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The transformation of the health system in Rwanda – from reconstruction to universal healthcare

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A – Development of the concept and methodology of the study; B – Query – a review and analysis of the literature; C – Submission of the application to the appropriate Bioethics Committee; D – Collection of research material; E – Analysis of the research material; F – Preparation of draft version of manuscript; G – Critical analysis of manuscript draft version; H – Statistical analysis of the research material; I – Interpretation of the performed statistical analysis; K – Technical preparation of manuscript in accordance with the journal regulations; L – Supervision of the research and preparation of the manuscript

Abstract

Introduction and Aim. The health system in Rewanda is often cited as an instructive case of post-conflict reconstruction in Sub-Saharan Africa. After the 1994 genocide, its infrastructure was damaged and much of its medical workforce lost. This review describes the reforms, focusing on financing, primary health care and community health workers (CHWs).

Materials and methods. A structured narrative review. Literature from 2018 to 2025 was searched in PubMed, Scopus and Web of Science databases, with reference-list screening and targeted retrieval. Screening was not duplicated and no formal quality assessment was undertaken. Indicator data came from UN and WHO estimates and Rwandan national statistics. Of 41 publications included, 24 report original analyses and 8 are evidence syntheses. All 41 were grouped into five themes: reconstruction, financing, primary health care, CHWs and emerging challenges.

Brief summary of current knowledge. Over three decades Rwanda has extended access through decentralisation, community-based health insurance (CBHI) and primary health care, with CHWs delivering much preventive and basic care in rural areas. Maternal and under-five mortality fell steeply over the same period, although this study cannot identify which reform produced which outcomes. The outcomes are uneven, and financing, non-communicable diseases, ageing and workforce capacity remain unresolved.

Summary. Rwanda's experience is consistent with the view that financing reform, primary care and community engagement can support recovery and progress toward Universal Health Coverage (UHC). How far it translates depends on the political settlement, administrative capacity and external support.

Keywords: Rwanda, universal health insurance, primary health care, health care reform, community health workers, health policy.

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INTRODUCTION

Rwanda's health system is widely discussed as a case of far-reaching health sector reconstruction in sub-Saharan Africa. The 1994 genocide left its infrastructure, medical workforce and administrative structures severely disrupted [1,2]. Over the following three decades the country rebuilt the system around universal access and community participation [2,27].

A key element of this transformation was the introduction of a universal health insurance system (Community-Based Health Insurance, CBHI), known as Mutuelles de Santé, which has become the foundation of healthcare financing in the country since the beginning of the 21st century [3,6,41]. CBHI is associated with greater use of services and lower out-of-pocket spending, but it continues to face problems of long-term financial stability [3,7,9,23].

Rwanda also invested in primary health care (PHC) and local infrastructure, integrating services with preventive and educational programmes [11,12]. Between 2000 and 2020 under-five mortality fell by more than 70%, although no causal link is established here (Figure 1A). Community health workers (CHWs) deliver basic services, maternal and child care and health education in the community [14,15].

Rwanda is frequently cited in debates on how low- and middle-income countries might pursue Universal Health Coverage (UHC) [16,17], and its experience is read as showing what sustained political commitment and community engagement can achieve on a small budget [2,41]. As attention turns to population ageing, non-communicable diseases (NCDs) and mental disorders, for which the available evidence is limited and largely cross-sectional, the system's future depends on strengthening primary health care, developing the health workforce and keeping CBHI solvent [18,19].

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AIM OF THE STUDY

This review describes how Rwanda rebuilt its health system after 1994. It covers the reconstruction of institutions, the introduction of CBHI, the development of primary health care and the part CHWs played in securing access to services. It summarises what has been achieved and what remains difficult as Rwanda pursues UHC.

MATERIALS AND METHODS

Review design

This article is a structured narrative review. It was not designed, conducted or reported as a systematic review or as a scoping review, and no reporting guideline for systematic reviews was applied. We set out to map the main directions of health system reform in one country across five thematic domains, an aim that does not require the exhaustive evidence base a systematic review is built on. Our search was therefore selective, and section 5.7 sets out the limitations this creates.

Literature search

Literature published between January 2018 and October 2025 was searched in PubMed, Scopus and Web of Science databases, with the final search in November 2025. Two further methods were used. The reference lists of included publications were screened, and a small number of items known to the authors were retrieved by targeted searching. These yielded the four included publications not retrieved from the three databases: two in journals are indexed in neither of them, one working paper and one conference abstract without a PubMed record. The following English-language terms were combined: Rwanda, health system, health care reform, primary health care, universal health coverage, community-based health insurance, community health workers, and health policy. Eligible items were English-language full-text publications addressing the development, financing or organisation of the Rwandan health system after 1994, or providing comparative or regional context.

The WHO Global Health Observatory is a repository of routinely collected and modelled indicators, not a bibliographic database, and was used only for the Maternal Mortality Estimation Inter-Agency Group series presented in Figure 1B. Three further indicator sources were used the same way and are named where they appear rather than in the reference list: the UN Inter-agency Group for Child Mortality Estimation (Figure 1A), the National Institute of Statistics of Rwanda (Figure 1C) and the Rwandan Ministry of Health Annual Health Statistical Booklet for 2023-2024, the source of the workforce figure in section 4.4. None is counted among the 41 publications.

Selection of publications and the resulting evidence base

We screened records initially on title and abstract and then on full text. There was no blinded duplicate screening and no formal instrument for borderline cases. Where eligibility or thematic placement was unclear, we settled it by discussion. Publications retrieved, screened and excluded at each stage were not counted prospectively, and no flow diagram is presented.

The basis of this review consists of forty-one publications, and they vary widely in type. Twenty-four report original analyses of primary or secondary data: twenty-two empirical studies, one financial modelling analysis and one International Monetary Fund working paper, which reports an original econometric analysis but which its publisher states is not peer reviewed. Eight are evidence syntheses: three systematic reviews, one with a meta-analysis, two scoping reviews and three narrative reviews. Four are policy analyses or case studies. The remaining five carry no original findings: two letters to the editor, two study protocols and one conference abstract, used for contextual framing only. Supplementary Table 1, provided as a separate file with the online version of this article, lists the author and year, publication type and design, setting and population, data source, thematic domain, principal findings and author-stated limitations of every publication.

