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PRACTITIONER ARTICLE

The Tenfold Gap: A Mechanism-Level Analysis of Rwanda's COVID 19 Health System Performance.

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Rwanda maintained 4–5% disruption across key maternal and child health indicators during COVID-19, against a WHO global pulse survey mean of 50%; a tenfold performance differential at $803 GDP per capita. The standard explanation attributes this to "strong leadership" and "community health workers." This article dispute that explanation as insufficient for policy replication and identifies five specific governance mechanisms Rwanda had in place before March 14, 2020: 30 District Health Management Teams with real resource authority; imihigo performance contracts embedding service continuity in mayoral political accountability; DHIS2 eIDSR integration with district-level analytical capacity; a CHW-facility complementarity model with defined non-overlapping roles; and near-universal community health insurance enabling free service delivery through local channels. The analysis confronts the counter-evidence directly: the Habimana et al. (2021) finding that 13 of 15 MCH indicators declined in Rwanda during COVID-19, with some falling 35–80%. It explains the methodological difference, concludes that Rwanda's system failed in some dimensions and outperformed globally in others, and identifies which of the five mechanisms are context-specific to Rwanda's political architecture and which are portable.

1. THE OUTCOME: $803 GDP PER CAPITA, 4–5% SERVICE DISRUPTION

In a low-income country with $803 GDP per capita in 2020, Rwanda's health system maintained service disruptions of 4–5% across key maternal and child health indicators during COVID-19. The WHO First Pulse Survey (March–June 2020, 105 countries) documented a global mean of 50% of tracer services disrupted simultaneously. Same pandemic, same pathogen, same global supply chain disruptions, same absence of effective vaccines before late 2020. What pre-existing conditions, established before Rwanda's first confirmed COVID-19 case on March 14, 2020, drove this outcome?

The Amberbir et al. (2024, Annals of Global Health) interrupted time series analysis of Rwanda's national HMIS data, covering 504 health centres and 818 health posts from 2017 to 2020 is the primary quantitative source for the 4–5% disruption estimate. The Bhattacharya et al. (2024, Journal of Global Health) comparative analysis controls for income level and attributes Rwanda's differential performance explicitly to pre-existing institutional architecture, not to contextual advantages that cannot be replicated. The VanderZanden et al. (2024, Journal of Global Health) analysis, drawing on the same dataset and extending the comparison to Bangladesh, finds that the same institutional properties explain resilience across two low- and lower-middle-income country contexts simultaneously.

The scale of the differential requires restating. Rwanda achieved approximately one-tenth the health service disruption of the global mean, with a fraction of the resources available to high-income countries that performed worse. If the operative variable were resources, Rwanda's outcome would be impossible. The operative variable was architecture, and architecture is specifiable, investable, and replicable.

2. WHY 'STRONG LEADERSHIP' AND 'POLITICAL WILL' ARE NOT GOVERNANCE SPECIFICATIONS

The standard narrative on Rwanda's health system success invokes a short list of attributes: exceptional political leadership, high state capacity built over two decades of post-genocide reconstruction, near-universal health insurance, a strong community health worker program, and sustained external donor support. Each of these is true as a description. None of them is useful as a governance specification.

"Strong leadership" describes an outcome, not a mechanism. A policymaker in Guinea, Nigeria, or the Democratic Republic of Congo who reads that Rwanda succeeded because of strong leadership learns nothing actionable. **The question is not whether Rwanda had strong leadership. The question is what institutional architecture that leadership built, in what sequence, with what enabling conditions, that produced resilience as a structural property rather than a crisis-mode response.**

The same limitation applies to "community health workers" as an explanation. Rwanda had 58,000 CHWs before COVID-19. So do many other countries. The existence of a CHW program does not, by itself, explain a tenfold performance differential. The explanation lies in how Rwanda's CHW program was structured in relation to the facility tier above it; the role definition, the accountability cascade, the information system that connected CHW-level data to district-level decision authority. CHWs are a component of the architecture. They are not the architecture.

The five mechanisms described below are the architecture. Each is traceable to a specific institutional investment decision made before 2020. Each had a specific role in the COVID-19 response. And each can be evaluated for portability to different institutional contexts, including contexts without Rwanda's political structure.

