Investing in Prevention Before Treatment: A Systematic Literature Review of Determinants of Public Expenditure on Health Promotion and Disease Prevention, with Implications for Thailand

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Abstract

Despite compelling evidence that prevention is more cost-effective than treatment, most countries systematically underinvest in health promotion and disease prevention relative to curative care—a pattern commonly termed the "prevention paradox." This systematic literature review synthesizes international evidence on the determinants of public expenditure for health promotion and disease prevention. Following PRISMA 2020 guidance, structured searches of five databases (2002–2023) yielded 23 eligible studies, which were appraised against transparent, design-sensitive quality criteria and integrated through narrative synthesis across five determinant categories: socioeconomic and demographic; political–institutional; organizational decision-making; health-system resources; and decentralization. Gross domestic product per capita emerged as the strongest single determinant, consistent with Wagner's Law, yet political factors—particularly democratic institutions and governance quality—proved comparably important for allocative efficiency, while path dependency and incremental budgeting substantially constrained reallocation toward prevention. The evidence further indicates that economic capacity translates into preventive investment chiefly when mediated by governance quality, and that decentralization's effects are conditional on institutional capacity. Synthesizing these patterns, we advance a simplified multi-level framework linking macro-, meso-, and micro-level determinants. For Thailand—a middle-income country transitioning to a super-aged society while non-communicable diseases consume a growing share of its health budget—raising preventive investment will require coordinated action: macro-level fiscal alignment, meso-level governance strengthening, and micro-level budget-process reform, including carefully phased

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zero-based budgeting that accounts for entrenched incremental practices. Future research should employ longitudinal, context-sensitive designs within developing economies.

Keywords: Public Expenditure, Health Promotion, Disease Prevention, Budget Determinants, Middle-Income Countries

Introduction

The global health landscape confronts a fundamental tension: overwhelming scientific evidence demonstrates that prevention yields substantially superior returns to investment compared with treatment interventions, yet government budgets persistently allocate the preponderance of resources toward curative services. This paradox merits urgent scholarly attention and policy examination.

The magnitude of this discrepancy warrants explicit documentation. Healthcare expenditures have surged dramatically across income-stratified groups, creating fiscal sustainability concerns for government budgets worldwide. Recent data from the World Health Organization indicate a concerning reversal of pandemic-era gains, with per capita government health spending declining across all income classifications during 2022 (World Health Organization, 2024). Simultaneously, roughly 4.5 billion individuals lack access to basic health services, while approximately 2 billion experience financial hardship attributable to healthcare costs (World Health Organization, 2024). These figures underscore the urgency of reconsidering resource allocation frameworks.

The evidence supporting preventive investment proves remarkably consistent across methodologically diverse studies. Research spanning multiple continents and time periods demonstrates that health promotion and disease prevention investments yield return-on-investment ratios ranging from 1:3 to 1:7—substantially exceeding returns from treatment expenditures (LEVIN & ZIGLIO, 1996; Kickbusch, 2003; Ekwaru et al., 2021; World Health Organization, 2019). At the population level, controlling major non-communicable disease risk factors—including tobacco use, dietary patterns, physical inactivity, and excessive alcohol consumption—prevents approximately 80% of cardiovascular disease and diabetes cases, alongside 40% of cancer incidence (Kumar & Preetha, 2012). These findings command attention not merely from efficiency standpoints but from social welfare perspectives. Yet despite this clarity, Organisation for Economic Co-operation and Development member states allocate merely 2.9% of total health expenditure to prevention (OECD, 2023).

This disconnect between scientific evidence and policy practice—the "prevention paradox"—reflects the multifaceted nature of public expenditure determination. The factors influencing budget allocation span economic, political, social, demographic, institutional, and health system dimensions (Amiri et al., 2021), yet prevention-specific spending remains inadequately theorized. Existing research tends to examine aggregate health expenditure, emphasizes high-income contexts, addresses narrow policy components in isolation, and rarely integrates interactions among factors (Zhou et al., 2020; Erlangga et al., 2023).

A notable exception illustrates the complexity of these relationships. Erlangga et al. (2023), analyzing primary healthcare spending patterns across 102 countries, found that political context proved as consequential as economic capacity in explaining budget allocation decisions. This finding suggests that prevention underinvestment stems from considerably more than fiscal constraints—institutional and political factors fundamentally shape investment priorities.

For purposes of this review, we adopt specific definitional frameworks. Health promotion comprises interventions enabling individuals to enhance health through control and modification of social and physical environments, incorporating social, institutional, and individual dimensions without exclusively emphasizing treatment (Caron et al., 2023). Disease prevention encompasses targeted population and individual-level activities addressing both primary prevention and early detection, reducing disease burden and modifiable risk factors (World Health Organization EMRO, 2024). Public expenditure encompasses exclusively government budget allocations toward these activities, excluding out-of-pocket and private sector expenditures.

