

# Schooling and Adolescent Reproductive Behavior in Developing Countries

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Background paper to the report *Public Choices, Private Decisions: Sexual and Reproductive Health and the Millennium Development Goals*

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*Front cover photo: TK*

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## **ABSTRACT**

The rapid growth in school attendance and attainment rates in developing countries has meant that a rising proportion of young people are becoming sexually mature while still attending school, often while still attending primary school. Unprotected sexual activity carries with it risks to reproductive health at any age but most particularly during adolescence, because the risks of infection are greater when full physical maturation is incomplete, and the risks of pregnancy are greater at the youngest maternal ages and when the pregnancy is unwanted, which is often the case when a pregnancy occurs prior to marriage. This paper draws primarily on recent DHS data to document trends in schooling and adolescent reproductive behaviors among adolescents and then to explore the potential implications of rising school attendance rates for adolescent reproductive health. This exploratory analysis includes (1) comparisons of various aspects of adolescent reproductive behavior between students and the non-enrolled, (2) a review of the evidence on the links between school exit and marriage timing, and (3) an assessment of the relative contribution of schoolgirl pregnancy to overall pregnancy rates and dropout rates among adolescents. At this point any inferences drawn are suggestive rather than definitive; more research will be necessary on each of these topics before these relationships and their policy implications can be fully understood. The paper ends with a call for a greater collaboration between schooling and reproductive health experts in the research and design of interventions for adolescents given the growing interconnectedness of these two domains of adolescent life.

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## 1. INTRODUCTION

The Millennium Development Goals (MDGs), adopted by the United Nations in 2000, include among them a series of social goals relating to universal primary schooling, gender equality in schooling at all levels, and various aspects of reproductive health (including improving maternal health and combating HIV/AIDS), all of which have important implications for the lives of adolescents. During the adolescent years, young people become socialized in adult gender roles as they become sexually mature, while at the same time acquiring the human capital they will need in adulthood. It is typically during these years that young people leave school and take up adult work and family responsibilities. Thus, policies and programs addressing the schooling and health needs of adolescents, including the special needs of girls, are likely to be prominent features of the plans currently being developed for the implementation of the MDGs.

The rapid growth in school attendance and attainment rates in developing countries has meant that a rising proportion of young people are becoming sexually mature while still attending school, often while still attending primary school. Unprotected sexual activity carries with it risks to reproductive health at any age but most particularly during adolescence, because the risks of infection are greater when full physical maturation is incomplete, and the risks of pregnancy are greater at the youngest maternal ages and when the pregnancy is unwanted, which is often the case when the pregnancy occurs prior to marriage. Thus it is important to understand more fully the implications of rising rates of school attendance during the teenage years for adolescent reproductive behavior, including gender differences in reproductive behavior.

This paper relies primarily on data from the Demographic and Health Surveys (DHS) to describe recent patterns and trends in schooling and reproductive health and behavior among adolescents in less developed countries, with a special focus on gender and socio-economic differences (see Table 1 for a list of countries, survey dates and sample sizes). The implications of rising school attendance rates for adolescent reproductive health are explored in three ways: (1) by comparing various aspects of adolescent reproductive behavior among students to that of their unmarried peers who are no longer attending school and (2) by reviewing the evidence on the links between school exit and marriage timing, and (3) by assessing the relative contribution of schoolgirl pregnancy to overall pregnancy rates and dropout rates among adolescents. Finally, inferences from these data are drawn about the role of schooling in the promotion of adolescent reproductive health. At this point these conclusions are suggestive rather than definitive; more research will be necessary on each of these topics before these relationships and their policy implications can be fully understood.

## 2. SCHOOLING AMONG ADOLESCENTS

One of the most dramatic trends in developing countries over the last twenty to thirty years has been the rapid rise in both school participation and grade attainment, particularly for girls. This has occurred in countries that have prospered economically and in those that have not. Indeed, the pace of change has been more rapid throughout the developing world than the pace of change that occurred during the transition to universal schooling among today's developed countries (Clemens 2004). These changes have meant that an increasing percentage of adolescents in every country remain enrolled during their adolescent years with growing numbers still attending school beyond the age of 15. Nonetheless, school participation and grade attainment rates lag for the poor, with poor girls at the greatest disadvantage.

Estimates of trends in school participation and grade attainment are derived from very recent household survey data collected in 50 developing countries representing roughly 60 percent of the population of the developing world as a whole and 88 percent of the population living in countries defined as low income by the World Bank (World Bank 2002).<sup>2</sup> Given the MDGs' particular attention to extreme poverty, our data provide particularly good coverage of the contexts where new policy efforts will be most needed. Two-thirds of these 50 surveys were fielded since 1998, with only five fielded prior to 1995 but no earlier than 1990. The median date for these surveys is 1998/99.

The DHS survey data on education were chosen rather than UNESCO data for several reasons. First, the DHS household survey data have adequate sample sizes to allow the calculation of attendance rates by single years of age. Second, these data allow us to relate attendance rates to household economic status. Finally, the DHS surveys of reproductive aged young men and women collect data on both school participation and attainment as well as on various aspects of reproductive behavior, allowing the exploration of possible associations. None of these types of analysis would be possible with data collected by UNESCO.

Trends in schooling are estimated by calculating the differences in attendance<sup>3</sup> and grade attainment rates between cohorts.<sup>4</sup> As the overwhelming majority of school-age children

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<sup>2</sup> By contrast, only 18 percent of the population of lower-middle income countries and 53 percent of the population of upper middle income countries live in countries participating in the DHS survey program. The coverage by regional group varies as well. The best represented regions include East and South Africa (92%), West and Middle Africa (75%), South-central/Southeastern Asia (86%), Former Soviet Asia (68%) and South America (72%). There is no coverage of Eastern Asia (essentially China), only 21 percent of the population of the Caribbean and Central America is represented and roughly 50% of the population of the Middle East.

<sup>3</sup> It is now the general convention to refer to the percent reported by the household head or respondent in a household survey as still in school as "attending" rather than "enrolled." This is because of the wording of the DHS question which asks whether or not each household member "is still in school."

<sup>4</sup> Mortality rates tend to be highest among the least educated. Thus, past school participation and attainment rates reported by older cohorts will overestimate actual school participation and attainment rates achieved in the past due to the better survival rates of the more educated. While mortality rates remain very low in most developing countries until the mid-40s, in the least developed countries where mortality rates are higher at every age, they begin to rise sharply after age 25 (United Nations 2001). Thus rates of

enter grade one by the age of 10, the reported percent who have ever attended school among children aged 10–14 becomes the most recent estimate of the percent who have ever attended school for those born in the mid to late 1980s. We compare these rates of ever attendance to those reported for household residents aged 20–24, 30–34 and 40–44 representing cohorts born in the mid 1950s, mid 1960s and the mid-1970s. For estimates of trends in grade attainment, however, the youngest cohort that can be used for trend comparisons is aged 20–24. Many of those under the age of 20 will still be enrolled in school. Thus, this indicator of grade attainment will underestimate the ultimate percent completing six or more years of school for those under the age of 20.

## 2.1 Trends in School Attendance Rates

Figure 1 presents a bar graph organized by region that shows the change in the percent ever attending school over the past 30 years for boys and girls by comparing ever attendance among those currently 10–14 to those aged 40–44. Ever attendance rates for the earlier period are shown in black and the subsequent increases are shown in gray. The ordering of countries within each region from low to high is determined by the most recent attendance rates for boys in each country. Gender differences can be noted by the relative distance of the bars for boys and girls separately. It is striking that absolute increases for girls have been much more notable than increases for boys, even in places where male attendance remains far from universal. The increases for girls in sub-Saharan Africa are particularly notable. As a result, gender gaps have narrowed. Indeed, in a few cases, attendance rates for boys appear to have declined (e.g. Madagascar, Tanzania, and Zambia).<sup>5</sup> The countries for which ever attendance rates among those aged 10–14 remain below 70 percent are primarily in sub-Saharan Africa, but also include Pakistan for girls.

It is impossible to summarize trends for 50 countries individually. Taking the 60 percent of the youth population of the developing world that is represented by nationally representative surveys conducted by DHS, the individual country attendance rates can be weighted by the share of the youth population residing in each country within this group of countries to generate weighted averages. These weighted averages, which are based on UN estimates of population size in 2000, can be used to characterize the experience of the “average” youth in this group of countries. Over the twenty years represented by the differences in ever attendance between those aged 10–14 and those aged 30–34, the average ever attendance rate for boys has increased by 12 percent and for girls by 35 percent. Thus, growth rates on average for girls have been nearly three times the growth rates for boys during the past twenty years. By contrast, during the most recent decade (as represented by a comparison between ever attendance among those aged 10–14 and those aged 20–24), ever attendance rates for boys have increased by 3 percent and by 15

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improvement are most likely to be underestimated for the least developed countries, mostly sub-Saharan African countries, when comparisons extend back over 20 or 30 years. The bias in estimates will be minimal when comparisons focus on the younger cohorts (i.e. ages 10–25). Thus the pace of change reported here will underestimate the actual pace of change among the least developed countries. Nonetheless, these estimates show impressive rates of change.

<sup>5</sup> The decline may be more apparent than real given the possibility that attendance rates for the 40-44 cohort is likely to be underestimated. See discussion in Footnote 4.

percent for girls, five times the growth rates for boys. The general deceleration of growth rates over the past 10 years has been greater for boys than girls.

## 2.2 Trends in Grade Attainment

Figure 2 presents another bar graph showing trends in the percent attaining six or more years of schooling by comparing grade attainment rates of those aged 40–44 to those aged 20–24 at the time of the most recent survey (see discussion above). Again, the data are ranked from low to high within region according to the results for young men for the most recent period. In most school systems, but not all, primary schooling ends in grade six. Thus this indicator of grade attainment is not only comparable across countries in terms of exposure to accumulated grades of schooling but also serves as a proxy for the percent completing primary. Here the diversity within regions and across countries is particularly striking. For young women in Africa for example, the percent completing six or more years of schooling varies in the late 1990s from 12 percent in Mali and 14 percent in Ethiopia to 92 in South Africa. For the majority of countries, absolute gains for young women exceed absolute gains for young men and thus gender gaps are narrowing.

The gender gap in grade attainment will continue to narrow sharply over the next 10 years. This expectation is based on actual changes that have already taken place in the percent ever attended as implied by current differences between ever attendance rates of those aged 10–14 and those aged 20–24 (see discussion above). Growth rates for girls in ever attendance rates, and by extension grade attainment, are five times growth rates for boys, suggesting that the pace at which the gender gap in attendance is narrowing is accelerating, as growth rates in attendance for boys slow down.

## 2.3 Attendance rates by age and by level

A particular advantage of DHS data is that they allow us to look at attendance rates by individual years of age so that we can learn more about gender differences in school participation during the adolescent years. While data on the ages of school attendance are not available for those who have already left school, we can look at the age distribution of those who were currently enrolled as of the survey date to see what percent are still attending school during their adolescent years.

By age 15, most adolescents have reached sexual maturity. It is of particular interest, therefore, to find out how many boys and girls of this age remain in school. Figure 3 presents data on the percent of 15-year-olds who are still attending school. The black bars represent girls and the gray bars represent boys. In most, but by no means all, countries the percent of boys in school at age 15 exceeds the percent of girls in school at the same age. Exceptions include Nigeria, Namibia, Nicaragua, Colombia, the Philippines, Kyrgyz Republic, Armenia and Kazakhstan. In a few other countries, percentages attending are essentially the same for boys and girls at this age: these include Brazil, Bolivia, Indonesia and Jordan. In the majority of countries, more than 50 percent of boys and girls remain in school at 15. While female students currently represent a majority of 15-year-olds in

fewer countries than male students, the rapid growth in attendance rates described above will inevitably lead to further increases in the percentage of girls and boys still attending school at age 15.

