SEXUAL AND REPRODUCTIVE HEALTH IN EARLY AND LATER ADOLESCENCE: DHS DATA ON YOUTH AGE 10-19

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Sexual and Reproductive Health in Early and Later Adolescence:
DHS Data on Youth Age 10-19

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Preface

The Demographic and Health Surveys (DHS) Program is one of the principal sources of international data on fertility, family planning, maternal and child health, nutrition, mortality, environmental health, HIV/AIDS, malaria, and provision of health services.

One of the objectives of The DHS Program is to provide policymakers and program managers in low- and middle-income countries with easily accessible data on levels and trends for a wide range of health and demographic indicators. DHS Comparative Reports provide such information, usually for a large number of countries in each report. These reports are largely descriptive, without multivariate methods, but when possible they include confidence intervals and/or statistical tests.

The topics in this series are selected by The DHS Program in consultation with the U.S. Agency for International Development.

It is hoped that the DHS Comparative Reports will be useful to researchers, policymakers, and survey specialists, particularly those engaged in work in low- and middle-income countries.

Sunita Kishor
Director, The DHS Program

Abstract

Adolescence is a period of transition from childhood to adulthood when many behaviors and events set the stage for adult health. Demographic and Health Surveys (DHS) data are often used to describe adolescents age 15-19 but are infrequently used to examine younger adolescents age 10-14. This study employs retrospective data from women and men age 15-24—the most recent cohort that experienced adolescence in the 5 years preceding the survey—to investigate health outcomes during the full range of adolescent years from age 10-19. For 52 countries, this study compiles adolescent sexual and reproductive health indicators in the areas of marriage, sexual activity, contraceptive use, fertility, maternal health, and gender-based violence.

We find marriage among women occurs during adolescence in most countries in West and East Africa while men marry after adolescence. Except for South and Southeast Asia, sexual debut occurs during adolescence for men and women. Contraceptive use is rare during early adolescence (except in some Latin American countries) but increases with age to about 20% among women age 15-19. Age-specific fertility rates are imperceptible among the youngest adolescents; even in the country with the highest early fertility rates (Mali), there are only 17 births per 1,000 women age 10-14. The earliest detectable adolescent fertility occurs at age 13-14 in Mali, Bangladesh, Angola, and Gabon. Overall, roughly 20% of women began childbearing before age 20. Over half of all adolescent women in Chad and Niger, and over half of ever-married adolescent women in Afghanistan and Bangladesh have begun childbearing, which is concerning given these countries demonstrated some of the lowest use of maternal health care. Physical violence during adolescence ranges from around 6% (Kyrgyz Republic) to 53% (Uganda); the experience of sexual violence similarly varies.

These retrospective data provide useful insights on very young adolescents and reveal reproductive events rarely occur prior to age 15.

1. Introduction

1.1. Background

Adolescence is typically defined as the period of life between age 10 and age 19 (WHO 1989). This critical time of social and biological transition between childhood and adulthood entails numerous milestones and new opportunities, roles, and responsibilities (Lloyd 2005). These changes influence not only the trajectories of individual lives but also entire cohorts and populations. There were an estimated 1.2 billion adolescents age 10-19 in the world as of 2016, with 89% living in low and middle-income countries (US Census Bureau 2017). Given their numbers, it is no surprise that such a continued emphasis is placed on adolescents in major policy initiatives such as the Sustainable Development Goals and Family Planning 2020 and that achieving a healthy adolescence is a cornerstone of much local and national development programming (Greene and Merrick 2015; Merrick 2015).

In health and development efforts, much attention is rightly focused on older adolescents age 15-19 because many adolescents this age are initiating those experiences and behaviors associated with adulthood such as sexual activity, marriage, and childbearing (Kothari et al. 2012). However, there have been recent calls to invest more in younger adolescents in order to prepare them for a healthier later adolescence and adulthood (Igras et al. 2014; Patton et al. 2016; UNFPA 2016). These calls have been echoed with requests for more data on this age group to better understand their current situation and needs (Brady 2011; Engebretsen 2012; Lundgren and Amin 2015; McCarthy, Brady, and Hallman 2016; WHO 2011; Woog and Kågesten 2017). This study uses Demographic and Health Surveys (DHS) data from 52 countries to describe the sexual, maternal, and reproductive health of recent cohorts of adolescents for the full adolescent age range from 10-19.

1.2. Methods and Data

1.2.1. Median Age at First Marriage among Men and Women Age 25-29

DHS data on older adolescents are readily available and frequently analyzed as DHS surveys sample women and men who are currently age 15 and older[1]. In most situations, collecting data directly from respondents who are younger than age 15 is neither cost effective nor free of ethical challenges (Brady 2011; Way 2014). As cross-sectional surveys, DHS surveys collect much of their data retrospectively. Retrospective data have substantial—and largely untapped—potential to be gleaned to characterize the lives of younger adolescents (Way 2014; WHO 2011).

DHS surveys contain two types of retrospective data: stand-alone retrospective questions and retrospective longitudinal schedules that cover a preset period of time preceding the survey. Examples of stand-alone retrospective questions from the Woman's Questionnaire[2] ask about the timing of key life events such as:

1. In what month and year did you start living with your (husband/partner)? How old were you when you first started living with him?

2. How old were you when you had sexual intercourse for the very first time?

3. How old were you when your (first) child was born?

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[1] Women's surveys sample women age 15-49, while surveys among men typically extend to age 54 or 59.
[2] Questions 4 and 5 are contained in the Domestic Violence module, an optional module administered with the individual woman's or man's questionnaire to a subsample of up to one respondent per household and is not included in every DHS survey.

4. How long after you first (got married/started living together) with you (husband/partner) did any of these things [acts of physical violence] first happen?

5. How old were you the first time you were forced to have sexual intercourse or perform any other sexual acts?

Several similar questions are administered in the men's survey. These questions can determine whether and when these events occurred during adolescence.

The two retrospective schedules used by the DHS surveys are employed in the Woman's Questionnaire only. They are the reproductive calendar[3] and birth histories. The reproductive calendar records month-by-month, retrospective information on episodes of contraceptive use or non-use and other reproductive events for (typically) 5 completed years preceding the survey[4]. Reproductive calendar and birth history data can situate contraceptive use and births, if they occur, during adolescence.

The reproductive calendar is a two-column calendar (ICF International 2015). The first column of the calendar records (1) pregnancies, births, and terminations,[5] (2) episodes of contraceptive use, and (3) episodes of no contraceptive use[6]. This involves working from the month of the interview to the beginning of the calendar period. The second column records a code for the reason for discontinuation if the respondent discontinued using contraception in that month. The reproductive calendars of women who are age 15-24 at the time of the interview describe the contraceptive experiences when the women were adolescents age 10-19.

Although the reproductive calendar pertains to the 5 years prior to the survey, birth histories record all births[7] that women experience in their lifetime. Births in the 5 years preceding the interview are also entered in the reproductive calendar. The birth history records the year, month, and day[8] of birth, age, survival status, co-residence, and singleton/multiple status. More detailed information is collected on antenatal, delivery, and postnatal care; immunization; and health for children born in the previous 5 years. Birth histories place all births within or outside of adolescence for all women. Data from women age 15-24 on antenatal, delivery, and postnatal care for births in the previous 5 years refer to births that occurred when the women were adolescents age 10-19.

This study exploits data from both stand-alone retrospective questions and the two longitudinal schedules (birth history and contraceptive calendar) to examine the lives of adolescents age 10-19. We examine these data among youth age 15-24 in order to describe the experiences of the most recent cohort of adolescents. This study includes topics[9] of sexual activity, marriage, contraceptive use, fertility[10], maternal health, and violence during adolescence. Additional data on school attendance, household headship, residence, and

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[3] Sometimes referred to as the contraceptive calendar.

[4] The exact length of the reproductive calendar is determined by the duration of data collection and the month in which the respondent is interviewed.

[5] Terminations may include induced abortions, miscarriages, and stillbirths.

[6] An alphabetic P, B, or T code indicates that the respondent experienced a pregnancy, birth, or termination in that month. A numeric code 1-9 or alphabetic code J-Y indicates the method of contraception used. The numeric code 0 indicates that the respondent was not using any method of contraception, and was not experiencing a pregnancy, birth, or termination.

[7] In a few cases, a pregnancy history is administered rather than a birth history.

[8] Prior to 2015, only year and month of birth were collected.

[9] Analysis of these topics is based on self-reported data obtained through the individual woman's and man's questionnaires.

[10] See Appendix 1 for a detailed discussion of the methods we used to calculate adolescent fertility rates.

wealth are found in the appendices[11]. We draw on data from DHS surveys conducted since 2010 in 52 countries. Table 1 displays these surveys and the data they provide.

Wherever possible, we analyze data from men and women. However, as shown in Table 1, seven country surveys did not include a men's questionnaire. The majority of the 45 surveys with men's data sampled a sub-sample of men. Table 1 also indicates the surveys with women in which data were not collected on sexual activity or from a birth history or reproductive calendar. Similarly, the Domestic Violence module is an optional module appended to the core questionnaire that was implemented in 38 of the 52 surveys. Finally, most surveys are administered to a sample of all women (and men) regardless of marital status. However, five surveys restricted eligibility to ever-married women and (where applicable) men, as indicated in Table 1. The Indonesia DHS sampled all women but only ever-married men[12]. This restriction to ever-married respondents limits the interpretation of certain indicators as they apply to all adolescents. When possible, an adjustment factor accounts for this eligibility restriction.

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[11] Analysis of school attendance and household characteristics are based on data on all household members obtained through the household questionnaires.

[12] A separate special DHS survey was conducted among never-married youth and these data have been analyzed elsewhere (Statistics Indonesia - Badan Pusat Statistik et al. 2013).

Table 1. Adolescent Data and Survey Attributes

Survey/Region	Women's Survey[1]	Men's Survey[2]	Women's Birth History	Reproductive Calendar	Sexual Activity	Domestic Violence Module
West Africa						
Benin 2011-12	✓	✓	✓	✓	✓	
Burkina Faso 2010	✓	✓	✓	✓	✓	✓
Cote d'Ivoire 2011-12	✓	✓	✓		✓	✓
Gambia 2013	✓	✓	✓	✓	✓	✓
Ghana 2014	✓	✓	✓	✓	✓	
Guinea 2012	✓	✓	✓		✓	
Liberia 2013	✓	✓	✓	✓	✓	
Mali 2012-13	✓	✓	✓	✓	✓	✓
Niger 2012	✓	✓	✓	✓	✓	
Nigeria 2013	✓	✓	✓	✓	✓	✓
Senegal 2015	✓	✓	✓	✓	✓	
Sierra Leone 2013	✓	✓	✓	✓	✓	✓
Togo 2013-14	✓	✓	✓		✓	✓
East Africa						
Burundi 2010	✓	✓	✓	✓	✓	
Comoros 2012	✓	✓	✓	✓	✓	✓
Ethiopia 2011	✓	✓	✓	✓	✓	
Kenya 2014	✓	✓	✓	✓	✓	✓
Malawi 2015-16	✓	✓	✓	✓	✓	✓
Mozambique 2011	✓	✓	✓	✓	✓	✓
Rwanda 2014-15	✓	✓	✓	✓	✓	✓
Tanzania 2015-16	✓	✓	✓	✓	✓	✓
Uganda 2011	✓	✓	✓	✓	✓	✓
Zambia 2013-14	✓	✓	✓	✓	✓	✓
Zimbabwe 2015	✓	✓	✓	✓	✓	✓
Southern and Middle Africa						
Angola 2015-16	✓	✓	✓	✓	✓	✓
Cameroon 2011	✓	✓	✓		✓	✓
Chad 2014-15	✓	✓	✓		✓	✓
Congo 2011-12	✓	✓	✓		✓	
Congo DR 2013-14	✓	✓	✓		✓	✓
Gabon 2012	✓	✓	✓		✓	✓
Lesotho 2014	✓	✓	✓	✓	✓	
Namibia 2013	✓	✓	✓	✓	✓	✓
North Africa, West and Central Asia						
Armenia 2010	✓	✓	✓	✓	✓	
Egypt 2014	✓		✓	✓		✓
Jordan 2012	✓		✓	✓		✓
Kyrgyz Republic 2012	✓	✓	✓	✓	✓	✓
Tajikistan 2012	✓		✓	✓	✓	✓
Yemen 2013	✓		✓	✓		
South and Southeast Asia						
Afghanistan 2015	✓	✓	✓	✓	✓	✓
Bangladesh 2014	✓		✓	✓	✓	
Cambodia 2014	✓	✓	✓	✓	✓	✓
Indonesia 2012	✓	✓	✓	✓	✓	
Myanmar 2015-16	✓	✓	✓	✓	✓	✓
Nepal 2011	✓	✓	✓	✓	✓	✓
Pakistan 2012-13	✓	✓	✓	✓		✓
Philippines 2013	✓		✓		✓	✓
Latin America and the Caribbean						
Colombia 2015	✓	✓	✓	✓	✓	✓
Dominican Republic 2013	✓	✓	✓		✓	✓
Guatemala 2014-15	✓	✓	✓	✓	✓	✓
Haiti 2012	✓	✓	✓		✓	✓
Honduras 2011-12	✓	✓	✓	✓	✓	✓
Peru 2012	✓		✓	✓	✓	✓

[1] The following surveys sample ever-married women: Egypt 2014, Jordan 2012, Afghanistan 2015, Bangladesh 2014, and Pakistan 2012-13.
[2] The following surveys sample ever-married men: Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

2.   Adolescents and Marriage

Marital indicators can illuminate societal and health trends and serve as markers of gender equality and women's health. Later ages at marriage and fewer marriages among adolescents may correlate with increased school attendance and employment opportunities for adolescent women. In addition, adolescent women who are married at younger ages may bear children at a younger age and are more vulnerable to maternal morbidity than older women. Young women who are married may also find it more difficult to access reproductive and family planning services and may be more vulnerable to domestic violence (Raj 2010). This study reports the median age and the age distribution of first marriage during adolescence in this section.

2.1.   Median Age at First Marriage

Median age at first marriage is an interpolated calculation of age by which 50% of a population has experienced their first union[13]. By definition, a median can be calculated for a cohort only if at least 50% has married by the start of the age bracket. This study presents medians for women and men age 20-24 to describe the marriage experience of the most recent cohort of adolescents. The study also presents medians for women and men age 25-29 because of the paucity of countries in which half the population has married by this age bracket. Medians are based on respondents of all marital statuses. In the surveys that excluded never-married women or men, medians are adjusted to account for this sample restriction[14].

2.1.1.   Median age at first marriage among women age 20-24

Figure 1 shows the median age at first marriage for women age 20-24. No men's data are displayed because no medians can be calculated among men age 20-24 in any study survey. Men simply do not marry during adolescence. For the majority of study countries, 50% of women age 20-24 has not experienced a first union at an adolescent age, as indicated in pale blue.

In the 22 countries for which a median can be calculated, the median age at first marriage varies widely within and between regions. In West Africa approximately half of the countries in the region have a median for women age 20-24, several of them occurring before age 18 (e.g., Burkina Faso: 17.9, Guinea: 17.8, Mali: 17.2). The youngest median age at marriage of all study countries is found in Niger, at age 16. Similarly, in East, Southern, and Middle Africa, half of the countries have medians occurring in adolescence, though only one occurs before age 18. In Chad, the median age at first marriage among women age 20-24 occurs at age 16.4.

Outside of Sub-Saharan Africa, first marriage during adolescence is less common. The medians for women age 20-24 are fewer in South and Southeast Asia and Latin America and the Caribbean. Only Afghanistan (19.5), Bangladesh (17.2), Nepal (18.9), and the Dominican Republic (19.7) have medians. No medians occur for this age group among women in North Africa, West and Central Asia.

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[13] Unions include persons who are married or living with someone as if married and encompass both formal, legally recognized marriages and non-formal marriages alike.

[14] Surveys that only sampled ever-married women include Afghanistan 2015, Bangladesh 2014, Egypt 2014, Jordan 2012, and Pakistan 2012-13. Ever-married men were only sampled in Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

Fig 1. Median age at first marriage among women age 20-24

Notes:
[1] Estimates for the following surveys adjust for samples of ever-married women: Afghanistan 2015, and Bangladesh 2014.
[2] The following DHS surveys did not sample men: Egypt 2014, Jordan 2012, Tajikistan 2012, Yemen 2013, Bangladesh 2014, Philippines 2013, and Peru 2012.
[3] Estimates for the following DHS surveys adjust for samples of ever-married men: Afghanistan 2015, Indonesia 2012, Pakistan 2012-13.

Fig 2. Median age at first marriage among men and women age 25-29

Notes:

[1] Estimates for the following surveys adjust for samples of ever-married women: Afghanistan 2015, and Bangladesh 2014.

[2] The following DHS surveys did not sample men: Egypt 2014, Jordan 2012, Tajikistan 2012, Yemen 2013, Bangladesh 2014, Philippines 2013, and Peru 2012.

[3] Estimates for the following DHS surveys adjust for samples of ever-married men: Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

There is no recorded age at first sex in the following surveys: Egypt 2014, Jordan 2012, Yemen 2013, or Pakistan 2012-13.

2.1.2. Median age at first marriage among women and men age 25-29

Figure 2 shows the median age at first marriage for women and men age 25-29. These data refer to the second most recent cohort of adolescents, i.e., the cohort of women and men that were adolescents 5-9 years prior to the survey. There is little variation in the median age at first marriage among men within and between regions. All medians occur between ages 22 and 24. Regionally, there are more medians in South and Southeast Asia and Latin America and the Caribbean, while in West Africa, many countries do not have a median because men are marrying at even older ages and 50% of the population has not yet experienced a union by age 25.

In all countries where there are data for both men and women, median age at first marriage is higher for men than for women. This age gap between median age for men and women by country is commonly between 3 and 6 years, although this difference varies by region. The largest differences in medians between men and women by country are in Sub-Saharan Africa. The difference in median age at first marriage between men and women by country is between 6 and 7 years in some countries (Burkina Faso, Ethiopia, and Chad), although there is a 7-year difference in Mali and Niger. The difference in medians between the sexes within countries is much lower in other regions of the world, and is generally less than a 4-year difference. South and Southeast Asia have the smallest differences between men's and women's median age at first marriage as a region. Median ages are less than 3 years in difference in this region, with the median age at first marriage for men and women occurring within a year and a half of each other in Pakistan.

The median age at first marriage for women age 25-29 is calculated for 29 of the 30 surveys for which it could not be calculated for women age 20-24. Four of these countries nonetheless indicate a median during adolescence for this older cohort of women age 25-29. These are Benin (19.3), Gambia (19.6), Yemen (19.0), and Honduras (19.5). These findings suggest that marriage after adolescence is a recent development.

The medians among women age 25-29 in the remaining 25 surveys confirm the data from the 20-24 age group: marriage does not occur during adolescence for most women, but during their 20s. However, a majority of countries whose medians do not fall within adolescence occur just after the adolescent period, particularly in West and East Africa (Cote d'Ivoire: 20.5; Senegal: 20.0; Togo: 20.2; Angola: 20.4; Burundi: 20.3; Kenya: 20.5; Pakistan: 20.9; Guatemala: 20.3). The median occurs after age 22 in eight countries. Namibia is the only country to have no median for women age 25-29, which indicates an even older age at marriage or greater singlehood over the life course.

2.2. Age Distribution of First Marriage

Figures 3-8 show the Kaplan-Meier failure function[15], which is the probability of having married by each single year of age among women age 15-24, by region. Women are displayed in blue and men in red. As with medians, analysis of surveys that exclude never-married women or men are adjusted to account for this sample restriction[16].

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[15] The Kaplan-Meier failure function is also referred to as the cumulative density function or cumulative incidence function and is simply the complement of the Kaplan-Meier survival function of time: $F(t) = 1 - S(t) = \Pr(T < t)$ (Box-Steffensmeier and Jones 2004; Cleves et al. 2010).

[16] Surveys that only sampled ever-married women include Afghanistan 2015, Bangladesh 2014, Egypt 2014, Jordan 2012, and Pakistan 2012-13. Ever-married men were only sampled in Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

Fig 3. Probability of marriage in West Africa
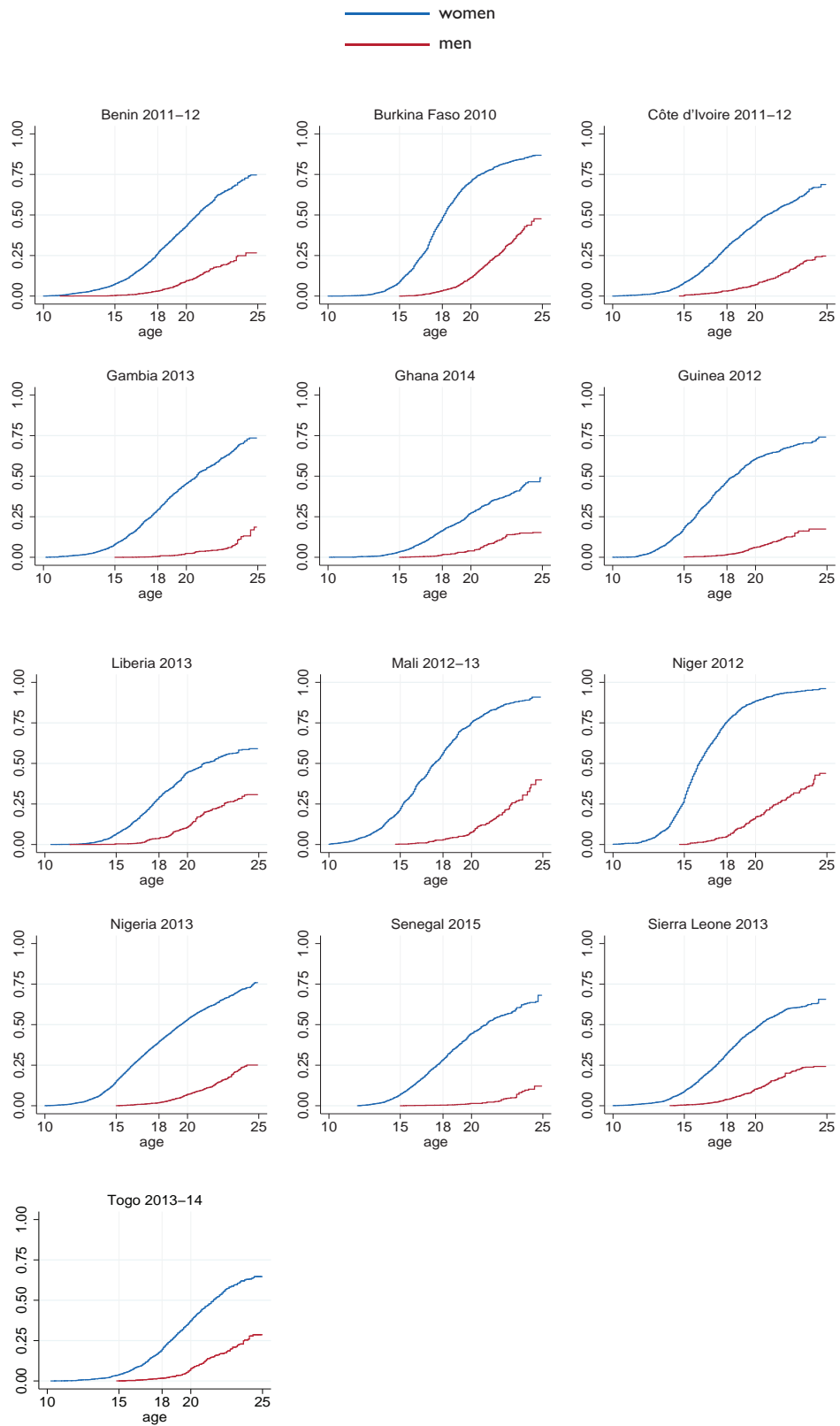
Note:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.

Fig 4. Probability of marriage in East Africa
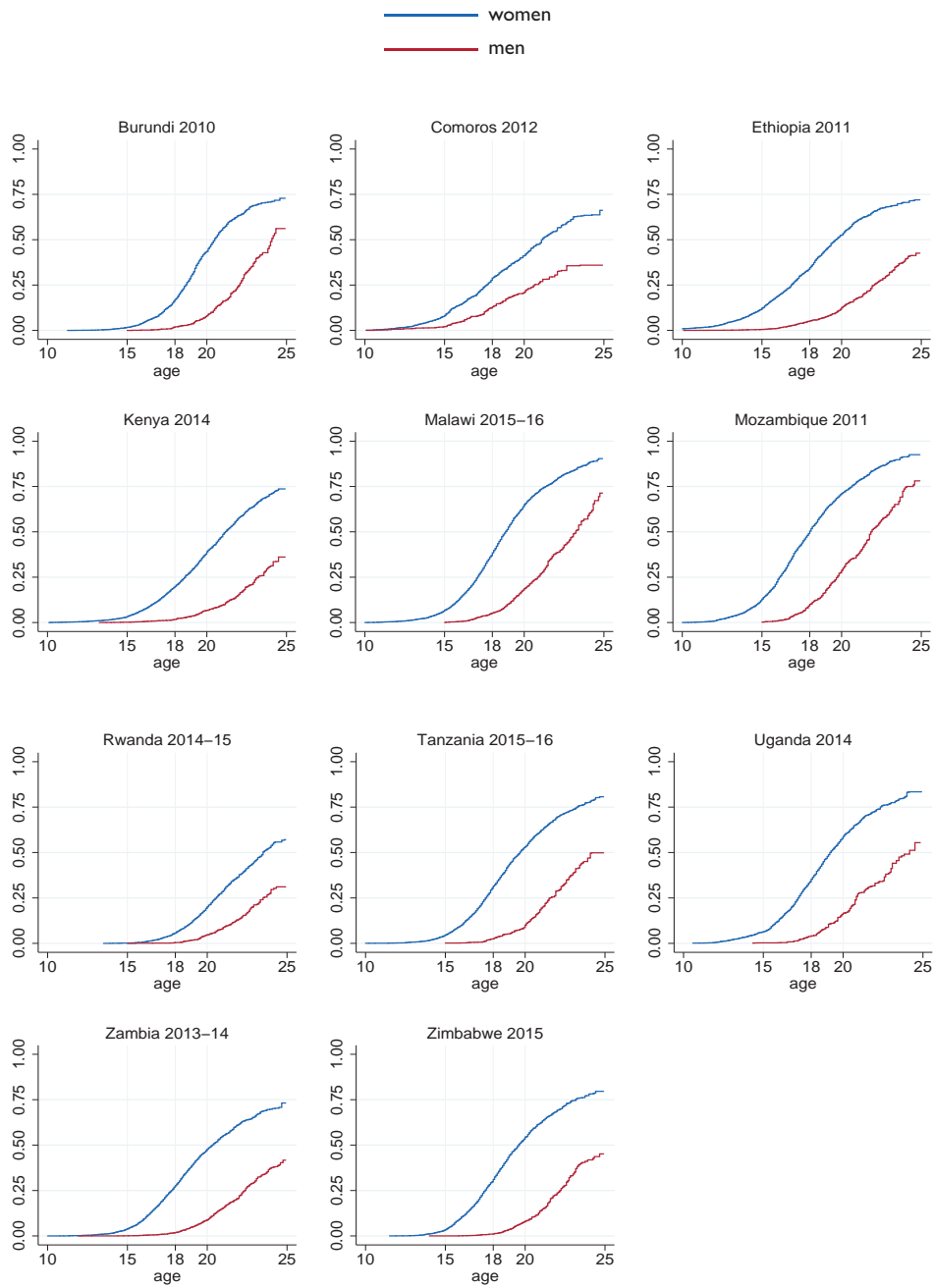
Note:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.

Fig 5. Probability of marriage in Southern and Middle Africa
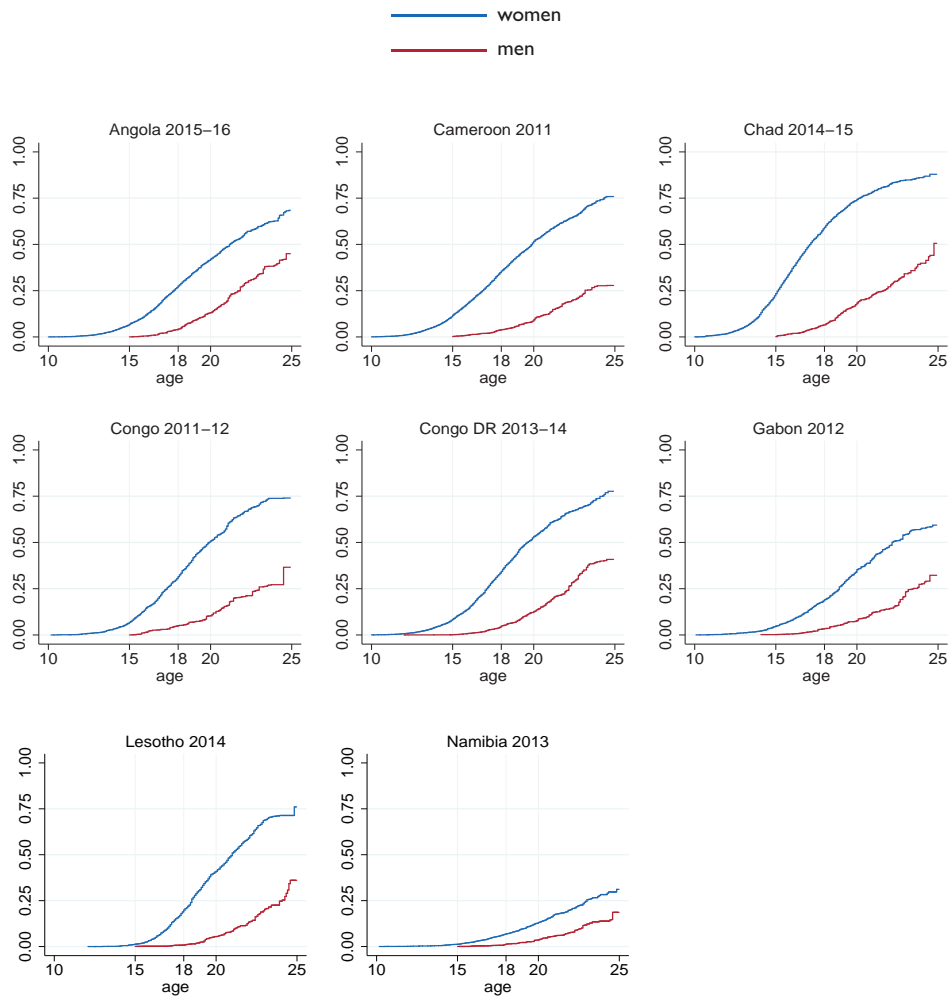
Note:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.

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Fig 6. Probability of marriage in North Africa, West and Central Asia
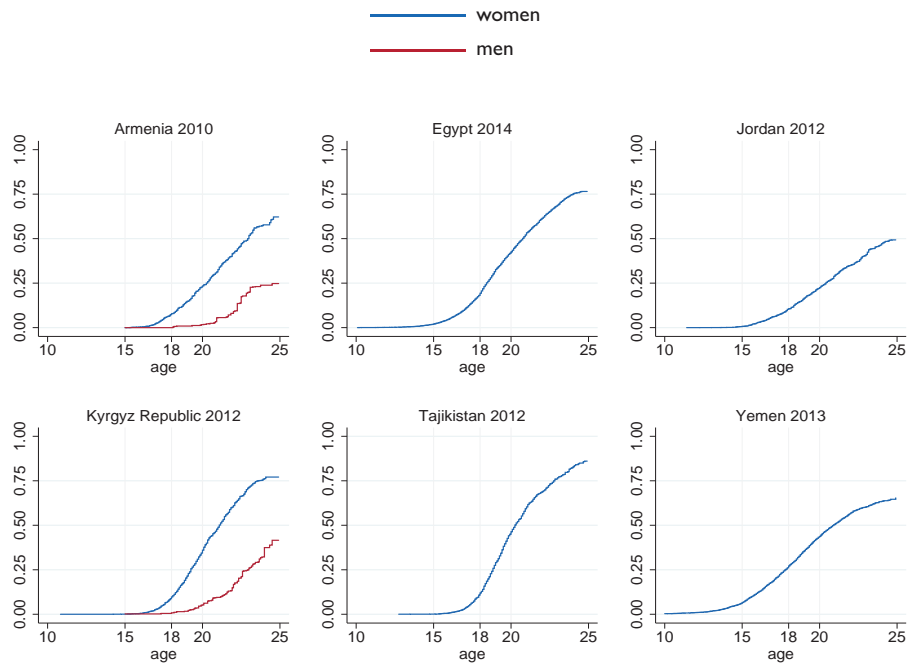
Notes:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.
The following DHS surveys did not sample men: Egypt 2014, Jordan 2012, Tajikistan 2012, and Yemen 2013.
Estimates for the following surveys adjust for samples of ever-married women: Egypt 2014 and Jordan 2012.

