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Government Budgetary Expenditure on Health and Its Impact on Infrastructure, Management, and Economic Growth in Goa State

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ABSTRACT: This study provides an empirical evaluation of government budgetary expenditure on healthcare in Goa State and rigorously assesses its structural impact on healthcare infrastructure, clinical service delivery performance, and Gross State Domestic Product (GSDP). Utilizing audit data from the Comptroller and Auditor General (CAG) of India, state financial accounts, and empirical performance metrics spanning FY 2016–17 through FY 2026–27, this paper analyzes fiscal outlays across the Public Health Department (PHD), Directorate of Health Services (DHS), and Goa Medical College and Hospital(GMCH).

While total public health spending expanded substantially from ₹683.97 crore (1.09% of GSDP) in 2016–17 to ₹2,217.00 crore (1.69% of GSDP) in 2026–27, primary healthcare received a sub-optimal average of only 19.94% of total health allocations, severely violating the 66% primary care target established by the National Health Policy (NHP) 2017. Furthermore, capital budget utilization remained highly inefficient, ranging between 26% and 41% annually. Critical structural gaps include a 51% vacancy rate among regular doctors/specialists at the tertiary level and acute physical infrastructure deficits of 24.4% in Sub-Centres, 41.7% in Primary Health Centres, and 50.0% in Community Health Centres relative to Indian Public Health Standards (IPHS). Calculated macro-fiscal elasticity (E_he = 0.338) and sub-period dynamic elasticity indices demonstrate that while health spending expands faster than economic output during expansionary cycles, operational bottlenecks, procurement delays, and severe patient-bypassing of peripheral facilities moderate the overall macroeconomic multiplier of public health investments in Goa. Key policy recommendations include establishing a centralized drug procurement body, rebalancing fiscal allocations toward primary health, and institutionalizing mandatory prescription quality audits.

1. INTRODUCTION

Public spending on healthcare represents a vital macroeconomic strategy for human capital accumulation, labor productivity enhancement, and sustained economic growth. Under the Constitution of India, health is predominantly a State subject, placing financial stewardship and operational execution directly upon state governments. Recognizing the systemic links between fiscal health outlays and welfare outcomes, the National Health Policy (NHP) 2017 established explicit macro-fiscal benchmarks: escalating total public health spending to 2.5% of Gross Domestic Product (GDP), increasing state health expenditure to over 8% of total state budgets, and allocating at least two-thirds (66%) of total health resources directly to primary healthcare.

The State of Goa presents a compelling and unique health-economic landscape in India. Characterized by high adult literacy, an advanced demographic transition with a Total Fertility Rate (TFR) of 1.3, and primary health indicators that consistently

outpace national averages, Goa is frequently viewed as a model state. Public healthcare in Goa is structured across a classic three-tier system:

1. Primary Care Tier: Sub-Centres (SCs), Primary Health Centres (PHCs), and Urban Health Centres UHCs).
2. Secondary Care Tier: Community Health Centres (CHCs), Sub-District Hospitals (SDHs), and District Hospitals (DHs).
3. Tertiary Care Tier: Goa Medical College and Hospital (GMCH) along with specialized tertiary institutions.

Despite substantial expansion in absolute fiscal outlays—with state health expenditure growing over three-fold across the eleven-year period from FY 2016–17 to FY 2026–27—persistent structural and operational inefficiencies compromise health system performance. Goa currently operates without a dedicated State Health Policy or a Centralized Autonomous Drug Procurement Body. This lack of institutional framework manifests in low capital budget execution, chronic underfunding of primary health services, severe human resource vacancies, and heavy patient-bypassing of peripheral facilities.

This revised study aims to deliver a comprehensive empirical examination of public health spending in Goa. Specifically, it analyzes multi-year fiscal trends, evaluates physical and operational infrastructure gaps against Indian Public Health Standards (IPHS), performs rigorous elasticity calculations to assess the macroeconomic growth linkage, and outlines actionable policy interventions.

2. MATERIALS AND METHODS

2.1 Data Sources and Study Material

This research utilizes secondary administrative, financial, and clinical empirical data compiled from official governance and oversight sources:

- **Comptroller and Auditor General (CAG) of India:** Performance Audit Report No. 4 of 2024 on 'Public Health Infrastructure and Management of Health Services in Goa' (covering FY 2016–17 to FY 2021–22).
- **State Budget Documents & Finance Accounts:** Goa State Budget Documents, Appropriation Accounts, and Budget Estimates (FY 2024–25 Actuals, FY 2025–26 Revised Estimates, FY 2026–27 Budget Estimates).
- **National & State Empirical Reports:** NITI Aayog SDG India Index Reports, District Hospital Performance Reports, Directorate of Planning, Statistics and Evaluation (DPSE) GSDP statements, and National Family Health Survey (NFHS-4 and NFHS-5) data.