Figure 4 shows how attendance rates change from ages 12 to 18 by region. Each bar captures the range in attendance rates between the first and third quartile of the distribution within each region, with the line inside the box capturing the median value at each age. The thin vertical lines on either end of the box encompass the extremes of each range of values. In Latin America, according to the median value, over 90 percent of boys and girls are still attending school at age 12. Median rates remain above 70 percent by age 15 and fall to 40 percent for girls and slightly higher for boys at age 18. In Asia, according to the median values, over 90 percent of boys and girls are still in school at age 12. Gender gaps become apparent by age 15, but even for girls median values remain above 60 percent. By age 18, attendance in Asia falls considerably below attendance in Latin America, with a bigger range of values for girls than for boys. The ranges in Africa are particularly large. By age 12, median attendance rates for boys are above 70 percent and for girls are around 60 percent. By age 15, median values fall below 60 percent for boys and to around 40 percent for girls. At all ages and in all regions, however, the range of experience is wide, with the most extreme ranges in Africa.

Among those who remain in school during their teen years, it is also interesting to explore their distribution by level between primary and post-primary schooling. Figure 5 shows scatter plots of the percentage of students aged 12–14 currently attending primary school and the percent of students aged 15–17 currently attending secondary or tertiary schooling at ages 15–17. Each dot represents a country, with values for boys on the vertical axis and value for girls on the horizontal axis. Variations across countries in the distribution of students by level reflect a variety of factors including differences in the structure of the school system, differences in starting ages, differences in repetition and dropout rates by age, and differences in access to secondary school for those completing primary. The diagonal line is the line characterizing gender equality.

An examination of Figure 5 leads to several observations. First, context matters. The percent of 12–14-year-old students attending primary and the percent of 15–17-year-old students attending secondary ranges across countries from almost 0 to 100. Even by ages 15–17, in more than half of the African countries in the sample, a majority of students remain enrolled in primary. On the other hand, in most of Asia, the majority of 12–14-year-old students have progressed beyond primary. Second, to the extent that gender differences exist in the distribution of students by level, it would appear that female students are more likely than male students to have progressed beyond primary by ages 15–17. This is apparent in Figure 5b in that most points that do not fall on the diagonal line (indicating gender equality) fall below the line indicating a higher percent of female students attending secondary school at this age than boys.

These results would suggest that the placement and design of school-based adolescent reproductive health programs must be sensitive to age and schooling level. They must also be sensitive to the range of ages represented by youth attending any particular grade.

For example, in Egypt, 88 percent of students enrolled in grade 8 range in age from 13 to 15. In Kenya no more than 50 percent of 8<sup>th</sup> graders are within this age range while 40 percent are 16 or older.<sup>6</sup> A wide diversity of ages within the same classroom presents special challenges to the teacher.

#### 2.4 Poverty and School Attendance

Finally, Figure 6 makes clear that school attendance during the teen years is strongly associated with relative socio-economic status. We use a household wealth index developed for use with DHS data by Filmer and Pritchett (1999) that measures relative inequality within each country.<sup>7</sup> By measuring attendance rates among 15-17-yearolds for the wealthiest 20 percent in each country along the horizontal axis and attendance rates among the poorest 40 percent in each country along the vertical axis, we can interpret the distance of each data point below the diagonal line as the wealth gap in attendance rates. Most data points lie substantially below the diagonal and this is even more true for girls than boys. A reduction in poverty rates would clearly increase the percent of adolescents continuing in school. The persistence of poverty remains the greatest barrier to education for all.

These data confirm that school attendance is becoming increasingly common during the teenage years both for boys and girls and that this trend is likely to continue as overall school participation and attainment rates continue to rise in response to rising rates of return to schooling and more favorable family circumstances (e.g., smaller families and better educated parents). The extent to which enrollment among adolescents remains concentrated in primary school, however, depends very much on country-specific features of the schooling system. Anti-poverty programs that are designed to encourage enrollment and discourage dropout among the poor will support further growth in enrollment rates among adolescents. However, such initiatives are likely to put additional pressures on under-resourced schooling systems. Without substantial additional investments in greater access to secondary schooling and better school quality, greater enrollment rates among the poor could lead to increased repetition rates, increased crowding in the primary grades, an erosion of school quality, and a fall rather than a rise in the percent of adolescent students attending secondary school.

### **3. ADOLESCENT REPRODUCTIVE HEALTH AND BEHAVIOR**

At the same time that school enrollment among adolescents, particularly adolescent girls, has been rising rapidly, the concern for adolescent reproductive health has intensified. Yet, it is not immediately obvious whether students are more or less likely than their non-enrolled peers to engage in behaviors that compromise reproductive health. Furthermore, the health consequences of various reproductive behaviors will vary by context

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<sup>6</sup> These are based on special tabulations from DHS that are not shown here.

<sup>7</sup> The index is based on a common set of indicators capturing the ownership of a set of consumer durables (e.g., a radio, bike, car, etc.) as well as various quality of housing indicators, including the availability of piped water, electricity, and finished flooring (Filmer and Pritchett 1999).

depending on the service environment and on the prevalence of sexually transmitted infections in the population, most particularly HIV/AIDS.

Recent data from WHO (2001) show the distribution of the leading causes of death among young people aged 15–29<sup>8</sup> by region and by sex. Here we focus on two of the six major causes of death related to reproductive health: maternal mortality and mortality due to HIV. First, maternal causes remain important causes of death for young women in most developing regions except East Asia, but are no longer the leading cause in any region (see Figure 7). On average, deaths due to maternal causes constitute roughly 15 percent of all deaths among young women. Second, for this age group, HIV/AIDS is a relatively unimportant cause of death in East Asia, Latin America and the Middle East, represents about 12-13 percent of all deaths in South Asia, and is the leading cause of death in Sub-Saharan Africa. Indeed, 58 percent of all deaths among young women in this age group and 43 percent of all deaths among young men are attributable to HIV in sub-Saharan Africa. Therefore, for young women in all regions but sub-Saharan Africa, behaviors that lead to early marriage and/or childbearing or that lead to unwanted pregnancy and abortion contribute to a much greater extent than does HIV to reproductive ill-health. In sub-Saharan Africa, unprotected sex among adolescents is particularly risky, given the much greater chance of contracting HIV. Thus early marriage, childbearing, and unprotected sex are the behaviors most directly associated with poor reproductive health outcomes for young people.

Data on adolescent reproductive behaviors come from DHS surveys of reproductive-aged men and women who are identified as being aged 15 and above in the household survey. In many Asian and Middle Eastern countries, however, never married women are not interviewed in the DHS, thus confining our exploration of some aspects of adolescent reproductive behavior to sub-Saharan Africa and Latin America as well as the Philippines and several central Asian countries that were formerly part of the Soviet Union. Among the recent set of surveys currently available, all have data on reproductive aged women and some have data on reproductive aged men. Sample sizes are typically smaller in the male surveys, which can occasionally limit some analyses. In these surveys, young men and women are asked about sexual experience, contraceptive use, pregnancy and childbearing. They are also asked about whether or not they are currently attending school and how many grades they have attained.

### 3.1 Early marriage and childbearing

Despite recent declines in the rates of early marriage, marriage before the age of 18 (the internationally recognized age of adulthood) remains very prevalent among girls in sub-Saharan Africa and South Asia but relatively rare for young men. Among 20-24-year-old women in the late 1990s, 45 percent in Western and Central Africa, 42 percent in South Asia, 37 percent in Eastern and Southern Africa, and 35 percent in the Caribbean and Central America are still marrying before the age of 18 (Mensch, Singh and Casterline 2005). As the majority of childbearing occurs after marriage (over 90 percent) and childbearing tends to follow marriage fairly immediately, rates of early childbearing also

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<sup>8</sup> Unfortunately it is not possible to create a more refined age breakdown.

remain high despite rapid declines (data not shown). Figure 8 shows levels and trends in early childbearing for young women. Most countries have recorded substantial declines but rates remain, above 30 percent in Bangladesh and in many sub-Saharan African countries and as high as 28% in India. Thus in many countries, child marriage remains an important factor in adolescent reproductive health. Because marriage and motherhood are extremely rare among currently enrolled students, rising enrollment rates among teens may contribute to a reduction in childbearing among adolescents in countries where very early childbearing is still an issue (see further discussion below).

### 3.2 Unprotected Sex among adolescents

Analogous data on pregnancy and abortion rates are not available but qualitative data suggest that abortion is an important factor influencing overall maternal morbidity and mortality among adolescents because of the circumstances in which abortions to adolescents occur. Data assembled by AGI (1999) suggest that young women are not necessarily more likely to have an abortion, but they are more likely to delay it and use less skilled providers. A common reason given for an induced abortion among adolescent girls is to stay in school (Bankole et al 1999).

The relative importance of HIV varies enormously by region, representing a minor cause of death for young men and women in East Asia, Latin America and North Africa and the Middle East, over 10 percent of deaths in South Asia and 58 percent and 43 percent of all deaths for young women and men respectively in sub-Saharan Africa as noted above. Because of the heavy toll of deaths in Africa at these ages, HIV emerges as the leading cause of death among adolescents worldwide even though it is relatively unimportant as a cause in most other developing country regions. Except in sub-Saharan Africa, the risks faced by young women and men are roughly the same during these years. In environments where HIV poses a significant risk, unprotected sex and other sexual behaviors including multiple partners, sex in exchange for money or favors, and coercive sex are much more likely than in other environments to lead to long term negative health consequences.

In traditional societies, the onset of puberty was often linked fairly immediately with sexual debut and the transition to marriage. Improvements in health and education over the years, however, have created a prolonged period of adolescence during which time there is an increasing premium on learning and the development of marketable skills prior to the assumption of adult responsibilities. During this prolonged adolescence, it is often assumed that globalization and the spread of youth culture have led to a decline in the age of sexual initiation world wide. The reality is much more complex. Actual trends in the percent sexually active by age result from the competing influences of delays in the age of marriage and a rise in the percent initiating sex outside marriage.

In Table 2, we show trends over the past twenty years in the percent marrying, having premarital sex by age 18, and having sex by 18 for young women living in 41 countries in

Africa (27), Asia (5) and Latin America (9) participating in the DHS in the 1990s.<sup>9</sup> These data make clear that there has been no consistent trend across these countries during the 1990s towards earlier initiation of sex, particularly in sub-Saharan Africa where adolescents are at greatest risk due to HIV. In Latin America, there have been recent declines in the percent marrying by 18 in 6 of the 9 countries with data and recent rises in the percent having premarital sex in 3 of the 9 countries. The net result of these changes has been a rise in the percentage having sex by age 18 in only two of these countries; in the rest there was either a decline or no change. In sub-Saharan Africa, of the 27 countries with recent data on trends, there has been a decline in the percent marrying before 18 in 24 countries and no change in 3 countries. The percent having premarital sex by age 18 has risen in 20 countries, and remained unchanged in 7 countries. Nonetheless, the net result of these changes is that in the majority of sub-Saharan African countries, there has been no rise in the percent having sex before 18; instead, in the majority of countries the percent having sex before 18 has either remained unchanged (14 countries) or fallen (8 countries). Thus, it would appear that in recent years, there is no evidence of a consistent trend towards greater sexual activity among teens – a prerequisite for negative trends in reproductive health outcomes. Instead, we see a change in the context of sexual initiation with premarital sex becoming increasingly likely as the age of marriage rise.