Thailand offers a particularly instructive setting for examining these determinants. Since 2002, the National Health Security Act B.E. 2545 has underpinned the tax-financed Universal Coverage Scheme administered by the National Health Security Office, which—together with two older schemes—extends financial protection to more than 99% of the population (Tangcharoensathien et al., 2018). Current health expenditure nonetheless remains modest at about 5% of gross domestic product (GDP), below comparator economies (World Bank, 2023). Crucially, Thailand pioneered a dedicated prevention-financing mechanism: the Thai Health Promotion Foundation (ThaiHealth), established in 2001 and funded by a 2% surcharge on tobacco and alcohol excise taxes—the first autonomous health-promotion agency in ASEAN, generating roughly US$120 million annually (Pongutta et al., 2019). At the same time, the country faces converging pressures: about 19% of the population was aged 60 or older in 2022, with a transition to a super-aged society projected around 2031–2033 (Office of the National Economic and Social Development Council, 2022), while NCDs account for roughly three-quarters of deaths and an estimated economic loss equivalent to about 9.7% of GDP (World Health Organization & United Nations Development Programme, 2021). These conditions make the prevention paradox both acute and policy-relevant for Thailand.

Understanding the determinants of preventive expenditure matters for several interrelated reasons consistently identified in the health-financing literature (Amiri et al., 2021; Erlangga et al., 2023). First, such understanding illuminates mechanisms enabling effective policy design for sustained investment increases. Second, it identifies structural barriers and opportunities necessary to align budget allocation with epidemiological evidence and economic rationale. Third, it supports development of evidence-based predictive modeling and sustainable long-term planning capacity within health systems. This systematic review therefore synthesizes international evidence while identifying knowledge gaps particularly relevant to middle-income countries transitioning toward aging

societies—contexts wherein the prevention paradox poses distinctive challenges to health system sustainability.

Objectives

This systematic literature review pursues two complementary aims. First, we synthesize empirical evidence regarding determinants of public expenditure for health promotion and disease prevention across international research, interpreting these findings through established economic, political, and institutional theories to explain how macro-, meso-, and micro-level factors interact to shape preventive investment decisions.

Second, it identifies critical knowledge gaps—particularly regarding middle-income-country contexts and longitudinal evidence—and articulates evidence-based policy recommendations that can help governments, and Thailand in particular, raise preventive investment in line with both epidemiological need and fiscal sustainability. Consistent with the qualitative, interpretive nature of a literature review, the integrative framework presented later is treated as an output of the synthesis rather than an a-priori model.

Theoretical Background

Understanding determinants of public expenditure on health promotion and disease prevention requires integration of economic, political, and institutional theories. This review synthesizes existing evidence to explain the "prevention paradox"—the persistent disconnect between scientific evidence supporting prevention's superior cost-effectiveness and actual government budget allocation systematically favoring treatment over prevention.

Macro-Level: Economic Structures Enabling Preventive Investment

Wagner's Law, named for nineteenth-century political economist Adolph Wagner, posits that as national income increases, demand for public services—including preventive health care—expands supraproportionally due to rising societal complexity and associated governance demands. Empirical validation of this relationship in health contexts proves generally supportive though context-contingent. Lamartina and Zaghini (2011), employing panel cointegration methods across 23 Organisation for Economic Co-operation and Development nations, confirmed positive relationships between per capita income and public health expenditure with income elasticity exceeding unity. However, developing country evidence reveals considerably more heterogeneity. Research from transitional economies demonstrates Wagner's Law effects only inconsistently (Sedrakyan & Varela-Candamio, 2019; Gatsi et al., 2019), suggesting that institutional contexts substantially mediate economic-expenditure relationships.

Simultaneously, Baumol's Cost Disease mechanism illuminates healthcare's inexorable cost escalation trajectory. Healthcare, as a labor-intensive service sector, experiences wage pressures it cannot offset through productivity improvements characteristic of capital-intensive manufacturing sectors. Bates and Santerre (2013) confirmed this dynamic empirically within United States health data; however, Colombier (2012), analyzing 20 OECD nations across four decades, found that Baumol's mechanism accounts for only 15-40% of health spending growth—indicating substantial policy discretion in managing prevention costs despite sectoral productivity constraints.

Demographic structure, particularly aging population trends, creates additional macro-level pressures for preventive spending. Analysis of 25 European Union nations revealed that economic growth, lifelong learning, and elderly care financing drove increases in health-related quality of life metrics (Vysochyna et al., 2023). Population aging simultaneously increases non-communicable disease demand whilst concentrating per-capita expenditures among elderly populations—those 65+ years receiving approximately five times greater per-capita health spending than children and 2.5 times greater than working-age populations (OECD, 2023). This concentration underscores prevention's critical role in reducing future disease burdens.

