Persistent Inequities in Maternal Health Care in Cambodia: A Narrative Review of Coverage, Quality, and Access Across the Continuum of Care

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ABSTRACT

Cambodia has achieved substantial reductions in maternal mortality over two decades, with near-universal facility delivery reaching 98.4% in 2021–22. However, aggregate improvements may obscure persistent inequities affecting poor, rural, and less-educated women. We conducted a narrative review synthesizing Cambodia Demographic and Health Survey data from 2000–2022, national policy documents, and peer-reviewed literature on maternal health equity. We examined coverage patterns across the continuum of care, including antenatal, intrapartum, and postnatal services, and analyzed financial, geographic, and quality-related drivers of inequity.

CDHS 2021–22 data reveal substantial wealth-based gaps in adequate antenatal care, with 4+ visits reaching only 75.6% among the poorest quintile compared to 95.8% among the richest quintile, representing a 20.2 percentage point gap. Similarly, timely postnatal care within 2 days shows a 13.9 percentage point gap between the poorest and richest groups, at 76.1% versus 90.0% respectively. Facility delivery shows smaller gaps at 6.1 percentage points. Evidence indicates that indirect costs, geographic barriers, variable quality of care, and rapid private sector growth without adequate integration contribute to these inequities.

Cambodia's next phase of maternal health improvement must shift from aggregate coverage targets to equityfocused strategies. Priority actions include strengthening antenatal and postnatal continuity in remote provinces, expanding financial protection beyond direct fees, improving quality and respectful care, and implementing disaggregated monitoring systems. Without targeted intervention, current inequities risk undermining Cambodia's impressive national gains.

Keywords: maternal health equity; Cambodia; antenatal care; skilled birth attendance; postnatal care; health financing; Health Equity Funds; IDPoor

INTRODUCTION

Cambodia's Maternal Health Success Story

Cambodia's maternal mortality ratio declined from approximately 472 deaths per 100,000 live births in 2000 to 154 in 2020, according to estimates from WHO and partners (World Health Organization et al., 2023). This achievement reflects coordinated investments in midwifery training, facility infrastructure, referral systems, and pro-poor financing mechanisms, particularly Health Equity Funds and the IDPoor poverty identification system (Ir et al., 2010; Deutsche Gesellschaft für Internationale Zusammenarbeit, 2022). By 2021–22, facility births had reached 98.4% with skilled attendance at 97.8%, representing a remarkable transformation from the early 2000s when only 10% of births occurred in facilities (National Institute of Statistics et al., 2022).

The Equity Challenge

Despite national success, substantial variation persists by wealth, education, geography, and residence. Women in the poorest quintile, those with no formal education, and residents of remote provinces continue to experience

lower coverage of adequate antenatal care, fragmented continuity of postnatal care, and greater financial burden (Dingle et al., 2013; Van de Poel et al., 2014). These inequities matter for three

interconnected reasons. First, equal access to life-saving services is a fundamental right and core principle of universal health coverage. Second, from an effectiveness perspective, preventable maternal deaths increasingly concentrate among disadvantaged groups, meaning that national mortality rates cannot decline further without addressing equity gaps. Third, persistent inequities erode public trust and undermine health system legitimacy, threatening the sustainability of Cambodia's hard-won gains.

Review Objectives

This narrative review addresses three research questions that are critical for Cambodia's next phase of maternal health policy. First, what magnitude and patterns of inequity exist across the maternal care continuum in Cambodia, particularly for antenatal care, facility delivery, and postnatal care? Second, what financial, structural, and quality-related factors drive these inequities, and how do they interact to create compounding barriers for disadvantaged women? Third, what policy actions are most likely to close equity gaps by 2030 given Cambodia's health system context and resource constraints?

METHODS

Review Approach

We conducted a narrative review rather than a systematic review to synthesize diverse evidence on maternal health equity in Cambodia. While we did not follow PRISMA guidelines or conduct formal quality assessment, we aimed for transparency in source selection and synthesis. The narrative approach allowed us to integrate quantitative survey data, program evaluations, policy documents, and qualitative studies that would be difficult to combine in a systematic review framework. However, we acknowledge that this approach carries greater risk of selection bias and may have missed relevant studies.

Data Sources

Our quantitative data came primarily from the Cambodia Demographic and Health Surveys conducted in 2000, 2005, 2010, 2014, and 2021–22 (National Institute of Statistics & ORC Macro, 2001, 2006; National Institute of Statistics & ICF Macro, 2011; National Institute of Statistics et al., 2015, 2022). We focused on maternal health service indicators disaggregated by wealth quintile, education level, residence (urban versus rural), and province. We also drew on national statistical reports and mortality estimates from the National Institute of Statistics and Ministry of Health.

For policy and program context, we reviewed Health Equity Fund and IDPoor program evaluations, Ministry of Health strategic plans and quality improvement reports, and country assessments from WHO and UNICEF. These documents provided essential information on financing reforms, implementation challenges, and policy evolution over the past two decades.

Our review of peer-reviewed literature emphasized studies examining equity in maternal health services specifically in Cambodia, as well as regional comparisons from similar low- and middle-income countries in Southeast Asia. We included studies on financial protection mechanisms, quality and respectful care, private sector dynamics, and health system organization as they related to maternal health equity.

Search and Selection Strategy

We identified sources through three complementary approaches. First, we conducted targeted database searches in PubMed and Google Scholar using search strings that combined "Cambodia" with terms for maternal health outcomes (such as "maternal health," "antenatal care," "postnatal care," and "facility delivery") and equity dimensions (such as "equity," "inequality," "wealth," "poverty," and "rural"). Second, we systematically hand-searched reference lists of key Cambodian maternal health studies to identify additional relevant sources through citation chaining. Third, we searched for grey literature from WHO, UNICEF, and major implementing partners through Google and organizational websites, using similar keyword combinations.

Our searches were conducted between August and November 2024. We prioritized studies published after 2010 to reflect Cambodia's current health system context, while including earlier foundational work on Health Equity Fund implementation and the policy processes that shaped Cambodia's maternal health trajectory. We did not apply language restrictions, though in practice all identified sources were in English or had English abstracts and summaries.

Synthesis Approach

Evidence was synthesized thematically across three dimensions. First, we organized findings by coverage domains across the continuum of care, specifically antenatal care, intrapartum care, and postnatal care. Second, we examined equity dimensions systematically, including wealth quintiles, education levels, urban versus rural residence, and geographic variation by province. Third, we analyzed driver categories that emerged consistently across sources, including financial protection mechanisms and barriers, geographic access and referral system functioning, quality of care and respectful treatment, and health system organization, particularly the role of the private sector.

We triangulated findings across quantitative surveys, program evaluations, and qualitative studies to identify consistent patterns and to flag areas where evidence was limited or contradictory. For example, when CDHS data showed high facility delivery rates, we looked for program evaluations and qualitative studies that could explain whether quality of care was equitable across wealth groups. This triangulation approach allowed us to move beyond simple coverage statistics to understand the mechanisms driving inequity.

Limitations of Methods

This review has several important methodological limitations that readers should consider when interpreting findings. Our non-systematic approach may have missed relevant studies, particularly those published in nonindexed journals or in languages other than English. The heterogeneity in outcome definitions and measurement approaches across different sources limits strict comparability, particularly when examining trends over time. Publication bias likely favors studies showing positive results or successful interventions, potentially leading us to underestimate the severity of implementation challenges. Our access to grey literature was incomplete, as some internal program evaluations and donor reports are not publicly available, meaning we may have missed important lessons about what has not worked in Cambodia's maternal health programs. Finally, our heavy emphasis on CDHS data means that findings reflect the strengths and limitations of survey methodology, including recall bias and the inability to directly observe quality of clinical care.

