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RESEARCH ARTICLE

FINANCING PRESSURE, DEMOGRAPHIC CHANGE, AND THE PUBLIC-PRIVATE MIX IN FIVE HEALTH SYSTEMS ACROSS CONTINENTS: A COMPARATIVE SECONDARY POLICY ANALYSIS

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Abstract

Background: Health systems may expand in nominal expenditure whil e still remaining under structural pressure when financing arrangements demographic change, and the balance between public and private provision do not evolve at the same pace.

Objective: To compare how five health systems across five continents - Canada, Brazil, Japan, Germany, and South Africa - express financing pressure through expenditure effort, financing composition, demograph ic intensity, and service-capacity strain.

Methods: This study used a comparative secondary policy-analysis design based on official country profiles, policy documents, and interna tionally harmonised datasets. The article makes the case-selection criteria explicit, states the indicator-harmonisation rules, introduces an analytical framework linking financing architecture, demographic pressure, and service capacity, and adds a descriptive cross-case coding strategy (low/moderate/high pressure) together with simple comparativ e statistics to move beyond purely narrative comparison. The article does not claim causal inference and does not use patient-level data.

Results: The five cases show that financing pressure is not a single phenomenon. In Canada, high spending coexists with access bottleneck s; in Brazil,universal entitlement coexists with a comparatively constrai ned public core and a meaningful household-payment burden; in Japan, a strong public financing model faces exceptional ageing pressure; in Germany, the central issue is long-term sustainability within a generous insurance system; and in South Africa, the most important structural challenge is a deeply segmented public-private mix.

Conclusion: Across continents, rising expenditure or formal coverage alone does not settle the question of adequacy. The comparative finding of this article is that health systems face different combinations of financing pressure, demographic change, and organisational strain, and that these combinations must be analysed in relation to each system's institutional design rather than through a single universal metric.

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Introduction:-

Comparative writing on health systems often falls into one of two traps. The first is to celebrate formal coverage arrangements without examining whether these arrangements remain adequately financed over time. The second is to treat expenditure growth itself as evidence of policy success, even when that growth is largely absorbed by inflation, demography, technology, or persistent structural inefficiencies. A more demanding comparative question asks whether health systems are able to convert expenditure into durable public capacity, equitable access, and sustainable organisational performance.The present article takes that second path. It adapts the analytical logic of a financing-focused manuscript originally developed for Israel and applies it to five country cases distributed across continents: Canada, Brazil, Japan, Germany, and South Africa. These cases were chosen not because they share one institutional model, but because each provides a distinct expression of the same policy problem. All have national policy frameworks that aim at broad population coverage or universal health coverage, yet the relationship between public financing, private contribution, demographic pressure, and service capacity differs markedly across them.
Recent comparative debate on health-system performance has increasingly moved beyond formal entitlement alone and toward questions of financing depth, financial protection, demographic adaptation, and capacity under changing patterns of need. The present study contributes to that discussion by treating financing pressure as a multidimensional comparative concept and by applying one analytical framework across five distinct health-system settings.

Recent literature reinforces this framing. WHO and the World Bank's 2023 global monitoring report warns that progress toward universal health coverage has stalled while catastrophic out-of-pocket spending remains a major concern. OECD work on fiscal sustainability likewise argues that ageing, technology, and expectations are putting persistent upward pressure on health budgets, while recent comparative analyses of financial protection emphasise that coverage in law is not sufficient if households remain exposed to unaffordable care. Taken together, this literature supports the article's central premise that financing adequacy should be assessed through a combined lens of coverage, protection, demographic adaptation, and system capacity.The central argument is that financing pressure should be understood as a family of structural tensions rather than as a single measurable condition. In one system, pressure may appear as long waits and unmet needs despite high spending. In another, it may appear as persistent household payment, underfunded public provision, or a public-private divide that reproduces unequal access. Elsewhere, the dominant pressure may come from ageing and workforce demand rather than from exclusion per se. A five-country cross-continental comparison makes those distinctions visible.The article therefore asks a focused question: what do the most recent official indicators suggest about financing pressure, demographic change, and the public-private mix in five selected health systems, and what comparative lessons follow from these patterns?