Meso-Level: Political Institutions and Policy Processes

The Multiple Streams Framework, developed by Kingdon (1993), identifies conditions enabling policy windows—moments when recognized problems, available solutions, and receptive political conditions converge. This framework proves particularly illuminating for understanding prevention's chronic underinvestment. Prevention faces a fundamental visibility challenge: successful prevention generates no observable crises activating problem streams. Citizens note absence of disease—fundamentally imperceptible—rather than celebrated prevention achievements. This structural disadvantage helps explain persistent policy neglect despite robust policy streams (evidence-based prevention programs) and public support.

Democratic governance substantially influences whether favorable political conditions emerge for preventive prioritization. Franco et al. (2004), examining 170 nations, found that democracy, political rights, and civil liberties demonstrated stronger health outcome associations than economic indicators—a striking finding suggesting political institutions fundamentally shape health investment priorities. When Bollyky et al. (2019) analyzed 170 countries spanning 1980-2016, they found democratic experience reduced non-communicable disease, cardiovascular disease, and tuberculosis mortality through both direct and indirect government health spending channels, with effects accruing over 20-year periods.

Governance quality further mediates political institutions' influence on allocative efficiency. Tiwari et al. (2023), examining 184 countries spanning 1996-2019, found that one-point governance index improvements reduced maternal mortality by 10-21% by enabling efficient, equitable resource

allocation transforming health expenditure into tangible outcomes. Roessler and Schmitt (2021), analyzing 158 countries across 1995-2015, demonstrated that democracies undertake substantially greater efforts reducing healthcare corruption compared with authoritarian regimes, and democratic systems demonstrate superior health system efficiency. Yet democratic governance alone insufficiently ensures prevention prioritization—additional organizational factors substantially intervene.

Micro-Level: Organizational Barriers to Reallocation

Historical Institutionalism illuminates why organizations resist preventive spending reallocation despite favorable macro and meso conditions. Incremental budgeting—anchoring current allocations to prior-year expenditures—institutionalizes path dependency, creating organizational inertia that Wildavsky (1964) identified as characteristic of public budgeting. This approach embodies implicit assumptions: the status quo represents appropriate allocation, marginal adjustments suffice for changing circumstances, and prior decisions constrain current options. Reeves et al. (2014), examining austerity's impact across 27 European Union nations spanning 1995-2011, found that fiscal constraints, rather than government ideology, drove spending changes—indicating that overcoming institutional inertia requires either crisis-forced reallocation or deliberate budget process reform.

Supply-Induced Demand, captured by Roemer's Law, creates additional organizational bias toward treatment. Abundant curative capacity generates treatment demand potentially exceeding medical necessity. However, Erlangga et al. (2023), analyzing 102 countries, found that physician and nurse density showed positive associations with primary care spending including preventive services—suggesting context-dependent effects. Resource-constrained systems likely benefit from capacity enhancement supporting prevention delivery, whilst well-resourced systems may face supply-induced demand pressures. This apparently paradoxical finding reflects important contextual variation.

Information asymmetries represent particularly significant micro-level barriers to prevention investment. Prevention's success manifests as absence of disease—fundamentally invisible at both population and individual levels. This generates no observable crises or dramatic events warranting political attention, rendering prevention benefits systematically less visible than treatment's acute, observable outcomes. Successful prevention produces no photographs, no compelling patient narratives, no urgent media coverage—features that capture political imagination and mobilize budgetary resources.

Synthesis: Multi-Level Explanation of Prevention Paradox

Prevention underinvestment reflects systematic interactions across analytical levels. Economic capacity, mediated through Wagner's Law, creates opportunity constrained by Baumol's Cost Disease pressures. Favorable political-institutional conditions increase prevention prioritization likelihood, yet policy windows for prevention rarely open given successful prevention's invisibility. Organizational path

dependency combined with information asymmetries cement historical low-prevention patterns. This integrated framework illuminates why addressing the prevention paradox requires coordinated, multi-level interventions spanning economic structure, political institutions, and organizational processes—single-level approaches prove insufficient to overcome complex, interactive barriers sustaining preventive underinvestment despite documented cost-effectiveness

Methods

This systematic literature review synthesizes empirical evidence on the determinants of preventive expenditure through narrative synthesis combined with explicit eligibility criteria, an approach suited to integrating heterogeneous evidence alongside theoretical interpretation. Reporting follows the PRISMA 2020 statement (Page et al., 2021).

Searches encompassed PubMed, Scopus, Web of Science, EconLit, and Thai-LIS for the period 2002–2023. Search terms combined "health promotion," "disease prevention," "public expenditure," "government spending," "health budget," "determinants," "factors," and "predictors." No language restriction was applied at the search stage; final inclusion required English- or Thai-language reporting.

Two reviewers independently screened titles, abstracts, and full texts against predetermined criteria, resolving disagreements by consensus informed by content expertise. Eligible studies were peer-reviewed empirical research (quantitative, qualitative, or mixed-methods) examining relationships between determinant variables and public expenditure on health promotion and disease prevention. Editorials, opinion pieces, grey literature, studies examining only treatment spending, and non-peer-reviewed publications were excluded. As shown in the PRISMA flow diagram (Figure 1), a total of 23 studies met the inclusion criteria and were carried forward to the synthesis.