RESULTS

Trends in National Coverage (2000–2022)

Cambodia achieved dramatic improvements across all maternal health indicators over the two decades from 2000 to 2022. Skilled birth attendance increased from just 32% in 2000 to 95.9% in 2014 and reached 97.8% by 2021–22. The transformation in facility delivery was even more striking, rising from only 10% in 2000 to

83.4% in 2014 and 98.4% in 2021–22. Coverage of four or more antenatal care visits rose from 38% in 2000 to 76% in 2014 and 86.6% in 2021–22. These improvements were accompanied by a decline in the maternal mortality ratio from approximately 472 deaths per 100,000 live births in 2000 to 154 in 2020 (World Health Organization et al., 2023).

However, these impressive aggregate trends obscure persistent and, in some cases, widening disparities between different population groups. While overall coverage has increased substantially, the benefits have not been equally distributed across wealth quintiles, education levels, or geographic regions. The following sections examine these inequities in detail.

Wealth-Based Inequities in 2021–22

Data from the most recent CDHS in 2021–22 reveal a clear pattern in how inequities are distributed across different maternal health services. When examining coverage by wealth quintile, the smallest gaps appear in

single-contact services that require minimal ongoing engagement with the health system. For example, receiving antenatal care from a skilled provider shows only a 2.8 percentage point difference between the poorest and richest quintiles, with coverage at 97.1% and 99.9% respectively. Similarly, receiving iron supplements during pregnancy shows a gap of just 1.2 percentage points, with 96.8% of the poorest women and 98.0% of the richest women receiving this intervention.

Moderate gaps appear in services requiring facility access at a single critical time point. Tetanus toxoid protection shows a 6.9 percentage point gap, from 88.4% among the poorest to 95.3% among the richest. Facility delivery shows a 6.1 percentage point gap, from 93.6% among the poorest to 99.7% among the richest quintile. Skilled birth attendance shows a 4.6 percentage point gap, ranging from 95.4% among the poorest to 100% among the richest.

The largest gaps appear in services requiring multiple contacts and sustained engagement over time. Coverage of four or more antenatal care visits shows a substantial 20.2 percentage point gap between wealth quintiles, with only 75.6% of women in the poorest quintile achieving adequate visits compared to 95.8% in the richest quintile. This represents approximately 70,000 poor women annually who do not receive adequate antenatal monitoring. Postnatal care within two days of birth shows a 13.9 percentage point gap, with 76.1% of the poorest quintile receiving timely postnatal care compared to 90.0% of the richest quintile.

This pattern suggests that access barriers compound over time rather than affecting single encounters equally. Women from poor households can often access the health system for a single antenatal visit or for delivery, but they face increasing difficulty maintaining contact over multiple visits or ensuring timely follow-up after birth. The second and third quintiles show coverage levels intermediate between the poorest and richest, with particularly steep gradients between the poorest quintile and the second quintile for adequate antenatal care.

Education and Urban–Rural Inequities

Education gradients in maternal health coverage mirror wealth patterns, though data disaggregation by education level is less comprehensive in recent CDHS reports. For four or more antenatal care visits, women with no formal education achieved only 73.3% coverage compared to 97.1% among women with more than secondary education, representing a gap of nearly 24 percentage points. This education gradient is particularly concerning because it likely reflects compounding disadvantages, as women with no education are also more likely to be poor and live in rural areas.

Urban-rural differences remain substantial despite overall improvements in rural coverage. Urban women consistently achieve 5 to 10 percentage points higher coverage across antenatal and postnatal care indicators. While the urban-rural gap has narrowed considerably for facility delivery, with rural areas now reaching over

97% coverage, it persists for services requiring multiple contacts or continuity. The urban-rural divide reflects both geographic access challenges and differences in health system capacity, with urban areas benefiting from greater concentration of facilities, providers, and supporting infrastructure.

Provincial Variation

Substantial geographic variation exists even within wealth quintiles, indicating that place-based factors operate independently of household economic status. Some remote provinces, particularly Ratanakiri and Mondulkiri in the northeast and parts of Preah Vihear and Stung Treng, show coverage of four or more antenatal visits below 65% even among middle-income households. In contrast, Phnom Penh and major provincial capitals such as Siem Reap and Battambang demonstrate near-universal coverage across all indicators regardless of wealth status.

This provincial variation suggests that geography compounds socioeconomic disadvantage in ways that national equity strategies must explicitly address. A poor woman living in a remote upland province faces multiple barriers that a poor woman living near a provincial capital does not encounter, including longer travel distances, less frequent transport options, fewer health facilities, and weaker referral systems. Similarly, provincial variation in health workforce distribution means that even middle-income families in remote areas may struggle to access quality care, while poor families near major cities may benefit from better facility density and more consistent service availability.

Antenatal Care: Contacts versus Content

While 97 to 99% of women receive at least one antenatal care visit from a skilled provider regardless of wealth status, adequacy gaps emerge in two critical dimensions. First, contact frequency remains unequal, with the 20.2 percentage point wealth gap in achieving four or more visits representing a substantial barrier to early identification of complications and preparation for safe delivery. Poor women who attend only one or two antenatal visits miss opportunities for blood pressure monitoring, screening for gestational diabetes, detection of abnormal fetal positioning, and counseling on birth preparedness and complication readiness.

Second, content quality is uneven even among women who attend multiple visits. Evidence from regional studies examining antenatal care in low- and middle-income countries indicates that essential components such as blood pressure measurement, urine and blood testing, nutritional counseling, and systematic counseling on danger signs and birth preparedness are delivered inconsistently (Benova et al., 2018). While Cambodiaspecific data on content quality stratified by socioeconomic status are limited, available program evaluations suggest that women attending public health centers may receive more standardized content compared to those attending private clinics, where protocols and record-keeping vary substantially.

This distinction between contact coverage and content coverage has important implications for how we measure progress and equity. Monitoring only the number of antenatal visits risks overstating true protection, as a woman who attends four visits but receives incomplete assessments and inadequate counseling may be no better prepared for complications than a woman who attends fewer visits with higher quality content. Future equity assessments should therefore measure both whether women achieve recommended contact frequency and whether they receive essential content components during those contacts. Effective coverage metrics that combine access and quality represent a more meaningful measure of whether the health system is truly serving all women equitably.

Intrapartum Care: High Coverage, Unclear Equity in Quality

Facility delivery has reached near-universal levels with relatively small wealth gaps of 6.1 percentage points between the poorest and richest quintiles. This represents a major achievement and reflects sustained policy focus on increasing institutional deliveries through midwifery deployment, facility upgrades, demand-side financing, and community mobilization. However, high aggregate coverage of facility delivery leaves important equity questions unanswered that national survey data cannot fully address.

First, quality of care during labor and delivery is not systematically measured or disaggregated by socioeconomic status in routine data systems. We do not know whether poor women and wealthier women who deliver in facilities receive equivalent monitoring, timely identification of complications, appropriate pain management, or respectful treatment during labor. Qualitative studies from other low- and middle-income countries suggest that disadvantaged women often face longer waiting times, less attentive monitoring, poorer communication about labor progress and decisions, and higher risk of disrespectful or abusive treatment (Bohren et al., 2015). Whether these patterns exist in Cambodia remains unclear due to limited facility-based research examining quality and experience of care by women's socioeconomic characteristics.

Second, cesarean section patterns raise questions about potential dual inequity, though available data do not allow definitive conclusions. Wealth-stratified cesarean section rates are not routinely reported in CDHS publications, making it difficult to assess whether poor women face unmet need for surgical delivery when complications arise, whether wealthier women receive non-indicated cesarean sections, or both. Evidence from other countries in the region suggests that cesarean section rates may be too low among poor women delivering in under-resourced facilities and simultaneously too high among wealthier women accessing private facilities where financial incentives favor surgical delivery (Sobhy et al., 2019). Cambodia likely faces similar patterns, but better data on indications, decision-making processes, and maternal and newborn outcomes are needed to interpret whether observed patterns reflect appropriate or inappropriate use of surgical intervention.