Analytical Framework and Methods:-

Study design:-

This study used a descriptive and interpretive secondary policy-analysis design. It did not attempt econometric causal identification and did not use patient-level or administrative microdata. Its aim was narrower and more policy-oriented: to test whether the latest official evidence from each selected country is consistent with a financing-pressure interpretation, and to show how the form of that pressure differs across systems.This design is appropriate for cross-national policy comparison because the units of analysis are health-system architectures rather than individuals or institutions. The purpose is not to estimate effect sizes, but to identify patterned differences in how expenditure effort, financing structure, demographic intensity, and service capacity interact in differently organised systems.

Case-selection criteria:-

The five cases were selected purposively using five explicit criteria. First, each country had to represent a recognisable national health-system model with broad or universal-coverage aspirations. Second, the set had to include geographic dispersion across continents in order to avoid a single-region comparison. Third, the cases had to exhibit variation in financing architecture, ranging from tax-funded and social-insurance systems to more segmented arrangements. Fourth, recent official indicators had to be available from authoritative and reproducible sources. Fifth, the final set had to maximise contrast in the dominant expression of financing pressure, so that the comparison would be analytically informative rather than repetitive.Canada was selected as a high-income universal system with high spending yet visible access bottlenecks. Brazil was selected as a constitutional universal system in a middle-income setting where the public core coexists with meaningful private and household financing. Japan was selected because it combines strong universal insurance with exceptional ageing pressure. Germany was selected as a mature, high-spending social-insurance system in which sustainability is the primary policy concern. South Africa was

selected as an African case of pronounced public-private segmentation in transition toward National Health Insurance.

Analytical dimensions and indicator harmonization:-

Five analytical dimensions were used. First, expenditure level or expenditure effort, because nominal spending remains an important but insufficient signal of system commitment. Second, health expenditure as a share of gross domestic product, because it places spending within a macroeconomic frame. Third, the public-private financing mix, including mandatory prepayment, government expenditure share, or out-of-pocket burden, depending on the structure of the source data. Fourth, demographic pressure, captured through recent indicators on the population aged 65 years and older. Fifth, service-capacity strain, interpreted through official evidence on unmet needs, waiting times, public-sector load, or other capacity markers reported by authoritative sources.Because the latest official indicators are not synchronised to a single year across all countries, the study uses a transparent harmonisation rule rather than imposing false equivalence. For each country, the latest official value available from the most authoritative source family used in the article was retained. The reference year is stated in the table whenever a metric is not aligned across countries. The dataset should therefore be read as a structured comparative snapshot rather than as a fully synchronised panel.

To improve cross-case transparency, the article distinguishes between comparable core indicators and contextual indicators. Comparable core indicators are expenditure as a share of GDP and the scale of the population aged 65 years and older. Contextual indicators are those that capture financing architecture in source-appropriate form, such as mandatory prepayment in OECD profiles, out-of-pocket burden in Brazil, and the government share of health expenditure in South Africa. This distinction avoids overstating metric equivalence where source architectures differ.

Descriptive comparative coding:-

To move beyond purely narrative comparison without claiming statistical inference, the article introduces a simple descriptive coding strategy. Each case is interpreted across four domains: spending effort, financing vulnerability, demographic intensity, and capacity strain. Each domain is coded qualitatively as low, moderate, or high on the basis of the official evidence presented in the country case and the harmonised overview table.This coding is not a weighted index and should not be read as a formal ranking model. Its purpose is narrower: to make explicit how the same analytical dimensions combine differently across the five cases. The coding therefore functions as a structured interpretive aid that strengthens reproducibility while remaining faithful to the policy-analysis design.

Sources and ethics:-

The empirical base was drawn from official sources rather than secondary commentary wherever possible. OECD Health at a Glance country notes were used for Canada, Japan, and Germany. PAHO's Health in the Americas country profile was used for Brazil. World Bank Data indicator pages drawing on internationally harmonised health-expenditure and demographic series were used to supplement Brazil and to structure the South Africa case. South African government sources were used to capture the policy logic of National Health Insurance and the persistence of a dual-system structure.No human participants were recruited and no identifiable personal data were used. Ethical approval was therefore not required.

Conceptual Framework:-

Figure 1 makes explicit the conceptual logic of the study. Financing pressure is treated as an observed outcome that emerges at the intersection of financing architecture, demographic pressure, and service-capacity mediators. This framework clarifies why countries with similar expenditure levels may nonetheless face different policy problems.
The model is intentionally parsimonious. It does not claim that all causal pathways are exhausted, but it does provide an explicit conceptual map that links the article's country narratives to a common analytical structure.

