

The Impact of Removing User Fees on Maternal and Child Health Services: A Systematic Review of Quasi-Experimental Studies

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Abstract

User fee removal is emerging as a leading strategy to expand access to financial services for maternal and child health (MCH) services. However, whether such policies improve downstream outcomes or equity remains unclear. We conducted a systematic review of quasi-experimental studies evaluating the effects of user fee removal on the MCH continuum of care, mortality outcomes, and equity, guided by PRISMA and an original conceptual framework linking financial barriers to service use, quality, system readiness, and health outcomes. We searched PubMed and Web of Science in August 2025 for studies that used experimental or quasi-experimental designs evaluating user fee removal. Of the 933 records screened, 14 studies met the inclusion criteria; all were quasi-experimental. Narrative synthesis followed SWiM (Systematic Review Without Meta-analysis) guidelines due to heterogeneity, and risk of bias was assessed using ROBINS-I. Free health care policies consistently improved access to antenatal care, facility-based delivery, and skilled birth attendance. Effects on postnatal care and caesarean section were mixed. These improvements did not correspond to significant reductions in maternal mortality, stillbirths, or neonatal mortality. Removing user fees had no immediate effect on the initiation of early antenatal care but showed long-term gains. Some policies closed equity gaps while some unintentionally widened health disparities. Removing user fees significantly increased MCH utilisation, with limited or inconsistent effects on mortality and equity. Our framework clarifies how fee removal brings both benefits and system pressures. Future research should address quality and system readiness to achieve equitable outcomes.

Keywords: Equity, Fees and Charges, Free Healthcare, Health outcomes, LMIC, Maternal and Child Health.

Introduction

User fees have shaped health financing policy in many low- and middle-income countries (LMICs), sparking decades of debate among policymakers, researchers, and practitioners. Proponents argued that charging at the point of service would generate revenue, improve efficiency, and increase the availability of essential commodities [1, 2]. Yet

strong evidence shows that direct payments burden poorer households, delay care-seeking, and worsen socioeconomic inequities, especially for maternal and child health (MCH) care, where delays heighten preventable morbidity and mortality risks [3-5].

Awareness of these inequities has shifted health financing worldwide. Researchers, NGOs, and international agencies now call for

the removal of user fees to increase access to essential MCH services, promote continuity of care, and accelerate progress toward universal health care (UCH) and financial protection [6]. As a result, many LMICs have removed fees for pregnant women, newborns, children, or everyone. This consensus recognizes that financial barriers are a major obstacle to service use and increases maternal and neonatal disparities.

Despite widespread adoption, evidence of the effects of removing user fees for MCH services remains limited and inconsistent. The most recent systematic review [7], synthesized studies across varied designs and assessed multiple policy actions, including introducing, reducing, and removing fees. The review found generally consistent increases in facility deliveries and obstetric complication management. However, evidence on mortality, care quality, and socioeconomic inequalities was inconclusive. Most included studies from the review relied on observational designs that were either uncontrolled or poorly controlled. This limited causal inference and the ability to attribute observed changes to fee-removal policies rather than to other factors.

Existing research also often conceptualizes fee removal as simply the inverse of fee increases, assuming symmetric behavioral and health system responses. These risks overlook unintended consequences such as increased workloads, supply-side strain, or changes in provider behavior, particularly in resource-constrained settings. As a result, significant gaps persist in understanding how fee removal policies affect the full continuum of MCH care, including antenatal, intrapartum, postnatal, and newborn services, and how these reforms interact with system readiness, quality of care, and equity.

To address these limitations, we conduct the first systematic review of studies using experimental or quasi-experimental designs to evaluate the effects of removing user fees for maternal and child health (MCH) services.

Although both designs were eligible, all included studies, after screening and eligibility assessment, were quasi-experimental, yielding stronger impact estimates than traditional observational approaches and enabling clearer attribution of observed changes to policy reforms. Guided by our original conceptual framework (Figure 2), developed based on Andersen's behavioural model, Donabedian's quality framework, and the WHO health system building blocks framework [8-10], we link financial barriers to service use, quality, system readiness, and health outcomes. We assess impacts across the full MCH continuum, with particular emphasis on mortality and equity outcomes, which have been underrepresented in previous syntheses. We also include a mechanistic synthesis to clarify the pathways through which fee removal may yield both intended benefits and unintended system-level pressures, thereby providing more robust, policy-relevant evidence to inform equitable health-financing reforms and support countries' progress toward universal health coverage.

Materials and Methods

We performed a systematic review following the PRISMA best-practice guidelines [11].

Search Strategy

We searched PubMed and Web of Science on August 15th, 2025, for peer-reviewed articles on user fees and maternal and child health services. The selection of these two databases was based on preliminary scoping, which indicated that most quasi-experimental evaluations of user-fee removal policies published in economics, development, and health-systems journals were already indexed in Web of Science. Titles from EconLit and Scopus were also examined during the scoping phase, revealing substantial overlap with Web of Science and no unique quasi-experimental evaluations relevant to the research topic. Consequently, expanding the search to

additional databases was deemed unlikely to materially alter the set of eligible studies.

We operationalized different permutations of each keyword based on previously validated searches. For the User Fee keyword, we included variants such as “user charges”, “direct payment”, “user fees”, “charges and fees [Mesh]” following the reviews of [3, 12, 13]. For MCH services keywords variants, we drew on [14-16] to include “maternal and child health service”, “reproductive health service”, “child health service”, etc. We applied the title and abstract fields (PubMed) and the topic field (Web of Science) to the search. The full details of the search strategy are presented below.

We did not conduct backward or forward citation searching, nor did we include grey literature such as government reports or donor evaluations. While these methods can enhance sensitivity, they may also increase variability in study quality. To ensure methodological consistency, we limited our inclusion criteria to peer-reviewed studies indexed in the two selected databases. We acknowledge that this strategy may introduce both publication and disciplinary bias, especially considering the cross-sectoral nature of user-fee reforms. This limitation is further addressed in the Discussion section.

Pubmed Search

#1	Search: (“user fee”[Title/Abstract] OR “user fees”[Title/Abstract] OR “user-fee”[Title/Abstract] OR “user-fees”[Title/Abstract] OR “user charge”[Title/Abstract] OR “user charges”[Title/Abstract] OR “direct payment”[Title/Abstract] OR “direct payments”[Title/Abstract] OR “free healthcare”[Title/Abstract])
#2	Search: (charges and fees[MeSH Terms])
#3	Search: (“Maternal and child health service*”[Title/Abstract] OR “maternal & child health services”[Title/Abstract] OR “Maternal-Child Health Service*”[Title/Abstract] OR “Maternal Health Service*”[Title/Abstract] OR “Maternal Health”[Title/Abstract] OR “Child Health Service*”[Title/Abstract] OR “Child health”[Title/Abstract] OR “child health care”[Title/Abstract] OR “Family Planning Service*”[Title/Abstract] OR “Prenatal Care”[Title/Abstract] OR “pregnancy”[Title/Abstract] OR “perinatal care”[Title/Abstract] OR “Obstetric Delivery”[Title/Abstract] OR “Infant care”[Title/Abstract] OR “Postnatal Care”[Title/Abstract] OR “Maternal-Child Health”[Title/Abstract] OR “obstetric care”[Title/Abstract] OR “Delivery care”[Title/Abstract] OR “Newborn care”[Title/Abstract] OR “Women’s health”[Title/Abstract] OR “Women’s Health Service*”[Title/Abstract] OR “Infant health”[Title/Abstract] OR “Neonatal care”[Title/Abstract] OR “ neonatal health”[Title/Abstract] OR “Family planning”[Title/Abstract] OR “Antenatal care”[Title/Abstract] OR “Facility delivery”[Title/Abstract] OR “Skilled birth attendance”[Title/Abstract] OR “skilled attendance at birth”[Title/Abstract] OR “skilled attendance”[Title/Abstract] OR “Institutional delivery”[Title/Abstract] OR “Institutional deliveries”[Title/Abstract] OR “Postpartum care”[Title/Abstract] OR “Newborn health”[Title/Abstract] OR “maternal and neonatal health”[Title/Abstract] OR “Maternal and newborn health*”[Title/Abstract] OR “maternal and child health*”[Title/Abstract] OR “reproductive health service*”[Title/Abstract] OR “reproductive health”[Title/Abstract] OR “MCHN”[Title/Abstract] OR “MCH”[Title/Abstract])
#4	Search: #1 OR #2
#5	Search: #3 AND #4