The 41 publications differ in how much weight they can attach to them. Nine appear in journals outside MEDLINE, two of them are not indexed in neither Scopus nor Web of Science, and Table 1 lists the status of each. The working paper was not peer reviewed, but with 26,195 households across three survey rounds, it remains among the largest analyses of CBHI and household spending in Rwanda. A study protocol and its results paper describe the same cohort and are counted once in the assessment of evidence on population ageing.

Quality assessment and synthesis

We did not appraise the included publications with a formal instrument. No single tool covers the range of designs here, and several publications are policy analyses or descriptive accounts to which risk-of-bias tools do not apply. Table 1 lists the design, data source and author-stated limitations of every publication instead, and the Discussion distinguishes empirical findings from descriptive or commentary sources throughout. We note this as a limitation in section 5.7.

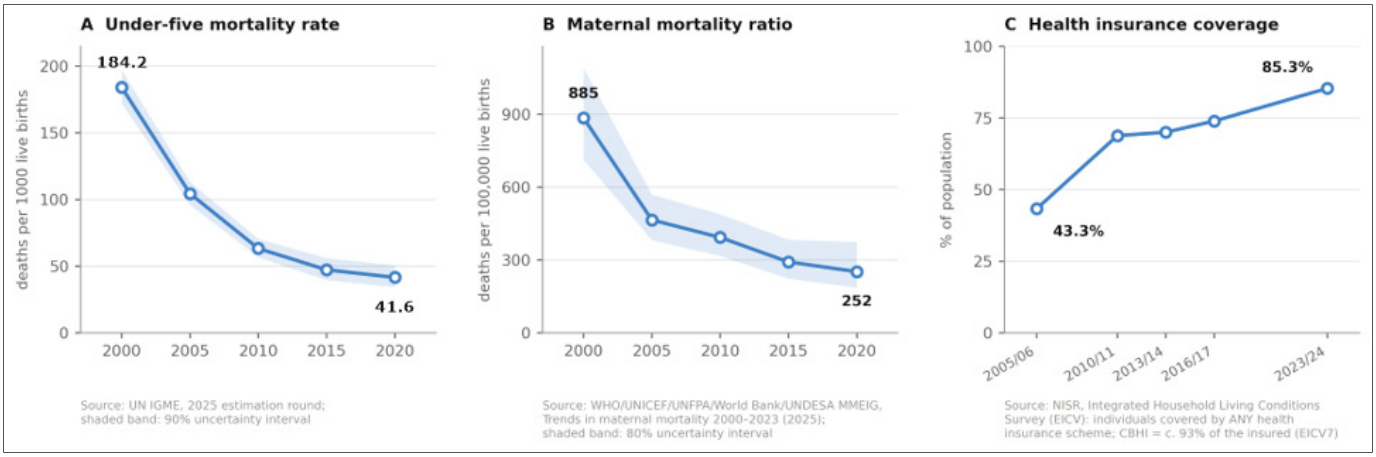


FIGURE 1. Trends in selected population health and coverage indicators in Rwanda.

TABLE 1. Characteristics of the 41 publications included in the review.

No.	Author, year	Publication type and design	Setting and population	Data source	Domain	Principal findings	Author-stated limitations
1	Uwishema et al., 2025	Letter to the editor [not MEDLINE -indexed. PubMed type: Letter. 3 pp., no abstract or methods]	Rwanda, national. No study sample	Secondary literature	Reconstruction	Descriptive account of system collapse after 1994 and of reconstruction via CBHI and the CHW programme. Contains no numerical data.	Not stated
2	Selden et al., 2025	Narrative review [journal not indexed in PubMed/Scopus/ Web of Science]	Rwanda, national	Literature (Google, PubMed 2000-2023) and NISR statistical yearbooks	Reconstruction	Reports insurance coverage rising from 43.3% (2005/06) to 97.3% (2022) and mean travel time to a health centre falling from 95.1 to 47.4 min (2005-2018).	Not stated
3	Nyandekwe et al., 2020	Original empirical study. Mixed-methods, longitudinal 2011-2018	Rwanda, national. 15 districts, 60 CBHI sections	Administrative data (RSSB, MoH, MINECOFIN, National Bank)	Financing /CBHI	Identifies five threats to CBHI financial sustainability: disproportionate risk equalisation, unit costs exceeding individual income, imperfect resource mobilisation, cost escalation and diseconomies of scale.	Views of health providers on the proposed payment mechanisms were not collected.
4	Umuhoza et al., 2022	Original empirical study. Qualitative/ mixed, Strategic Health Purchasing framework	Rwanda, national. CBHI, RSSB and performance-based financing	Secondary and primary data, Sept 2020–Mar 2021	Financing /CBHI	Progress in strategic purchasing is offset by overlapping functions that weaken purchasers' capacity to improve resource allocation. Open-ended fee-for-service payment in CBHI undermines financial sustainability.	Not retrievable (full text behind paywall)
5	Uwishema, 2023	Letter to the editor [PubMed type: Letter. 2 pp., no abstract]	Rwanda, national. No study sample	Not retrievable	Reconstruction	Not retrievable. The publication has no abstract and the full text was not accessible.	Not applicable
6	Chirwa et al., 2021	Original empirical study. Secondary analysis of two cross-sectional survey rounds. Concentration indices, RIF decomposition	Rwanda, national. CBHI households n=9212 (2010/11) and n=9605 (2013/14)	EICV household survey 2010/11 and 2013/14 (NISR)	Financing /CBHI	Stratified premiums (from 2011) are less regressive than the earlier flat-rate system, but socioeconomic inequality in premium burden persists. Female-headed households pay lower premiums.	No dedicated limitations section. Authors flag assumptions in household equivalence scales.
7	Woldemichael et al., 2019	Working paper (grey literature) reporting an original econometric analysis [IMF series, expressly not peer reviewed]. Quasi -experimental Bayesian extended two-part model	Rwanda, national. N=26,195 households across three rounds (2000, 2005/06, 2010/11)	EICV household survey, three rounds	Financing /CBHI	CBHI reduced annual out-of-pocket expenditure by approx. RWF 3600 per person and lowered the incidence of catastrophic expenditure, but benefits accrued disproportionately to wealthier rather than poorer households.	Possible measurement error from self-reported expenditure. Simplifying model assumptions. Enrolment classified at household level.
8	Muremyi et al., 2025	Original empirical study. Cross-sectional, multivariable logistic regression	Rwanda, nationwide. 14,580 households in 1260 villages	EICV5 household survey (2016/17), NISR	Financing /CBHI	Individuals in the wealthiest quintile had markedly higher odds of holding insurance (aOR 3.82) and those without formal education markedly lower odds (aOR 0.57).	No dedicated limitations section. Authors call for longitudinal and qualitative research.
9	Nyandekwe & Kakoma, 2025	Financial modelling analysis [journal not indexed in PubMed/Scopus/ Web of Science]. Four scenarios, 2011-2021 with projections to 2040/41	Rwanda, national. Unit of analysis is the financing system	MoH reports, World Bank health financing data, DHS, NISR	Financing /CBHI	Under a fee-for-service status quo the UHC model accumulates a deficit of RWF 913.03 bn by 2040/41. Under fully active strategic purchasing it generates reserves of RWF 516.94 bn.	Not stated
10	Weber et al., 2020	Original empirical study. Qualitative, semi-structured interviews and consultation observations	Rwanda, Muhanga district. 9 interviews, 11 observations	Primary qualitative data	Primary health care	Primary care providers were confident in their diagnostic capability, but nurses regarded this responsibility as exceeding their training. Constraints of time, consulting space and laboratory access were reported as barriers.	Interviews conducted through a local interviewer owing to language barriers. No prolonged observation. The study does not measure actual diagnostic accuracy.