A final question is whether or not adolescents are more likely to be sexually active if they are poor. In Figure 9, we compare percent of 15–17-year-olds who are sexually active by socioeconomic status using the definitions described above for Figure 6. For a majority of countries with data, girls of this age are more likely to be sexually active if they are poor. Among boys, however, in some countries the richer boys are more likely to be sexually active, in some others sexual activity rates do not vary by socioeconomic status, and in a few activity rates are higher among the poor. Further evidence of the potential relationship between poverty and risky sex comes from an analysis of survey data from KwaZulu-Natal Province, South Africa where HIV prevalence rates are among the highest in the world (Hallman 2004). In this setting, the poor are more likely than the non-poor to have engaged in a variety of sexual behaviors associated with high risk including multiple partners, sex for money, and coercive sex. Furthermore, low socioeconomic status has more consistent negative effects on female than on male sexual behavior.

#### **4. SCHOOLING AND ADOLESCENT REPRODUCTIVE BEHAVIOR**

Poor health is the outcome of many forces beyond a young person's control, including the disease environment, family circumstances, and personal vulnerability. However, individual behavior also affects health during adolescence. In particular, unprotected sex

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<sup>9</sup> The analysis is based on retrospective reporting and uses multiple decrement life tables to model premarital sex and marriage (without prior premarital sex) among young women as competing risks (NRC/IOM 2005). Thus, the analysis looks at the likelihood that a virgin will make a transition into marriage or engage in sex prior to marriage by age 18. The Asian countries covered by DHS are primarily former Soviet countries from Central Asia that do not have patterns typical of other parts of Asia. Trends are derived from a comparison of young women ages 20–24 and 40–44. Unfortunately, most DHS surveys in Asia have ever married samples.

and/or early marriage, which can lead to STIs, HIV/AIDS, and pregnancy, carry many risks for young people, including most immediately the risk of school dropout. Thus we would expect that students with better resourced and more supportive families, as well as students doing well academically and receiving encouragement from their teachers, would be more likely than others to take steps to avoid the risk of dropout by either avoiding sex, engaging in protected sex, taking steps to terminate unwanted pregnancies before detection, or pressuring their parents to refuse or delay early offers of marriage. Observed differences in behavior between students and non-students cannot necessarily be assumed to be caused by differences in school exposure and experience, because common individual and family factors may simultaneously encourage school success and the avoidance of risk or early marriage among some, and school failure and risk taking or early marriage among others. Nonetheless, differences in the duration of school exposure and experience between students and non-students are likely to be among the factors influencing the behavior of students and non-students during their teenage years. The mean grades attained by those currently enrolled typically exceed the mean grades attained among the non-enrolled by 50 percent or more, suggesting the possibility that differences in exposure to the school environment could be important.<sup>10</sup>

School, the institution outside the family that plays the most important role in the socialization of the young, has the potential to influence directly students' aspirations, motivations and risk taking behaviors. In an in-depth study of the role of school quality in school dropout and premarital sex in Kenya, Mensch et al. (2001) and Lloyd et al. (2000) found that the attitudes and behaviors of teachers towards their students can affect the likelihood of premarital sex while in school and the likelihood of dropout, particularly for girls. This study, which combined direct observations of teacher and student behavior in the classroom with a community based survey of adolescents and their families, found that girls are more likely to engage in premarital sex and also more likely to drop out when they are not treated equitably in the classroom.

There are multiple behavioral pathways through which such an association between schooling status and adolescent reproductive behavior might work, including differences between students and non-students in sexual activity, in risky sexual behaviors (e.g., unprotected sex, multiple sexual partners, sex in exchange for money or gifts, coercive sex), in contraceptive use (or more particularly condom use), in the incidence of unsafe abortion, and in the incidence of early marriage and childbearing. In the discussion below we will explore several of these pathways. However the lack of data precludes a discussion of differences between students and non-students in risky sexual behaviors and the incidence of unsafe abortion. Suffice it to say that it is the poor who are least likely to be in school and also most likely to engage in risky sexual behavior. Further research, however, is needed to explore these relationships.

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<sup>10</sup> For each of the 50 countries with DHS data on schooling, the ratio of the mean grades attained for the currently enrolled relative to the mean grades attained for the non-enrolled among unmarried young men and women aged 15-17 was calculated. In all but 4 countries ( Haiti, Armenia, Kyrgyz Republic and Uzbekistan) ratios exceed one. In 60 percent of countries ratios are 1.5 or higher; in 40 percent of countries ratios are greater than or equal to 2.0. High ratios ranging in value from 5 to 14 are found in 5 sub-Saharan African countries for young men and for 8 sub-Saharan countries for young women.

#### 4.1 Sexual initiation and schooling status

Figure 10 compares the percent among unmarried 15–17-year-olds reporting that they ever had sex, according to enrollment status, for boys and girls separately. Because the likelihood of premarital sex rises sharply with age and the percent enrolled falls with age during these years, rates are age standardized for girls because sample sizes typically permit the estimation of rates for single years of age. For girls, the average age distribution for all 31 countries with available data is used to calculate a weighted average of age-specific rates. While reported rates of sex vary more widely across countries for boys than for girls, it appears true for both sexes, and more consistently so for girls, that sexual initiation is more likely to have occurred among the non-enrolled than among the enrolled at these ages.

As students are a selective sample of all adolescents, it is interesting to see whether or not differences between students and non-students in reported sexual experience vary by the overall percent enrolled at this age. The higher the percent in school, the less selective a population students are relative to non-students. In all but four countries, the ratio of the percent of unmarried women aged 15–17 who ever had sex among those not currently enrolled to the percent of the same age group who have ever had sex among the enrolled exceeds one (Figure 11).<sup>11</sup> Furthermore, a rise in the percent in school does not appear to reduce the strength of the association. Quite the contrary, if anything, the behavioral benefits associated with being a student seem to strengthen with a rise in overall enrollment rates at these ages.

#### 4.2 Contraceptive use and schooling status

Contraceptive use and condom use can also be compared by school status in the same way (Figures 12 and 13). The main problem here, however, is that, because of the relatively low levels of sexual activity at this age, sample sizes become compromised in many countries. After eliminating data from countries where the sample size falls below 30, we are able to compare contraceptive use and condom use among 15–17-year-olds who are sexually active and unmarried according to school status. These data represent countries predominantly in sub-Saharan Africa, with data from 12 countries for boys and 18 countries for girls. Figure 12 shows that rates of contraceptive use for girls are typically higher among the enrolled; similar patterns are apparent for the boys but for fewer countries. Figure 13 reveals that girls report very low levels of condom use among their sexual partners, but slightly higher rates are reported in some countries for students. Reported rates of condom use vary more widely for boys at this age and again are more likely to be reported as greater among students.

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<sup>11</sup> The ratio could not be calculated for Niger and Uzbekistan because there were no students in the sample reporting that they had ever had sex.

### 4.3 School exit and marriage timing

Discussions of early marriage often focus on its negative consequences for schooling. The assumption is that girls who are married off early by their parents are forced to drop out of school prematurely and that the elimination of child marriage would contribute to a further growth in enrollment rates during the teen years. However, in most settings where marriage is early, school enrollment during the years when marriage becomes common is already very low. Indeed, even among those who stay in school into the adolescent years, there tends to be some gap in years between the timing of school exit and the timing of marriage.

Recent data from Pakistan based on a nationally representative survey fielded in 2001-02 provide a good illustration of this point (Lloyd and Grant 2005). Figure 14 provides a comparison of marriage timing for those who never attended school and for those who attended school using life table analysis. First we can see that the transition to marriage occurs much earlier for those who never attended school. Indeed, among those never attending school, 50 percent have married between the ages of 18 and 19. Second, we can see that among those who ever attended school, there is a sizeable gap in years between school exit and first marriage. For example, of those who ever attended school, 50 percent have exited school by age 16 but it is not until age 24 that roughly 50 percent have married. Similar findings can also be shown for other countries.

Indeed, a recent analysis of changes in the percentage of 20–24 and 40–44-year-old women married by age 18 as a function of changes in grades of school attained in 49 DHS countries indicates that although the decline in the percent marrying early is associated with the rise in mean grades attained over the past twenty years, the association ( $R = -.46$ ) is weaker than many might have expected (Mensch et al. 2005). These aggregate results could be partially explained by the fact that in many countries, as noted above, a delay in school exit does not necessarily lead to a delay in marriage if most still leave school at an age when relatively few are yet married. In the future, however, this relationship could begin to strengthen if further delays in school exit begin to encroach on traditional patterns of marriage timing.

### 4.4 Pregnancy among schoolgirls

The term “schoolgirl pregnancy” draws attention to the risks schoolgirls face when they stay in school beyond the age of sexual maturity. Anyone who has lived or traveled in Africa and read the local papers, is familiar with the attention given to this issue. In most countries, schoolgirls whose pregnancies are detected are required to drop out of school, at least temporarily. While in many settings rules are currently being liberalized to provide for the possibility of reentry, reentry rates among new mothers tend to be low. Thus, there is a high cost associated with becoming known to be pregnant while still in school. A pregnant schoolgirl has to choose between dropping out of school or undergoing an abortion that is typically illegal, and therefore likely to be unsafe, in order to remain in school. Boys who get girls pregnant do not face these risks.

A growth in the percent of girls attending school after puberty inevitably leads to a rise in the risk of pregnancy among students. Figure 15 maps the variation across countries in the percentage of births to 15–19-year-old girls that were reported to have led to school drop out, according to the percent enrolled. The rates for South Africa are atypically high, possibly due to the availability of a government child care grant for new mothers. The percent of births due to pregnancy while in school at these ages ranges from one to 25 percent (excluding South Africa) as enrollment rates rise from 10 to 70 percent, with a growing range of values at higher levels of enrollment. However, the percent of all births to adolescents (aged 15–19) that are attributable to schoolgirl pregnancy are no higher than 25 percent of all pregnancies but can be as low as 10 percent in countries where 60 to 70 percent of students are still enrolled in school. Thus, even in the most extreme case, the 70 percent of the adolescents attending school contributed no more than 25 percent of all births and therefore the 30 percent of the adolescents who are not enrolled contributed no less than 75 percent of the births.<sup>12</sup>

Rarely do more than 10 percent of those who have dropped out of school report pregnancy as the reason (Figure 16). In half the countries where recent data have been collected, reported rates fall below 5 percent. While all of those reporting pregnancy as a reason for dropout did indeed have a birth, it is still likely that these self-reports often capture the proximate but not the underlying causes of dropout. Many factors in the school environment may be discouraging to girls. Girls who are less motivated to continue are likely to be the ones who are more likely to have unprotected sex and more likely to take their pregnancies to term than their more motivated and more successful sisters. We never hear about the pregnancies that were terminated and, therefore, those who get pregnant but find a way to terminate the pregnancy in order to continue in school are likely to report other reasons for dropout. Policies designed to reduce the risk of pregnancy among those who want or need to leave school for other reasons are unlikely to have a significant effect on dropout rates unless they are combined with other educational policies designed to enhance the quality and equity of the learning environment.

## 5. CONCLUSIONS AND IMPLICATIONS

In this paper, data have been presented to demonstrate the rapid rise in the percent of sexually mature adolescents attending school, with the current pace of increase among girls outstripping the pace of change for boys. These trends indicate that an increasing proportion of young women and men's adolescent years will be spent attending school. The gap in enrollment during this phase of life between the poor and the better off remains large, however, with new challenges ahead if school systems are going to effectively integrate more disadvantaged students into the educational mainstream. Furthermore, there remain enormous variations across countries in whether or not the majority of sexually mature adolescents are attending primary or secondary school. These variations primarily reflect country differences in the extent of post-primary educational opportunities.

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<sup>12</sup> This is an underestimate of the difference as some of those no longer in school were in school at the time they were pregnant.

