DYNAMICS OF CARE AND SECTOR USE BETWEEN BIRTH, CONTRACEPTION, AND SICK CHILD SERVICES

MOMENTUM Private Healthcare Delivery

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Cover photo: A mother holds her baby. PSI Kenya. 2018.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

ABBREVIATIONS

ANC	Antenatal care
ARI	Acute respiratory illness
CI	Confidence interval
DHS	Demographic and Health Surveys
FBO	Faith-based organization
FP	Family planning
IUD	Intrauterine device
LMIC	Low- and middle-income country
MNCH	Maternal, Newborn, and Child Health
MOMENTUM	MOMENTUM Private Healthcare Delivery Project
NURHI	Nigerian Urban Reproductive Health Initiative
PRH	Office of Population and Reproductive Health
PNC	Postnatal care
PSI	Population Services International
RH	Reproductive health
SC	Sick Child
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

A life course approach to health, where present health outcomes are considered influenced by a continuum of past experiences during critical and sensitive periods from birth to present age, is increasingly recognized as key to achieving improved family planning (FP), reproductive health (RH) and maternal, newborn, and child health (MNCH) outcomes of women in low- and middle-income countries (LMICs) (Cohen et al., 2022; Jones et al., 2019). Moreover, to meet the broad FP/RH and MNCH needs of women in the context of mixed health systems, the complementary strengths of the public and private sectors must be leveraged to ensure better availability, access, and choice (Kruk et al., 2018). To do so, understanding which sector to leverage at a certain point of care across the healthcare seeking journey is key for health stewards of mixed health systems (Hanson et al., 2008; Sambo & Kirigia, 2011; USAID & SHOPS PLUS, n.d.-a). Previous studies have demonstrated the differences in public and private sector use of health services at the aggregate level, but they do not examine patterns of sector use across health service utilization for individuals. Whether and when an individual switches sectors for healthcare could have implications for continuity of care over the life course, including for contraceptive use during adolescence and other life stages, and for pregnancy, childbirth, and postpartum care (Kerber et al., 2007). Conversely, sector fidelity—using health services in the same sector for various health needs—may provide greater continuity, facilitate future care seeking, and result in fewer missed opportunities for future care needs.

The USAID MOMENTUM Private Healthcare Delivery project (MOMENTUM) conducted an analysis using data collected by The Demographic and Health Surveys (DHS) Program to examine sector use and sector fidelity at the individual level for childbirth, contraceptives, and sick child care. The analysis addresses three research questions:

1. What are the patterns of sector use, sector switching, and missed opportunities for care across eight countries in Asia and sub-Saharan Africa?
2. Is sector for birth associated with subsequent missed opportunities for using modern contraceptives and seeking sick child care?
3. Are sector fidelity and switching sectors across birth and contraception associated with subsequent missed opportunities for sick child care?

METHODS

MOMENTUM selected eight USAID Population and Reproductive Health (PRH) priority countries across Africa and Asia with recent DHS data (ranging from 2015-2018) to represent geographic diversity and to maximize analytic sample sizes: Afghanistan, India, Indonesia, Kenya, Malawi, Nigeria, Pakistan, and Uganda. The analytic sample included ever-married women who were potentially in need of three services: facility birth, modern contraception, and sick child services. We developed variables to characterize sector use and missed opportunities for care for each of these services.

To address the first research question, we conducted descriptive analyses to depict patterns of service utilization. To answer the second and third research questions, we conducted adjusted multivariable logistic regression analyses to examine associations between sector of use and sector of fidelity with missed opportunities for modern contraceptives and sick child care, adjusting for potential confounders,

including residence, wealth, education, parity, antenatal care, cesarean section, and any problems accessing care.

RESULTS

OVERVIEW. Sample sizes ranged from 1,955 women in Kenya to 28,545 women in India. In seven of the eight countries, less than 50% of women reported receiving all three types of care, ranging from 11% in Nigeria to 54% in Indonesia.

WHAT ARE THE PATTERNS OF SECTOR USE, SECTOR SWITCHING, AND MISSED OPPORTUNITIES FOR CARE ACROSS EIGHT COUNTRIES IN ASIA AND SUB-SAHARAN AFRICA? While use of the public sector in sub-Saharan Africa predominated for all three services, and use of the private sector for birth and sick child care services was greater in Asia, sector switching was common in all countries, especially where health care seeking in general was low.

IS SECTOR FOR BIRTH ASSOCIATED WITH SUBSEQUENT MISSED OPPORTUNITIES FOR USING MODERN CONTRACEPTIVES AND SEEKING SICK CHILD CARE? In four countries (Kenya, Malawi, Pakistan, and Uganda) there was no association between sector of care at birth and nonuse of modern contraceptives. In India, Indonesia, and Nigeria, nonuse of contraceptives was significantly greater among those who used the private sector at birth as compared to the public sector. In Afghanistan, nonuse of contraceptives was lower among those who used the private sector. In all eight countries, sector of care at birth was not associated with missing sick child care.

ARE SECTOR FIDELITY AND SWITCHING SECTORS ACROSS BIRTH AND CONTRACEPTION ASSOCIATED WITH SUBSEQUENT MISSED OPPORTUNITIES FOR SICK CHILD CARE? Sector switching between birth and contraceptive use was generally not associated with missing future care for sick children. Women who did not access care at birth or for contraception had greater odds of missing care for sick children in most countries. Women who did access care for birth but not for contraception had greater odds of also missing sick child care in most countries. For women who accessed care for contraception but not for birth, missed care for sick children was similar to that of women with sector fidelity in most countries.

CONCLUSION

Overall, the analysis found wide variation in patterns of sector use both across and within countries. Although sector switching was common, it was not strongly associated with missing subsequent opportunities for care. Health system stewards should note that for FP/RH and MNCH care, our analysis demonstrates that women frequently use both sectors, and both should be considered in health policymaking and planning. However, specific interventions should be informed by a deeper understanding of the local context and an understanding of how service users navigate and interact with the public and private sectors.

An important finding was that overall, substantial proportions of women in our sample who delivered in both public and private facilities went on to miss care for FP or for sick children, suggesting a significant need to improve integration and continuity of care across sectors. Moreover, a sizable proportion of women in our sample never accessed the health system for any of the included services. Our analysis suggests that both the public and private sectors have roles to play in positively influencing health

seeking behavior. Increasing the range and availability of high-quality health services that women can access to meet their reproductive health needs is important in both sectors.

Although this study fills an important gap in the research literature, future studies could deepen our understanding of health care seeking journeys by examining fidelity to specific facilities or providers. Future work could also analyze preferences and determinants of those choices for various types of health care services and populations, including adolescents. Increasing our understanding of how individuals navigate their health system can help system stewards improve health outcomes by identifying and addressing issues resulting in missed opportunities for care.

INTRODUCTION

Increasingly, the global community recognizes that a life course approach to the family planning (FP), reproductive health (RH) and maternal, newborn, and child health (MNCH) needs of women in low- and middle-income countries (LMIC) is critical to achieving improved health outcomes (Cohen et al., 2022; Jones et al., 2019). These needs can be addressed by leveraging the complementary strengths of the public and private sectors (Kruk et al., 2018). To do so, a better understanding of healthcare seeking journeys across the public and private sectors is critical for health policy and planning (Hanson et al., 2008; Sambo & Kirigia, 2011; USAID & SHOPS PLUS, n.d.-a).

The public-private mix for FP and MNCH services varies substantially across countries. Several studies and resources detail these differences for individual health areas (Campbell et al., 2016; Chakraborty & Sprockett, 2018; Footman et al., 2015; Grépin, 2016; USAID & SHOPS PLUS, n.d.-b, n.d.-a). For example, within East Africa, private sector use among modern contraceptive users ranges from 7% in Rwanda to 40% in Uganda (USAID & SHOPS PLUS, n.d.-b). In West Africa, the use of the private sector for child health visits ranges from 19% in Senegal to 60% in Nigeria (USAID & SHOPS PLUS, n.d.-b). A study that examined the public-private mix for antenatal care (ANC), institutional birth, and postnatal care (PNC) in 22 large African cities found that patterns of care seeking in the public and private sector varied across cities, with no consistent pattern in use of these three services.(Wong et al., 2022). Within countries, the public-private mix also varies across individual health services. For example, an analysis of Demographic and Health Survey (DHS) data from 70 LMICs from 1990-2013 indicated generally higher levels of private sector use for sick child visits for diarrhea or fever than for ANC, facility birth, or modern FP (Grépin, 2016).

These variations in patterns of public and private sector service utilization across and within countries may be the result of multiple factors. Patterns of health service use across sectors vary by individual characteristics. For example, studies have found that women living in urban areas and those with higher incomes use the private sector at higher rates than those living in rural areas and those with lower incomes (Chakraborty & Sprockett, 2018; Grépin, 2016; Guo et al., 2019; Pomeroy et al., 2014). Other factors relating to these patterns include the types of facilities within the public and private sectors, country policies, the out-of-pocket costs of private sector services, and accessibility of private facilities (Doctor et al., 2019; Yoong et al., 2010).

While these previous studies highlight aggregate differences in public and private sector use for health services, they do not examine patterns of sector use across health service utilization for individuals. This type of analysis can reveal important information, as individuals may access some services in the private sector and others in the public sector. For example, a woman may use the public sector for ANC but switch to a private provider for birth, postpartum contraception, and subsequent child health visits.

Switching sectors could have implications for continuity of care over the life course, from contraceptive use during adolescence and other life stages, through pregnancy, childbirth, postpartum care, and health services for her children (Kerber et al., 2007). While switching sectors could be a positive indicator of a client's agency and the existence of choice in her healthcare decisions, it could also reveal a discontinuity of care, which could lead to interruptions in future healthcare seeking and potential missed opportunities for follow-up and referrals. Conversely, sector fidelity—seeking services from the same sector across various health needs—may facilitate future care seeking and result in fewer missed opportunities. However, the dynamics and implications of health seeking behavior across sectors are not

well understood. An improved understanding of these patterns of care seeking can inform strategic communication interventions and guide FP and MNCH investments across health systems for maximum impact.

The United States Agency for International Development (USAID)-funded MOMENTUM Private Healthcare Delivery (MOMENTUM) project harnesses the potential of the private sector to expand access to and use of high-quality, evidence-based MNCH, voluntary FP, and reproductive health services. To address the gaps in the literature, MOMENTUM analyzed DHS data to examine sector use and sector fidelity at the individual level for childbirth, modern contraceptives, and sick child care. Examining sector use, sector fidelity, and subsequent missed opportunities for care, necessitates a data source that allows for sequencing of use of services across different health care needs. The DHS uses different recall timeframes for survey questions about these three services, which allowed us to order them for our analysis, starting with childbirth (Point 1), then modern contraceptives (Point 2), then sick child care (Point 3). As such, we used this sequence as our continuum of care for the three services to allow us to analyze sector switching between different points on this continuum.

The three research questions addressed by these analyses are as follows:

1. What are the patterns of sector use, sector switching, and missed opportunities for care across eight countries in Asia and sub-Saharan Africa?
2. Is sector for birth (Point 1) associated with subsequent missed opportunities for using modern contraceptives and seeking sick child care (Point 2 *or* Point 3)?
3. Are sector fidelity and switching sectors across birth and contraception (Points 1 *and* 2) associated with subsequent missed opportunities for sick child care (Point 3)?

METHODS

DATA

We explored an initial set of 21 USAID PRH priority countries that had available DHS data collected after 2014. The DHS is designed to collect data from a nationally representative sample of households in LMICs using a multistage cluster sampling design. The surveys collect information on demographics and contraceptive, maternal, newborn and child health related behaviors and outcomes, including healthcare seeking across multiple health areas. DHS data are publicly available.

Of these 21 countries, eight countries were selected for inclusion in the analysis: Four countries each were selected from sub-Saharan Africa and Asia that yielded the largest possible analytic sample based on the inclusion criteria described below. Limiting to countries with large analytic sample sizes increased the reliability and precision of the estimates produced by the analysis. The eight countries and corresponding year of DHS data collection were Afghanistan (2015), India (2015-16), Indonesia (2017), Kenya (2014), Malawi (2015-16), Nigeria (2018), Pakistan (2017-2018), and Uganda (2016). The most recent survey available at the time of the analysis was used for each country.

SAMPLE

The analytic sample included ever-married women who were potentially in need of all three services: facility birth, modern contraception, and sick child services. Specifically, women were included if they reported (1) a delivery in the previous five years; (2) a current need for FP (excluding pregnant, infecund, or menopausal women and those who expressed desire for having another child in the next two years); and (3) at least one child under five years of age with symptoms of fever, acute respiratory illness (ARI), or diarrhea in the last two weeks. We excluded women with missing information on any independent or dependent variables of interest.