Abbreviations: aOR, adjusted odds ratio; CBHI, community-based health insurance; CHW, community health worker; CI, confidence interval; DHS, Demographic and Health Survey; EICV, Integrated Household Living Conditions Survey; GDP, gross domestic product; HMIS, health management information system; HPV, human papillomavirus; MDG, Millennium Development Goal; MINECOFIN, Ministry of Finance and Economic Planning; MoH, Ministry of Health; NGO, non-governmental organisation; NISR, National Institute of Statistics of Rwanda; PMC, PubMed Central; PMID, PubMed identifier; REDCap, Research Electronic Data Capture; RDHS, Rwanda Demographic and Health Survey; RIF, recentred influence function; RSSB, Rwanda Social Security Board; RWF, Rwandan franc; STEPs, WHO STEPwise approach to NCD risk factor surveillance; UHC, universal health coverage; UI, uncertainty interval.

Letters, conference abstracts and study protocols carry no original findings and are used for context only (see section 3.3 of the main text). Publication type is given for every item, and MEDLINE indexing status is noted for those not indexed. Fields we could not establish from the published record are marked as such.

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No.	Author, year	Publication type and design	Setting and population	Data source	Domain	Principal findings	Author-stated limitations
11	Shepard et al., 2023	Original empirical study. Prospective controlled matched-cluster design with cost -effectiveness analysis	Rwanda, Bugesera district (rural). 8 health posts vs 8 matched controls. 1952 respondents	Primary survey, financial records, HMIS, insurance data	Primary health care	Laboratory-equipped health posts increased primary care utilisation by 1.83 outpatient visits per person per year ($p<0.0001$) at USD 101 per disability-adjusted life year averted. Of ten preventive indicators, two improved significantly, two improved non-significantly and one deteriorated significantly.	Two inputs (land use, ongoing NGO support) were not costed. The economic evaluation covered only three conditions.
12	VanderZanden et al., 2024	Original empirical study. Mixed-methods comparative multiple case study	Rwanda and Bangladesh, national. 68 key-informant interviews (37 in Rwanda)	Document review, HMIS coverage data, interviews	Primary health care	Leadership and a culture of accountability were common enablers of system resilience. Implementation strategies effective during the MDG period were sustained and supplemented by digital platforms.	Only two countries. No comparison with less successful countries. Recall bias. Not a rigorous systematic review.
13	Hirschhorn et al., 2020	Conference abstract [AcademyHealth Annual Research Meeting 2020. No PMID. PMC only]. Mixed-methods as described in the abstract	Rwanda, national. Sample size recorded as 'not applicable'	Document review and key-informant interviews	Reconstruction	Reports a 74% decline in under-five mortality, from 196 to 50 deaths per 1000 live births between 2000 and 2015 (RDHS survey estimates).	Not stated (the abstract format has no limitations section)
14	Morrow et al., 2021	Original empirical study. Time-use modelling using the CHW Coverage and Capacity tool	Rwanda and Zanzibar, national. Two established and one new CHW cadre	Policy documents, programme evaluation, DHS 2015	CHWs	Two established CHW cadres operated within a workload range considered manageable, whereas a newly introduced cadre completed fewer than half of its assigned tasks.	Wide confidence margins. Limited evidence on optimal CHW-to-population ratios. The tool was adapted differently across countries.
15	Tuyisenge et al., 2020	Original empirical study. Qualitative, 16 semi-structured interviews	Rwanda, Eastern Province (rural). 16 maternal CHWs	Primary qualitative data, June–Aug 2014	CHWs	CHWs are central to promoting facility-based antenatal and delivery care, but work as unpaid volunteers, without formal training in maternal health and under substantial workloads.	Not stated
16	Ly et al., 2022	Narrative review	Africa. 16 countries operating universal health insurance schemes	Literature: 92 of 311 identified publications	Financing /CBHI	State-run insurance is the dominant model and outperforms community-based schemes. The authors regard voluntary enrolment as irreconcilable with universality.	Not exhaustive and open to selection subjectivity. Countries differ in income and health spending. No uniform methodology for coverage indicators.
17	Ifeagwu et al., 2021	Systematic review	sub-Saharan Africa. 39 publications	Seven databases, publications 2005 to July 2019	Financing /CBHI	More than two-thirds of included studies identified equitable national health insurance as a route to UHC. Most health system revenue in the region derives from out-of-pocket payments.	Possible publication bias. Over-representation of two countries. Francophone literature under-covered.
18	Sabey, 2022	Original empirical study. Qualitative, 30 interviews, complexity theory framework	Rwanda, Kigali and Ngoma. 30 key stakeholders, fieldwork 2019	Primary qualitative data	Emerging challenges	Decentralisation and integration of mental health with primary care increased availability of care, but institutionalisation and individualisation of psychiatric care were identified as gaps poorly matched to the Rwandan context and unrecognised owing to top-down implementation.	Single authorship. Absence of co-authors based in low- and middle-income countries.
19	Boah et al., 2025	Original empirical study. Population-based cross-sectional survey, two-stage sampling	Rwanda, Kigali and Burera district. Adults aged 40+, n=4369	Primary survey, Mar-June 2024 (REDCap). Validated instruments	Emerging challenges	Prevalence of multimorbidity 55.2% (95% CI 53.7-56.6), frailty 14.5% (13.5-15.6) and limitation in activities of daily living 16.0% (14.9-17.1). Health status was worse in women and at older ages.	Cross-sectional design precludes causal inference. Vulnerable groups excluded. Some conditions self-reported. No data on disease duration.