2.2 Field Sample & Institutional Coverage

To evaluate field-level operational performance, clinical productivity, and facility-level infrastructure, empirical data from 19 representative public health facilities across both North Goa and South Goa districts were analyzed:

Tertiary Care (1 Unit): Goa Medical College and Hospital (GMCH), Bambolim.

Secondary Care (4 Units): North Goa District Hospital (Mapusa), Chicalim Sub-District Hospital, Margao T.B. Hospital, and 2 Community Health Centres (Pernem CHC, Canacona CHC).

Primary Care (14 Units): 4 Primary Health Centres (Porvorim, Chimbel, Chinchinim, Balli) and 10 Sub-Centres.

2.3 Quantitative Analytical Framework and Elasticity Formulas

To rigorously measure the economic responsiveness of healthcare spending relative to overall state domestic product growth, macro-fiscal elasticity metrics were constructed.

1. Point Health Expenditure Elasticity (E_he): Defined as the percentage change in Gross State Domestic Product (GSDP) relative to the percentage change in State Health Expenditure (HE):

EQUATION 1: HEALTH EXPENDITURE ELASTICITY

E_he = (% Change in GSDP) / (% Change in Health Expenditure) = [(GSDP_t - GSDP_0) / GSDP_0] / [(HE_t - HE_0) / HE_0]

EQUATION 2: ARC ELASTICITY OF HEALTH EXPANSION

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Arc Elasticity / Log-Linear Sensitivity Index: To evaluate structural elasticity across multi-year cycles while minimizing base-year skewness, the Arc Elasticity formula was applied:

$$E_{arc} = [(GSDP_t - GSDP_0) / (GSDP_t + GSDP_0)] / [(HE_t - HE_0) / (HE_t + HE_0)]$$

Interpretation criteria: An elasticity $E_{he} < 1.0$ indicates that health expenditure grows at a faster percentage rate than GSDP (reflecting fiscal expansion/deepening). An $E_{he} > 1.0$ indicates that total economic output expands at a rate higher than health expenditure, reflecting higher macroeconomic return or multiplier effects from health investments.

2.4 Results and Empirical Interpretation

2.4.1 Macro-Fiscal Analysis and Health Expenditure Trajectory

Between FY 2016–17 and FY 2026–27, total state health spending expanded from ₹683.97 crore to ₹2,217.00 crore, reflecting a compound nominal growth of 224.1%. Table 1 presents the comprehensive multi-year macro-fiscal trajectory.

Fiscal Year	GSDP Current Prices (₹ Cr)	Total State Exp. (TSE) (₹ Cr)	State Health Exp. (HE) (₹ Cr)	HE as % of TSE	HE as % of GSDP
2016–17 (Act.)	62,976	12,848.37	683.97	5.32%	1.09%
2018–19 (Act.)	71,853	16,728.80	1,001.40	5.99%	1.39%
2021–22 (Act.)	89,422	19,654.20	1,533.98	7.80%	1.72%
2024–25 (Act.)	1,21,309	23,423.00	1,850.00	7.90%	1.52%
2025–26 (RE)	1,38,000	29,275.00	2,040.00	6.97%	1.48%
2026–27 (BE)	1,31,000	30,194.00	2,217.00	7.34%	1.69%

Sources: Comptroller and Auditor General (CAG) Report No. 4 of 2024; Goa State Budget Documents (2024–2027).

Detailed Empirical Interpretation:

1. Fiscal Intensity and Budget Priority: Health expenditure as a percentage of Total State Expenditure (TSE) steadily increased from 5.32% in 2016–17 to a peak of 7.90% in 2024–25, approaching the NHP 2017 baseline target of 8.0%. However, in 2025–26 and 2026–27, this share moderated to 6.97% and 7.34% respectively. This indicates that while total budget size expanded sharply (reaching ₹30,194 crore), healthcare allocations did not grow proportionately with overall state budget expansion in the most recent fiscal cycles.

2. Health Spending relative to GSDP: As a share of GSDP, public health outlays improved from 1.09% in 2016–17 to 1.72% in 2021–22 (largely driven by emergency COVID-19 pandemic outlays), before settling at 1.69% in 2026–27. While Goa outperforms the national state average (approx. 1.2–1.4%), it remains well below the statutory NHP 2017 policy benchmark of 2.5% of GDP.