Third, the role of the private sector in facility delivery raises equity concerns about fragmentation and continuity. Wealthier urban women increasingly deliver in private facilities that may offer more comfortable accommodation and more attentive service, but these facilities are often poorly integrated with public sector referral systems and health information systems. When complications arise that exceed private facility capacity, transfers to public referral hospitals can be delayed or poorly coordinated. Additionally, women who receive

antenatal care in public health centers but deliver in private facilities may experience discontinuity in their clinical records and fragmented communication between providers, potentially compromising safety and quality.

Postnatal Care: The Weakest Link

Postnatal care coverage is the lowest and least equitable stage across the continuum of maternal care. Nationally, only 84.0% of women receive postnatal care within two days of birth, substantially lower than facility delivery at 98.4% or adequate antenatal care at 86.6%. The 13.9 percentage point wealth gap between the poorest and richest quintiles for timely postnatal care is larger than the facility delivery gap and smaller than the antenatal care gap, indicating that postnatal care shares challenges with both types of services.

Provincial variation in postnatal care exceeds 20 percentage points in some comparisons, with remote provinces showing particularly low coverage. This geographic variation reflects fragmented linkages between delivery services and postnatal follow-up, as well as limited outreach capacity from health centers to reach women who have returned home after facility discharge. Unlike facility delivery, which occurs at a predictable time and place where services can be concentrated, postnatal care requires either that women return to facilities during a period when they face competing demands or that health workers conduct home visits, which is resource-intensive and difficult to sustain at scale.

Several specific factors explain why postnatal care lags behind other components of the continuum. First, discharge practices vary considerably across facilities, with some women being discharged within hours of delivery without structured follow-up planning. Early discharge may be clinically appropriate for uncomplicated births, but it requires explicit arrangements for postnatal contact, which are not consistently implemented. Second, health centers often lack proactive outreach systems to follow up with women after discharge, particularly in rural areas where distances are large and health worker time is limited. Third, women and families may not perceive postnatal care as essential, particularly when birth went well and both mother and baby appear healthy. This perception is reinforced when postnatal visits consist primarily of routine observations without engaging counseling or useful interventions. Fourth, indirect costs of transport and time deter postnatal clinic visits, especially for poor women who face competing demands for their time and cannot easily afford multiple trips to health facilities.

The clinical significance of weak postnatal care coverage cannot be overstated. Early postnatal care is critical for detecting postpartum hemorrhage, puerperal sepsis, hypertensive disorders, and breastfeeding difficulties that are leading causes of preventable maternal mortality and severe morbidity. For newborns, early postnatal contact allows detection of danger signs such as poor feeding, respiratory distress, hypothermia, and jaundice that require urgent intervention. The concentration of maternal and newborn deaths in the first 48 hours after birth means that the 16% of women nationally, and 24% of the poorest women, who do not receive timely postnatal care face substantially elevated risk of preventable complications going undetected until they become life-threatening emergencies.

Drivers of Persistent Inequities

Four interconnected factors shape maternal health equity in Cambodia, operating at different levels of the health system and reinforcing one another to create compounding barriers for disadvantaged women.

Incomplete Financial Protection

Health Equity Funds represent Cambodia's flagship pro-poor financing mechanism, removing user fees for households identified through the IDPoor poverty targeting system. Substantial evidence demonstrates that HEFs have improved access to maternal health services for eligible households, particularly for facility delivery (Ir et al., 2010; Jacobs et al., 2018; Annear et al., 2019). Women enrolled in HEFs are significantly more likely to deliver in health facilities compared to similar poor women not enrolled, and they report lower financial burden from health care costs. However, three significant gaps in financial protection persist despite the HEF system.

First, indirect costs remain substantial barriers even when direct user fees are eliminated. Transport to and from health facilities can cost several dollars for poor families living in rural areas, representing a substantial proportion of daily or weekly household income. For women requiring referral from health centers to district or

provincial hospitals, transport costs multiply. Food and accommodation for family members who accompany women during facility stays add further costs. Lost income from days spent traveling to and attending health facilities affects both women and their family members who must reduce work to accompany them. These indirect costs operate as powerful deterrents to seeking timely care, particularly for antenatal and postnatal visits that do not carry the same urgency as delivery.

Second, informal payments persist despite official fee exemptions for HEF enrollees. Qualitative studies and program evaluations document that families sometimes pay for supplies, medications, or expedited services even at facilities where they should receive free care (Van Damme et al., 2004). These informal payments may reflect genuine supply shortages that force facilities to request family contributions, provider-level rent-seeking behavior, or poor families' perception that payment is expected regardless of official policies. Regardless of underlying causes, informal payments undermine financial protection and create unpredictability in costs, which may be even more deterring than predictable fees.

Third, private sector costs are not covered by HEF, creating a two-tiered system where wealthier women can access private services while poor women remain dependent on public facilities. As the private sector expands, particularly in urban areas and provincial capitals, this stratification becomes more pronounced. Wealthier women who perceive public facilities as overcrowded, under-equipped, or providing lower quality care can opt for private alternatives, while poor women have no such option. This dynamic can create a negative feedback loop where declining use of public facilities by middle-class and wealthy families reduces political pressure for quality improvement in the public sector, further entrenching inequities.

Geographic Barriers and Referral System Weaknesses

Distance and transport constraints disproportionately affect women in remote provinces and rural communities far from district centers. Women in provinces such as Ratanakiri, Mondulkiri, Preah Vihear, and Stung Treng commonly face travel times exceeding two to three hours to reach referral hospitals capable of managing obstetric complications. During the rainy season, roads become impassable and travel times increase substantially. For women experiencing complications such as severe bleeding, eclampsia, or obstructed labor, these delays can be fatal.

Emergency transport systems, including ambulances based at health centers and district hospitals, have improved substantially but remain inconsistently available, particularly in the most remote areas. Even when ambulances are available, their deployment may be delayed by poor communication, unclear decision-making about when referral is needed, or lack of fuel and maintenance. Some provinces have implemented community transport schemes where motorcycles or vehicles are pre-positioned for emergency use, but these remain pilot initiatives rather than systematic solutions.

Referral system weaknesses compound geographic barriers through poor communication and coordination between levels of care. Health centers identifying women who need referral may lack reliable phone communication with receiving hospitals, making it difficult to alert hospitals about incoming patients or to receive advice about stabilization before transfer. When women are referred, their clinical information often travels only through a brief written note or does not transfer at all, forcing receiving hospitals to reassess from the beginning and potentially delaying definitive treatment. Follow-up after emergency referrals is particularly weak, with limited systematic communication back to health centers about outcomes or recommendations for continued care, meaning that women who return to their communities after hospitalization may not receive appropriate postnatal follow-up.

Variable Quality and Respectful Care

While comprehensive data on quality and respectful maternity care in Cambodia are limited, available evidence suggests concerning variation in how women are treated during antenatal, delivery, and postnatal care. International research synthesizing evidence from multiple countries demonstrates that disadvantaged women often experience lower quality care across multiple dimensions (Bohren et al., 2015; Tunçalp et al., 2015). These dimensions include longer waiting times before being seen by providers, less complete clinical assessments with key components of care being skipped, poorer communication about their condition and care plans, minimal involvement in decision-making about interventions, and in some cases overtly disrespectful or abusive

treatment including being shouted at, being denied requests for pain relief, or being physically restrained during labor.

Even when clinical care is technically adequate, experiences of poor communication, lack of privacy, and disrespectful treatment erode trust in health services and reduce future care-seeking. Women who feel humiliated or mistreated during facility delivery may choose to deliver at home for subsequent pregnancies despite understanding the risks. Women who attend antenatal visits but receive perfunctory examinations without counseling or opportunities to ask questions may not return for follow-up visits because they perceive little value in the encounters.