3. THE FIVE MECHANISMS: WHAT WAS BUILT, WHEN, AND WHAT IT DID

MECHANISM 01: 30 DISTRICT HEALTH MANAGEMENT TEAMS WITH REAL RESOURCE AUTHORITY

Built: Progressive devolution of district governance authority from 2000 through the 2005 decentralization reform. **Mechanism:** Each of Rwanda's 30 administrative districts had a DHMT with genuine operational authority over budget allocation, provider accountability, and service delivery coordination, not advisory status. **COVID-19 role:** All 30 activated District Command Posts within days of the first confirmed case on March 14, 2020. District mayors activated Rapid Response Teams under pre-existing protocols without central authorization. **Evidence:** Bhattacharya et al. (2024, Journal of Global Health); Amberbir et al. (2024, Annals of Global Health)

The critical distinction is between advisory authority and operational authority. Many countries have district health offices. Few give them real resource management power with genuine accountability for outcomes. Rwanda's post-2005 decentralization explicitly transferred budget authority, personnel management, and service delivery coordination to the district level with accountability mechanisms (described below) that created consequences for non-performance. When COVID-19 arrived, this was not a new structure being activated under emergency conditions. It was the existing operating architecture, which had been managing routine health service delivery for 15 years.

MECHANISM 02: IMIHIGO PERFORMANCE CONTRACTS EMBEDDING SERVICE CONTINUITY IN MAYORAL POLITICAL ACCOUNTABILITY

Built: Formalized as part of the Rwandan governance architecture from 2006; health service delivery indicators incorporated progressively through subsequent annual cycles. **Mechanism:** Annual performance contracts between district mayors and the central government, including measurable health service delivery targets. Non-performance carries explicit political consequences at the mayoral level, creating incentive alignment between political authority and health outcomes. **COVID-19 role:** Maintained service delivery targets throughout COVID-19. The combination of political accountability at mayoral level with operational authority at DHMT level created a two-layer incentive structure that functioned continuously during the pandemic. **Evidence:** Mugiraneza et al. (2025, BMC Health Services Research); SPARC Africa (2021)

The imihigo system is the governance mechanism most frequently misunderstood in analyses of Rwanda's health system. It is not a public health tool. It is a political accountability tool that incorporates health service delivery targets. This distinction matters for replicability: the mechanism works in Rwanda because it is embedded in a political architecture with a strong executive, high state capacity, and measurable political consequences for non-performance at the mayoral level. The accountability stacking district mayor accountable to the president; DHMT accountable to the mayor; facilities accountable to the DHMT, creates a cascade in which health service delivery failure has political visibility at the highest level of government.

TRANSFERABILITY CAVEAT

The imihigo system is the least portable of the five mechanisms. It requires a strong executive, high state capacity, and measurable political consequences for non-performance; and conditions that most FCAS settings do not have. Rwanda is an existence proof that accountability stacking is achievable in a low -and-middle income country. It is not a governance template for direct replication without contextual adaptation. Alternative incentive alignment models for contexts without strong executive authority are documented: NGO-led performance contracting in Honduras produced 33–68% MCH service utilization increases at identical resource levels (Zarychta, 2020; Root et al., 2020).

MECHANISM 03; DHIS2 EIDSR INTEGRATION WITH DISTRICT-LEVEL ANALYTICAL CAPACITY

Built: DHIS2 deployed nationally from 2012; eIDSR (Electronic Integrated Disease Surveillance and Response) integrated from 2014; district-level analytical capacity built through progressive training cycles. **Mechanism**: Single national surveillance platform connecting facility-level reporting to district dashboards in near real-time. District health officers had analytical access to their own data; not a national dashboard visible only at central level. **COVID-19 role**: DHIS2 served as the routine monitoring infrastructure during COVID-19, providing district-level visibility on service delivery trends across all 25 tracer indicators. The same system that tracked routine health service delivery tracked COVID-19's impact on that delivery. **Evidence:** Amberbir et al. (2024): HMIS data from 504 health centres and 818 health posts; Babili et al. (2023, Frontiers in Digital Health): SMS-based home-based care program; Omorou et al. (2024, JMIR mHealth): e-ASCov CHW screening application.

