

Incorporating system-level risk into the valuation of healthcare investments

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Standard economic evaluations of healthcare interventions only usually take account of risks associated with the specific intervention and in normal, steady conditions. However, this approach ignores broader health system impacts during system-level crises. System-level risks cause volatility that can threaten public health systems and population health. These risks may be systematic (such as global recessions) or systemic (arising from a series of cascading failures that turn rare events into crises). Our research shows that extending conventional analysis to include system-level risks can help capture the full value of healthcare interventions.

We utilise concepts from financial economics, which explicitly consider how investments perform under system-level risks, to demonstrate valuable insights for public health evaluation. We illustrate the approach through four key concepts applied to disease elimination and eradication (DEE) programmes, showing how each captures value that conventional methods tend to miss.

First, asset pricing theory provides a useful lens for assessing how interventions perform under systematic risk. Assets that perform well during market downturns are

considered more valuable. Likewise, DEE programmes may act counter cyclically by delivering their greatest relative benefits precisely when they are most needed — during periods of economic stress when disease burden is high, and health system capacity is constrained. Standard evaluation models fail to account for this interaction between outcomes and the broader economy, potentially undervaluing programs like DEE.

Beyond systematic risk, rare disaster models suggest a way of thinking about DEE's "insurance" value in the context of rare, high-impact shocks, such as pandemics and climate crises. These models show that protection is most valuable during catastrophic states when resources are scarce and welfare losses are severe. In high systemic-risk settings, localised disruptions can escalate into broader crises, triggering routine-care breakdowns and disease resurgence, as seen following COVID-19. By reducing re-emergence risk during such periods, DEE can generate disproportionately large benefits that standard evaluations struggle to capture.

Third, real options analysis (ROA) offers a framework for valuing flexibility in long-term, uncertain investments such as DEE. While standard evaluations often treat the substantial upfront costs of DEE as "sunk," ROA views them as investments that create valuable "options", allowing decision-makers to scale, delay, or adapt interventions as new information emerges. This perspective captures the strategic value of flexibility, such as investing in surveillance systems that enable timely responses to emerging health threats.

Finally, declining discount rates offer a more equitable lens for interventions that have inter generational impacts. While many health economic guidelines recommend constant discount rates, financial economics and some governments advocate for rates that decline over time. Applying declining discounting to DEE programmes better captures their long-term benefits and the value of protecting the health of future generations.

By using key concepts from financial economics, we illustrate how programmes such as DEE may be valued very differently if system-level risks are taken into account. For policymakers, our approach suggests that some longer-term healthcare investments may be considered better value than if more standard health economics methods are used. Future research could focus on developing broader frameworks for policy evaluation in such contexts.

[Read the full paper, funding sources and disclaimers in Applied Health Economics and Health Policy](#)

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