The drivers of variable quality and respectful care are complex and operate at multiple levels. At the health system level, insufficient staffing leads to time pressure and provider burnout, making it difficult for overburdened midwives and nurses to provide unhurried, attentive care. Inadequate supervision and quality assurance means that poor practices may go uncorrected and providers may lack feedback on their clinical and interpersonal performance. At the facility level, poor infrastructure including lack of privacy, inadequate supplies, and uncomfortable conditions affects both provider morale and the care environment for women. At the provider level, insufficient training in person-centered communication and respectful care, combined with hierarchical professional cultures, can result in providers treating women as passive recipients rather than active participants in their care. Finally, at the societal level, discrimination based on poverty, ethnicity, education, or other characteristics may manifest in how health workers perceive and treat different women.

Rapid Private Sector Growth Without Integration

Cambodia's private health sector has expanded rapidly, now accounting for a substantial proportion of health care utilization, particularly in urban areas and provincial capitals. For maternal health services, the private sector offers potential benefits including greater perceived convenience, shorter waiting times, more privacy, and more attentive service for women who can afford to pay. However, four concerns about private sector expansion have equity implications.

First, weak regulation means that quality standards and clinical protocols vary substantially across private facilities. While some private hospitals provide high-quality care consistent with international standards, other smaller private clinics may lack adequately trained staff, appropriate equipment, or systematic quality assurance processes. The Ministry of Health faces capacity constraints in inspecting and licensing the growing number of private facilities, and enforcement of standards is inconsistent. Women and families lack reliable information about quality differences across facilities, making it difficult to make informed choices.

Second, fragmented information systems mean that private facilities often do not report service statistics, complications, or outcomes to national health management information systems. This creates blind spots in understanding overall maternal health service utilization, complication rates, and outcomes. When wealthy women predominantly use private facilities that do not report data, national statistics increasingly reflect only the experiences of poorer women using public facilities, potentially distorting our understanding of national patterns and masking emerging problems in private sector care.

Third, high costs in private facilities create financial barriers that limit access to wealthier families, reinforcing socioeconomic stratification in access and quality. While Health Equity Funds cover services in public facilities and contracted private providers, most private facility care is out-of-pocket. This creates a system where wealthy women can choose high-quality private care, middle-income families face difficult trade-offs between cost and perceived quality, and poor families have no choice but to use public facilities regardless of their quality or convenience.

Fourth, poor continuity and integration between public and private sectors creates risks for all women but particularly for those who move between sectors. Women who receive antenatal care at public health centers but deliver in private facilities experience fragmented record-keeping and care planning. When complications arise in private facilities that exceed their capacity, transfers to public referral hospitals may be delayed by poor coordination, unclear protocols, or private providers' reluctance to transfer patients early because of financial implications. Public referral hospitals report receiving women transferred from private facilities with advanced

complications that should have been identified and managed earlier, suggesting that some private facilities may delay appropriate referral until situations become critical.

DISCUSSION

Summary of Key Findings

Cambodia's maternal health achievements over the past two decades are undeniable and represent a major public health success story that other countries in the region look to as a model. However, equity gaps persist and concentrate in services that require continuity and sustained engagement rather than single encounters. The poorest women, those with low education, and rural residents face compounding barriers that extend beyond simple geographic or financial access. These barriers include financial constraints that reach beyond user fees to encompass transport and indirect costs, geographic isolation that limits timely access to quality care and emergency services, variable quality and respectful treatment that erodes trust and reduces future care-seeking, and private sector expansion that benefits wealthier women while fragmenting the health system and drawing attention and resources away from public facility improvement.

The pattern of inequities across the continuum reveals important insights about where barriers operate most forcefully. Single-contact services such as receiving at least one antenatal visit or receiving iron supplements show very small wealth gaps, indicating that poor women can access the health system for basic encounters. Facility delivery shows moderate gaps, suggesting that the combination of policy focus, infrastructure investment, and financial incentives has successfully reached most poor women for this critical event.

However, services requiring multiple contacts over time, such as achieving four or more antenatal visits, show the largest gaps, indicating that sustaining engagement is where poor women face greatest difficulty. Postnatal care falls between these categories, requiring return to facilities or outreach after delivery, and shows substantial gaps that reflect both continuity challenges and lower prioritization in policy and programming.

Why Cambodia Succeeded in Facility Delivery but Not Postnatal Care

Understanding why Cambodia achieved near-universal facility delivery while postnatal care lags provides important lessons for equity-oriented policy. Facility delivery became a flagship indicator that received sustained political attention, targeted investment, and accountability mechanisms over more than a decade. The national strategy to increase facility delivery included multiple reinforcing components. Midwifery training and deployment programs ensured that skilled providers were available at health centers and referral facilities throughout the country. Facility infrastructure was upgraded through both government investment and donor support, making facilities more capable of managing normal and complicated deliveries. Demand-side financing mechanisms including vouchers for poor women and Health Equity Funds removed financial barriers for targeted populations. Community mobilization and health education campaigns emphasized the importance of facility delivery and built demand for services. Political leaders at national and subnational levels championed facility delivery targets and held health managers accountable for progress.

In contrast, postnatal care received far less focused attention until recently. It was neither a flagship indicator nor a priority in resource allocation decisions during the period of most rapid maternal health improvement. Service delivery models for postnatal care remained weak, with inadequate integration between delivery services and subsequent follow-up, limited outreach capacity for home visits, and unclear protocols for when and how postnatal contacts should occur. Perceived urgency by both providers and families was lower for postnatal care compared to delivery, as both groups viewed birth itself as the critical event and underestimated risks in the immediate postpartum period. Discharge practices from maternity wards often involved little structured planning for postnatal follow-up, with women being sent home without clear instructions about warning signs or scheduled appointments.

This comparison demonstrates that achieving equity requires explicit prioritization, sustained investment, and accountability mechanisms tailored to each component of the continuum of care. Simply achieving high coverage in one indicator does not automatically translate to equity across other services. Each stage of the continuum has distinct barriers and enablers that policy must address specifically.

Regional Context and Comparative Lessons

Examining Cambodia's maternal health equity trajectory in regional context provides perspective on both achievements and remaining challenges. Vietnam achieved more balanced coverage across antenatal care, facility delivery, and postnatal care, with smaller wealth and urban-rural gaps compared to Cambodia (Sabde et al., 2019). Vietnam's stronger primary health care system, with extensive commune health stations staffed by trained providers and integrated into a well-functioning referral network, likely explains more equitable and complete continuum coverage. Additionally, Vietnam's universal social health insurance system, though imperfect, provides more comprehensive financial protection than Cambodia's targeted approach through Health Equity Funds.

Laos faces similar challenges to Cambodia in providing maternal health services in geographically difficult terrain with dispersed populations and ethnic diversity. Like Cambodia, Laos struggles with weak postnatal care coverage and substantial provincial variation. However, Laos has a less developed private sector, meaning fragmentation between public and private care is not yet a major equity concern, though this may change as economic development proceeds.

Thailand represents a more mature health system with near-universal coverage and substantially smaller equity gaps across all maternal health indicators. Thailand's universal health coverage scheme, implemented in 2001, provides comprehensive financial protection including coverage of direct costs, transport subsidies, and mechanisms to address indirect costs. Thailand's well-established primary care network with strong referral systems ensures geographic access even in remote areas. Most relevant for equity, Thailand maintains systematic quality monitoring and has implemented respectful maternity care standards with accountability mechanisms. While Thailand's substantially higher income level means direct comparison with Cambodia is limited, the Thai experience demonstrates that comprehensive financial protection, strong primary care, and explicit attention to quality and respectful care can achieve equity alongside high aggregate coverage.