Web of Science Search

#1	"Maternal and child health service*" OR "maternal & child health services" OR "Maternal-Child Health Service*" OR "Maternal Health Service*" OR "Maternal Health" OR "Child Health Service*" OR "Child health" OR "child health care" OR "Family Planning Service*" OR "Prenatal Care" OR "pregnancy" OR "perinatal care" OR "Obstetric Delivery" OR "Infant care" OR "Postnatal Care" OR "Maternal-Child Health" OR "obstetric care" OR "Delivery care" OR "Newborn care" OR "Women's health" OR "Women's Health Service*" OR "Infant health" OR "Neonatal care" OR "neonatal health" OR "Family planning" OR "Antenatal care" OR "Facility delivery" OR "Skilled birth attendance" OR "skilled attendance at birth" OR "skilled attendance" OR "Institutional delivery" OR "Institutional deliveries" OR "Postpartum care" OR "Newborn health" OR "maternal and neonatal health" OR "Maternal and newborn health*" OR "maternal and child health*" OR "reproductive health service*" OR "reproductive health" OR "MCHN" OR "MCH" (Topic)
#2	"user fee" OR "user fees" OR "user-fee" OR "user-fees" OR "user charge" OR "user charges" OR "direct payment" OR "direct payments" OR "free healthcare" OR "charges and fees" (Topic)
#3	Search: #1 AND #2

We obtained 933 articles from PubMed (596) and Web of Science (337). After removing duplicates (233), 700 articles were left for screening. Of the 700 articles screened, we excluded 525 because they did not cover user fee interventions, 2 were not in English, and 9 were not actual research studies. We excluded 536 articles, leaving 164 articles for retrieval. All 164 articles were retrieved for eligibility. At eligibility, upon reviewing the full text, 29 articles were excluded because they did not use a randomized-controlled trial or a quasi-experimental design. 38 articles were further excluded because the interventions did not provide free healthcare or abolish user fees. 63 articles were excluded because they did not measure at least one of the outcomes of interest (antenatal care, skilled birth attendance, facility-based delivery, caesarean section, postnatal care, mortality or equity). 20 studies that implemented multiple parallel interventions alongside user fee removal were excluded to ensure clear attribution of observed effects to the fee removal policy. These exclusions (totaling 150) resulted in 14 included quasi-experimental studies for data synthesis and analysis. The PRISMA flow diagram for this process is presented in Figure 1.

Inclusion/Exclusion Criteria

We applied a series of inclusion and exclusion criteria during the screening and eligibility stages.

Articles were included if:

1. They were peer-reviewed.
2. Written in English.
3. Used randomized-controlled trial or quasi-experimental designs.
4. Assessed effects of healthcare interventions that provide free healthcare or eliminate user fees at the point-of -care for maternal and child healthcare services.
5. They include at least one quantitative measure related to maternal and child healthcare service access and utilization, health outcomes, or equity.

Articles were excluded if:

1. They involved women and children using other healthcare services other than maternal healthcare services.
2. They focused on policies introducing, increasing, reducing user fees, or examining reduced or subsidized insurance, vouchers, or financial incentives.
3. User fee removal bundled with other major intervention components.

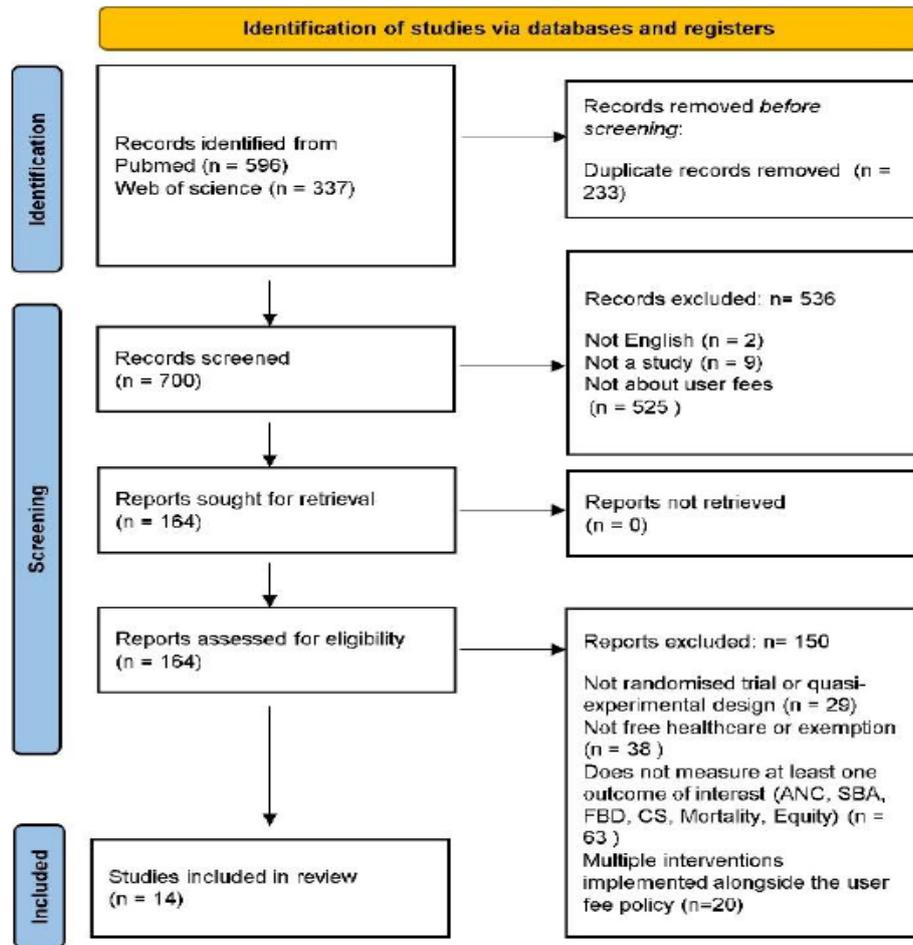


Figure 1. PRISMA Flow Diagram

Scope and Key Definitions

According to [13], user fees refer to direct payments made at the point of care when there is no prepayment or risk pooling. These fees encompass charges for consultations, medications, diagnostics, and other out-of-pocket expenses. Any policy that modifies these charges, whether by introducing, removing, or adjusting them, represents a change in the user fee regime. This review examines the removal of user fees and its effects on maternal and child health (MCH) service utilization and outcomes, with the objective of removing financial barriers for vulnerable groups. The terms “free healthcare,” “user fee removal,” and “user fee exemption” are used interchangeably to describe interventions that eliminate point-of-service payments.

Conceptual Framework

A conceptual framework was developed to examine how removing user fees through financing reforms influences maternal and child health in low- and middle-income countries (LMICs). This framework integrates established models of access, quality, and system performance, including Andersen’s behavioral model, Donabedian’s structure–process–outcome model, the WHO health system building blocks framework, Tanahashi’s effective coverage cascade, and the Three Delays model [8-10, 17, 18]. Together, these models capture both demand- and supply-side determinants and the quality of care.

Figure 2 presents the hypothesized sequence: removing user fees reduces financial barriers, thereby increasing utilisation. This increased utilisation affects two system components:

quality and capacity (processes, provider competence, workload), and referral and readiness (staffing, supplies, infrastructure). These components then mediate effects on health outcomes and equity. Solid arrows represent direct causal links between these steps, while dashed arrows show feedback loops, illustrating how perceived quality and referral effectiveness can influence future utilisation.

This framework addresses existing gaps by explicitly linking financing reforms, system readiness, and equity. Andersen's model helps explain determinants of utilisation.

Donabedian's model supports the mediation of structural and process factors. The WHO framework provides an operational definition of readiness. Tanahashi's and the Three Delays models identify bottlenecks beyond financial access. Evidence shows that fee removal increases service contact. However, it may strain system capacity and cause crowding and variable quality if structural investments do not keep pace [19]. This synthesis thus enables identification of bottlenecks in access, quality, and readiness for maternal health financing reforms in LMICs.

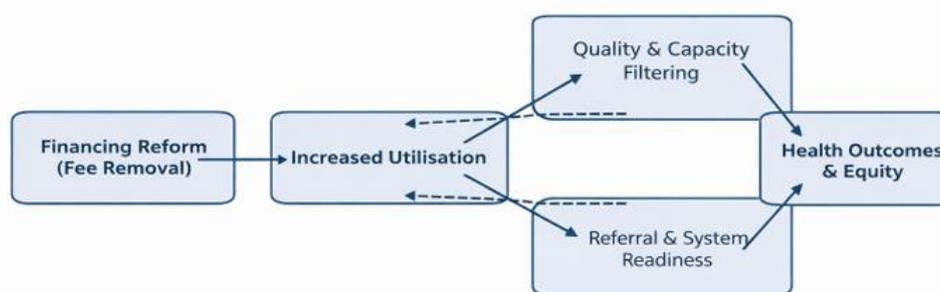


Figure 2. Conceptual Pathway Linking Fee Removal to Utilisation, Quality/System Readiness and Outcomes

Data Extraction and Synthesis

Data extraction followed a set pathway. Findings were mapped to four stages: financial protection (out-of-pocket cost protection), utilisation (healthcare use), quality or capacity (care standards or resources), and health outcomes (patient results). We extracted information on policy design, setting, population, study details, outcomes, and main findings. We noted modifiers such as distance (proximity to services), socio-economic status (income, education, occupation), and implementation fidelity (policy implementation level). Mechanisms were coded and summarized in an evidence map. Effect sizes with 95% confidence intervals or p-values were reported when available.