Fig 7. Probability of marriage in South and Southeast Asia
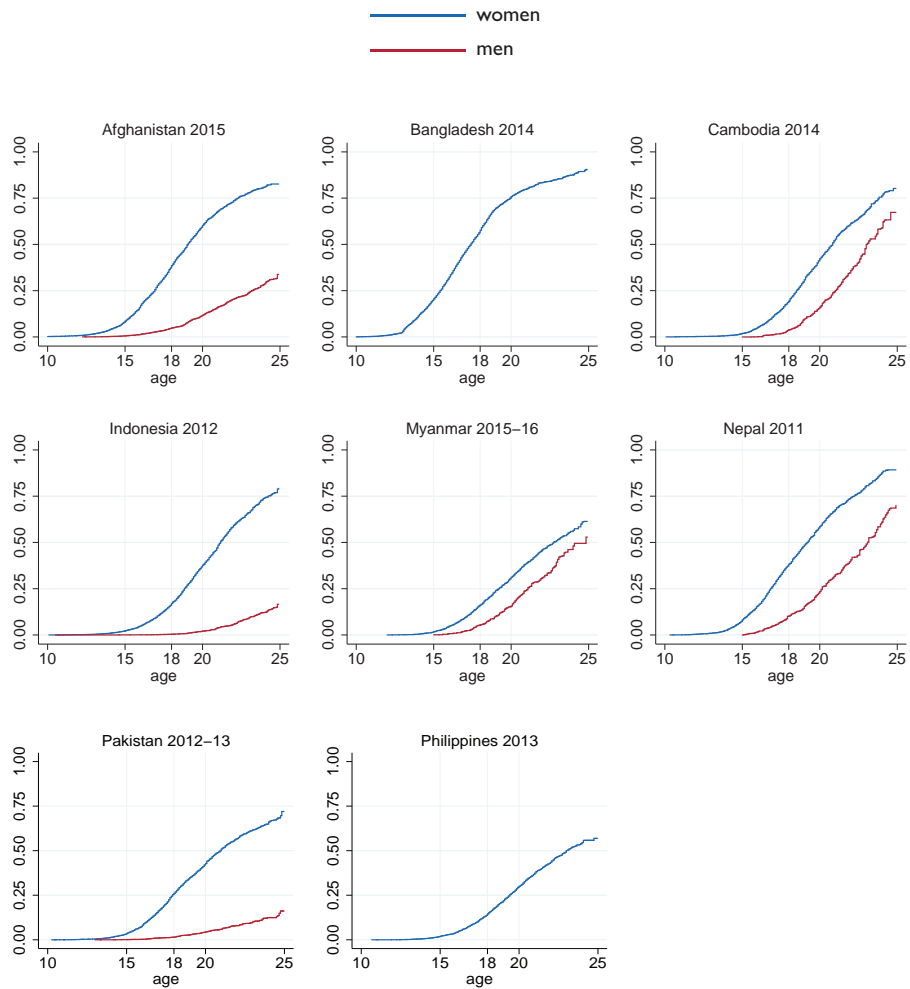
Notes:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.
The following DHS surveys did not sample men: Bangladesh 2014 and Philippines 2013.
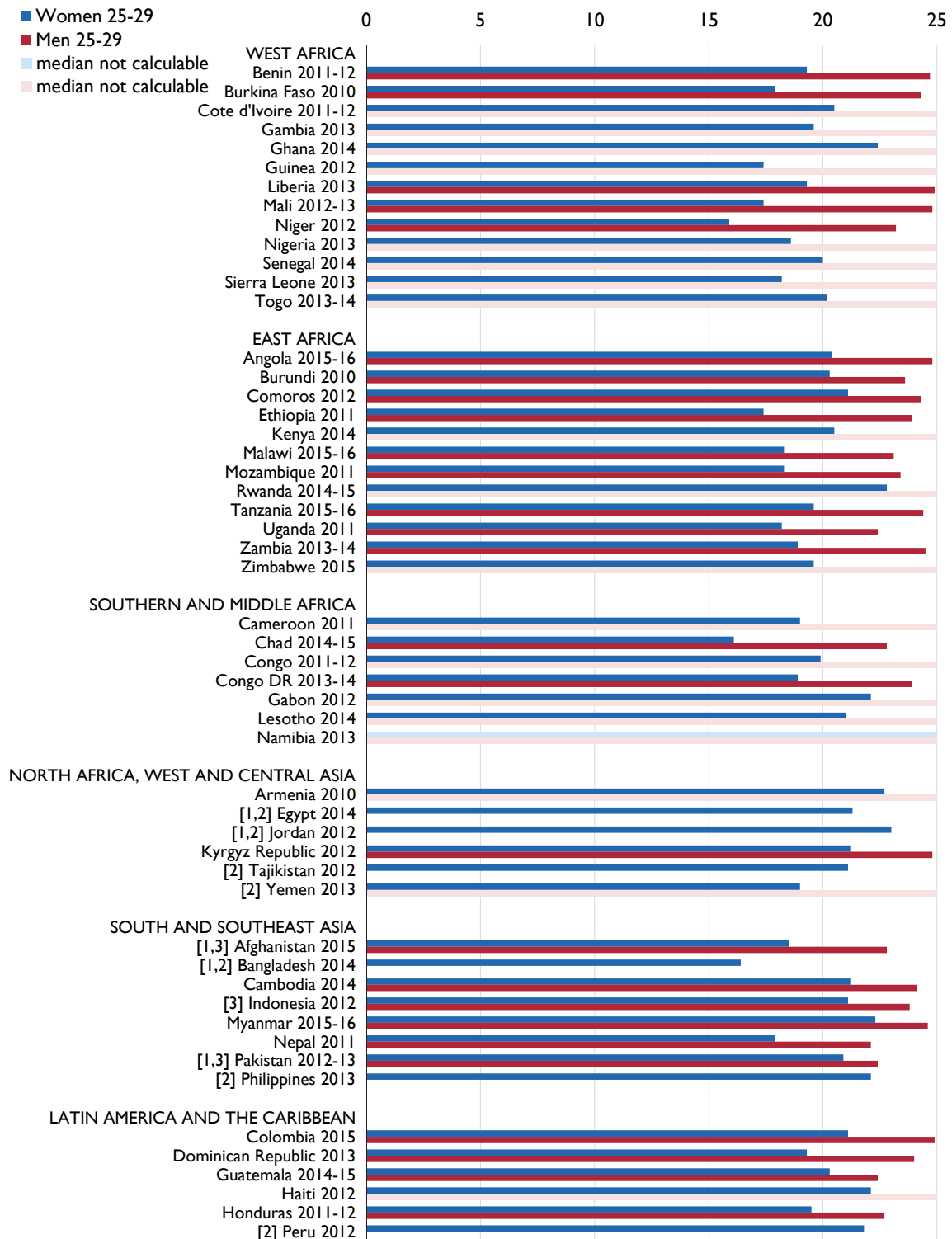Estimates for the following DHS surveys adjust for samples of ever-married women: Afghanistan 2015, Bangladesh 2014, and Pakistan 2012-13.
Estimates for the following DHS surveys adjust for samples of ever-married men: Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

Fig 8. Probability of marriage in Latin America and Caribbean
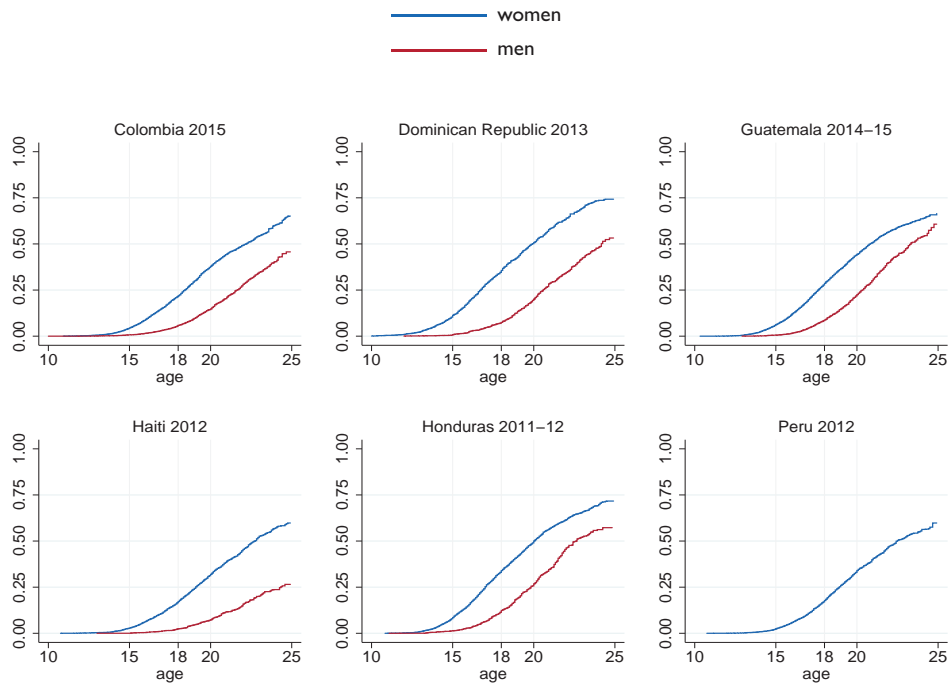
Notes:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.
The following DHS surveys did not sample men: Peru 2012.

In West Africa, fewer than 10% of women age 15 and younger are entering their first union, although there are a few countries where a much larger proportion of women age 15 and younger have experienced their first union: Guinea (18%), Mali (22%), Niger (29%), Nigeria (15%) (Figure 3). Some countries experience steep curves in the cumulative distribution by the end of adolescence that result in approximately 3 in 4 women being married by age 20 in Mali (75%), Niger (76%), and Burkina Faso (71%). In Ghana, the proportion of women likely to be married by the end of adolescence is 27%, which is markedly lower than the range of 37% - 76% present in other West African countries that are likely to experience marriage in adolescence. Nowhere in West Africa do men experience marriage by the age of 18, and this proportion increases very little by age 20. In Niger, 17% of men have married by age 20, which is the highest proportion in the region. West Africa also exhibits the largest gaps between men's and women's probability of marriage.

With a few exceptions, nearly one in two women marries in adolescence in East Africa (Figure 4). Rwanda, an exception, is unlikely to see unions in women younger than age 18, with only 20% of women likely to be married in adolescence. For most countries in East Africa, it is not likely for a woman age 15 and younger to be married, although in a few countries, more than 10% of women that young have married: Ethiopia (12%) and Mozambique (13%). In Malawi and Mozambique, nearly three in four marry by the end of adolescence, 65% and 71% respectively. Only in Comoros and in Mozambique, it is likely that at least one in five men will experience marriage by the end of adolescence, 21% and 29%, respectively.

In approximately half of the countries in Southern and Middle Africa, at least one in two women marry during their adolescence, which is similar to East Africa (Figure 5). Of note is Chad, where a large portion of women age 15 and younger are likely to be married (23%), and 74% are likely to be married in adolescence. Namibia is very atypical for the region and other African regions. Fewer than one in five

women are likely to experience their first union in adolescence (13%), and men are not likely to be married in adolescence, with the proportion that could expect to be married in this age range between 4%-18%.

In North Africa, West and Central Asia, it is very unlikely that women or men experience marriage before age 15 (Figure 6). The Kyrgyz Republic and Tajikistan have similar age distributions, with approximately one in ten women married by age 18. This rapidly increases to 36% and 46%, respectively, by the end of adolescence. Marriage in adolescence is a rare event in Armenia and Jordan, with only 23% of adolescent women and 2% of adolescent men (in Armenia) entering into marriage by age 20. While very early marriage is uncommon throughout the region, 2% of women in Egypt and 7% in Yemen are married by age 15. These two countries have the most adolescents married by age 18 (19% and 27%, respectively). By age 20, this figure rises to 43-44%, similar to the Kyrgyz Republic and Tajikistan.

In South and Southeast Asia, adolescent marriage ranges from about one in three women in Myanmar to two in three women in Afghanistan (Figure 7). In Bangladesh, three in four women are married by the age of 20. While marriage by age 15 is low—about 2%—in Southeast Asian countries, it is higher in South Asia. About 8%-9% of women are married by age 15 in Nepal and Afghanistan and this figure reaches 21% in Bangladesh.

In South and Southeast Asia, men's marriage during adolescence lags behind that for women, as it does in other regions. This is especially the case in Indonesia and Afghanistan, where the low percentage of men married during adolescence suggests substantial spousal age differences. Still, 12% of men are married during adolescence in Afghanistan. The age curves for men and women are more similar to one another in Cambodia, Myanmar, and Nepal, although fewer men than women are married at each age. Between one-quarter and one-third as many men as women are married by age 18 in these countries. By age 20, this ratio narrows slightly to half as many men married as women. Here, men's probability of being married is closer to the probability of women being married at any age compared to countries in other regions.

In Latin America and the Caribbean, between 32% and 51% of women experience their first marriage in adolescence (Figure 8). In the Dominican Republic, 11% experience marriage before age 15, which is the highest proportion for this age in the region. Like other regions, men experience a very small probability of having their first union in adolescence. In Honduras, however, nearly one in ten men (9%) are likely to be married by age 18, a notable difference compared with men in all other regions.

3. Adolescents and Sexual Debut

Becoming sexually active is a milestone event in social development that may occur during adolescence in many parts of the world. The extent to which sexual debut is normative behavior for adolescents can vary substantially. DHS surveys in 48 countries collect retrospective data on first sex from women and from men in 44 countries[17]. This section of the report uses these data to describe indicators of sexual activity—namely sexual debut—regardless of marital or relationship status. Sexual debut can occur within the institution of marriage or the context of other relationship types. However, several surveys sample only ever-married women or men[18]. Adjusting for this sample restriction would necessitate assumptions about the sexual behavior of non-sampled unmarried adolescents without robust supporting empirical evidence. Meanwhile, incorrectly generalizing unadjusted rates of sexual debut among married adolescents to the population of all adolescents would likely overestimate true levels of sexual activity. The unadjusted estimates presented here are best interpreted as the prevalence or median among ever-married women and men.

3.1. Median Age at First Sex

3.1.1. Median age at first sex among women and men age 20-24

Figure 9 presents the median age at first sex among women and men age 20-24. As with age at first marriage, medians cannot be calculated for this age group in all study countries, indicated in pale blue and pale red in Figure 9. Therefore, we also present median age at first sex among the next oldest cohort, women and men age 25-29 in Figure 10.

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[17] No data on age at first sex are collected in DHS surveys in the Egypt 2014, Jordan 2012, Pakistan 2012-13, and Yemen 2013. There are no men's samples in the Bangladesh 2014, Egypt 2014, Jordan 2012, Peru 2012, Philippines 2013, Tajikistan 2012, and Yemen 2013 DHS surveys.

[18] Surveys that only sampled ever-married women include Afghanistan 2015, Bangladesh 2014, Egypt 2014, Jordan 2012, and Pakistan 2012-13. Ever-married men were only sampled in Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

Fig 9. Median age at first sex among men and women age 20-24
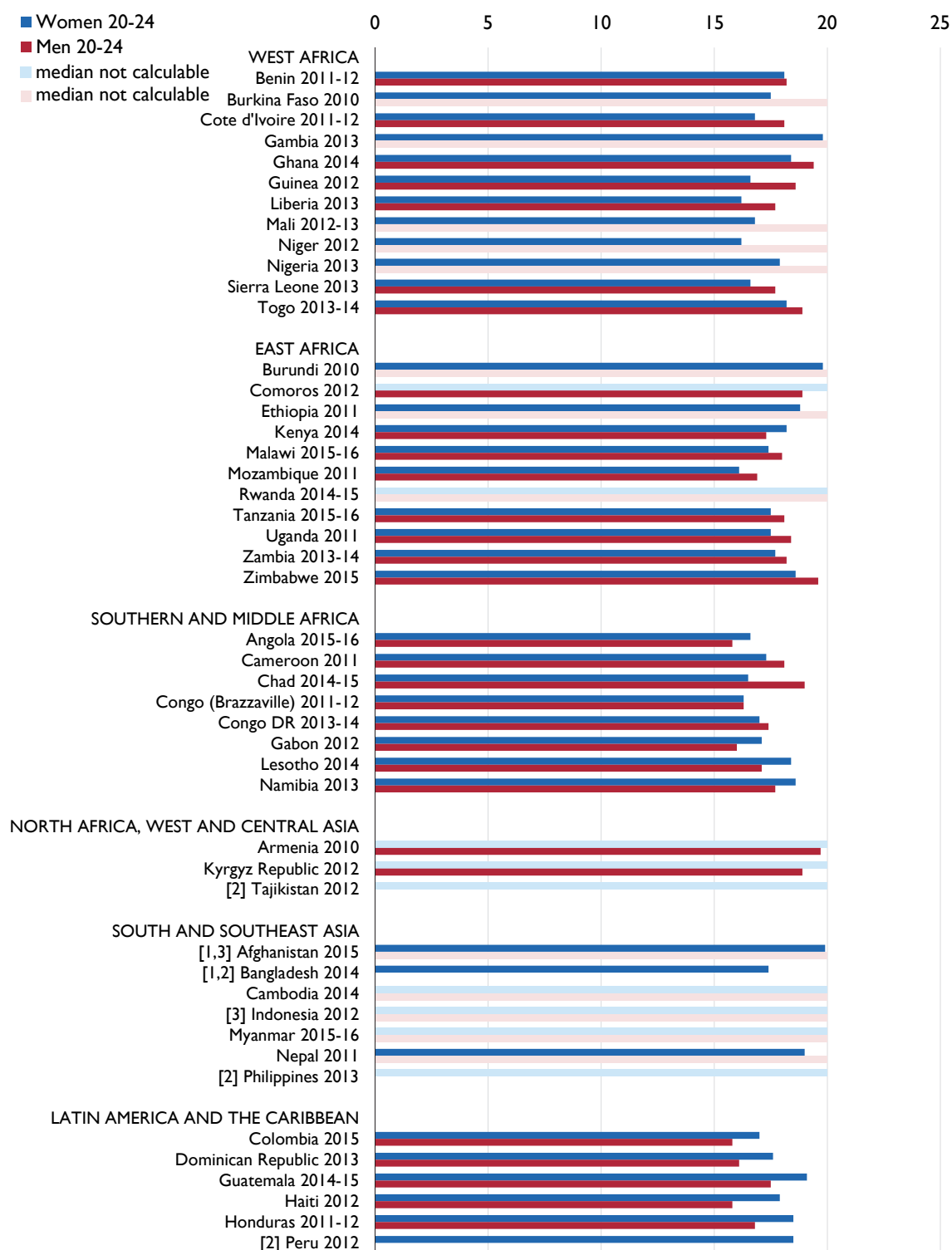
Notes:

[1] Estimates for the following surveys are based on samples of ever-married women: Afghanistan 2015 and Bangladesh 2014.

[2] The following DHS surveys did not sample men: Egypt 2014, Jordan 2012, Tajikistan 2012, Yemen 2013, Bangladesh 2014, Philippines 2013, and Peru 2012.

[3] Estimates for the following DHS surveys are based on samples of ever-married men: Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.

There is no recorded age at first sex in the following surveys: Egypt 2014, Jordan 2012, Pakistan 2012-13, or Yemen 2013.

Figure 9 indicates that sexual debut occurs during adolescence for most women in all West African, Southern and Middle African, and Latin American and Caribbean countries in this study and in most study countries in East Africa. Women's youngest median age at sexual debut appears in Mozambique (16.1), Chad (16.5), Congo (16.3), Liberia (16.2), and Niger (16.2). The median age at first sex occurs during women's adolescence in just three South and Southeast Asian countries, where marriage age is also low (Afghanistan, Bangladesh, and Nepal) and in no West and Central Asian countries in the study. The highest adolescent median age at first sex is in Afghanistan (19.9), followed closely by Gambia and Burundi (19.8). In the remaining Asian countries and in Comoros and Rwanda, sexual debut is not a part of women's adolescent experience.

Patterns are similar among men age 20-24, although there are more countries for which a median age cannot be calculated for men than for women in West Africa. Meanwhile, the converse pattern is evident in Comoros, Armenia, and the Kyrgyz Republic: the median age at first sex occurs during adolescence for men age 20-24 but such a median cannot be calculated for women of the same age. These findings suggest differential age mixing in sexual partnerships in these countries.

In most countries where medians are calculated for both sexes, there is little difference in sexual debut by sex and medians are relatively similar, with almost all occurring within a year of each other. Men's median age at sexual debut is consistently older than that for women in West Africa, while in Latin American and Caribbean countries, it is consistently younger than that for women. The absence of medians calculated for men in Asian countries indicates men experience later sexual debut than women in these regions. In East, Southern, and Middle Africa, however, women experience sexual debut earlier than men in about half the countries while men experience sexual debut earlier than women in the other half.

3.1.2. *Median age at first sex among women and men age 25-29*

Figure 10 illuminates age patterns in sexual debut among women and men age 25-29 where these data are absent for the younger cohort. In all countries, the median age at first sex often occurs within close ages for the two sexes. These gaps between medians are usually less than 3 years, with medians commonly occurring within 1 to 2 years of each other. The largest difference in medians between men and women age 25-29 is in Niger, where the median age at first sexual intercourse occurs 6.6 years later for men than for women. In West Africa, this median occurs at older ages in men than in women. In other African countries where the median is at a younger age for men than in women, such as in Kenya, Comoros, and half of the countries in Southern and Middle Africa, these medians occur very close in age. In South and Southeast Asia, the median age among men age 25-29 is older than for women. In North Africa, West and Central Asia and Latin America and the Caribbean, the opposite is true in that women begin having sex later than men.

Fig 10. Median age at first sex among women and men age 25-29
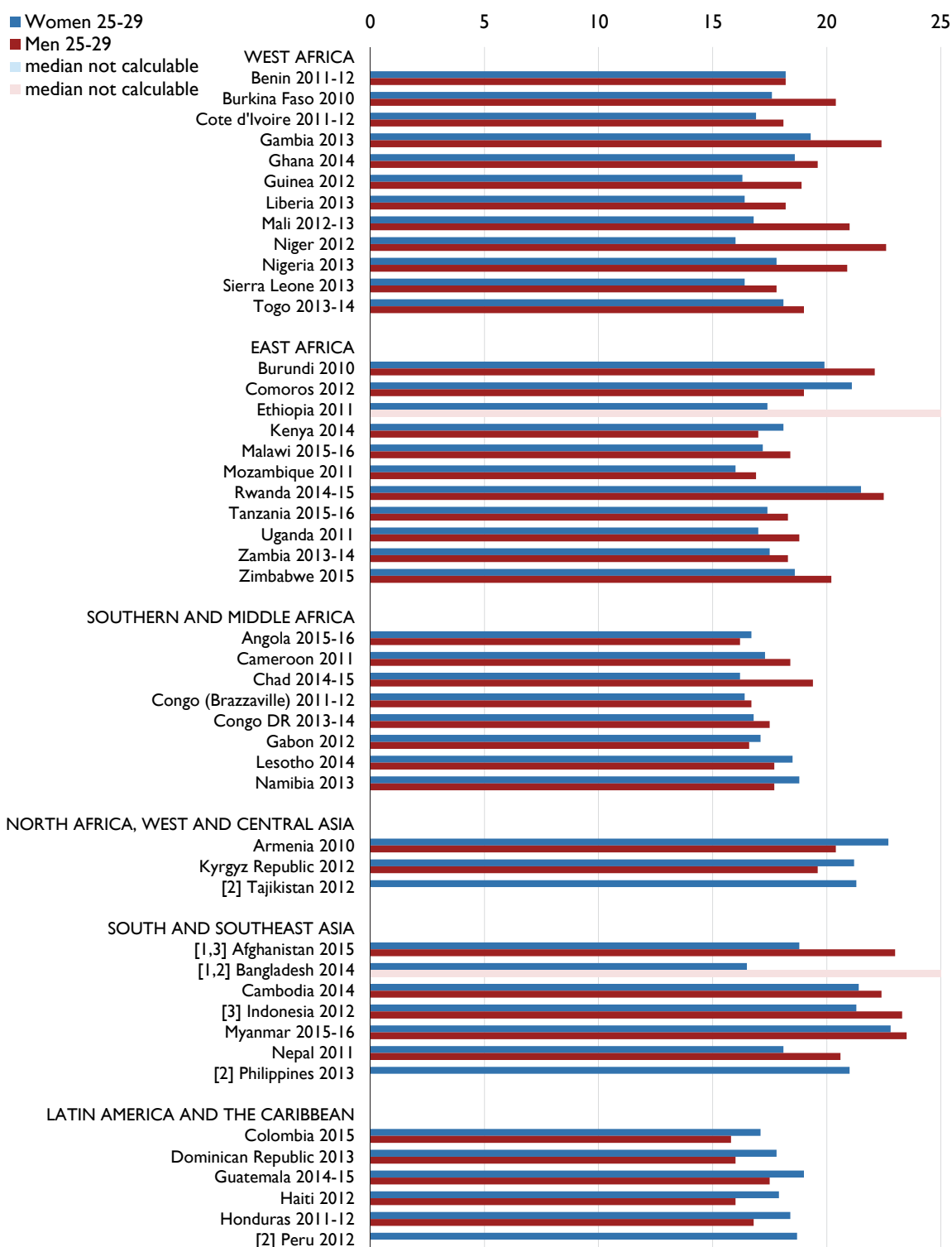
Notes:
[1] Estimates for the following surveys are based on samples of ever-married women: Afghanistan 2015 and Bangladesh 2014.
[2] The following DHS surveys did not sample men: Egypt 2014, Jordan 2012, Tajikistan 2012, Yemen 2013, Bangladesh 2014, Philippines 2013, and Peru 2012.
[3] Estimates for the following DHS surveys are based on samples of ever-married men: Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.
There is no recorded age at first sex in the following surveys: Egypt 2014, Jordan 2012, Pakistan 2012-13, or Yemen 2013.

In the 10 countries for which no median could be calculated among women age 20-24, data for women age 25-29 indicate that sexual debut, on average, occurs in their early 20s, ranging from age 21 in Rwanda and the Philippines and age 21.1 in the Comoros to age 22.7 in Armenia and age 22.8 in Myanmar. There is a wider range of sexual debut among men age 25-29 among the 14 countries for which a median could not be calculated among younger men: the median age at first sex ranges from age 20.4 in Burkina Faso to age 23.5 in Myanmar. No median age at first sex can be calculated for men in the Comoros, Ethiopia, and Bangladesh, even among this older age group.

3.2. Age Distribution of Sexual Debut

Figures 11-15 show the Kaplan-Meier failure function[19] of the probability of first sex by age among respondents age 15-24, by region. Women are displayed in blue, and men in red. These figures more finely portray patterns of sexual debut at each year and month of age. The figures show that, in most regions, the onset of sexual activity is most rapid during adolescence—most notably, after age 15—as reflected by the steepest portion of the curve apparent during these years. Adolescent men and women exhibit similar patterns, with men's sexual debut occurring somewhat later than women's sexual debut. The South and Southeast Asia region belies the general age pattern, with sexual debut at older ages than elsewhere among both women and men.

More than three in four women and two in four men have first had sex by age 20 in most West African countries (Figure 11). The probability of sexual debut during adolescence is nearly universal in Liberia, Sierra Leone, and Côte d'Ivoire, where between 91% and 99% of women have experienced sexual debut by age 20, and 75% to 86% for men. More than three quarters of women (87% in Liberia) have experienced sexual debut by age 18 and approximately one quarter by age 15. Sexual debut during adolescence is lowest in Senegal and the Gambia, where 8% to 9% of women have experienced first sex by age 15, with approximately one-third by age 18 and one-half by age 20. A minority of men have experienced sexual debut by age 20 in these countries (27% and 40%, respectively). The differential between men's and women's age patterns of sexual debut are largest in Niger, followed by Mali. While 86-88% of women have experienced first sex by age 20 in these countries, only 27% of men in Niger and 45% of men in Mali have. There are no measurable levels of sexual debut in early adolescence, before age 13 or 14, in any study country.

In East Africa, first sex begins at later ages (Figure 12). Fewer women and men have experienced sexual debut by the end of adolescence than in West Africa. In most countries in the region, 13-15% of women have had sex by age 15 and 70-85% by age 20. Only 4-5% of women have had first sex by age 15 in Burundi, Rwanda, and Zimbabwe. Less than half of women (43-47.5%) have had sex by the end of adolescence in Comoros, Ethiopia, and Rwanda and less than half of men in Burundi, Ethiopia, and Rwanda. Mozambique is the exception in this region, with more than a quarter of women having had first sex by age 15 and 96% by age 20, with only slightly lower percentages at these ages among men. The age curves for men closely align with those for women in East Africa. However, in nearly every country, more men than women experience sexual debut during the earliest adolescent years. Women catch up between age 15-18 so that more women than men experience sexual debut by the end adolescence. Comoros and Ethiopia display a different pattern, with a greater percentage of men having experienced first sex than women at each age. The differentials between the sexes is largest in Ethiopia, where more women than men have experienced sexual debut during adolescence, and in Comoros, where more men than women have experienced sexual debut.

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[19] The Kaplan-Meier failure function is also referred to as the cumulative density function and is simply the complement of the Kaplan-Meier survival function of time: $F(t) = 1 - S(t) = Pr(T < t)$ (Box-Steffensmeier and Jones 2004; Cleves et al. 2010).

Fig 11. Probability of sexual debut in West Africa
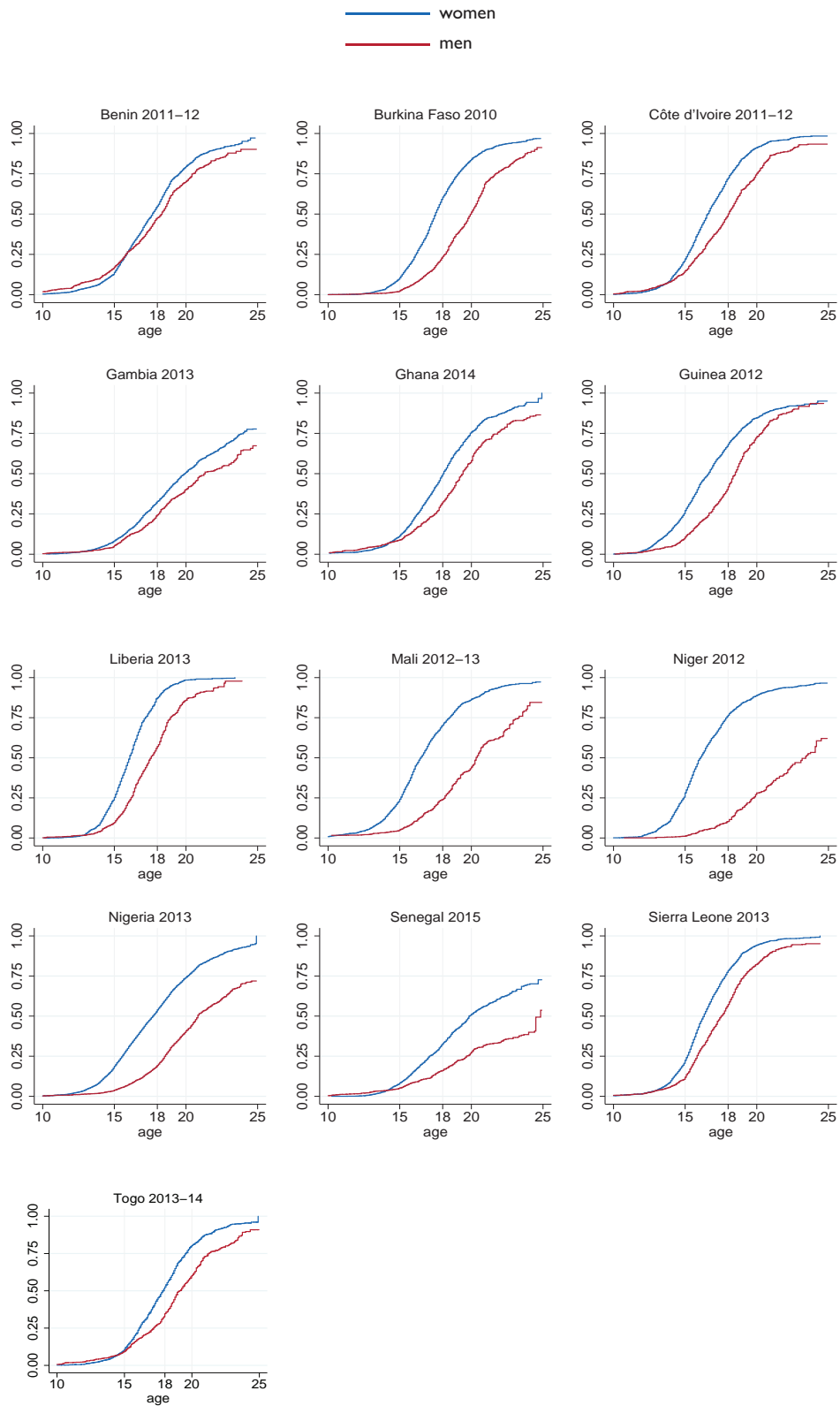
Note:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.

Fig 12. Probability of sexual debut in East Africa
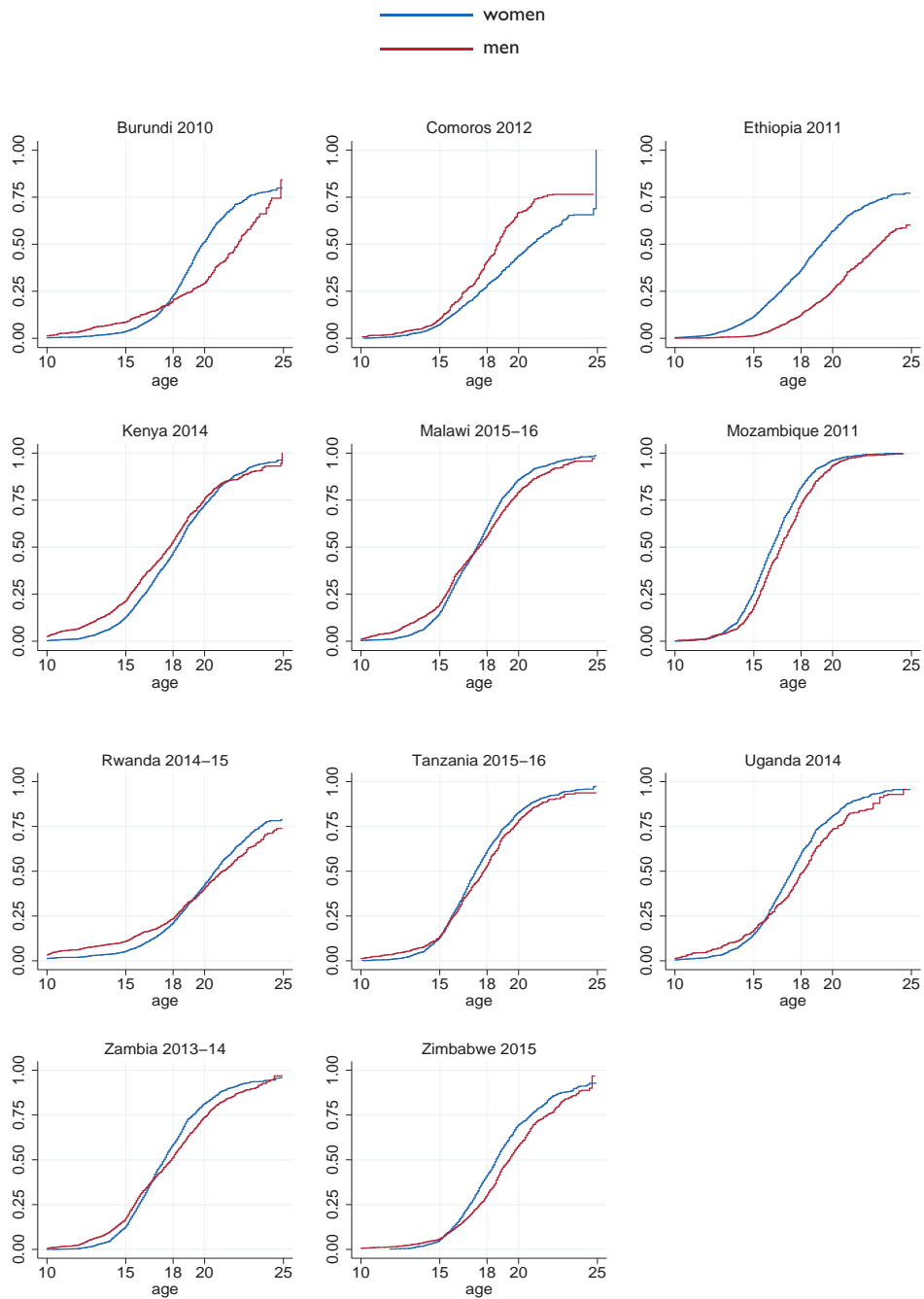
Note:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.