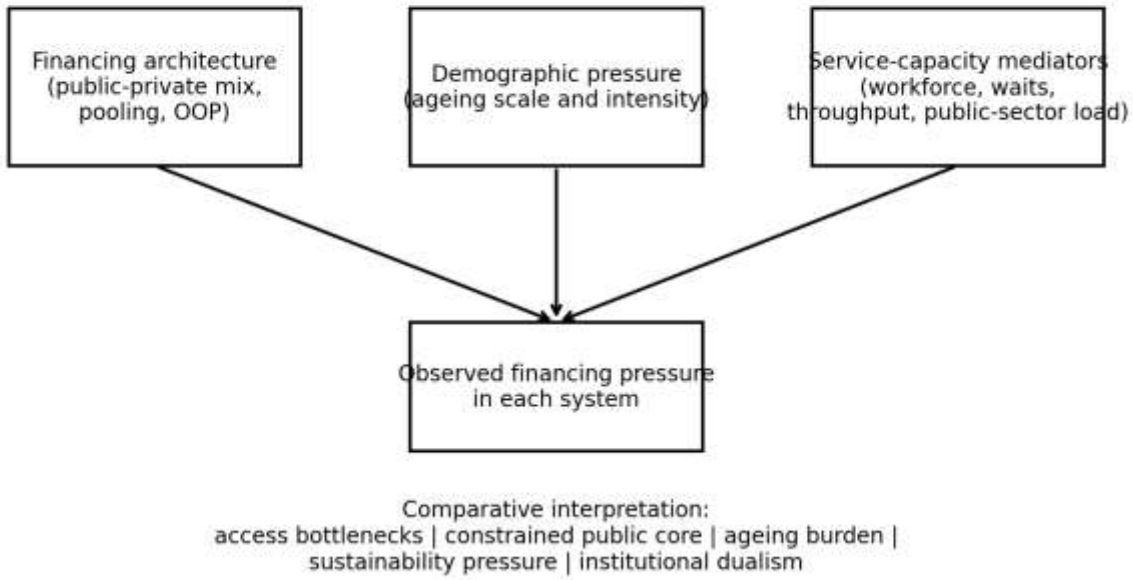

Figure 1. Conceptual framework linking financing architecture, demographic pressure, and service-capacity strain.

Comparative Overview:-

As a limited descriptive supplement to the narrative comparison, the article also reports two simple cross-case statistics based on the harmonised overview. Across the five cases, the gap between the highest and lowest health-expenditure share of GDP is 3.39 percentage points (12.3% in Germany versus 8.91% in South Africa), while the Pearson correlation between expenditure share of GDP and the absolute size of the population aged 65 years and older is weak and positive ($r = 0.20$). Given the very small number of cases and the structural differences between countries, these calculations are illustrative only. Their main value is to reinforce the article's argument that demographic scale alone does not explain the form or intensity of financing pressure.Table 1 presents the harmonised comparative snapshot used throughout the country cases. Figures 2-4 visualise the two most comparable quantitative dimensions in the article: health expenditure as a share of GDP and the demographic scale of the population aged 65 years and older. Because the underlying official series are not fully synchronised across countries, the exhibits are descriptive rather than econometric and should be read as structured comparative evidence.

Table 1. Harmonised comparative indicators used in the five-case comparison.

Country	Continent	Architecture	Spending	Financing signal	Demography	Core tension
Canada	North America	Universal core coverage	11.3% GDP	70% mandatory prepayment	8.17M aged 65+ (2024)	Access bottlenecks despite high spending
Brazil	South America	SUS universal system + private coexistence	4.5% public-health GDP (2021); 9.73%	OOP 22.65% of total health spending (2021)	23.42M aged 65+ (2024)	Universalism with a constrained public core

			CHE/GDP (2023)			
Japan	Asia	Universal social insurance	10.6% GDP	85% mandatory prepayment	36.92M aged 65+; about 30% of population	Strong protection under extreme ageing pressure
Germany	Europe	Universal insurance with strong social-insurance core	12.3% GDP	86% mandatory prepayment	19.37M aged 65+; about 23% of population	Sustainability and cost-containment pressure
South Africa	Africa	Dual public-private system; NHI transition	8.91% GDP (2023)	Government share 61.61%; OOP 6.69%; about 84% use public facilities	4.28M aged 65+; about 7% of population	Parallel systems and uneven capacity