Results were synthesized narratively by intervention type and outcome. A meta-analysis was not conducted due to heterogeneity in definitions, follow-up periods, policy durations,

and study designs. Pooling could obscure context-specific insights. Narrative synthesis preserves interpretive depth. Future research should standardize outcome measures and use cluster-randomized trials that combine fee removal with quality interventions.

Risk of Bias Assessment (ROBINS-I)

We assessed risk of bias using the ROBINS-I tool [20]. We evaluated each study across seven domains: confounding, participant selection, intervention classification, deviations from intended interventions, missing data, outcome measurement, and selective reporting. We then compiled domain-level judgments for all 14 studies (Table 6) and used these assessments to inform the weighting of interpretations in the synthesis (see Results/Discussion).

For each difference-in-differences (DiD) study, we extracted whether the authors formally tested the parallel trends assumption,

such as through event studies with pre-treatment leads, joint F or Wald tests, or placebo/falsification timing tests, and whether pre-trends were satisfied. These diagnostics are summarized in Table 7.

During the narrative synthesis, we assigned greater weight to findings from studies assessed as having a moderate risk of bias, such as DiD studies with pre-trend tests and robustness checks, compared to those from studies with a serious risk of bias, such as single-group interrupted time series (ITS) exposed to time-varying confounding or co-interventions. This weighting is explicitly indicated in the Results, and conclusions are qualified accordingly.

Results

Study Characteristics

All 14 included quasi-experimental studies (7 Interrupted Time Series (ITS), 7 Difference-in-Differences (DiD)) were conducted in low- and middle-income countries (LMICs). Over half took place in Sub-Saharan Africa: Kenya (n=5), Zambia (n=4), and Ghana (n=2). Most studies evaluated national or subnational user-

fee removal policies for maternal and child health. Some focused on phased rollouts or sequential reforms. Data sources included routine Health Management Information Systems (HMIS), facility registers, and Demographic and Health Surveys (DHS/GDHS). ITS studies used monthly or quarterly facility data. DiD analyses relied on repeated household survey waves. Study populations included national samples of women aged 15–49 years and users of public health facilities. Several studies disaggregated results by socioeconomic or geographic subgroups. The primary outcomes assessed were service utilization measures, such as facility deliveries, antenatal care, skilled birth attendance, and postnatal care, while a smaller number of studies evaluated neonatal, infant, or maternal mortality. ITS studies applied segmented regression models, adjusting for autocorrelation and, in some cases, seasonality or control series. In contrast, DiD studies used fixed-effects or event-study models, though reporting of parallel-trends tests was inconsistent. Comprehensive details of the study characteristics appear in Table 1.

Table 1. Study Characteristics

Study (Author, Year)	Country	Design	Data source	Outcomes
Gitobu et al., (2018)	Kenya	ITS	Facility maternity & death registers	Facility-based delivery, Maternal Mortality and Neonatal Mortality
Aye et al., (2024)	Burkina Faso	ITS	HMIS + MoH annual statistical reports	Facility-based delivery
Lang'at et al., (2019)	Kenya	ITS	MoH registers (333) + DHIS2	Antenatal care, Skilled-birth attendance, Caesarean section and Stillbirth
Chitalu & Steven (2017)	Zambia	ITS	HMIS; Health Facility Census	Facility-based delivery
Orangi et al., (2021)	Kenya	ITS	Kenya HIS	Antenatal care, Facility-based delivery, Postnatal care
Demissie et al., (2020)	Ethiopia	ITS	District HIS + facility logbooks	Facility-based delivery

Owuor & Amolo (2019)	Kenya	ITS	DHIS-2 verified with facility data	Antenatal care, Skilled-birth attendance, Caesarean section, Maternal Mortality, Neonatal Mortality
McKinnon et al., (2015)	Ghana, Senegal, Sierra Leone	DiD	DHS birth histories	Facility-based delivery and Equity
Chama-Chiliba & Koch (2016)	Zambia	DiD	ZDHS 2007; Health Facility Census 2005; HMIS	Facility-based delivery
Lagarde et al., (2022)	Zambia	DiD	DHS; 2005 Health Facility Census (proximity/quality)	Facility-based delivery, Skilled-birth attendance, Caesarean section and Neonatal Mortality
Manthalu et al., (2016)	Malawi	DiD	HMIS facility annual data (MoH/CHAM)	Antenatal care, Facility-based delivery and Postnatal care
Bigool (2024)	Ghana	DiD	GDHS 2003, 2008, 2014	Antenatal care, Facility-based delivery and Skilled-birth attendance
Renard (2022)	Zambia	DiD	Zambia DHS; 2005 Health Facility Census	Facility-based delivery, Skilled-birth attendance, Postnatal care, Neonatal Mortality, Stillbirth, Infant Mortality and Equity
Oyugi et al., (2024)	Kenya	DiD	Kenya DHS 2014 (birth recode)	Facility-based delivery, Skilled-birth attendance, Caesarean section and Neonatal Mortality

Effects of User Fee Removal on Access and Utilisation of Antenatal Care (ANC) Services

Five studies evaluated the impact of removing user fees on ANC attendance. Three studies used interrupted time-series analysis, and two used difference-in-differences methods. The effects of user fee removal on ANC were heterogeneous, varying across countries, policy designs, and specific ANC indicators. Detailed results of the individual studies are presented in Table 2.

Three studies reported significant increases in ANC utilization following the removal of user fees. In Ghana, a doubly robust DiD study

by [21] found a 6.9–7.7 percentage-point increase in the probability of at least one ANC visit after the expansion of free maternal healthcare, with pre-policy dynamics near zero, supporting credible causal inference. In Malawi, user fee exemption under mission-facility Service Level Agreements (SLAs) resulted in substantial gains: the proportion of women with at least one ANC visit increased by approximately 15%, and the average number of ANC visits rose by about 12%, although early ANC initiation did not change significantly [22]. County-level evidence from Kenya [23] also demonstrated strong positive effects: the introduction of free maternity care in three counties led to a large and sustained increase in

ANC utilization, with post-policy slopes rising by 44.6 ANC visits per month ($p < 0.001$).

In contrast, national-level ITS analyses of Kenya's 2013 free maternity policy and its 2017 Linda Mama revision showed no significant effects on ANC. In public facilities, neither the level nor the trend of ANC visits reached statistical significance. For example, IRR 1.031, $p = 0.359$ for the 2013 policy; IRR 1.223, $p = 0.246$ for the 2017 policy. In private and faith-based facilities, ANC visits decreased significantly immediately after the 2013 policy

(IRR = 0.850, $p = 0.038$). This was expected, as the reform initially applied only to the public sector. The Linda Mama revision produced no measurable effect on ANC in either sector [24]. Sub-national evidence from Nyamira County found no significant immediate policy effect on ANC4. Although ANC4 showed a strong pre-policy upward trend (+10.7 per month), post-policy trajectories remained positive. However, they did not show statistically significant changes in level during the first 18 months [25].

Table 2. Direction of Effects of User Fee Removal on Utilisation of ANC Services

Study (Year)	Country	Design	ANC measure	Direction of effect
Bigool (2024)	Ghana	DiD	≥ 1 ANC	↑ sig +6.9–7.7 pp (SE 0.028–0.030)
Lang'at et al. (2019)	Kenya	ITS	≥ 1 ANC	↑ sig (trend) +44.64/month; 95% CI 20.41–68.81; $p < 0.001$
Manthalu et al. (2016)	Malawi	DiD	≥ 1 ANC	↑ sig + 15% ($p < 0.01$)
Manthalu et al. (2016)	Malawi	DiD	Average ANC visits	↑ sig +12% ($p < 0.05$)
Manthalu et al. (2016)	Malawi	DiD	Early ANC (1st trimester)	→ n.s.
Orangi et al. (2021)	Kenya	ITS	ANC visits	→ n.s. Level IRR 1.031 (0.966–1.101), $p = 0.359$; trend IRR 1.003 (0.995–1.012), $p = 0.415$
Orangi et al. (2021)	Kenya	ITS	ANC visits	↓ sig (level) Level IRR 0.850 (0.729–0.991), $p = 0.038$; trend n.s.
Orangi et al. (2021)	Kenya	ITS	ANC visits	→ n.s. Level IRR 1.223 (0.871–1.718), $p = 0.246$; trend IRR 1.002 (0.992–1.012), $p = 0.714$
Orangi et al. (2021)	Kenya	ITS	ANC visits	→ n.s. Level IRR 0.831 (0.374–1.848), $p = 0.650$; trend IRR 1.006 (0.983–1.029), $p = 0.626$
Owuor & Amolo (2019)	Kenya	ITS	ANC4	→ n.s. Immediate step: –1.233 ($p = 0.801$); month-specific levels 1–18 all n.s.; pre-trend +10.72/month; post-trend +8.49/month

Key: ↑ -increase ↓ - decrease → -no change sig-significant n.s. - no significant change PP- Percentage Points

Effects of User Fee Removal on Facility-Based Delivery (FBD)

Twelve studies from low- and middle-income countries examined facility-based delivery. Five studies used interrupted time

series analysis. Seven studies employed difference-in-differences methods (Table 3). User fee removal was consistently associated with increased facility-based delivery, but the magnitude, persistence, and nature of these

effects varied by geographic access, facility readiness, and the fidelity of policy implementation. Some settings saw immediate, strong effects, while others reported more moderate or variable changes.