MEASURES

We constructed variables to describe sector use and missed opportunities for care for each of the three health services: birth, contraceptive use, and sick child care. See Tables 1 and 2 for a summary, as well as details below.

Birth

All women in the analytic sample gave birth in the previous five years based on the inclusion criteria. The most recent delivery was assumed to be the first service received (Point 1) in the cascade of the three services assessed based on the measurement recall periods for each.

We assessed location of the most recent birth and classified the *sector of birth* as public, private, or other/none. The other/none category included women who gave birth at home or at other non-facility locations.

Modern contraceptive use

Based on the study inclusion criteria, all women were either current users of a modern contraceptive method or had current unmet need for modern contraception. To align with the DHS recall timeframes, contraceptive use and related services were assumed to be the second point in the cascade (Point 2). More than 94% of modern contraceptive users in our sample reported that they began using their most recent method longer than a month ago, so this service was also expected to have preceded sick child care (Point 3), the timing of which is described below.

We constructed variables describing the source of current contraceptive method and missed opportunities for contraception. For women who were current users of a modern contraceptive method, we assessed the source of her current contraceptive method. The sector from which women received their current contraceptive method was classified as public, private, pharmacy/shop, and other/none. While some countries consider pharmacies and certain types of shops to be part of the private sector, other countries do not consider these sites as formal health providers. In our analysis, because of the importance of pharmacies and drug shops in providing contraceptives (Bradley et al 2018, HIPS 2021), we classified use of pharmacies and drug shops as a separate source category. The other/none category included women who received contraception from informal sources, such as friends, relatives, or traditional practitioners. This category also included those who were not using a method or who were using a traditional method. Traditional methods included periodic abstinence, withdrawal, or other country-specific traditional or folk methods. Women in the other/none category were considered to have a *missed opportunity for contraception*, one of the two outcomes for the second research question.

Sick child care

Based on the inclusion criteria for the study, all women in this study reported at least one child under five years of age with symptoms of fever, ARI, or diarrhea in the last two weeks. Sick child care in the past two weeks was assumed to be the third and final service in the cascade (Point 3), following most recent delivery and contraceptive use. Although possible that a women could have given birth in the two weeks preceding the survey, in 99% or more of the sample (in the four countries with data on date of most recent delivery), the most recent delivery occurred before the most recent instance of a sick child.

We constructed variables for source of sick child care and missed opportunities for sick child care based on care seeking for children with these symptoms in the two weeks preceding the DHS survey. Source of sick child care was classified as public, private, pharmacy/shop, and other/none. As for contraceptive use, we classified use of pharmacies and drug shops as a category separate from the private sector. The other/none category included those who did not seek care and those who sought care at informal outlets like traditional practitioners, friends or relatives. If more than one child needed care or if care was obtained in more than one sector, the variable was coded as other/none if any single child did not receive care. Otherwise, the variable was coded hierarchically in the following order:

- *Private* if any care from a private facility;
- *Public* if no private facility care but any public facility care; followed by
- *Pharmacy/shop* if pharmacy/shop only and no public or private facility care.

Women in the other/none category were considered to have a *missed opportunity for sick child care*, an outcome for the second and third research questions.

TABLE 1. DHS TIMEFRAME REFERENCES FOR INCLUDED AREAS

Health service	Timeframe for measurement in DHS
Birth (Point 1)	Births in the last five years (analysis focused on *most recent* if more than one birth within the last five years)
Modern contraceptive use (Point 2)	Current modern contraceptive use or current unmet need for modern contraception, typically reflecting use beginning prior to the month of the survey. *
Sick child care (Point 3)	Child under age five who had symptoms of an illness including fever, ARI, or diarrhea in the last two weeks.

The vast majority (>94%) of modern contraceptive users in our sample initiated use of their current method more than one month prior to interview

TABLE 2. SUMMARY OF SECTOR CLASSIFICATIONS USED IN ANALYSIS

Health Service	Public	Private	Pharmacy or shop	Other or none (e.g., a missed opportunity)
Birth (Point 1)	✔	✔	n/a	• Home birth • Other non-facility birth location
Modern contraceptives (Point 2)	✔	✔	✔	• Other source (e.g., traditional practitioners, friends, relatives) • Traditional method • No method (has unmet need)
Sick child care (Point 3)	✔	✔	✔	• Informal outlets (e.g., traditional practitioners, friends, relatives) • No care (has unmet need)

Sector fidelity between delivery and contraception

We first examined sector fidelity descriptively, defined as using public sector or private sector services exclusively across the continuum of health services for birth, contraceptive use, and sick child care. We then constructed a sector fidelity variable that served as the main independent variable for the third research question. This variable reflected sector fidelity and sector switching for the first two services in the cascade: childbirth and contraceptive use (Points 1 and 2). The variable consisted of the following five categories based on the sector of service delivery and missed opportunities for care:

1. The *sector fidelity* category included women with consistent sector use between childbirth and contraception. This category included women who used the public sector for both services and women who used the private sector for both services.
2. The *sector switching* category included women with a public or private sector birth (Point 1) who used a different sector (or a pharmacy/shop) to access contraceptives (Point 2).
3. The *institutional birth, no contraceptive use* category included women who gave birth in a public or private facility (Point 1) but who were not using a modern contraceptive method from either a public, private, or pharmacy/shop source (Point 2).
4. The *no institutional birth, contraceptive use* category included women who did not give birth in a public or private facility (Point 1) but who were using a modern contraceptive method and received it from either a public, private, or pharmacy/shop source (Point 2).
5. The *no institutional birth, no contraceptive use* category included women who did not give birth in a facility (Point 1) and who were not using a modern contraceptive method from either a public, private, or pharmacy/shop source (Point 2).

Confounders

For our statistical analyses, we examined potential confounders that have been shown to be associated with reproductive and maternal health care and sector use, including demographic and maternal characteristics, as well as indicators of access and availability of health care services (Campbell et al., 2016; Doctor et al., 2018, 2019; USAID & SHOPS PLUS, n.d.-b). These variables included place of residence (urban or rural), wealth (terciles of low, medium, or high, created from a continuous wealth score), education (none/primary vs. secondary and higher), parity (one child vs. two or more). Indicators of access to care included use of ANC during the most recent pregnancy that resulted in a live birth (0-3 visits vs. 4 or more visits, groups developed for this analysis), and any problem accessing health care related to securing money or permission for care, distance to care, or not wanting to go alone. We also examined cesarean section for the most recent live birth since cesarean sections are more common in the private sector than public (Soto-Vega et al., 2015). Further, in areas where the cesarean section rate is low, having had a cesarean section may indicate better access to services (Beyene et al., 2021).

ANALYSIS

To address the first research question (describe sector fidelity and missed opportunities for care across the eight countries), we produced Sankey diagrams, which are graphs that demonstrate the flow from one set of values to another across different stages (Naqvi, 2021). In this analysis the values are: use and sector of care for birth (Point 1), contraception (Point 2), and sick child care (Point 3). The Sankey diagrams visualize services across the cascade of services and within sectors, demonstrating the relative utilization of each sector and revealing missed opportunities for care.

For the second research question—how sector of birth (Point 1) is associated with missed opportunities for contraceptives (Point 2) and sick child care (Point 3)—we started with a descriptive analysis of differences in missed opportunities for contraception and sick child care (Points 2 and 3) according to the sector of delivery for the most recent birth (Point 1). To explore the relationships between sector use for the most recent delivery and missed opportunities for contraceptive use or sick child care we conducted multivariable logistic regression analyses. The outcome for one model was the dichotomous variable for missed opportunity for contraception (Point 2), and for the other model, missed opportunity

for sick child care (Point 3). The main independent variable for each model was the categorical variable describing the sector of birth for the most recent birth.

For the third research question (how sector switching between Points 1 and 2 are associated with missed opportunities at Point 3), we started by describing missed opportunities for sick child care (Point 3) according to the categorical sector fidelity variable across delivery and contraceptive use (Points 1 and 2). We then conducted multivariable logistic regression analyses with the dichotomous variable for missed opportunity for sick child care as the outcome. The main independent variable for this model was the categorical sector fidelity variable that describes sector use across delivery and contraception.

All models were adjusted for potential confounding variables, including residence, wealth, education, parity, antenatal care, cesarean section, and any problems accessing care. Estimates were weighted to adjust for nonresponse and disproportionate sampling. Statistical tests were adjusted for the complex survey design. All analyses were conducted using Stata version 16.1.

RESULTS

OVERVIEW OF THE SAMPLE

The analytic samples for each country (Table 3) consisted of women who were ever married, had a birth in the previous five years, had a need for contraceptives, and had at least one child under five years old who was sick in the two weeks before the survey, and who had no missing data on any variable. Sample sizes ranged from 1,955 women in Kenya to 28,545 women in India. In most countries, more than half of women had a facility birth for their most recent birth, ranging from 44% in Nigeria to 81% in India. Current modern contraceptive use ranged substantially from 27% in Nigeria to 81% in Malawi. Receipt of sick child care had the least variation across countries, ranging from 58% in Afghanistan to 82% in Indonesia. In all but one country, less than half of women received all three types of care with a low of 11% in Nigeria and a high of 54% in Indonesia.

TABLE 3. ANALYTIC SAMPLE OF WOMEN IN COUNTRIES STUDIED

| Country and Year | Women with a need for care for birth, FP, and sick children (N) | Among women with a need for all three services | | | |
		Facility Birth (%)	Modern Contraceptive Use (%)	Sick Child Care (%)	Care for All Three (%)
Afghanistan 2015	5,350	53.8	41.2	58.3	16.2
India 2015-16	28,545	81.5	47.6	73.1	31.3
Indonesia 2017	5,225	80.2	80.7	81.6	54.0
Kenya 2014	1,955	64.8	72.0	62.3	33.8
Malawi 2015-16	4,836	91.3	81.3	60.4	46.5
Nigeria 2018	2,649	43.9	27.4	64.4	11.4
Pakistan 2017-2018	2,231	72.4	46.2	71.4	26.4
Uganda 2016	3,175	73.9	53.8	69.7	30.5

QUESTION 1. WHAT ARE THE PATTERNS OF SECTOR USE, SECTOR SWITCHING, AND MISSED OPPORTUNITIES FOR CARE ACROSS THE EIGHT COUNTRIES?

Figure 1 illustrates sector use and missed opportunities for care across the sequence of health services using Sankey diagrams. These diagrams demonstrate the use of services and sector of care across the healthcare needs for birth, FP, and sick child care, showing how individuals move across the three points in the diagram (i.e., the three service areas) to aid in understanding the dynamics of use across each service. They can also be useful in detecting patterns within a sector, as well as gaps in services. This analysis is limited to ever-married women who had a need for all three services.

Use of the public sector predominated in three of the four sub-Saharan African countries—Kenya, Malawi, and Uganda—as well as in Afghanistan. The private sector had a larger reach in three of the four countries in Asia (India, Indonesia, and Pakistan) for facility birth and sick child care. In Indonesia, the private sector was the source for the largest share of modern contraceptive users.

> **QUESTION 1: SUMMARY OF FINDINGS**
>
> Use of the **public sector** for care for birth, contraceptive use and sick child care predominated in sub-Saharan Africa; **private sector** use was greater in Asia, particularly for birth and sick child care.
>
> **Sector switching was common** in all countries, especially where health care seeking was low.
>
> Where one sector predominated in a country, **sector fidelity** between points was more common.

Pharmacies played a significant role in contraceptive service provision in Afghanistan and Pakistan and in sick child care in Nigeria. Pharmacies were not frequently used in Kenya, Malawi, and Uganda. Nigeria, and to a lesser extent Afghanistan, was characterized by higher rates of non-use of health services and low rates of private sector service utilization.

Overall, switching sectors was common in all countries. In countries where non-use of health services was common, sector switching was particularly high among those who did seek care. This pattern was noted in Afghanistan and Nigeria. Sector fidelity occurred more frequently in countries where a single sector predominated services utilization. For example, sector fidelity was seen frequently in Malawi, Kenya, and Uganda where the public sector predominated. Sector fidelity was also higher in Indonesia, which has a relatively large private sector reach across services.