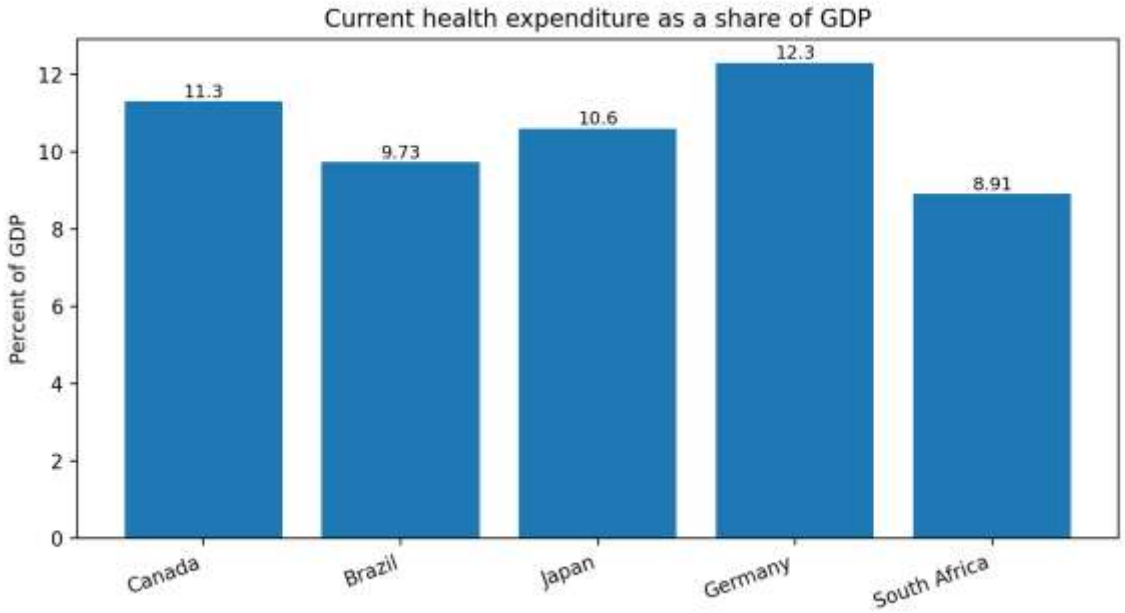

Figure 2. Current health expenditure as a share of GDP in the five study countries.

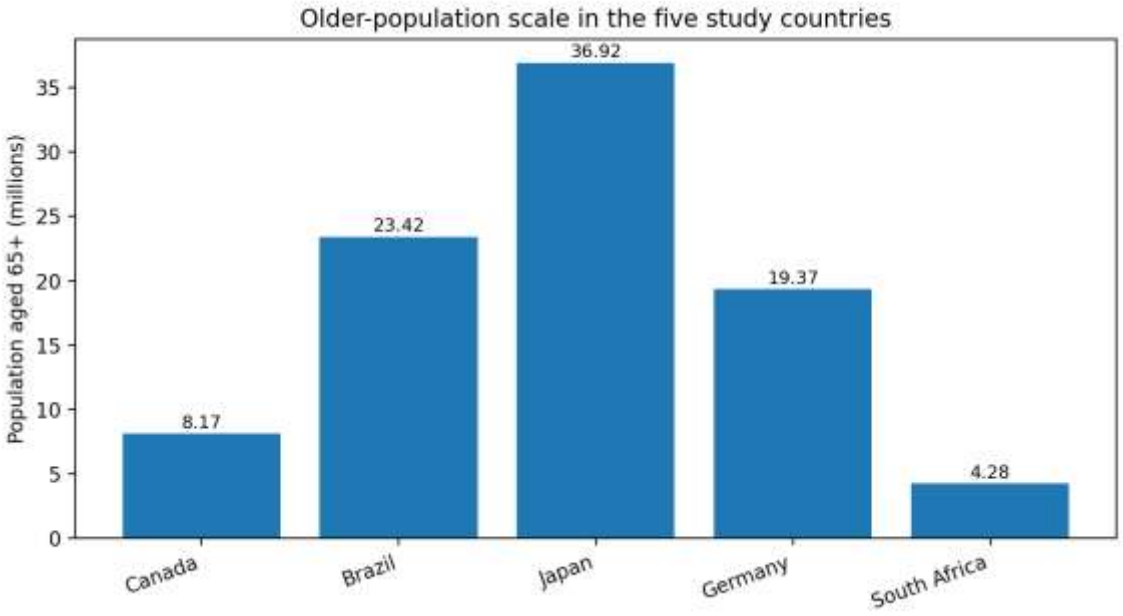

Figure 3. Population aged 65 years and older in the five study countries (millions).