These findings are reflected in several ITS analyses from Kenya and Ethiopia, which showed immediate increases. For instance, Kenya's national ITS found that the 2013 free maternity policy increased public-facility deliveries by 19.6% (IRR 1.196, $p < 0.001$) [24]. County-level ITS studies reported increases of 44-47 deliveries per month across three counties following policy implementation [23]. In Ethiopia, free delivery services led to an immediate monthly increase of 56.8 deliveries, with sustained positive trends [26].

Findings from DiD analyses also indicated strong positive effects. In Zambia, a staggered DiD event study identified an overall 13.9 percentage-point increase in institutional deliveries, although the effect decreased with greater distance and lower facility quality [27]. In Malawi, the mission-facility service-level agreement exemption policy led to an 11-15% increase in facility-based deliveries [22].

In contrast, effects were more limited where barriers remained. For example, Burkina Faso's 2016 *Gratuité* policy, evaluated through controlled ITS, did not result in significant changes in facility-based delivery. Possible reasons included prior subsidy saturation, insecurity, and reimbursement constraints [28].

Effects of User Fee Removal on Skilled Birth Attendance

Six studies in five countries examined how removing user fees affected skilled birth attendance. Four studies used difference-in-differences analysis. Two others used interrupted time series methods (Table 3). User fee removal policies increased skilled birth attendance in most contexts; however, the size and speed of these effects depended on local characteristics such as baseline access, facility quality, and population need. Some settings saw

immediate increases, while others experienced more gradual changes or muted effects.

Difference-in-differences analyses demonstrated substantial gains. In Zambia, removing delivery fees increased skilled birth attendance by 12 percentage points in rural districts and 8 percentage points in peri-urban districts ($p < 0.05$). These effects became evident from 2 to 3 years post-reform, particularly among the poorest populations and in areas with higher facility quality [27]. In Ghana, a doubly robust DiD estimated unconditional and dynamic increases in SBA of 4.6 and 4.5 percentage points, respectively, with these gains observed following the national maternal-care exemption; the timing of the emergence of effects was not explicitly stated. Conditional estimates were smaller and not statistically significant, indicating heterogeneity attributable to covariate adjustment [21]. In Kenya, a within-mother DiD using Kenya Demographic and Health Survey (KDHS) data found a 17-percentage-point increase in SBA following the 2013 free maternity policy, indicating a prompt individual-level behavioural response [29].

ITS studies also found substantial effects on skilled birth attendance. In Kenya, mean monthly SBA levels nearly doubled, rising by 47.3 cases per month after policy implementation. Improvements were sustained over 25 months [23]. In Nyamira County, the policy led to an immediate increase of 257 SBA cases per month, which persisted for 12 to 18 months and was stronger in hospitals than in primary facilities [25].

Effects of User Fee Removal on Caesarean Section Rates

Four studies examined the effects of removing user fees on caesarean section rates. Two studies used difference-in-differences, and two used interrupted time-series designs (Table 3). The main finding was that removing user fees did not consistently increase caesarean

section (CS) rates. In cases where there was an increase, the effect was not significant.

In Zambia, a long-term DiD analysis found no significant change in caesarean section rates after fee removal in rural and peri-urban areas (about +0.01 percentage points; $p > 0.45$). Confidence intervals crossed zero, indicating insufficient power to detect small changes [27].

Similarly, in Kenya, county-level ITS analyses found no significant increases in caesarean section rates after policy implementation. In three counties, the Free Maternity Services policy was associated with a non-significant immediate change in level (-1.12 percentage points, 95% CI -3.94 to 1.68) and a small, non-significant upward trend (+0.14 per month) (Lang'at et al., 2019). Additionally, a within-mother DiD analysis using Kenya Demographic and Health Survey (KDHS) data identified no measurable change in caesarean section probabilities after the 2013 free maternity policy (-1.7 to -2.1 percentage points; both non-significant) [29].

An exception was observed in Nyamira County, where an ITS analysis at the county referral hospital revealed an immediate increase of 12.33 caesarean sections per month (95% CI 0.4 to 24.3; $p = 0.043$). This effect lasted up to nine months and was limited to the hospital setting rather than primary care facilities [25].

Effects of User Fee Removal on Postnatal Care

Four studies examined the impact of user fee removal on postnatal care (PNC): three used difference-in-differences methods, and one used an interrupted time-series analysis (Table

3). The effects of user fee removal on PNC outcomes varied by country, sector, and policy design, with some studies reporting positive changes and others finding no significant impact.

In Malawi, removal of fees through mission-facility SLAs did not lead to a significant change in PNC use. The estimated effect was small (about +0.4%) and not statistically significant in both primary and secondary comparison groups. However, other maternal services, such as antenatal care and facility-based deliveries, did improve [22].

In Kenya, a national interrupted time-series analysis showed immediate and long-term effects. After the 2013 free maternity policy, public facilities had a 14.4% drop in PNC visits (IRR 0.856; 95% CI 0.792–0.926; $p < 0.001$). There was a significant upward trend in monthly returns afterwards (+1.6% per month; IRR 1.016; $p = 0.002$). The 2017 Linda Mama program led to an even bigger immediate decrease (-38.1%; IRR 0.619). This was also followed by a positive post-intervention trend (+2.3% per month). Private and faith-based facilities showed no significant changes. These findings match partial program coverage and reimbursement delays [24].

In Zambia, the difference-in-differences analysis showed a significant 7.8 percentage-point increase in early PNC checks (within 24 hours) in rural districts. Effects were non-significant in peri-urban areas and decreased with greater distance and lower facility quality. Observed increases were smaller than those for facility-based delivery, indicating supply-side constraints [30].

Table 3. Direction of Effects of User Fee Removal on MCH Utilization

Study (Year)	Country	Design	Facility-based delivery	Skilled birth attendant	Caesarean section	Postnatal care
Gitobu et al., (2018)	Kenya	ITS	↑ sig +29.5% (234,601→303,705) $p < 0.001$. Trend change: ↑ post-policy slope +124.9/quarter ($p < 0.01$).	N/A	N/A	N/A

Aye et al., (2024)	Burkina Faso	ITS	→ n.s. Level change: ↓ n.s -2.1 post-policy (p= 0.628). Trend change: ↓ n.s -0.10 pp/month (p=0.740)	N/A	N/A	N/A
Lang'at et al., (2019)	Kenya	ITS	↑ sig Trend change: (+44-47/month) p<0.001 Level change: +58.5 EmONC cases/month immediately (proxy for demand) overall +97% post-policy	↑ sig Level change: +253.05 at month 1 (95% CI -101.24, 607.35) Trend change: +47.31/month (95% CI 27.88-66.73, p<0.001)	→ n.s. Level change: n.s -1.12 (95% CI -3.94, 1.68) Trend change: n.s +0.14/month (95% CI -0.15, 0.42)	N/A
Chitalu & Steven (2017)	Zambia	ITS	↑ sig Level change: +1.2 post-policy (p<0.05) Trend change: n.s	N/A	N/A	N/A
Orangi et al., (2021)	Kenya	ITS	↑ sig Level change: +19.6% public facility deliveries (IRR 1.196, 95% CI 1.113-1.286), p<0.001.	N/A	↑ sig 2013 level for CS. ↓ sig (CS trend later)	Mixed: public level ↓ then trend ↑. Private/faith-based: no significant PNC effects Level change: 2013 policy public facilities: -14.4% IRR 0.856 (95% CI 0.792-0.926) p=0.000. 2017 Linda Mama - public facilities: -38.1% IRR 0.619 (0.412-0.929) p=0.021 Trend change: 2013 policy public facilities: +1.6%/month 1.016 (1.006-1.026) p=0.002. 2017 Linda Mama public facilities: +2.3%/month IRR 1.023 (1.011-1.035) p=0.000