FIGURE 1. SECTOR USE FROM BIRTH (POINT 1) TO CONTRACEPTION (POINT 2) TO SICK CHILD CARE (POINT 3) AMONG WOMEN WITH A NEED FOR ALL THREE SERVICES

Afghanistan 2015
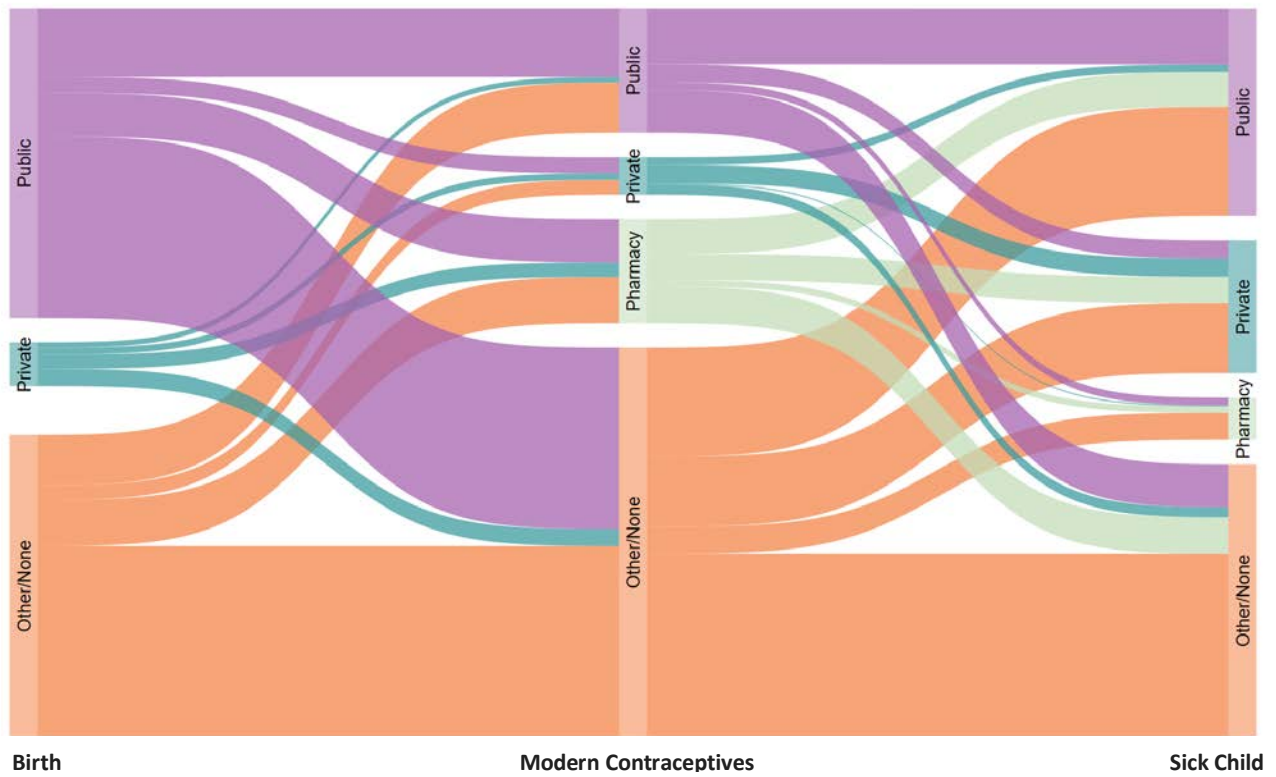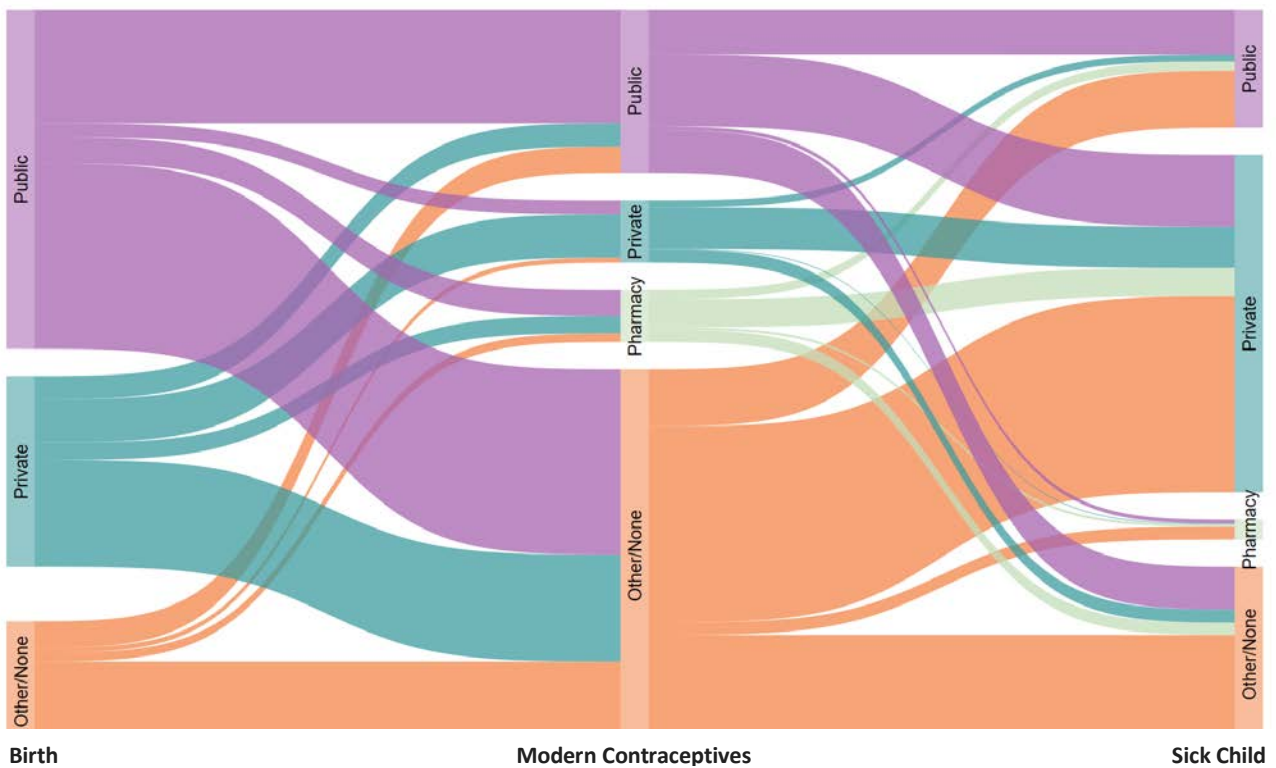
India 2015-16

Figure 1 continued…

Indonesia 2017

Birth   Modern Contraceptives   Sick Child

Kenya 2014

Birth   Modern Contraceptives   Sick Child
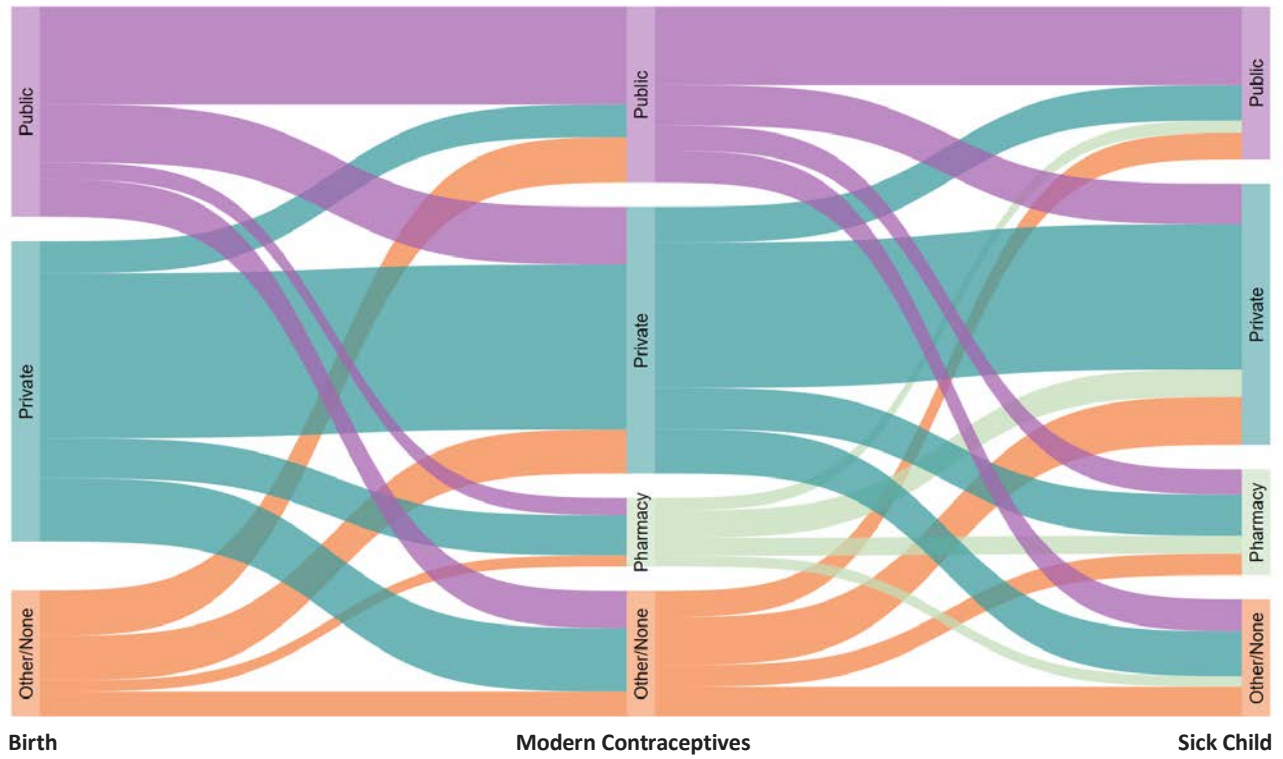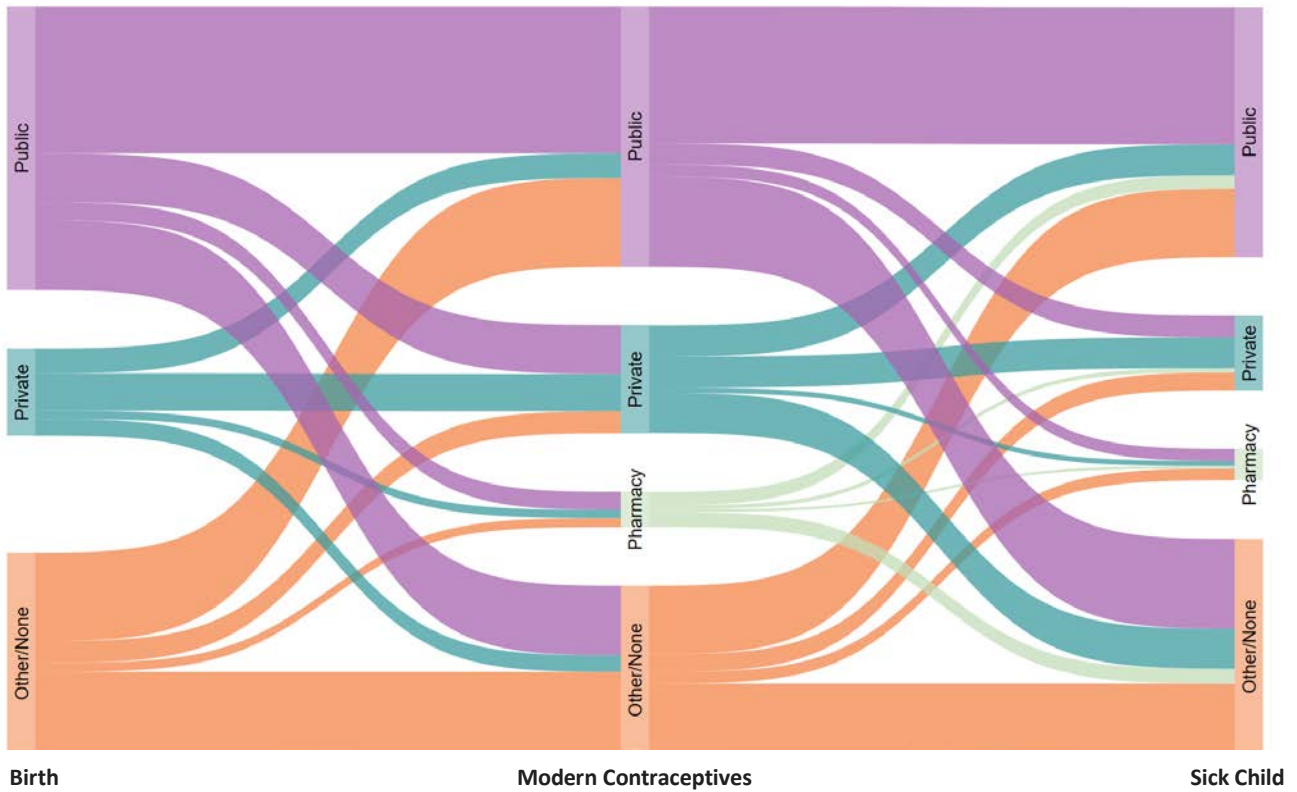
Figure 1 continued…