As shown in Figure 13, the pattern of women's sexual debut in Southern and Middle Africa resembles that of West Africa more than East Africa. In most countries, about two in 10 women have had first sex by age 15 (ranging from 18% in Cameroon and Gabon to 25% in Chad) and 82-94% have had first sex by age 20. Sexual debut by age 15 is somewhat less frequent in Lesotho (6%) and Namibia (7%), although the percent of women who experience sexual debut by age 20 reaches 80% and 77% in these countries, respectively.

Like East Africa, the age patterns of sexual debut are very similar for both sexes in Southern and Middle Africa. Slightly more men than women have experienced sexual debut at every age in adolescence in Gabon, Lesotho, and Namibia, and at least during the early adolescent years in Angola and the Congo (Brazzaville). More adolescent women than men have experienced first sex at each age in Cameroon and Chad, with the differentials being noticeably sizable in Chad.

In sharp contrast to the other regions of the world, the onset of sexual activity is not a part of the adolescent experience for the majority of women in Asia[20] (Figure 14). Nepal, where early marriage is common, is the exception. Here, 8% of women have experienced sexual debut by age 15, 38% by age 18, and 58% by age 20.

Adolescent women do not experience first sex until after age 15 in Armenia, the Kyrgyz Republic, and Tajikistan, where about one in 10 women have had first sex by age 18 in these countries. In Cambodia, Indonesia, Myanmar, and the Philippines, only 1-2% have had first sex by age 15, although 15-20% have by age 18. Less than a majority of women (24-46%) have experienced first sex by the end of adolescence in these seven countries.

Because the sample only included ever-married women, the proportion of ever-married women who have had experienced sexual debut during adolescence is higher in Afghanistan and, especially, in Bangladesh. The proportion having had first sex by age 15 at 12% and 30%, respectively, and by age 18 at 57% and 77%, respectively. First sex during adolescence is near universal in Bangladesh, with 94% of ever-married women having experienced sexual debut by age 20.

Men have an earlier sexual debut than women in West and Central Asia and, by the end of adolescence, a majority of men have experienced first sex in Armenia (55%) and the Kyrgyz Republic (69.5%). This is not the case in South and Southeast Asia. In these countries, a minority of men have experienced first sex by the end of adolescence in Cambodia (26%), Myanmar (23%), and Nepal (45.5%) and the levels of sexual debut are similar between men and women throughout adolescence. The sample of men in Indonesia is a sample of ever-married men, while the sample of women is of all women, which makes comparisons in the age distribution of sexual debut difficult. No data were collected from men in Bangladesh, the Philippines, and Tajikistan.

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[20] Since no retrospective data on sexual debut were collected in the Egypt 2014, Jordan 2012, Pakistan 2012-13, and Yemen 2013 DHS, they are omitted.

Fig 13. Probability of sexual debut in Southern and Middle Africa
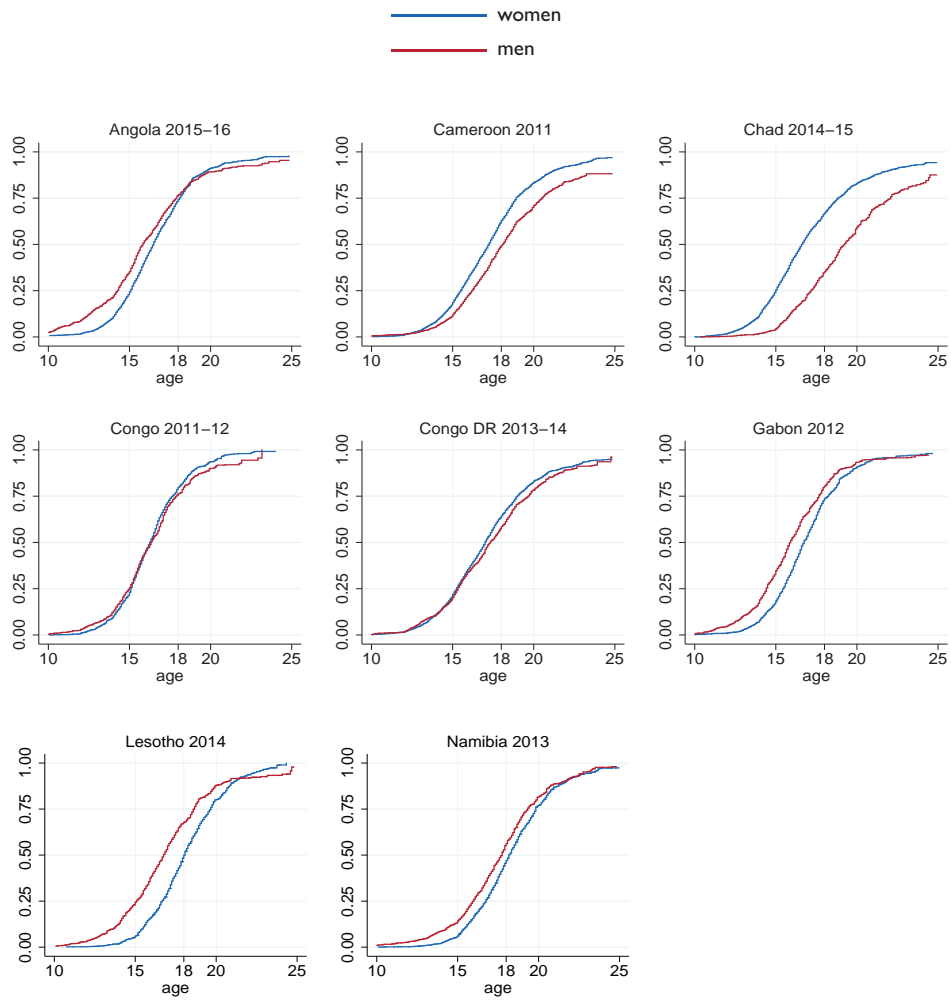
Note:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.

Fig 14. Probability of sexual debut in Asia
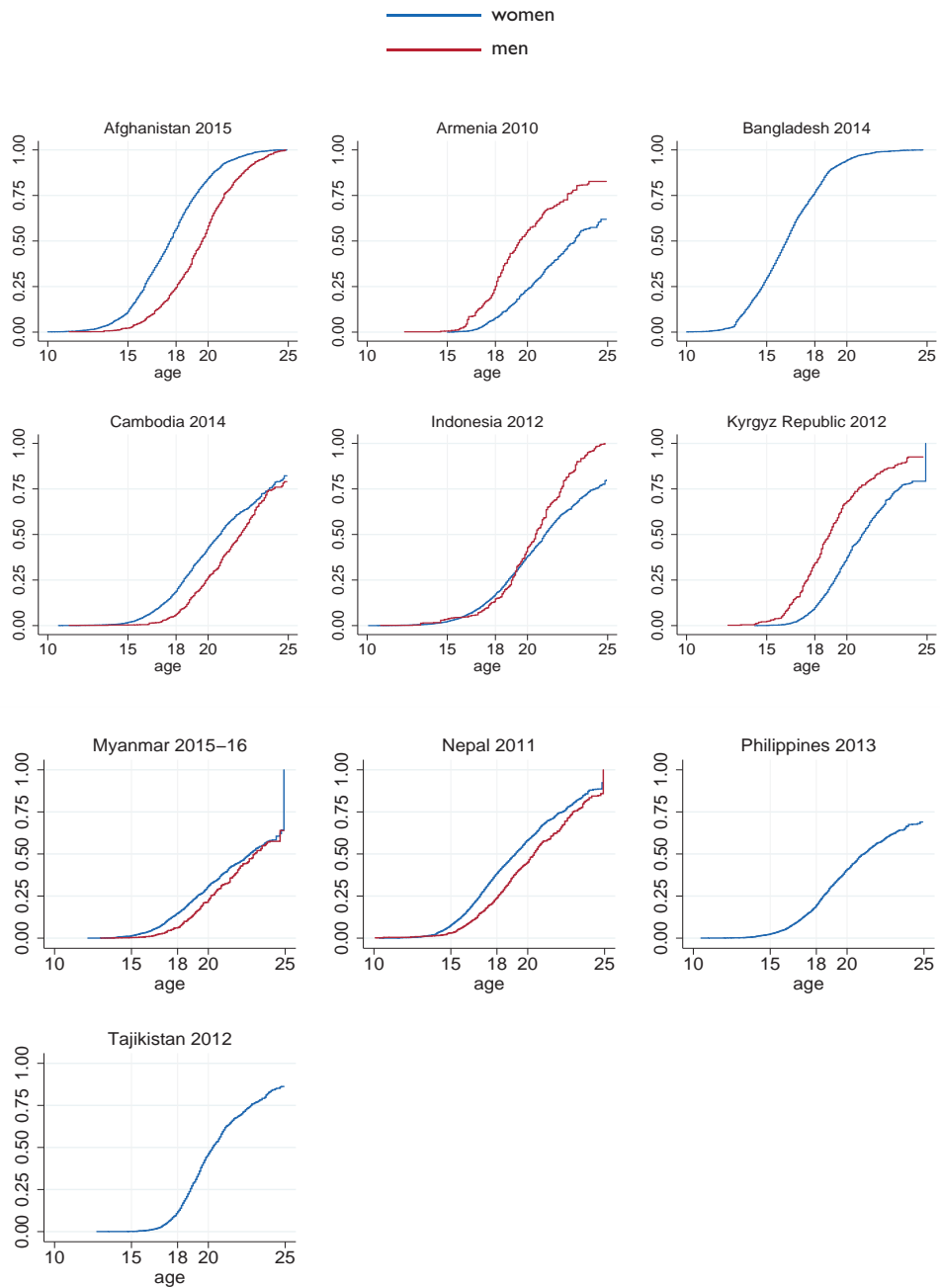
Notes:
Cumulative distribution function (F(t)=1-S(t)) estimated from respondents age 15-24.
No data on age of first sex were collected in the following surveys: Egypt 2014, Jordan 2012, Pakistan 2012-13, and Yemen 2013.
The following DHS surveys did not sample men: Bangladesh 2014, Philippines 2013, and Tajikistan 2012.
Estimates for the following DHS surveys are based on samples of ever-married women: Afghanistan 2015 and Bangladesh 2014.
Estimates for the following DHS surveys are based on samples of ever-married men: Indonesia 2012.

Sexual debut during adolescence is more common in Latin America and the Caribbean (Figure 15), although it is not a universal experience. About three in four women have had first sex by age 20, ranging from 59% (Guatemala) to 85% (Colombia). However, sexual debut occurs after adolescence for about 40% of women in Guatemala, Peru, and Honduras. Sexual debut is common during adolescence, but it occurs during later adolescence rather than earlier adolescence: About 15% of women have had first sex by age 15 and about half of women by age 18 in most countries. These figures are closer to 8% and 40%, respectively, in Guatemala and Peru where sexual debut is the most delayed in the region.

Fig 15. Probability of sexual debut in Latin America and Caribbean
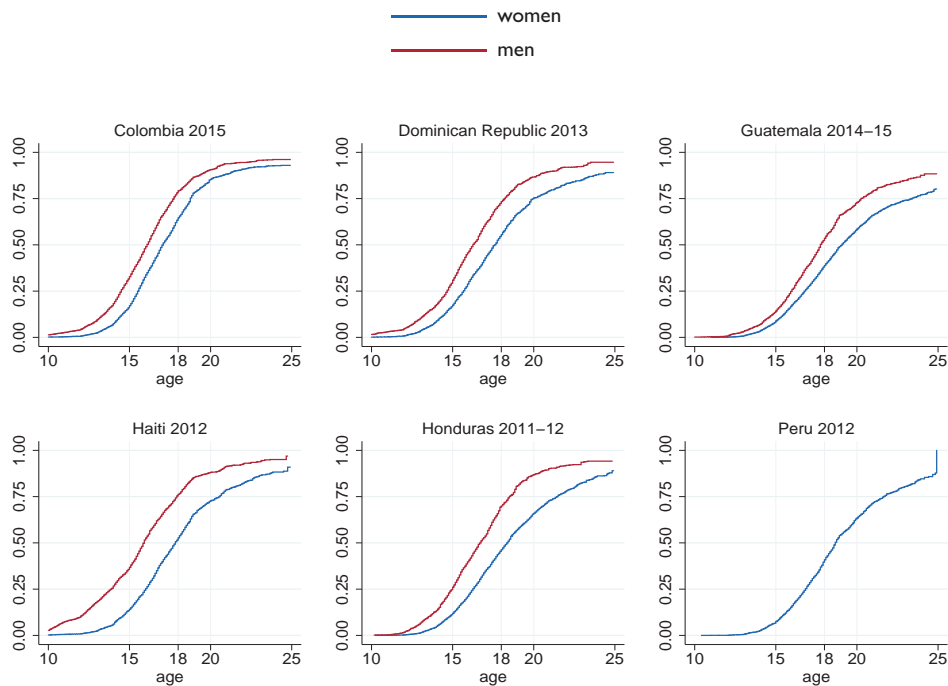
Notes:
Cumulative distribution function (F(*t*)=1-S(*t*)) estimated from respondents age 15-24.
The following DHS survey did not sample men: Peru 2012.

Men experience an earlier sexual debut than women do in Latin America and the Caribbean. The probability of experiencing first sex is greater for men than women at every age and in all five countries where comparisons are possible. Approximately three in ten men have had sex by age 15 and this figure increases rapidly to over 85% by age 20, except in Guatemala. With the latest age at sexual debut, approximately 14% of Guatemalan men have had sex by age 15, 53% by age 18% and 73% by age 20. The differential between women and men is greatest in Haiti and Honduras.

4.   Intersections between Marriage and Sex

For some adolescents, marriage provides the first occasion for sexual intercourse. Elsewhere, where the age at marriage is high or rising, a period of time emerges in which adolescents may engage in sexual activity outside of marriage (Lloyd et al). The relative sequencing of sexual debut and marriage in the life course varies country to country as does the extent to which sexual activity occurs within or outside the confines of marriage. The degree to which premarital sexual activity—for adolescent women *or* men—is socially sanctioned or occurs in practice varies across the globe. Expressed norms about sexual behavior are context-specific but gendered, which suggests that differences by sex are to be expected. This section of the study quantifies premarital sex in study countries. It also presents the distribution of marital status and current sexual activity among adolescent women and men.

4.1.   Premarital Sex

Figure 16 displays the prevalence of premarital sex among adolescent women currently age 15-19[21]; Figure 17 displays these data for adolescent men[22]. Adolescents are considered to have had premarital sex if (a) they are unmarried and report ever having had sexual intercourse or (b) the date of first sex precedes their date of marriage.

The lowest levels of premarital sex among women occur in West, Central, South, and Southeast Asia. Namely, the percentage of women age 15-19 who have had sex before marriage is the lowest—0.2%—in Armenia, followed by Tajikistan (0.4%), the Kyrgyz Republic (1.5%), Cambodia (1.5%), and Indonesia (2.6%). Premarital sex is also low outside of this region in the Gambia (3.8%), Ethiopia (4.7%), and Senegal (5.7%). Premarital sex is higher, although still a minority of adolescent women, in Latin America and the Caribbean and in North and East Africa.

In contrast, the highest levels are concentrated in Southern and Middle Africa followed by parts of West and East Africa. A majority of adolescent women age 15-19 have experienced premarital sex in Angola (56.1%), Congo (55.9%), Côte d'Ivoire (50.6%), Gabon (58.1%), Liberia (64.2%), Mozambique (50.2%), and Sierra Leone (52.7%).

The regional patterns of premarital sex among adolescent men age 15-19 is similar to that among women. Levels are lowest in West, Central, South, and Southeast Asia and higher in Southern and Middle Africa and, to a lesser extent, in West and East Africa. However, premarital sex is also uncommon among adolescent men in Niger and Ethiopia, distinguishing themselves from the overall pattern for their regions. The highest levels of premarital sex among adolescent men are in the Latin American and Caribbean countries in this study, which diverges from patterns observed among adolescent women.

Generally, a higher proportion of adolescent men age 15-19 than women of the same age has experienced premarital sex. However, in most West African countries, more adolescent women have experienced premarital sex than adolescent men.

The differences can be stark. In the Comoros, 29.9% of adolescent men age 15-19 have experienced premarital sex contrasted to just 7.2% of adolescent women, which is a difference of 22.8 percentage points. The differences between adolescent men and women are greatest in Latin America and the Caribbean, as seen in Honduras (29.9 percentage points), the Dominican Republic (28 percentage points), and Haiti (24.8 percentage points). In Liberia, where premarital sex is more common among adolescent women (64.2%) than adolescent men (40.9%), there is a 23.3 percentage point difference in the other direction.

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[21] Data on sexual activity are unavailable from the Egypt 2014, Jordan 2012, Pakistan 2012-13, and Yemen 2013 DHS surveys.

[22] No surveys were conducted among men in the Bangladesh 2014, Egypt 2014, Jordan 2012, Pakistan 2012-13, Peru 2012, Philippines 2013, Tajikistan 2012, and Yemen 2013 DHS surveys. There are too few cases in Indonesia 2012 DHS to facilitate analysis.

Fig 16. Prevalence of sex before marriage among women age 15-19

Legend:
- 0% – 15%
- 15.1% – 30%
- 30.1% – 45%
- 45.1% – 64.2%

Country labels: Philippines, Indonesia, Cambodia, Myanmar, Bangladesh, Nepal, Kyrgyz Republic, Tajikistan, Afghanistan, Armenia, Ethiopia, Uganda, Kenya, Rwanda, Burundi, Tanzania, Malawi, Comoros, Mozambique, Lesotho, DRC, Zambia, Zimbabwe, Angola, Namibia, Chad, Niger, Nigeria, Cameroon, Gabon, Congo, Benin, Togo, Ghana, Cote d'Ivoire, Liberia, Sierra Leone, Guinea, Mali, Gambia, Senegal, Burkina Faso

Inset: Dominican Republic, Haiti, Colombia, Peru, Guatemala, Honduras

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Fig 17. Prevalence of sex before marriage among men age 15-19

Legend:
- 0% - 15%
- 15.1% - 30%
- 30.1% - 45%
- 45.1% - 70.7%
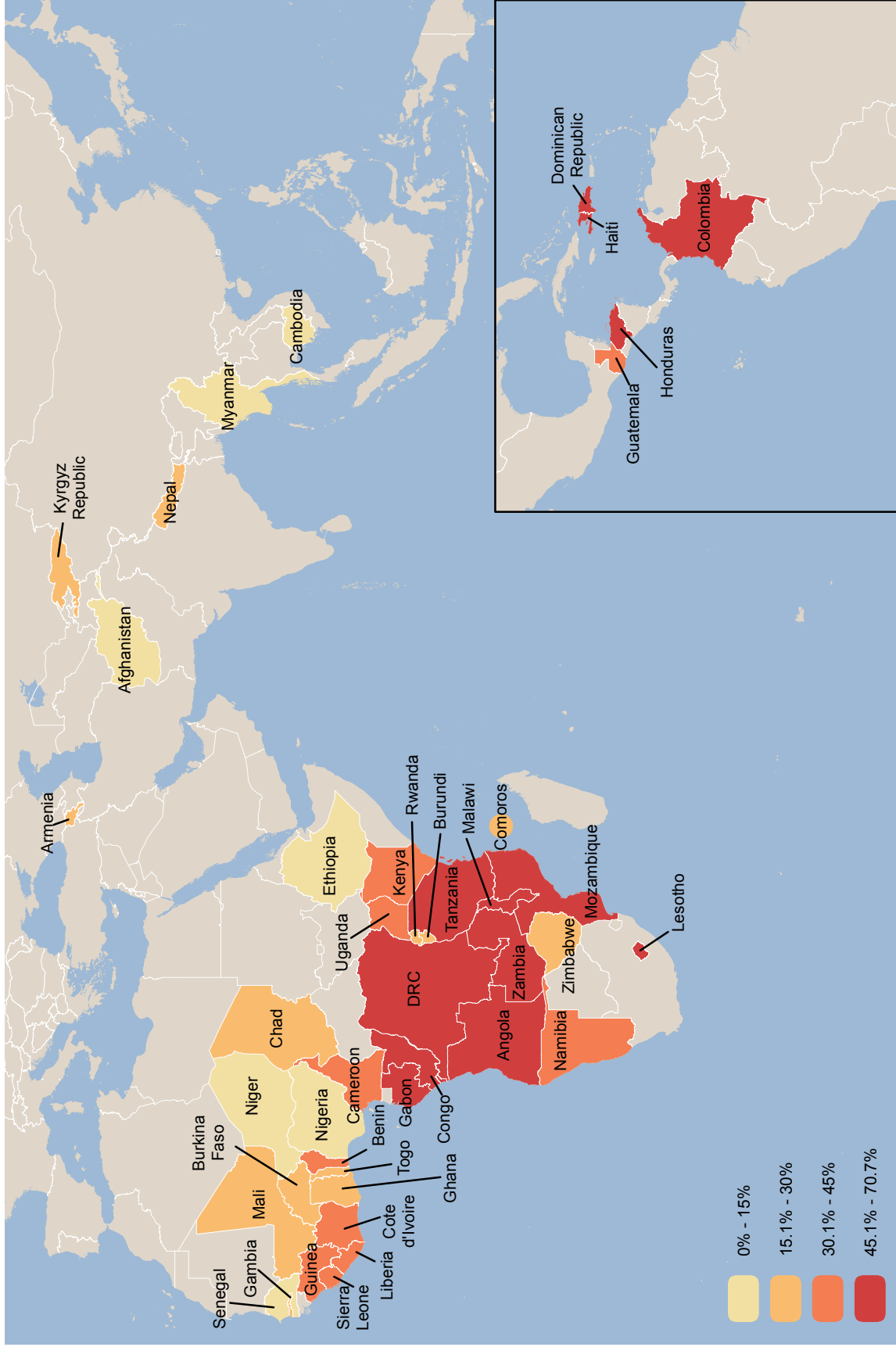
4.2. Current Marital and Sexual Activity Status

Current marital status is a helpful indicator for understanding the level of marriage among adolescents at a given point in time. In Figure 18, we further show current marital status (married and unmarried) for adolescent women men age 15-19. Among unmarried adolescents, we also show whether or not they are sexually active. Adolescents who have had sex in the previous 30 days are considered sexually active. Married adolescents are assumed to be sexually active.

Less than 30% of women age 15-19 are currently married in any country, with the exception of Niger, where 61% in this age range are married. Although there is variation within and among regions, Africa reports more marriage among adolescent women than Asia and Latin America and the Caribbean. There are less than 10% of adolescent women married in Ghana, Burundi, Rwanda, Namibia, Armenia, and the Kyrgyz Republic. Among unmarried women, sexual activity varies widely. In some countries, there are more unmarried and sexually active women than married women. This is true for Ghana, Liberia, Sierra Leone, the Democratic Republic of the Congo, Namibia, and Colombia. There are also countries that exhibit almost no sex outside of marriage. This is true for one in three countries in countries West and East Africa, and is nearly universal in Asian countries. It is clear that most adolescent women remain unmarried and not sexually active. Among men, there are stark differences in marital status in adolescence. In no country where men of all marital statuses were married are there more than 10% of men who are married. Although the majority of adolescent men are unmarried and not sexually active, sex outside of marriage is more prevalent for men than for women. With large variances within and among regions, some countries exhibit a notable amount of sex outside of marriage. Mozambique, Angola, and the Democratic Republic of the Congo have approximately one in three adolescent men who are having sex outside of marriage. There is almost no reported sex among unmarried men in Asian countries.

Fig 18. Current marital and sexual activity status among women and men age 15-19
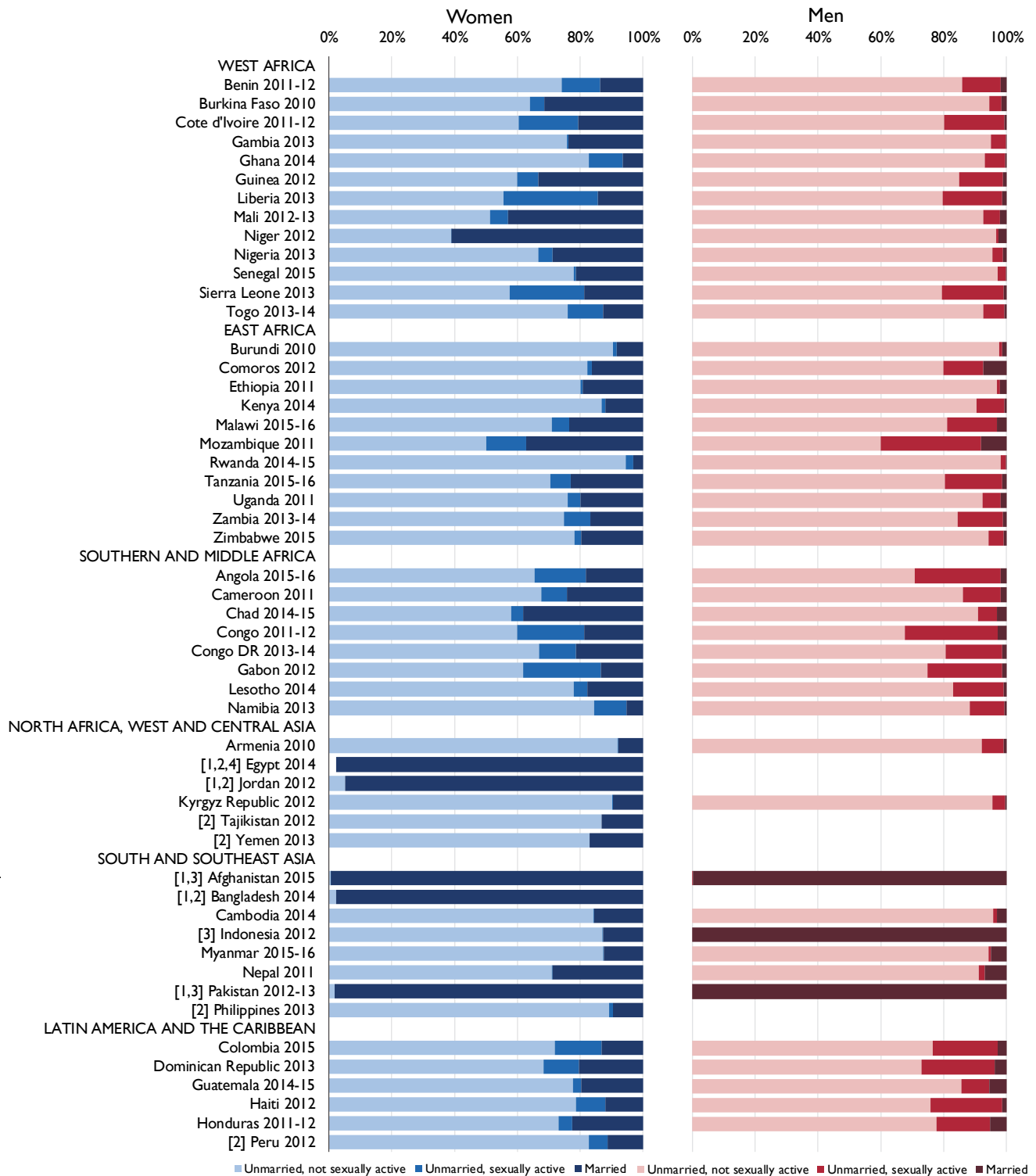
Notes:
[1] Estimates for the following DHS surveys are based on samples of ever-married women: Afghanistan 2015, Bangladesh 2014, Egypt 2014, Jordan 2012, and Pakistan 2012-13.
[2] The following DHS surveys did not sample men: Egypt 2014, Jordan 2012, Tajikistan 2012, Yemen 2013, Bangladesh 2014, Philippines 2013, and Peru 2012.
[3] Estimates for the following DHS surveys are based on samples of ever-married men: Afghanistan 2015, Indonesia 2012, and Pakistan 2012-13.
[4] There is no recorded data on sexual activity in the following DHS surveys: Egypt 2014, Jordan 2012, Yemen 2013, and Pakistan 2012-13.

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5.   Contraception

Prior research indicates that adolescent women may experience greater unmet need for family planning than their adult counterparts (Darroch et al. 2016; MacQuarrie 2014). The Family Planning 2020 Initiative, with its ambitious goal of 120 million additional users by the year 2020, makes particularly salient the contraceptive behavior of adolescent cohorts who are entering their reproductive years (Dasgupta et al. 2017; FP2020 2016; Stover and Sonneveldt 2017). The risks of pregnancy are greater at young maternal ages, which suggests that increased contraceptive use during adolescence is desirable to improve poor maternal and infant health outcomes (Winter et al. 2014).

DHS surveys of women typically incorporate a reproductive calendar that records reproductive events—episodes of contraceptive use (or non-use) as well as pregnancies and births—for each month in the 5 years preceding the survey. Therefore, these retrospective data collected from each cohort of women characterize the experiences while 5 years younger. For example, calendar data from women age 15-19 describe the contraceptive experiences during age 10-14 while data from women age 20-14 describe the contraceptive experiences during age 15-19. Of the 52 study surveys, 41 surveys[23] administered the reproductive calendar, yielding the data on adolescent contraceptive use presented in this study.

5.1.   Contraceptive Use During Adolescence

Figures 19 and 20 present the percent of women age 15-24 who used contraception at some point during the 5 years preceding the survey during age 10-19, which provides a comparison of early adolescence with later adolescence. Figure 19 shows these data for samples of all women, whether married or unmarried, while Figure 20 shows these data for samples that surveyed only ever-married women.

5.1.1. Adolescent contraceptive use among women of all marital statuses

Figure 19 shows that contraception is rarely used during the early adolescent years with nearly all study surveys registering well below 10% of women used any method of contraception between age 10-14. Peru is the exception, where 23% of women report having used contraception between age 10-14. Contraceptive use in this age group is relatively high in two of the other three Latin American and Caribbean surveys—Colombia (8%) and Honduras (6%) and, outside of this region, Benin (9%). Contraceptive use in this age group is nearly imperceptible in the North African, West and Central Asian and South and Southeast Asian surveys in this study.

Contraceptive use during age 15-19 is comparably higher in most study surveys and reaches close to 20% of women or higher in 15 countries. During these ages, contraception is again highest in Peru (66%) and noticeably more common in the three other Latin American and Caribbean countries, Colombia (57%), Honduras (47%), and Guatemala (26%), and in Namibia (43%), Liberia (41%), Zimbabwe (35%), and Malawi (33%). In contrast to the pattern exhibited by most countries, there is little difference in the use of contraception in the two age groups in Lesotho and Benin.

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[23] The surveys that did not administer the reproductive calendar are: Cameroon 2011, Chad 2014-15, Congo 2011-12, Congo Democratic Republic 2013-14, Côte d'Ivoire 2011-12, Dominican Republic 2013, Gabon 2012, Guinea 2012, Haiti 2012, Philippines 2013, and Togo 2013-14.

Fig 19. Percent of women age 15-24 who used contraception in the 5 years preceding the survey during age 10-19 (all women surveys)
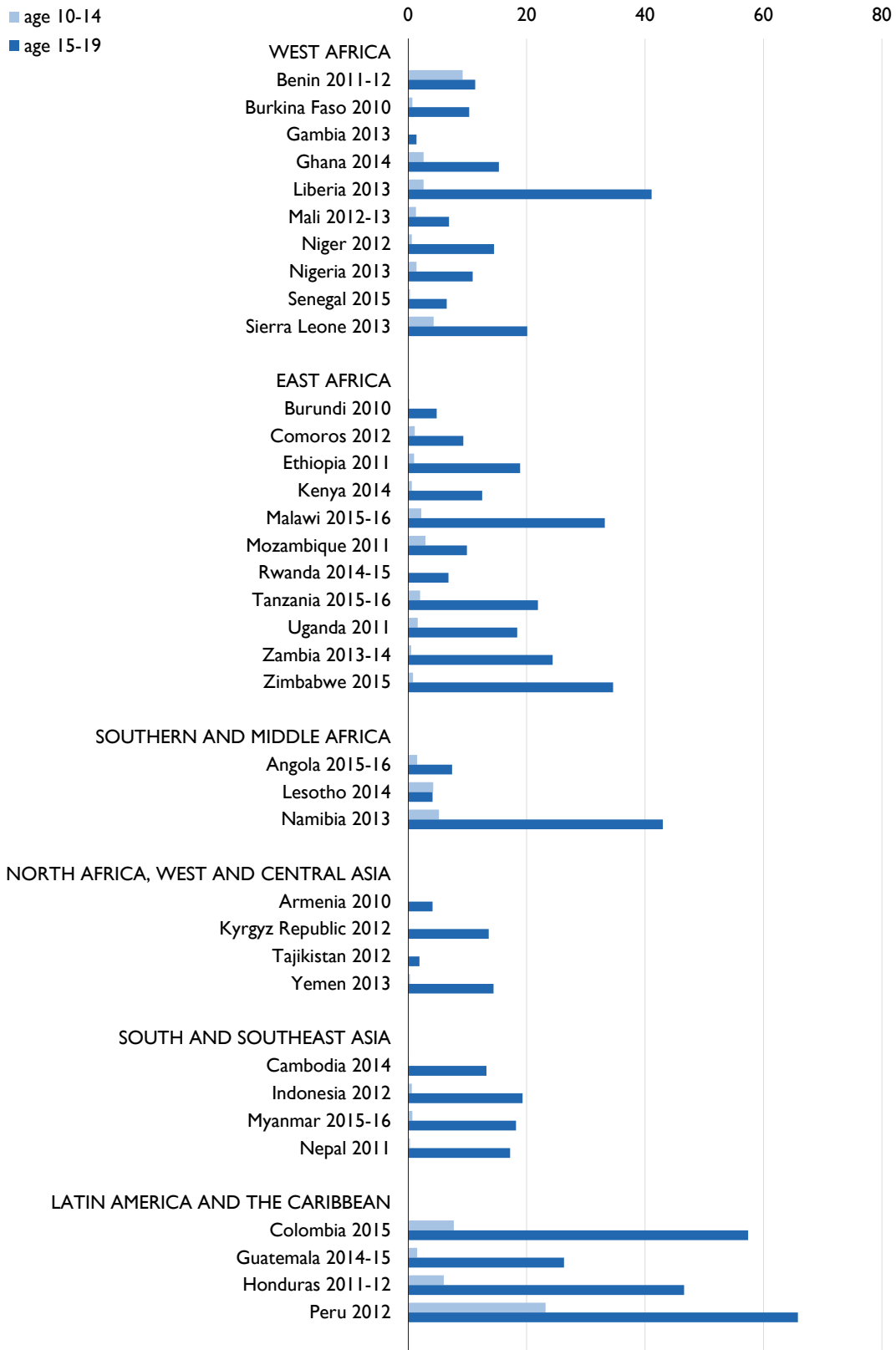
5.1.2. *Adolescent contraceptive use among ever-married women*

Figure 20 shows the percent of ever-married women who have used contraception in the 5 years preceding the survey. Five surveys sampled only ever-married women: Egypt 2014, Jordan 2012, Afghanistan 2015, Bangladesh 2014, and Pakistan 2012-13. In these five surveys, contraceptive use is rare during age 10-14 except in Bangladesh, where 19% of ever-married women age 15-19 used a method of contraception at some point during age 10-14. In all five countries, contraceptive use in later adolescence exceeds that during early adolescence, ranging from about 11% of ever-married women age 20-24 in Afghanistan and Pakistan to 26% in Egypt and Jordan and the majority of women in Bangladesh (60%).