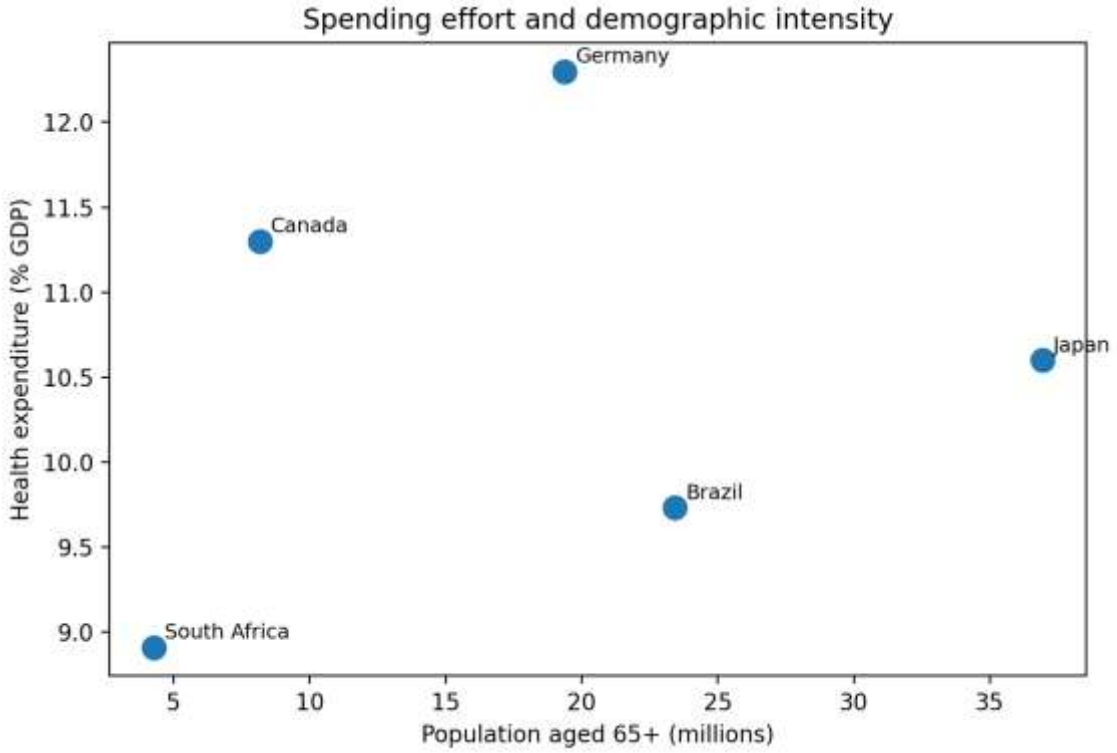

Figure 4. Spending effort and demographic intensity: descriptive scatter of expenditure and older-population scale.