Abbreviations: aOR, adjusted odds ratio; CBHI, community-based health insurance; CHW, community health worker; CI, confidence interval; DHS, Demographic and Health Survey; EICV, Integrated Household Living Conditions Survey; GDP, gross domestic product; HMIS, health management information system; HPV, human papillomavirus; MDG, Millennium Development Goal; MINECOFIN, Ministry of Finance and Economic Planning; MoH, Ministry of Health; NGO, non-governmental organisation; NISR, National Institute of Statistics of Rwanda; PMC, PubMed Central; PMID, PubMed identifier; REDCap, Research Electronic Data Capture; RDHS, Rwanda Demographic and Health Survey; RIF, recentred influence function; RSSB, Rwanda Social Security Board; RWF, Rwandan franc; STEPs, WHO STEPwise approach to NCD risk factor surveillance; UHC, universal health coverage; UI, uncertainty interval.

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20	Amberbir et al., 2025	Study protocol [reports the same cohort as ref. 19]	Rwanda, Kigali and Burera. Planned n=4280 and 24 primary care facilities	Planned primary data collection plus STEPs 2021 survey	Emerging challenges	No results, protocol only. States the objective of quantifying multimorbidity, frailty and health system responsiveness for older adults.	Cross-sectional design. Some conditions self-reported. Not representative of the private sector.
21	Binagwaho et al., 2020	Case study (practice report) ['Quality in Practice' section, 4 pp.]	Rwanda, national. 43 public hospitals	MoH accreditation programme data as at July 2018	Reconstruction	A three-level national accreditation system was developed in place of external accreditation bodies. By July 2018, 24 of 43 public hospitals had reached level 1 and 4 had reached level 2. Linking accreditation to performance-based financing was decisive.	No formal limitations section. The authors note infrastructural, financial and staffing constraints.
22	Koch et al., 2022	Original empirical study. Prospective observational, nested within a randomised trial	Rwanda, rural district hospital in Kirehe. 340 women after caesarean section	Discharge interviews, hospital billing records, clinical notes	Financing /CBHI	Despite near-universal CBHI enrolment, 48.2% of women had to borrow money and 12.7% to sell assets. Including transport and forgone earnings, expenditure was catastrophic for 22.6% of patients.	Single-centre study. Women declining surgery for financial reasons were not captured. Recall bias. Indirect costs under-estimated.
23	Eze et al., 2023	Systematic review with meta-analysis	20 low- and middle-income countries. 61 publications, 221,568 households	Literature from nine databases plus grey literature	Financing /CBHI	CBHI enrolment was associated with greater service utilisation (aOR 1.60; 95% CI 1.04-2.47) and lower out-of-pocket spending, but improvement in financial protection was demonstrated in only 24 of 43 studies examining it.	High heterogeneity. Uneven country representation (approx. 25% of studies from China). No eligible studies from three regions.
24	Mukangendo et al., 2018	Original empirical study. Cross-sectional, logistic regression	Rwanda, rural Nyanza district. 495 outpatients across 9 health centres	Primary survey, May-June 2017	Financing /CBHI	Predictors of low CBHI adherence were long waiting times ($p<0.019$), unaffordable premiums ($p<0.050$) and inconvenient payment arrangements ($p<0.001$).	Not stated
25	Uwera et al., 2025	Original empirical study [not MEDLINE-indexed]. Cross-sectional data quality assessment	Rwanda. 24 facilities in 4 districts. Data for 2020 and 2022	Paper registers, HMIS reports, e-Tracker	Primary health care	Discrepancies between facility registers and reported HMIS figures ranged from −2.57% to 0.67% for bacille Calmette-Guérin vaccine, −13.85% to −1.45% for the third dose of pentavalent vaccine and −8.30% to 2.00% for the first dose of measles-rubella vaccine. Paper-based data quality varied between districts, while e-Tracker data quality improved over time.	After paper registers were withdrawn in 2022 the 2020 analysis could not be repeated. Automated e-Tracker reports were assumed to be faithful.
26	Binagwaho et al., 2020	Original empirical study. Secondary analysis of repeated cross-sectional national surveys	Rwanda, national. Children under 5. Four rounds, n=6287/3765/4076 /3538	RDHS 2000, 2005, 2010, 2015	Primary health care	Childhood stunting fell from 47.4% (2000) to 38.3% (2015). Higher risk was associated with the lowest wealth quintile, low maternal education and low birth weight.	Cross-sectional design precludes causal inference. Institutionalised populations excluded. Wealth index based on proxy measures.
27	Iyer et al., 2018	Original empirical study. Ecological comparative analysis with qualitative policy analysis	Rwanda and Burundi, national. Data 1960-2015	World Development Indicators. Policy documents	Reconstruction	Following 2005 health sector policies, life expectancy rose by 14.7 years (95% CI 11.4-18.0) in Rwanda versus 4.6 years (1.8-7.5) in Burundi, after adjustment for gross domestic product per capita. The authors attribute the difference to public sector leadership, investment in health information systems, equity-oriented policy and the use of external aid to build local capacity.	Policy analysis restricted to materials available as research articles or technical reports.
28	Dzinamarira et al., 2021	Policy analysis. Literature-based comparative account	Rwanda, South Africa and Zimbabwe, national	Literature, WHO and government sources, press reports	Primary health care	Reports that Rwanda's coordinated national system limited transmission. The three countries would benefit from systematic exchange of experience.	Steps of systematic evidence synthesis, including quality assessment, were omitted. The search was limited in scope and depth.