Demissie et al., (2020)	Ethiopia	ITS	↑ sig Level change: +56.8 deliveries/month (p<0.001). Trend change: ↑ sig +1.698/month (p=0.009). 36–51% relative increase by year 3	N/A	N/A	N/A
Owuor & Amolo (2019)	Kenya	ITS	↑ sig Level change: +257.4 /month (SE 66.0), p<0.001; Hospitals +116/month (SE 38.0), p=0.004; PHCF +189/month (SE 52.3), p=0.001 Trend change: Significant through 12–18 months depending on facility type	↑ sig Level change: (Immediate)+257.4 /month (95% CI 123.6–391.3), p<0.001; significant to month 12; hospitals sustained to month 18 Trend change: Pre-slope +10.1/month; post-slope +8.2/month	↑ sig Level change: Immediate +12.33 CS/month (95% CI 0.4–24.3), p=0.043; significant to month 9 Trend change: +0.162 (n.s.)	N/A
McKinnon et al., (2015)	Ghana/Senegal/Sierra Leone	DiD	↑ sig +5–9 pp across SES/education. Poorest: +5.4 pp (95% CI 2.1–8.8); Richest: +6.8 pp (4.0–9.7); No education: +4.6 pp (2.2–7.0); ≥Secondary: +8.6 pp (5.4–11.9)	N/A	N/A	N/A
Chama-Chiliba & Koch (2016)	Zambia	DiD	→ n.s.(public) ↑ sig (private/FBO) Public FBD: DiD –0.337 (SE 0.247), n.s.; Private/FBO: +1.575 (SE 0.671), p<0.01	N/A	N/A	N/A
Lagarde et al., (2022)	Zambia	DiD	↑ sig +13.9 pp overall Public facility +10.8 pp (SE 0.034, p<0.001)	↑ sig +12 pp (rural, 95% CI 0.07–0.16, p<0.0001); +8 pp (peri-urban, 0.02–0.14, p=0.012)	→ n.s. Rural: +0.01 pp (95% CI –0.02, 0.04, p=0.457); Peri-urban: +0.01 pp (95% CI –0.02, 0.04, p=0.570)	↑ sig +7.8 pp rural)
Manthalu et al., (2016)	Malawi	DiD	↑ sig +11% (95% CI 1–21%, p<0.05) vs primary control. +15% (4–26%, p<0.01) vs secondary control	N/A	N/A	→ n.s. No effect (≈ +0.4% in log model); alternative control also n.s. SE ≈ 0.094 (primary); SE ≈ 0.099 (secondary)

Bigool (2024)	Ghana	DiD	↑ sig +10.8 pp uncond; cond n.s. +10.8 pp (unconditional); +4.8 pp (conditional, n.s.); dynamic +10.3 pp (uncond)	↑ sig Group average +4.6 pp (unconditional, p<0.05); Dynamic +4.5 pp (p<0.01); Conditional +2.9 pp (n.s.) SE ≈ 0.017–0.019	N/A	N/A
Renard, (2022)	Zambia	DiD	N/A	↑ sig +11.4 pp overall (SE 0.023, p<0.01). Phase 2 +10.4 pp (SE 0.043, p<0.05)	N/A	↑ sig (rural), mixed elsewhere +7.8 pp increase in rural districts (significant); similar magnitude in rural areas of urban districts (n.s.)
Oyugi et al., (2024)	Kenya	DiD	N/A	↑ sig +17 pp FE model, p<0.01	↓ n.s. -1.7 pp (SE 0.022) with firstborns; -2.1 pp (SE 0.030) without firstborns	N/A

Key: ↑ increase ↓ decrease → no change sig significant n.s. no significant change PP Percentage Points FBO
Faith-based organizations

Effects of User Fee Removal on Maternal Mortality

Two interrupted time-series studies assessed the impact of user-fee policies on maternal mortality. Positive effects were observed for antenatal care (ANC) visits and institutional deliveries from these studies. However, the evidence regarding maternal mortality was complex and, in some settings, counterintuitive (Table 4).

In Kenya, a large interrupted time series study across 77 public facilities reported a slight decrease in the institutional maternal mortality ratio (iMMR) from 258.3 to 237.1 per 100,000; however, this change was not statistically significant (p=0.07). Notably, stratified analyses revealed a significant decline only in rural facilities. In contrast, overall trends indicated an increase in post-policy mortality slopes (pre-trend: -1.64; post-trend: +3.49, p=0.01), which may reflect increased

caseloads and ongoing quality-of-care limitations [31].

A county-level ITS in Nyamira County, Kenya, demonstrated a more concerning trend. Specifically, the institutional maternal mortality ratio increased significantly at several post-policy time points: +301 per 100,000 at month 9 (95% CI 3–599, p=0.048), +382 at month 12 (p=0.029), and +545 at month 18 (p=0.020). Previously, pre-intervention trends showed declining mortality (-16.8/month, p=0.013), whereas post-policy slopes increased (+10.3/month) [25].

Effects of User Fee Removal on Neonatal Mortality

Four studies examined the effects of user-fee removal on newborn deaths. Of these, two used interrupted time series, while the other two used difference-in-differences. However, results show that fee removal did not reliably lower newborn deaths, as most studies reported little or no impact (Table 4).

In Kenya, two ITS studies evaluated the 2013 free maternal health policy. The first, a multi-facility ITS study, found no significant drop in neonatal deaths at health facilities, with rates moving slightly from 23.3 to 22.9 per 1,000 births ($\Delta = -0.4$; $p = 0.14$). Immediate and trend changes were not statistically significant (post-trend $p = 0.10$) (Gitobu et al., 2018). At the county level in Nyamira, the second ITS found similarly small, non-significant changes (-2.33 to -4.11 per 1,000) and no trend, even though service use increased markedly [25].

Turning to Zambia, results from two DID analyses were similar to those in Kenya. A national DHS-based DID found no average policy effect in rural or peri-urban districts, as the confidence intervals included zero. An extended event-study showed reductions in neonatal mortality only among households near higher-quality facilities, with no effect nationwide [27, 30].

However, a notable exception to these findings occurred in Kenya. A within-mother difference-in-differences analysis identified significant declines in early neonatal mortality (approximately 16.5–20.6%) and overall neonatal mortality (approximately 19–20%) following the 2013 free maternity policy ($p < 0.01$). This reduction corresponds to an estimated 4,015 neonatal deaths averted nationally [29].

Effects of User Fee Removal on Stillbirth

Two studies evaluated the effects on stillbirth (SB) using interrupted time-series and difference-in-differences analyses. User-fee removal policies did not result in significant reductions in stillbirth, and the overall evidence indicates null effects (Table 4).

In Kenya, an interrupted time-series (ITS) analysis of 90 public facilities following the June 2013 Free Maternity Services policy found no statistically significant change in stillbirth rates. The immediate level change was -2.55 per 1,000 births (95% CI: -9.87 to 4.77 ;

$p > 0.05$), and the post-policy trend remained stable ($\beta_3 = +0.08$; 95% CI: -0.45 to 0.61), despite improvements in antenatal care (ANC; care before birth), skilled birth attendance (SBA; presence of trained health professionals), and emergency obstetric and newborn care (EmONC). To provide additional context, although stillbirth rates were declining slightly prior to the policy ($\beta_1 = -0.38$; $p = 0.05$), the intervention did not accelerate this decline or alter slope trajectories [23].

Similarly, in Zambia, a large difference-in-differences analysis leveraging staggered fee removal across rural and peri-urban districts found no significant effect on stillbirth risk. Estimates derived from the Demographic and Health Survey (DHS) reproductive calendar histories indicated probability changes centered on zero, with confidence intervals that included the null. The authors explicitly reported stillbirth effects as non-significant, despite observed increases in facility utilization and other maternal health indicators [30].

Effects of User Fee Removal on Infant Mortality

Only one study employing a difference-in-differences approach assessed the effects of removing user fees on infant mortality. The findings from this study indicate that user fee removal reduces infant mortality, though average population-level effects were generally negligible (Table 4).

Turning to specific country evidence, in Zambia, a large difference-in-differences analysis [30], which leveraged staggered fee removal across rural, peri-urban, and subsequently urban districts, found no significant change in the risk of death before age one. The estimated absolute risk difference was $+0.004$ (SE 0.008; $p > 0.10$), indicating no measurable effect at either the national or district level, despite documented improvements in maternal service utilization. Furthermore, the study reported declines in newborn mortality were observed only among

households near higher-quality facilities, highlighting the importance of supply-side readiness and geographic accessibility in translating increased utilization into improved survival outcomes.

Effects of User Fee Removal on Equity

Three studies using difference-in-differences designs evaluated the effects of user-fee removal policies on equity. The evidence shows these policies consistently increased maternal health service utilization across socioeconomic groups. However, they did not consistently reduce either socioeconomic or geographic inequities. In many cases, reforms led to absolute gains for all groups, but relative disparities remained unchanged or widened (Table 4).

A multi-country analysis (Ghana, Senegal, Sierra Leone) [32] found that removing delivery fees increased facility-based delivery

by +5.4 percentage points among the poorest and +6.8 percentage points among the richest, with no significant wealth-based heterogeneity ($p=0.53$). However, there were significantly larger gains among higher-educated women (+8.6 percentage points vs +4.6 percentage points; $p=0.04$), suggesting potential education-based widening of inequality.