Malawi 2015-16

Birth   Modern Contraceptives   Sick Child

Nigeria 2018

Birth   Modern Contraceptives   Sick Child

Pakistan 2017-2018

Birth   **Modern Contraceptives**   **Sick Child**

Uganda 2016

Birth   **Modern Contraceptives**   **Sick Child**
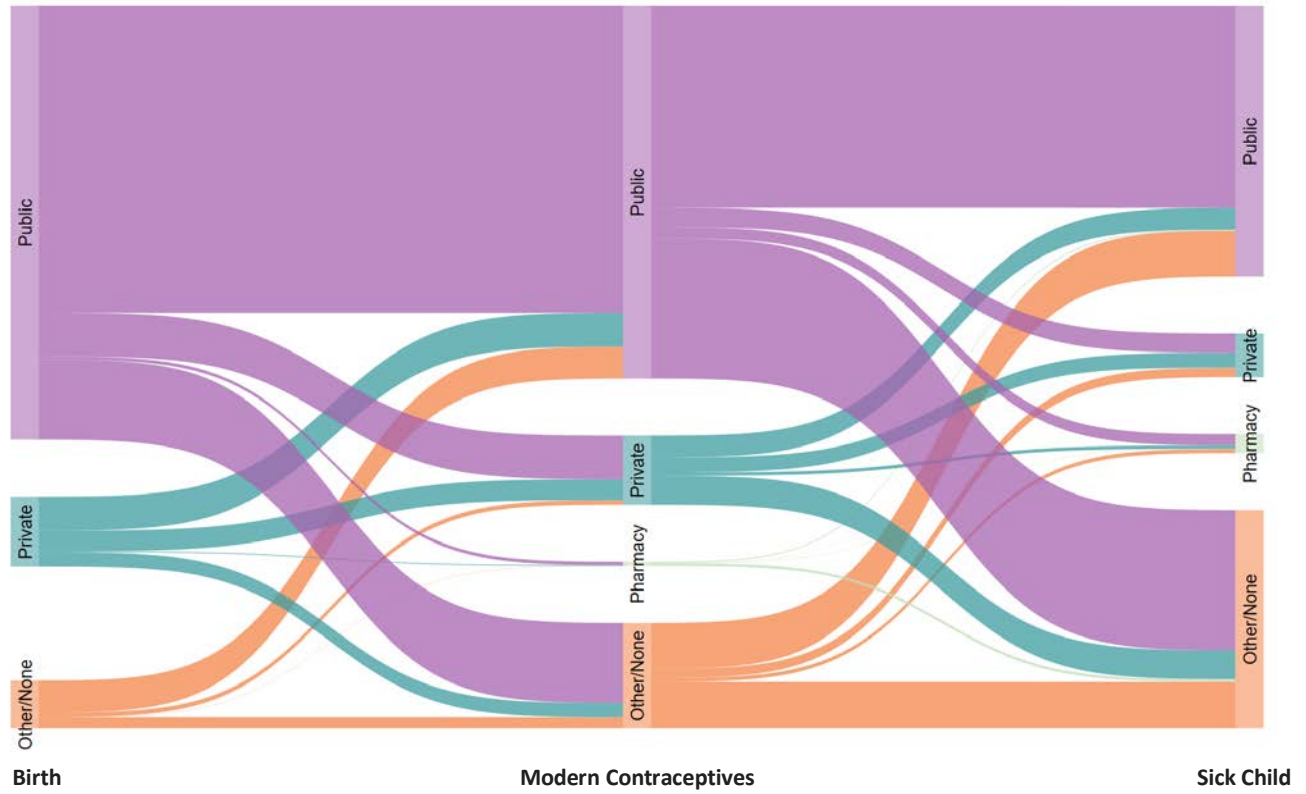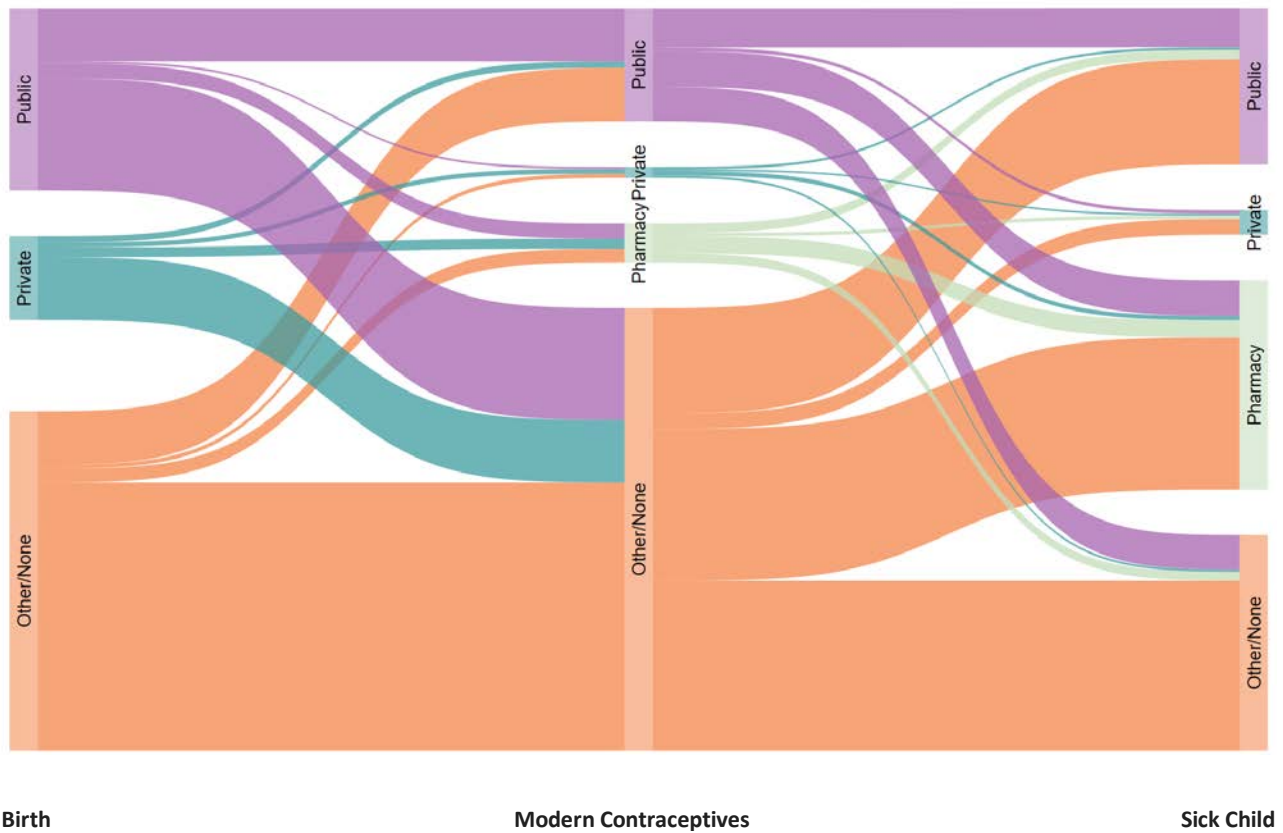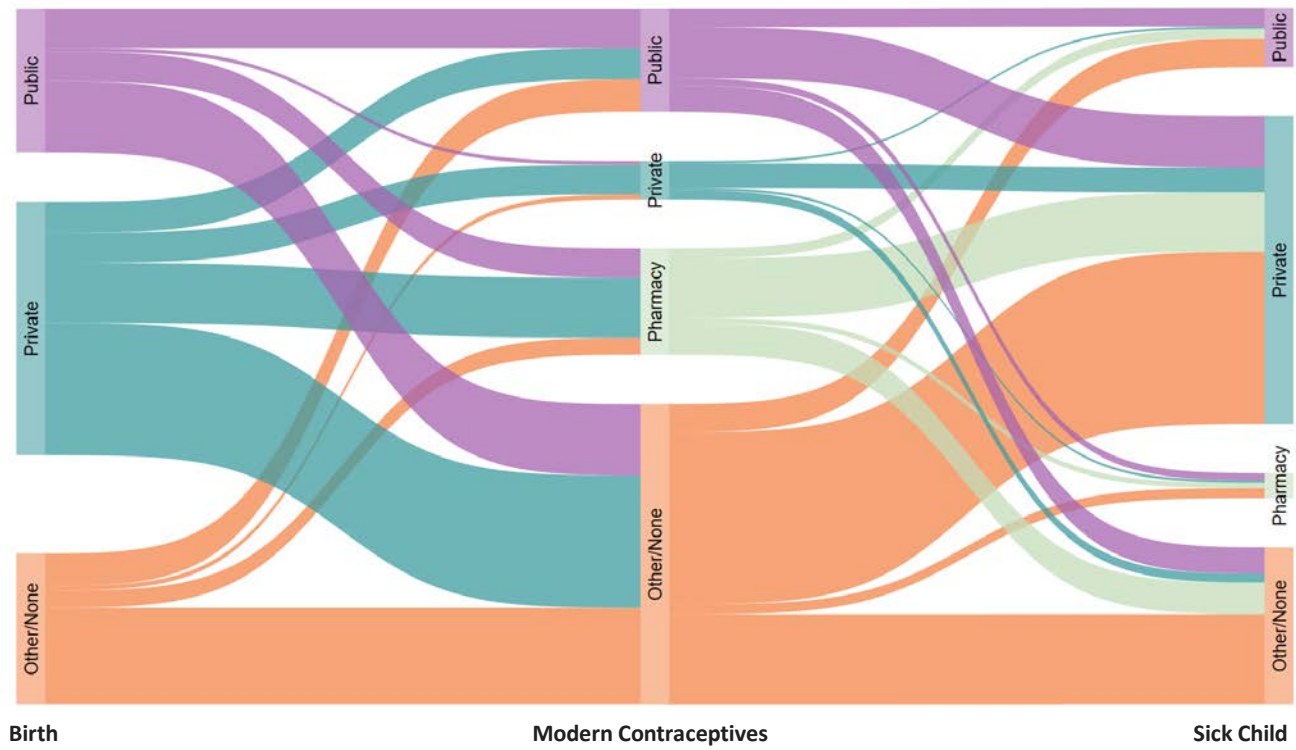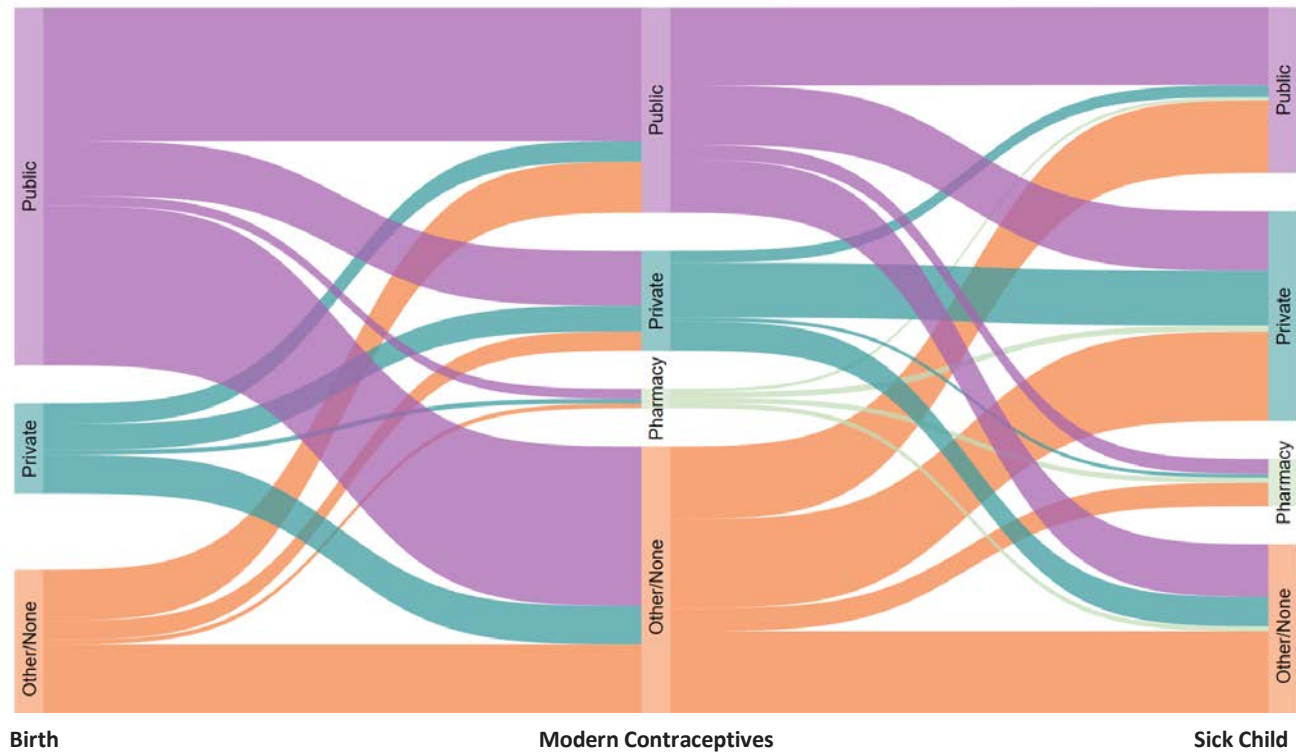
Note: Other/None for birth includes those who gave birth at home or other non-facility location; for FP includes informal sources, traditional method use, or no use; and sick child care includes informal sources or no care.