3. Intra-Sectoral Budget Distortion (Primary vs. Tertiary Skew): Audit data reveals that primary healthcare received an average of only 19.94% of total state health allocations throughout the period—a staggering shortfall against the NHP target of 66.0%. In FY 2026–27, out of the total ₹2,217.00 crore health budget, nearly 48% (₹1,063 crore) is allocated directly to tertiary care at GMCH. This severe fiscal imbalance starves primary and secondary facilities of necessary operational funds.

2.4.2 Infrastructure Deficits and Capital Execution Analysis

Analysis of physical health infrastructure reveals substantial structural deficits across all healthcare tiers when evaluated against Indian Public Health Standards (IPHS) population-based norms. Table 2 provides a detailed breakdown of these shortfalls.

Facility Type	Target Requirement (IPHS Norms)	Existing Functional Units	Shortfall (Units)	Infrastructure Deficit (%)
Sub-Centres (SCs)	291	220	71	24.4%
Primary Health Centres (PHCs)	48	28	20	41.7%
Community Health Centres (CHCs)	12	6	6	50.0%

Sources: CAG Audit Report No. 4 of 2024; Directorate of Health Services (DHS) Goa.

Detailed Empirical Interpretation:

1. Progressive Deficits in Peripheral Care: Infrastructure shortfalls escalate as healthcare levels move from grassroots to secondary care. While Sub-Centres suffer a 24.4% deficit, PHCs and CHCs exhibit severe deficits of 41.7% and 50.0% respectively. The state possesses only half of the required Community Health Centres needed to provide specialized secondary care (obstetrics, pediatrics, surgery) to rural and semi-urban populations.

2. Chronic Capital Budget Under-Utilization: CAG audit findings demonstrate that annual capital outlay utilization in the health sector hovered between an extremely poor 26.0% and 41.0%. Capital funds allocated for constructing PHC buildings, upgrading CHC diagnostic blocks, and procuring advanced medical equipment remained consistently unspent due to prolonged administrative sanctions, land acquisition disputes, and tender delays by public works execution agencies.

2.4.3 Operational Efficiency, Human Resources, and Service Bypassing

Operational productivity across facility tiers—evaluated using Bed Occupancy Rates (BOR), clinical staffing ratios, and drug availability metrics—is summarized in Table 3

Facility Level / Institution	Target BOR Benchmark (IPHS Norm)	Observed Operational BOR (%)	Human Resource Vacancy Rate (%)
GMCH (Tertiary Care)	75.0%	62.0% – 77.0%	51.0% (Doctors / Specialists)
North Goa District Hospital	80.0%	35.2% – 63.9%	21.2% (Overall DHS Cadre)
Community Health Centres (CHCs)	60.0%	11.1% – 41.2%	Heavy Contractual Reliance (>1,000)

Sources: CAG Audit Report No. 4 of 2024; Field Inspection Records.

Detailed Empirical Interpretation of Table 3:

1. Severe Bypassing and Under-Utilization of Peripheral Facilities: Community Health Centres registered abysmal Bed Occupancy Rates ranging between 11.1% and 41.2%, falling far short of the 60.0% standard benchmark. Similarly, North Goa

District Hospital recorded BOR as low as 35.2%. Field investigations reveal that patients routinely bypass primary and secondary units due to non-functional Operation Theatres, lack of blood storage facilities, and absence of duty specialists.

2. Systemic Overcrowding at Tertiary Level: In stark contrast, GMCH experienced severe bed congestion, with BOR reaching up to 77.0% (and exceeding 100% in general medicine wards). GMCH is overburdened with routine primary and secondary cases that should be treated at local PHCs or CHCs.

3. Acute Human Resource Crisis: GMCH suffers from a critical 51.0% vacancy rate among regular doctors and clinical specialists. Across the DHS cadre, overall vacancies stand at 21.2%. The system relies heavily on over 1,000 contractual staff, leading to high turnover, operational instability, and compromised care continuity.

4. Pharmaceutical Procurement Inefficiencies and Out-Of-Pocket Expenditure (OOPE): Prescription audits conducted across sampled facilities revealed that between 10.0% and 83.0% of prescribed Essential Drugs were out of stock in hospital dispensaries. Due to the absence of a Centralized Drug Procurement Body and failure to conduct mandatory batch quality testing, patients are forced to purchase medicines from private pharmacies, sharply increasing private out-of-pocket health expenditure.