Fig 20. Percent of women age 15-24 who used contraception in the 5 years preceding the survey during age 10-19 (ever-married surveys)
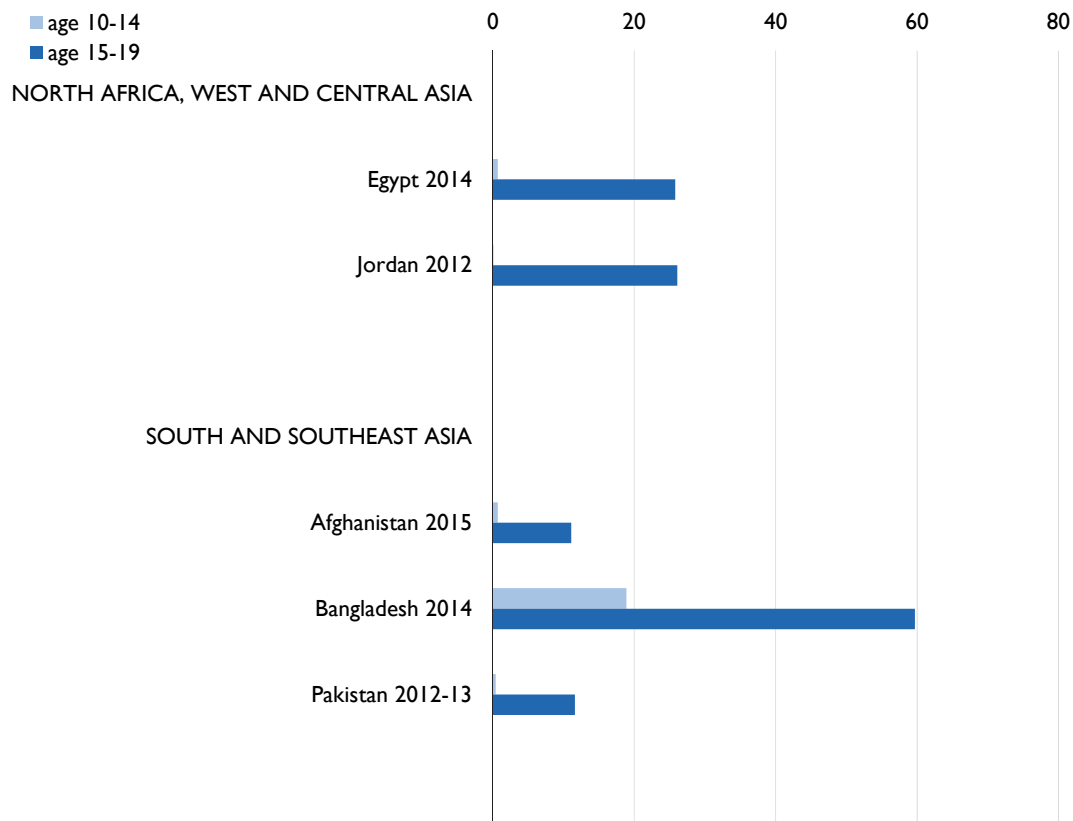
Contraceptive use is known to vary by marital status (MacQuarrie 2014; MacQuarrie et al. 2015). However, the retrospective reproductive calendars do not capture marital histories that would be needed to disaggregate contraceptive use by marital status, and only a measure of current marital status is available. Nonetheless, these samples of ever-married women allow some contrast with contraceptive experience of adolescents in the all-women samples.

This study did not distinguish between the use of modern methods and traditional methods of contraception. Modern methods represent the majority of current contraceptive use in nearly all study countries. Traditional methods are currently used by substantial proportions of all women (more than 10%) only in Armenia, Jordan, Cambodia, and Peru with a smaller proportion (5-10%) in Bangladesh, Pakistan, Guatemala, and Honduras.

6.   Fertility

The onset of fertility changes adolescent lives in profound ways. Childbearing marks a transition from childhood into adulthood. The birth of a first child, particularly during adolescence, shapes educational, occupational, and other life opportunities and alters an individual's life trajectory far into adulthood. Parenthood may confer a change in social status along with new roles and responsibilities.

Fertility indicators are seldom reported for very young adolescents. Fertility rates are typically calculated for women age 15-49, because broad consensus in the demographic community defines this age range as the reproductive life span for women. However, the same retrospective birth history data, from which age-specific fertility rates are calculated for older women, are available to describe the fertility experiences of adolescents as young as age 10. This section presents grouped and single year age-specific fertility rates for adolescent women age 10-19.

6.1.   Adolescent Fertility

Figure 21 shows grouped adolescent age-specific fertility rates (ASFR) for the 5 years prior to the survey for women age 10-14 and age 15-19[24]. These fertility rates are shown as births per 1,000 women. See Appendix 1 for a discussion of the methods used to calculate adolescent fertility rates.

It is expected that ASFR would be higher for the 15-19 age group than for the 10-14 age group, given the predictable pattern of ASFR for women age 15-49. Figure 21 shows that fertility is negligible in this youngest age group in all countries, as compared to fertility among women age 15-19. Although there is substantial variation in ASFR among the older adolescent age group, ASFR are consistently compressed in a narrow range close to zero among the youngest adolescent age group. Within this narrow band, the highest ASFR for women age 10-14 are in West Africa followed by Southern and Middle Africa. Mali has the highest ASFR with 17 births per 1,000 women age 10-14 followed by Angola (11) and Guinea (10). Bangladesh (9) and Mozambique (6) stand out for having higher than average early adolescent fertility rates for their regions. In most North African, West and Central Asian countries and many South and Southeast Asian countries, ASFR are nearly immeasurable for women age 10-14.

Among the older adolescents, the ASFR varies considerably from a high of near 200 births per 1,000 women in Niger (210) and Chad (197) to a low of near 25 births in Armenia (28) and Jordan (27). In general, ASFR are higher among adolescent women age 15-19 in the three African regions than they are in the two Asian regions and Latin America and the Caribbean. Rwanda has a distinctively low ASFR (44) among women age 15-19 compared with the other countries in East Africa.

Figure 22 shows fertility curves of single-year ASFR for women age 10-19 for the two countries in each region with the highest and the lowest adolescent fertility rates. Fertility curves for all study countries are found in Appendix A5.1-A5.6. By showing fertility levels (and their 95% confidence bands) at each year, fertility curves can better convey the age distribution of fertility during adolescence.

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[24] ASFR are calculated accounting for truncation in the sample at the youngest ages and, where necessary, for ever-married samples.

Fig 21. Adolescent age-specific fertility rates, grouped ages 10-14 and 15-19

● ASFR 10–14   ● ASFR 15–19

Fig 22. Adolescent fertility curves, selected countries

Niger 2012

Ghana 2014

Mozambique 2011

Rwanda 2014–15

Chad 2014–15

Namibia 2013

Yemen 2013

Jordan 2012
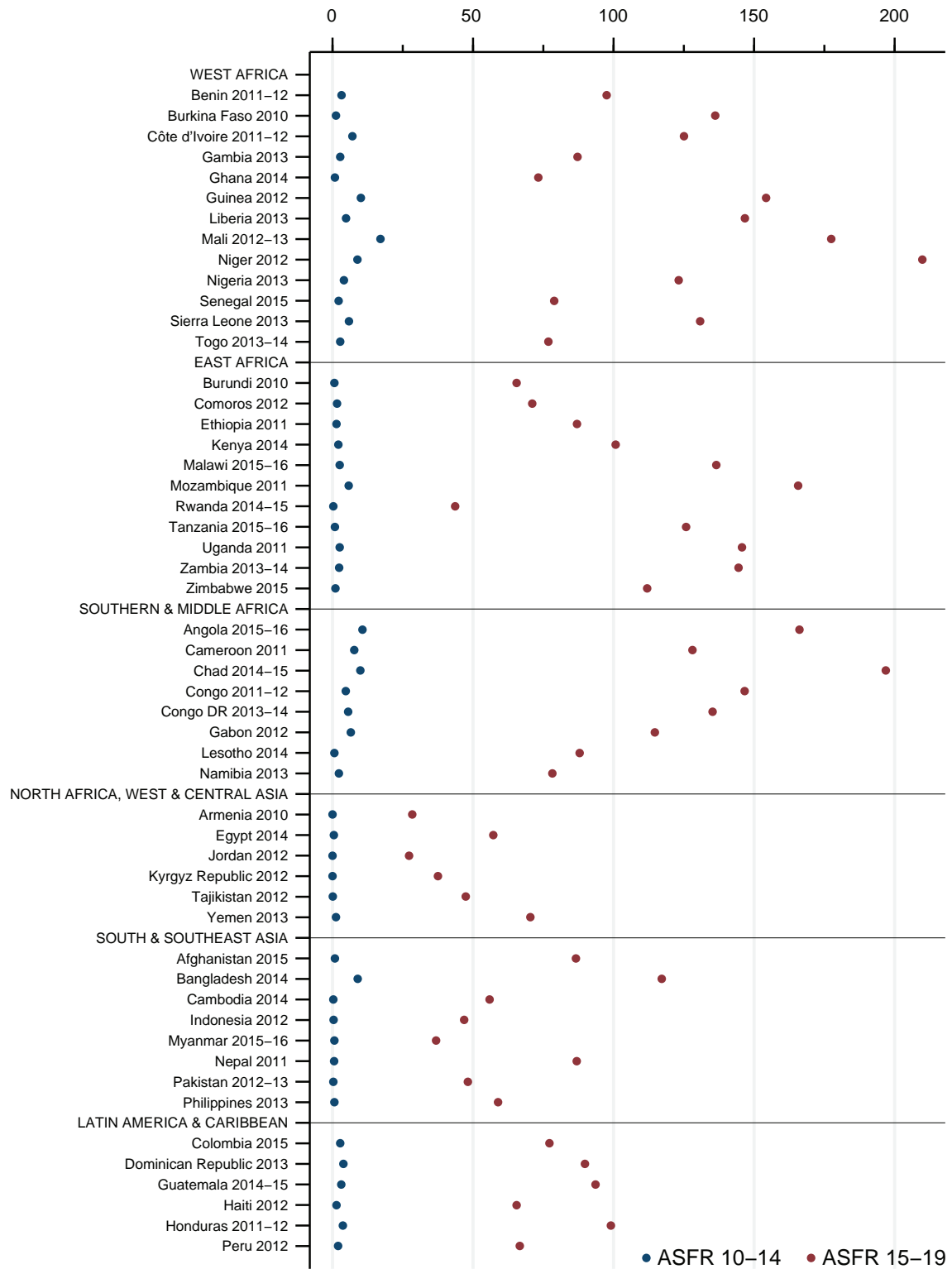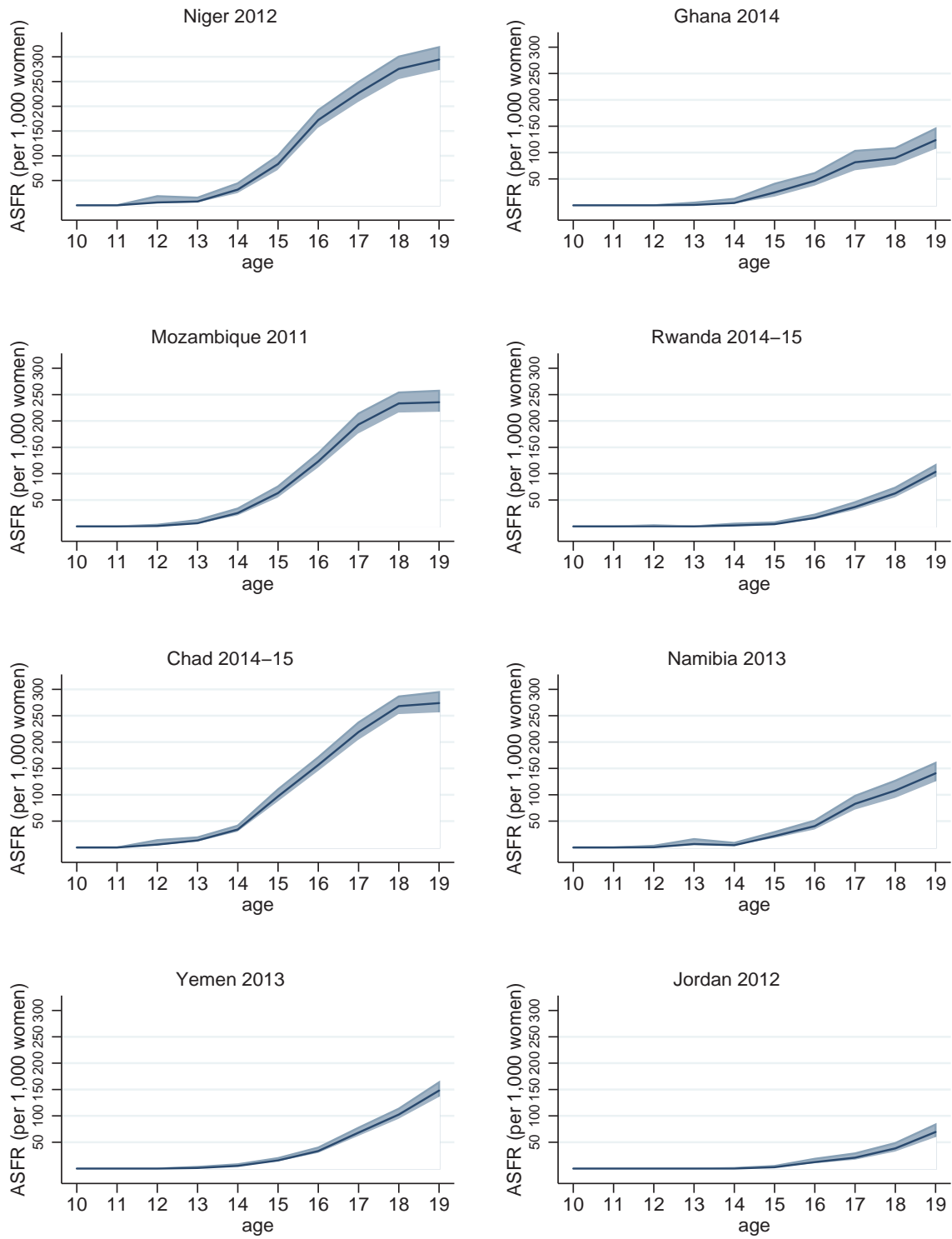
Continued…

Fig 22. Adolescent fertility curves, selected countries—*continued*
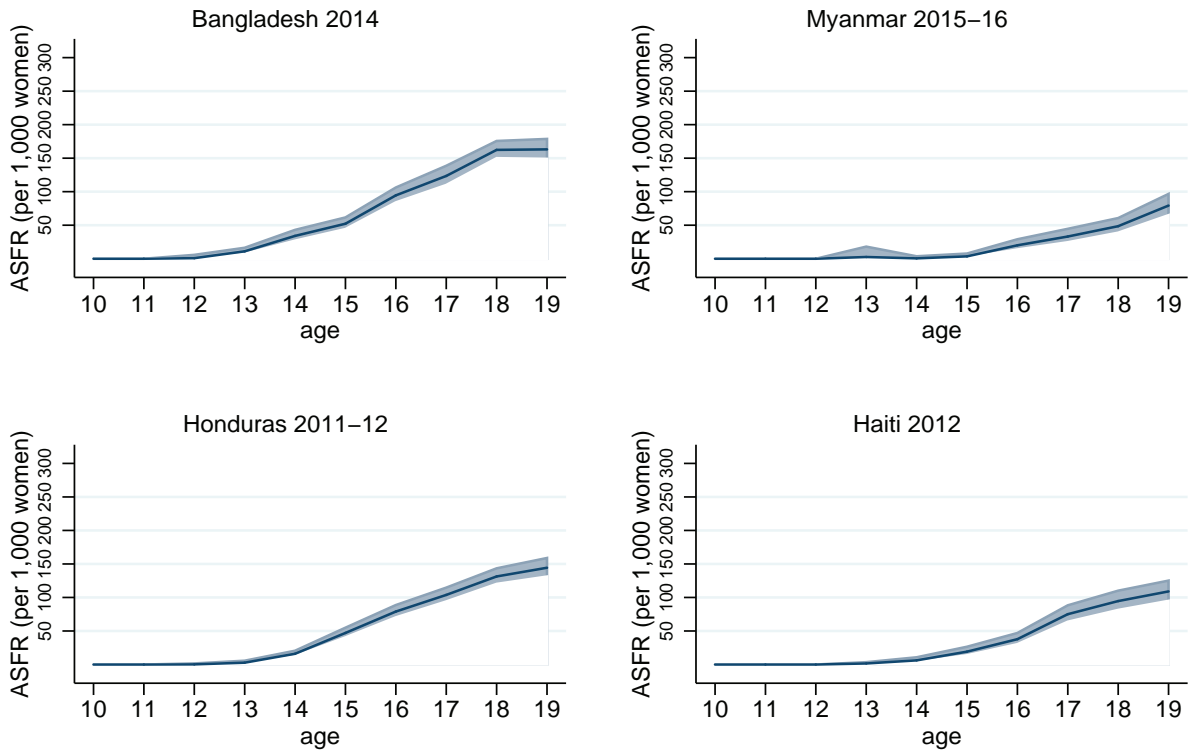
Note:
Selected two countries in each region with the highest and lowest adolescent fertility rates, respectively

Figure 22 indicates that among the highest adolescent fertility countries in the three African regions, Niger, Mozambique, and Chad, and Bangladesh in South and Southeast Asia, fertility begins to rise steeply from age 14-15 through the later adolescent years, but levels out between ages 18 and 19. In all other countries shown here, there is a more steady, albeit more gradual, increase in the age-specific fertility rates through the mid and older adolescent ages.

This figure also shows the wide range in adolescent fertility rates within each region. In Niger, West Africa, the ASFR approaches 300 births per 1,000 women by age 19. The highest adolescent fertility countries in East Africa (Mozambique, 236) and Southern and Middle Africa (Chad, 274) are near 250 births per 1,000 women by age 19. In contrast, the ASFR is 100-150 births per 1,000 women in Ghana (124), Rwanda (103), and Namibia (141), the lowest adolescent fertility countries in these regions. The range is somewhat more narrow in Latin America and the Caribbean, with ranges in ASFR at age 19 of 109 in Haiti to 144 in Honduras. In South and Southeast Asia, the ASFR at age 19 of 163 in Bangladesh contrasts with that of 79 in Myanmar. In North Africa, West and Central Asia, the range extends from 148 at age 19 in Yemen to 69 in Jordan. Interestingly, although both Bangladesh and Yemen indicate an ASFR of roughly 150 births per 1,000 women age 19, adolescent fertility begins earlier in Bangladesh and is higher at each age along the curve up to age 19.

6.2.   The Initiation of Adolescent Fertility

Fertility curves are typically presented for women of reproductive age 15-49. These typical curves begin at age 15 with some level of fertility greater than 0. Fertility appears as if out of thin air because fertility curves do not extend from the onset of risk. The above figure (and Appendix A5.1-A5.6) fills this gap by showing fertility at the earliest ages at which it emerges. Figure 24 provides a closer look at the starting point of adolescent fertility by displaying at a larger scale the single-year, age-specific fertility rates for the youngest adolescents age 10-14. Specifically, Figure 23 shows fertility curves for the two countries in each region with the earliest starting ages for fertility[25]. The scale is enlarged and extends only to 70 births per 1,000 women to zoom in on differences in a very small region of the fertility curve. Each of the selected countries, having the highest early start to adolescent fertility, is an outlier in their respective regions.

In none of these countries with the earliest onset of fertility is there measurable fertility prior to age 12. These figures indicate some variation in the onset of fertility both within and across regions after age 12. There is some fertility by age 13 in Mali (but not Côte d'Ivoire) and Bangladesh (but not Nepal) and, to a lesser extent, in both Angola and Gabon. In all other regions, fertility does not begin until age 14. Fertility among very young adolescents, even by age 14 for example, is even less apparent in North Africa, West and Central Asia (Tajikistan and Yemen), Latin America and the Caribbean (Honduras and Guatemala), and in Nepal and the Comoros.

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[25] "Highest earliest start" of fertility was assessed at ages 12 and 14.

Fig 23. Adolescent fertility curves age 10-14 by region for the two surveys in each region with the earliest fertility start
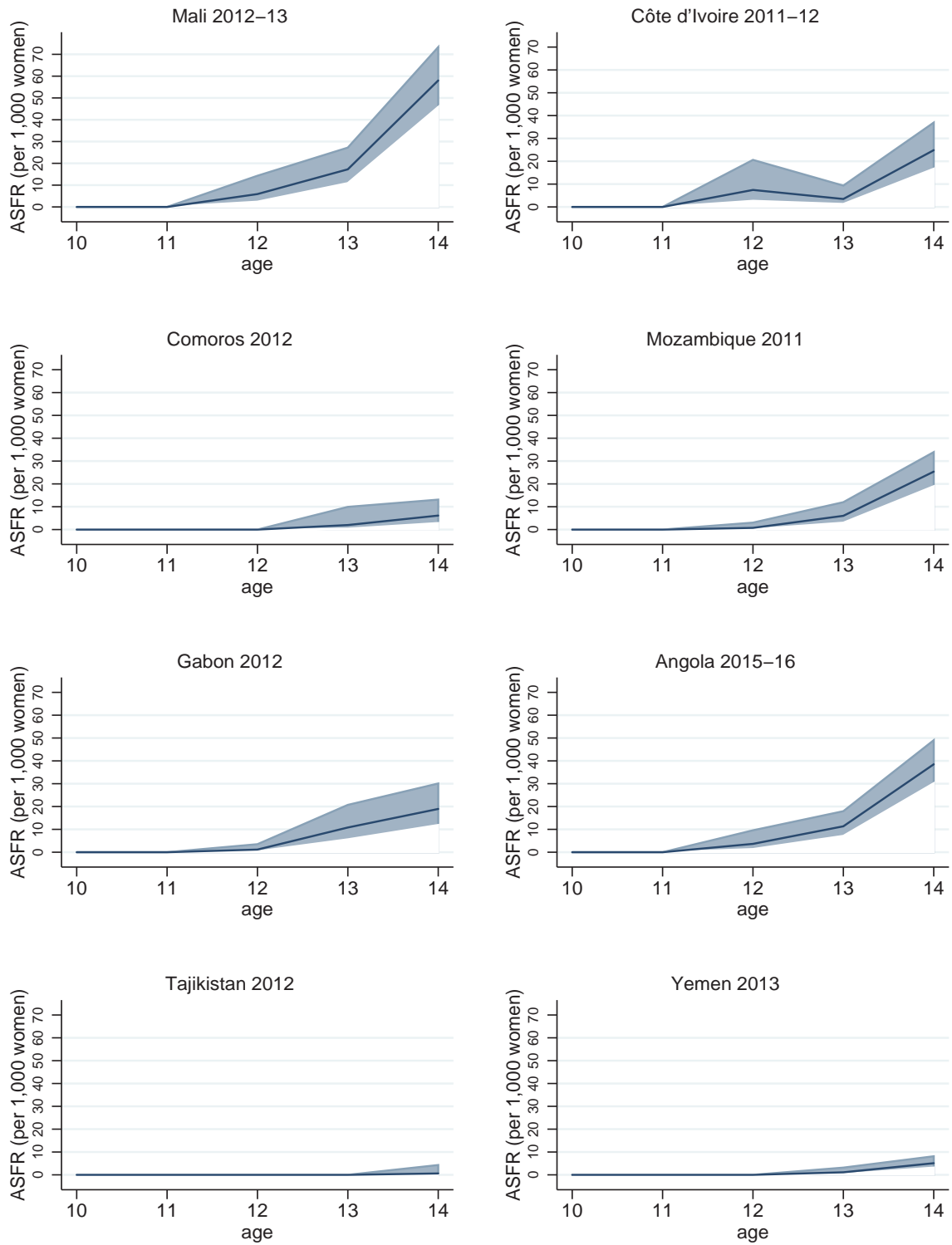
Fig 23. Adolescent fertility curves age 10-14 by region for the two surveys in each region with the earliest fertility start—*continued*
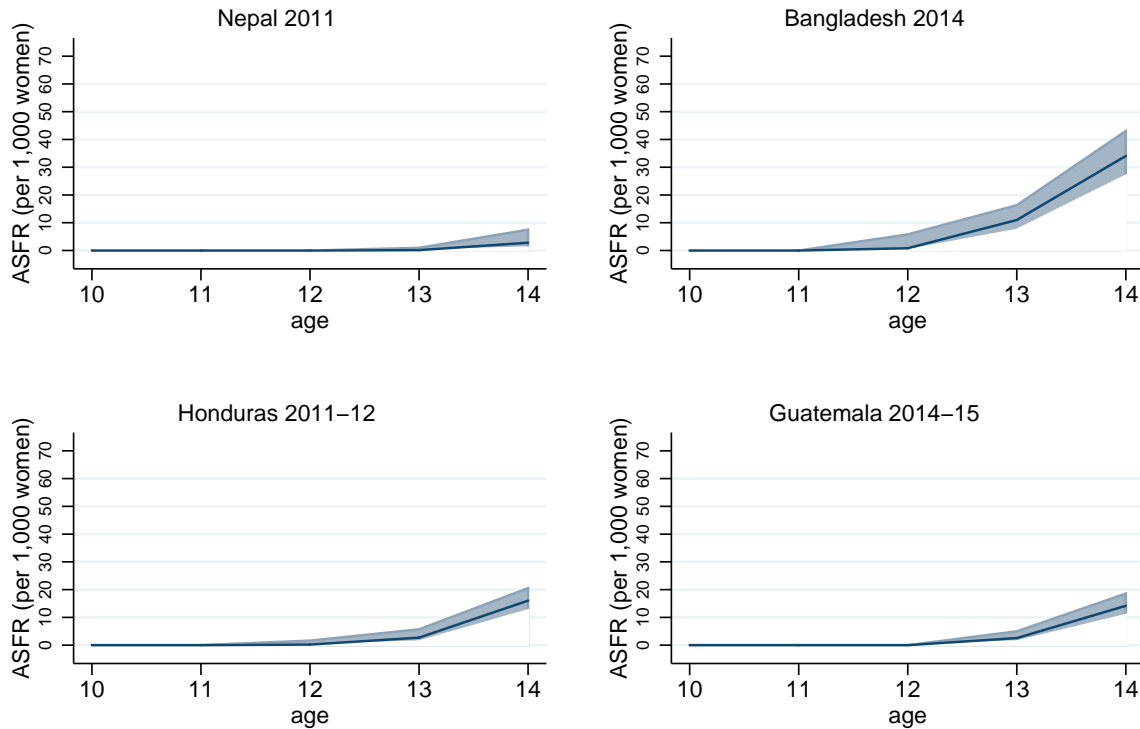
Note:
Selected two countries in each region with the highest earliest starting fertility rates assessed at ages 12 and 14

6.3.   Adolescent Fertility Rates and the Total Fertility Rate

Figure 24 plots the total fertility rate (TFR) for each study country and its ASFR for the youngest adolescents age 10-14. Each region is indicated by color. This figure allows us to examine whether there is any association between the TFR and the ASFR for women 10-14. Stated otherwise, does the initiation of fertility early in adolescence have any relationship to the total fertility at the end of women's reproductive lives?

A relationship between the ASFR and TFR would not be unexpected since the TFR is the number of children a woman would have over her lifetime if she experienced the prevailing ASFR at each age. However, the TFR is calculated from ASFRs for age 15-49, which excludes that for age 10-14. Furthermore, the empirical relationship between the ASFR for the youngest adolescents and TFR has not been tested because the ASFR for this age group is seldom computed. The bivariate regression line fit to these data indicates the statistical magnitude of any such association.

The bivariate regression indeed indicates that the ASFR for women age 10-14 is positively associated with total fertility (p=0.000). Countries with an earlier start to fertility have a higher total level of fertility. Specifically, the TFR is on average 0.19 higher with each unit increase (each additional birth per 1,000 women) in the ASFR for women age 10-14 in the study countries.

Mali has the highest ASFR (17 births per 1,000 women age 10-14) and one of the highest TFRs (6.3) of all study countries. Burundi and Niger are each outliers with a higher TFR than would be predicted by their ASFR for age 10-14. Burundi has a high TFR of 6.1 despite an ASFR of just 0.59 among women age 10-14, while Niger's high TFR of 7.6 (the highest among study countries) is even higher than would be expected with an ASFR of 9 among those age 10-14. Meanwhile, Armenia and Bangladesh are the outliers with lower TFRs than would be predicted by their early adolescent ASFR. Bangladesh has a TFR of just 2.3 despite an early ASFR of 9 among women age 10-14. Armenia has a TFR of 1.7 and an ASFR for age 10-14 that does not register above 0.0.

Fig 24. Total fertility rates and age-specific fertility rates for age 10-14
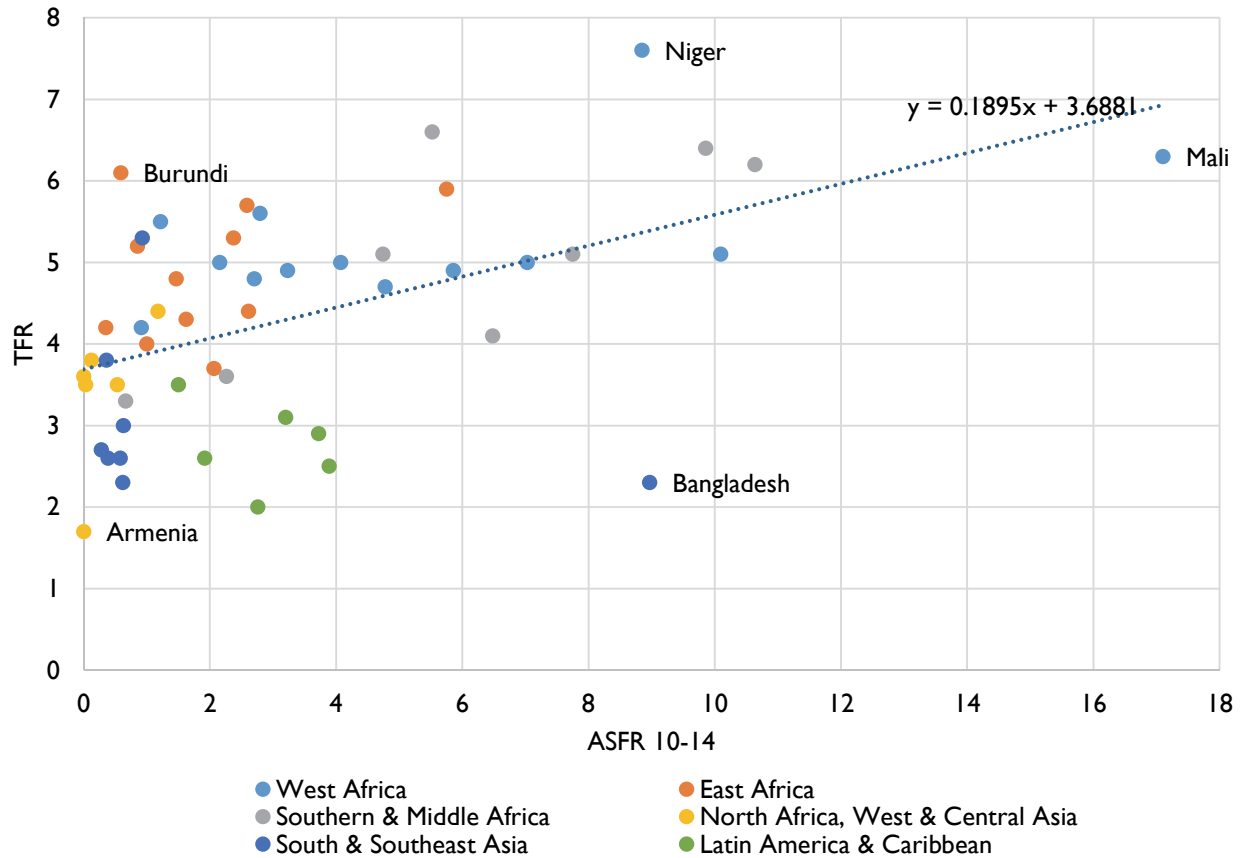
7.   Maternal Health

Adolescent pregnancy and birth are proven risk factors for multiple adverse health consequences for both the mother and child. Young women who become pregnant during their teenage years are at an increased risk of developing eclampsia, puerperal endometritis, systemic infections, and maternal death (Ganchimeg et al, 2014; Chen et al, 2006; Conde-Agudelo, Beliza, and Lammers 2005). Children born to adolescent mothers have increased risks of low birth weight and premature birth, which contribute to early neonatal death (Ganchimeg et al, 2014; Chen et al, 2006; Conde-Agudelo, Beliza, and Lammers 2005). Research indicates that these risks are attributable to the underdeveloped body of younger adolescent women (Scholl, Hediger, and Belsky, 1994). In addition, adolescents face disadvantages related to socio-economic factors. For example, research shows they receive either insufficient or sub-standard care during pregnancy and childbirth, when compared with older age groups (Jaychandran, Chapotera and Stone, 2016; Loto et al., 2004). However, even after controlling for these sociodemographic and health systems factors, adolescents remain at risk (Ganchimeg et al, 2014), which further necessitates adequate antenatal and childbirth care.

In this chapter, we present indicators of maternal health care for women age 15 to 24 who have begun childbearing during adolescence. Table 2 provides an overview of the indicators, their definitions, and the population bases used for the analysis in this section. To analyze adolescent pregnancy and birth, we restricted our denominator to women with a live birth in the 5 years preceding the survey if their most recent birth occurred before age 20. Percentages calculated for women or births in Bangladesh are based on pregnancies or births in the 3 years preceding the survey. In this table, we disaggregate these indicators by exact age at birth, either before age 17 or between ages 17 and 19. We chose these age groups based on an examination of the frequency of births by each year of adolescence. Small sample sizes in most countries restricted analysis of younger adolescent groups, in which the unweighted number of women with a birth in younger age groups is less than 50. We present confidence intervals to provide insight into differences between groups, although we did not conduct significance testing. The analysis conducted among women in Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan is based on an ever-married sample of women.