The key architectural feature is district-level analytical access. Many countries have national DHIS2 deployments where data flows to a central dashboard visible to ministry staff. Rwanda's design distributed analytical access to the district level; meaning that the DHMT leaders who had resource management authority also had the data required to exercise it. Information and authority were held at the same governance level. During COVID-19, this meant that service delivery trends were visible to decision-makers with the power to respond, not aggregated to a level where response decisions required re-routing back down through administrative channels.

MECHANISM 04: CHW-FACILITY COMPLEMENTARITY MODEL WITH DEFINED NON-OVERLAPPING ROLES

Built: CHW program established at scale from 2004–2007; community-facility role definition formalized through successive policy cycles. **Mechanism:** Each of Rwanda's approximately 58,000 CHWs had a specific defined role in community surveillance, malaria case management, maternal care follow-up, and during COVID-19, screening that was non-overlapping with facility-tier functions. CHWs were not a backup for facilities; they were a defined parallel delivery tier. **COVID-19 role:** CHWs continued routine community-level functions during COVID-19 when facility utilization dropped. The community tier sustained coverage for services that would otherwise have been lost to facility avoidance. CHW-based COVID-19 screening was operationalized through a dedicated mHealth application (e-ASCov) deployed to CHWs at scale. **Evidence:** Niyigena et al. (2022, BMJ Open): 292 CHWs, three districts, stratified survey

The distinction between CHW programs and CHW-facility complementarity is specific and important. A CHW program delivers some health services at community level. A complementarity model defines, in advance, which services are delivered at which tier and ensures that the two tiers do not duplicate or substitute for each other in ways that create perverse incentives or accountability confusion. Rwanda's model assigned CHWs to community-level functions, in surveillance, referral, basic case management, maternal follow-up while facilities handled diagnosis, treatment, and complications. During COVID-19,

when facility utilization fell because community members feared COVID-19 exposure at health centres, the community tier continued functioning. The redundancy was designed, not improvised.

MECHANISM 05: NEAR-UNIVERSAL COMMUNITY HEALTH INSURANCE ARCHITECTURE

Built: Mutuelle de Santé (community-based health insurance) scaled nationally from 2004–2010; formal integration with district health financing architecture progressively strengthened. **Mechanism:** Near-universal community health insurance coverage enabling free or near-free service delivery at point of contact for insured populations. Community-level premium collection mechanisms created financial flows that bypassed facility user-fee barriers without requiring central subsidy for each individual transaction. **COVID-19 role:** Insurance coverage maintained service accessibility when economic contraction would otherwise have produced utilization drops. Community members had a pre-paid claim on health services that did not require cash payment at the point of crisis, reducing the financial barrier to facility and CHW utilization during lockdown. **Evidence:** Counter-argument 03 in the full report acknowledges near-universal health insurance as a pre-existing condition; Bhattacharya et al. (2024) control for income level but not insurance coverage explicitly.

4. THE COUNTER-EVIDENCE CONFRONTED: WHAT THE HABIMANA ET AL. DATA SHOWS

The Habimana et al. (2021) working paper, published by the African Economic Research Consortium, found that 13 of 15 MCH indicators significantly decreased in Rwanda during COVID-19, with facility deliveries declining approximately 10% and some indicators falling 35–80%. This finding is in apparent tension with the Amberbir et al. (2024) finding of 4–5% disruption that anchors the Rwanda case in this report. A rigorous analysis requires confronting this directly rather than citing only the favorable data.

The methodological explanation for the divergence has three components. **First,** the two studies measure different outcome constructs: Amberbir et al. measure disruption relative to counterfactual trend that is, deviation from the expected trajectory based on pre-COVID trend lines, which adjusts for Rwanda's ongoing service utilization growth. Habimana et al. measure absolute indicator values at a point in time during COVID-19 against a prior reference period. A system that was growing at 5% per year and grew only 0.5% during COVID-19 shows 4.5 percentage points of "disruption" in the first framing and a "decline" in the second if the reference period pre-dates the growth trajectory.

Second, the studies cover partially different indicator sets and time periods. The Amberbir et al. ITSA covers national HMIS data from 504 health centres and 818 health posts with a pre-period from 2017; the Habimana et al. analysis uses a different reference period and methodology. The indicator-specific findings are not directly comparable without access to both underlying datasets.