Data extraction used a standardized form capturing study characteristics (author, year, country, population), methodology, determinant variables, and key findings; the extracted characteristics are summarized in Table 1. Determinants were organized within five categories: socioeconomic and demographic; political–institutional; organizational decision-making; health-system resources; and decentralization.

Because the included studies spanned heterogeneous designs—cross-country regression, panel analyses, simulation modeling, and reviews—each was appraised against four transparent criteria rather than a single design-specific instrument: (i) the appropriateness of the study design to the research question; (ii) the adequacy of the sample or country coverage; (iii) the validity and reliability of the key variables; and (iv) the rigor of the analytic method. Appraisal results were not used to exclude studies but informed the interpretive weight assigned to each study's contribution. Evidence was then integrated through thematic narrative synthesis examining convergence and divergence

across studies, the magnitude and direction of relationships, interactions among factors across analytical levels, and contextual variation.

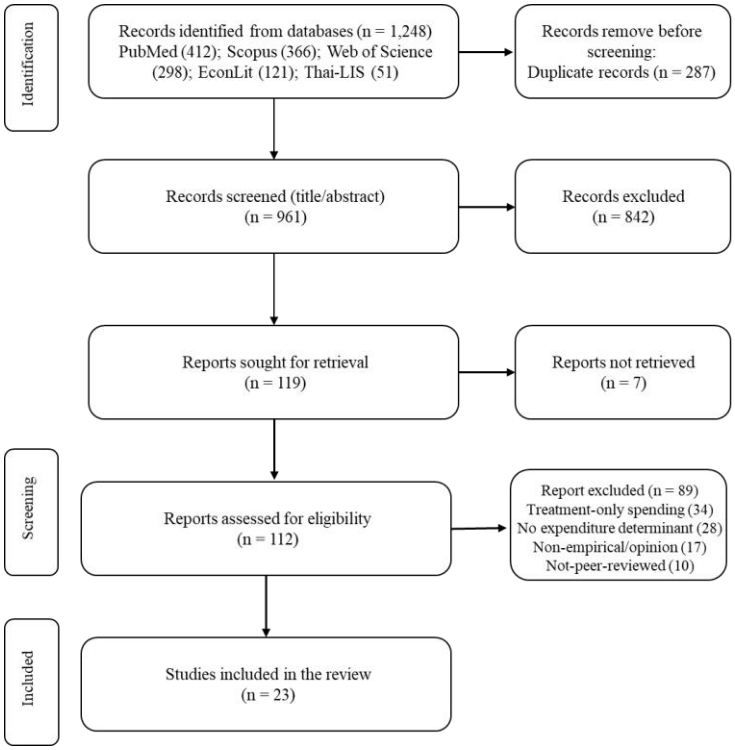

Figure 1. Diagram of the study selection process.

Results

This review synthesizes evidence on public expenditure determinants for health promotion and disease prevention, organizing findings within five determinant categories.

Macro-Level Determinants: Economic Capacity and Demographic Structure

Economic capacity emerges as the strongest and most consistent determinant. Erlangga et al. (2023), analyzing 102 countries, found GDP per capita showing positive significant associations with government primary healthcare spending including prevention and promotion activities—findings consistent with Wagner's Law predictions of supraproportional public service demand growth accompanying income increases.

However, relationships between economic capacity and prevention spending demonstrate important non-linearities. Wang et al. (2016), through theoretical modeling and numerical simulation, identified an inverted U-shaped relationship between prevention spending proportions and both economic growth and social welfare. Critically, the optimal prevention spending proportion for

maximizing social welfare exceeded the proportion optimal for maximizing economic growth, indicating tensions between economic and welfare objectives beyond certain thresholds. Empirical analysis from Taiwan demonstrates substantial prevention underinvestment relative to optimal levels: Taiwan's 2014 prevention expenditure constituted only 0.0027 of GDP, compared with optimal levels of 0.0119 for economic development and 0.0203 for social welfare maximization.

Demographic structure substantially influences prevention spending priorities. Analysis of 25 European Union nations found that economic growth, lifelong learning, and elderly care financing drove increases in health-related quality of life years (Vysochyna et al., 2023). while population aging concentrates per-capita spending among older groups. These patterns are highly salient for Thailand, where rapid aging and a rising NCD burden are projected to push the public-health-expenditure-to-GDP ratio upward over the coming decades (Office of the National Economic and Social Development Council, 2022), strengthening the economic case for earlier preventive investment.

Meso-Level Determinants: Democratic Governance and Policy Processes

Democratic institutions substantially influence preventive expenditure patterns. Bollyky et al. (2019), analyzing 170 countries across 1980-2016, found that democratic experience reduced cardiovascular disease, non-communicable disease, and tuberculosis mortality partly through government health spending channels across 20-year periods. Franco et al. (2004), examining 170 nations, found democracy, political rights, and civil liberties showed stronger health outcome associations than economic indicators—suggesting political systems fundamentally shape health investment priorities. When economic variables were simultaneously considered, they lost explanatory weight relative to democracy's influence.