We have also shown that the behaviors leading to poor reproductive health during the adolescent years include unprotected sex and early marriage, both behaviors that are less common among students. While individual and family factors may simultaneously encourage school success and the avoidance of risk or early marriage among some and school failure and risk taking or early marriage among others, differences in the duration of school exposure and experience between students and non-students are likely to be among the factors that differentiate the reproductive behaviors of students and non-students during the adolescent years. Indeed, it is possible that the lack of a recent trend toward greater sexual activity among teens, could be partially explained by rising school enrollment among adolescents.

In conclusion, sexual maturation is increasingly likely to occur while in school. Being in school as an adolescent is, therefore, likely to have important implications for adolescent reproductive health. The paper presents data supportive of the view that expanding opportunities for secondary schooling could represent one of the most significant reproductive health interventions for youth. At the same time, these data suggest that investments in adolescent reproductive health can contribute to the achievement of gender equity in schooling, given that girls' reproductive health during the adolescent years is at greater risk than boys.

A research agenda emerges from these observations that will require new alliances between experts in schooling and those in adolescent reproductive health. First: what features of schools, both primary and secondary, are most likely to encourage (1) delays in sexual initiation, (2) reductions in the incidence of risky sexual behaviors, (3) the consistent use of contraception and protection among the sexually active, and (4) delays in marriage and childbearing among young women? Second, what reproductive behaviors carry the greatest risk for students in terms of school progress and dropout: (1) unprotected sex, (2) abortion, (3) marriage, (4) childbearing? The answers will vary by context but without these answers efforts to expand secondary schooling for young people on the one hand, and to improve adolescent reproductive health on the other, will be handicapped.

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**Table 1** - List of Countries with Recent DHS Surveys Used in Analysis, including Estimates of Youth Population, Dates of Surveys, and Sample Sizes

Country	Survey Date(s)	Youth Population 10-24 UN database, 2000 (in thousands)	Household Sample Size	Female Sample Size, 15-49	Male Sample Size
1 Armenia	2000	1,068	5,980	6,430	1,719
2 Bangladesh	1999-00	44,726	9,854	10544**	2,556
3 Benin	1996 (2001)	2,115	5,796	6,219	2,709
4 Bolivia	1998	2,601	12,109	11,187	3,780
5 Brazil	1996	50,868	13,283	12,612	2,949
6 Burkina Faso	1998-99	3,976	4,812	6,445	2,641
7 Cameroon	1998	4,996	4,697	5,501	2,562
8 Central African Republic	1994-95	1,199	5,551	5,884	1,729
9 Chad	1996-97	2,491	6,840	7,454	2,320
10 Colombia	2000	12,346	10,907	11,585	
11 Comoros	1996	240	2,252	3,050	795
12 Cote d'Ivoire	1998-99	5,595	2,122	3,040	886
13 Dominican Republic	1996 (1999)	2,603	8,831	8,422	2,279
14 Egypt	2000	21,991	16,957	15,573	
15 Ethiopia	1999	19,988	14,072	15,367	2,607
16 Ghana	1998-99	6,581	6,003	4,843	1,546
17 Guatemala	1998-99	3,830	5,587	6,021	
18 Guinea	1999	2,637	5,090	6,753	1,980
19 Haiti	2000	2,881	9,595	10,159	3,171
20 India	1998-00	298,291	92,486	90,303	
21 Indonesia	1997	64,059	34,255	28,810	
22 Jordan	1997	1,610	7,335	5,548	
23 Kazakhstan	1999	4,631	5,844	4,800	1,440
24 Kenya	1998	11,306	8,380	7,881	3,407
25 Kyrgyz Republic	1997	1,533	3,672	3,848	
26 Madagascar	1997	5,025	7,171	7,060	
27 Malawi	2000	3,722	14,213	13,220	3,092
28 Mali	2001	3,652	12,285	12,817	3,390
29 Morocco	1992	9,501	6,577	9,256	1,336
30 Mozambique	1997	5,848	9,282	8,779	2,335
31 Namibia	1992	572	4,101	5,421	
32 Nepal	2001	7,152	8,602	8,726	2,261
33 Nicaragua	1997 (2001)	1,715	11,528	13,634	2,912
34 Niger	1998	3,505	5,928	7,577	3,542
35 Nigeria	1999	37,637	7,647	9810**	2,680
36 Pakistan	1990-91	44,432	7,193	6,611	1,354
37 Paraguay	1990	1,751	5,683	5,827	
38 Peru	2000	8,058	28,900	27,843	
39 Philippines	1998	24,319	12,407	13,983	
40 Rwanda	2000	2,689	9,696	10,421	2,717
41 Senegal	1992-93 (1997)	3,082	3,528	6,310	1,436
42 South Africa	1998-00	13,715	12,247	11,735	
43 Togo	1998	1,496	7,517	8,569	3,819
44 Turkey	1998	19,311	8,059	8,576	1,971
45 Uganda	2000-01	7,757	7,885	7,246	1,962
46 United Repub of Tanzania	1999	11,845	7,000	4,029	6,000
47 Uzbekistan	1996	8,152	3,703	4,415	
48 Vietnam	1997	25,053	7,001	5,664	
49 Zambia	1996-97 (2001-02)	3,521	7,286	8,021	1,849
50 Zimbabwe	1999	4,489	6,369	5,907	2,609

\* Male sample age ranges vary by country, falling within 12-70 years

\*\* Female sample age range 10-49 for this country

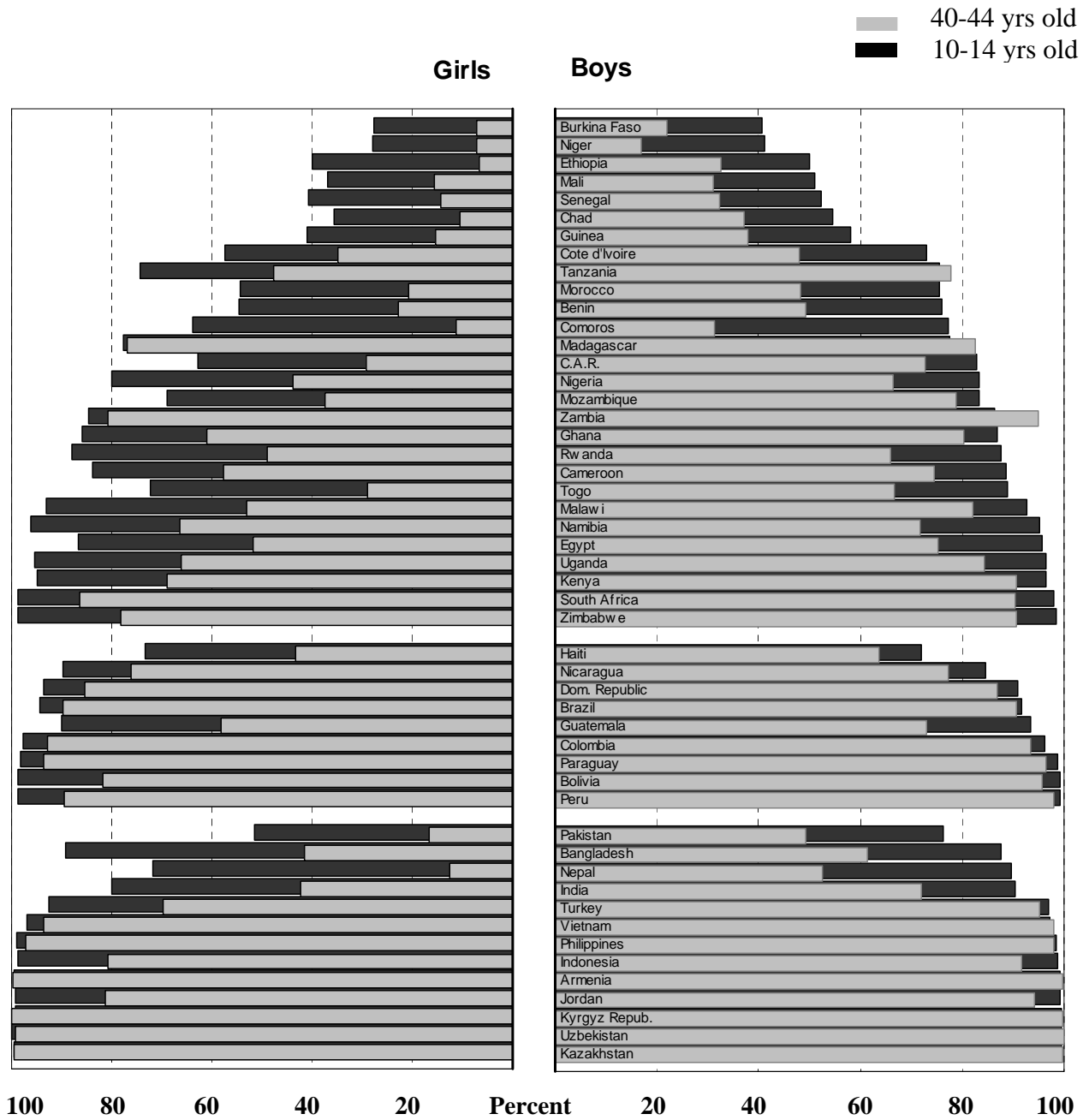
**Table 2** Direction of change in probability of women marrying, having premarital sex, and having sex by age 18: Comparison of 20–24-year-olds and 40–44-year-olds, DHS Surveys (1990-2003). Significant difference.

	<b>Number of countries</b>	<b>Increase</b>	<b>No change</b>	<b>Decrease</b>
<b>Marriage</b>				
Africa	27	0	3	24
Asia	5	1	3	1
Latin America/ Caribbean	9	0	3	6
<b>Total</b>	<b>41</b>	<b>1</b>	<b>9</b>	<b>31</b>
<b>Premarital Sex</b>				
Africa	27	20	7	0
Asia	5	1	4	0
Latin America/ Caribbean	9	3	5	1
<b>Total</b>	<b>41</b>	<b>24</b>	<b>16</b>	<b>1</b>
<b>Having Sex</b>				
Africa	27	5	14	8
Asia	5	2	2	1
Latin America/ Caribbean	9	2	3	4
<b>Total</b>	<b>41</b>	<b>9</b>	<b>19</b>	<b>13</b>