In Zambia, difference-in-differences analyses with event-study designs showed that utilization gains, such as a 13.9 percentage-point increase in institutional deliveries and an 11.4 percentage-point increase in skilled birth attendance, were largest for households near higher-quality facilities. In contrast, households in distant or low-quality areas benefited less. Reductions in mortality appeared only near well-equipped facilities. This highlights that geographic inequities are mainly due to service readiness rather than user fees alone [30].

Table 4. Direction of Effects of User Fee Removal on Maternal and Child Health Outcomes

Study (Year)	Country	Design	Maternal mortality	Neonatal mortality	Stillbirth	Infant mortality	Equity
Gitobu et al., (2018)	Kenya	ITS	All facilities: → n.s. MMR fell from 258.3 to 237.1 per 100,000 ($\Delta -21.2$). Pre-policy trend: -1.64 ($p=0.20$); post-policy trend: $+3.49$ ($p=0.01$). Overall $p=0.07$ for pre-post difference in MMR levels Rural facilities: ↓ sig ($p=0.02$) Level change: quarterly slopes show ↑ post-policy (3.49 , $p=0.01$)	→ n.s. 23.3→22.9 per 1,000 ($\Delta -0.4$), $p=0.14$ Level change: No significant Trend change: Pre-trend -0.09 ($p=0.24$); post-trend $+0.12$ ($p=0.10$)	N/A	N/A	N/A
Owuor & Amolo (2019)	Kenya	ITS	↑ sig Overall iMMR 9–18 month County: significant ↑ in iMMR at months 12 & 18 ($p<0.05$); CRH: level increases—e.g., +301 per 100,000 at month 9 (95% CI 3–599, $p=0.048$), +382 at month 12 ($p=0.029$), +545 at month 18 ($p=0.020$)	→ n.s. level effects -2.33 to -4.11 , ($p>0.33$) Pre-trend $+0.08$ ($p=0.565$); Post-trend -0.025 (ns)	N/A	N/A	N/A
Lang’at et al., (2019)	Kenya	ITS	N/A	N/A	→ n.s. Level change	N/A	N/A

					-2.55 (95% CI -9.87, 4.77) (p>0.05) Trend change pre = -0.38 (p=0.05); β_3 post = +0.08 (ns)		
Lagarde et al., (2022)	Zambia	DiD	N/A	→ n.s. Average policy effect ($\beta=0.00$ in rural 95% CI -0.01 to 0.02 & peri-urban -0.02 to 0.02 Pvalue: n.s	N/A	N/A	Effects stronger nearer higher-quality facilities
Renard (2022)	Zambia	DiD	N/A	→ n.s. Average effect ↓ sig reductions only for households near qualified facilities	→ n.s. stillbirth risk	→ n.s. +0.004 (absolute risk difference) SE 0.008, (p>0.10)	Newborn mortality declined near qualified facilities. Effects fade with distance to facility.
Oyugi et al., (2024)	Kenya	DiD	N/A	↓ sig 19–20% p<0.01 Early neonatal ↓ 16.5–20.6% Neonatal ↓ 19.3–20.0% (significant).	N/A	N/A	N/A
McKinnon et al., (2015)	Ghana/Senegal/Sierra Leone	DiD	N/A	N/A	N/A	N/A	Mixed: absolute FBD ↑ across SES; rich-poor gap not reduced Absolute increases per 100 births: Wealth—poorest +5.4 (95% CI 2.1–8.8), richest +6.8 (4.0–9.7), heterogeneity p=0.53;

							Assets—0 assets +8.2 (5.1–11.4) vs 3+ assets +4.4 (0.5–8.2), p=0.11; Education— none +4.6 (2.2–7.0) vs secondary+ +8.6 (5.4– 11.9), p=0.04.
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Key: ↑ increase ↓ decrease → no change sig significant n.s. no significant change PP Percentage Points FBO
Faith-based organizations

Table 5. Mechanism Evidence Map

Study (country, year)	Design	Utilisation effect	Mortality/other outcomes	Mechanism domains (1–6)	Interpretation
Aye et al., 2024 (Burkina Faso)	ITS	FBD: n.s.	Mortality: not assessed	1,2,6	FBD saturated due to prior subsidy.
Bigool, 2024 (Ghana)	DiD	ANC ≥1: +6.9pp; FBD: +10.8pp; SBA: +4.6pp	Stunting: –12.3% (moderate ↓), severe n.s	2,5,6	Policy increased ANC quality/attendance; demand barriers moderated effects on severe stunting.
Chama-Chiliba & Koch, 2016 (Zambia)	DiD	No mean ↑ in public FBD; ↑ deliveries at faith-based	N/A	3,5,6	Cost shifting & indirect costs; redistribution to FBO; implementation & demand barriers.
Chitalu & Steven, 2017 (Zambia)	ITS	Immediate FBD +1.2pp; no sustained trend	N/A	1,6	Short-term response without capacity/funding to sustain.
Demissie et al., 2020 (Ethiopia)	ITS	FBD ↑ (44–51% by 2–3 years)	N/A	1,6,2	Gradual capacity/process improvements needed for sustained effect.
Gitobu et al., 2018 (Kenya)	ITS	FBD +29.5%	MMR ↓ n.s; NMR ↓ n.s	1,3,4	Volume ↑ without commensurate EmONC/referral capacity limited mortality impact.
Lang’at et al., 2019 (Kenya)	ITS	ANC, SBA, live births ↑; CS, stillbirth →	Stillbirth: →	2,3,6	Process/throughput gains not matched by advanced obstetric capacity.
Orangi et al., 2021 (Kenya)	ITS	2013 FMP: public deliveries +19.6%, CS +28.9%; 2017 LM mixed; PNC level ↓ then trend ↑	N/A	3,6,2	Policy transitions disrupted PNC; redistribution across sectors; incentive/contracting issues.

Owuor & Amolo, 2019 (Kenya)	ITS	SBA ↑ (long-term); CS ↑ (medium-term)	Institutional MMR ↑; NMR →	1,4,2	More severe cases reached hospitals; referral/critical-care constraints increased in-facility MMR.
Oyugi et al., 2024 (Kenya)	DiD	SBA ↑ 17pp; public facility birth ↑ 5.8pp	Early NMR ↓ 17–21%; NMR ↓ 19–20%	2	Suggests improved intrapartum/immediate neonatal care in some contexts.
Renard, 2022 (Zambia)	DiD	FBD +43%; SBA +36%	Infant mortality: avg —; death at birth ↓ near qualified facilities; stunting ↓ 8%	1,2,5	Benefits concentrated where proximity/capacity higher; equity by distance remains.
Lagarde et al., 2022 (Zambia)	DiD	Institutional/assisted delivery ↑ (10–15pp); CS N/A	Neonatal mortality →	1,2,5	Utilisation ↑, outcome static; capacity/quality constraints and distance gradients.
Manthalu et al., 2016 (Malawi)	DiD	ANC ≥1 +15%; avg ANC +12%; FBD +11%; early ANC/PNC N/A	N/A	2,5,6	Non-price barriers and continuity gaps constrained early ANC and PNC.
McKinnon et al., 2015 (Ghana, Senegal, Sierra Leone)	DiD	FBD ↑ across wealth/education; richest/educated gained more	Neonatal mortality →	5,1	Distributional improvements uneven; capacity/proximity advantages for better-off.

Key: ↑ increase ↓ decrease → no change sig-significant n.s. no significant change PP Percentage Points.

Mechanism domains: 1) Supply-side capacity readiness 2) Quality-of-care processes 3) Provider incentives/workload 4) Referral system 5) Demand-side accessibility beyond fees 6) Implementation fidelity.

Mechanism Evidence Map

Study-level mechanisms were mapped against the conceptual pathway and summarized in Table 5.

Risk/ Quality Assessment

We found that the methodological quality of studies varied substantially. Four studies were judged to have an overall moderate risk of bias, primarily those employing difference-in-differences with strong diagnostics (parallel trends check, event-study plots and placebo tests). These studies typically adjusted for key confounders and used non-equivalent controls or fixed-effects models to mitigate bias. For example [21], in Ghana

leveraged rich covariate sets and municipal or regional fixed effects.

Conversely, 10 studies were rated as having a serious risk of bias, largely due to design limitations and contextual challenges. Studies relying on uncontrolled interrupted time series were particularly vulnerable to residual confounding and concurrent policy changes. In fragile settings such as Burkina Faso, deviations from intended interventions were common, driven by health system shocks including strikes, insecurity, and COVID-19 disruptions. These factors contributed to elevated risk in studies like [28]. Table 6 below presents the full details of the Risk of bias assessment.