Abbreviations: aOR, adjusted odds ratio; CBHI, community-based health insurance; CHW, community health worker; CI, confidence interval; DHS, Demographic and Health Survey; EICV, Integrated Household Living Conditions Survey; GDP, gross domestic product; HMIS, health management information system; HPV, human papillomavirus; MDG, Millennium Development Goal; MINECOFIN, Ministry of Finance and Economic Planning; MoH, Ministry of Health; NGO, non-governmental organisation; NISR, National Institute of Statistics of Rwanda; PMC, PubMed Central; PMID, PubMed identifier; REDCap, Research Electronic Data Capture; RDHS, Rwanda Demographic and Health Survey; RIF, recentred influence function; RSSB, Rwanda Social Security Board; RWF, Rwandan franc; STEPs, WHO STEPwise approach to NCD risk factor surveillance; UHC, universal health coverage; UI, uncertainty interval.

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29	Louis et al., 2022	Case study [Frontiers 'Community Case Study'. Not MEDLINE-indexed]	Rwanda, national. No study sample	Government documents, WHO materials, secondary literature	Emerging challenges	Rwanda's pandemic response drew on the decentralised system built after 1994. The pandemic intensified mental health problems and prevented collective mourning at the 26th commemoration.	Not stated
30	Musanabaganwa et al., 2021	Original empirical study. Ecological analysis of national surveillance data	Rwanda, national. 10,316 infections and 133 deaths over 10 months	National COVID-19 surveillance data. Isolation centre records	Primary health care	Age-specific case fatality was similar to or higher than in comparator countries, indicating that low population-level fatality reflected the young age structure rather than lower risk of death at a given age.	No dedicated limitations section. The authors urge caution in cross-country comparison.
31	Niyigena et al., 2022	Original empirical study. Convergent parallel mixed-methods	Rwanda, three rural districts. N=292 (quantitative) and n=24 (qualitative)	Telephone survey and interviews with CHWs	CHWs	Only 164 CHWs (56.2%) had received any training in the preceding 12 months, almost 10% had received no supervision, and only 24% had three or more supervisory visits during the lockdown.	Districts received NGO support, so needs are probably under-estimated nationally. Incomplete mobile coverage. Recall bias.
32	Doyle et al., 2025	Original empirical study [not MEDLINE-indexed]. Pre/post with follow-up, no control group	Rwanda, Burera district. 573 CHWs from 571 villages, three measurements over 20 months	Questionnaires, telephone survey, programme monitoring data	CHWs	After training, CHWs held more egalitarian gender attitudes. Inequitable attitudes were less likely among CHWs with secondary education and more than three years of service.	Self-reported data. Possible social desirability bias. Not generalisable to all CHWs in Rwanda.
33	Zulu et al., 2025	Scoping review [concerns low- and middle-income countries generally. Rwanda is one of approx. 18 settings]	Low- and middle-income countries. 22 articles, 2019-2023	Literature from five databases	CHWs	CHWs undertook health promotion, surveillance and maintenance of essential services. In Rwanda, shortages of personal protective equipment together with inadequate training and increased workload constrained service delivery.	Not stated
34	Menon et al., 2025	Study protocol [PubMed type: Clinical Trial Protocol. Results published separately]	Rwanda, Nyabihu and Musanze districts. 800 consultations planned	Planned audio recordings of CHW–patient consultations	CHWs	No results, protocol only. Primary endpoint is the appropriateness of referral decisions supported by a large language model.	Not stated in the published protocol
35	Musabyemariya & Andegiorgish, 2025	Original empirical study. Cross-sectional mixed-methods (described by the authors as a case report)	Rwanda, national. 180 questionnaires, 32 key-informant interviews	Primary data	Emerging challenges	Adoption of the WHO rehabilitation guide was attributed to government commitment evidenced by existing policies and to the presence of a disability rights movement.	Not retrievable (paywall)
36	Dukuzimana et al., 2025	Original empirical study. Qualitative, focus group discussion and three individual interviews	Rwanda, Burera district (rural). 10 nurses from 10 health centres	Primary qualitative data	Emerging challenges	Rehabilitation services at health centre level are very limited, available in only a few facilities and largely confined to mental health and basic eye care.	The focus group format may have produced mutual influence between participants. Findings relate to rural settings only.
37	Kayumba et al., 2025	Original empirical study. Mixed cross-sectional and retrospective design	Rwanda, 6 public hospitals across 5 provinces. 20 health workers and 32 patients	Interviews plus HMIS and electronic medical records	Financing /CBHI	Patient satisfaction with services under the dual clinical practice policy was 81%, with increases in patient volumes and hospital revenue, but limited awareness of the policy among staff.	Costs assumed equivalent when estimating remuneration. A six-month horizon does not capture long-term effects.
38	Rubagumya et al., 2020	Narrative review [not an original study]	Rwanda, national. No study sample	Not retrievable	Emerging challenges	Progress in HPV and hepatitis B vaccination and the launch of a five-year National Cancer Control Plan, alongside persistent low cancer awareness, late diagnosis and workforce shortages.	Not stated

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No.	Author, year	Publication type and design	Setting and population	Data source	Domain	Principal findings	Author-stated limitations
39	Flourence et al., 2025	Scoping review with narrative synthesis [not MEDLINE-indexed]	11 low- and lower-middle-income countries including Rwanda. 78 included texts	Four databases plus grey literature, 2009-2024	Financing /CBHI	Fee-for-service remains the dominant payment method and population coverage depends on whether enrolment is mandatory and how it is enforced. The authors recommend pooling risk and strategic purchasing.	Purposive country selection. Systematic information unavailable for all countries. No quality appraisal tool applied.
40	Hajji et al., 2025	Systematic review [not MEDLINE-indexed. PROSPERO CRD42023422038]	Low- and middle-income countries. 45 studies, 2010-2022	Literature from seven databases	Financing /CBHI	Analysis of the three financing functions in Kutzin's framework shows the literature is disproportionately concentrated on purchasing, at the expense of revenue raising and pooling.	Evidence dominated by a few countries (Kenya, Nigeria, China, Thailand). Predominance of qualitative studies. Language restriction.
41	Chemouni, 2018	Policy analysis (political economy) [not indexed in PubMed]. Qualitative process tracing	Rwanda, national. Unit of analysis is the policy process	Not retrievable (paywall)	Financing /CBHI	Sustained commitment to expanding coverage was enabled by a dominant political settlement. CBHI was selected from among the available options because it aligned most closely with the ruling coalition's ideology.	Not stated