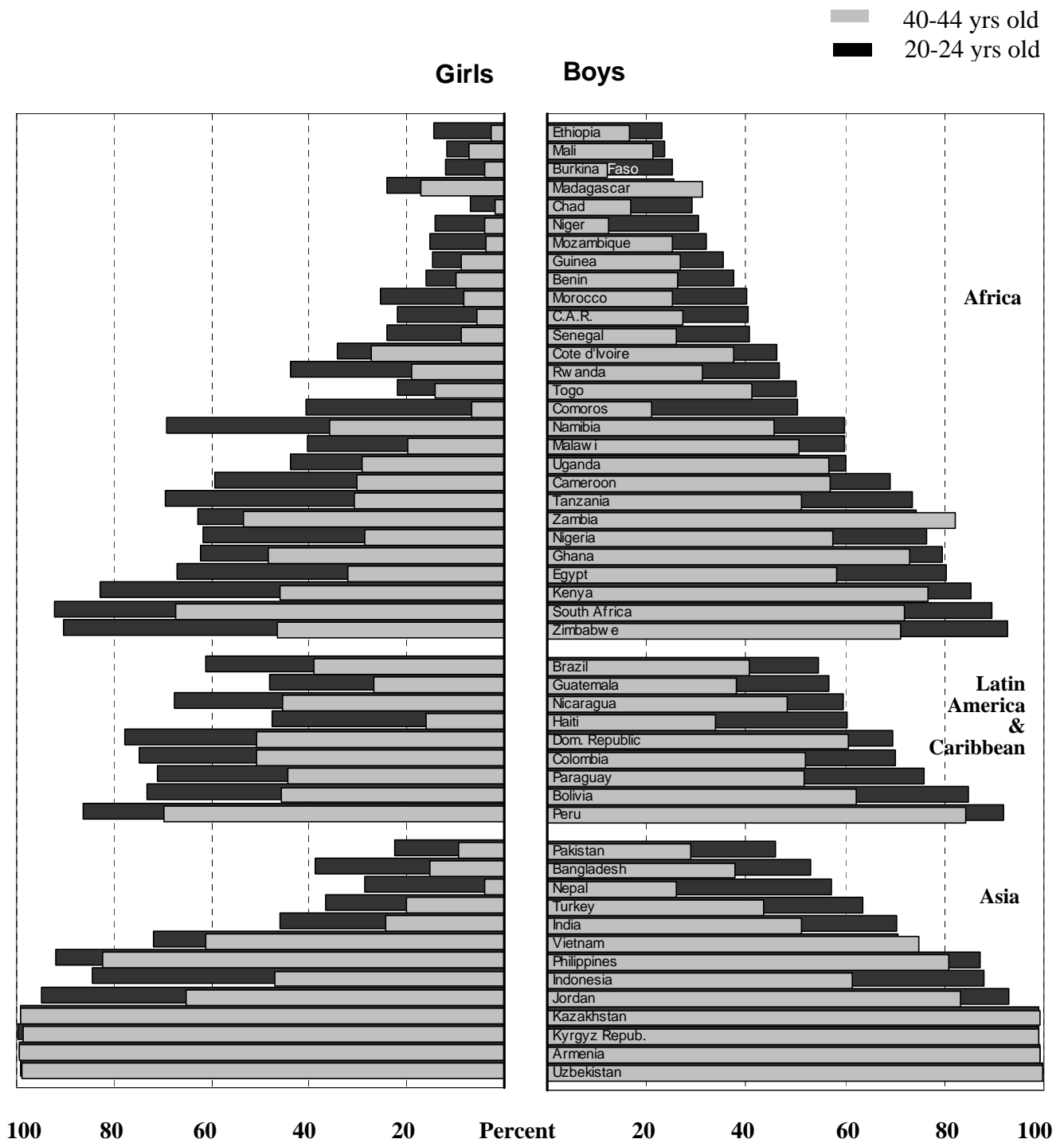
Note: Differences between age groups are based on a likelihood ratio test. “No change” implies no significant change.

Source: NRC and IOM 2005.

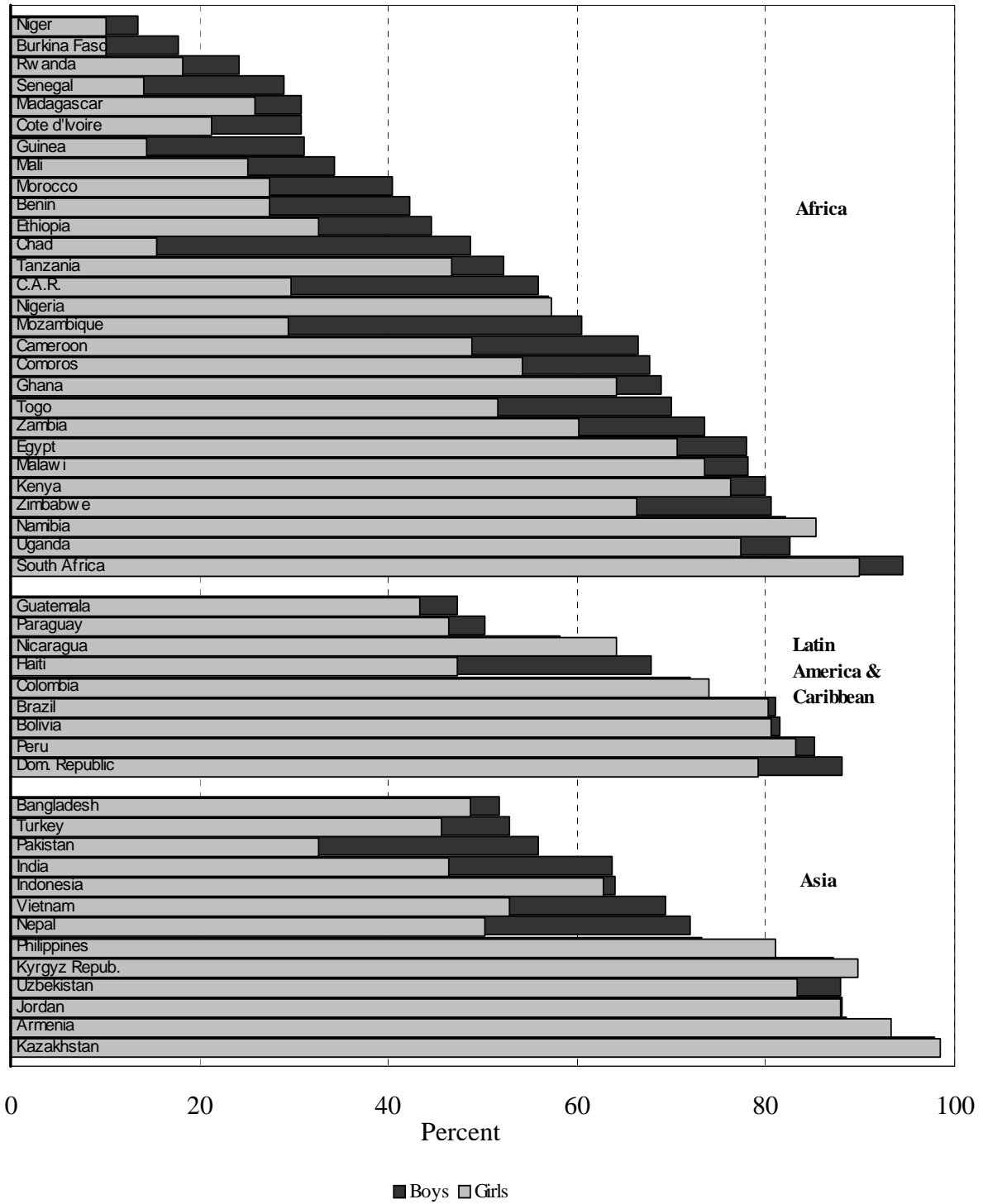
**Figure 1** Percent ever attended school by cohort



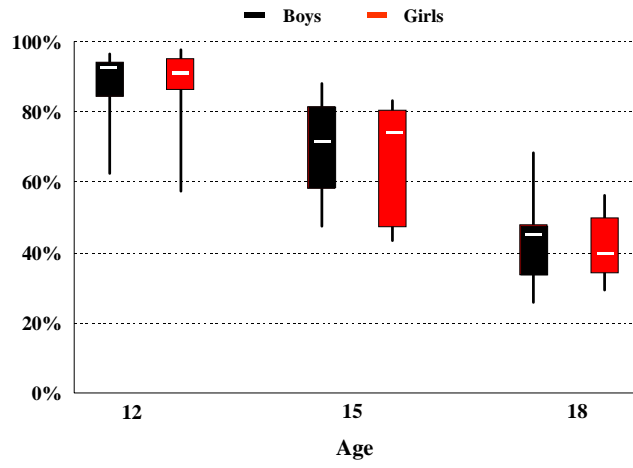
**Figure 2** Percent completed 6 or more grades of school by cohort



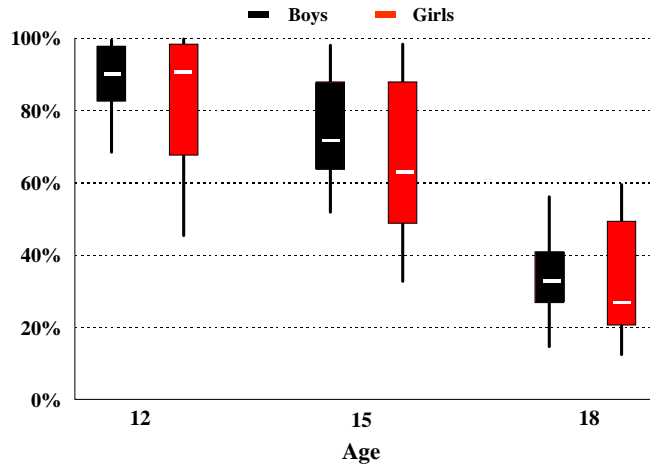
**Figure 3** Percent currently enrolled among 15-year-olds



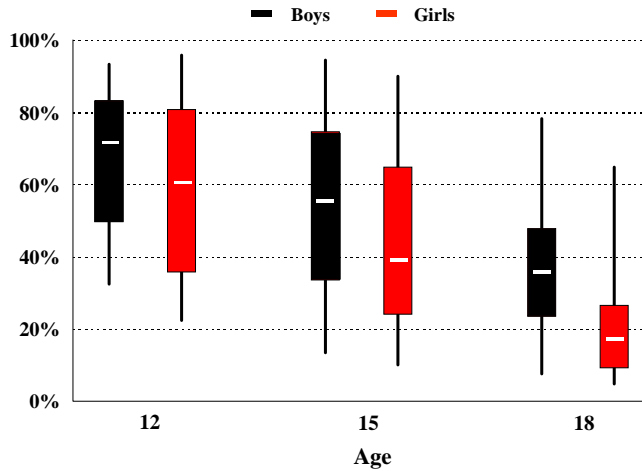
**Figure 4** Distribution of percent currently enrolled, ages 12, 15, and 18  
(median, quartiles, range)  
**9 Latin American & Caribbean Countries**