Table 2. Maternal health indicators to be included in the adolescent report

Indicator	Definition	Population Base
Adolescent birth	Percentage of women who have had at least one birth before age 20	All women interviewed age 15-24
Age at most recent birth	Percentage of women who had a birth in the five years preceding the survey and the most recent birth occurred before age 17 and before age 20	
Any antenatal care (ANC)	Percentage of women with at least one antenatal care visit for their most recent pregnancy	Women age 15-24 with a live birth in the five years preceding the survey, disaggregated by women whose most recent birth occurred either before age 17 or between age 17 and 19
Four or more ANC	Percentage of women with four or more antenatal care visits for their most recent pregnancy	
Mother was given iron syrup/tablets during pregnancy	Percentage of women who were given iron syrup/tablets during their most recent pregnancy	
Birth delivered in a facility	Percentage of births delivered in a facility	All births that occurred within the five years preceding the survey, disaggregated by age at mothers birth, either before age 17 or between 17 and 19
Birth delivered by a skilled birth attendant	Percentage of births delivered by a doctor, nurse or other trained health worker	
Low Birth Weight	Percentage of births perceived to be small or very small at birth	
Postnatal care for the mother	Percentage of women who received a postnatal check-up within two days of delivering their most recent birth	Women age 15-24 with a live birth in the two years preceding the survey, disaggregated by women whose most recent birth occurred either before age 17 or between age 17 and 19

7.1. Adolescent Birth

Figure 25 shows the percentage of women age 15-24 who had one birth, two births, and three or more births before age 20. The total percent of women who have had any number of births before age 20 varied by region, although the least amount of variation is seen in Latin America and the Caribbean (LAC), where between 20% to 30% of women in these countries had an adolescent birth—most commonly only one birth. There was a large range in adolescent parity in South and Southeast Asia, where we found that Bangladesh and Afghanistan presented with the largest proportions of adolescent births at over 60% of women in Bangladesh and about 55% of women in Afghanistan having at least one birth before age 20. However, in Afghanistan, women who had given birth before age 20 most commonly had two or more births, and 18% of women reported three or more births during adolescence. However, it is worth noting again that the proportions presented here for Afghanistan and Bangladesh (as well as Egypt, Jordon, and Pakistan), are among a sample of ever-married women only. In South and Southeast Asia, adolescent childbearing is much lower—with less than 20% total with three or more births being rare. Armenia, the Kyrgyz Republic, and Myanmar had the lowest proportion of young women who had given birth before age 20, around or less than 10%. In West Africa, no less than 20% of women in each country had an adolescent pregnancy before age 20, with Mali and Niger having the highest proportions of women with any number of births and women with greater adolescent parity.

Fig 25. Percentage of women age 15-24 with a birth before age 20

| | 1 birth | 2 births | 3 or more | no births |
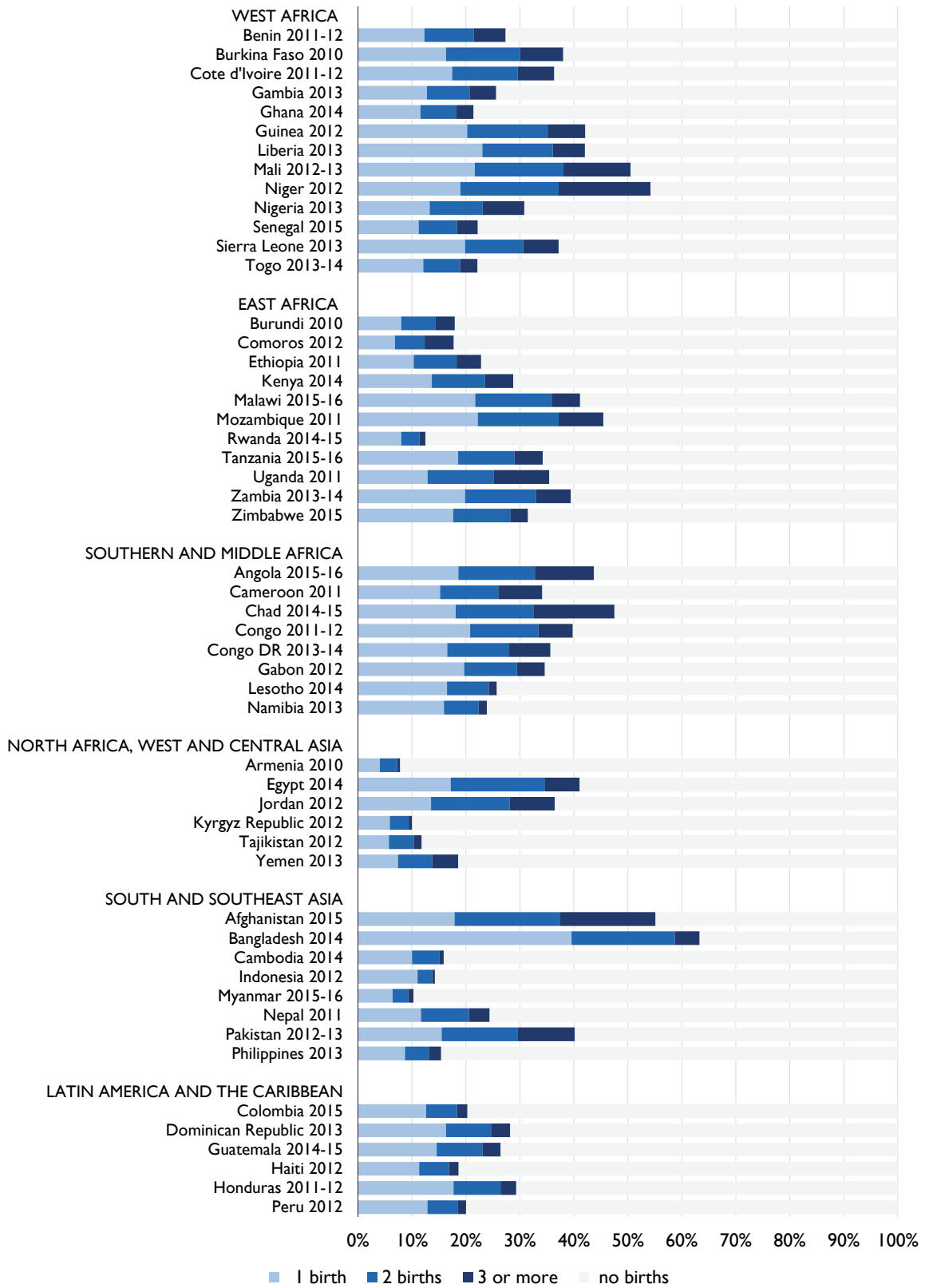
Note:
Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

49

Fig 26. Percentage of women age 15-24 whose most recent birth in the last 5 years occurred before age 17 and before age 20
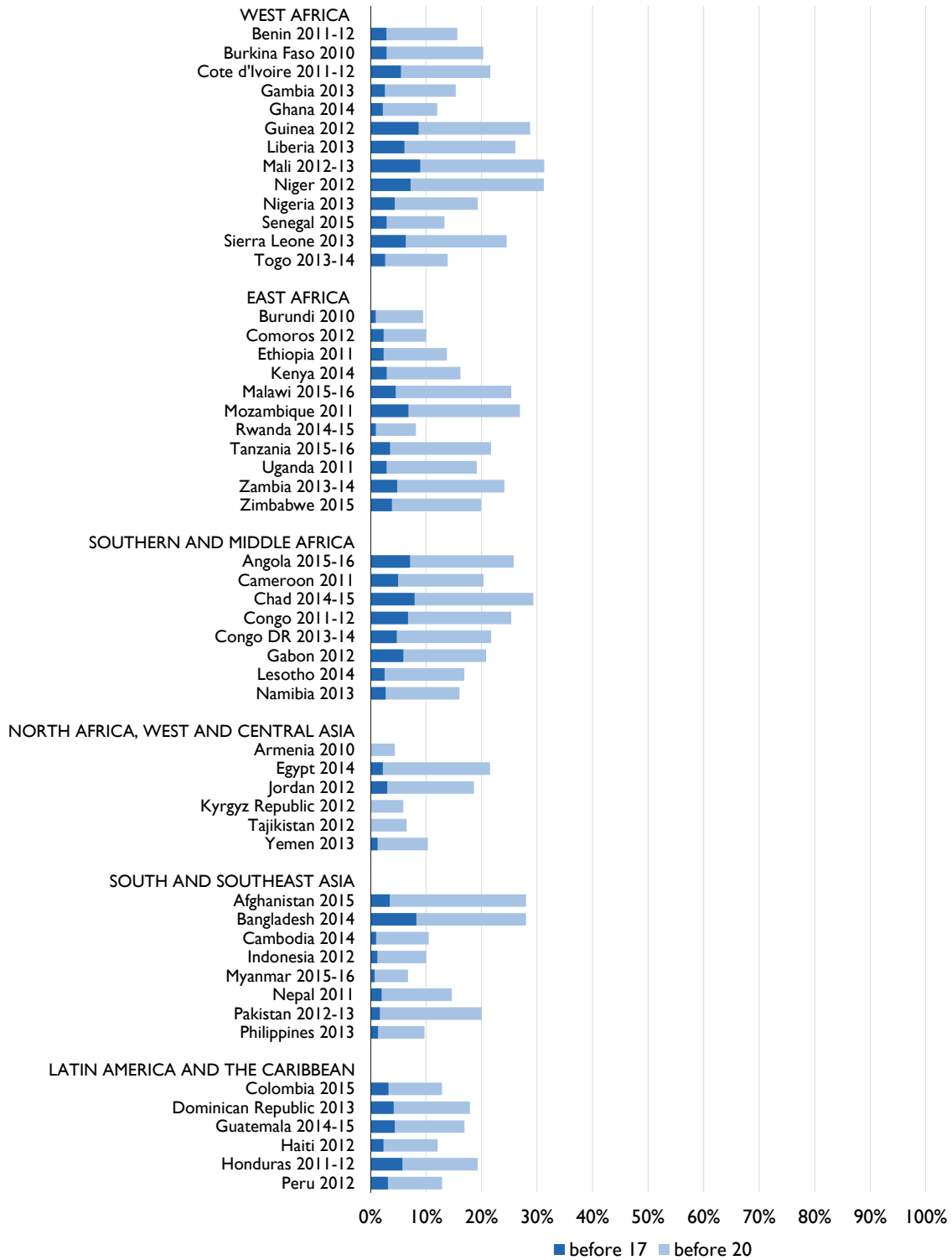
Legend: ■ before 17 ■ before 20

Notes:
1. Bangladesh is calculated among women with a birth within three years of the previous survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

Figure 26 illustrates the percent of women who had a birth in the 5 years preceding the survey (or 3 years for Bangladesh), for which the most recent birth occurred before age 17 and before age 20. These two age groups of women serve as the denominators for indicators of antenatal care (ANC). With half a dozen exceptions (Bangladesh, Mali, Guinea, Chad, Niger, and Angola), less than 7% of women in each country had a most recent birth in the preceding 5 years before age 17. This highlights the paucity of data for indicators of maternal health in early adolescence. In three countries, Armenia, the Kyrgyz Republic, and Tajikistan, less than 1% of women age 15-24 had a birth in the previous 5 years before age 17. Since the unweighted sample in this age group was less than 25, we suppressed these results in the following figures on ANC and postnatal care (PNC), which draw from reports on the most recent pregnancy with a live birth. Even when we examined all births in the 5 years preceding the survey by age, the sample size was still insufficient. Thus, we suppressed results for the birth-related indicators. For four countries (Burundi, Jordan, Myanmar, and Rwanda), there were only between 25 and 49 unweighted women with a most recent birth before age 17. We labeled these four countries with parenthesis to alert the reader to use caution when interpreting the results for the younger adolescent group.

7.2. Antenatal Care

Figure 27 presents the percentage of women under 17 and between 17 and 19 who had a birth within the previous 5 years and who had at least one ANC visit during their most recent pregnancy. Overall, the majority of women in all countries obtain at least one ANC visit, and in most countries, the proportion of women in both age groups ranges from 80% to 100%. The LAC region has the most consistent and highest reports within any given region, although overall only several countries have particularly low ANC coverage. These include Nigeria in West Africa, Ethiopia in East Africa, and Afghanistan in South and Southeast Asia. There was a tendency for the 17-19 year olds to have higher coverage compared with those under age 17 in about two-thirds of the countries with sufficient sample sizes for both age group. However, these differences appeared to be generally insignificant, although we noted significant differences between age groups only in Nigeria.

Fig 27. Percentage of women with at least one antenatal care visit for their most recent pregnancy

Legend: ■ < age 17 ■ age 17-19

Notes:
1. Bangladesh is calculated among women with a birth within three years of the previous survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

52

Fig 28. Percentage of women with four or more antenatal care visits

Notes:
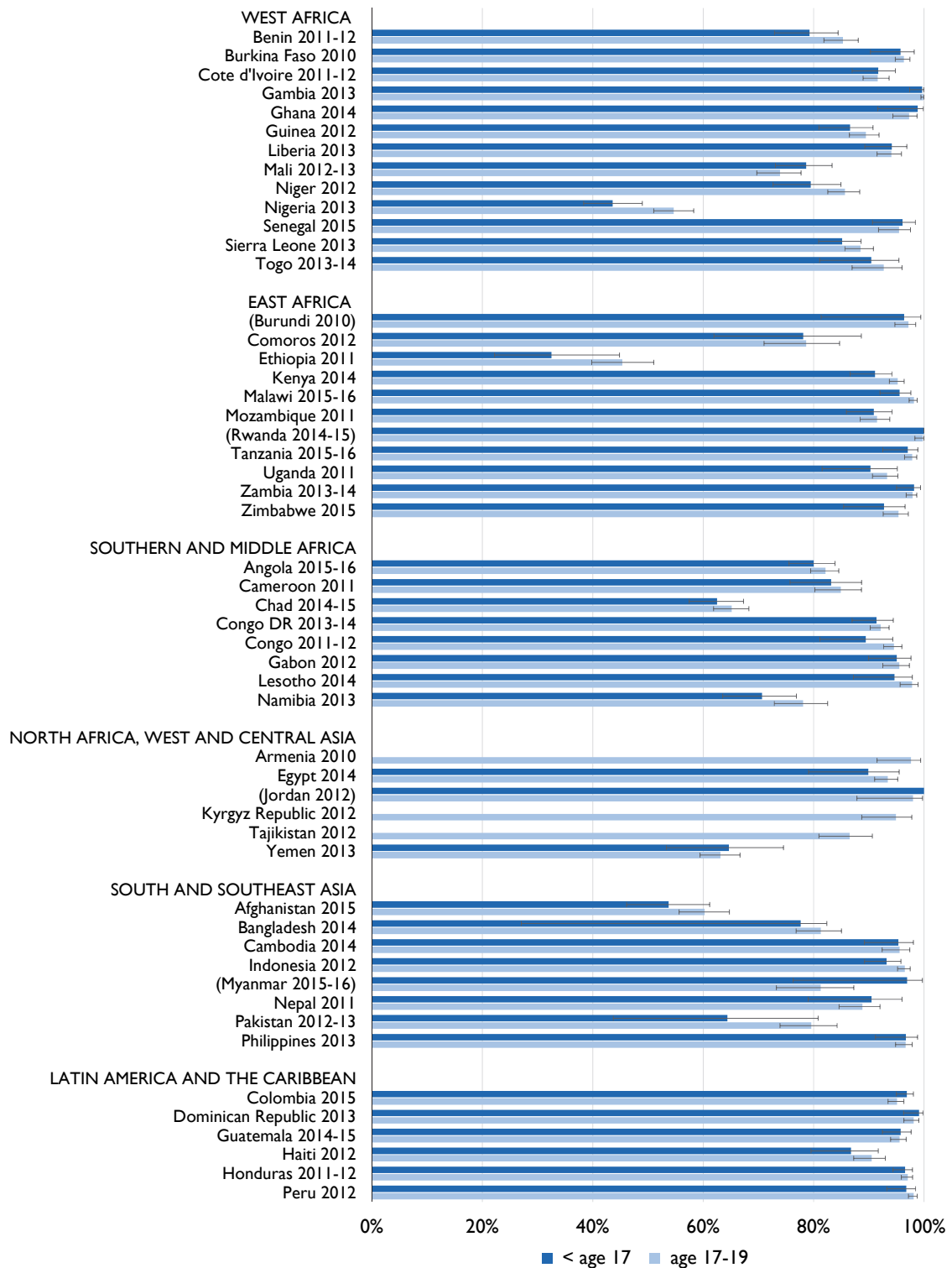1. Bangladesh is calculated among women with a birth within three years of the previous survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

As expected, fewer women in both age groups obtained the recommended four or more ANC visits during their last pregnancy in the previous five years. Figure 28 presents these results. Overall, just under 60% of young women with a birth in the previous 5 years in all countries had four or more ANC visits during their last pregnancy. We see variation both across and within region. While all countries in LAC had high coverage of at least one ANC, we found that for four or more ANC visits, Haiti was an outlier in the region. About 60% of women in each age group in Haiti attended four or more visits, while over 80% of women in other countries in the region attended ANC four or more times. There were other regional differences as well. For example, in North Africa, West and Central Asia, Yemen had low coverage, particularly for those age 17 to 19, while both age groups in Jordan had over 90% coverage. In South and Southeast Asia, women in Afghanistan, Bangladesh, and Pakistan in both age groups had low attendance and close to 90% of women in Indonesia and Philippines achieved the recommended level of attendance. In East Africa, Ethiopia again stood out with low coverage. Although we only saw a definitive significant difference between the two age groups in Nigeria and Indonesia, there was a tendency for women age 17 to 19 to have more coverage than those under age 17.

Figure 29 shows the percent of women who consumed iron supplements during their most recent pregnancy for women who gave birth during their adolescence in the 5 years before the survey. Iron consumption is high—over 70% in about two-thirds of the countries included here. We found no pattern of similarities within regions. Within each region, one or two countries had notably low coverage. Most notably, in West Africa, less than 50% of women under age 17 with a birth in Nigeria consumed iron during their most recent pregnancy. In East Africa, Ethiopia's coverage was particularly low and was close to 10% for women in each age group. In Kenya, only around 30% or less of women in both age groups consumed iron during their most recent pregnancy. In North Africa, West and Central Asia, women in Armenia and Yemen (only those age 17 to 19) consumed iron least often, with less than 30% in each country. Less than 40% of all adolescent women in Afghanistan and those under age 17 in Pakistan consumed iron during their most recent pregnancy. This contrasts with much higher coverage among women in South and Southeast Asian countries. We only saw significant differences in Nigeria by age group. Unlike ANC indicators, we did not find any insignificant patterns of differences by age groups among the remaining countries.

Fig 29. Percentage of women who were given iron syrup/tablets

WEST AFRICA
Benin 2011-12
Burkina Faso 2010
Cote d'Ivoire 2011-12
Gambia 2013
Ghana 2014
Guinea 2012
Liberia 2013
Mali 2012-13
Niger 2012
Nigeria 2013
Senegal 2015
Sierra Leone 2013
Togo 2013-14

EAST AFRICA
Burundi 2010
Comoros 2012
Ethiopia 2011
Kenya 2014
Malawi 2015-16
Mozambique 2011
Rwanda 2014-15
Tanzania 2015-16
Uganda 2011
Zambia 2013-14
Zimbabwe 2015

SOUTHERN AND MIDDLE AFRICA
Angola 2015-16
Cameroon 2011
Chad 2014-15
Congo 2011-12
Congo DR 2013-14
Gabon 2012
Lesotho 2014
Namibia 2013

NORTH AFRICA, WEST AND CENTRAL ASIA
Armenia 2010
Egypt 2014
(Jordan 2012)
Kyrgyz Republic 2012
Tajikistan 2012
Yemen 2013

SOUTH AND SOUTHEAST ASIA
Afghanistan 2015
Bangladesh 2014
Cambodia 2014
Indonesia 2012
Myanmar 2015-16
Nepal 2011
Pakistan 2012-13
Philippines 2013

LATIN AMERICA AND THE CARIBBEAN
Colombia 2015
Dominican Republic 2013
Guatemala 2014-15
Haiti 2012
Honduras 2011-12
Peru 2012

0% 20% 40% 60% 80% 100%

■ <17   ■ 17-19

Notes:
1. Bangladesh is calculated among women with a birth within three years of the previous survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

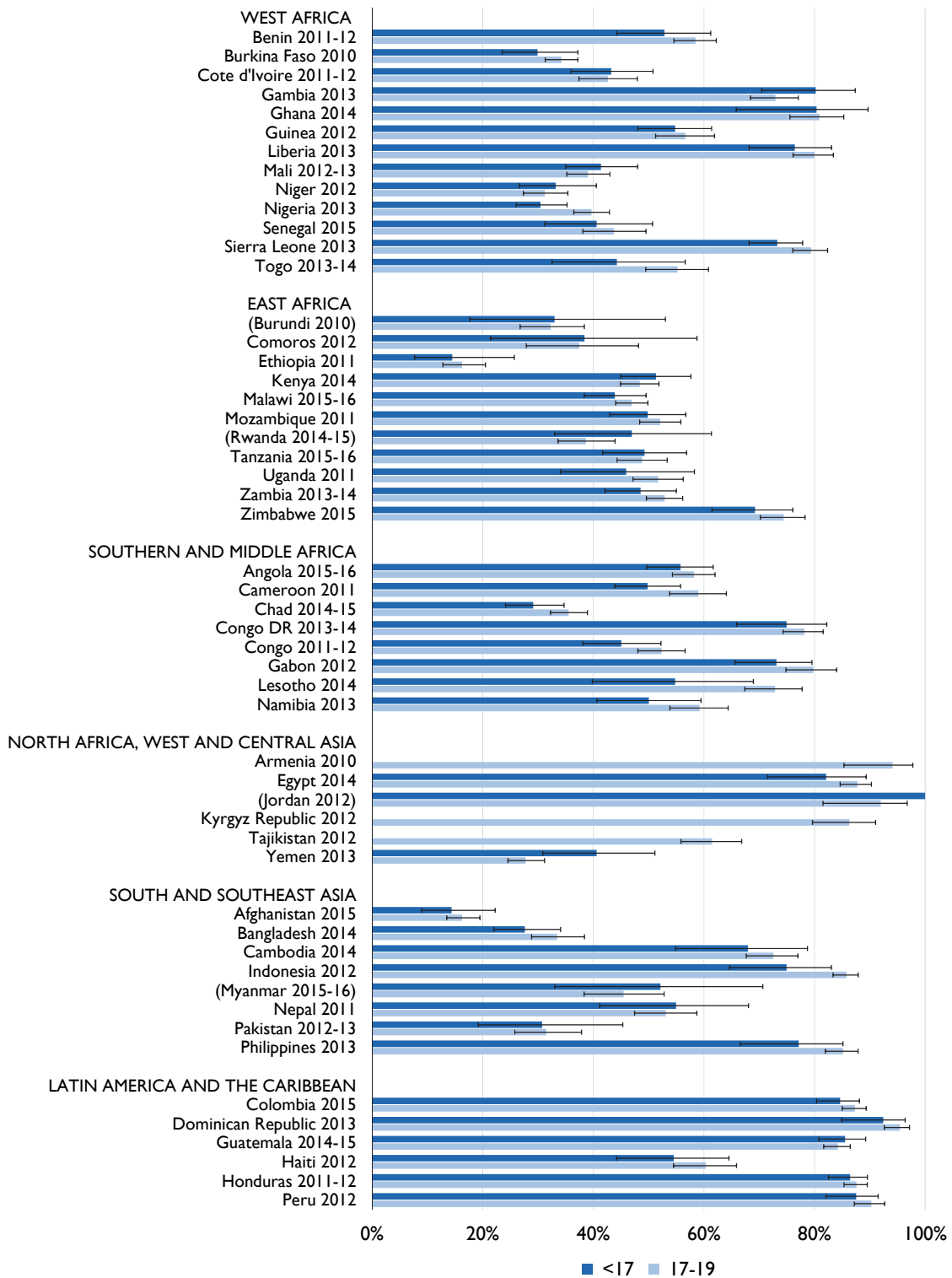**Fig 30. Percentage of births delivered in a health facility**
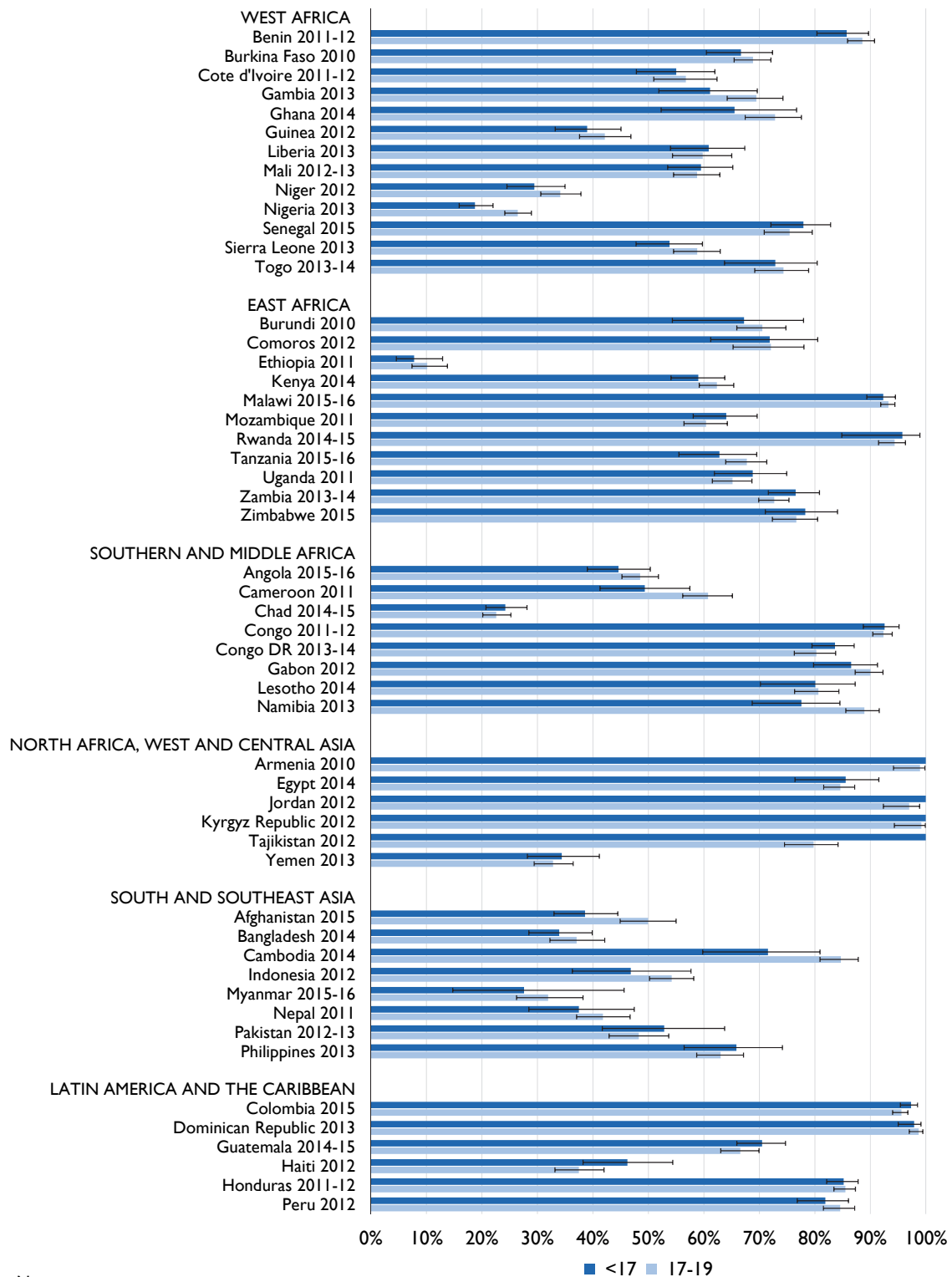
Legend: ■ <17 ■ 17-19

Notes:
1. Bangladesh is calculated among births occuring within three years of the previous survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

7.3. Delivery Care

Figure 30 shows the percent of births in the 5 years preceding the survey delivered in a health facility by women either under age 17 or between age 17 and 19. As with indicators calculated among most recent births, we found large variations within regions. In West Africa, both age groups in Benin have the highest proportion of facility based deliveries at just under 90%, while in Niger only slightly over 30% of children of mothers of both age groups and closer to 20% of births to women under age 17 in Nigeria are born in facilities. In East Africa, we found children in Ethiopia were least commonly born in facilities compared with all other countries (close to 10%). Yet, in Rwanda, about 95% of births to women in their adolescence occurred in health facilities. In Southern and Middle Africa, just over 20% of births in Chad and over 90% of births in the Congo were facility based deliveries among adolescents of all ages. In LAC, there is a large gap between proportion of facility deliveries between Colombia and the Dominican Republic (close to 100%) and Haiti (under 40% for births women age 17 to 19). In North Africa, West and Central Asia, facility based delivery overall is quite high over 95% of births to teenage women. Yemen stands out with low facility delivery (just over 30%). All births to women under age 17 in Tajikistan were delivered in a facility. In South and Southeast Asia, facility delivery is lower as a whole than most regions, except for Cambodia. We saw significant differences by age group in Nigeria, Namibia, Afghanistan, and possibly Cambodia, where births to older teens were more likely delivered in health facilities compared with younger teens. In Tajikistan, however, we saw a difference by age, although births to women under age 17 more often occurred in a health facility compared with older adolescents, although the sample of births to women under age 17 only totaled 59 unweighted cases.

Figure 31 shows the percent of births to adolescent women where a skilled birth attendant (SBA) was present at birth, disaggregated by births to women under age 17 and births to women age 17 to 19. We saw approximately the same coverage of SBA as facility delivery, particularly when comparing regional variations. The same countries with low coverage for facility delivery in each region also had low coverage for SBA, such as in Niger, Nigeria, Ethiopia, and Chad. Yemen had higher coverage of SBA than facility delivery, as did Indonesia, Philippines, and Comoros, while there were notably fewer births delivered by a SBA than in a facility in Togo and Congo. The SBAs delivered births in Nigeria, Namibia, and Afghanistan significantly more often to women age 17 to 19 compared with births to women under age 17. Just over half of all the countries had better coverage of both facility delivery and SBA among older adolescents, although for both indicators, the differences were largely insignificant, except in the few countries cited.