QUESTION 2. IS SECTOR FOR BIRTH (POINT 1) ASSOCIATED WITH SUBSEQUENT MISSED OPPORTUNITIES FOR USING MODERN CONTRACEPTION AND SEEKING SICK CHILD CARE (POINTS 2 OR 3)?

Missed opportunities for subsequent FP use or sick child care (Points 2 or 3), or both, are shown in Figure 2 and indicate different patterns of care seeking before accounting for other factors that may influence the relationship between initial sector use and subsequent missed care.

Missed opportunities were similar between those giving birth in the public and private sectors in most countries except Afghanistan and Nigeria (Figure 2). In Afghanistan, women who gave birth in the public sector (Point 1)

> **QUESTION 2: SUMMARY OF FINDINGS**
>
> In four countries (Kenya, Malawi, Pakistan, and Uganda) there was **no association** between sector of care at birth and non-use of contraceptives.
>
> In India, Indonesia, and Nigeria, nonuse of contraceptives was **significantly greater** among those who used the private sector at birth as compared to the public sector; In Afghanistan, nonuse of contraceptives was **lower** among those who used the private sector.
>
> In all eight countries, sector of care was **not associated** with missing sick child care.

appeared more likely to miss opportunities for contraception (Point 2) (58.7% vs. 38.9%); missed opportunities for sick child care (Point 3) were also slightly higher among women who gave birth in the public sector than in the private sector (39.0% versus 33.6%). In Nigeria, missing opportunities for subsequent care was more common for women who gave birth in the private sector than in the public sector for both contraception (Point 2 (74.6% versus 61.5%) and sick child care (Point 3) (37.3% versus 28.7%). In all countries the percentage of those with a missed opportunity for contraception (Point 2) or sick child care (Point 3) was highest among those giving birth at home, though the difference was marginal in Indonesia.

Figure 2 also shows differences in sector fidelity versus sector switching across countries and between women who gave birth at public versus private facilities. Question 3 below further explores these dynamics.

Results of adjusted multivariable regression models are depicted in Figure 3 and represent the associations between sector of birth and subsequent missed opportunities for care in each country independent of potential confounding variables. Appendix Table 1 presents the results of the full models.

No clear pattern emerged across countries in the adjusted association of sector of birth—comparing the private sector to the public sector—at Point 1 and subsequent missed opportunities for receiving contraceptives at Point 2. In Afghanistan, delivery in a private sector facility was associated with lower odds of a subsequent missed opportunity for contraceptives (adjusted odds ratio [aOR]: 0.54, CI: 0.33-0.88) relative to delivery in the public sector. In India, Indonesia, and Nigeria there was a positive association between private sector delivery and missed opportunities for contraceptives (aOR: 1.21, CI: 1.10-1.33; aOR: 1.27, CI: 1.03-1.56; and aOR: 1.68, CI: 1.18-2.39, respectively). In the other four countries, there was no significant association between sector of delivery and missed opportunities for subsequent contraceptive use.

Women who delivered at home or outside a facility had significantly higher adjusted odds of a subsequent missed opportunity for contraception relative to those who delivered in a public facility in six of the eight countries: India (aOR: 1.22, Confidence Interval (CI): 1.11-1.34), Indonesia (aOR: 1.38, CI: 1.06-1.80), Kenya (aOR: 1.53, CI:1.11-2.11), Nigeria (aOR: 1.37, CI: 1.07-1.76), Pakistan (aOR: 1.46, CI: 1.05-2.04), and Uganda (aOR: 1.24, CI: 1.02-1.50). Overall, the multivariable results largely confirm what is seen descriptively; those with no care earlier in the sequence are more likely to miss care at later points.

A similar analysis was also conducted relative to any missed opportunity for sick child care at Point 3 (Figure 4 and Appendix Table 2) with similar patterns but fewer significant associations. Across all eight countries there were no significant associations between delivery in a private facility (relative to delivery in a public facility) and a subsequent missed opportunity for sick child care. In five countries, birth outside of a health facility was positively associated with missed care for sick children: Afghanistan (aOR: 1.34, CI: 1.03-1.73), India (aOR: 1.31, CI: 1.19-1.43), Kenya (aOR: 1.55, CI:1.17-2.06), Malawi (aOR: 1.64, CI: 1.23-2.18), and Nigeria (aOR: 1.36, CI: 1.08-1.72).

FIGURE 2. PERCENTAGE OF WOMEN WITH SECTOR FIDELITY, SECTOR SWITCHING, AND MISSED OPPORTUNITY FOR CONTRACEPTION AND SICK CHILD CARE (POINTS 2 OR 3), BY SECTORS AND USE OF A FACILITY FOR BIRTH (POINT 1) AMONG WOMEN WITH A NEED FOR ALL THREE SERVICES
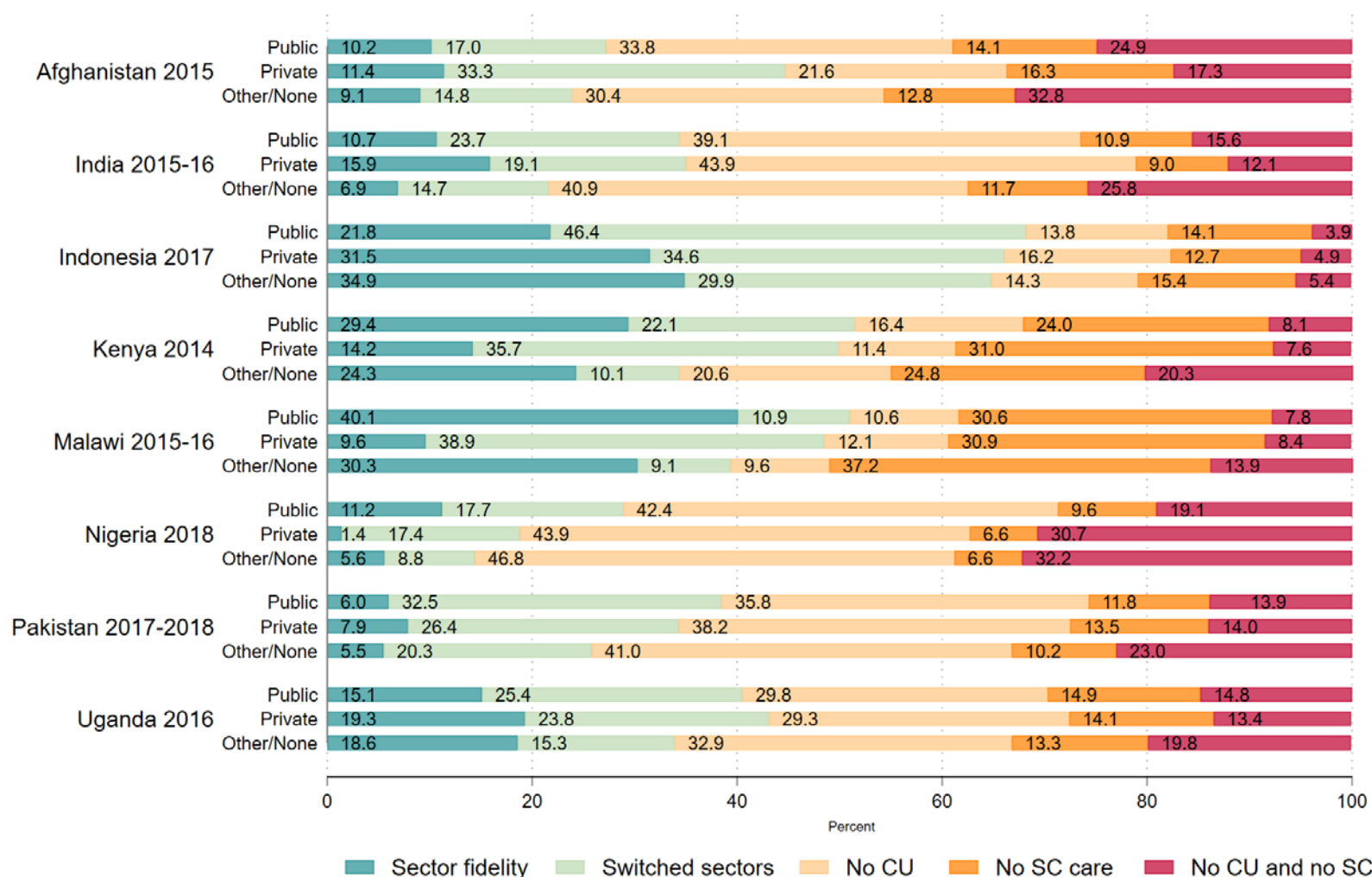
Note: Sector fidelity refers to using the same sector for all three services, among those who gave birth in a facility, or the same sector for FP and sick child care only for those who gave birth at home/other location. Other/None = includes those who gave birth at home or other non-facility location.
CU = (Modern) Contraceptive Use; SC = Care for Sick Children

Dynamics of Care and Sector Use Between Birth, Contraception, and Sick Child Services   22

FIGURE 3. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS OF HAVING NO CARE FOR CONTRACEPTION (POINT 2) COMPARING SECTORS AND USE OF A FACILITY FOR BIRTH (POINT 1) AMONG WOMEN WITH A NEED FOR BIRTH, CONTRACEPTION, OR SICK CHILD SERVICES