**13 Asian Countries**

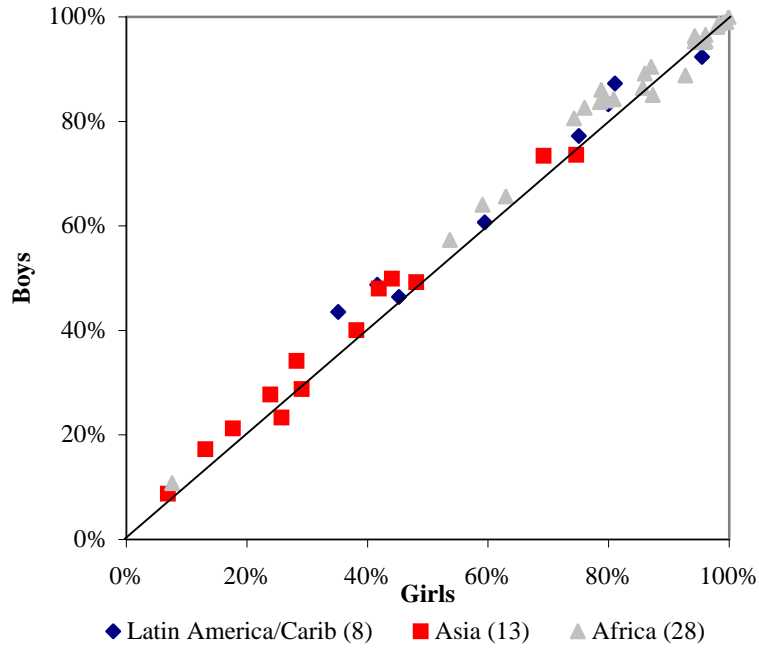


**28 African Countries**

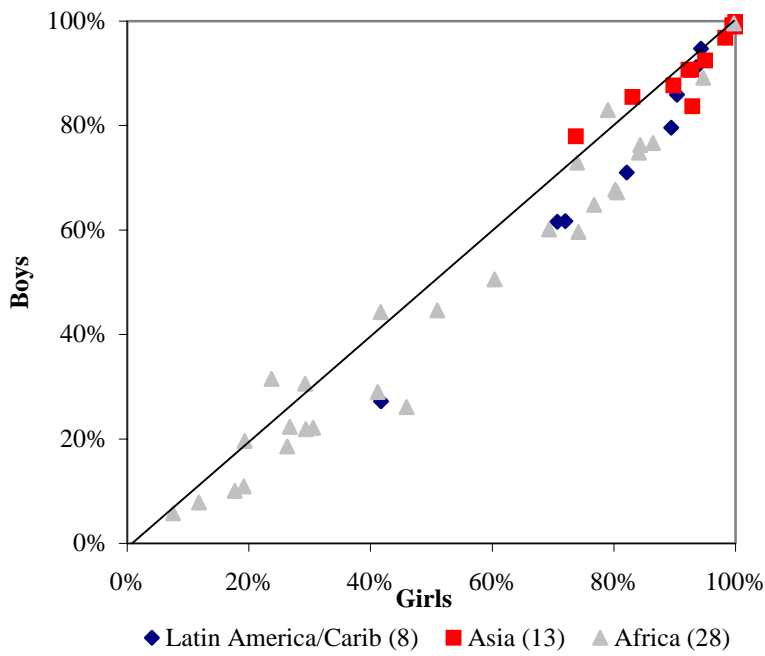


**Figure 5** Percent of students enrolled, by level

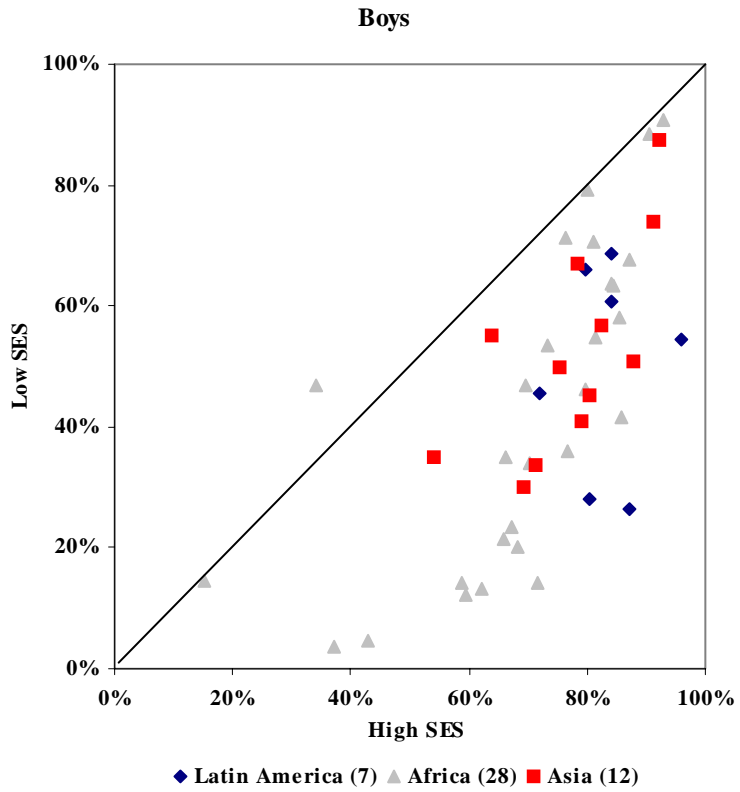
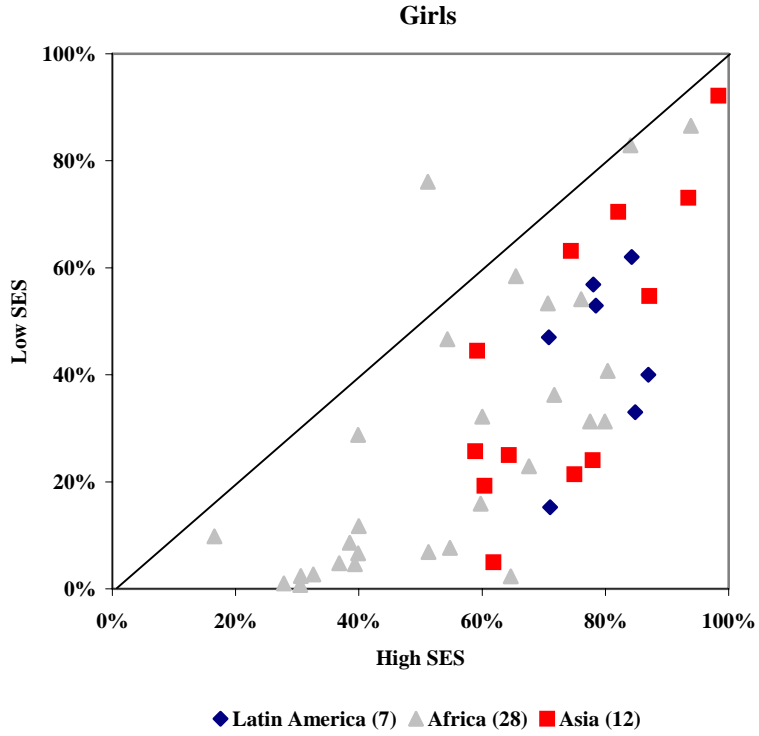
**(a) Aged 12-14 enrolled in primary**



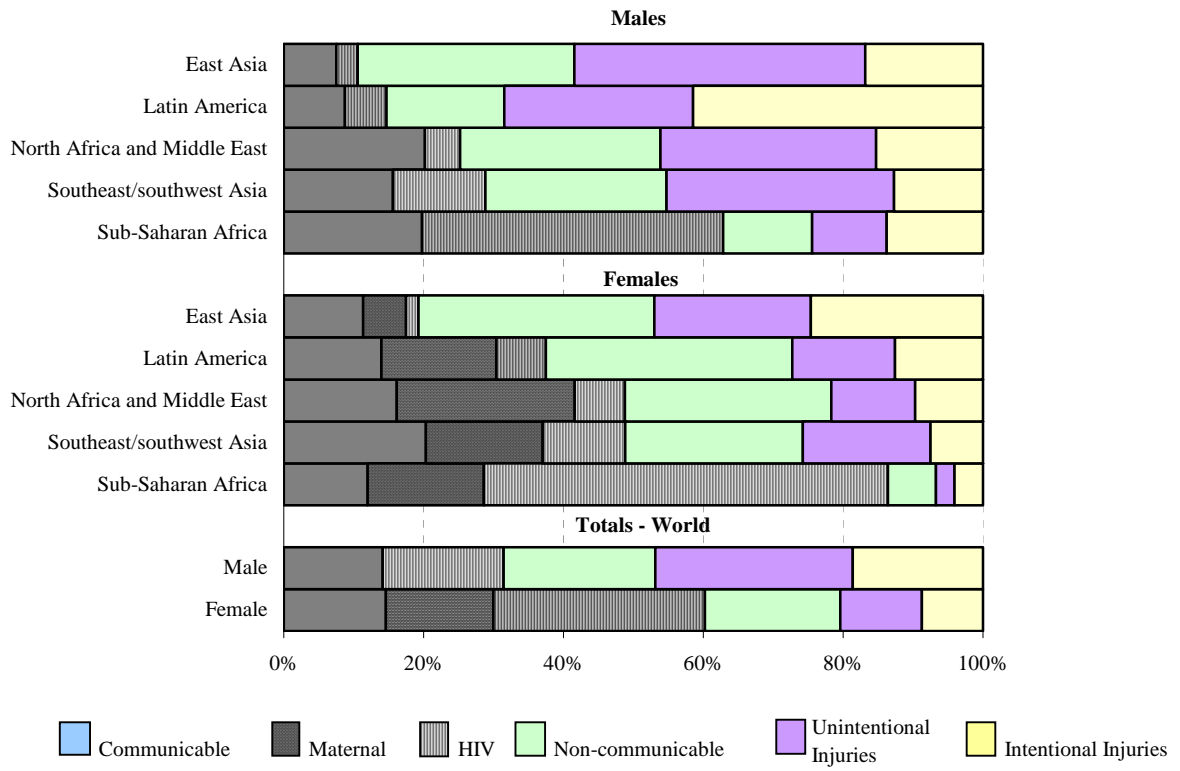
**(b) Aged 15-17 enrolled in secondary and above**



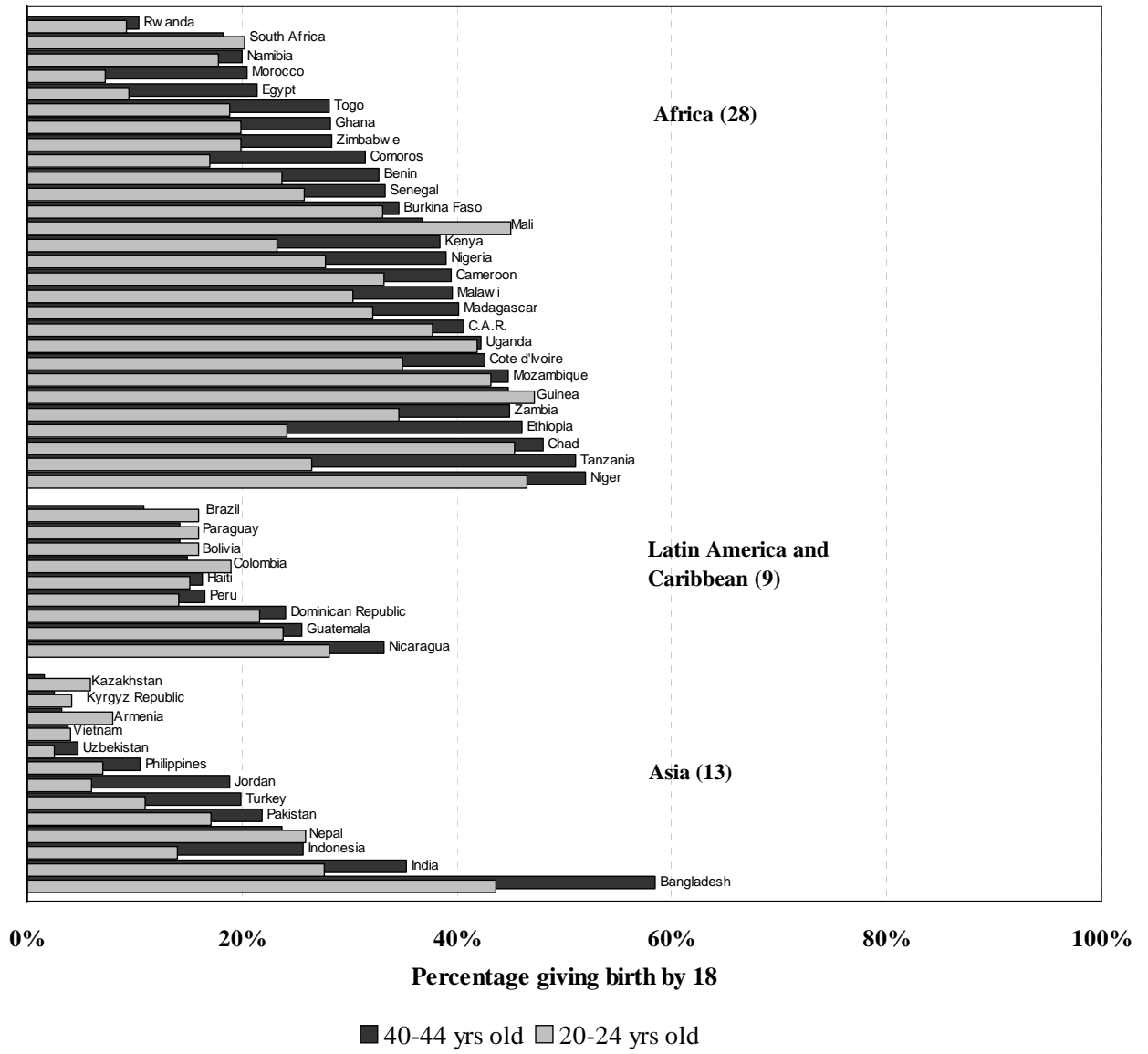
**Figure 6** Percent aged 15-17 currently enrolled, by socio-economic status