Abbreviations: aOR, adjusted odds ratio; CBHI, community-based health insurance; CHW, community health worker; CI, confidence interval; DHS, Demographic and Health Survey; EICV, Integrated Household Living Conditions Survey; GDP, gross domestic product; HMIS, health management information system; HPV, human papillomavirus; MDG, Millennium Development Goal; MINECOFIN, Ministry of Finance and Economic Planning; MoH, Ministry of Health; NGO, non-governmental organisation; NISR, National Institute of Statistics of Rwanda; PMC, PubMed Central; PMID, PubMed identifier; REDCap, Research Electronic Data Capture; RDHS, Rwanda Demographic and Health Survey; RIF, recentred influence function; RSSB, Rwanda Social Security Board; RWF, Rwandan franc; STEPs, WHO STEPwise approach to NCD risk factor surveillance; UHC, universal health coverage; UI, uncertainty interval.

Letters, conference abstracts and study protocols carry no original findings and are used for context only (see section 3.3 of the main text). Publication type is given for every item, and MEDLINE indexing status is noted for those not indexed. Fields we could not establish from the published record are marked as such.

The evidence was synthesised thematically. Five domains were defined a priori and each publication assigned to the one matching its principal subject: (1) reconstruction of the health system after 1994 [1,2,5,13,21,27]; (2) financing and the development of CBHI [3,4,6-9,16,17,22-24,37,39-41]; (3) primary health care and its contribution to UHC [10-12,25,26,28,30]; (4) the role of CHWs [14,15,31-34]; and (5) emerging challenges, including NCDs, population ageing, rehabilitation and mental health [18-20,29,35,36,38].

RESULTS

Reconstruction of the health system after 1994

Ruined infrastructure, a lack of medical personnel and the loss of social trust constituted the main barriers to reconstruction after 1994 [1,2]. The government adopted a development model based on the principle of decentralization and the integration of health interventions with social and educational policies [2,27]. Over two decades, a network of district hospitals, health centres and health posts was established [2,11]. The national hospital accreditation programme, introduced in 2012, had resulted, by July 2018, in 24 of 43 public hospitals to level 1 and 4 to level 2 of a three-level scheme [21]. A comparative analysis found that after health sector policies adopted in both countries in 2005, life expectancy rose by 14.7 years (95% confidence interval [CI] 11.4-18.0) in Rwanda against 4.6 years (95% CI 1.8-7.5) in Burundi, adjusted for gross domestic product per capita. The authors note that their policy analysis was restricted to materials available as research articles or technical reports [27].

Financing and community-based health insurance

National household surveys report that coverage by any health insurance scheme rose from 43.3% in 2005/06 to 85.3% in 2023/24, with CBHI accounting for about 93% of those insured (Figure 1C). Coverage figures vary widely with the definition used, and household surveys, administrative records and demographic surveys give different values for the same period.

The protection by community-based health insurance (CBHI) gives against cost varies by household wealth and by district. A meta-analysis covering 20 low- and middle-income countries found CBHI enrolment associated with greater service utilisation (adjusted odds ratio [OR] 1.60; 95% CI 1.04-2.47) and lower out-of-pocket spending, but with financial protection improving in only 24 of 43 studies examining it [23]. In Rwanda, a non-peer-reviewed International Monetary Fund analysis of three rounds of the national household survey estimated that CBHI cut annual out-of-pocket expenditure by about 3600 Rwandan francs (RWF) per person, with the benefit falling disproportionately to wealthier households [7]. Among 340 women undergoing caesarean section at a rural district hospital, 48.2% borrowed money and 12.7% sold assets despite near-universal CBHI enrolment. Including transport and forgone earnings, expenditure was catastrophic for 22.6% of them [22].

Enrolment is patterned by wealth and education. Across 14,580 households, the wealthiest quintile had far higher odds of holding insurance (adjusted OR 3.82) and those without formal education far lower odds (adjusted OR 0.57) [8]. Premium stratification introduced in 2011 made contributions less regressive than the earlier flat rate system, but did not remove socioeconomic inequality in premium burden [6]. Reported barriers include long waiting times, unaffordable premiums and inconvenient payment arrangements [24].

The system also faces problems of long-term financial stability and poor compliance with payment deadlines [3,9,24]. A financial modelling analysis projected a deficit of RWF 913.03 billion by 2040/41 under a fee-for-service status quo, against reserves of RWF 516.94 billion under fully active strategic purchasing system. That analysis appeared in a journal not indexed in MEDLINE and its projections are illustrative [9]. Strategic purchasing and a reformed subsidy system have been introduced, although an assessment found overlapping functions weakening purchasers' capacity to improve allocation, and open-ended fee-for-service payment undermining the scheme's sustainability [4].

Primary health care

Primary health care was central to the reconstruction strategy. An integrated community-based model combined prevention, health education and basic services, although providers report constraints of time, consulting space and laboratory access [10-12]. A prospective controlled study in Bugesera district found that laboratory-equipped health posts raised primary care utilisation by 1.83 outpatient visits per person per year ($p<0.0001$) at USD 101 per disability-adjusted life year (DALY) averted, although of ten preventive indicators two improved significantly, two improved non-significantly and one deteriorated significantly [11]. Between 2000 and 2020, under-five mortality fell from 184.2 (90% uncertainty interval [UI] 172.1-197.2) to 41.6 (34.3-50.7) per 1000 live births and the maternal mortality ratio from 885 (80% UI 713-1091) to 252 (186-374) per 100,000 live births (Figure 1A, 1B). Childhood stunting declined from 47.4% in 2000 to 38.3% in 2015 [26]. These trends run alongside the reforms described, but the review cannot say which of them produced the change.

Routine data quality has been formally assessed only once. That assessment of routine immunisation data in 24 facilities across four districts found discrepancies between facility registers and figures reported through the health management information system (HMIS) of up to 13.85%, varying between districts and facilities, although data quality in the electronic tracking system improved over time [25]. On that evidence, published national figures should not be read at the precision in which they are reported.