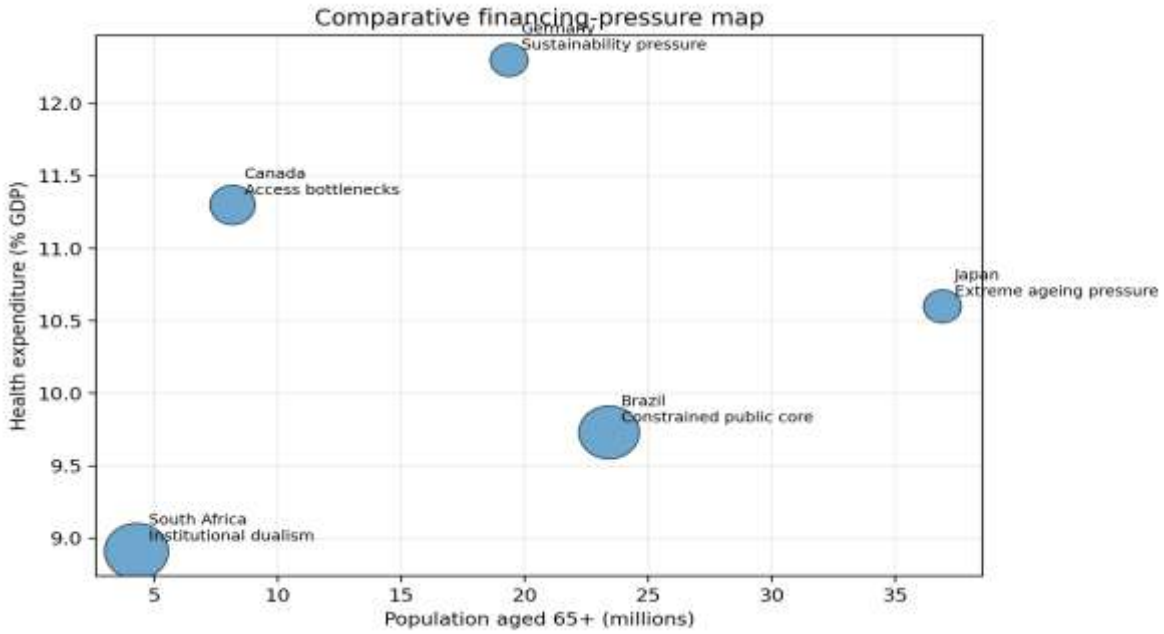

Figure 5. Comparative financing-pressure map combining spending effort, demographic scale, and the dominant qualitative pressure profile.

Table 2 summarises the descriptive coding strategy used to convert the country narratives into a more explicit cross-case profile.

Country	Spending effort	Financing vulnerability	Demographic intensity	Capacity strain	Dominant pressure type
Canada	High	Moderate	Moderate	High	Access bottlenecks within a high-spending universal system
Brazil	Moderate	High	Moderate	Moderate	Universal entitlement with a constrained public core
Japan	High	Low	High	Moderate	Strong protection under extreme ageing pressure
Germany	High	Low	High	Moderate	Sustainability pressure in a generous insurance model
South Africa	Moderate	High	Low	High	Institutional dualism and uneven capacity

Table 2. Descriptive cross-case coding used to strengthen analytical integration.

Country Cases:-

Canada: High spending, universal coverage, and persistent access bottlenecks:-

Canada is frequently treated as a paradigmatic tax-funded universal system, and in formal coverage terms that description remains broadly correct. OECD reports that the entire population is covered for a core set of services. Canada also spends heavily by international standards: health expenditure reached 11.3% of GDP, and spending per capita remained above the OECD average. These figures might suggest a comfortably financed system. Yet that is not the whole story (OECD, 2025).The key financing signal in Canada is not only the level of spending but the way spending translates into access. OECD reports that 70% of spending is covered by mandatory prepayment, below the OECD average, and that 9.1% of people expressed unmet healthcare needs, compared with an OECD average of 3.4%. This gap matters analytically because it indicates that a high-spending universal system may still display operational strain. Financing pressure in Canada is therefore better understood as an access and capacity problem within a system that is publicly legitimate but organisationally stretched.

Demographic pressure intensifies that interpretation. According to the World Bank population series, more than 8.17 million Canadians were aged 65 years and older in 2024. This ageing trend increases demand for chronic disease management, long-term care, and workforce-intensive services. The Canadian case demonstrates that high aggregate expenditure does not automatically eliminate bottlenecks.Country-specific policy implication: the managerial priority is not primarily expansion of formal coverage, but conversion of expenditure into timely access through workforce planning, throughput management, community-care strengthening, and improved coordination between hospital and non-hospital services.

Brazil: Universal entitlement with a constrained public core:-

Brazil's Unified Health System (Sistema Unico de Saude, SUS) is one of the most important constitutional universal-health arrangements in the Global South. It provides an especially valuable case for a financing-pressure analysis because it combines strong normative commitment with longstanding questions about the fiscal strength of the public core. PAHO reports that public expenditure on health in Brazil accounted for 4.5% of GDP in 2021, while out-of-pocket spending represented 22.65% of total health expenditure. World Bank expenditure data also place current health expenditure in Brazil at 9.73% of GDP in 2023, confirming that the country is not a low-spending case in aggregate terms.The important analytical point is that total expenditure does not settle the adequacy question. Brazil's financing profile suggests that a universal system can exist alongside a meaningful household burden and a constrained public core. In such a setting, financing pressure is expressed less through the absence of entitlement than through the risk that formal rights outpace the fiscal and organisational capacity needed to maintain them over time.