Cambodia's trajectory suggests that achieving high aggregate coverage in flagship indicators such as facility delivery does not automatically translate to equity across the full continuum of care. Countries seeking to learn from Cambodia's success in rapidly increasing facility births should note that this achievement required sustained focus, integrated interventions across supply and demand sides, and explicit pro-poor mechanisms. However, they should also recognize that equity in other dimensions, particularly continuity services like adequate antenatal and timely postnatal care, requires additional specific strategies rather than assuming that general health system strengthening will address all gaps equally.

Policy Implications: An Equity-Oriented Agenda for 2025–2030

Cambodia should shift from coverage expansion toward equity consolidation and quality improvement as organizing principles for maternal health policy in the coming years. This shift requires moving beyond aggregate national targets to explicit measurement and accountability for who is being left behind, with specific attention to the poorest wealth quintile, women with no formal education, and residents of remote provinces where gaps are largest. Five priority areas should anchor Cambodia's equity-oriented maternal health agenda for 2025 to 2030.

First, intensifying antenatal care and birth preparedness for the poorest and most remote populations requires targeted outreach and continuity interventions. The Ministry of Health Maternal and Child Health Department should work with provincial health departments and NGO partners to deploy community health workers for systematic outreach, appointment tracking, and birth preparedness counseling in areas where 4+ antenatal visit coverage remains below 80%. Transport vouchers or community transport funds should be provided to reduce the indirect cost burden that prevents poor women from maintaining regular antenatal contact. Programs should prioritize first-trimester antenatal care initiation because early entry allows more complete delivery of all recommended content across subsequent visits. Standardized antenatal care content checklists should be implemented and monitored through supervision to ensure that women who do attend visits receive complete assessments and counseling regardless of facility type or provider. Progress should be measured through disaggregated indicators including 4+ antenatal visits by wealth quintile and province, first-trimester antenatal care initiation rates by the same dimensions, and antenatal care content adherence scores from facility audits.

Second, strengthening postnatal care as a continuity package requires explicitly linking maternity wards with health center follow-up systems and establishing proactive outreach rather than relying on women to return for facility-based postnatal visits. The Ministry of Health should mandate early postnatal contact within 48 hours before discharge or via home visit for women who are discharged immediately after delivery. Maternity wards should be required to communicate with assigned health centers about all women who have delivered and their planned postnatal follow-up schedule. Pilot programs testing mobile health reminders through SMS or phone calls should be evaluated and scaled where effective and feasible. Community health volunteer networks should receive specific training in promoting postnatal care and identifying women who have not attended scheduled follow-up visits. Key indicators should include postnatal care within 2 days disaggregated by wealth quintile and province, postnatal care within 7 days as a measure of slightly delayed but still valuable followup, and maternal and newborn danger sign recognition among mothers assessed through exit interviews or follow-up surveys.

Third, expanding financial protection beyond direct user fees requires addressing the indirect costs that Health Equity Funds currently do not cover and reducing informal payments that persist despite official fee exemptions. The Ministry of Health should work with the National Social Security Fund, Health Equity Fund implementing agencies, and Ministry of Social Affairs to extend HEF benefits to cover transport costs through vouchers or subsidized ambulance services for eligible households. Facilities should be required to display fee schedules prominently including explicit statements that HEF members should not be charged for any services or supplies, and to establish accessible grievance mechanisms where women can report requests for informal payments without fear of retaliation. Pilot programs testing cash transfers for poor pregnant women to address indirect costs including transport, food, and lost wages should be rigorously evaluated. Progress should be measured through catastrophic out-of-pocket spending on maternal care from household surveys, reported informal payment rates from exit interviews and anonymous feedback mechanisms, and Health Equity Fund utilization rates among eligible households.

Fourth, implementing respectful maternity care standards requires moving beyond technical clinical quality to address how women experience care and whether they are treated with dignity regardless of their socioeconomic status. The Ministry of Health Quality Assurance Unit should develop and disseminate national respectful maternity care guidelines adapted to the Cambodian context, addressing dimensions including privacy, informed consent, freedom from abuse and discrimination, timely care without unreasonable delays, and supportive care including allowing birth companions where feasible. Provincial hospitals and health centers should receive training in person-centered communication, shared decision-making, and culturally appropriate care delivery. Facilities should establish client feedback systems including exit interviews, suggestion boxes, and follow-up calls to systematically collect women's perspectives on their care experience. Quality performance indicators linked to facility budgets and management accountability should include not only clinical process measures but also client experience scores. Key indicators should include client experience scores from standardized surveys, provider adherence to respectful maternity care standards assessed through supervision checklists and simulated patients, and complaints received along with evidence of timely investigation and resolution.

Fifth, institutionalizing disaggregated data and accountability requires moving from ad hoc analysis to routine monitoring and public reporting of equity indicators. The National Institute of Statistics, Ministry of Health Planning and Health Information Department, and provincial health authorities should establish annual equity dashboards that present all key maternal health indicators disaggregated by wealth quintile, urban versus rural residence, and province. These dashboards should be publicly released and discussed at annual health sector reviews. The Ministry of Health should set explicit gap-reduction targets, for example committing to halve the difference between the richest and poorest quintiles in postnatal care within 2 days by 2030. Bi-annual provincial equity reviews should be conducted to examine local patterns, identify provinces and districts falling furthest behind, and trigger targeted technical and financial support. Cambodia should transition from simple coverage metrics toward effective coverage indices that combine contact with content, measuring whether women are not only attending services but receiving evidence-based care components. Key indicators should include whether annual equity dashboards are published on schedule, whether gap reduction targets are being met measured through trends in differences between richest and poorest quintiles and between urban and rural populations, and whether effective coverage indices for antenatal and postnatal care show improvement over time.

Trade-Offs and Implementation Challenges

Implementing all five priority areas simultaneously is unrealistic given resource constraints and implementation

capacity limits in the Cambodian health system. A phased approach is therefore recommended. In years one and two from 2025 to 2026, priority should focus on postnatal care strengthening and financial protection expansion, as these address the largest current gaps and build on existing systems including Health Equity Funds and facility-based delivery services. Postnatal care interventions including linkage systems and outreach protocols can be piloted in selected provinces and scaled based on lessons learned. Financial protection expansion including transport vouchers and informal payment reduction can be tested through existing HEF implementing agencies before broader rollout.

In years three through five from 2027 to 2030, focus should expand to include quality and respectful maternity care standardization and data system institutionalization. Quality improvement typically requires longer time frames to show impact because it involves changing provider behaviors, facility cultures, and management systems. Data system improvements including dashboard development and effective coverage measurement require investment in information technology infrastructure and capacity building for analysis and interpretation. By sequencing implementation, Cambodia can manage the coordination complexity and resource demands while maintaining momentum.

Coordination complexity represents a second major implementation challenge because multiple actors including the Ministry of Health at national and provincial levels, implementing NGOs, private sector providers, and community-level structures must work together coherently. Without strong governance and clear leadership, there is substantial risk of fragmentation where different actors pursue parallel initiatives that do not reinforce each other. The Ministry of Health should establish a high-level coordination mechanism specifically for the equity agenda, with representation from all key stakeholders and explicit authority to align programs and resources.

Political economy considerations represent a third significant challenge. The equity agenda may face resistance from private sector interests if regulation, quality standards, or integration requirements are perceived as threatening business models or profit margins. Sustained political commitment beyond electoral cycles is essential because equity interventions often show results gradually rather than producing immediate visible wins that generate political credit. Advocates and civil society organizations can play important roles in maintaining pressure and ensuring that equity remains on the policy agenda even when competing priorities emerge.

Limitations

This review has several important limitations that should be considered when interpreting findings and recommendations. First, our non-systematic methodology means we did not conduct comprehensive database searches following formal protocols or perform quality assessment of included studies using standardized tools. Relevant studies may therefore have been missed, particularly those published in non-indexed journals, in languages other than English, or in grey literature with limited distribution. This limitation is partially mitigated by our use of citation chaining and direct consultation of policy documents, but readers should recognize that our evidence synthesis is not exhaustive.