Third, and most important for interpretation: both findings can be simultaneously true. Rwanda's health system did experience disruptions during COVID-19; meaningful ones, documented in 13 of 15 MCH indicators. And Rwanda's health system experienced far smaller disruptions than the global average on the same dimensions, because the five governance mechanisms described above were functioning. The appropriate conclusion is not "Rwanda had no disruption" but rather "Rwanda had less disruption than comparators, attributable to identifiable governance mechanisms, despite documented failures in the CHW supply chain and supervision architecture."

The CHW data from Niyigena et al. (2022), a stratified survey of 292 CHWs across three districts during the July 2020 lockdown provides the most precise documentation of where the system failed: 60.9% of CHWs reported stockouts of essential medicines, supplies reduced from 47.9% to 30.6% of antibiotics reported available. Only 24% of CHWs received three or more supervision visits during the period, below the threshold considered adequate for quality assurance. These are genuine failures. They co-existed with a tenfold performance advantage relative to the global mean. The co-existence of failure and comparative resilience is the finding, not a contradiction.

5. WHAT IS PORTABLE AND WHAT IS NOT

The five mechanisms vary substantially in their dependence on Rwanda's specific political architecture. Understanding this variation is the most practically important analytical contribution for program designers.

MECHANISM	CONTEXT-SPECIFICITY	PORTABILITY ASSESSMENT	ALTERNATIVE IN OTHER CONTEXTS
DHMTs With Real Resource Authority	Low — the mechanism is institutional design, not politically specific	High — district health boards with genuine policy authority can be established in most decentralizing systems, conditional on governance threshold adequacy (IMF Working Paper, Nakatani et al., 2022)	Civil society-led district health committees; NGO coordination boards with performance contracting
Imihigo Performance Contracts	High — requires strong executive, high state capacity, political consequences for non-performance	Low direct transfer — the mechanism is embedded in Rwanda's specific political architecture; the principle (accountability stacking) is portable, the instrument is not	NGO performance contracting (Honduras model); conditional transfers with civil society monitoring; community scorecards
DHIS2 eIDSR With District-Level Access	Low — technical platform is context-independent	High — 76 countries globally have active DHIS2 deployments; the design choice is distributing analytical access to the district level, not retaining it centrally	Open-source platform replicable; the architectural choice (district-level access vs. central dashboard) is a design decision within any DHIS2 deployment
CHW-Facility Complementarity Model	Moderate — requires pre-existing CHW program at scale and sustained investment in role definition and scope-of-practice governance	Moderate — the principle (defined non-overlapping roles) is portable; the implementation requires deliberate policy architecture over multiple program cycles	Task-shifting frameworks; integrated community case management (iCCM) with facility-referral linkages
Near-Universal Community Health Insurance	Moderate-High — requires sustained investment over a decade at scale; community premium collection requires functional local governance	Low-Moderate — building community health insurance at scale is a multi-decade investment; the portability is in the principle (removing user-fee barriers at point of crisis), which can be achieved through emergency fee waivers or targeted voucher programs	Emergency user-fee removal (documented in 14% of countries during COVID-19 per WHO First Pulse Survey); targeted voucher programs; government direct transfer to facilities

The portability assessment above produces a practical implication for program designers. Three of the five mechanisms: DHMT authority, DHIS2 district-level access, and CHW-facility role definition are replicable in most settings given adequate governance threshold investment. One imihigo is not directly replicable but has alternative instruments that produce comparable accountability stacking effects in different political contexts. One community health insurance is a long-term investment with near-term alternatives available for the specific crisis-period function it serves.

Rwanda is, as this analysis has established, an existence proof, demonstrating that a low-income country can achieve tenfold-better health service continuity during a global pandemic through governance architecture rather than resource advantage. It is not a replication template. The mechanisms are replicable. The specific political context in which they operate is not.

The standard Rwanda narrative "strong leadership" and "community health workers" is not wrong. It is **insufficiently specified** to produce the replication it implies. The five mechanisms described in this analysis provide the specification. Whether those mechanisms can be built, in what sequence, with what enabling conditions, in a specific country context is the implementation question that this analysis raises but cannot answer without that context. That question is what program design is for.

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