Table 6. ROBINS-I Summary Judgements

Study	Design	Confounding	Selection of participants	Classification of interventions	Deviations from intended interventions	Missing data	Measurement of outcomes	Selection of reported result	Overall ROBINS-I	Key notes
Aye et al., 2024 (Burkina Faso)	ITS	Serious	Low	Low	Low	Moderate	Moderate	Moderate	Serious	ITS: potential history/co-intervention bias; seasonality/auto-correlation often addressed but residual confounding likely.
Bigool, 2024 (Ghana)	DiD	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate	Augmented DiD / FE improves control for time-invariant confounding; still subject to time-varying unmeasured confounding.
Chama-Chiliba & Koch, 2016 (Zambia)	DiD	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate	DiD: assumes parallel trends; some studies test/event-study; residual confounding possible. No mortality outcomes in study.
Chitalu & Steven, 2017 (Zambia)	ITS	Serious	Low	Low	Low	Moderate	Moderate	Moderate	Serious	ITS: potential history/co-intervention bias; seasonality/auto-correlation often addressed but residual confounding likely. No mortality outcomes in study.
Demissie et al., 2020 (Ethiopia)	ITS	Serious	Low	Low	Low	Moderate	Moderate	Moderate	Serious	ITS: potential history/co-intervention bias;

										seasonality/auto-correlation often addressed but residual confounding likely. No mortality outcomes in study.
Gitobu et al., 2018 (Kenya)	ITS	Serious	Moderate	Low	Low	Moderate	Serious	Moderate	Serious	ITS: potential history/co-intervention bias; seasonality/auto-correlation often addressed but residual confounding likely. Single-county hospital; selection & data completeness concerns. Mortality measurement may be underpowered/subject to misclassification.
Lang'at et al., 2019 (Kenya)	ITS	Serious	Low	Low	Low	Moderate	Moderate	Moderate	Serious	ITS: potential history/co-intervention bias; seasonality/auto-correlation often addressed but residual confounding likely.
Orangi et al., 2021 (Kenya)	ITS	Serious	Low	Low	Low	Moderate	Moderate	Moderate	Serious	ITS: potential history/co-intervention bias; seasonality/auto-correlation often addressed but residual confounding likely. No mortality outcomes in study.

Owuor & Amolo, 2019 (Kenya)	ITS	Serious	Moderate	Low	Low	Moderate	Serious	Moderate	Serious	ITS: potential history/co-intervention bias; seasonality/auto-correlation often addressed but residual confounding likely. Single-county hospital; selection & data completeness concerns. Mortality measurement may be underpowered/subject to misclassification.
Oyugi et al., 2024 (Kenya)	DiD	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate	Augmented DiD / FE improves control for time-invariant confounding; still subject to time-varying unmeasured confounding.
Renard, 2022 (Zambia)	DiD	Moderate	Low	Low	Low	Low	Serious	Moderate	Serious	DiD: assumes parallel trends; some studies test/event-study; residual confounding possible. Mortality measurement may be underpowered/subject to misclassification.
Lagarde et al., 2022 (Zambia)	DiD	Moderate	Low	Low	Low	Low	Serious	Moderate	Serious	DiD: assumes parallel trends; some studies test/event-study; residual confounding possible. Mortality measurement

										may be underpowered/subject to misclassification.
Manthalu et al., 2016 (Malawi)	DiD	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate	DiD: assumes parallel trends; some studies test/event-study; residual confounding possible. No mortality outcomes in study.
McKinnon et al., 2015 (Ghana, Senegal, Sierra Leone)	DiD	Moderate	Low	Low	Low	Low	Serious	Moderate	Serious	DiD: assumes parallel trends; some studies test/event-study; residual confounding possible. Mortality measurement may be underpowered/subject to misclassification.

Judgement scale: Low / Moderate / Serious / Critical / NI (No information). Overall judgement reflects worst domain (adjusted for plausible residual confounding and bias from selection, measurement, missingness, and reporting).

DiD Identification Diagnostics

Difference-in-differences (DiD) studies frequently reported event-study or parallel trend diagnostics, placebo or falsification tests,

and fixed-effects specifications. All seven DiD papers included a formal pre-trend diagnostic, and six of seven demonstrated clear parallel trends for their primary outcomes (Table 7).

Table 7. DiD Identification Diagnostics – Parallel Trends Tests

Study (Year)	Country	DiD estimator	Parallel trends test?	How tested	Satisfied?
Bigool (2024)	Ghana	Doubly-robust DiD (Callaway & Sant'Anna), event-study	Yes	Event-study leads; pre-trend coefficients ≈ 0 (after covariates)	Yes (primary outcome)
Manthalu et al. (2016)	Malawi	DiD (facility and household data)	Yes	Visual pre-trend + regression tests	Yes
McKinnon et al. (2015)	Multi-country	DiD with interaction terms; event-study framework	Yes	Pre-policy trend equivalence by SES groups	Mostly — borderline difference for most-educated subgroup ($p \approx 0.06$); main outcomes OK
Chama-Chiliba & Koch (2016)	Zambia	Multilevel DiD	Yes	Placebo reform dates; fixed-effects; restricted subsamples	Yes
Renard (2022)	Zambia	Staggered DiD; Callaway-Sant'Anna; event-study	Yes	Event-study leads/lags; placebo	Yes
Lagarde et al. (2022)	Zambia	Staggered DiD; event-study	Yes	Event-study; pre-trend flat	Yes
Oyugi et al. (2024)	Kenya	Within-mother DiD (FE)	Yes	Placebo policy dates; FE models	Yes

Discussion

Effects of Removing User Fees on MCH Access/Utilization and Mortality Outcomes

Our findings align with the pathways hypothesized earlier and illustrated in Figure 2. Increased antenatal care, facility-based delivery, and skilled birth attendance confirm the framework's first stage: financial protection enables access as observed by earlier studies [3, 7, 12, 13, 33]. However, limited and inconsistent effects on maternal, neonatal, and stillbirth mortality highlight the mediating roles of quality and system readiness in later

framework stages. An exception arises in Kenya where neonatal mortality dropped after the 2013 policy [29], suggesting that improved care quality or processes strengthen the utilization–outcome link, consistent with effective coverage logic. These findings reinforce that financial barriers are a major constraint to maternal health service use in low- and middle-income countries. However, despite improved utilisation, there is little evidence that these gains translate into proportional reductions in downstream outcomes, including maternal, neonatal, or stillbirth mortality, suggesting that financial

access alone is insufficient to achieve better population-level outcomes.

Effects Removing User Fees on Early ANC Initiation

The framework anticipates that non-financial barriers moderate the pathway from financial access to timely utilization. Specifically, regarding ANC, a crucial component of MCH care, the study found limited immediate early initiation despite fee removal. Evidence across LMICs indicates that sociocultural norms and gendered decision-making constrain first-trimester ANC even when fees are removed, while stigma surrounding early pregnancy disclosure and perceptions of risk also play a role [4, 34-37]. Furthermore, in line with the framework's feedback loops and contextual modifiers, timely ANC improved only when financial reforms were paired with outreach, transport, and health literacy efforts, as observed in Ghana and Madagascar [38, 39].

Effects of Removing User Fees on Equity

Persistent socioeconomic and geographic disparities reflect the framework's prediction: equity outcomes rely on both demand- and supply-side factors. Removal of fees increased utilization across all groups. However, inequalities in caesarean uptake, ANC completion, and facility delivery persisted, sometimes widening, especially where distance and quality differences were notable. These disparities echo previous findings [40, 41] and stem from factors such as geographic distance, the concentration of high-quality facilities in urban areas, unequal access to information, and informal fees. Fee removal alone cannot address these. Free care increases user volume but often does not expand the health system's capacity or equity focus enough to guarantee equal benefit.

Although equity findings varied across studies, these differences become coherent when examined through a unified framework of

how each study defined socioeconomic position and geographic access. Multi-country analyses employing wealth or asset indices (e.g., McKinnon et al., 2015) demonstrated absolute increases in facility delivery across all socioeconomic strata yet showed limited reductions in relative inequalities. This is partly because such indicators measure long-term household resources rather than immediate access to functioning health facilities. In contrast, Zambia's DHS-based difference-in-differences analyses indicated that equity patterns were primarily influenced by proximity to facilities and facility readiness. The most significant improvements in skilled birth attendance and early postnatal care occurred among households located near higher-quality facilities, while benefits diminished considerably with increased distance or inadequate system readiness. Additionally, education-based disparities widened in several contexts because more educated women were better positioned to translate reduced financial barriers into timely and appropriate utilization. Collectively, these findings suggest that fee removal policies tend to reduce absolute inequities but often leave relative inequities unchanged, particularly where structural disadvantages such as geographic distance, inconsistent facility quality, and information asymmetries persist. This interpretation supports the proposed framework: equity outcomes are shaped not only by financial access but also by the spatial distribution of quality and the capacity of different groups to navigate the health system.