Second, our reliance on cross-sectional survey data from the Cambodia Demographic and Health Surveys means our findings reflect the strengths and limitations of survey methodology. Self-reported service utilization is subject to recall bias, particularly for services received months before the survey interview. Coverage estimates may be affected by social desirability bias where women over-report utilization of services that are promoted as important. Changes in survey methodology, sampling, or questionnaire wording across different CDHS rounds limit strict comparability over time. Most importantly, CDHS and similar household surveys provide robust information on whether women contacted services but very limited information on the quality of care received, provider behavior and respectful treatment, clinical content and appropriateness of care, or women's experiences and satisfaction.

Third, weak evidence on some equity dimensions means our analysis is incomplete. While CDHS consistently reports wealth quintile disaggregation, education and especially provincial breakdowns are reported less comprehensively across all indicators. Ethnic minority status, another important equity dimension in

Cambodia's diverse population, is rarely analyzed in relation to maternal health coverage. Urban versus rural comparisons are available but do not capture the full complexity of geographic disadvantage, as substantial variation exists within both urban and rural categories.

Fourth, measurement challenges limit interpretation even for indicators that are reported. Recall bias in selfreported utilization has been mentioned. Changes in how indicators are defined or measured over time mean that apparent trends may partly reflect methodological changes rather than true changes in coverage. For example, if survey enumerators' training or question wording changes how they classify antenatal care providers, apparent increases in coverage by skilled providers could reflect measurement rather than real improvement. More fundamentally, lack of Cambodia-specific data on antenatal care content quality, respectful maternity care, and clinical appropriateness of interventions means we must extrapolate from regional and international evidence, which may not fully apply to the Cambodian context.

Fifth, limited evidence on the private sector represents a significant gap given its rapid growth and important role, particularly for wealthier urban populations. National surveys like CDHS typically undercount private facility utilization because women may not clearly distinguish between public and private providers or may report private facility deliveries as occurring at "health centers" or "hospitals" without specifying sector. Regulation and quality in the private sector are poorly documented because facilities are not required to report through health management information systems and inspection capacity is limited. Financial data on private sector revenues, profit margins, and pricing are not systematically collected. This evidence gap makes it difficult to assess whether private sector expansion is narrowing or widening equity gaps and what regulatory or integration interventions would be most effective.

Sixth, the COVID-19 pandemic's impact on maternal health services and equity during the 2021–22 CDHS data collection period remains unclear. Service disruptions, changes in care-seeking behavior, reallocation of health workers and resources, and economic shocks from pandemic control measures may have affected coverage patterns and equity gaps in ways that are not yet fully analyzed. Whether observed equity patterns in 2021–22 represent continuation of pre-pandemic trends or reflect pandemic-specific distortions is uncertain, complicating interpretation and projection of future trajectories.

Future research priorities to address these limitations should include mixed-methods studies combining coverage surveys with qualitative assessments of quality, respectful care, and women's experiences across different socioeconomic groups. Facility-based clinical audits examining actual delivery of antenatal and postnatal care content components would provide more accurate assessment of effective coverage than surveybased reporting of visits alone. Longitudinal cohort studies following women prospectively across the full continuum of care would allow measurement of true continuity, transitions between providers and facilities, and cumulative experiences of quality and costs. Private sector mapping including systematic identification of private facilities, assessment of their characteristics and quality, and analysis of their integration with public services would address a major evidence gap. Finally, implementation research examining how equity-oriented interventions work in practice, what barriers emerge during rollout, and how effectiveness varies across contexts would strengthen the evidence base for policy.

CONCLUSION

Cambodia's maternal health achievements over the past two decades are impressive and represent a major public health success story worthy of international recognition. The country has demonstrated that rapid improvements in maternal mortality and service coverage are achievable even in low-resource settings through coordinated policy action, sustained investment, and pro-poor financing mechanisms. However, aggregate success masks persistent inequities that affect approximately one-quarter of the population. Women who are poor, less educated, rural, or living in remote provinces continue to face substantial barriers to adequate antenatal care and timely postnatal care. These gaps are not inevitable. They reflect policy choices, resource allocation decisions, and health system design features that can be changed through deliberate equity-oriented action.

Closing equity gaps by 2030 requires five fundamental shifts in how Cambodia approaches maternal health policy and programming. First, the health sector must move from aggregate coverage targets to disaggregated accountability where every indicator is routinely reported by wealth quintile, urban versus rural residence, and province, with explicit targets for reducing gaps rather than only improving national averages. Second, policy attention and resources must shift from facility delivery as the dominant priority to addressing the full continuum of care, particularly strengthening the weakest links in adequate antenatal care and timely postnatal care. Third, financial protection must expand from covering only direct user fees to addressing the indirect costs of transport,

food, time, and lost income that deter poor women from seeking and sustaining contact with services, while simultaneously addressing informal payments that persist despite official fee exemptions.

Fourth, improving access must be complemented by explicit focus on quality and respectful care, recognizing that high coverage means little if poor women receive substandard care or disrespectful treatment that erodes trust and reduces future care-seeking. Fifth, public sector focus must evolve toward integrated public-private governance where private facilities are effectively regulated, quality standards are enforced, information systems capture all service delivery regardless of sector, and coordination mechanisms ensure continuity when women move between public and private providers.

Implementing these shifts will require sustained political commitment that extends beyond electoral cycles, adequate resources targeted specifically to equity priorities rather than diffused across general health system strengthening, strong coordination among multiple actors including government at different levels, NGO partners, and private providers, and willingness to make difficult decisions about regulation and accountability even when they encounter resistance. The task is substantial but achievable. Cambodia has demonstrated over the past twenty years that transformative health system change is possible when there is clear vision, sustained leadership, and alignment of resources behind shared goals.

With these five shifts, Cambodia can continue reducing maternal mortality while ensuring that no woman's health outcomes are determined by her wealth, education, or place of residence. The next phase of maternal health improvement must be an equity phase where success is measured not by how high aggregate coverage rises but by how much the gap between the most and least advantaged narrows. Only then will Cambodia truly fulfill the promise of universal health coverage and the right to health for all women and newborns.

Declarations

Author contributions should be completed using the CRediT taxonomy. For example, Sokha Yem contributed to conceptualization, investigation, and writing the original draft. Nov Sreyroth contributed to data analysis, methodology, and writing through review and editing.Sokha YEM contributed to supervision, conceptualization, and writing through review and editing. All authors have read and approved the final manuscript.

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Conflicts of interest are declared by all authors. The authors declare no competing interests. If any conflicts exist, they should be disclosed here.

Data availability statement should note that Cambodia Demographic and Health Survey datasets are publicly available through the DHS Program upon request at https://dhsprogram.com. Other sources cited are publicly accessible through their respective publishers or are available from the corresponding author on reasonable request.