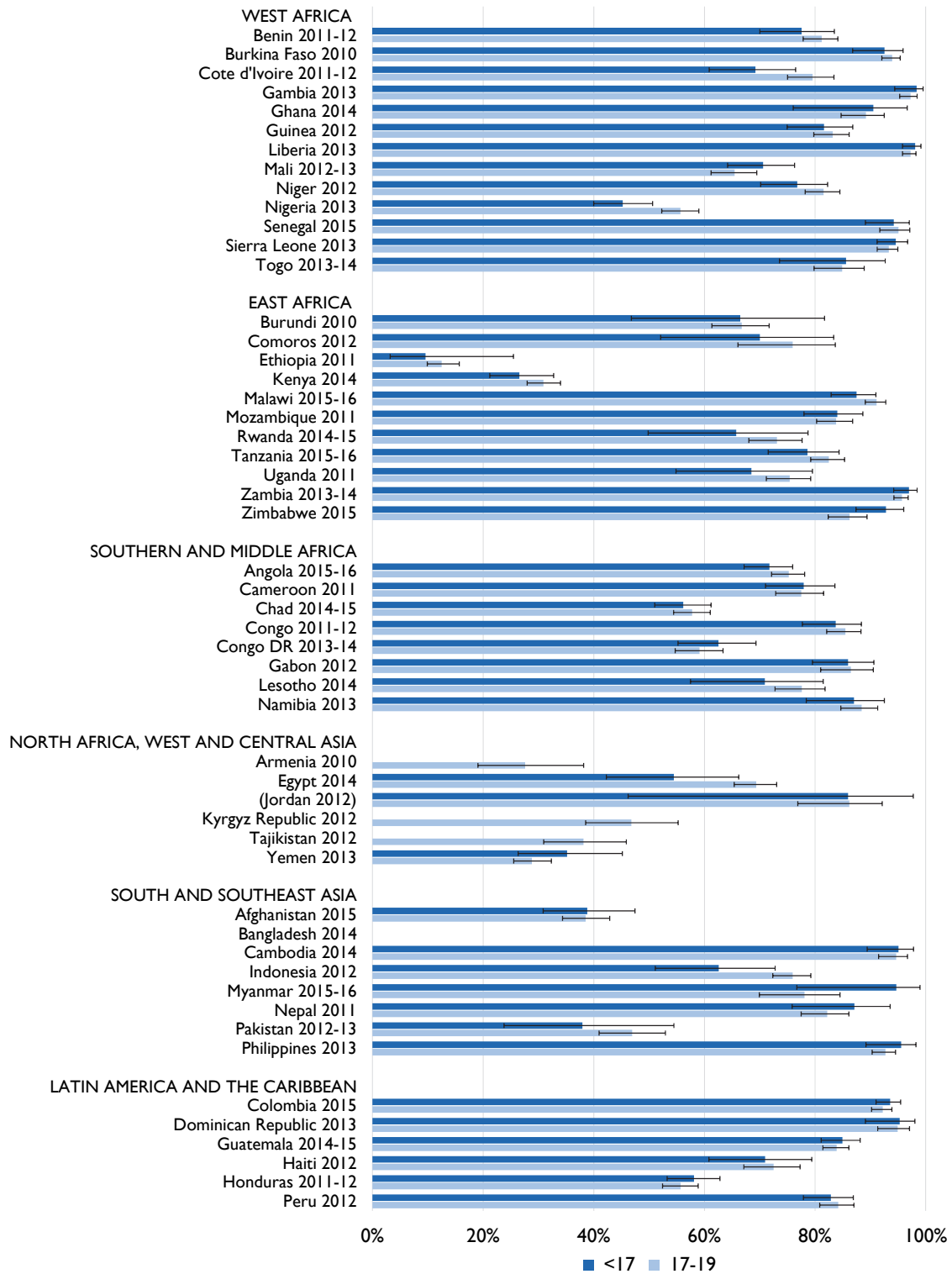**Fig 31. Percentage of births delivered by a doctor, nurse, or other trained health worker**

Notes:
1. Bangladesh is calculated among births occuring within three years of the previous survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
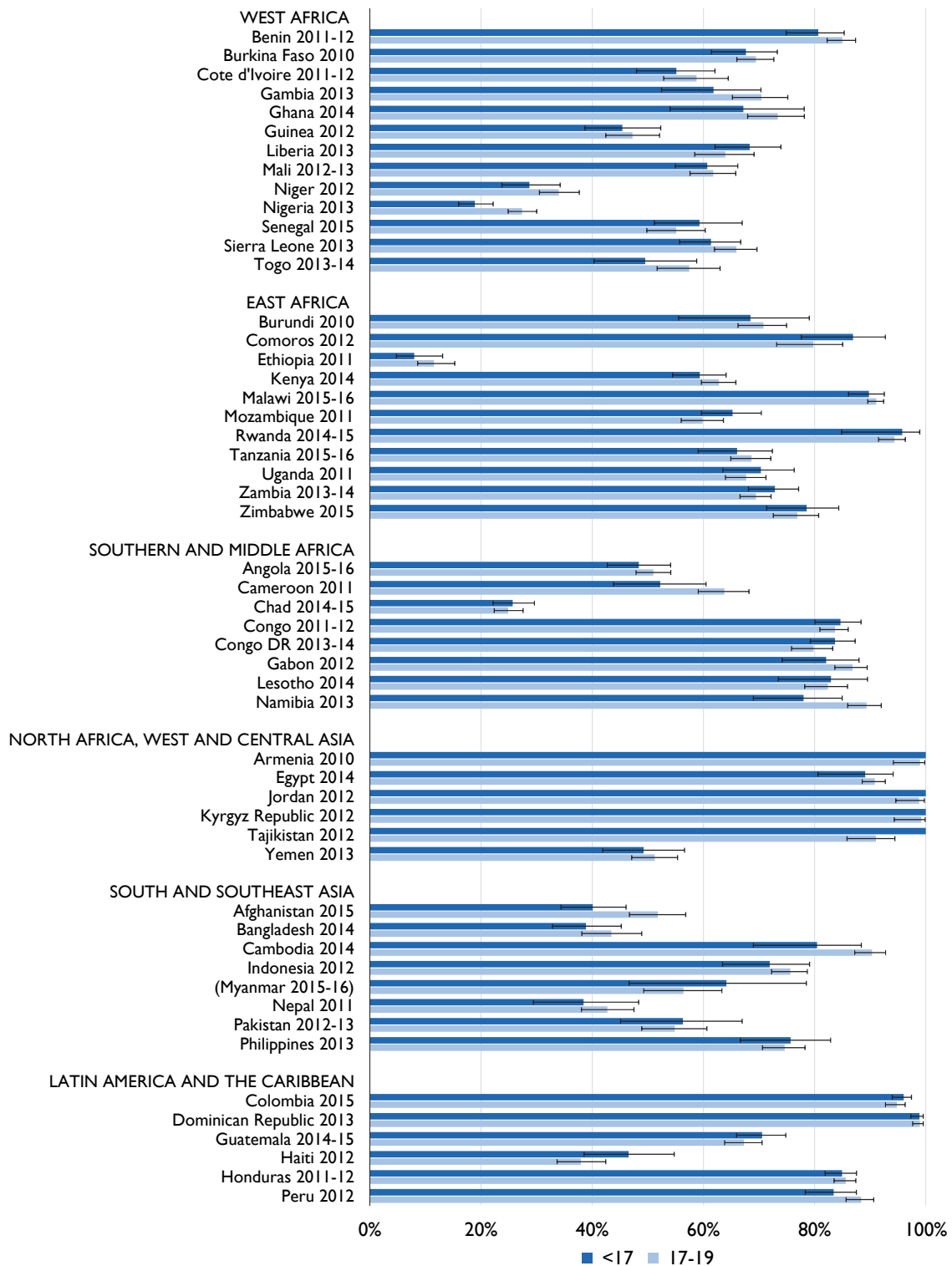3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

Fig 32. Percentage of births perceived to be small or very small at birth
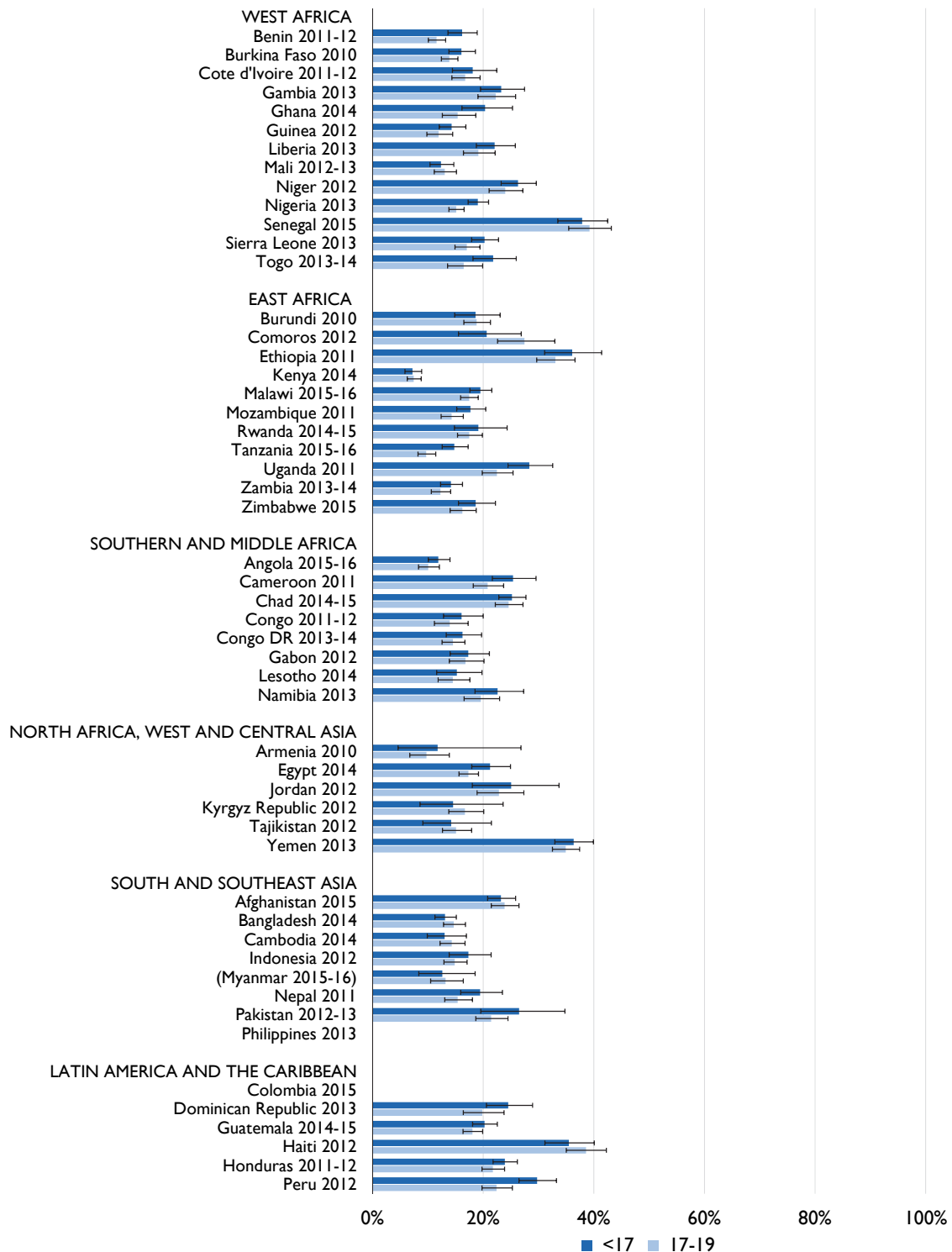
Notes:
1. Bangladesh is calculated among births occuring within three years of the previous survey.
2. Question is not included in surveys in the Philippines and Colombia.
3. Countries in parenthesis have between 25 and 49 unweighted number of births to women under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
4. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

7.4. Low Birth Weight

Figure 32 shows the percent of births to women under age 17 or women age 17 to 19 perceived to be small or very small at birth by their mother. Overall, few births were perceived to be low birth weight—less than 20% in each country, with a few exceptions. Senegal, Ethiopia, Yemen, and Haiti appear to have the highest proportion of children perceived as small at birth (between 30% and 40%) and Kenya's mothers reported small births least frequently (less than 10%). In most countries, there were higher proportions of small births reported among mothers under age 17 than women age 17 to 19. The differences were insignificant, except in Nigeria, Togo and Peru.

7.5. Postnatal Care

Figure 33 includes women age 17 and under and women age 17 to 19 who had a birth in the 2 years preceding the survey and who received postnatal care (PNC) within 2 days of delivery for their most recent birth in that time. We found that receipt of PNC is inconsistent across countries and within regions. Ethiopia, Chad, and Colombia have the lowest proportions of adolescents with PNC during their most recent pregnancy in the previous 2 years. Adolescents age 17 to 19 in Armenia, the Kyrgyz Republic, and Peru have the highest proportions of PNC. We did not observe differences by age groups. The larger confidence intervals seen in this figure reflect the small samples of women with recent births in the two years preceding the survey in those age groups.

Fig 33. Percentage of women who received a postnatal check-up within two days of delivering their most recent birth
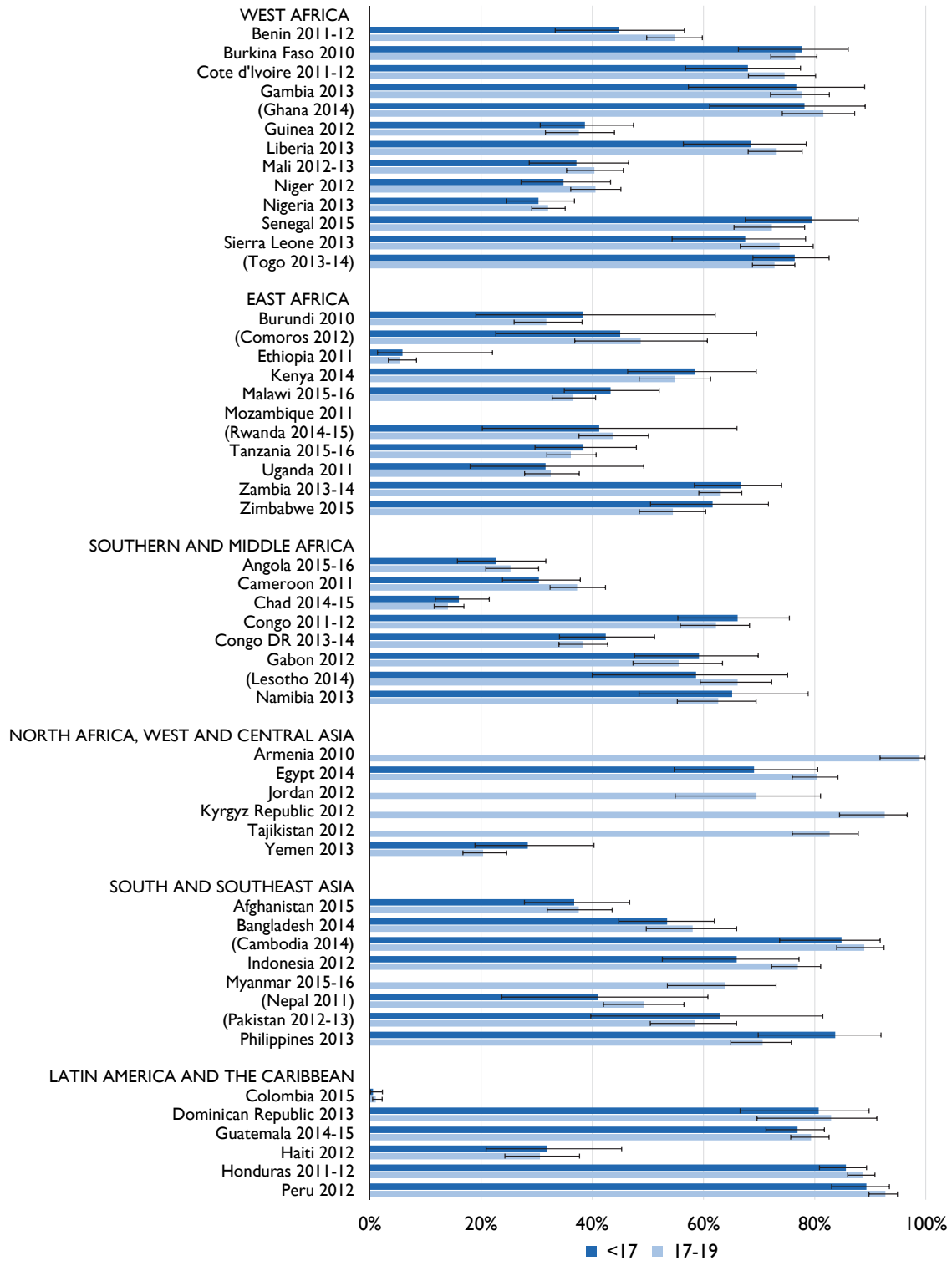
Notes:
1. Question is not included in the Mozambique survey.
2. Countries in parenthesis have between 25 and 49 unweighted number of women with a birth under 17 and results should be interpreted with caution; figures based fewer than 25 unweighted cases were suppressed.
3. Afghanistan, Bangladesh, Egypt, Jordan, and Pakistan are based on data from an ever-married sample of women.

8.   Violence

Gender-based violence is a problem for women of all ages, but has been identified as a particular concern for adolescents who may lack social status and empowerment, and because women who marry at young ages may be at increased risk (Bruce 2012; Falb et al. 2015; Johnson et al. 2015; MacQuarrie 2009; Peterman, Bleck, and Palermo 2015). Thirty-eight surveys administered the Domestic Violence module as a part of their women's questionnaire (ICF International 2016). This module collects data on women's experiences with multiple forms of violence. Of relevance to this study, we report on adolescent women's experiences with physical and sexual violence.

Our physical violence measure is restricted to adolescent women age 15-19 who have experienced an act of physical violence since age 15. This is a composite measure[26] that includes several specific acts committed by a current or former husband/partner adapted from the Conflict Tactic Scales (Straus 1990):

1. Slap
2. Twist arm or pull hair
3. Push, shake, or throw something at her
4. Punch with his fist or with something that could hurt
5. Kick, drag, or beat up
6. Try to choke or burn on purpose
7. Threaten or attack with a knife, gun, or any other weapon

It also includes "yes" responses to the following questions:

1. Did any previous (husband/partner) ever hit, slap, kick, or do anything else to hurt you physically?
2. From the time you were 15 years old has anyone (other than (your/any) (husband/partner)) hit you, slapped you, kicked you, or done anything else to hurt you physically?

We similarly restrict our analysis of sexual violence to the sample of women age 15-19. However, our sexual violence measure includes any act of sexual violence the woman has experienced, regardless of her age at the time of the incident(s). This is also a composite measure[27] that includes these acts by a current or former husband/partner:

1. Physically force her to have sexual intercourse with him even when she did not want to
2. Physically force to perform any other sexual acts she did not want to
3. Force with threats or in any other way to perform sexual acts she did not want to

It also includes a "yes" response to either of the questions:

1. Did any previous (husband/partner) physically force you to have intercourse or perform any other sexual acts against your will?
2. At any time in your life, as a child or as an adult, has anyone ever forced you in any way to have sexual intercourse or perform any other sexual acts when you did not want to?

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[26] The items comprised in this measure have been determined a priori to constitute physical violence and have been validated in numerous DHS surveys (MacQuarrie, Winter, and Kishor 2015; MacQuarrie, Winter, and Kishor 2014).
[27] The items comprised in this measure have been determined a priori to constitute sexual violence and have been validated in numerous DHS surveys (MacQuarrie, Winter, and Kishor 2015; MacQuarrie, Winter, and Kishor 2014).

8.1. Physical Violence

8.1.1. Experience of physical violence during adolescence

Figure 34 shows the percentage of women age 15-19 who have experienced physical violence since age 15. These data are available for 38 surveys[28]. The prevalence of physical violence varies greatly from country to country and there are no striking regional patterns. While it may appear that physical violence is generally higher in West East, and Middle and Southern Africa than elsewhere, there are a sufficient number of counterfactuals to prevent us from confidently drawing such a conclusion.

The highest levels of physical violence experienced by adolescents are found in Uganda (53.3%), Sierra Leone (44.4%), and Cameroon (44.1%). The lowest levels are found in the Kyrgyz Republic (6.3%), Cambodia (6.8%), and Tajikistan (7.3%). Most countries indicate that between 15-35% of women age 15-19 have experienced physical violence since age 15.

In 24 countries, the experience of physical violence during adolescence varies significantly by marital status, as shown in Figure 35. In 10 countries, there were no statistically significant differences by marital status and in four countries with samples of ever-married women[29], such differences could not be tested.

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[28] The following 14 surveys did not administer the Domestic Violence module: Benin 2011-12, Ghana 2014, Guinea 2012, Liberia 2013, Niger 2012, Senegal 2015, Burundi 2010, Ethiopia 2011, Congo 2011-12, Lesotho 2014, Armenia 2010, Yemen 2013, Bangladesh 2014, and Indonesia 2012.

[29] These are Egypt 2014, Jordan 2012, Afghanistan 2015, and Pakistan 2012-13.

Fig 34. Percentage of women age 15-19 experiencing physical violence since age 15

	Percentage
WEST AFRICA	
Burkina Faso 2010	20
Cote d'Ivoire 2011-12	32
Gambia 2013	37
Mali 2012-13	35
Nigeria 2013	24
Sierra Leone 2013	44
Togo 2013-14	21
EAST AFRICA	
Comoros 2012	10
Kenya 2014	31
Malawi 2015-16	22
Mozambique 2011	21
Rwanda 2014-15	24
Tanzania 2015-16	21
Uganda 2011	53
Zambia 2013-14	28
Zimbabwe 2015	26
SOUTHERN AND MIDDLE AFRICA	
Angola 2015-16	20
Cameroon 2011	44
Chad 2014-15	17
Congo DR 2013-14	37
Gabon 2012	36
Namibia 2013	30
NORTH AFRICA, WEST AND CENTRAL ASIA	
Egypt 2014	35
Jordan 2012	31
Kyrgyz Republic 2012	6
Tajikistan 2012	7
SOUTH AND SOUTHEAST ASIA	
Afghanistan 2015	32
Cambodia 2014	6
Myanmar 2015-16	14
Nepal 2011	9
Pakistan 2012-13	29
Philippines 2013	16
LATIN AMERICA AND THE CARIBBEAN	
Colombia 2015	19
Dominican Republic 2013	13
Guatemala 2014-15	9
Haiti 2012	25
Honduras 2011-12	13
Peru 2012	16

Fig 35. Percentage of women age 15-19 experiencing physical violence since age 15, by marital status (selected surveys)

Figure 35 indicates that, in the great majority of countries where significant differences exist, adolescent women who have ever been married are more likely to have experienced physical violence than their never-married peers. The opposite pattern is evident in Burkina Faso and Nigeria, where physical violence is more common among never-married women (1.8-2.3 times more likely). Small numbers of ever-married women in some countries such as Namibia means greater uncertainty around their estimates of physical violence than among never-married women.

The absolute differences are most sizable in Rwanda (36 percentage points) and Gabon (31 percentage points). Relative differences are sizable in numerous countries. Ever-married adolescent women are more than twice as likely to have experienced physical violence compared to their never-married counterparts in Rwanda, Tanzania, Nepal, the Philippines, and every Latin American and Caribbean country in the study. Ever-married women in the Dominican Republic are more than three times more likely to have experienced physical violence.

8.1.2. *Perpetrators of physical violence against adolescents*

Figure 36 shows the perpetrator of physical violence among the adolescent women who experienced such violence since age 15, by marital status[30]. The left panel displays these data for never-married and the right panel displays these data for ever-married women. The total may sum to more than 100% because women may report more than one perpetrator.

Never-married women and ever-married women report sharply different types of perpetrators. Never-married women most commonly report that they experienced physical violence perpetrated by a family members, followed by another perpetrator, usually a teacher. More than one-half of adolescents report a family member (usually a parent) as the perpetrator in East Africa, while more than 8 in 10 women do so elsewhere. More than 70% of adolescent women report someone other than family or partner as the perpetrator in Kenya and Uganda. Elsewhere, this figure ranges from 4% (Tajikistan) to 45% (Zimbabwe). Intimate partners are infrequently the perpetrator of physical violence among never-married adolescents. The exceptions are the Comoros (19%) and Congo Democratic Republic and Gabon (12% each).
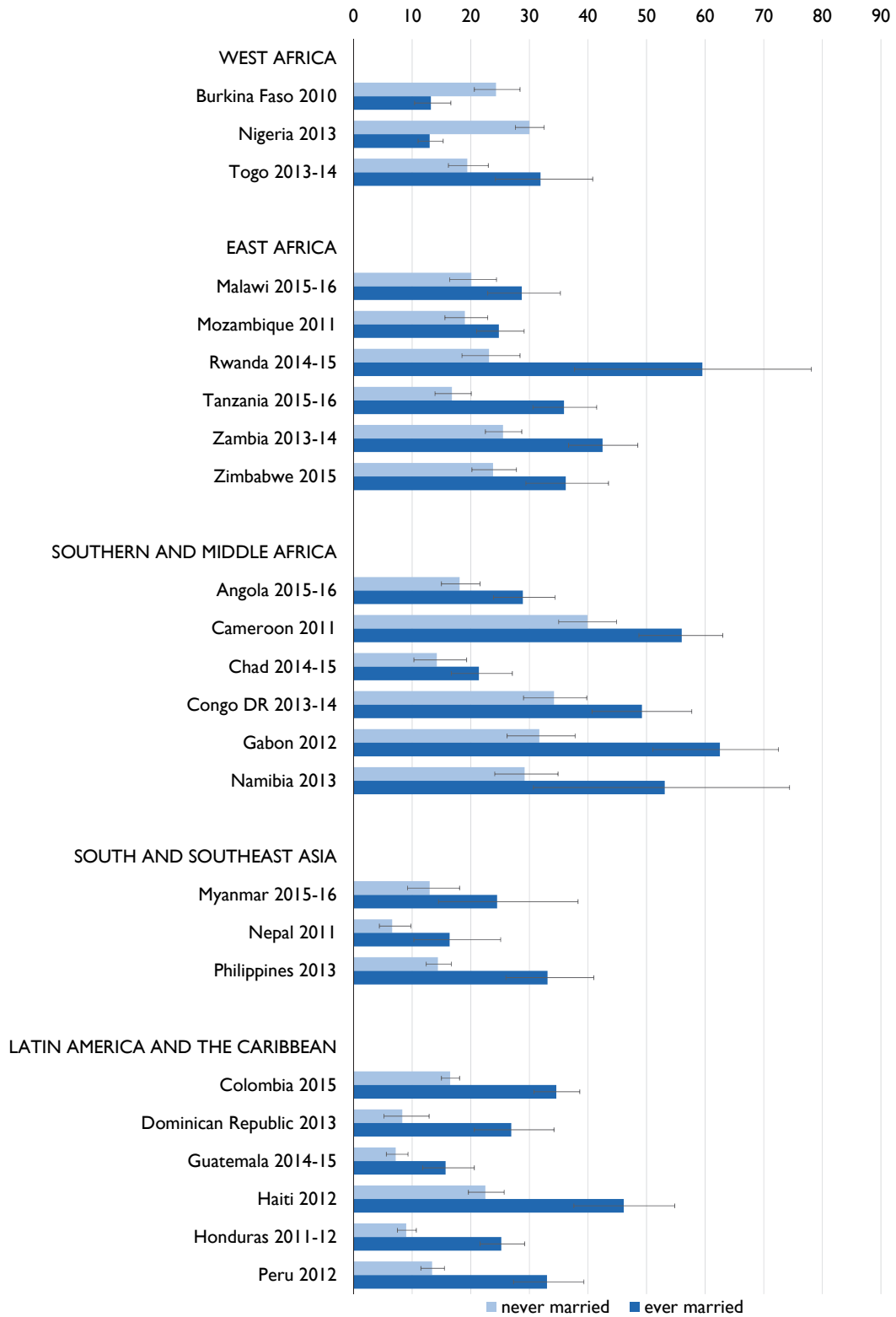
Among ever-married women, in contrast, an intimate partner is reported to be the most common perpetrator of physical violence in most countries. Even where an intimate partner is not the most common perpetrator (Burkina Faso, Gambia, Comoros, Haiti), they are more commonly a perpetrator among ever-married women than among never-married women. The proportion of ever-married women reporting a physically violent intimate partner ranges from 23% (Comoros) to 98% (Namibia). Family members are also frequent perpetrators of physical violence among ever-married adolescent women, as they were among never-married women. The proportion of ever-married women reporting family member as the perpetrator ranges from 11% (Nepal) to 91% (Comoros), with no particular regional pattern evident.

Unlike never-married women, other perpetrators do not figure prominently in ever-married women's experience of physical violence. Even where other perpetrators are more common (Togo, Kenya, Uganda, the Philippines), they are eclipsed by family members and intimate partners as perpetrators of physical violence.

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[30] The following surveys are omitted because there were fewer than 50 cases reporting physical violence: Jordan 2012, Cambodia 2014, Pakistan 2012-13.
The following surveys are omitted because they lack data on never-married women: Egypt 2014, Afghanistan 2015.

Fig 36. Perpetrator of physical violence among never/ever-married women age 15-19 experiencing physical violence since age 15

never-married women

ever-married women

WEST AFRICA
Burkina Faso 2010
Cote d'Ivoire 2011-12
Gambia 2013
Mali 2012-13
Nigeria 2013
Sierra Leone 2013
Togo 2013-14

EAST AFRICA
Comoros 2012
Kenya 2014
Malawi 2015-16
Mozambique 2011
Rwanda 2014-15
Tanzania 2015-16
Uganda 2011
Zambia 2013-14
Zimbabwe 2015

SOUTHERN AND MIDDLE AFRICA
Angola 2015-16
Cameroon 2011
Chad 2014-15
Congo DR 2013-14
Gabon 2012
Namibia 2013

NORTH AFRICA, WEST AND CENTRAL ASIA
Kyrgyz Republic 2012
Tajikistan 2012

SOUTH AND SOUTHEAST ASIA
Myanmar 2015-16
Nepal 2011
Philippines 2013

LATIN AMERICA AND THE CARIBBEAN
Colombia 2015
Dominican Republic 2013
Guatemala 2014-15
Haiti 2012
Honduras 2011-12
Peru 2012

■ family member ■ intimate partner ■ other

68

8.2. Sexual Violence

8.2.1. Experience of sexual violence among adolescents

Seven surveys in this study include the Domestic Violence module but did not collect data on sexual violence: Burkina Faso 2010, Côte d'Ivoire 2011-12, Egypt 2014, Jordan 2012, Pakistan 2012-13, the Philippines 2013, and Peru 2012. For the remaining 31 countries, Figure 37 shows the proportion of adolescent women age 15-19 who ever experienced forced sexual intercourse or other forced sexual acts. In contrast to the physical violence indicator, this indicator is not limited to sexual violence experienced during adolescence or to any age period. This figure indicates the experience of sexual violence occurring before the age of 15 and that occurring before age 19 or their current age.

With some notable exceptions, the prevalence of sexual violence is higher in East Africa and parts of Southern and Middle Africa. It is rarest in the Kyrgyz Republic and Tajikistan and reported by fewer than 10% of women throughout West Africa, South and Southeast Asia, and Latin America and the Caribbean. The highest levels of sexual violence are evident in Cameroon (21%), Uganda (20%), and Congo Democratic Republic (16%).

In all but a few countries, the proportion of women who experienced sexual violence in later adolescence (between the age 15-19 or their current age) outpaces the violence experienced during childhood or early adolescence (before age 15). For example, in Mali, with average levels of sexual violence for the countries in this study, 8% of adolescent women age 15-19 have experienced forced sexual intercourse or acts but less than 1% have experienced this violence before age 15. Substantial levels of childhood or early adolescent sexual violence are nonetheless noted in Rwanda, Uganda, Cameroon, and Gabon. In Guatemala and Kenya, more than two-thirds of adolescent women report that the sexual violence they experienced occurred before age 15, although overall levels are relatively low.

Fig 37. Percentage of women age 15-19 experiencing forced sexual intercourse or other sexual acts

	0	10	20	30	40
WEST AFRICA					
Gambia 2013					
Mali 2012-13					
Nigeria 2013					
Sierra Leone 2013					
Togo 2013-14					
EAST AFRICA					
Comoros 2012					
Kenya 2014					
Malawi 2015-16					
Mozambique 2011					
Rwanda 2014-15					
Tanzania 2015-16					
Uganda 2011					
Zambia 2013-14					
Zimbabwe 2015					
SOUTHERN AND MIDDLE AFRICA					
Angola 2015-16					
Cameroon 2011					
Chad 2014-15					
Congo DR 2013-14					
Gabon 2012					
Namibia 2013					
NORTH AFRICA, WEST AND CENTRAL ASIA					
Kyrgyz Republic 2012					
Tajikistan 2012					
SOUTH AND SOUTHEAST ASIA					
Afghanistan 2015					
Cambodia 2014					
Myanmar 2015-16					
Nepal 2011					
LATIN AMERICA AND THE CARIBBEAN					
Colombia 2015					
Dominican Republic 2013					
Guatemala 2014-15					
Haiti 2012					
Honduras 2011-12					

■ before age 19   ■ before age 15

Fig 38. Percentage of women age 15-19 experiencing forced sexual intercourse other sexual acts, by marital status (selected surveys)
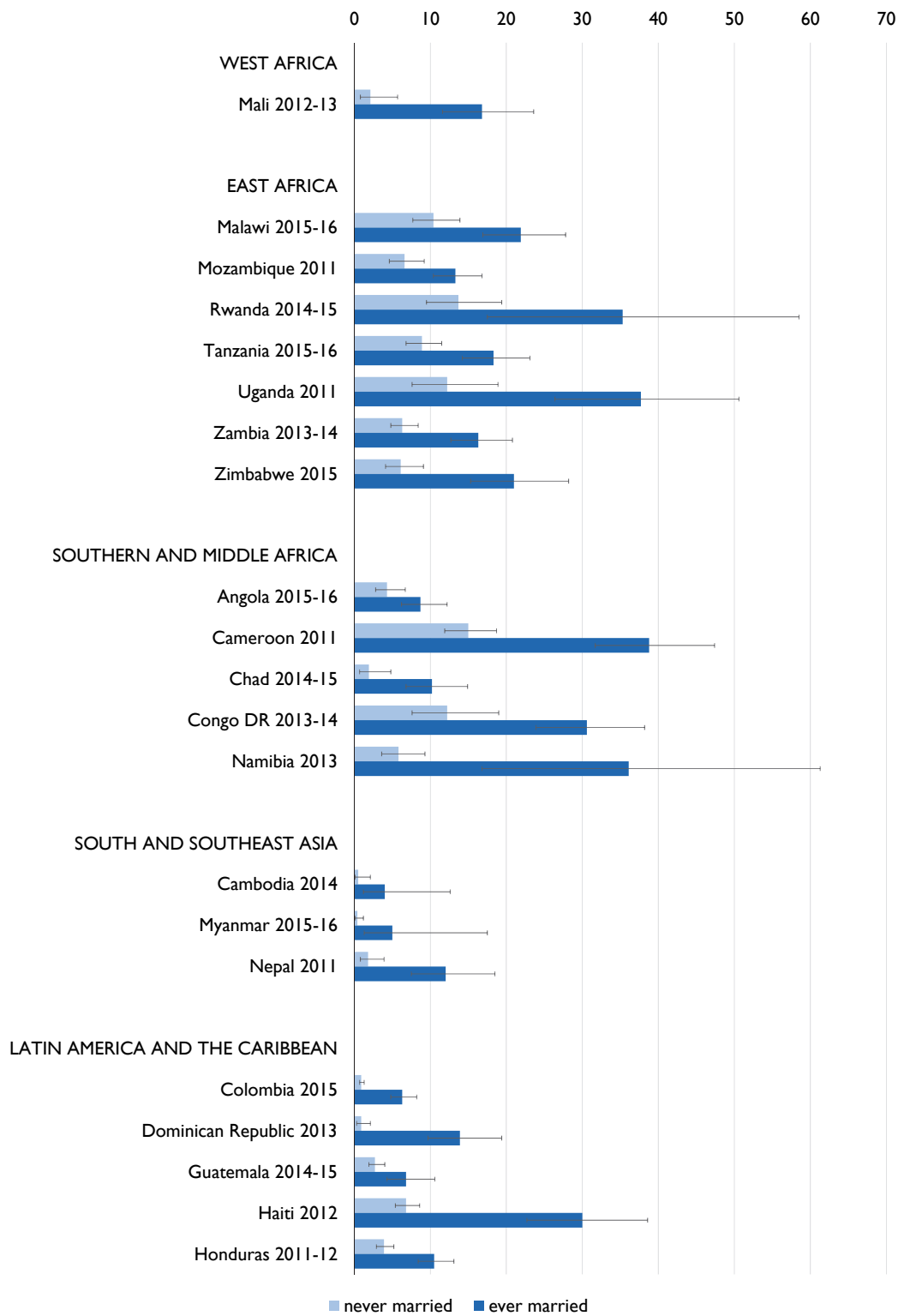
Figure 38 shows the prevalence of sexual violence disaggregated by marital status for those 21 countries where those differences were statistically significant. It indicates that sexual violence is more common among ever-married women compared with never-married women. The differences are substantial in nearly every country. Angola, Cambodia, Myanmar, and Guatemala may be possible exceptions. Levels of sexual violence typically exceed 10% among ever-married women—and exceed 35% in four countries. Meanwhile, levels among never-married women range from less than 1% to 15%.

8.2.2. *Perpetrators of sexual violence against adolescents*

Figure 39 shows women's reports of the sexual violence perpetrator for the first time they experienced forced sexual intercourse or acts. These data are omitted for countries[31] with few women reporting sexual violence. The total sums to 100% because women could report only one perpetrator.