Governance quality critically mediates how political institutions shape allocative efficiency. Tiwari et al. (2023), examining 184 countries spanning 1996-2019, found that one-point governance index improvements reduced maternal mortality by 10-21% and transformed health spending into improved outcomes through efficient, equitable resource allocation. Roessler and Schmitt (2021), analyzing 158 countries across 1995-2015, demonstrated that democracies reduce healthcare corruption more effectively than authoritarian regimes, with democratic countries demonstrating higher health system efficiency. However, democratic governance does not automatically produce prevention prioritization—additional organizational factors intervene critically.

Micro-Level Determinants: Path Dependency and Incremental Budgeting

Organizational path dependency substantially resists prevention spending reallocation. Prior-year preventive health expenditure showed strong influence on current-year allocations, consistent with incremental budgeting theory (Wildavsky, 1964) where budgets anchor to historical patterns. Walsh (2016) noted incremental budgeting's efficiency given past experience but identified its implicit assumption: "we do things this way because we always have."

Fiscal constraints, rather than political ideology, drive spending changes. Reeves et al. (2014), examining 27 European Union nations across 1995-2011, found austerity measures reduced health spending but government ideology did not significantly mediate responses. Hartman et al. (2006) demonstrated that health spending captured 39% of incremental GDP growth in 2002, 27% in 2003, and 18% in 2004—exceeding historical averages despite economic slowdown.

Health Resource Determinants: Capacity and Dual Effects

Health resource relationships prove complex and context-dependent. Supply-induced demand theory (Roemer's Law) suggests that abundant curative infrastructure biases systems toward treatment. However, Erlangga et al. (2023), across 102 countries, found that physician and nurse density per 1,000 population showed positive associations with primary-care and prevention spending—contradicting pure supply-induced-demand predictions. Sultana et al. (2024), analyzing Bangladesh through vector autoregressive models, similarly found that health spending and physician density improve population-health outcomes.

This apparent paradox reflects important contextual dependency: resource-constrained systems benefit from capacity expansion supporting prevention delivery, whilst well-resourced systems face supply-induced demand pressures. Kim & Lane (2013) in European Union developing countries found that nurse-midwife density associated with life quality and governance dimensions showing positive health outcome relationships.

Decentralization Determinants: Context-Dependent Effects

Decentralization shows positive but governance-contingent effects on preventive spending. Nakatani et al. (2024), analyzing 50 countries spanning 1996-2018, found that fiscal decentralization alone worsened health outcomes but was compensated by improved government governance, with identifiable ceiling levels for decentralization's positive impacts conditional on governance quality.

Sapkota et al. (2023), systematically reviewing 39 studies, identified both positive effects (increased health spending, reduced out-of-pocket costs, improved post-decentralization resources, improved donor coordination, increased underprivileged area funding) and negative effects (weakened overall health sector financing, shift from public to private goods, limited inter-regional equalization financing, weak financial capacity, delayed fund transfers). Xu and Lin (2022), analyzing China's 30 provinces spanning 2008-2019, found positive fiscal decentralization effects on public health through increased public health spending and improved local medical services. Greater financial autonomy enabled local governments to directly increase spending aligned with local health needs.

However, equity implications vary considerably. Abimbola et al. (2017) found that decentralization provided subnational units fiscal space for local resource utilization, yet wealthy

jurisdictions increased health budgets whilst poor jurisdictions experienced decreases. Equalization policies—through inter-governmental transfers, national programs, or health insurance ensuring universal service access—can substantially mitigate pre-existing spending and outcome inequalities.

Table 1. Characteristics of the studies included in the synthesis (n = 23).

Study (Author, Year)	Country / Coverage	Methodology	Key determinant findings
Amiri et al. (2021)	Global (review)	Systematic review	Catalogues economic, demographic, political and health-system determinants of health expenditure.
Zhou et al. (2020)	Emerging economies	Panel regression	GDP, demographic structure and health resources jointly drive health-care expenditure.
Erlangga et al. (2023)	102 countries	Cross-country regression	GDP per capita is the strongest predictor of primary-care/prevention spending; political context is as important as economic capacity; workforce density positively associated.
Lamartina & Zaghini (2011)	23 OECD	Panel cointegration	Income elasticity of public health spending exceeds unity, supporting Wagner's Law.
Sedrakyan & Varela-Candamio (2019)	Armenia, Spain	Time-series	Support for Wagner's Law is context-dependent and inconsistent.
Gatsi et al. (2019)	Ghana	Time-series (ARDL)	Weak and inconsistent support for Wagner's hypothesis in a developing economy.
Bates & Santerre (2013)	United States (50 states)	Panel	Confirms Baumol's cost-disease dynamic in the health sector.
Colombier (2012)	20 OECD	Panel	Baumol effect explains only 15–40% of spending growth, leaving substantial policy discretion.
Vysochyna et al. (2023)	25 EU	Panel	Economic growth, lifelong learning and elderly-care financing raise health-related quality of life.
Wang et al. (2016)	Taiwan	Theoretical model / simulation	Inverted-U relationship between prevention share and growth/welfare; observed prevention share far below the welfare-optimal level.