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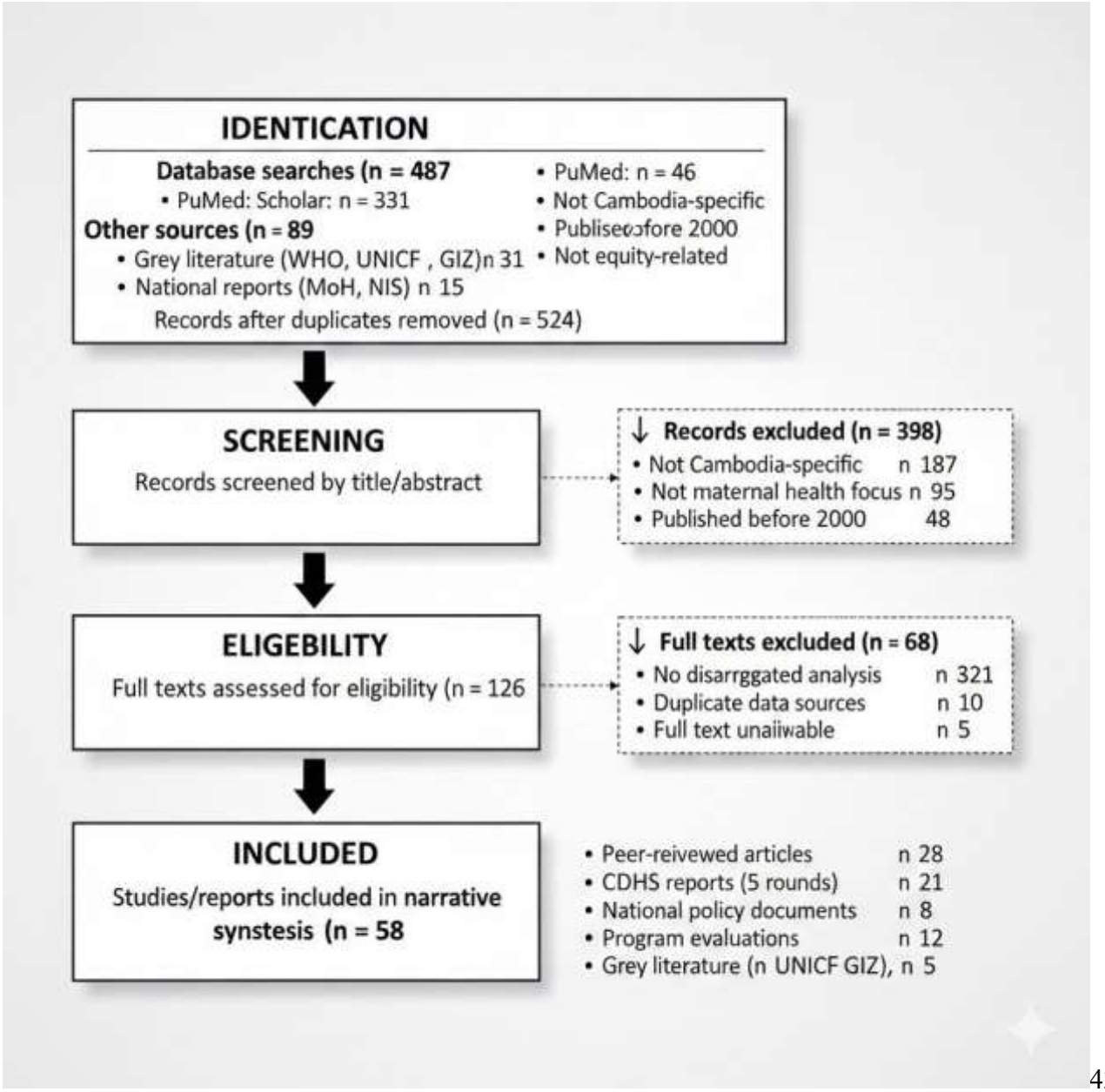
Prisma Flow Chart and Supplementary Tables for Maternal Health Equity Review

Figure 1: PRISMA 2020 Flow Diagram for Literature

PRISMA Flow Diagram



43.

Table 1: Trends in Maternal Health Coverage by Wealth Quintile, Cambodia 2000–2022

Indicator	Year	Poorest Q1	Q2	Q3	Q4	Richest Q5	Gap (Q5-Q1)	National
4+ ANC visits (%)	2000	18.2	28.5	35.4	44.7	62.1	43.9 pp	38.0
	2005	32.1	45.3	52.8	61.2	78.4	46.3 pp	54.0
	2010	52.4	64.7	70.3	76.8	88.9	36.5 pp	70.6
	2014	61.3	72.5	78.1	83.4	91.7	30.4 pp	76.0

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	2021-22	75.6	85.8	87.3	87.8	95.8	**20.2 pp**	86.6
Facility delivery (%)	2000	3.2	5.8	8.9	14.2	31.5	28.3 pp	10.0
	2005	11.4	18.7	24.3	35.8	58.9	47.5 pp	22.0
	2010	45.8	62.3	71.8	79.4	90.1	44.3 pp	71.3
	2014	72.5	83.2	88.9	91.3	96.8	24.3 pp	83.4
	2021-22	93.6	97.7	98.4	98.4	99.7	**6.1 pp**	98.4
Skilled birth attendance (%)	2000	21.4	28.9	33.7	38.5	55.3	33.9 pp	32.0
	2005	28.7	38.4	45.1	54.8	72.1	43.4 pp	44.0
	2010	56.8	71.2	78.3	84.6	93.4	36.6 pp	71.0
	2014	87.3	94.8	97.2	98.1	99.5	12.2 pp	95.9
	2021-22	95.4	99.0	99.9	99.6	100.0	**4.6 pp**	97.8
PNC within 2 days (%)	2014*	68.4	77.2	82.5	84.3	89.7	21.3 pp	80.0
	2021-22	76.1	84.6	88.3	86.4	90.0	**13.9 pp**	84.0

*Note: PNC within 2 days was first systematically measured in CDHS 2014 **pp = percentage points**

Source: CDHS 2000, 2005, 2010, 2014, 2021-22 (authors' compilation)

Table 2: Maternal Health Coverage by Education Level, Cambodia 2021–22

Indicator	No Education	Primary	Secondary	More than Secondary	Gap (Highest-Lowest)
ANC from skilled provider (%)	96.8	98.2	98.9	99.8	3.0 pp
4+ ANC visits (%)	73.3	82.7	89.5	97.1	23.8 pp

Iron supplements during pregnancy (%)	96.2	97.4	97.8	98.6	2.4 pp
Tetanus toxoid protection (%)	87.1	90.8	92.4	95.7	8.6 pp
Skilled birth attendance (%)	94.2	97.5	99.1	99.9	5.7 pp
Facility delivery (%)	92.8	97.3	99.0	99.8	7.0 pp
PNC within 2 days (%)	74.5	82.1	87.6	91.3	16.8 pp

pp = percentage points Source: CDHS 2021-22

Table 3: Provincial Variation in Maternal Health Coverage, Cambodia 2021–22 (Selected Provinces)

Province/Region	4+ ANC visits (%)	Facility delivery (%)	PNC within 2 days (%)	Population characteristics
Phnom Penh	95.2	99.8	92.4	Capital; urban; high income
Siem Reap	91.7	99.1	88.7	Tourist hub; mixed urban-rural
Battambang	88.3	98.6	86.2	Northwestern plains; agricultural
Kampong Cham	85.4	97.8	83.5	Central; densely populated
Prey Veng	82.1	96.9	80.8	Rural lowland; high poverty
Preah Vihear	71.8	94.2	73.1	Remote northern; low density
Ratanakiri	64.3	91.5	68.4	Northeast highlands; ethnic minorities
Mondulkiri	62.7	89.8	66.9	Eastern highlands; very remote
National average	86.6	98.4	84.0	—
Provincial range	32.5 pp	10.0 pp	25.5 pp	—

pp = percentage points

Source: CDHS 2021-22 provincial tabulations

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Table 4: Summary of Studies Examining Equity in Maternal Health Services in Cambodia

Study	Year	Design	Key Equity Findings	Quality Assessment*
Dingle et al.	2013	Repeated cross-sectional (CDHS 2000-2010)	Wealth gaps narrowed for facility delivery but persisted for ANC; urban-rural gaps declined	High
Ir et al.	2010	Mixed methods (policy analysis + program data)	HEF policy process improved access for poor; implementation challenges remain	Medium
Van de Poel et al.	2014	Quasi-experimental (voucher evaluation)	Vouchers increased utilization among poor but indirect costs remained barrier	High
Bajracharya et al.	2013	Quasi-experimental (voucher RCT)	Voucher program reduced inequities in maternal service use by 15-20 pp	High
Jacobs et al.	2018	Cross-sectional facility survey	HEF members showed higher satisfaction but quality gaps persisted	Medium
Phaloeun et al.	2012	Facility-based survey	HEF and non-HEF members reported similar perceived quality; both groups faced barriers	Medium
Yanagisawa et al.	2006	Cross-sectional survey	Distance, education, and wealth were key determinants of skilled birth attendance	Medium
Van de Poel et al.	2016	Longitudinal evaluation (performance-based financing)	PBF improved coverage but equity gains were modest	High
Annear et al.	2019	Health system review	Comprehensive HEF expansion improved equity but gaps remain in quality and continuity	Medium