Mechanistic Synthesis: Linking Service Utilization to Quality and System Readiness

The divergence between increased service contact and limited survival gains is clarified by the conceptual framework's synthesis of Tanahashi's effective coverage cascade and Donabedian's structure-process-outcome model: fee removal reliably advances contact

coverage, but progress to effective coverage, where use plus competent, timely care depends on readiness and quality [9, 17]. Across settings with large post-reform utilization gains, studies described congestion, staffing shortfalls, stockouts, and constrained emergency obstetric and newborn care. These are bottlenecks that the framework locates at the quality/capacity filters and at the third delay [18, 19]. Weak referral systems and transition shocks during program changes, such as Kenya's 2013 free maternal policy and the 2017 Linda Mama policy, further impeded the conversion from contact to effective coverage.

Although substantial increases in antenatal care, facility-based delivery, and skilled birth attendance were observed across the included studies, the evidence demonstrates limited, inconsistent, or even adverse effects on maternal, neonatal, and stillbirth mortality. These findings indicate that mortality outcomes are influenced more by system readiness than by utilisation alone. Most mortality analyses, particularly the multi-facility interrupted time series (ITS) studies from Kenya and the national difference-in-differences (DiD) analyses from Zambia, did not find statistically significant reductions in maternal or neonatal deaths, even when service contact increased sharply. This highlights persistent deficiencies in emergency obstetric and newborn care, referral timeliness, provider competence, and critical-care capacity, all of which are necessary to translate increased utilisation into improved survival. In certain contexts, increased caseloads without corresponding improvements in staffing, supplies, or operating theatre availability may have contributed to worse outcomes. For example, in Nyamira County, institutional maternal mortality rates increased significantly after policy implementation, reversing previous declines despite higher utilisation, which suggests congestion, referral bottlenecks, and critical-care limitations. In contrast, the only study reporting significant mortality reductions (Oyugi et al., 2024)

employed within-mother DiD models that better accounted for unobserved heterogeneity and included deaths occurring outside facilities, thereby revealing early neonatal mortality reductions not captured by routine facility data. Collectively, these findings support the conceptual framework that fee removal reliably increases contact coverage, but effective coverage, defined as utilisation combined with timely and competent care, requires robust emergency obstetric and newborn care (EmONC) systems, efficient referral pathways, and sufficient staffing and supply chains. Without these complementary investments, fee-removal policies are unlikely to consistently reduce maternal or neonatal mortality at the population level.

Interpreting mortality findings requires a clear distinction between institutional mortality and population-level mortality, as fee-removal reforms influence these outcomes differently. Several interrupted time series (ITS) studies have measured only institutional maternal or neonatal deaths, which are highly sensitive to changes in case mix. When financial barriers are eliminated, a greater number of high-risk, late-presenting, or referred obstetric emergencies access facilities, which can mechanically increase institutional mortality ratios even if true population mortality remains unchanged. This phenomenon is observed in Nyamira County, where institutional maternal mortality rose following policy implementation despite increased service utilisation. This likely reflects referral concentration, facility congestion, and a higher acuity case mix, rather than a decline in overall survival. In contrast, studies utilizing population-representative Demographic and Health Survey (DHS) data (e.g., Renard 2022; Oyugi 2024) capture deaths occurring both within and outside health facilities. These analyses report no significant national change in neonatal or infant mortality in Zambia, but substantial reductions in early neonatal mortality in Kenya. Synthesizing these findings suggests that fee removal may initially

increase facility-based deaths due to a higher proportion of critically ill women and newborns accessing care. However, improvements in population mortality depend on the capacity of facilities to provide adequate emergency, referral, and newborn care, translating increased access into improved survival.

Confidence is higher for findings related to utilization, such as facility delivery and skilled attendance, when these are consistently observed in difference-in-differences (DiD) studies with verified parallel trends and robustness checks (e.g., Bigool 2024; Lagarde et al. 2022; Renard 2022; Manthalu et al. 2016; McKinnon et al. 2015; Oyugi et al. 2024). Confidence is lower for outcomes where evidence is primarily derived from interrupted time series (ITS) designs that are at serious risk of residual confounding or measurement limitations, such as institutional mortality and stillbirth. One DiD study identified a borderline pre-trend within an education subgroup, while the primary outcome satisfied parallel trends. As a result, the strength of subgroup equity inferences is downgraded, but confidence in the primary utilization effect is maintained. Overall, a quality-weighted interpretation supports the conclusion that removing user fees reliably increases contact coverage, while improvements in mortality and equity depend on concurrent investments in quality and system readiness.

Policy Impacts

Applying the framework yields a holistic inference. Fee removal alone boosts utilization. However, survival gains require complementary investments in system readiness, clinical quality, and referral capacity. Policies should therefore integrate financial reforms with targeted strengthening of emergency obstetric and neonatal care, supply chains, staffing, supervision, and reliable purchasing or reimbursement. Addressing geographic access through transport and

referral networks is also needed to avoid congestion and widening of the distribution.

Collectively, the evidence indicates that user-fee removal constitutes a necessary but insufficient approach for improving maternal and newborn health outcomes. To achieve substantial reductions in mortality and promote equitable health gains, fee removal policies should be accompanied by supply-side enhancements, including investments in emergency obstetric and newborn care capacity, reliable referral and transport systems, adequate staffing, essential commodities and pharmaceuticals, and facility-level supervision. Equally critical are equity-focused interventions, such as targeting remote and underserved populations through transport vouchers, maternity waiting homes, community health worker outreach, or geographic resource allocation formulas that align funding with need. Strengthening information systems to monitor quality-of-care indicators, delays across the care continuum, and variations by distance or facility readiness will facilitate more responsive policy development. Policymakers should therefore integrate financial reforms with investments in readiness and quality to ensure that increased access results in effective and equitable coverage, rather than merely higher contact rates.

Future Research

To test and refine the framework, future quasi-experimental studies should embed mechanism measures, including readiness indices, process quality indicators, and referral performance, and incorporate geospatial equity analyses to capture distance and facility quality gradients. Improved outcome measurement (standardized definitions, robust surveillance) and transparent reporting of implementation fidelity will sharpen detection of mortality effects and reveal the conditions under which fee removal yields effective coverage.

Strengths of the Review

This review provides a coherent mechanistic synthesis anchored in a specifically tailored conceptual framework and applies a transparent risk-of-bias approach suitable for non-randomized designs. By integrating diverse policy designs and contexts, it offers policy-relevant insights for LMICs.

Limitations of the Review

This review has several limitations relevant to policy interpretation. First, data quality issues were evident across included studies, particularly for rare outcomes such as maternal and neonatal mortality, raising concerns for policymakers' reliance. Misclassification and incomplete reporting may bias effect estimates, potentially affecting the use of evidence in policy decisions. Second, the risk of bias assessment indicated that most studies were at serious risk of bias due to residual confounding, reliance on routine data, and vulnerability to concurrent policy changes, factors that should be considered in policy analyses. Finally, we did not conduct a meta-analysis because of substantial heterogeneity in study designs, outcome definitions, and reporting formats. While narrative synthesis preserves contextual detail necessary for policy relevance, it limits the ability to provide pooled effect estimates. These limitations should be considered when interpreting the findings and highlight the need for more rigorous designs and standardized reporting to inform future policy research.

An additional limitation concerns the scope of our search strategy. We limited our database search to PubMed and Web of Science, informed by an initial scoping exercise that indicated most quasi-experimental evaluations of user-fee reforms published in economics and development journals were already indexed in Web of Science. During this scoping, we reviewed titles from Scopus and EconLit and observed substantial overlap, with no additional eligible quasi-experimental studies uniquely indexed in those databases. Consequently, we

did not expand the search to further databases. We also did not perform backwards or forward citation searching, nor did we include grey literature sources such as government reports or donor evaluations. Although these decisions ensured methodological consistency and maintained a focus on peer-reviewed evidence, they may have introduced publication and disciplinary biases, potentially excluding relevant evaluations from outside biomedical and health policy journals. These limitations should be considered when interpreting the comprehensiveness of our findings.

Conclusion

Removing user fees for maternal and child health services consistently increases service access and utilization. However, these gains do not automatically translate into reductions in maternal, neonatal, or stillbirth mortality. Consistent with our conceptual framework, financial reforms address demand-side barriers but fall short of achieving effective coverage unless accompanied by investments in the quality of care, system readiness, and referral capacity. Persistent equity gaps driven by distance, differential facility quality, and other non-price barriers further underscore the need to pair fee removal with targeted system strengthening and equity-oriented strategies. This ensures that expanded access results in equitable, meaningful health outcomes.

Conflict of Interest

None to declare.

Ethical Approval

Not applicable.

Author Contributions

Peter Kofi Taadi conceptualized the study, developed the methodology, performed the formal analysis, prepared the original draft of the manuscript, and led the writing process. David Stuckler and Paul Abiodun Olaiya supervised the research and contributed to the

review and editing of the manuscript to enhance clarity and rigor.

Data Availability

This study is a systematic review that synthesises evidence from previously published studies. As such, the primary datasets generated by the included studies are not owned by the authors and are not publicly available through this article. All studies included in the synthesis are fully referenced in the manuscript. Any secondary analyses conducted by the authors that are not presented in the article may be made

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