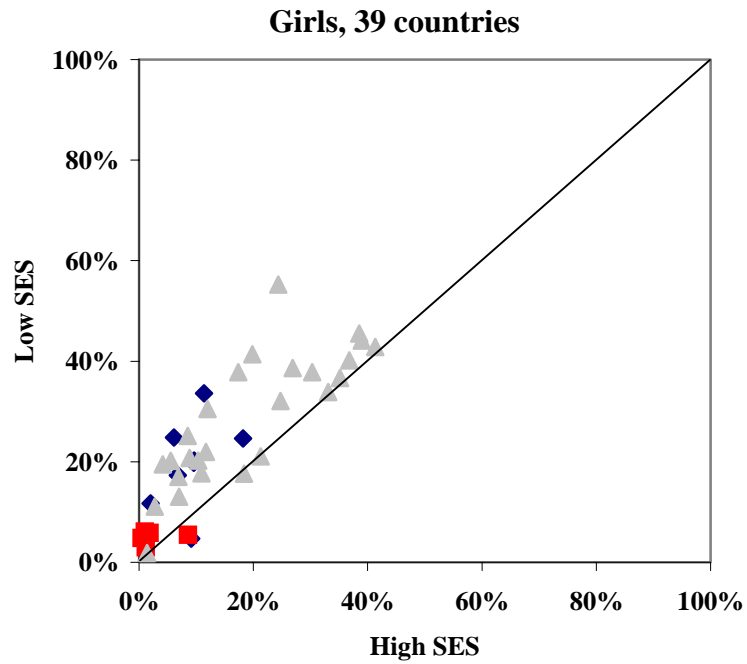
**Figure 7** Percentage distribution of deaths in developing countries at ages 15–29 by cause, according to sex and region



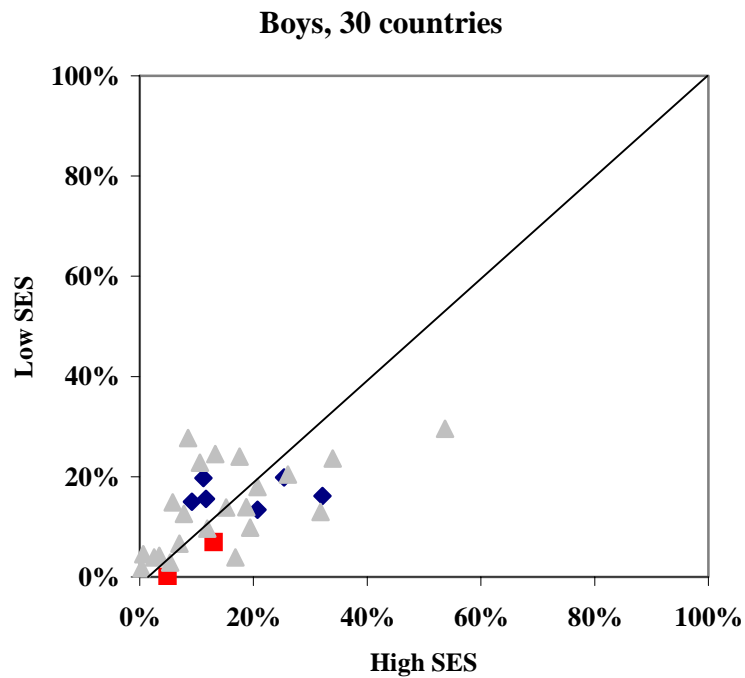
**Figure 8** Percent of Women Giving Birth by Age 18, by Cohort



**Figure 9** Percent sexually active, by socio-economic status (unmarried 15–17-year-olds)



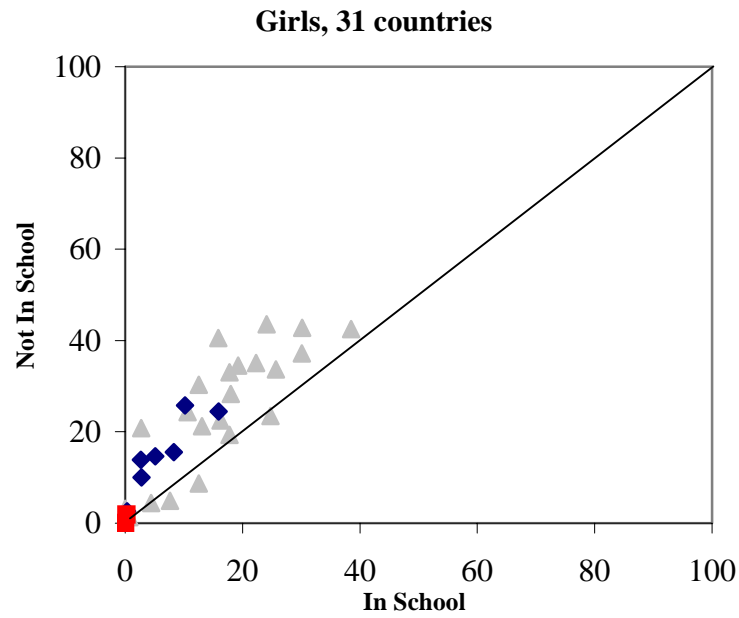
Note: Age standardized



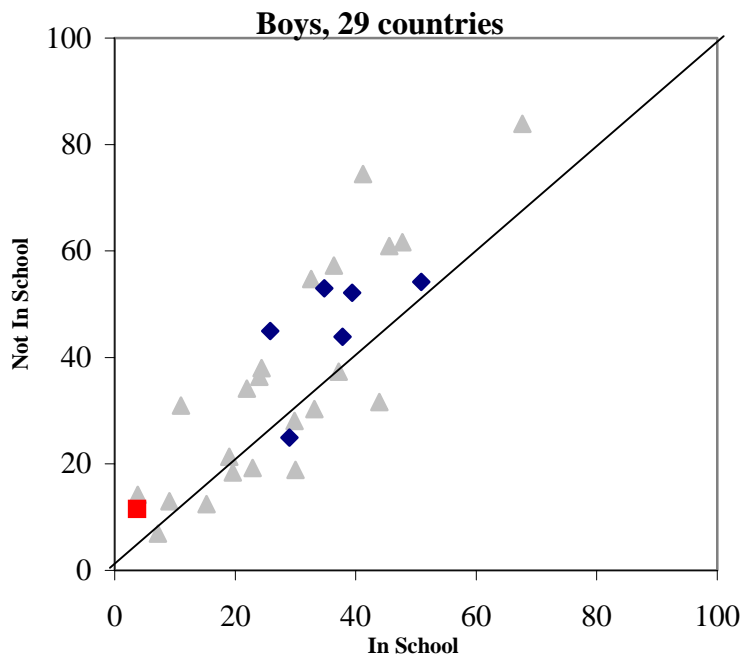
Note: Not age standardized

◆ Latin America & Caribbean    ■ Asia    ▲ Africa

**Figure 10** Percent ever had sex, by enrollment status(unmarried 15–17-year-olds)



Note: Age standardized

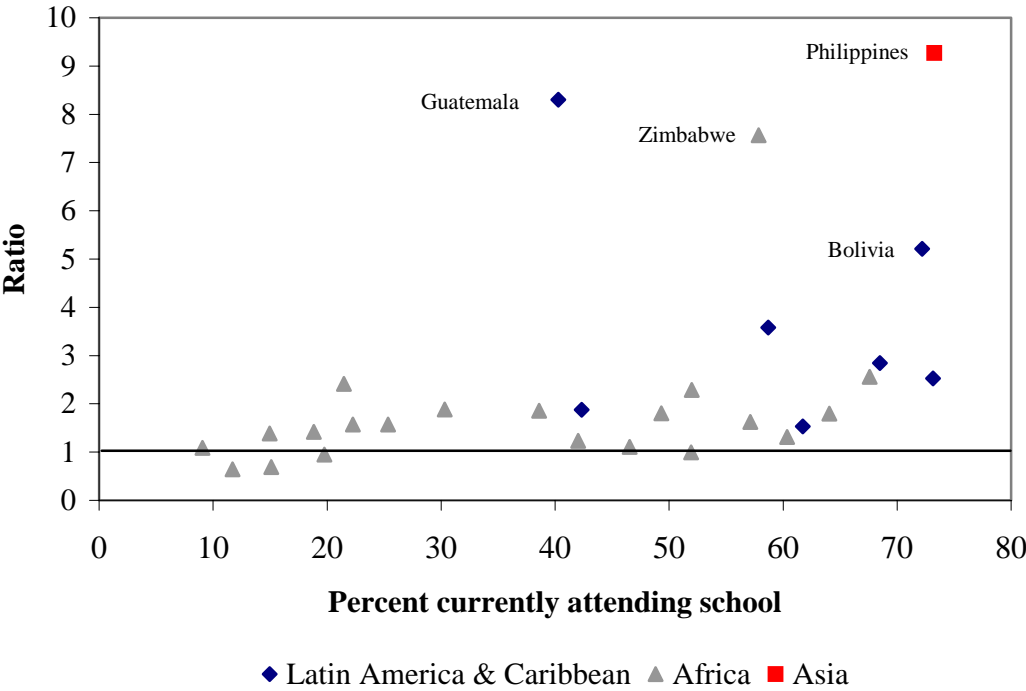


Note: Not age standardized

◆ Latin America & Caribbean    ■ Asia    ▲ Africa

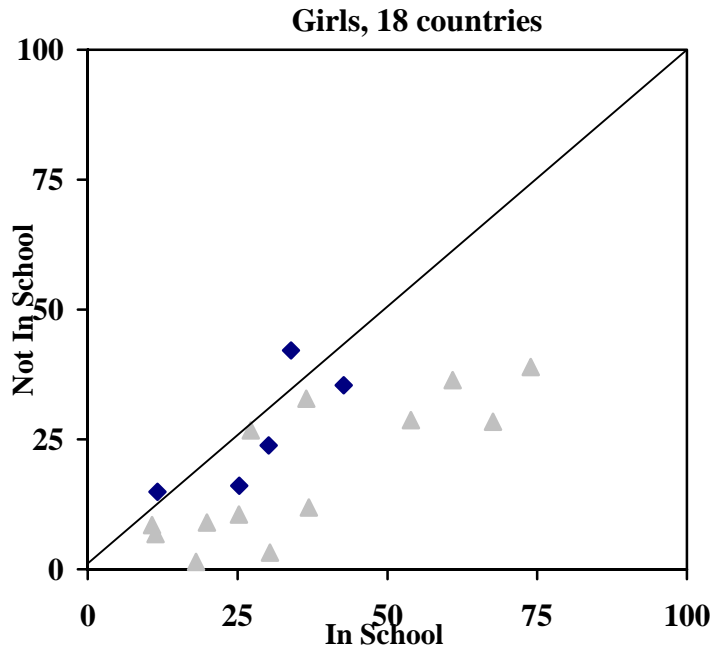
**Figure 11** Ratio of percent of non-students who ever had sex relative to percent of students who ever had sex, by school attendance (unmarried 15–17-year-olds)

**Girls, 29 countries**



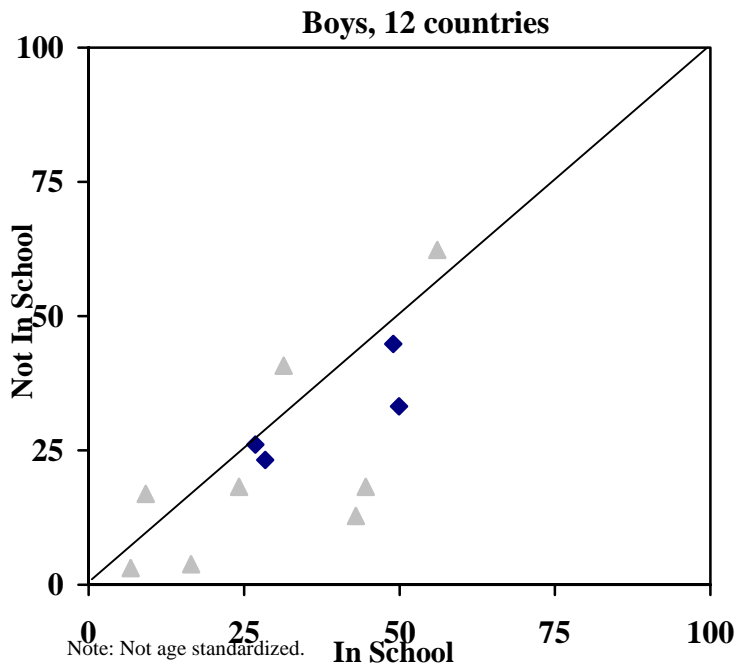
Notes: Age standardized  
 For Niger and Uzbekistan, denominator is zero and they are not included.  
 Source: DHS Surveys, 1995-2001

**Figure 12** Percent using any contraception among those who ever had sex, by current enrollment status (unmarried 15-17 year-olds)



Note: Not age standardized.