FIGURE 4. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS OF HAVING NO SICK CHILD CARE (POINT 3), COMPARING SECTORS AND USE OF A FACILITY FOR BIRTH (POINT 1) AMONG WOMEN WITH A NEED FOR BIRTH, CONTRACEPTION, OR SICK CHILD SERVICES
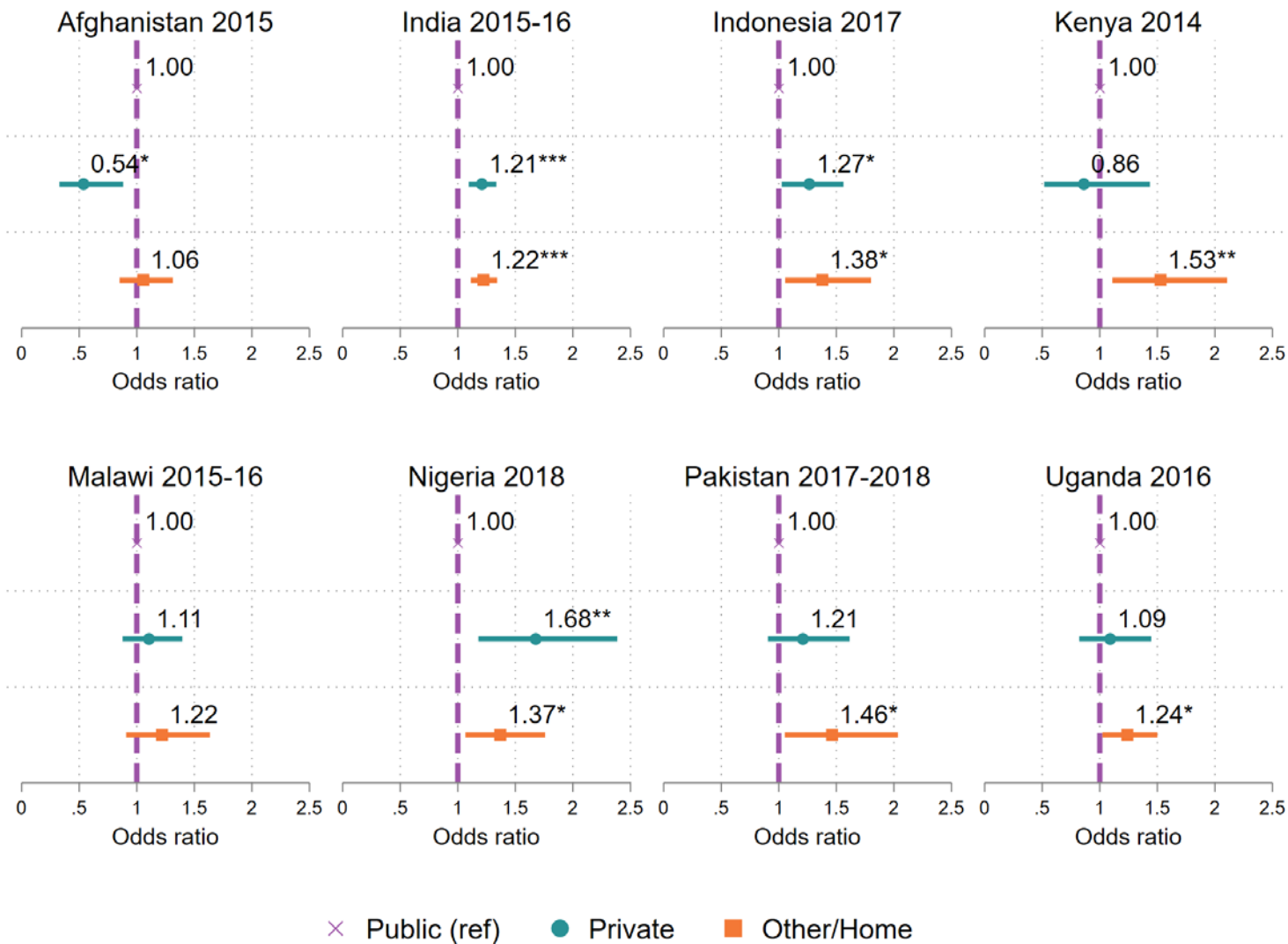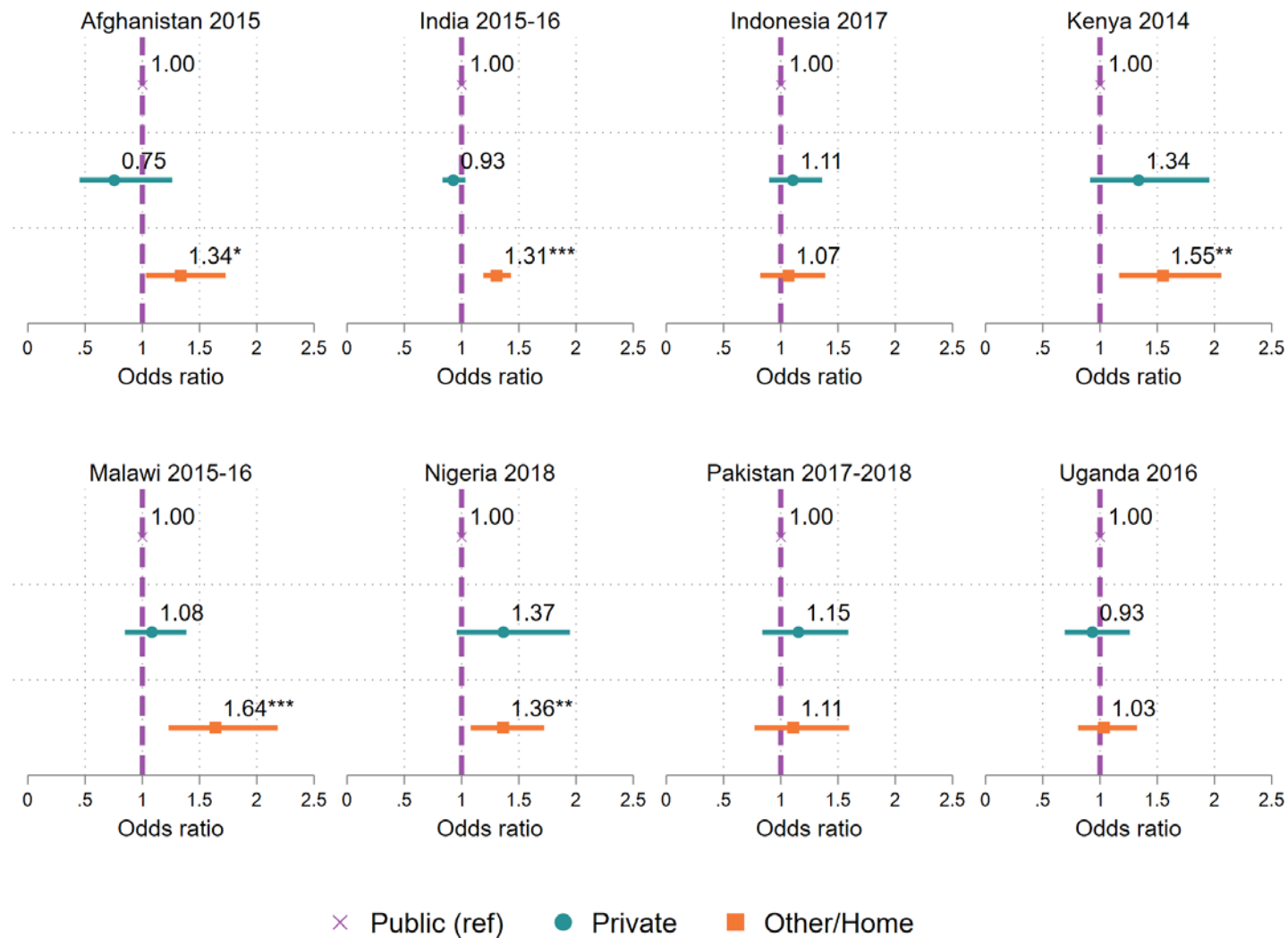
QUESTION 3. ARE SECTOR FIDELITY AND SWITCHING SECTORS ACROSS BIRTH AND CONTRACEPTION (POINTS 1 AND 2) ASSOCIATED WITH SUBSEQUENT MISSED OPPORTUNITIES FOR SICK CHILD CARE (POINT 3)?

Figure 5 depicts the proportion of women who did not access sick child care (Point 3) by different patterns of health facility and sector use for birth and contraceptive use (Points 1 and 2). In most (seven of eight) countries, missed sick child care did not appear to differ between those who switched sectors and those who had public or private fidelity. In Afghanistan and India, missed sick child care was more frequent among those who gave birth in the public sector and received a contraceptive method in the public sector than among those who used the private sector for both services. The opposite was true in Kenya. In every

> **QUESTION 3: SUMMARY OF FINDINGS**
>
> Sector switching between birth and contraceptive use was generally **not associated with missing care** for sick children.
>
> Women who **did not access care at birth or for contraception** had greater odds of missing care for sick children in most countries.
>
> Women **who accessed care for birth but NOT for contraception** had greater odds of missing care at Point 3 in most countries.
>
> For women who accessed care for contraception **but NOT for birth,** missed care for sick children was similar to that of women with sector fidelity in most countries.

country, the proportion of women not accessing care for sick children was highest among women who also did not access care for the other two services (i.e., did not give birth at a facility and were not using a modern contraceptive method at the time of the survey).

Results of adjusted multivariable regression models are depicted in Figure 6 and represent the associations between sector switching (between birth and contraceptive use) and missing sick child care, independent of potential confounding variables. Appendix Table 2 presents the results of the full models.

In six of the eight countries, switching sectors between birth and contraceptive use (Points 1 and 2)—as compared to staying in the same sector—was not significantly associated with missing sick child care at Point 3. In the two countries with a significant association, the direction of the association differed. In Pakistan, switching sectors was associated with a 72% increase in the odds of missing sick child care relative to those with sector fidelity (aOR: 1.72, CI: 1.05-2.84). In Nigeria, however, those who switched sectors had significantly lower odds of missing sick child care relative to those with sector fidelity (aOR: 0.57, CI: 0.33-0.99).

Missing opportunities for both facility birth and contraception (Points 1 and 2) was generally associated with also missing subsequent sick child care at Point 3. When compared to women with sector fidelity at Points 1 and 2, women who neither gave birth in a facility (Point 1) nor used modern contraception (Point 2) had greater odds of missing sick child care (Point 3) in six countries of the eight countries (Afghanistan, India, Kenya, Malawi, Pakistan, and Uganda). In these countries, the adjusted odds ratios ranged from 1.55 (CI: 1.37-1.77) in India to 2.46 (CI: 1.43-4.22) in Malawi.

Likewise, women with a facility birth who then missed an opportunity for contraception were also generally more likely to subsequently miss sick child care. There were significant positive associations between giving birth in a facility but not using modern contraception and then missing care for a sick child relative to sector fidelity in Afghanistan (aOR: 1.42; CI: 1.01-2.01), India (aOR: 1.17, CI: 1.05-1.30), Indonesia (aOR: 1.42, CI: 1.11-1.83), Malawi (aOR: 1.25, CI: 1.02-1.52), and Uganda (aOR: 1.50, CI: 1.18-1.90).

On the other hand, women without a facility birth (Point 1) who then obtained contraception (Point 2) generally had similar odds of missing sick child care at Point 3 as compared to women with sector fidelity at Points 1 and 2. The odds of missing sick child care were elevated among these women in only two countries—India (aOR: 1.36, CI: 1.15-1.60) and Malawi (aOR: 1.56, CI: 1.12-2.18)—whereas there was no significant association in the other six countries.

FIGURE 5. PROPORTION OF WOMEN WHO DID NOT ACCESS SICK CHILD CARE, BY SECTOR FIDELITY AND NONUSE OF SERVICES FOR BIRTH AND CONTRACEPTION AMONG WOMEN WITH A NEED FOR ALL THREE SERVICES

Note: Switched sectors includes pharmacy as source of care for contraception; CU = Contraceptive Use

FIGURE 6. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS FOR HAVING MISSED SICK CHILD CARE BY SECTOR FIDELITY AND NONUSE OF SERVICES FOR BIRTH AND CONTRACEPTION AMONG WOMEN WITH A NEED FOR ALL THREE SERVICES
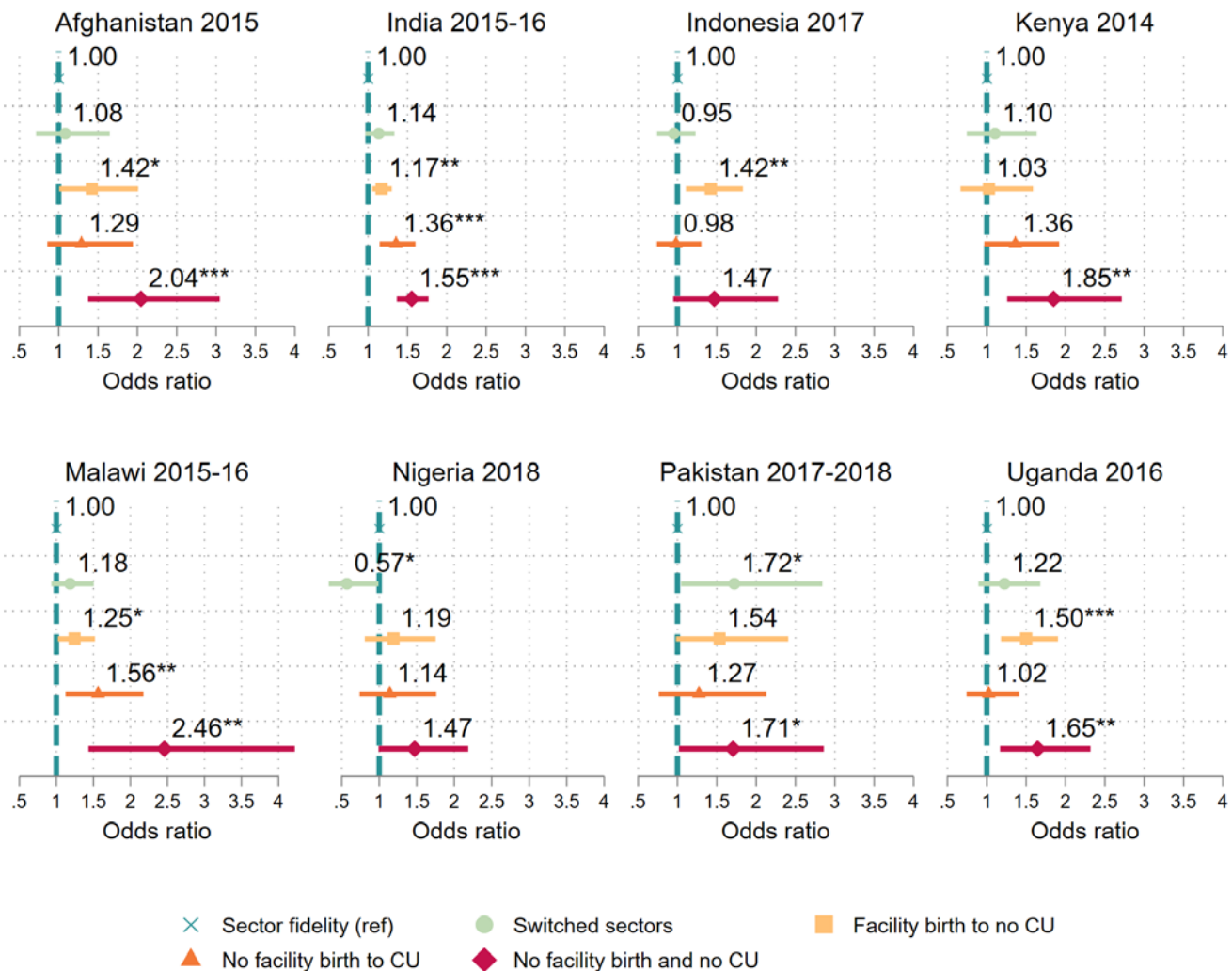
Note: ref = reference; CU = contraceptive use