Fig 39. Perpetrator of first forced sex/sexual act among women age 15-19 experiencing sexual violence
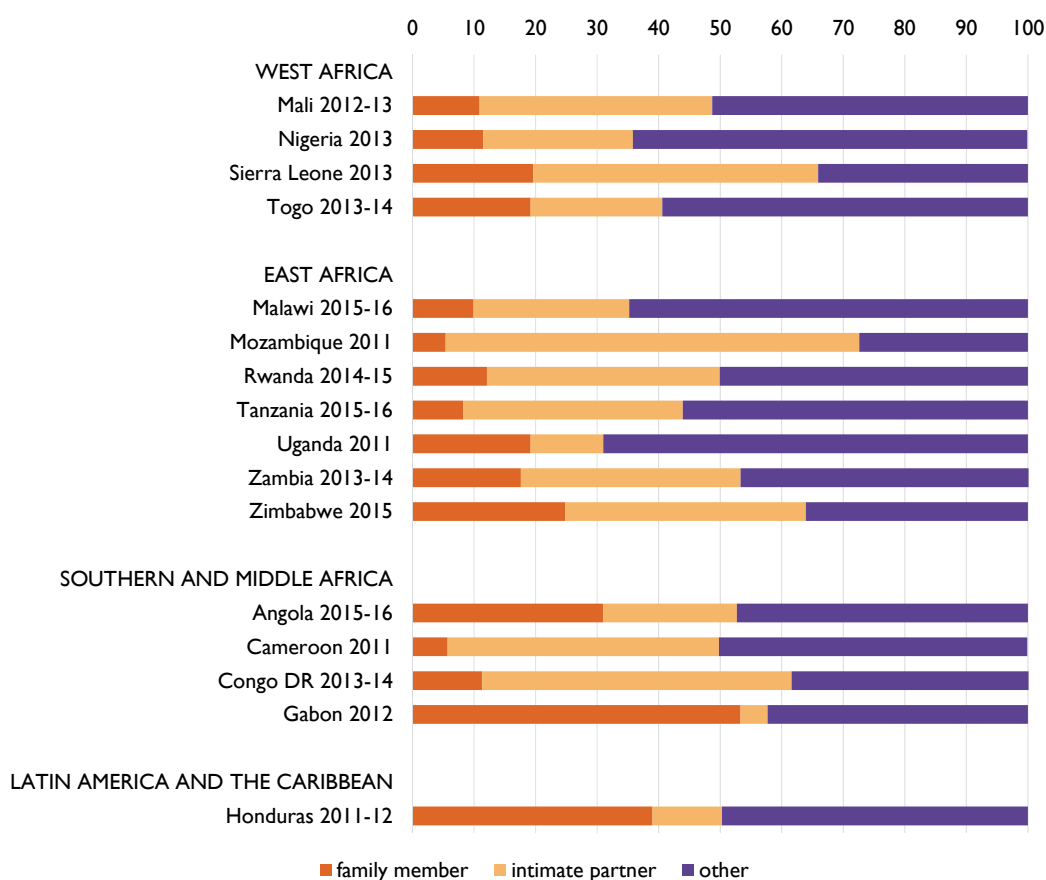
"Other" perpetrators—usually a friend or a stranger—are the most commonly reported perpetrator of sexual violence in the majority of countries—11 of 16 countries for which these data are available. They are a close second most common perpetrator in four other countries. The percent of adolescent women reporting

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[31] The excluded countries in which the number of women reporting forced sexual intercourse or other sexual acts are fewer than 50 unweighted cases are: Gambia 2013, Comoros 2012, Kenya 2014, Chad 2014-15, Namibia 2013, Tajikistan 2012, Cambodia 2014, Myanmar 2015-16, and Nepal 2011.

an "other" person as the perpetrator of their (first) incident of sexual violence ranges from 27% in Mozambique to 69% in Uganda.

An intimate partner is the most commonly reported perpetrator of sexual violence in four countries: Sierra Leone (46%), Mozambique (67%), Zimbabwe (39%), and Congo Democratic Republic (50%). A sizable minority of adolescent women report an intimate partner perpetrator in Cameroon (44%) and Rwanda (38%). The percent of adolescent women reporting the perpetrator of sexual violence to be an intimate partner ranges from just 4% in Gabon to 67% in Mozambique.

Family members are rarely the most common perpetrator of sexual violence. The exception is Gabon, where 53% of women report a family member. A family member is also frequently reported in Honduras (39%), although this is not the most common perpetrator there. Outside of these two countries, the percentage of women reporting the perpetrator of sexual violence to be a family member ranges from 5% in Mozambique to 31% in Angola.

9. Discussion and Conclusions

This study exploits retrospective data among respondents age 15-24 to describe the adolescent lives of those age 10-19. The analyses presented here indicate that much can be learned about even the youngest adolescents by using data commonly collected in surveys of older women (and men) of reproductive age (Way 2014; WHO 2011). The calculation of fertility rates for adolescents as young as age 10 is one particular innovation in youth indicators, as is the estimate of contraceptive use during adolescent years from the reproductive calendar.

Although adolescence is a period of profound changes, many sexual and reproductive behaviors with which the public health community is concerned begin to emerge in adolescence, but are deferred until older ages for large proportions of respondents in many countries. The study found that women experience marriage during adolescence in 22 countries, mostly in West and East Africa and parts of South Asia. For the remaining majority of countries (except Namibia), marriage occurs in the early 20s or later for most women. Men everywhere marry at older ages that are beyond adolescence, which are suggestive of typical age mixing patterns.

Becoming sexually active is typical during adolescence for men and women alike, except in South and Southeast Asia. Sexual debut during adolescence is most common in West, Southern, and Middle Africa. Differences between the sexes in the age pattern of sexual debut are most narrow in East Africa. Similarly, levels of sex before marriage are lowest in Asia and highest in West, Southern, and Middle Africa. Although the age at which adolescent women and men become sexually active is similar, premarital sex is more common among men than among women. Where marriage and sexual debut occur during adolescence, these experiences are less common among the youngest adolescents (age 10-14), but quickly increase with each year of age among older adolescents (age 15-19).

Contraceptive use is also rare during early adolescence, with the possible exception of parts of Latin America and Caribbean (e.g., Peru). Contraceptive use increases with age so that roughly one in five adolescent women have used contraception between ages 15-19 in many countries.

Similarly, single-year and grouped age-specific fertility rates are negligible among the youngest adolescents in all study countries. In Mali, with the highest rates, there are a mere 17 births per 1,000 women age 10-14. The grouped fertility rate varies greatly among older adolescents from approximately 25 to 200 births per 1,000 women age 15-19. There are no measurable single-year fertility rates prior to age 12; the earliest apparent adolescent fertility occurs at age 13-14 in Mali, Bangladesh, Angola, and Gabon. Nonetheless, study data indicate that roughly one in five adolescent women have begun childbearing during adolescence, on average. The proportion of adolescents who have had at least one birth varies regionally from a range of about 10% in North Africa, West and Central Asia to 50-60% in parts of South Asia, where multiple adolescent births were common.

Maternal health care indicators show a large variation in coverage across and within regions. Overall, the highest levels of maternal care before, during, or after birth are found in North Africa, West and Central Asia, and Latin America and the Caribbean. The lowest levels of maternal care are found in Ethiopia, Niger, and Nigeria as well as in Afghanistan, Bangladesh, Chad, and Niger. This is a pattern that should elicit concern because these latter four countries are countries where more than one-half of women have had at least one child in adolescence and about 20% or more of these women (only ever-married women in Afghanistan and Bangladesh) have had more than one child before age 20.

The study also indicates that nearly one in four women, on average, experience physical violence during the age 15 to 19. The highest magnitude of physical violence during later adolescence is found in Uganda, Sierra Leone, and Cameroon, while the lowest levels appear in the Kyrgyz Republic, Tajikistan, and

Cambodia with a range extending from 53% to 6%. Although rarer than physical violence, lifetime experience of sexual violence (ranging from 8-21%) is highest in East, Southern, and Middle Africa and also lowest in Kyrgyz Republic and Tajikistan. Married adolescent women are more likely to have experienced either physical violence or sexual violence, bearing out earlier expressed concerns (Bruce 2012; Johnson et al. 2015; Peterman, Bleck, and Palermo 2015). Married adolescent women are most likely to experience physical violence that is perpetrated by an intimate partner, eclipsing family members who are the most common perpetrator among never-married adolescents. The most common perpetrator of sexual violence against adolescents is a friend or stranger.

While DHS data are frequently employed to assess the situation of older adolescents and youth age 15-24, these data have been underutilized to describe the lives of very young adolescents. This study demonstrates the capacity of DHS data to describe the full span of adolescence (Way 2014; WHO 2011) and yields much needed information about these youngest adolescents to meet the demand among youth program managers, policymakers, and researchers (Engebretsen 2012; Igras et al. 2014; Lundgren and Amin 2015; McCarthy, Brady, and Hallman 2016; Woog and Kågesten 2017). The results presented here indicate most sexual and reproductive events of interest are in later adolescence or even at older ages. These findings yield important information for programs that specifically target either older or younger adolescents and simultaneously provide further evidence that direct reports from very young adolescents would be of limited value except in specific situations. The indicators in this study are a first step to exploiting existing data in novel ways to understand a population for whom empirical evidence may be sparse. We anticipate that our efforts will be joined by those of other researchers who will continue to develop further indicators from these data and more deeply investigate the analytic relationships among adolescent characteristics and experiences.

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# Appendix 1. Calculation of Adolescent Fertility Rates

This study includes age-specific fertility rates for five-year age intervals 10-14 and 15-19 and single-year rates for ages 10 through 19, based on exposure and births during the 5 years (60 months) before the survey. This appendix describes the calculation of those rates.

The calculations for the grouped age interval 15-19 and single year ages 15 through 19 are completely consistent with standard DHS practice. That is, contributions to the numerators (births) and denominators (exposure) come from the birth histories for women age 15-24 at the time of the survey, which comprise all the births and exposure to the risk of a birth while age 15-19 in the past 5 years. Women age 20-24 contribute about half of the exposure and women age 15-19 contribute the remainder.

The calculations for age interval 10-14 and single years age 10 through 14 require modifications. The usual procedure would require access to birth histories for women age 10-19 at the time of the survey. However, DHS surveys do not include women under age 15. Therefore, the rates are limited to contributions from women age 15-19 at the time of the survey, who represent about half of the total births and exposure.

Figure A1 is a Lexis diagram that illustrates all the exposure to ages 10-19, in the past 5 years, of women who are age 15-19 at the time of the survey. The vertical axis is completed years of age at the date of interview and the horizontal axis is the ordinal number of years before the survey. The blue-shaded parallelogram shows the exposure, of women who were age 15-19 at the time of the survey, to age 10-19 during the 5 years before the survey. The gray triangle at the upper left would be filled by contributions to the rate for ages 15-19 from women age 20-24 at the time of the survey, referred to above. The gray triangle at the bottom right of the figure shows the combinations of age and time for which the survey respondents cannot provide any information. This absence of any data in the gray triangle at the bottom right is described as censoring due to the age 15 cutoff for eligibility in DHS questionnaires.

Fig A1. Lexis Diagram showing the exposure, in blue, of women age 15-19 at the time of a survey, to ages 10-19 during the 5 years before the survey
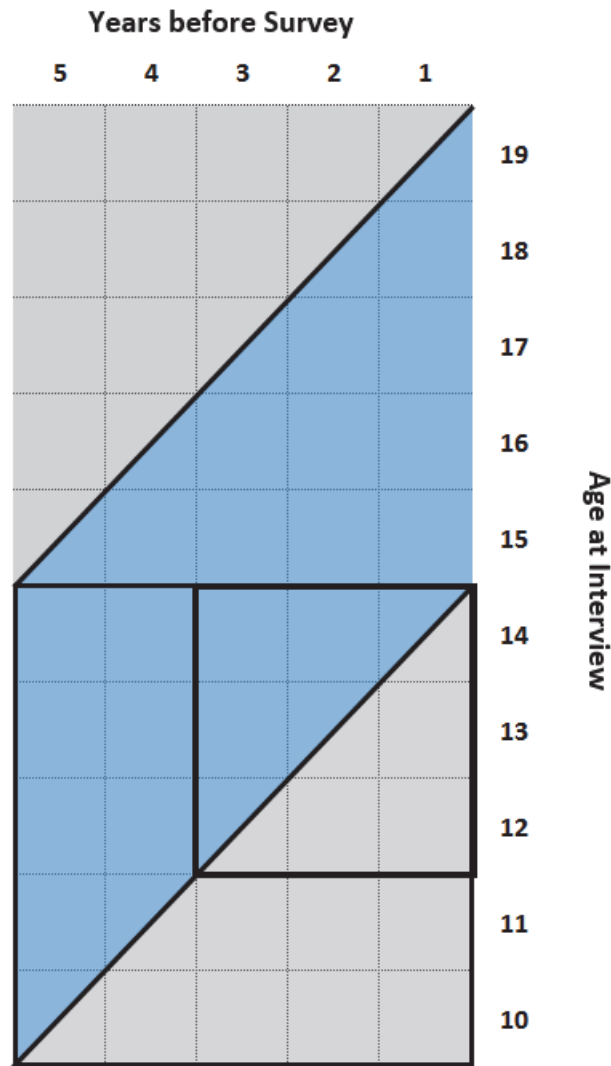
Black lines enclose a 3x3 square for ages 12-14 during the 3 years before the survey. DHS survey final reports present fertility rates in the past 3 years and the past 5 years. Contributions to that square for fertility in the past 3 years would come only from women age 15-17 at the time of the survey. The youngest age group for which three-year fertility rates could be estimated are for women age 12-14. Such rates were estimated but are not presented in the current study.

Our procedure to deal with the censoring at age 15 is as follows. First, for the single year rates, we simply divide the births by the exposure, corresponding to the blue areas in the rows for ages 10, 11, 12, 13, and 14. No adjustments are made, although the information is incomplete; this is exactly what would be done for single-year rates at any age. The diagram shows almost complete exposure to age 14, because within the 5 years before the survey, the birth histories for women age 16, 17, 18, and 19 at date of interview will all include a full year of exposure and births while age 14, and the only loss of exposure is half a year for those women who were age 15 at the time of the survey. In effect, we assume that the missing half year would have the same expected ratio of births to exposure as what we observe. The rate for age 14 is 90% complete.

Similarly for the other single year rates, the rate for age 13 is 70% complete; the rate for 12 is 50% complete; the rate for age 11 is 30% complete; and the rate for age 10 is 10% complete. The rates for ages 10 and 11 have the least data, but these rates are the lowest. The time period to which the data refer moves steadily backward for the lower ages. The data for age 10 are located entirely in the fifth year before the survey. However, as stated, the rates for the earliest ages are extremely low.

Second, we want to calculate a rate for ages 10-14 in the past 5 years. If we were to divide the observed number of births by the observed woman-years of exposure in the lower left blue triangle, the five-year rate would be biased toward the ages with the most data. The rates for these ages are low, but there is a steep gradient by age that must be taken into account. Failing to correct for this bias toward data from later ages would produce fertility rates that overestimate fertility in the age group.

The approach we have taken is to weight the exposure to each year of age in inverse proportion to its completeness. To be specific, say that R is the five-year rate for ages 10-14 and r10 through r14 are the single-year rates for ages 10 through 14, calculated as just described. The woman-years of exposure to each year of age, in the birth histories, is E10 through E14. Then R is calculated as

$$
R = \frac{\left[B10 + \left(\frac{B11}{3}\right) + \left(\frac{B12}{5}\right) + \left(\frac{B13}{7}\right) + \left(\frac{B14}{9}\right) \right]}{\left[E10 + \left(\frac{E11}{3}\right) + \left(\frac{E12}{5}\right) + \left(\frac{E13}{7}\right) + \left(\frac{E14}{9}\right) \right]}.
$$

This R yields a good estimate of the usual five-year rate that would be produced if we had birth histories for women age 10-14 at the time of the survey, unless there was a large amount of temporal variation in the underlying birth probabilities for single years of age 10 to 14 within the past 5 years.

Two other types of weights that are involved in all estimates of fertility rates deserve mention here. First, every case is weighted by the sample weight, (v005), which is inversely proportional to the sampling probability for that case. The sample weights correct for under-sampling and over-sampling in the survey design and for differential non-response.

Second, in samples that are limited to ever-married women, the sample weights are multiplied by an "all-women factor" (awfactt), which compensates for omission of women, especially young women, who were omitted from the survey because it was determined in the household questionnaire that they had never been married. The all-women factor inflates the denominators of the fertility rates, in effect adding exposure to the risk of childbearing for the omitted women, but leaves the numerators unchanged, because of an assumption that women do not have any births prior to marriage. In countries that consider it socially unacceptable to ask an unmarried woman whether she has had any children and therefore exclude never-married women from the individual interview, the only births before age 15 that will be detected by a survey are to women who married before age 15. The fertility rates in this study to which this weight applies are those from the following surveys: Afghanistan 2015, Bangladesh 2014, Egypt 2014, Jordan 2012, and Pakistan 2012-13.

All fertility rates presented in this study were estimated using a Stata 14 program authored by Thomas Pullum in March 2017 for the express purpose of calculating single-year and five-year grouped ASFRs with censored data for ages 10-19. This program is a modification of another Stata program written by Thomas Pullum to estimate age-specific fertility rates, total fertility rates, and general fertility rates for ages 15-49 from DHS data. The all women factor adjustment was suggested by Kerry MacQuarrie. The specific adjustment for censoring was suggested by Trevor Croft. Alternative adjustments would be possible but likely would produce nearly identical estimates.
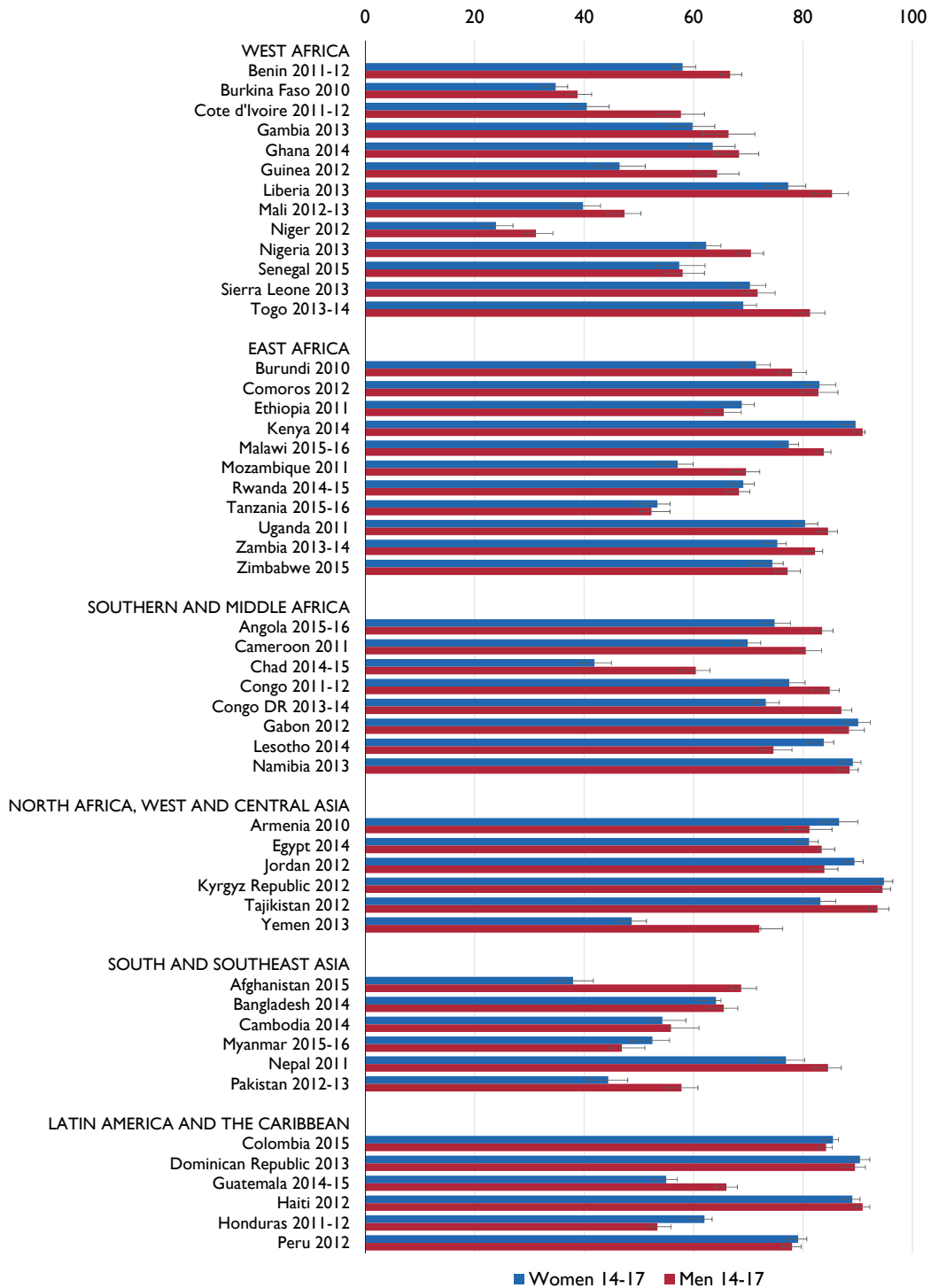
Appendix 2. School Attendance

Fig A2.1. Percent attended school among women and men age 10-13
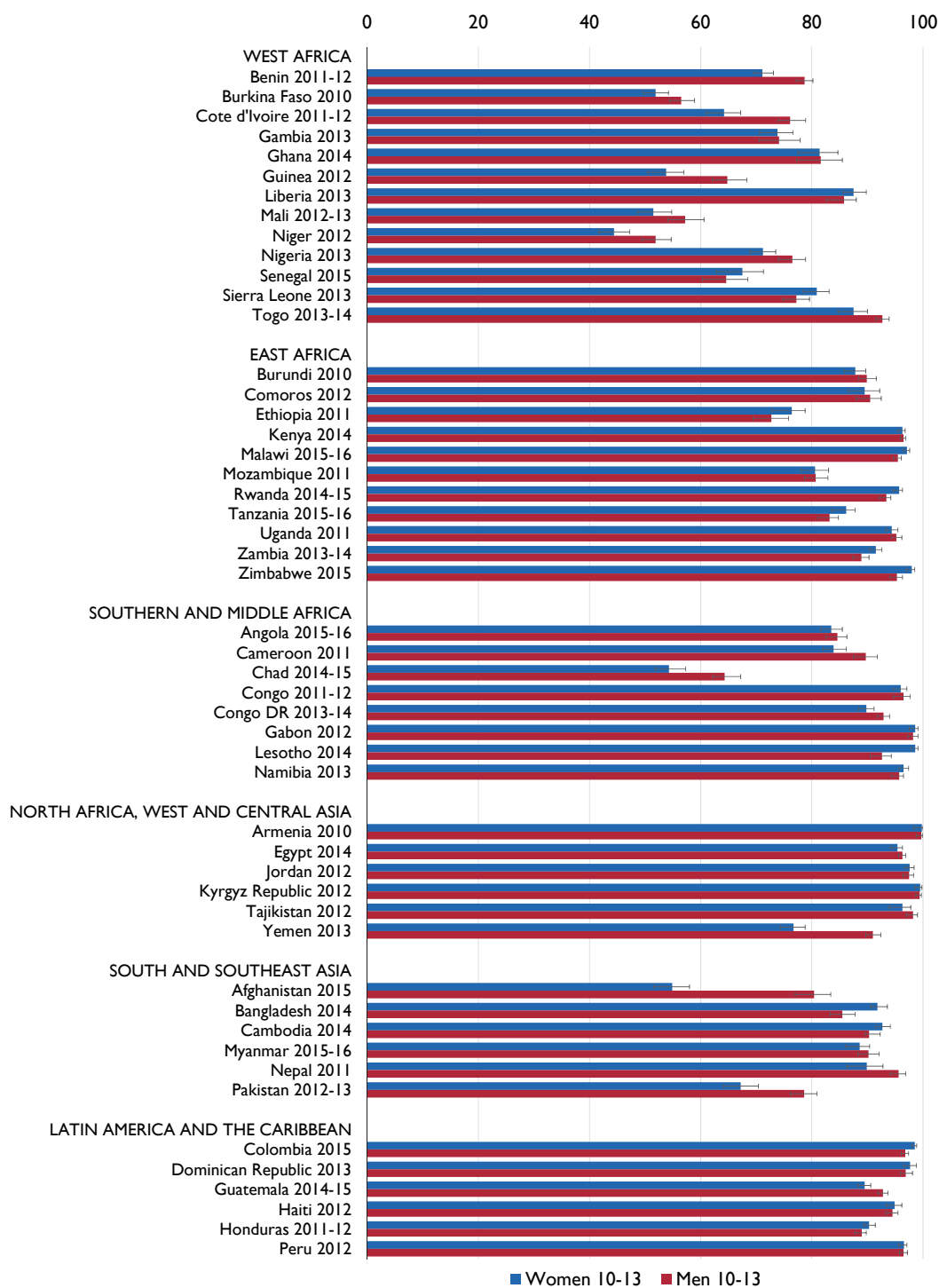
Notes:
Indonesia and Philippines surveys did not include school attendance.
Figure is based on de-facto population reported in the household survey

Fig A2.2. Percent attended school among women and men age 14-17

Women 14-17   Men 14-17

Notes:
Indonesia and Philippines surveys did not include school attendance
Figure is based on de-facto population reported in the household survey.

Appendix 3. Household Wealth Quintiles

**Table A3.1. Percent of women and men age 10-19 among the poorest and richest wealth quintile**

	Women 10-14		Women 15-19		Men 10-14		Men 15-19	
	poorest	richest	poorest	richest	poorest	richest	poorest	richest
Western Africa								
Benin 2011-12	20.0	18.0	13.9	26.8	21.9	14.4	17.9	19.4
Burkina Faso 2010	21.6	19.9	15.8	30.3	22.3	16.3	18.9	22.1
Cote d'Ivoire 2011-12	16.8	21.7	14.4	30.8	18.7	16.3	15.6	24.0
Gambia 2013	20.9	17.7	18.9	22.8	19.9	16.8	17.4	20.8
Ghana 2014	21.5	16.1	20.6	19.2	25.0	16.2	24.1	15.0
Guinea 2012	20.9	21.5	15.5	26.1	19.8	19.0	17.9	24.5
Liberia 2013	14.9	26.0	12.3	30.9	20.2	17.5	14.2	27.5
Mali 2012-13	17.9	22.6	15.2	30.2	20.7	18.7	17.7	25.0
Niger 2012	18.7	21.4	16.1	25.3	22.1	19.6	14.7	29.3
Nigeria 2013	21.3	19.5	17.1	20.2	20.8	17.6	18.1	19.0
Senegal 2015	21.9	18.3	19.9	20.6	21.5	17.0	19.1	22.2
Sierra Leone 2013	16.6	21.9	16.4	27.4	19.5	17.6	16.2	28.6
Togo 2013-14	23.3	17.4	16.7	27.5	25.1	13.1	21.7	16.6
Eastern Africa								
Burundi 2010	19.9	18.5	18.3	22.4	17.6	19.6	17.7	23.6
Comoros 2012	21.0	18.8	17.3	19.2	24.9	15.3	16.6	22.2
Ethiopia 2011	19.9	20.1	17.4	25.7	20.9	16.2	17.4	23.0
Kenya 2014	22.8	14.9	16.8	20.7	24.5	14.1	20.4	14.5
Malawi 2015-16	19.6	18.8	18.4	22.8	20.7	17.4	16.1	23.7
Mozambique 2011	19.3	21.6	17.9	25.8	19.4	18.6	14.6	25.8
Rwanda 2014-15	19.4	18.0	15.7	25.2	19.2	18.9	15.0	23.5
Tanzania 2015-16	21.6	15.5	17.6	28.8	22.3	15.2	18.0	20.4
Uganda 2011	21.2	17.2	16.3	25.2	19.4	14.7	16.8	19.1
Zambia 2013-14	19.4	19.2	15.5	27.1	19.8	16.2	13.3	23.6
Zimbabwe 2015	20.8	16.5	17.7	22.6	22.8	15.4	15.5	18.3
Southern and Middle Africa								
Angola 2015-16	18.1	21.5	16.8	24.8	21.1	20.4	15.9	28.1
Cameroon 2011	21.4	19.0	14.3	23.7	22.4	15.8	16.1	22.6
Chad 2014-15	18.9	19.6	18.2	24.3	17.2	19.8	16.8	25.6
Congo 2011-12	18.6	23.6	14.9	22.4	21.6	19.1	14.7	22.0
Congo DR 2013-14	18.4	19.4	16.1	26.6	18.6	18.2	15.6	22.4
Gabon 2012	17.3	21.6	14.4	23.0	22.4	21.8	17.1	23.7
Lesotho 2014	23.5	16.2	15.6	21.5	24.8	14.1	15.3	18.0
Namibia 2013	26.1	17.7	19.4	23.1	24.7	15.7	20.4	18.4
North Africa, West and Central Asia								
Armenia 2010	24.5	18.5	21.8	20.8	24.8	19.6	23.3	18.6
Egypt 2014	24.0	17.1	23.4	19.0	22.3	17.8	26.7	18.2
Jordan 2012	21.4	18.0	22.0	19.5	21.7	18.8	22.6	17.9
Kyrgyz Republic 2012	22.1	12.9	18.6	23.1	22.6	15.3	22.1	18.1
Tajikistan 2012	25.0	19.6	19.3	21.0	24.4	17.9	22.1	20.8
Yemen 2013	21.3	18.1	17.3	20.5	20.6	18.3	18.5	19.1
Asia								
Afghanistan 2015	21.4	19.4	19.2	22.7	20.3	18.4	20.9	21.2
Bangladesh 2014	24.0	17.6	16.4	19.2	24.7	15.5	18.0	20.0
Cambodia 2014	23.8	16.3	17.8	21.4	24.4	14.8	20.8	17.3
Indonesia 2012	22.7	18.6	17.3	21.9	22.4	19.9	18.7	20.0
Myanmar 2015-16	24.6	15.2	19.6	20.2	23.9	16.4	20.2	17.4
Nepal 2011	23.7	16.9	19.3	17.9	22.0	17.7	15.9	19.4
Pakistan 2012-13	21.4	16.9	17.3	20.0	21.4	17.4	17.2	19.1
Philippines 2013	24.9	16.0	16.6	22.8	26.1	15.9	21.9	17.1
Latin America and Caribbean								
Colombia 2015	25.1	17.4	19.4	18.8	26.7	16.9	21.2	20.3
Dominican Republic 2013	18.5	19.3	19.2	20.7	21.9	14.1	20.3	19.8
Guatemala 2014-15	23.2	15.0	18.6	18.5	24.0	15.4	18.3	18.4
Haiti 2012	20.3	20.2	17.3	22.7	24.4	16.8	20.5	18.1
Honduras 2011-12	22.7	16.0	17.9	20.1	24.2	15.2	21.3	17.2
Peru 2012	25.9	14.1	17.3	21.1	26.2	13.7	21.0	16.8

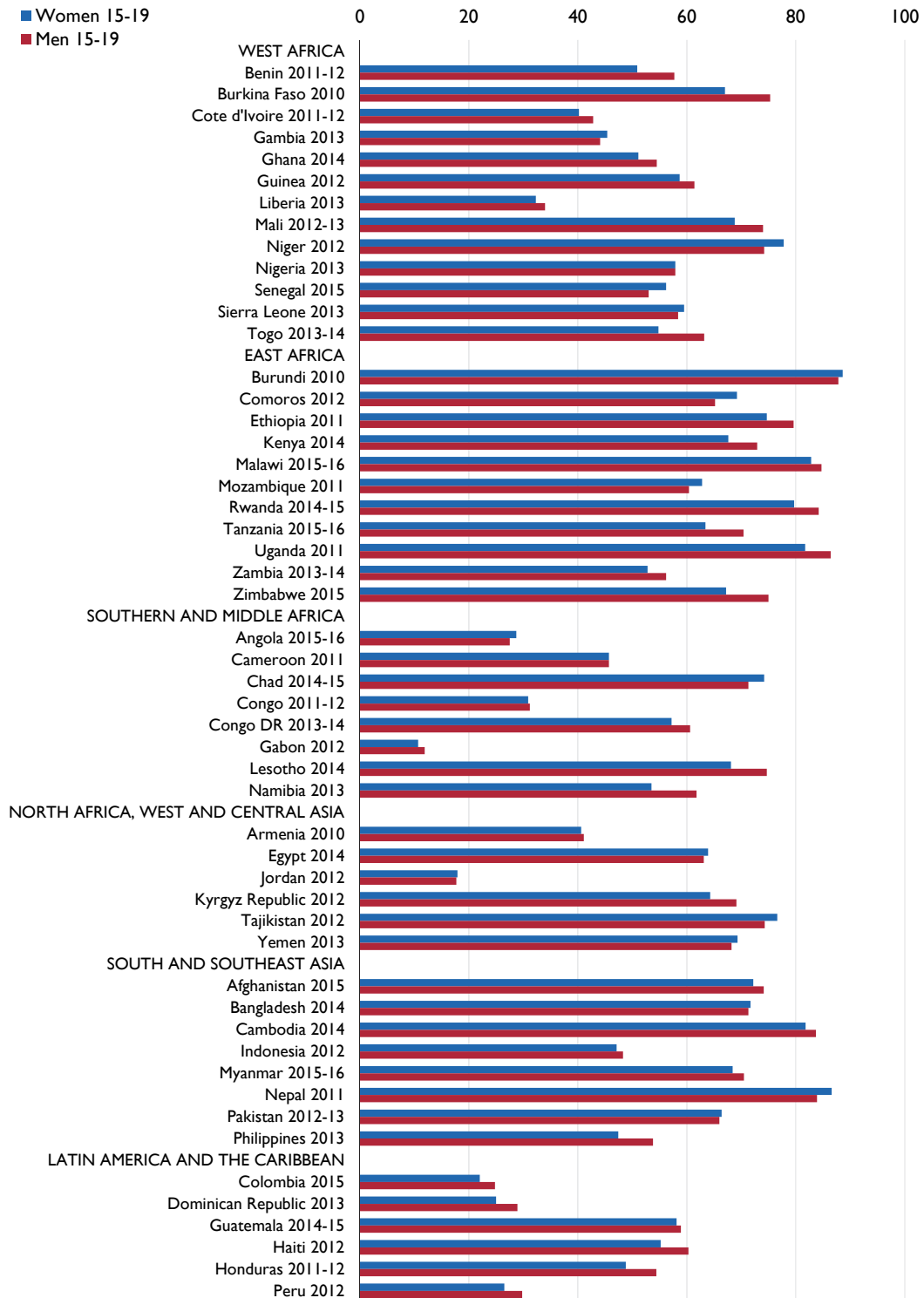Note: Table is based on de jure population reported in the household survey.

