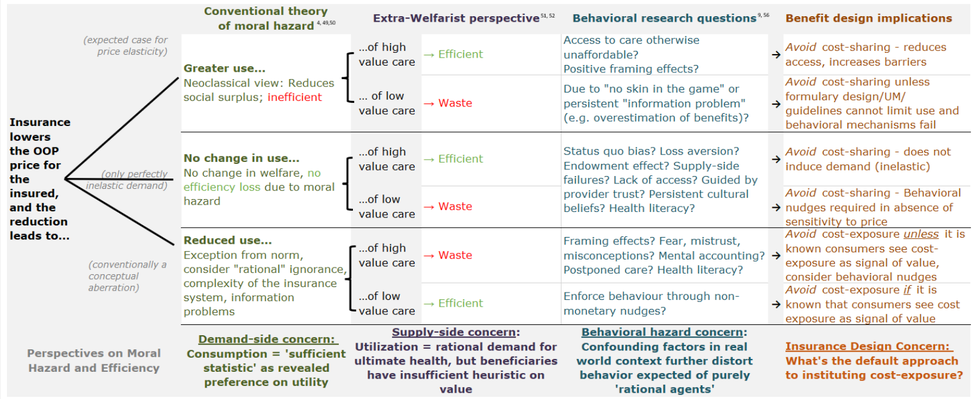
Equity/distributional effects:

- 10 of 34 papers explored equity and distributional consequences of cost-share/alternatives[14,15,18,20,22,36,37,39-41], but none considered racial or ethnic disparities explicitly.
- Several studies suggest lower-income consumers were more likely to adjust their health care consumption in response to a change in deductibles than in response to beneficiary rebates or refunds.[15,22,37]
- Increases in cost-exposure were associated with reductions in medication adherence for lower-income beneficiaries,[14,39,40] and VBIDs were found to mitigate these effects.[36]

Behavioral issues / benefit design considerations

- The interplay of behavioral hazard and provider-induced moral hazard suggests that beneficiary cost exposure might not be a preferable rationing policy per se, unless instituted under limited conditions within VBID.[11,16,31]
  - Conditions referenced in the literature include: Applying it only to recognized low value care, ensuring clinical relevance to the specific value of treatments for individual beneficiaries, making allowances for those with chronic diseases along with progressively scaled exemptions for indigent beneficiaries.

Figure 2: Decomposition of Moral Hazard with respect to efficiency and insurance design



DISCUSSION

- **Figure 2** synthesizes the concepts studied in this review to illustrate that the health and societal outcomes associated with the observed excess consumption under insurance are inadequately understood by conventional moral hazard theory.
- The normative implications from the neoclassical moral hazard model[49,50] have been debated in the conceptual economic literature for several decades.[51]
- We find that a growing body of empirical studies adds to theoretical challenges by revealing real-world behavioral confounders, inherent limitations of patient information landscapes, and emergent distributional issues.
- We can still reaffirm wide support for the neoclassical view that demand is responsive to price for a substantial segment of health plan expenditures, but the welfare implication of this change in consumption requires more nuanced interpretations.[52]
- Empirical studies in this review offer scant contemporary evidence that beneficiary "skin-in-the-game" should be used as the default mechanisms to reduce waste or enhance efficiencies in healthcare consumption.
- Given that price elasticities of demand have been found to vary considerably across disease areas and medication classes, current uniform levels of co-insurance per formulary tiers lack clinical nuance.
- Limited research exists on optimizing benefit designs for both behavioral and moral hazard, often presenting conceptual arguments[5,9,53] or case studies without study controls.[54,55]
- Studies on VBID models stand out as they prioritize identifying care value on the supply side, in order to then implement cost-sharing that deters use of low-value or non-essential care.
- Our review reveals that neglecting behavioral factors in health insurance modeling can lead to considerable misinterpretations of consumer decision-making with extensive welfare implications.

CONCLUSIONS

- We find that the broad-based imposition of demand-side cost-exposure in the US setting is not well substantiated by contemporary empirical evidence.
- Rising expectations to address health inequities and the distributional impact of OOP cost burdens may reach beyond traditional economic paradigms and actuarial models, but they must be considered in determining access to modern health technologies through commercial insurance.
- A refined conceptual framework is required to engender broader empirical research on US benefit design, including:
  - Outcome measures that go beyond mere changes in consumption to capture downstream clinical, economic and distributional consequences,
  - Strategies to integrate both patient and physician observed behaviors (to manage hazards, nudges, rewards), their preferences and economic stakes in the current system (e.g., financial affordability, maximal care provision, but also misaligned incentives), as well as insurance providers' objective functions (e.g., optimal resource efficiency but also profit maximization).
- When drawing on behavioral insights, it is beneficial to differentiate between the removal of negative incentives (e.g., deductibles) and the introduction of positive ones (e.g., consumer rebates).
- Cost incentives tend to shift motivation from intrinsic values, such as personal health benefits, to extrinsic, financial rewards.
- In certain scenarios, the lack of external incentive expectations (i.e., the absence of a penalty without the promise of a reward) appears to be most effective in enhancing intrinsic motivations.
- Future research should explore the sustainability of extrinsic rewards on inherent motivation towards personal well-being.
- Due to the presence of behavioral hazard, merely adjusting financial exposure will likely be insufficient, and non-monetary instruments (e.g., nudges[56]) should be explored as a complementary strategy to incentivize behavior.

DISCLOSURES

Marlon Graf, Iris Brewer, Jacquelyn W. Chou, James R. Baumgardner, and Kelly Birch (at the time of the study) are employees with PRECISIONheor, with Chou holding equity in its parent company, Precision Medicine Group.
Ulrich Neumann is an employee of Johnson & Johnson and holds shares in the company.

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