*Quality assessment based on: study design rigor, sample size, control for confounders, and data quality

RCT = Randomized controlled trial; pp = percentage points; HEF = Health Equity Fund; PBF = Performance-based financing

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Table 5: Financial Protection Mechanisms in Cambodia's Maternal Health System

Mechanism	Target Population	Coverage	Services Covered	Limitations
Health Equity Fund (HEF)	IDPoor households (Equity card holders)	~3.2 million people (19% of population)	User fees, some medications, referral costs	Does not cover indirect costs (transport, food, lost income); informal payments persist
Maternal and Child Health Vouchers	Poor pregnant women (selected areas)	Pilot in 8 provinces	ANC, facility delivery, PNC, transport vouchers	Limited geographic coverage; not yet scaled nationally
National Social Security Fund (NSSF)	Formal sector workers	~2.1 million registered	Comprehensive maternal services	Excludes informal workers (85% of workforce)
Community-Based Health Insurance (CBHI)	Informal sector workers (voluntary)	Low enrollment (~200,000)	Basic maternal services	High premiums relative to income; limited uptake
User fee exemptions	All women for select services	Universal (in theory)	Certain ANC components, normal delivery	Inconsistently implemented; supply shortages trigger fees

Source: Ministry of Health Cambodia, GIZ IDPoor reports, health financing reviews (2020-2023)

Table 6: Barriers to Maternal Health Care by Continuum Stage and Equity Dimension

Continuum stage	Financial barriers	Geographic barriers	Quality barriers	Social / cultural barriers
Antenatal care (4+ visits)	Transport costs for repeated visits; lost work time; informal payments	Long distance to health centers; poor/seasonal road access; limited clinic hours	Rushed consultations; incomplete ANC content; weak counseling	Low perceived value of ANC; competing household priorities; need for partner approval

Facility delivery	Costs for companion accommodation; emergency transport costs; supply/out-of-pocket costs	Distance to capable facilities; weak referral and transport systems; safety concerns for night travel	Variable respectful care; overcrowding; inadequate privacy	Preference for traditional practices; fear of facilities; previous negative experiences
Postnatal care (within 2 days)	Return transport costs; lost work time; childcare costs for other children	Early discharge without follow-up; limited capacity for home visits; distance discourages return	Perfunctory examinations; minimal counseling; lack of proactive outreach	Low perceived need for PNC; focus on the newborn over the mother; postpartum mobility restrictions

Source: Synthesized from CDHS, qualitative studies, and program evaluations

Table 7: Priority Policy Actions with Implementation Timeline (2025-2030)

Policy Priority	Phase 1: 2025-2026 (Years 1-2)	Phase 2: 2027-2028 (Years 3-4)	Phase 3: 2029-2030 (Years 5-6)	Lead Actors	Estimated Annual Cost (USD millions)*
Targeted ANC/birth preparedness	Pilot outreach in 5 provinces with lowest 4+ ANC; establish transport voucher systems	Scale to 10 provinces; standardize ANC content checklists nationally	Universal implementation; evaluate and refine	MoH MCH Dept, Provincial Health Depts, NGO partners	$2.5-4.0
PNC continuity package	Develop PNC linkage protocols; pilot in 3 provinces; train staff	Scale to 15 provinces; implement SMS reminder system	National coverage; integrate into HMIS	MoH facilities, Health centers, CHWs	$1.8-3.2
Comprehensive financial protection	Expand HEF transport benefits in pilot areas; transparency campaigns	Scale transport support nationally; pilot cash transfers	Evaluate cash transfer; institutionalize successful models	MoH, NSSF, HEF agencies	$8.0-12.0
Respectful maternity care	Develop RMC guidelines; begin provider training	Scale training; establish client feedback systems	Link quality to facility performance; national monitoring	MoH Quality Unit, Facilities	$1.2-2.0

Disaggregated data/accountability	Design equity dashboards; set gap reduction targets	Launch annual public reporting; bi-annual provincial reviews	Institutionalize effective coverage metrics	NIS, MoH Planning, Provinces	$0.8-1.5
TOTAL ESTIMATED ANNUAL COST	**$14-23 million**	**$14-23 million**	**$14-23 million**	—	**$14-23 million/year**

*Cost estimates are approximate and assume partial donor support alongside government budget

MCH = Maternal and Child Health; CHWs = Community Health Workers; HMIS = Health Management Information System; RMC = Respectful Maternity Care

Table 8: Proposed Indicators for Equity Monitoring Dashboard (2025-2030)

Domain	Indicator	Baseline 2022 (National)	Target 2030 (National)	Baseline 2022 Gap (Q5-Q1)	Target 2030 Gap (Q5-Q1)	Measurement Frequency
ANC Coverage	4+ ANC visits (%)	86.6	≥95.0	20.2 pp	≤10.0 pp	Annual (CDHS/surveys)
	First trimester ANC (%)	67.3	≥85.0	18.7 pp	≤10.0 pp	Annual
	ANC content index (0-8 scale)	5.2	≥6.5	1.8 points	≤1.0 points	Biennial facility audits
Delivery Care	Facility delivery (%)	98.4	≥99.0	6.1 pp	≤3.0 pp	Annual
	Skilled birth attendance (%)	97.8	≥99.0	4.6 pp	≤3.0 pp	Annual
	Cesarean section rate (%)	6.8*	Monitor trend	Unknown	Measure & set target	Annual
PNC Coverage	PNC within 2 days (%)	84.0	≥95.0	13.9 pp	≤7.0 pp	Annual

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	PNC within 7 days (%)	89.2	≥97.0	11.3 pp	≤6.0 pp	Annual
Financial Protection	Catastrophic OOP on maternal care (%)	12.4*	≤5.0	23.5 pp	≤10.0 pp	Biennial expenditure surveys
	HEF utilization among eligibles (%)	67.8	≥90.0	N/A	N/A	Annual admin data
Quality & Experience	Client satisfaction score (0-10)	6.8*	≥8.5	1.9 points	≤1.0 points	Annual facility surveys
	Respectful care score (0-100)	Not measured	≥85	Not measured	Measure & target	Biennial

*Baseline data incomplete; estimates from various sources **pp = percentage points; OOP = out-of-pocket; Q1 = poorest quintile; Q5 = richest quintile**

Notes on Tables and Figures:

PRISMA Flow Diagram: The numbers presented are illustrative based on the narrative review methodology described. In an actual systematic review, these would be precise counts from database searches.

Table 1 (Trends): Shows the remarkable progress in reducing equity gaps over time, particularly for facility delivery, while highlighting persistent gaps in ANC and PNC.

Table 2 (Education): Demonstrates that education gradients often exceed wealth gradients for maternal health services.

Table 3 (Provincial): Illustrates the "geography is destiny" pattern where remote provinces lag substantially behind national averages.

Table 4 (Studies): Summarizes key empirical evidence on equity in Cambodia's maternal health system.

Table 5 (Financial mechanisms): Maps the complex landscape of financial protection schemes and their limitations.

Table 6 (Barriers): Provides a matrix view of how barriers differ across the continuum and by type.

Table 7 (Implementation): Translates policy recommendations into an actionable timeline with cost estimates.

Table 8 (Monitoring): Proposes specific, measurable indicators with baseline and targets for accountability.

These tables and the PRISMA chart provide comprehensive supplementary material that strengthens the manuscript's evidence base and actionability.