Appendix 4. Rural Residence

Fig A4.1. Percent of women and men age 10-14 who live in rural areas
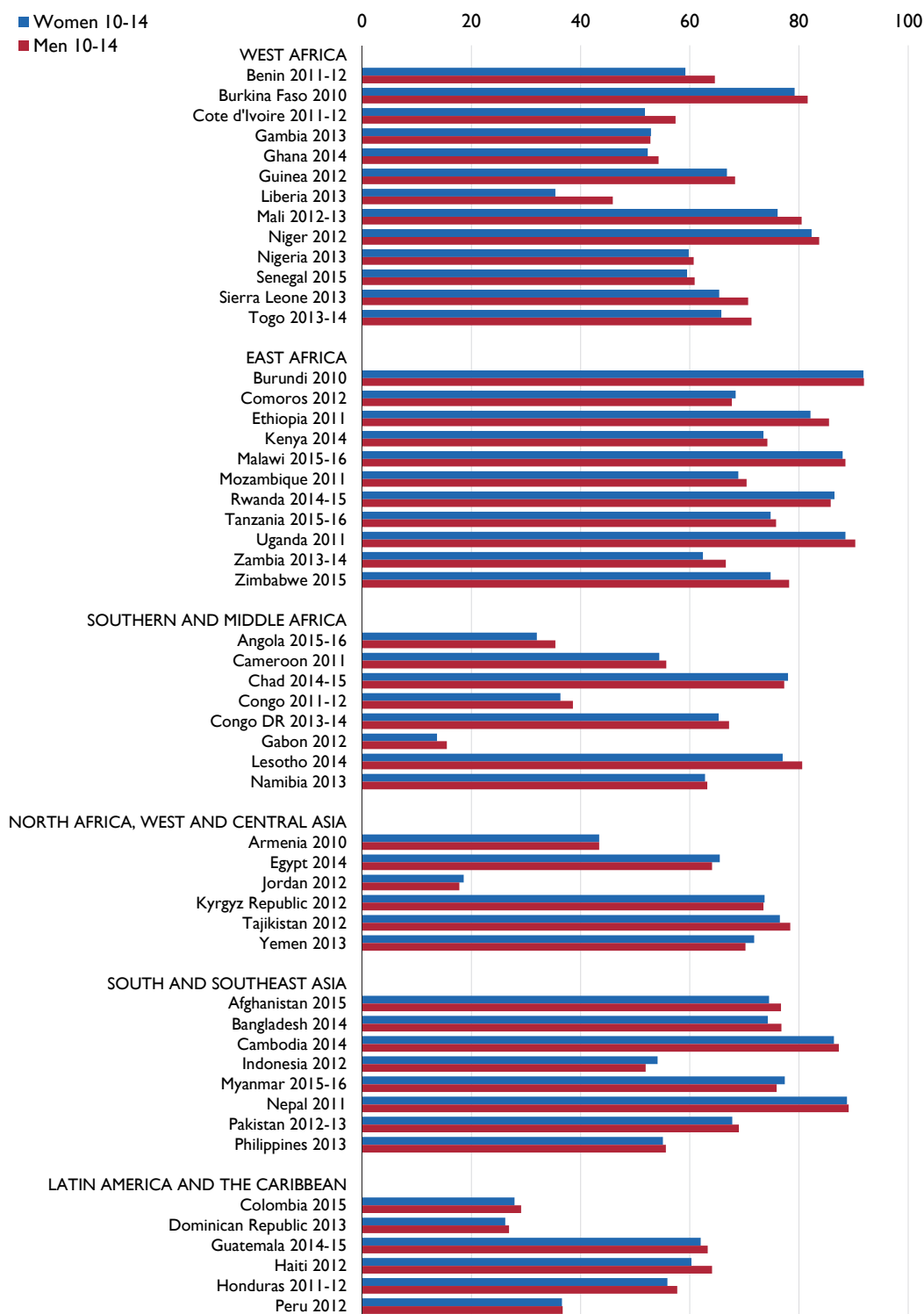
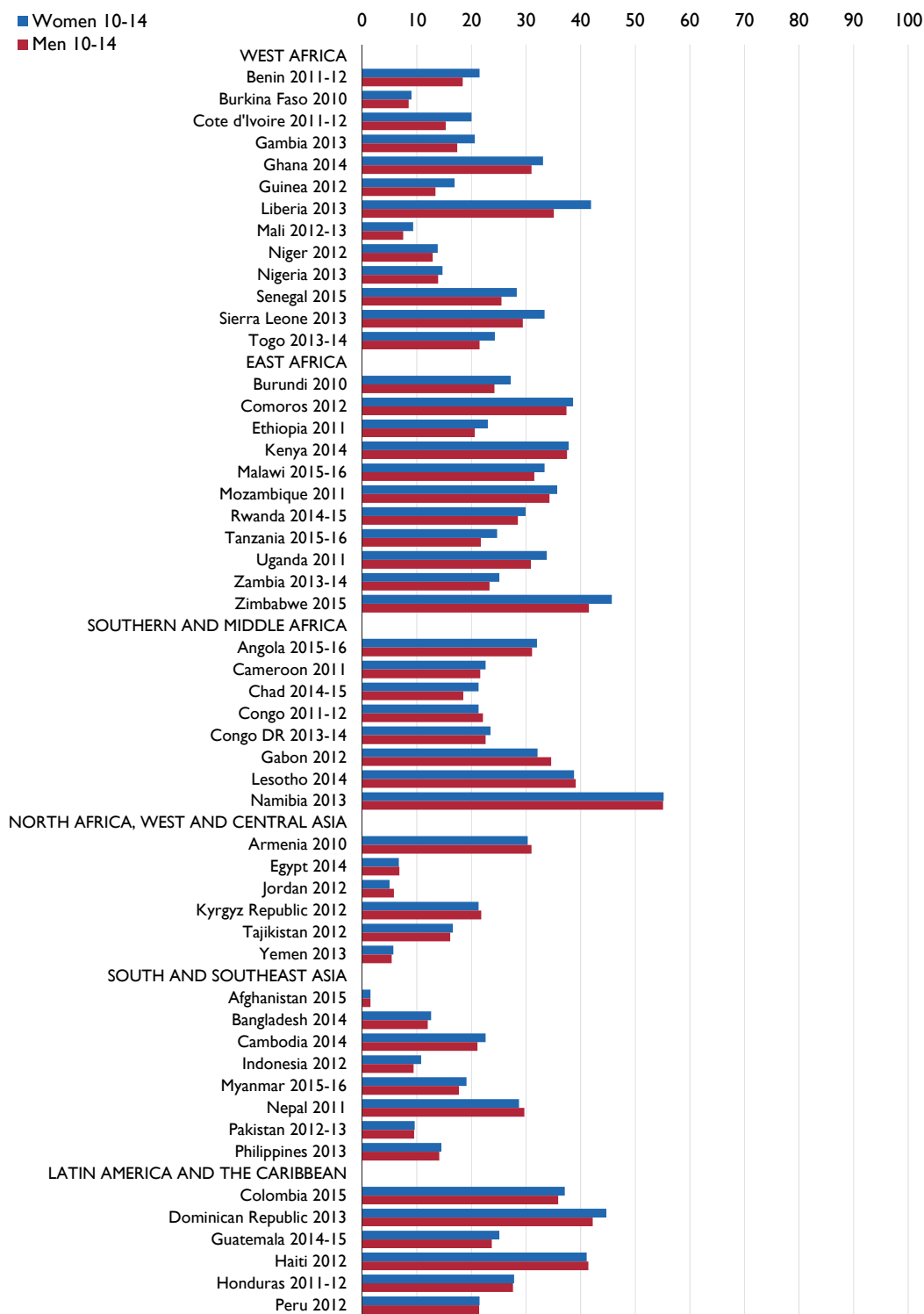Note: Figure is based on de jure population, i.e., usual residents.

Fig A4.2. Percent of women and men age 15-19 who live in rural areas

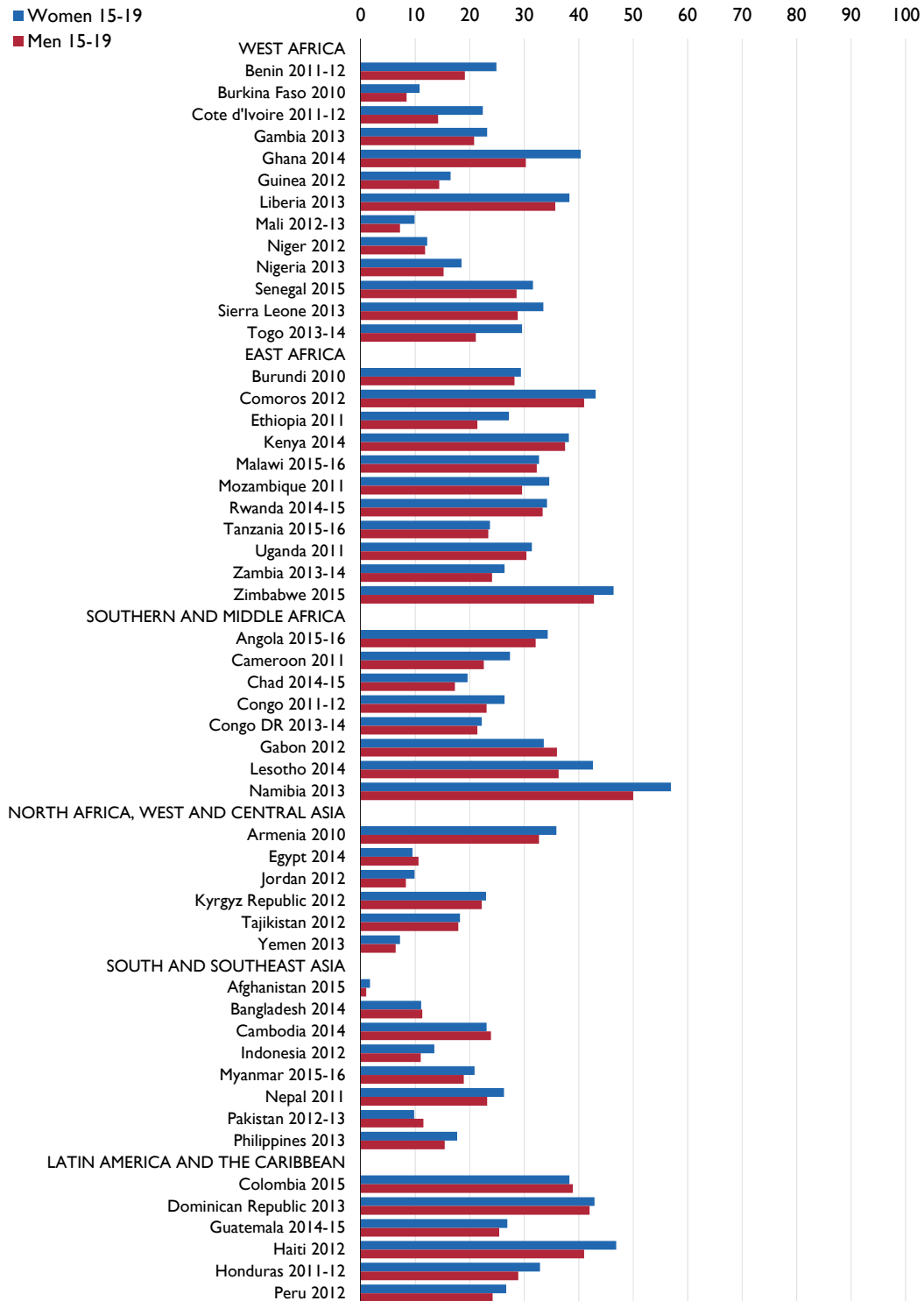Note: Figure is based on de jure population, i.e., usual residents.

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Appendix 5. Female Headed Households

Fig A5.1. Percent of women and men age 10-14 living in female headed households

Note: Figure is based on de jure population, i.e., usual residents, as reported in the household survey.

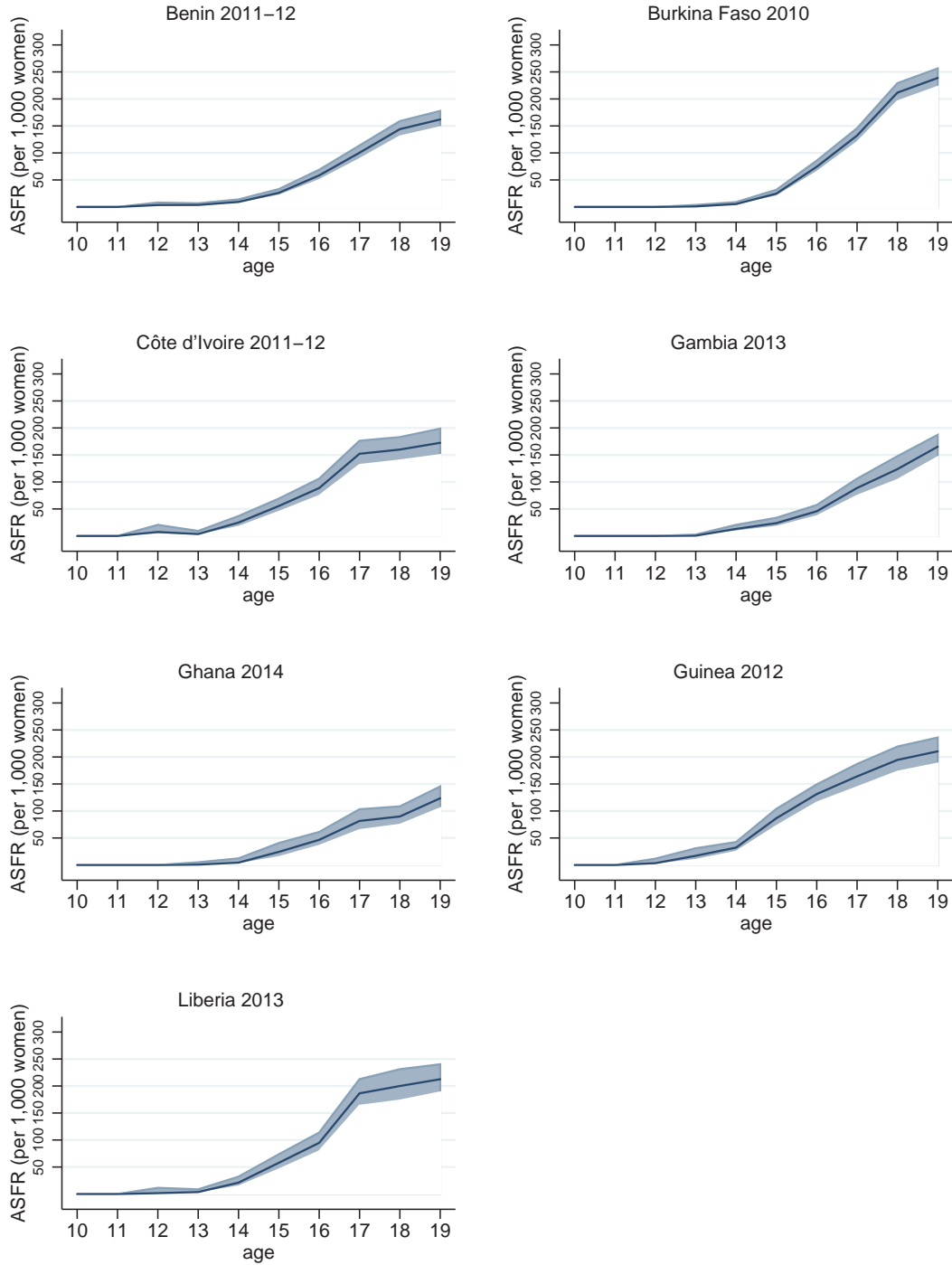# Fig A5.2. Percent of women and men age 15-19 living in female headed households

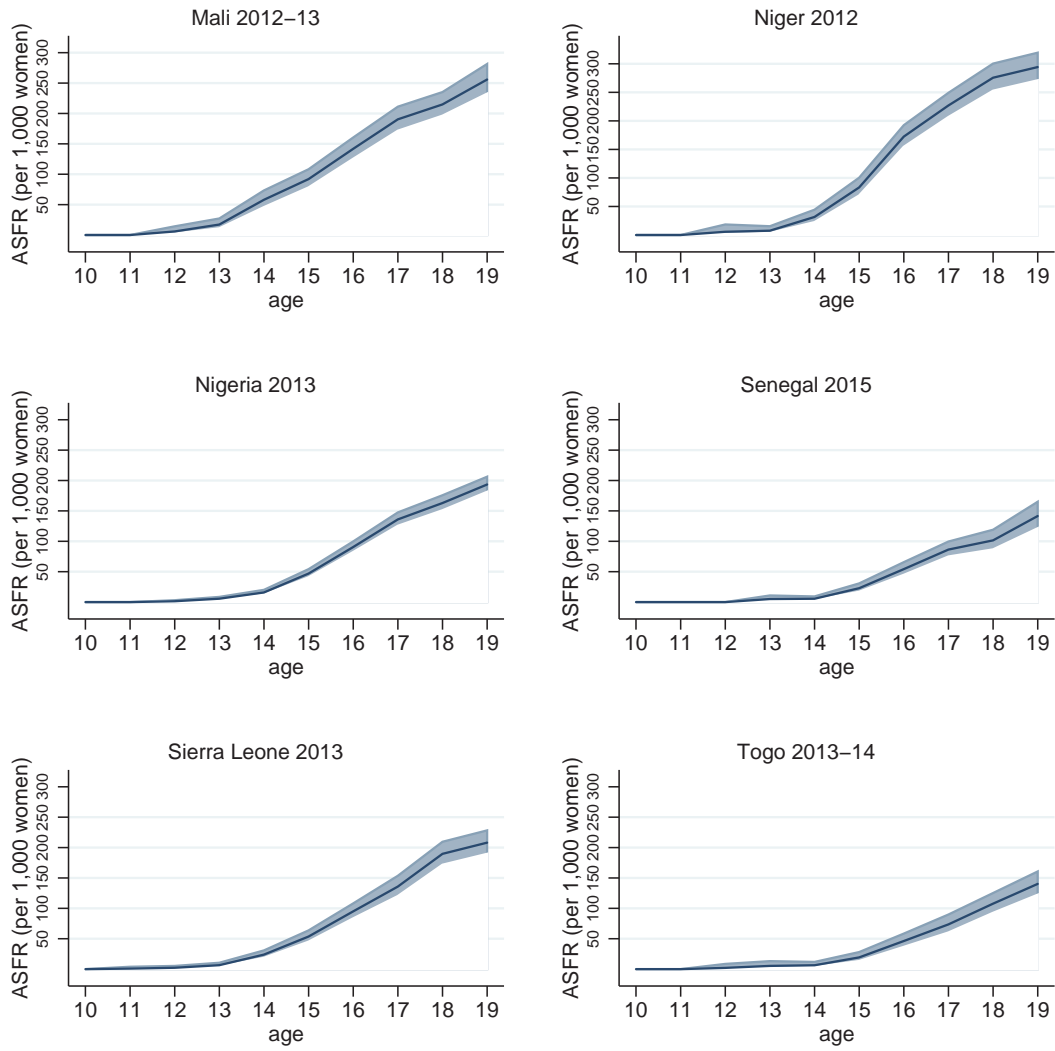Notes: Figure is based on de jure population, i.e., usual residents, as reported in the household survey.

Appendix 6. Adolescent Fertility Curves
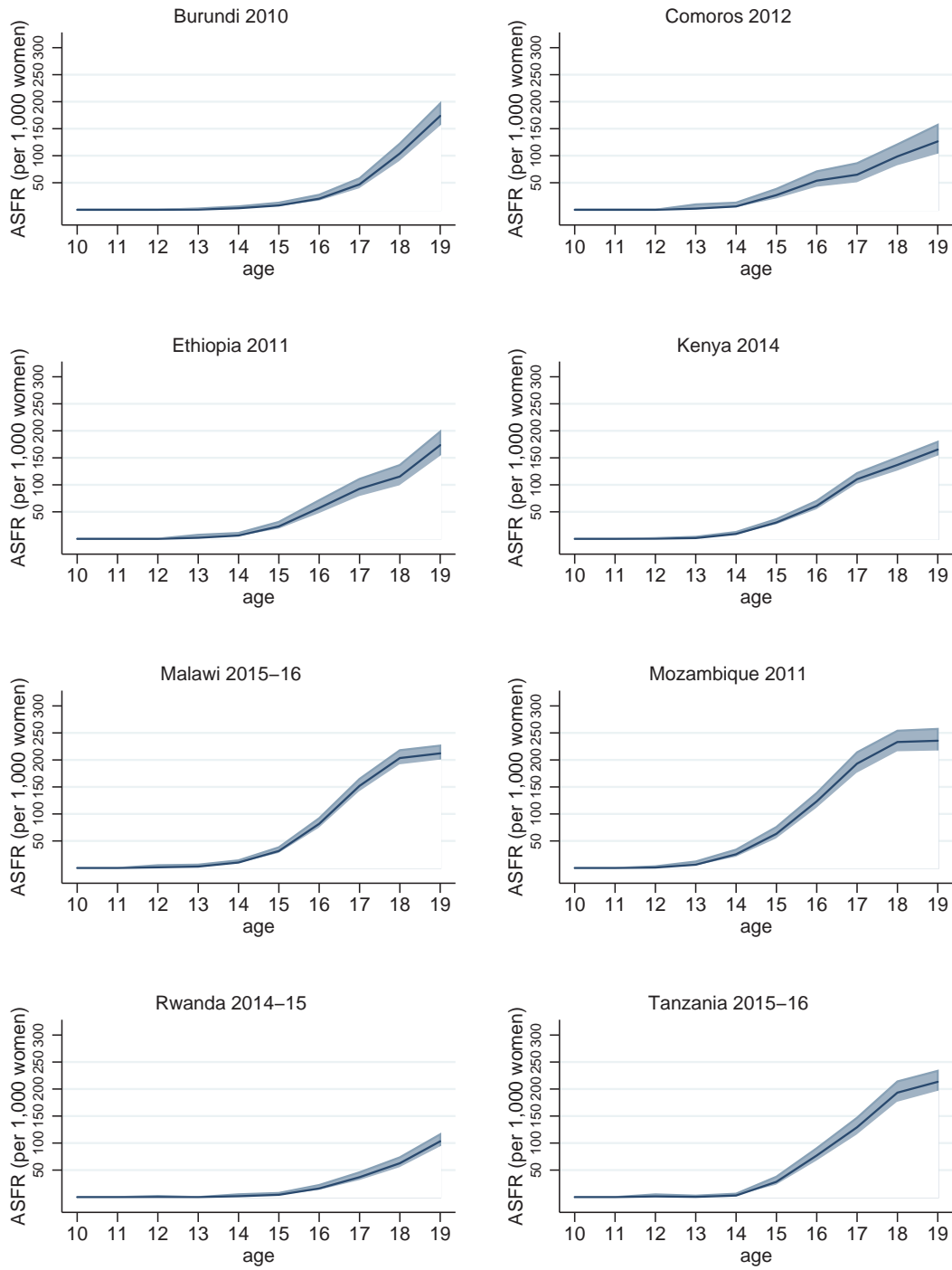
Fig A6.1. Adolescent fertility curves, West Africa

Benin 2011–12

Burkina Faso 2010

Côte d'Ivoire 2011–12

Gambia 2013

Ghana 2014

Guinea 2012

Liberia 2013

Continued…

Fig A6.1. Adolescent fertility curves, West Africa—*continued*

Mali 2012–13

Niger 2012

Nigeria 2013

Senegal 2015

Sierra Leone 2013

Togo 2013–14

Fig A6.2. Adolescent fertility curves, East Africa

Burundi 2010

Comoros 2012

Ethiopia 2011

Kenya 2014

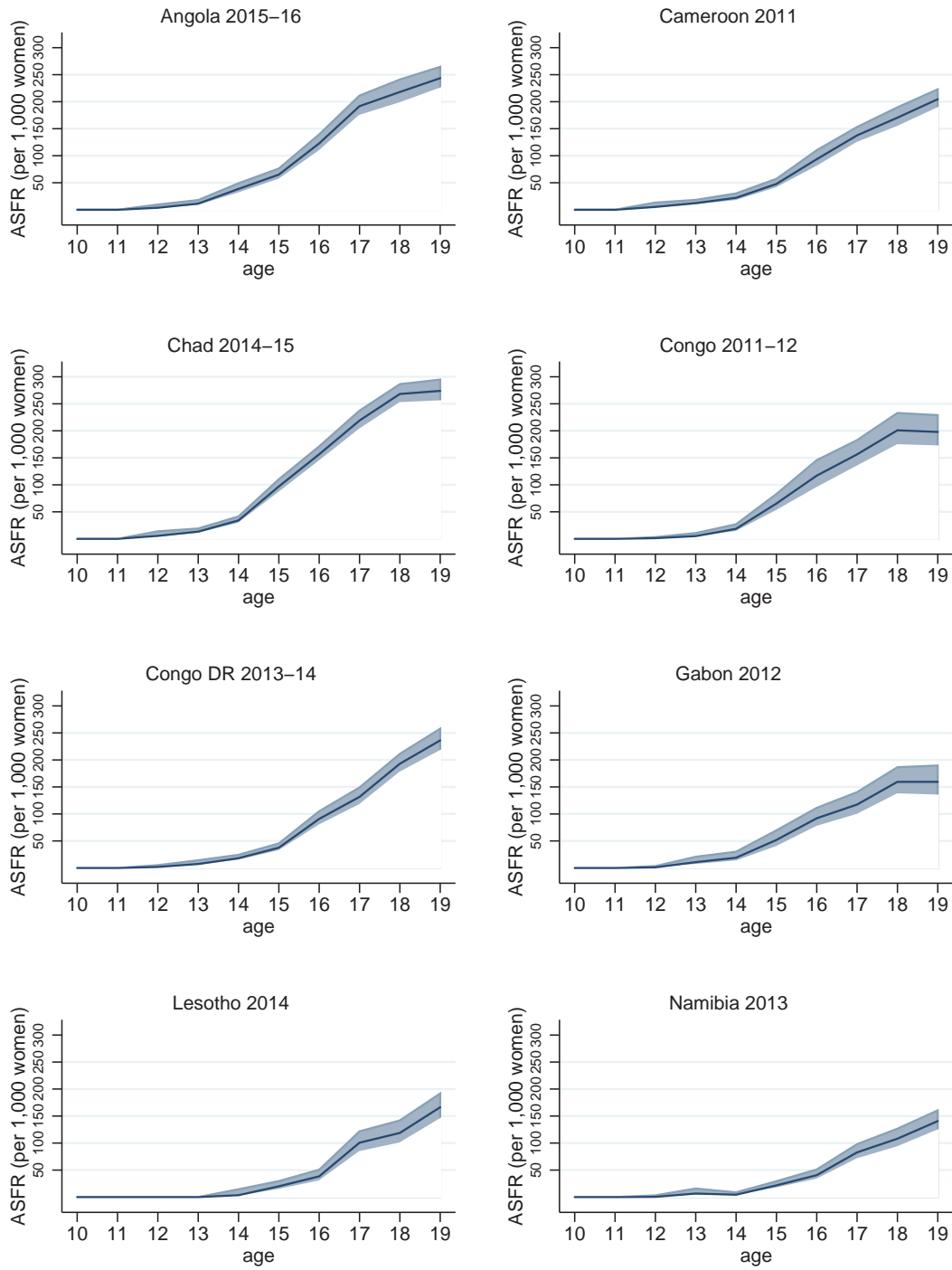Malawi 2015–16

Mozambique 2011

Rwanda 2014–15

Tanzania 2015–16

Continued…
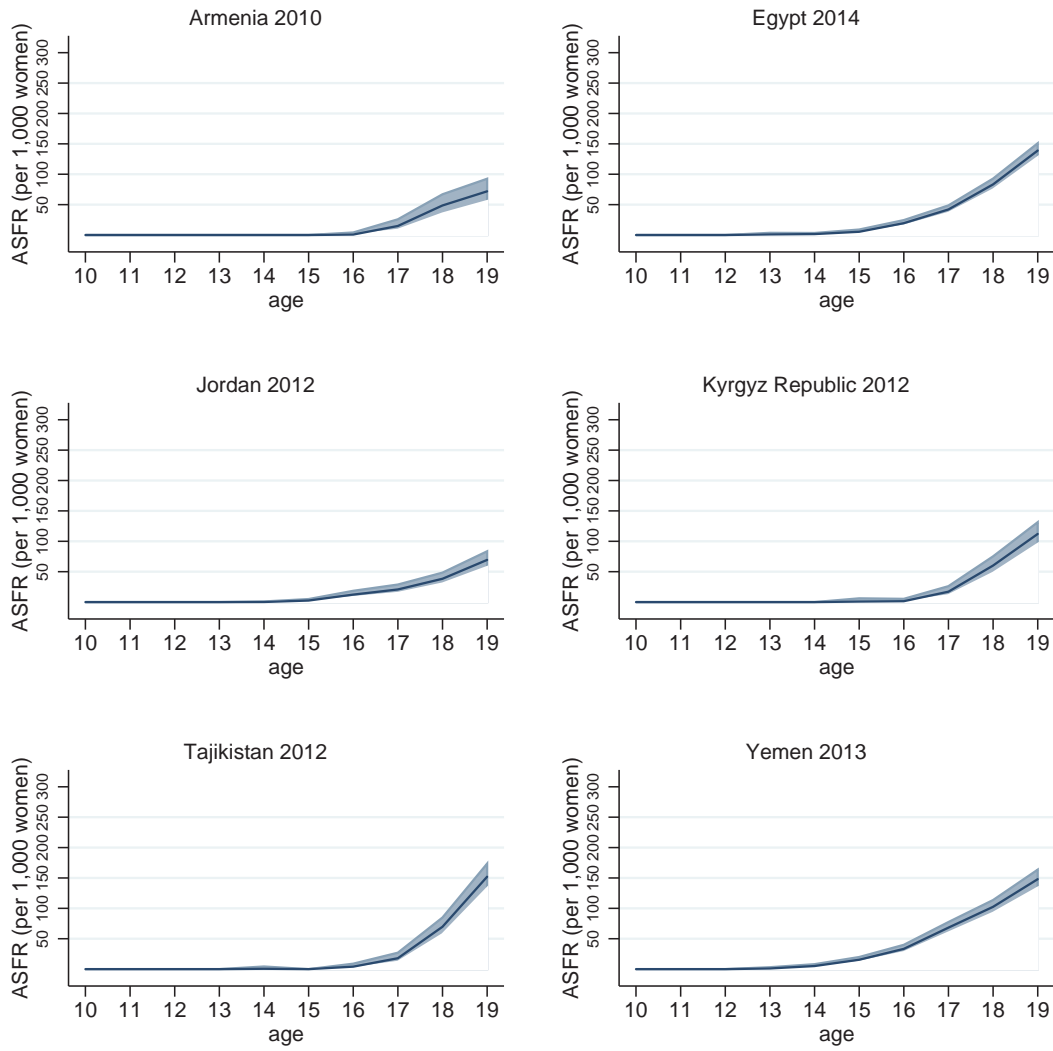
Fig A6.2. Adolescent fertility curves, East Africa—*continued*
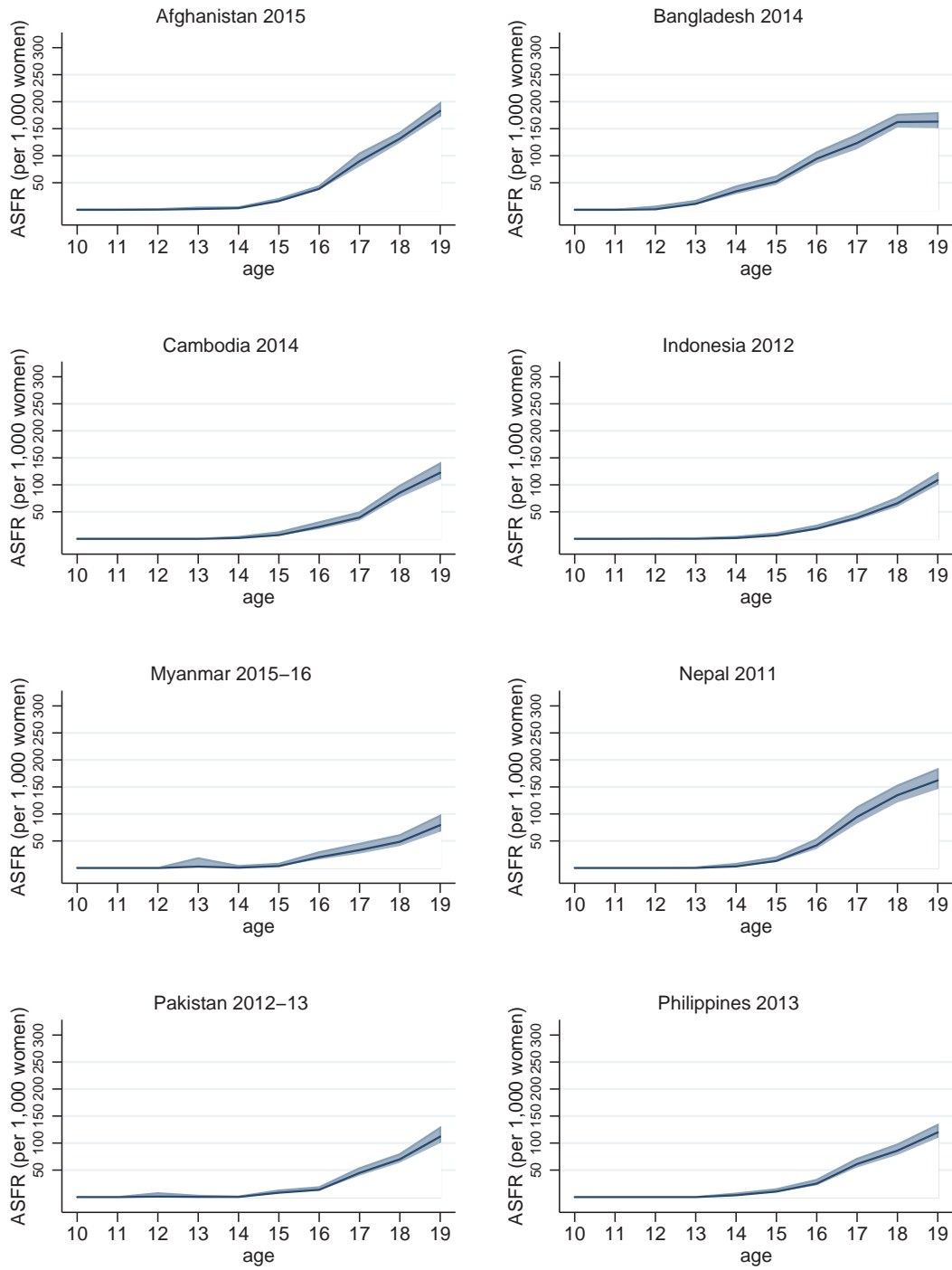
Fig A6.3. Adolescent fertility curves, Southern and Middle Africa

Angola 2015–16

Cameroon 2011

Chad 2014–15

Congo 2011–12

Congo DR 2013–14

Gabon 2012

Lesotho 2014

Namibia 2013

Fig A6.4. Adolescent fertility curves, North Africa, West and Central Asia

Fig A6.5. Adolescent fertility curves, South and Southeast Asia

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Fig A6.6. Adolescent fertility curves, Latin American and Caribbean

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