◆ Latin America & Caribbean    ▲ Africa

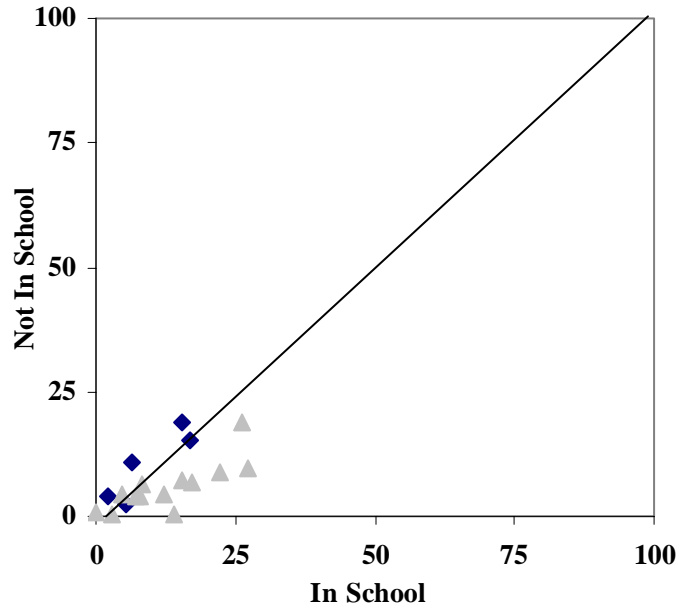


Note: Not age standardized.

◆ Latin America    ▲ Africa

**Figure 13** Percent using condoms among those who ever had sex, by current enrollment status (unmarried 15–17-year-olds)

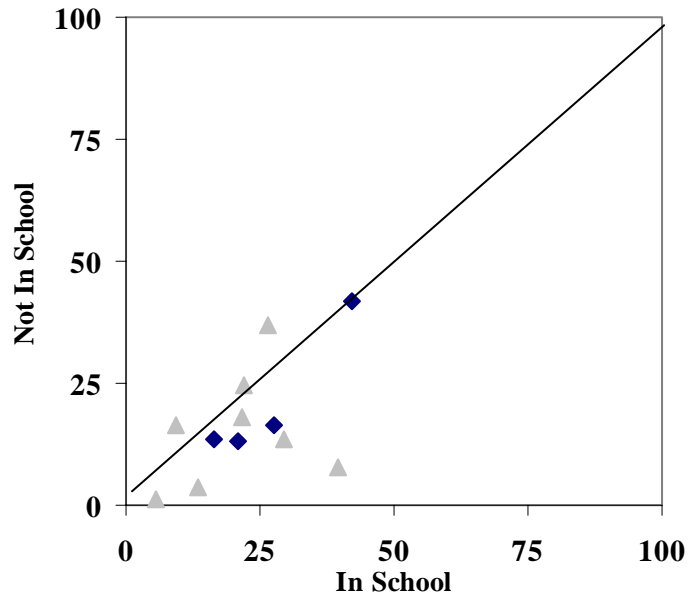
**Girls, 18 countries**



Note: Not age standardized.

◆ Latin America & Caribbean ▲ Africa

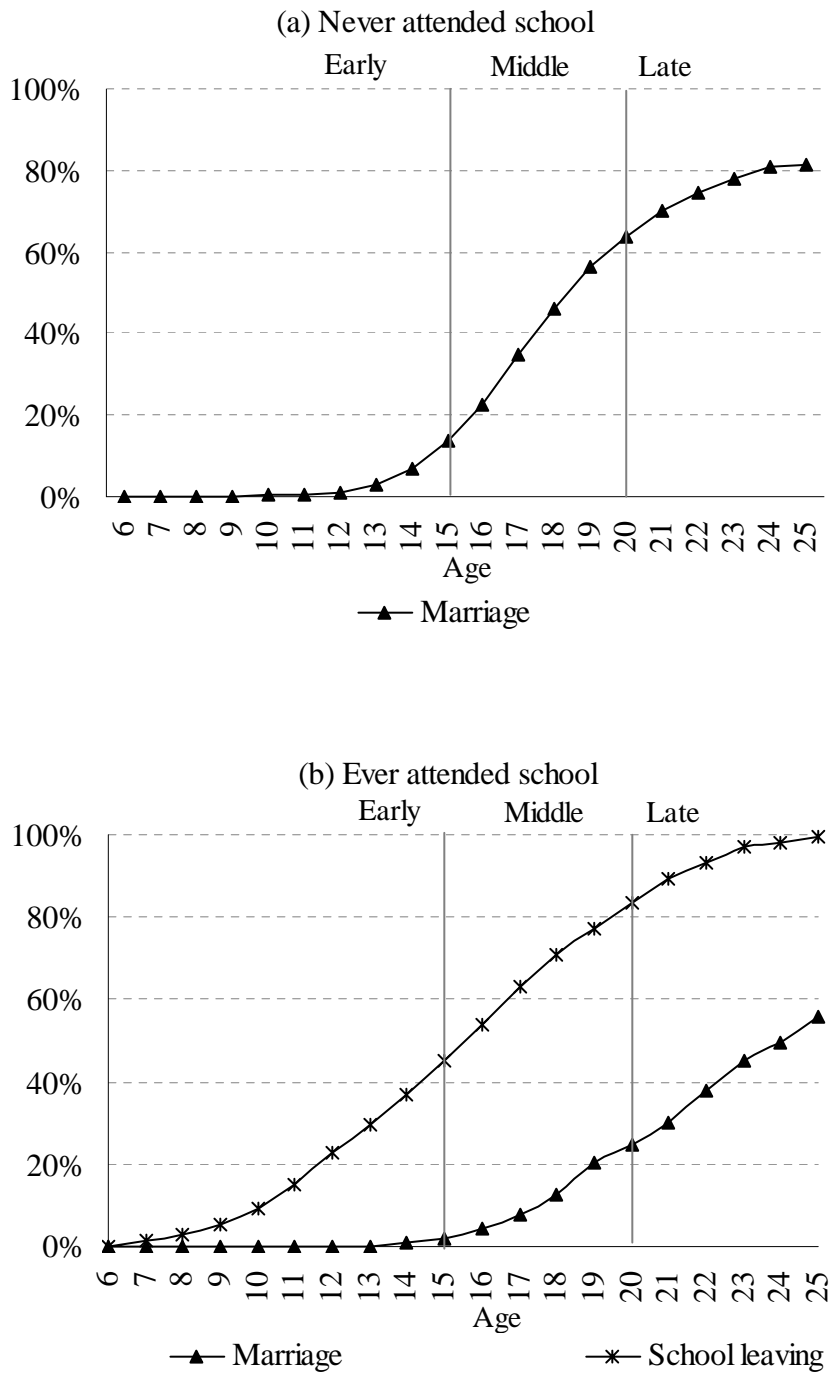
**Boys, 12 countries**



Note: Not age standardized.

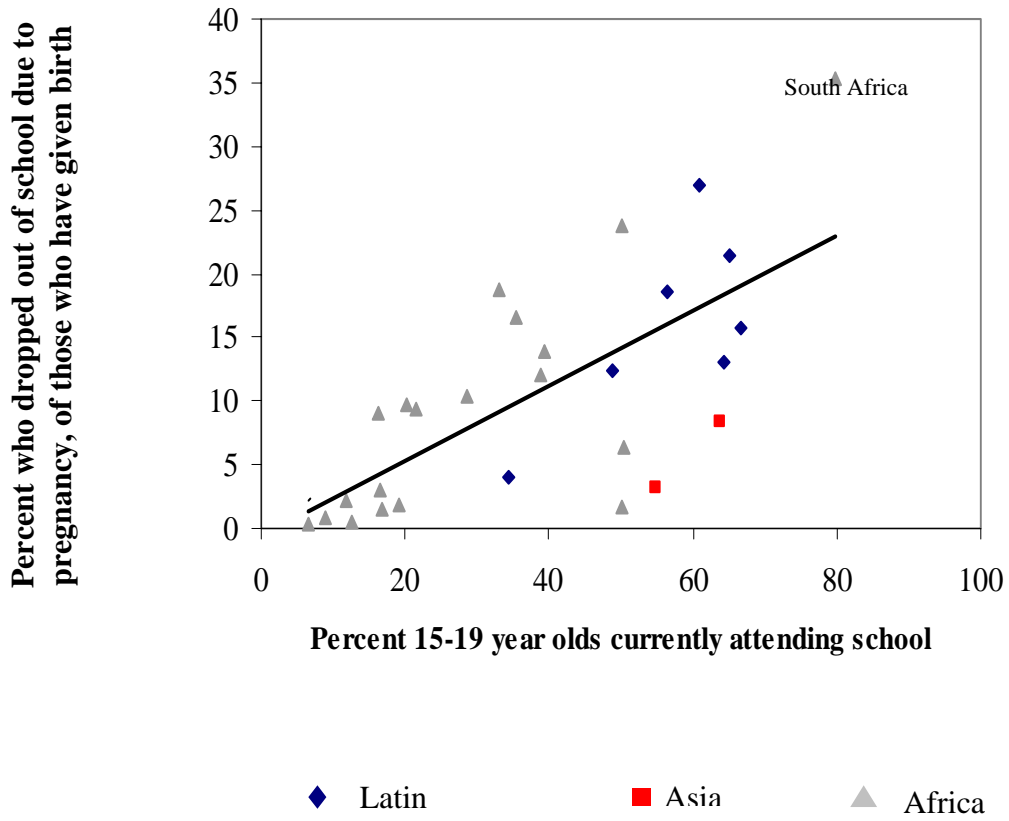
◆ Latin America ▲ Africa

**Figure 14** Comparison of transitions to adulthood (females, 6–25-years-old)



Source: 2001-02 Adolescent and Youth Survey in Pakistan  
 Note: Adapted from Lloyd and Grant (2005)

**Figure 15** Percent of mothers aged 15-19 who reported dropout due to pregnancy, by level of school attendance



**Figure 16** Percent Reporting Pregnancy as Reason for Dropout  
(Women 20-24 Years-Old Who Ever Attended School)