Table 1. Characteristics of the studies included in the synthesis (n = 23) (Continue)

Study (Author, Year)	Country / Coverage	Methodology	Key determinant findings
Bollyky et al. (2019)	170 countries (1980–2016)	Observational	Democratic experience lowers NCD, cardiovascular and tuberculosis mortality, partly through government health spending.
Franco et al. (2004)	170 nations	Ecological	Democracy and political rights show stronger health associations than economic indicators.
Krueger et al. (2015)	67 countries	Multilevel analysis	Democracy is positively associated with self-rated population health.
Tiwari et al. (2023)	184 countries (1996–2019)	Panel	A one-point improvement in governance reduces maternal mortality by 10–21%.
Roessler & Schmitt (2021)	158 countries (1995–2015)	Cross-country	Democracies curb health-sector corruption and achieve higher system efficiency than autocracies.
Reeves et al. (2014)	27 EU (1995–2011)	Cross-national	Fiscal constraints, not government ideology, drove health-spending changes under austerity.
Hartman et al. (2006)	United States	Incremental budget analysis	Health captured a large, above-average share of incremental GDP growth, illustrating incrementalism.
Sultana et al. (2024)	Bangladesh	Vector autoregression	Health spending and physician density improve population-health outcomes.
Kim & Lane (2013)	17 countries	Comparative	Government health expenditure is associated with better public-health outcomes.
Nakatani et al. (2024)	50 countries (1996–2018)	Panel	Fiscal decentralization alone worsens outcomes; good governance compensates, with a ceiling effect.
Sapkota et al. (2023)	Review of 39 studies	Systematic review of reviews	Decentralization yields mixed effects: gains in spending and access versus weakened financing and equity.
Xu & Lin (2022)	China (30 provinces, 2008–2019)	Panel	Fiscal decentralization raises public-health spending and improves local health outcomes.

Table 1. Characteristics of the studies included in the synthesis (n = 23) (Continue)

Study (Author, Year)	Country / Coverage	Methodology	Key determinant findings
Abimbola et al. (2017)	Nigeria / LMICs	Institutional analysis	Decentralization widened inter-jurisdiction inequities in the absence of equalization transfers.
Amiri et al. (2021)	Global (review)	Systematic review	Catalogues economic, demographic, political and health-system determinants of health expenditure.

An Integrative Multi-Level Framework

Synthesizing the evidence, we present a simplified, three-level framework that emerges from—rather than precedes—the analysis (Figure 2). The framework is organized by the level at which determinants operate and by the interactions among them, and it is offered as an interpretive heuristic appropriate to a qualitative review rather than a formal causal model.

At the macro level, economic capacity (Wagner's Law) and demographic change create the fiscal space and the demand for prevention, bounded by Baumol's cost disease. At the meso level, democratic institutions, governance quality, and fiscal arrangements determine whether that capacity is converted into preventive priority. At the micro level, path dependency, incremental budgeting, supply-induced demand, and information asymmetry govern whether reallocation actually occurs. The framework's central message lies in the interactions across these levels: governance quality moderates how strongly economic capacity translates into preventive outcomes, while path-dependent inertia dampens responsiveness to changing need.

Two observations follow. First, underinvestment is sustained jointly by political myopia, organizational inertia, interest-group pressures favoring curative sectors, and the structural invisibility of prevention's benefits—so that economic evidence alone does not produce reallocation. Second, the link between economic capacity and preventive spending is neither direct nor linear: it is amplified by governance quality, dampened by institutional path dependency, and conditioned by the maturity of the political system. This explains why single-level interventions are insufficient and why coordinated, multi-level action is required.