DISCUSSION

MOMENTUM's analysis found that switching between sectors was common across the eight coutnries, in line with Wong et al., (2022), where switching sectors was common across maternal health care services. Our study expands upon this to include contraceptive use and examines subsequent missed opportunities, which were not strongly associated with dropping out of subsequent care. This finding is important for two reasons.

First, there is substantial evidence to show that the private sector is a significant source of care for women in LMICs, and particularly for contraception (Bradley and Shiras, 2020). Considering the general desirability that women in need of delivery, contraception and child health services go on to access these services, our analysis found that according to the DHS data, switching between the public and private sectors does not negatively affect future health seeking for the subsequent services.

Secondly, our finding that sector switching was common across the studied countries underlines the continuing importance of recognizing that most health systems are "mixed systems, where goods and services are provided both by the public and private sector, and health consumers are requesting these services from both sectors" (WHO, Global Health Observatory, accessed 2023). Global strategies have called for greater recognition and leverage of the private sector within mixed health systems as essential to achieving national and Sustainable Development Goals (WHO, 2020). Our finding reminds us that the private sector's contributions to these goals are critical because it is already where a significant percentage of women in many countries seek care. More formal recognition of these providers' existing role in positive health outcomes, as well as further inclusion of these providers in health systems planning and management, can help improve the care seeking journeys of women as individuals and as parents.

Therefore, investors and governments seeking to leverage the private health sector in LMICs for improved health outcomes should not only strive to ensure that the right incentives and mechanisms are in place to foster private sector engagement, but also that careful consideration is given to those incentives and mechanisms so that they will materialize into effective integration of private health actors into health systems.

Our analysis also identified that sector fidelity with public facilities was more frequent in countries with large public sector dominance and, for private fidelity, similarly in places where the private sector has a large presence. There may be many reasons behind an individual'sdecision to switch sectors during this continuum, such as the ability of the individual to exercise choice of sector or services in their country, or conversely, that the individual faces a lack of choice due to gaps in health care availability across the two sectors. Together with the findings from the literature that the private sector is typically accessed by those with means for choice (i.e., individuals from urban areas and/or in higher wealth quintiles) (Chakraborty & Sprockett, 2018; Grépin, 2016; Guo et al., 2019; Pomeroy et al., 2014) the findings of this study lean towards the notion that public sector fidelity may be a function of lack of affordable or available private sector facilities. This area warrants further research, as existing evidence is unable to speak to the determinants behind these sector patterns.

Another striking finding of MOMENTUM's analysis is how many women across the eight countries did not access the health system at any point in the continuum, or who dropped out of the continuum at

later points. One approach to behavior change, the Integrated Gateway Model,[1] postulates that one health behavior or 'gateway moment' may trigger or facilitate a subsequent behavior across the life cycle. In this way, interactions with health providers at one point in time can influence care in the future, especially at a gateway moment when an individual is more receptive to new information and sustained behavior change around health seeking, such as during pregnancy and childbirth (Schwandt et al., 2015). These critical touch points also facilitate continuity of care through appropriate provider attention and referral for other health needs, facility coordination within networks, or physical integration or availability of multiple services within facilities (Atun et al., 2010; Mallick et al., 2016). For example, studies have found that improved interpersonal communication and initiation of ANC in the first trimester was associated with greater health seeking for contraceptive and MNCH services during a woman's life course (Gryseels et al., 2022; Singh et al., 2016; Sserwanja et al., 2022). Additionally, studies have identified gaps or 'missed opportunities' to capitalize on prior health provider contacts to promote postnatal care and FP (Gryseels et al., 2022; Navodani et al., 2017). These behavioral gateway moments tend to bring women who might not otherwise seek or access care into the health system and therefore, offer an opportunity to impact a woman and her family's current and future health (Firoz et al., 2018).

Nonetheless, whether a woman switched sectors during this sequence of services is irrelevant if a woman never reaches health facilities or access points at all. While the reasons for why a woman may drop out of the formal health system between two services warrant further research, our analysis suggests that both the public and private sectors can better influence future care seeking behavior at these gateway moments by providing consistently high-quality and person-centered care. While quality of care was not explicitly considered in our analysis, our findings can be seen as complementary to the growing evidence base exploring differences in quality of care between public and private health facilities, with differing degrees of quality by sector depending on the aspect of quality, service area, or country (Basu et al., 2012; Doctor et al., 2019; Mallick et al., 2021; Powell-Jackson et al., 2015). Experience of poor quality of care could understandably be a deterrent to seeking future care (Kruk et al., 2018). Regardless of differences in quality by sector, there is tremendous room for improvement in quality of care for both sectors along the continuum of FP/RH and MNCH care (Mallick et al., 2020). Universally expanding reach and capacity remains a key goal in achieving high-quality universal health coverage to meet the health care needs of any individual across a life course (Kruk et al., 2018). Increasingly, digital health tools may also serve to better foster continuity of care and improved patient outcomes for women who drop out, or never engage, with the health system (Victor et al., 2023).

STRENGTHS AND LIMITATIONS

The strengths of this study lie in the multi-country comparison of health care use within unique healthcare systems while also identifying widespread trends. Using retrospective reports of health behavior, this study applied a life course perspective to the three services to understand care seeking dynamics to contextualize missed opportunities for care comparatively across sectors and across countries. To our knowledge, this is the first study to take such a life course approach to examine sector use and gaps in care across this sequence as they relate to sector use.

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[1] A behavior change approach tested by the USAID Health Communication Project and the Bill and Melinda Gates Foundation-funded Nigerian Urban Reproductive Health Initiative (NURHI)

There are several important limitations. First, this study is unable to specify whether sector fidelity does indeed reflect continuity of care related to care provided by the same health providers or at the same health facilities, as women may still switch providers even when using facilities within the same sector. Second, our sample may include those without a true need for the health care services in question. The construct of need for contraception is dynamic, complex, and difficult to measure. The FP community of practice commonly defines need for FP based on a widely used but limited set of criteria (Senderowicz & Maloney, 2022). As such, our sample may include women who are defined as having a need but have other reasons for contraceptive nonuse related to individual preferences rather than lack of access (Senderowicz & Maloney, 2022). For sick child care, sick children may only have mild symptoms that resolved quickly and therefore did not also require a visit to a health care provider. The survey questions do not collect information that would allow for the use of a more precise denominator. As a result, the findings are likely biased towards the null.

Third, the sequence of services used in our analysis was selected based on available data as presented in the DHS, and our sample is limited to those who have had a recent live birth. Using a different sequence of contraception, reproductive health and MNCH services, or different services altogether, may yield different results. These variables do not approximate the entirety of care seeking for all services, and the women who may have need for these services at the time of the DHS survey and in the analytic sample are not representative of a larger population or representative of the need for any one of the services individually. For example, adolescents and young people aged 10-29 are an important population of study for the FP community of practice. However, the methodology used by our analysis does not provide insight into the contraceptive care seeking and sector switching patterns of young people if they are male, or if they are female and had not given birth before the DHS was conducted in their country. Given that the current generation of adolescents aged 10-24 is the largest to date (Patton et al., 2016), and that approximately 90% of these young people live in LMICs (Lin, 2012), this population has an outsized effect on the future health and socio-economic well-being of entire countries. Additional research into patterns of care seeking by young people, for contraception and other services, is needed by governments seeking to be effective stewards of mixed health systems.

Lastly, despite large samples in the countries studied, the number of those with a need for all three services was small in some countries, especially when examining use of services within the private sector. This limited our ability to expand the analysis to a broader set of countries. Although we did identify patterns between countries with large public sector dominance and larger private sector presence, the findings may not generalize to countries that were not studied in this analysis given the unique health systems in each country. Finally, given limited knowledge of predictors of sector specific use and missing care, we used a parsimonious set of covariates, which may have resulted in unmeasured and residual confounding.

CONCLUSION

Evidence of sector-specific patterns of use and future care seeking of specific services has been limited. This study sought to answer three key questions about sector use across the sequence of delivery, contraception, and sick child services as recorded in DHS surveys:

(1) What are the patterns of sector use, sector switching, and missed opportunities for care across eight countries in Asia and sub-Saharan Africa?

Our analysis found that switching sectors was common across the countries included in the study. For those countries where nonuse of health services was common, sector switching was particularly high. For countries where a single sector predominated service utilization, sector fidelity occurred more frequently.

(2) Is sector for birth associated with subsequent missed opportunities for using modern contraceptives and seeking sick childcare?

There was no clear pattern in our findings across countries related to the association between sector of delivery and subsequent missed opportunities for contraceptives or between sector of delivery and subsequent missed opportunities for sick child care. In all countries, <u>not</u> delivering in a health facility was associated with missing subsequent opportunities for contraceptives, and in most countries, this was associated with missing opportunities for sick child care.

(3) Are sector fidelity and switching sectors across birth and contraception associated with subsequent missed opportunities for sick child care?

In most countries, switching sectors (as compared to sector fidelity) was not significantly associated with subsequent missed opportunities for sick child care. However, missing an opportunity for facility-based birth, FP, or both was generally associated with missing sick child care.

Overall, we found wide variation in patterns of sector use both across countries, and services within countries. The analysis also identified many opportunities for care being missed by both women and children. While sector switching was common, it was not strongly associated with missing subsequent opportunities for care in the sequence assessed in this analysis. However, the implications of sector use and sector switching may be context specific and unique to the health systems of the individual countries. Ideally, any interventions related to sector switching or sector fidelity should first be informed by the local context and an understanding of how service users navigate and interact with the public and private sectors.

Substantial proportions of women in our sample who delivered in both public and private facilities went on to experience missed care for FP or for sick children, suggesting a significant need to improve integration and continuity of care across both sectors. As sector switching was not found to lead to increases in missed opportunities, efforts should be made to ensure that women have access to a wide range of high-quality health services to meet their reproductive health needs across both sectors. Further, while this work explores the dynamics of sector switching according to available DHS data, future studies (both primary and secondary) could help to identify fidelity to specific facilities or providers. Future work could also help to understand preferences, and the determinants of those preferences, for different types of services and for different populations, such as adolescents. Having greater clarity on how individuals make health care decisions and how mixed health systems are, or are not, serving individuals' needs can help system stewards improve health outcomes by identifying and addressing gaps that may lead to missed opportunities for care.