2.5 Econometric Analysis & Results

Applying Equation 1 to the long-term empirical dataset (2016–17 to 2021–22):

• Baseline GSDP Growth (2016–17 to 2021–22): Percentage change in GSDP = (89,422 - 62,976)/62,976=+41.99%
• Baseline Health Expenditure Growth (2016–17 to 2021–22): Percentage change in HE = (1,533.98-683.97)/683.97=+124.28%
• Calculated Baseline Elasticity (E_he): E_he = 41.99% / 124.28% = 0.338

Sub-Period Dynamic Arc Elasticity Analysis:

1. Expansionary Phase (2016–17 to 2021–22): Arc Elasticity E_arc = 0.322. During this period, state health spending expanded dynamically (driven by infrastructure expansion and emergency pandemic response), growing nearly four times faster than nominal GSDP.

2. Stabilization & Consolidation Phase (2021–22 to 2026–27): Percentage change in GSDP = (1,31,000 - 89,422) / 89,422 = +46.50%; Percentage change in HE = (2,217.00 - 1,533.98) / 1,533.98 = +44.53%. Calculated Elasticity E_he = 46.50% / 44.53% = 1.044.

3. DISCUSSION

The transition of elasticity from 0.338 to 1.044 demonstrates that as public health expenditure stabilizes following structural expansion, economic output (GSDP) moves into near-proportional alignment with health outlays. However, the overall macroeconomic health multiplier remains constrained. While health spending positively supports labor productivity, structural bottlenecks—such as 26%–41% capital un-utilization, 51% specialist shortages, and essential drug stock outs—dampen the direct economic growth returns that would otherwise be realized from state health capital investment.

3.1 Policy Recommendations and Strategic Framework

To eliminate structural inefficiencies, maximize macroeconomic returns on public investment, and align Goa's healthcare system with National Health Policy benchmarks, a strategic policy framework is proposed:

1. **Institutionalize a Centralized Autonomous Medical Procurement Agency:**
   Establish a dedicated corporation (modeled after Tamil Nadu Medical Services Corporation - TNMSC) to streamline drug procurement, enforce mandatory batch quality testing, and guarantee 100% availability of Essential Medicines at peripheral health units, thereby eliminating out-of-pocket expenditure.
2. **Rebalance Intra-Sectoral Fiscal Allocations toward Primary Care:**
   Formally restructure budget planning to incrementally increase primary healthcare funding from the current 19.94% toward the NHP target of 66.0%. This will strengthen Sub-Centres and PHCs and reduce unnecessary tertiary care burden.

3. **Enact HR Recruitment Reforms and Specialist Cadre Stabilization:**
   Address the 51% doctor/specialist vacancy rate at GMCH and DHS by establishing a dedicated State Health Services Recruitment Board, offering competitive specialist incentive packages, and regularizing long-term contractual staff.
4. **Capital Budget Execution and Facility Operationalization:**
   Create a specialized Health Infrastructure Project Cell within the Public Works Department (PWD) to overcome procurement bottlenecks, ensure 100% execution of capital budgets, and operationalize dormant Operation Theatres and blood storage units in CHCs.
5. **Formulate a Comprehensive State Health Policy for Goa:**
   Promulgate a statutory State Health Policy tailored to Goa's unique demographic profile, focusing on non-communicable disease (NCD) management, geriatric care, and seamless referral linkage protocols.

4. CONCLUSION

While the State of Goa exhibits commendable health outcomes and has demonstrated substantial political commitment through absolute health budget expansion (reaching ₹2,217.00 crore in FY 2026–27), its public healthcare system is hindered by deep structural and operational disconnects. Low capital budget execution, extreme primary care underfunding, severe specialist shortages, and pharmaceutical supply chain failures induce patient bypassing and overburden tertiary care.

The econometric findings underscore that public health spending positively correlates with GSDP growth, but administrative bottlenecks currently moderate the macroeconomic multiplier of health capital in Goa. By implementing centralized procurement, rebalancing funds toward primary health, regularizing medical personnel, and streamlining capital project execution, Goa can optimize fiscal efficiency, alleviate public financial burden, and transform its public healthcare framework into a robust engine for sustainable economic development.

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AUTHOR CONTRIBUTIONS

Dr.Suraj M. Popker & Dr. Ulhas M. Bansode: Conceptualization, Investigation.

Prof. Brahma Edwin Barreto & Dr. Ulhas M. Bansode: Methodology

Dr.Suraj M. Popker & Dr. Ulhas M. Bansode: Data Curation, Formal Analysis.

Prof. Brahma Edwin Barreto: Supervision, Writing—Review & Editing.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICS STATEMENT

Ethical approval was not required for this study as it relies exclusively on publicly available secondary administrative and audit data.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

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