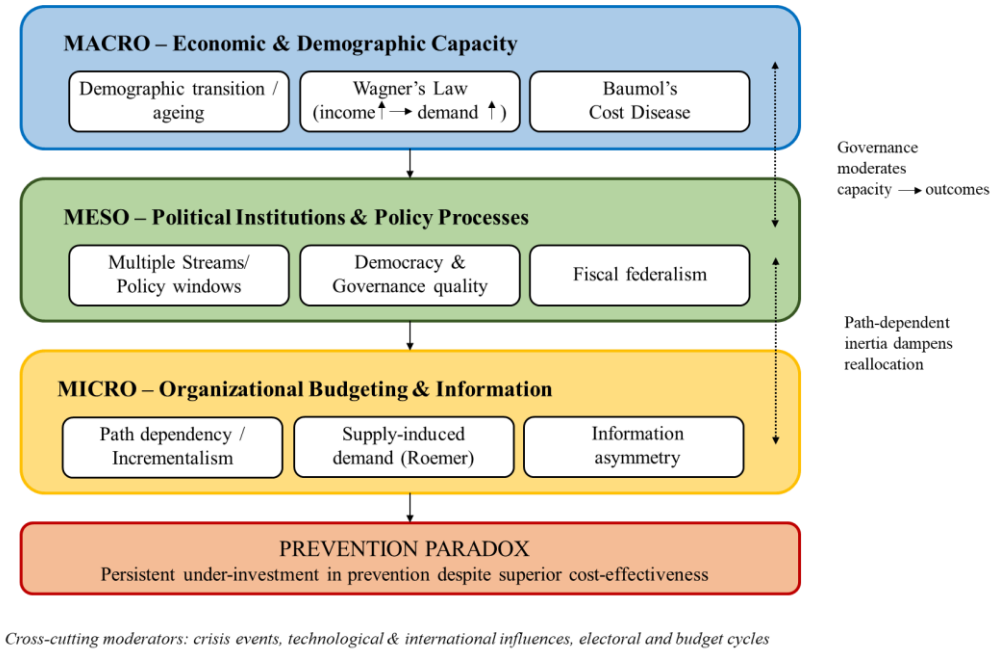

Figure 2. An integrative multi-level framework of the determinants of public preventive-health expenditure, derived from the synthesis.

Conclusion and Policy Recommendations for Thailand

Synthesis of Findings

This systematic literature review synthesized empirical evidence on determinants of public expenditure on health promotion and disease prevention, identifying knowledge gaps and limitations of existing studies. Our findings categorize key determinants into five main groups: economic, social, and demographic environmental factors; political factors; organizational decision-making factors; health resource factors; and decentralization factors. This synthesis reveals the complexity and interactive dynamics among various determinants shaping public investment patterns in preventive health.

First, economic factors, particularly GDP per capita, consistently emerge as the strongest primary determinant. Multiple countries across different time periods align with Wagner's Law, positing that as national income increases, demand for and capacity to invest in public services—including health prevention—grow at rates exceeding proportional increases. However, this relationship is not uniformly linear. Theoretical study reveals an inverted U-shaped relationship between GDP proportions allocated to prevention and both economic growth and social welfare, indicating an optimal threshold beyond which additional spending may not yield significant marginal returns.

Second, political factors, particularly democratic governance and governance quality, exert significant and consistent influence on health investments and outcomes. Research across 170 countries confirms that democratic experience affects mortality reduction both directly and indirectly, with government health expenditure serving as a critical pathway. Good governance quality can transform health expenditures into improved outcomes through efficient and equitable resource allocation. These findings underscore that political factors constitute not merely external contexts but critical mechanisms determining health resource allocation direction and efficiency.

Third, organizational decision-making factors, particularly lagged public expenditure on health promotion and disease prevention, reflect path dependency and incremental budgeting concepts. Budgetary decisions typically rely on historical precedents and change gradually. This indicates that reallocating budgets to increase preventive investment constitutes a gradual process requiring sustained, long-term effort rather than abrupt change.

Fourth, the relationship between health resources and preventive investment reveals challenging complexity. While Roemer's Law suggests excess curative infrastructure may diminish preventive focus, empirical evidence yields mixed results. Studies across 102 countries and in Bangladesh identify positive associations between health workforce density and primary health care investment including preventive activities. This suggests robust health systems with adequate resources may constitute necessary conditions for effective preventive service delivery, with variations likely reflecting country-specific contexts.

Fifth, decentralization demonstrates context-dependent effects with both positive and negative dimensions. Research across 50 countries indicates that decentralization's impact on health outcomes depends critically on governance quality. Countries with good governance can leverage decentralization to enhance local responsiveness and promote public health through increased spending. Conversely, countries with weak governance may face inequality and resource inefficiency challenges.

This comprehensive synthesis underscores complex interactions among various determinants. These factors do not operate in isolation but influence each other reciprocally. The effect of GDP per capita on preventive investment is moderated by governance quality, while decentralization's impact depends on both economic development levels and institutional quality. Consequently, effective policymaking necessitates simultaneous consideration of multiple dimensions.

Nevertheless, this literature review reveals significant knowledge gaps and limitations. There is a scarcity of longitudinal studies tracking policy change impacts. Most studies employ cross-sectional or short-panel data, potentially failing to capture gradual, long-term effects of preventive investments.

Most studies focus on high- and middle-income countries, lacking evidence from low-income contexts exhibiting significantly different dynamics and constraints.

Policy Recommendations for Thailand

Increasing health promotion and disease prevention investment requires integrated approaches. Focusing solely on single factors—such as GDP growth or democratic improvements—proves insufficient. Rather, effective strategies demand synergistic action across multiple dimensions, including building robust institutions, enhancing governance quality, and designing budgetary processes that incentivize long-term investment. For Thailand, deepening understanding of these determinants will enable policymakers to design more effective and sustainable public health resource allocation strategies, addressing evolving disease burdens and building health systems emphasizing prevention over treatment.