Primary health care has also been credited with the system's resilience during crises, including the COVID-19 pandemic [12,28,30]. These studies compare Rwanda with Bangladesh [12], with South Africa and Zimbabwe [28] or with reference countries [30]. None of them establishes what would have happened without the reforms. An ecological analysis of 10,316 infections and 133 deaths concluded that Rwanda's low case fatality reflected its young age structure, not a lower risk of death at any given age. The authors also credited effective infection control and broad testing [30].

The role of community health workers

Community health workers (CHWs) are integrated into Rwanda's public health system [14,15,31,32]. The Ministry of Health's Annual Health Statistical Booklet for 2023-2024, reports 58,567 CHWs in post. The figure of about 45,000 in the literature reflects an earlier establishment of three per village, later raised to four. CHWs monitor population health, run preventive activities and health education, and support women during pregnancy and the postpartum period [14,15]. A time-use modelling study found two established CHW cadres operating within a manageable workload range, while a newly introduced cadre completed fewer than half of its assigned tasks [14].

How these workers are trained, supervised and paid is less well documented than their number. A mixed-methods study of 292 CHWs in three rural districts found that only 56.2% had received any health training in the preceding 12 months, almost 10% had received no supervision at all, and only 24% had had three or more supervisory visits during the three-month national lockdown [31]. A qualitative study of CHWs working in maternal health described them as unpaid volunteers without formal training in maternal health and carrying substantial workloads [15]. A scoping review across low- and middle-income countries reached comparable conclusions, identifying Rwanda among settings where shortages of protective equipment, inadequate training and increased workload constrained service delivery during the pandemic [33].

Emerging challenges

As health indicators have improved, new challenges have come into view: non-communicable diseases (NCDs), ageing of population and gaps in rehabilitation and long-term care [19,35,36]. A population-based cross-sectional study of 4369 adults aged 40 years and over in Kigali and Burera district found a prevalence of multimorbidity of 55.2% (95% CI 53.7-56.6), frailty of 14.5% (13.5-15.6) and limitation in activities of daily living of 16.0% (14.9-17.1) [19]. Rehabilitation remains limited at primary care level. Nurses in ten rural health centres reported it available in only a few facilities and largely confined to mental health and basic eye care, while a national study attributed progress in adopting the WHO rehabilitation guide to government commitment and to a disability rights movement [35,36].

In mental health, a qualitative study of 30 stakeholders found that decentralisation and integration with primary care had increased availability, but found the institutionalisation and individualisation of psychiatric care poorly matched to the Rwandan context and unrecognised by top-down implementation [18]. A descriptive account of the pandemic period reports intensified mental health needs and the loss of collective mourning at the 26th commemoration of the genocide, attributing the system's capacity to respond to structures established after 1994 although that account presents no supporting data [29]. In oncology, the narrative review reported progress in human papillomavirus and hepatitis B vaccination and a five-year National Cancer Control Plan, alongside persistent low cancer awareness, late diagnosis and workforce shortages [38]. Current policy attention is on keeping CBHI solvent and on improving service quality, with a large language model tool to support CHW consultations the subject of a study protocol [4,9,21,34]. This direction aligns with the implementation of the "Vision 2050" strategy, aimed at fully achieving universal health coverage and further strengthening the resilience of the health system [9,12].

DISCUSSION

Strength and consistency of the evidence

The evidence reviewed here is uneven in both strength and coverage. The financing domain is the best documented, with a systematic review and meta-analysis [23], econometric analyses of nationally representative household survey data [6,7] and a nationwide survey of insurance uptake [8]. Primary health care is supported by one prospective controlled study with an economic evaluation [11] and by analyses of national survey data [26], but much of the remaining literature is descriptive. The CHW domain rests largely on qualitative and mixed-methods studies in selected districts [15,31], with one larger pre-post evaluation of 573 CHWs [32]. The two publications on large language model decision support and on CHW time use are, respectively, a protocol whose results appeared separately [34] and a modelling exercise with wide confidence intervals [14]. Regarding the post-1994 reconstruction the evidence is largely descriptive, and three items there are used only for context: two letters to the editor [1,5] and one conference abstract [13]. The evidence on emerging challenges is the least conclusive. It rests on one population-based survey of 4369 adults [19], whose protocol [20] describes the same cohort and is not independent evidence, two studies of rehabilitation, one qualitative [36] and one mixed-methods [35], one qualitative study of mental health policy [18], one narrative review of cancer control [38] and one descriptive account [29]. None have longitudinal or comparative design, so conclusions about ageing and non-communicable disease remain provisional.

Association and causation

The improvements documented above occurred in parallel with the reforms described and cannot be attributed causally to CBHI, primary health care expansion or the CHW programme individually. No included study could isolate the effect of a single national reform on national mortality. The only prospective controlled study evaluates a facility-level intervention in a single district [11]. The econometric analyses address household expenditure and premium burden, not mortality [6,7]. The implementation study describes itself as interpretive [12]. Reforms were also implemented alongside substantial economic growth, expanded education and external assistance, any of which may independently have influenced these outcomes. The evidence supports the claim that a coherent package of reforms accompanied a rapid improvement in population health, but not the claim that any one component produced it.

Conflicting and uncertain findings

The literature pulls in different directions on four points. First, while CBHI is consistently associated with increased service utilisation, its effect on financial protection is inconsistent. The improvement was demonstrated in only 24 of 43 studies in the largest available meta-analysis, and a prospective Rwandan study found catastrophic expenditure in 22.6% of women after caesarean section despite insurance coverage [22,23]. Second, the distributional findings run against the scheme's equity rationale. One analysis found the benefits accrure disproportionately to wealthier households and enrolment is strongly patterned by wealth and education [7,8]. Third, a regional narrative review concluded that state-run insurance models outperform community-based schemes and that voluntary enrolment cannot easily be reconciled with universality [16], which sits awkwardly with accounts presenting CBHI as a model for replication. Fourth, accounts of the CHW programme's scale coexist with evidence that almost one in ten CHWs received no supervision and fewer than three in five received any training in the preceding year [31].