According to the World Bank population series, Brazil had approximately 23.42 million people aged 65 years and older in 2024. That is a substantial older population in a country already managing regional inequality, epidemiological diversity, and the need for broad territorial provision.Country-specific policy implication: the most relevant reform priority is not rhetorical recommitment to universalism, but stronger public budget commitment, improved pooling, and measures that reduce household exposure while preserving territorial reach.

Japan: Strong public financing under extreme ageing pressure:-

Japan is often cited as a high-performing universal system, and the latest OECD profile reinforces that view. OECD reports that all residents are covered for a core set of services and that 85% of spending is financed through mandatory prepayment, higher than the OECD average. Total health expenditure reached 10.6% of GDP. On a narrow financing reading, Japan therefore appears stronger than many other systems in this comparison.Yet the Japanese case illustrates a different form of structural pressure. The dominant challenge is not a weak financing architecture or a large household-payment burden. It is the extraordinary demographic intensity with which a comparatively strong public financing model must now contend. According to the World Bank population series, Japan had about 36.92 million people aged 65 years and older in 2024, and roughly 30% of the population fell into that age group.

This matters because ageing changes the meaning of adequacy. A system can remain broadly universal, well financed, and publicly legitimate while still experiencing increasing pressure to reallocate resources, redesign care pathways, and expand labour-intensive services.Country-specific policy implication: Japan's priority is long-term care capacity, workforce adaptation, age-friendly service redesign, and better integration between medical care and long-term support services.

Germany: A generous insurance model facing sustainability pressures:-
Germany represents the European case in this comparison because it combines universal core coverage, strong social-insurance traditions, and high overall spending. OECD reports that all residents are covered for a core set of services, that 86% of expenditure is financed through mandatory prepayment, and that health expenditure reached 12.3% of GDP. Compared with many health systems, Germany's financing profile points to a robust public or quasi-public core and comparatively strong financial protection.For that reason, Germany is analytically important precisely because its main challenge is not obvious exclusion. The relevant pressure is sustainability within abundance: how to maintain a generous, high-resource system while controlling cost growth, preserving workforce capacity, and managing population ageing. World Bank demographic data indicate that around 19.37 million people in Germany were aged 65 years and older in 2024, and that older people accounted for about 23% of the total population.

The German case therefore helps clarify a comparative distinction that can be lost in less precise discussions. Health systems do not all face the same kind of financing problem. In Germany, the question is less whether a public core exists than how it can remain fiscally and organisationally sustainable as costs, expectations, and age-related service demand continue to rise.Country-specific policy implication: Germany's most relevant management agenda is productivity improvement, cost containment, prevention of workforce shortages, and targeted redesign that protects solidarity while moderating contribution pressure.

South Africa: Dualism, uneven capacity, and the politics of integration:-
South Africa is the most institutionally distinct case in this comparison and the most important African case for demonstrating how public-private segmentation can become the central expression of financing pressure. The country is formally moving toward National Health Insurance, and official government materials present NHI as the route to universal health coverage and stronger financial risk protection. Yet the current system remains sharply divided between a heavily used public sector and a relatively privileged medical-schemes sector.Recent official South African sources describe this divide clearly. The Presidency stated in 2024 that about 84% of the population uses public health facilities while 16% are covered by medical schemes. A 2023 national guideline on patient waiting times likewise notes that demand for services in many establishments exceeds available capacity. At the same time, World Bank health-expenditure indicators show that current health expenditure in South Africa reached 8.91% of GDP in 2023, with domestic general government health expenditure accounting for 61.61% of current health expenditure and out-of-pocket spending accounting for 6.69%.

This combination is revealing. South Africa is not primarily a case of high out-of-pocket spending in the conventional sense. Nor is it simply a low-spending case. Its core tension is that substantial aggregate spending coexists with a deeply unequal institutional distribution of access, personnel, and infrastructure between the public and private sectors.Country-specific policy implication: the central reform task is pooling and purchasing integration, combined with public-sector strengthening and operational measures that reduce waiting times and other visible markers of uneven capacity.

Cross-Case Discussion:-
Viewed together, the five cases support four comparative propositions. First, expenditure level alone does not determine adequacy. Canada and Germany both spend a large share of GDP on health, yet their main pressures differ: Canada's problem is access and capacity translation, whereas Germany's is long-term sustainability within a generous insurance model.Second, the public-private mix matters even when formal entitlement is broad. Brazil demonstrates how universalism may remain exposed when household and private financing continue to play a strong role. South Africa demonstrates an even deeper version of the same problem: aggregate spending may coexist with sharply unequal institutional access where financing and service delivery are segmented.