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APPENDIX: TABLES 1-3

APPENDIX TABLE 1. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS FOR HAVING A MISSED OPPORTUNITY FOR USE OF MODERN CONTRACEPTIVES, COMPARING SECTORS AND USE OF HEALTH SERVICES FOR BIRTH AND FP AMONG WOMEN WITH A NEED FOR BIRTH, FP, OR SICK CHILD SERVICES

	Afghanistan 2015		India 2015-16		Indonesia 2017		Kenya 2014	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Delivery Source								
Private	0.54*	[0.33,0.88]	1.21***	[1.10,1.33]	1.27*	[1.03,1.56]	0.86	[0.52,1.44]
Other/None	1.06	[0.85,1.31]	1.22***	[1.11,1.34]	1.38*	[1.06,1.80]	1.53**	[1.11,2.11]
Place of residence (ref = Urban)								
Rural	1.03	[0.72,1.46]	0.97	[0.88,1.08]	0.67***	[0.55,0.81]	1.51*	[1.10,2.09]
Wealth (ref = Low)								
Medium	1.1	[0.81,1.50]	0.80***	[0.73,0.88]	1.19	[0.94,1.50]	0.51***	[0.37,0.71]
High	0.71+	[0.49,1.03]	0.71***	[0.63,0.79]	1.41**	[1.09,1.83]	0.40***	[0.27,0.61]
Education (ref = none or primary)								
Secondary or higher	0.61*	[0.39,0.94]	0.96	[0.88,1.04]	1.41**	[1.12,1.76]	0.9	[0.65,1.24]
Parity (ref = 2+ children)								
1 child	1.78**	[1.26,2.51]	2.91***	[2.66,3.19]	1.23*	[1.03,1.47]	1.56*	[1.03,2.35]
C-section (ref = No)								
Yes	0.83	[0.64,1.09]	0.77***	[0.71,0.83]	0.72*	[0.55,0.95]	0.61**	[0.45,0.82]
Number of ANC visits (ref = 0-2 visits)								
4 or more ANC visits	0.55	[0.24,1.23]	0.71***	[0.63,0.79]	0.86	[0.69,1.07]	1.07	[0.52,2.23]
Any problem accessing care (ref = No)								
Yes	1.12	[0.68,1.84]	1.13**	[1.05,1.22]	1.04	[0.87,1.24]	0.96	[0.73,1.25]

	Malawi 2015-16		Nigeria 2018		Pakistan 2017-2018		Uganda 2016	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Delivery Source (ref = Public)								
Private	1.11	[0.88,1.40]	1.68**	[1.18,2.39]	1.21	[0.91,1.62]	1.09	[0.82,1.45]
Other/None	1.22	[0.91,1.64]	1.37*	[1.07,1.76]	1.46*	[1.05,2.04]	1.24*	[1.02,1.50]
Place of residence (ref = Urban)								
Rural	1.42+	[0.95,2.14]	0.87	[0.66,1.16]	0.86	[0.64,1.16]	1.42*	[1.07,1.87]
Wealth (ref = Low)								
Medium	0.91	[0.74,1.13]	0.86	[0.63,1.17]	0.76	[0.55,1.06]	0.68***	[0.55,0.83]
High	0.88	[0.67,1.16]	0.56**	[0.39,0.82]	0.63*	[0.41,0.97]	0.53***	[0.41,0.69]
Education (ref = none or primary)								
Secondary or higher	0.9	[0.68,1.19]	0.52***	[0.39,0.69]	1.12	[0.84,1.50]	0.79*	[0.63,0.99]
Parity (ref = 2+ children)								
1 child	0.78*	[0.62,0.99]	1.18	[0.82,1.70]	1.93***	[1.38,2.69]	1.06	[0.81,1.39]
C-section (ref = No)								
Yes	0.83*	[0.70,0.99]	0.51***	[0.40,0.65]	0.98	[0.75,1.28]	0.96	[0.81,1.15]
Number of ANC visits (ref = 0-2 visits)								
4 or more ANC visits	0.89	[0.59,1.34]	0.66	[0.39,1.10]	0.58**	[0.42,0.81]	0.88	[0.59,1.29]
Any problem accessing care (ref = No)								
Yes	0.95	[0.78,1.16]	1.26*	[1.01,1.58]	1.07	[0.81,1.41]	1.11	[0.91,1.36]

APPENDIX TABLE 2. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS FOR HAVING MISSED OPPPORTUNITY FOR CARE FOR SICK CHILDREN, COMPARING SECTORS AND USE OF A FACILITY FOR BIRTH AMONG WOMEN WITH A NEED FOR BIRTH, FP, OR A SICK CHILD SERVICES

	Afghanistan 2015		India 2015-16		Indonesia 2017		Kenya 2014	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Delivery Source (ref = Public)								
Private	0.75	[0.45,1.26]	0.93	[0.83,1.03]	1.11	[0.90,1.36]	1.34	[0.91,1.96]
Other/None	0.34*	[1.03,1.73]	1.31***	[1.19,1.43]	1.07	[0.82,1.39]	1.55**	[1.17,2.06]
Place of residence (ref = Urban)								
Rural	0.99	[0.72,1.36]	1.15*	[1.03,1.28]	0.99	[0.81,1.21]	0.78+	[0.60,1.02]
Wealth (ref = Low)								
Medium	0.9	[0.70,1.15]	0.76***	[0.69,0.84]	0.69***	[0.55,0.85]	0.88	[0.66,1.17]
High	0.82	[0.58,1.15]	0.69***	[0.61,0.78]	0.73*	[0.57,0.93]	0.76	[0.54,1.06]
Education (ref = none or primary)								
Secondary or higher	0.76	[0.45,1.26]	1.04	[0.95,1.13]	1.22+	[0.98,1.53]	0.97	[0.71,1.32]
Parity (ref = 2+ children)								
1 child	0.8	[0.58,1.09]	0.86**	[0.78,0.95]	1.02	[0.84,1.24]	1.24	[0.87,1.79]
C-section (ref = No)								
Yes	0.70*	[0.53,0.94]	0.76***	[0.70,0.83]	0.68**	[0.52,0.88]	0.57***	[0.44,0.73]
Number of ANC visits (ref = 0-2 visits)								
4 or more ANC visits	1.14	[0.66,1.97]	0.81***	[0.72,0.91]	1.00	[0.78,1.28]	1.04	[0.59,1.82]
Any problem accessing care (ref = No)								
Yes	0.97	[0.64,1.48]	1.25***	[1.15,1.35]	1.30**	[1.09,1.55]	0.9	[0.69,1.18]

	Malawi 2015-16		Nigeria 2018		Pakistan 2017-2018		Uganda 2016	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Delivery Source (ref = Public)								
Private	1.08	[0.85,1.39]	1.37+	[0.96,1.95]	1.15	[0.84,1.59]	0.93	[0.69,1.26]
Other/None	1.64***	[1.23,2.18]	1.36**	[1.08,1.72]	1.11	[0.77,1.60]	1.03	[0.81,1.32]
Place of residence (ref = Urban)								
Rural	0.66**	[0.50,0.87]	1.08	[0.85,1.37]	1.18	[0.89,1.55]	0.97	[0.69,1.35]
Wealth (ref = Low)								
Medium	1.00	[0.82,1.23]	0.81	[0.63,1.05]	0.86	[0.61,1.23]	0.84	[0.66,1.07]
High	1.06	[0.86,1.30]	0.64**	[0.46,0.88]	0.89	[0.58,1.37]	0.73*	[0.54,0.98]
Education (ref = none or primary)								
Secondary or higher	0.86	[0.69,1.06]	0.88	[0.68,1.14]	0.95	[0.68,1.33]	0.84	[0.66,1.07]
Parity (ref = 2+ children)								
1 child	0.96	[0.80,1.15]	0.99	[0.70,1.39]	0.72	[0.47,1.11]	1.24	[0.95,1.61]
C-section (ref = No)								
Yes	0.88+	[0.76,1.02]	0.69***	[0.56,0.86]	0.78+	[0.58,1.04]	0.78*	[0.64,0.94]
Number of ANC visits (ref = 0-2 visits)								
4 or more ANC visits	0.79	[0.58,1.09]	1	[0.55,1.82]	1.12	[0.78,1.62]	1.22	[0.86,1.75]
Any problem accessing care (ref = No)								
Yes	1.22*	[1.04,1.44]	1.29*	[1.05,1.58]	1.12	[0.84,1.50]	1.04	[0.86,1.26]

APPENDIX TABLE 3. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS FOR HAVING MISSED CARE FOR SICK CHILDREN, COMPARING SECTORS AND USE OF HEALTH SERVICES FOR BIRTH AND FP AMONG WOMEN WITH A NEED FOR BIRTH, FP, OR SICK CHILD SERVICES

	Afghanistan 2015		India 2015-16		Indonesia 2017		Kenya 2014	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Sector use (ref = Sector fidelity)								
Switched sectors	1.08	[0.71,1.65]	1.14	[0.97,1.33]	0.95	[0.74,1.23]	1.10	[0.75,1.63]
Facility birth to no FP	1.42*	[1.01,2.01]	1.17**	[1.05,1.30]	1.42**	[1.11,1.83]	1.03	[0.67,1.59]
No facility birth to FP	1.29	[0.85,1.94]	1.36***	[1.15,1.60]	0.98	[0.74,1.30]	1.36+	[0.97,1.92]
No facility birth and no FP	2.04***	[1.37,3.05]	1.55***	[1.37,1.77]	1.47+	[0.95,2.28]	1.85**	[1.26,2.71]
Place of residence (ref = Urban)								
Rural	1.00	[0.72,1.38]	1.16*	[1.03,1.29]	1.00	[0.82,1.22]	0.77+	[0.59,1.01]
Wealth (ref = Low)								
Medium	0.89	[0.70,1.14]	0.76***	[0.69,0.83]	0.68***	[0.55,0.84]	0.90	[0.68,1.19]
High	0.84	[0.59,1.18]	0.67***	[0.60,0.76]	0.72*	[0.56,0.93]	0.79	[0.57,1.12]
Education (ref = none or primary)								
Secondary or higher	0.77	[0.46,1.28]	1.04	[0.95,1.13]	1.20	[0.96,1.50]	0.99	[0.73,1.35]
Parity (ref = 2+ children)								
1 child	0.77	[0.56,1.05]	0.83***	[0.75,0.91]	1.01	[0.84,1.23]	1.22	[0.85,1.77]
C-section (ref = No)								
Yes	1.17	[0.69,1.99]	0.80***	[0.71,0.90]	1.00	[0.78,1.28]	1.05	[0.60,1.85]
Number of ANC visits (ref = 0-2 visits)								
4 or more ANC visits	0.71*	[0.54,0.95]	0.76***	[0.70,0.83]	0.69**	[0.53,0.90]	0.58***	[0.45,0.74]
Any problem accessing care (ref = No)								
Yes	0.97	[0.64,1.47]	1.25***	[1.15,1.35]	1.29**	[1.08,1.54]	0.90	[0.69,1.18]

Appendix Table 3 continued…

	Malawi 2015-16		Nigeria 2018		Pakistan 2017-2018		Uganda 2016	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Sector use (ref = Sector fidelity)								
Switched sectors	1.18	[0.93,1.50]	0.57*	[0.33,0.99]	1.72*	[1.05,2.84]	1.22	[0.89,1.68]
Facility birth to no FP	1.25*	[1.02,1.52]	1.19	[0.81,1.75]	1.54+	[0.98,2.41]	1.50***	[1.18,1.90]
No facility birth to FP	1.56**	[1.12,2.18]	1.14	[0.74,1.76]	1.27	[0.76,2.13]	1.02	[0.74,1.41]
No facility birth and no FP	2.46**	[1.43,4.22]	1.47+	[0.99,2.19]	1.71*	[1.02,2.86]	1.65**	[1.17,2.32]
Place of residence (ref = Urban)								
Rural	0.67**	[0.51,0.88]	1.09	[0.86,1.39]	1.19	[0.90,1.57]	0.94	[0.67,1.31]
Wealth (ref = Low)								
Medium	1.01	[0.82,1.23]	0.81	[0.63,1.05]	0.87	[0.61,1.25]	0.87	[0.69,1.11]
High	1.06	[0.86,1.30]	0.66*	[0.48,0.92]	0.89	[0.57,1.38]	0.75+	[0.56,1.01]
Education (ref = none or primary)								
Secondary or higher	0.85	[0.68,1.05]	0.91	[0.70,1.19]	0.94	[0.67,1.31]	0.85	[0.67,1.07]
Parity (ref = 2+ children)								
1 child	0.97	[0.81,1.16]	0.98	[0.69,1.39]	0.68+	[0.44,1.05]	1.22	[0.94,1.59]
C-section (ref = No)								
Yes	0.80	[0.58,1.09]	1.09	[0.59,1.98]	1.21	[0.83,1.77]	1.24	[0.86,1.78]
Number of ANC visits (ref = 0-2 visits)								
4 or more ANC visits	0.89	[0.77,1.03]	0.71**	[0.57,0.88]	0.78+	[0.58,1.04]	0.78*	[0.65,0.95]
Any problem accessing care (ref = No)								
Yes	1.22*	[1.03,1.43]	1.28*	[1.04,1.57]	1.10	[0.82,1.46]	1.03	[0.85,1.24]