Dependence on external financing

None of the reviewed sources quantifies the share of health sector spending met by external assistance, which is itself a gap in this literature. Comparative analysis attributes part of Rwanda's relative advantage to the deliberate use of external aid to build domestic capacity instead of parallel structures [27]. Capacity built this way may outlast an individual donor programme, but the reviewed sources do not show how far the sector depends on continuing external finance. In the financing analyses reviewed, two prominent threats to CBHI solvency are open-ended fee-for-service payment and imperfect revenue mobilisation [3,4,9]. One study of CHW conditions of work noted that the districts it examined received non-governmental support beyond what the Ministry of Health provided, so national needs are probably greater than those it measured [31].

Inequalities and the limits of national indicators

The national figures used above hide wide differences within the country. Insurance enrolment varies by wealth quintile, education and residence [8], premium burdens vary by household income and the sex of the household head [6], and multimorbidity and frailty between urban and rural populations [19]. Rehabilitation is largely unavailable at rural primary care level [36]. National indicators also carry a measurement error. Discrepancies of up to 13.85% between facility registers and reported figures have been documented for routine immunisation data [25], and published estimates of insurance coverage diverge according to the definition and instrument used. One review reports 97.3% coverage for 2022 [2], whereas the national household survey series gives 85.3% for 2023/24 (Figure 1C), the two resting on different definitions and different instruments. Cross-country comparison and judgements about progress over time turn partly on which source is chosen.

Conditions of transferability

Rwanda is often held up as a model for other low- and middle-income countries, but the literature reviewed here supports a narrower claim. A political economy analysis argues that the sustained commitment to expanding coverage was made possible by a dominant political settlement with a long time horizon, and that CBHI was chosen among the available options because it aligned with the ruling coalition's emphasis on community self-reliance [41]. According to that reading it is the political settlement rather than the scheme itself that would have to be reproduced, which is a far harder condition to meet. Reviews of health financing across sub-Saharan Africa and of national insurance programmes in eleven low- and lower-middle-income countries reach similar conclusions, finding that coverage outcomes turn on whether enrolment is mandatory and how it is enforced, on the size of the informal sector and on the share of financing drawn from general taxation [16,17,39,40]. The one direct comparison available here, between Rwanda and Burundi after 2005, attributes the divergence in life expectancy gains to public sector leadership, health information systems and equity-oriented policy, not to any single programme [27]. Rwanda's gains also coincided with economic growth, expanding education and external as-

sistance (sections 5.2 and 5.4), and the comparison between Rwanda and Burundi credits, among other factors, the use of external aid to build local capacity rather than parallel structures [27]. A country with a different socioeconomic trajectory, or one unable to secure or direct comparable external support, could not assume the same result, but none of the reviewed sources test this hypothesis. Rwanda also has advantages a country copying the model would not necessarily have. Its population is young, and in the pandemic the low population-level case fatality reflected that age structure rather than a lower risk of death at a given age [30].In contrast, its large community health workforce is thinly supported, so the adopting country would have to budget for the supervision and pay that Rwanda has not yet secured [31]. How far these experiences can be transfered depends on the political settlement, on the wider socioeconomic context and the availability and use of external support, on administrative and financing capacity, and on demographic structure. A reader considering Rwanda as a precedent would need to check each of those conditions in the setting concerned.

Limitations

This review has several limitations. First, the search was selective, screening was not duplicated, and complete search strategies and per-database dates were not recorded. Relevant work may have been missed, and the choice of sources rests on our judgement. Second, no formal quality assessment was undertaken, for the reasons in section 3.4, and the strength of individual findings is described in words rather than scored. Third, the publication period was restricted to 2018-2025, excluding earlier primary studies of the initial reform period, so some historical claims rest on secondary accounts. Fourth, only English-language publications were considered, which may under-represent francophone scholarship. Fifth, the literature is heterogeneous in design, and seventeen of the fourty-one publications report no original analysis of data, five of them no original findings at all. Sixth, the evidence base is not uniformly peer-reviewed, including as it does a working paper, two letters, two protocols and a conference abstract, with nine of the fourty-one publications appearing in journals outside MEDLINE, all identified in Table 1. Seventh, the synthesis is narrative and thematic, with domains defined a priori, findings not pooled, and the weight given to individual studies reflecting the authors' judgement. Eighth, publication bias is plausible where a national reform programme has attracted this much favourable attention, and unfavourable findings may be under-represented. Ninth, the review relied on nationally reported indicators whose measurement error has been documented [25]. Finally, the findings concern one country with a distinctive political and demographic profile, which restricts their generalisability.

Summary of the discussion

Rwanda's reforms combined a financing instrument, CBHI, with a delivery structure built on primary health care and CHWs, in the context of a political commitment to decentralised universal coverage. This literature attributes the progress to two decades of equity-oriented policy, to social accountability mechanisms and to partnership with international organisations, although the gains are unevenly spread and not yet secure[2,27,41]. Whether they are sustained will depend on the scheme's finances and on the public health workforce [4,9,19,37].

CONCLUSIONS

1. The reform of Rwanda's health system is a substantial example of public sector reconstruction in a post-conflict setting. The literature links this progress to political leadership, decentralised governance and a sustained commitment to equity of access [2,21,27]. Rwanda's experience may offer lessons for other sub-Saharan African countries seeking to link health policy to broader social and economic development, subject to the conditions set out in section 5.6.
2. The CBHI has been central to widening access to health services, and it is associated with lower out-of-pocket spending and broader population coverage [7,23]. Its effects on financial protection are, however, not uniform [22], enrolment is patterned by wealth and education [8], and premium burdens by household income [6]. Narrowing the gaps between income groups will require a more secure financial footing for the scheme and more redistribution within it [4,9,40].
3. The PHC and CHWs remain central to the system. The PHC infrastructure and the CHW network have supported service delivery to rural populations over a period in which maternal and child health indicators improved [11,12,26]. CHWs need continued investment, and the evidence documents shortfalls in training, in supervision and in pay [15,31].
4. The system will have to adapt to emerging health needs. A high burden of multimorbidity among older adults in the surveyed districts [19], the prospect of population ageing and unmet mental health needs all call for long-term and rehabilitative care built into the existing structure [18,19,35,36], although current evidence does not allow conclusions about trends. Sustaining the gains will also require investment in the health workforce [37].

Rwanda's experience is consistent with the proposition that a low-income country can sustain health system development while combining financing reform, decentralised governance and a primary care network. This review cannot establish that those components caused the gains. Whether the experience is a useful reference for reform in other countries depends on how far the political, administrative and financing conditions that supported it are present in the setting concerned.

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