Third, demographic pressure changes the meaning of financing adequacy. Japan and Germany show that ageing can become the dominant organising fact of health-system strategy, while Canada illustrates a milder but still important version of that dynamic. In these cases, financing pressure is expressed not only through budget shares, but also through workforce requirements, care redesign, and the difficulty of maintaining service capacity as the need for long-term and chronic care intensifies.Fourth, the same macro indicator may signal very different policy realities depending on institutional design. A similar percentage of GDP spent on health does not imply similar access, protection, or organisational resilience. That is why this article treats financing pressure as a relational concept rather than as a one-dimensional expenditure measure.

Table 3. Country-specific policy implications derived from the comparative analysis.

Country	Dominant pressure	Tailored policy implication
Canada	Access bottlenecks despite high spending	Expand workforce capacity, reduce waits, and improve conversion of expenditure into timely care.
Brazil	Constrained public core within universal entitlement	Strengthen public financing depth and reduce household exposure inside SUS.
Japan	Extreme ageing pressure within a strong financing model	Redesign care around long-term, chronic, and community-based needs.
Germany	Sustainability pressure in a generous insurance system	Improve productivity and cost control without weakening solidarity.
South Africa	Parallel public-private systems and uneven capacity	Advance pooling reform and strengthen the public delivery platform during NHI transition.

Limitations:-

This study remains a secondary policy analysis and therefore has limits that should be stated plainly. First, the comparison is based on the latest official values available rather than a fully synchronised panel year. Second, some financing indicators are structurally source-specific, which means that equivalence across countries is interpretive rather than perfectly metric. Third, the descriptive coding introduced here is intended to improve analytical transparency, not to substitute for formal index construction or causal modelling. Fourth, the study focuses on national-level architectures and cannot capture within-country regional heterogeneity in full depth.These limitations do not invalidate the comparison, but they do define its scope. The manuscript should therefore be read as a structured policy-analysis exercise designed to differentiate pressure types across systems, not as a definitive causal explanation of expenditure or performance outcomes.

Conclusion:-

This article has argued that financing pressure in health systems is best understood comparatively and structurally. The five cases examined here do not converge on a single diagnosis. Instead, they show that expenditure growth, financing mix, demographic change, and organisational capacity interact in different ways across institutional settings.The broader lesson is that health-policy analysis should move beyond the binary distinction between universal and non-universal systems. What matters just as much is whether the financing architecture keeps pace with the care needs generated by population ageing, epidemiological change, and rising service expectations, and whether resources are translated into accessible and timely care.The comparative contribution of this manuscript lies in showing that the same analytical framework - expenditure effort, financing mix, demographic pressure, and capacity strain - can illuminate five very different systems without collapsing their differences into a single ranking. For comparative health-policy scholarship, that is important because it shifts the question from who spends more to how different forms of pressure emerge inside differently organised systems.

Appendix A. Operationalisation of the comparative indicators:-

The table below makes explicit how each country contributes to the comparative design. It is included to reinforce methodological transparency and to show that the article's narrative claims are anchored in recurring observable indicators rather than in free-standing policy description.

Table A1. Indicator architecture, reference years, and source families.

Country	Spending indicator	Financing indicator	Demography indicator	Primary source family
Canada	Current health expenditure % GDP (latest OECD year used in article)	Mandatory prepayment share of health spending	Population aged 65+ total (2024)	OECD; World Bank
Brazil	Current health expenditure % GDP (2023) plus public expenditure context (2021)	Out-of-pocket share of total health expenditure (2021)	Population aged 65+ total (2024)	PAHO; World Bank
Japan	Current health expenditure % GDP (latest OECD year used in article)	Mandatory prepayment share of health spending	Population aged 65+ total and share of population (2024)	OECD; World Bank
Germany	Current health expenditure % GDP (latest OECD year used in article)	Mandatory prepayment share of health spending	Population aged 65+ total and share of population (2024)	OECD; World Bank
South Africa	Current health expenditure % GDP (2023)	Government share and out-of-pocket share of health spending (2023)	Population aged 65+ total and share of population (2024)	World Bank; South African government sources

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