First: strengthen governance, accountability, and analytic capacity

Because governance quality is among the most consistent determinants identified in this review—mediating whether spending becomes better outcomes—it warrants the greatest emphasis. Thailand should prioritize transparency, accountability, and rigorous monitoring and evaluation of preventive expenditure, building on existing institutional strengths such as the National Health Security Office's strategic-purchasing capacity and the country's health-technology-assessment infrastructure. Strengthening these capacities, including at subnational level, is the single highest-leverage action implied by the evidence and a precondition for the reforms that follow.

Second: align budgets with need and reform the budget process, including phased Zero-based Budgeting

In line with Wagner's Law and Thailand's rising NCD and aging burden, the budget share for prevention should be progressively expanded and protected. Yet because organizational path dependency is a powerful determinant, expansion alone is unlikely to redirect spending. Zero-based budgeting (ZBB) is therefore promising in principle: by requiring justification from a zero base, it could dismantle the incremental anchoring that entrenches curative bias.

Its implementation in Thailand must, however, be realistic. Thai public budgeting is characterized by strong path dependency and deeply embedded incremental, line-item practices, and bureaucratic resistance to departing from established routines is well documented—illustrated historically by the Ministry of Finance's initial objection to the earmarked surcharge that funds ThaiHealth (Pongutta et al., 2019). Comprehensive ZBB is also administratively costly and information-intensive, demanding analytic capacity that is unevenly distributed across agencies. A wholesale shift

would likely encounter the same inertia it seeks to overcome. We therefore recommend a phased, selective approach: piloting modified or priority-based zero-based budgeting within specific prevention programs and agencies, coupled with health-technology-assessment evidence and clear performance metrics, before any broader rollout. Notably, ThaiHealth's earmarked-tax model already provides a protected, ring-fenced financing stream for prevention that complements—without replacing—the curative budget, and it offers a domestic template worth sustaining and selectively expanding.

Third: Decentralization Coupled with Local Capacity Building

Decentralization can serve as an effective tool for enhanced responsiveness to local population health needs. However, decentralization must accompany capacity building and readiness of local authorities in personnel, knowledge, and capabilities for efficient preventive health budget management and utilization. Governments should support and guide local authorities in designing and implementing health promotion and disease prevention programs appropriate to specific local contexts and needs, while facilitating best practices exchange among localities.

Fourth: Cross-Sectoral Policy Integration

Health promotion and disease prevention are not limited to the public health sector but interconnect with policies in other sectors such as education, transportation, agriculture, and urban planning. Policymakers should view preventive investment as integral to holistic development, promoting inter-ministerial and inter-agency collaboration to create environments conducive to population health.

Recommendations for Future Research

Given identified knowledge gaps, several research directions merit priority attention. First, future research should emphasize time-series or panel data covering extended periods for Thailand to analyze dynamics of public expenditure determinants on health promotion and disease prevention and health outcomes. Such studies will enable identification of causal relationships and gradual impacts of preventive investments with greater precision. Data collection and analysis at more granular levels—such as provincial or regional—should be conducted where feasible, to understand variations in determinants and outcomes across areas, potentially reflecting diverse local economic, social, and political contexts.

Second, given literature review findings that determinants do not operate in isolation, econometric or statistical models capable of analyzing interaction effects should be employed—for instance, examining how governance quality affects the relationship between GDP per capita and preventive expenditure, or how decentralization's influence on preventive investment varies by economic development level. Research should endeavor to understand more deeply the mechanisms

through which these factors influence public preventive expenditure. Mixed-methods approaches combining qualitative and quantitative research may explore stakeholder perspectives and probe actual budgetary decision-making processes.

Third, beyond universal factors identified through literature review, future research should consider factors specific to the Thai context—such as universal health coverage policies, health system management structures, Thailand's rapid demographic transitions, or even social and cultural influences on investment priorities and prevention emphasis. Presenting data on Thailand's evolving disease burden, including non-communicable diseases and emerging/re-emerging diseases, should be considered as cofactors potentially influencing preventive budget allocation decisions.

Fourth, assessing whether Thailand's health promotion and disease prevention investments genuinely produce tangible improved health outcomes is crucial. Future research should emphasize impact evaluation of various preventive programs and policies, potentially employing rigorous methodologies such as quasi-experimental designs or health economic evaluations to assess investment cost-effectiveness. More comprehensive and sensitive health outcome indicators should be developed or utilized, genuinely reflecting preventive investment impacts—such as disease incidence rates, premature mortality rates, or health-adjusted quality of life measures.

Fifth, while this study reviews literature broadly, future research might consider cross-country comparative studies focusing on developing country groups with economic and social characteristics similar to Thailand, learning from their experiences and policies that may be adapted to the Thai context.

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