

Addressing Structural and Environmental Factors for Adolescent Sexual and Reproductive Health in Low- and Middle-Income Countries

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A deeper understanding of how structure and environment shape the sexual and reproductive health vulnerabilities of youths across a range of outcomes has implications for the development of successful policies and programs. We have discussed some of the key structural and environmental factors that influence the sexual and reproductive health of adolescents, particularly in low- and middle-income countries, and the importance of engaging adolescents in identifying solutions. We have highlighted 2 case studies that describe structural or environmental approaches to improving adolescent sexual and reproductive health and made recommendations to more systematically incorporate attention to structure and environment to improve global adolescent health. (*Am J Public Health*. 2015;105:1973–1981. doi:10.2105/AJPH.2015.302740)

The global population of adolescents is vast and growing: more than 25% of the world's population is younger than 15 years, and more than 1 billion are aged 10 to 19 years.¹ Although adolescents have one of the lowest rates of mortality globally, numerous negative sexual and reproductive health (SRH) outcomes, such as early pregnancy and infection with HIV/AIDS and other sexually transmitted infections (STIs), continue to threaten the health and well-being of adolescents more than any other age group. Adolescents in low- and middle-income countries (LMICs) experience the largest SRH burdens of adolescents globally.² In sub-Saharan Africa, for example, the birth rate per 1000 girls aged 15 to 19 years is 143, compared with the worldwide average of 65.³ Likewise, up to 6000 young people are estimated to be infected with HIV each day, the vast majority of whom live in sub-Saharan Africa; approximately 75% of those becoming infected are female.⁴ The United Nations Children's Fund (UNICEF) estimates that 14% (2.5 million) of unsafe abortions that occur annually every year in LMICs involve adolescents younger than 20 years.⁵

Despite growing recognition for the need to improve adolescent SRH outcomes, there have

been few success stories. One reason for this may be that intervention strategies have largely failed to address the broader contexts that surround these adolescent behaviors and outcomes. Although theorists have been arguing for years to focus more “upstream” from an individual's risk or protective factors to the social structures and environments that shape health behaviors, it has primarily been in the field of HIV/AIDS, in which researchers and interventionists have developed and delineated numerous examples of structural approaches to reducing risks and vulnerability to infection.⁶

Outside the HIV/AIDS realm, however, addressing structural factors in relation to population health has been much slower paced. In fact, it was not until 2008 that there was a concerted worldwide effort to address such factors through recognition of the social determinants of health.^{7,8} The Commission on the Social Determinants of Health concluded that to make a difference in improving the health of a particular population, the context and social determinants that surround a particular population must be addressed. Specifically, the social determinants of health are defined as the “conditions in which people are born, grow, live, work, and age” or “the conditions or

circumstances that are shaped by families and communities and the distribution of money, power, resources at global, national, and local levels.”^{8(p1641)} Such conditions are often out of the control of individuals, thereby limiting the effectiveness of health promotion efforts that focus solely on changing individual behaviors.

The social determinants framework has 2 broad levels in which social determinants operate to influence health: the structural and the proximal. Structural determinants are structures that create social stratifications, such as economic, education, political, and social welfare systems, whereas proximal determinants are circumstances of daily life, which include individual health behaviors and relationships among family members, peers, and neighbors. Although more emphasis has been placed on examining the influence of proximal determinants on adolescent health outcomes, in a recent study Viner et al. compared the relative influence of structural and proximal determinants and found that structural determinants were stronger in terms of affecting overall health among adolescents worldwide.⁸ Other researchers have similarly noted that although focusing on individual behavior change is important, including the strengthening of an individual's agency (or capacity to act),⁹ it is essential to have enabling structures and environments that facilitate behavior change to achieve a large-scale population health impact. Focusing on enabling structures and environments has been overlooked for too long in the realm of adolescent health in LMICs.

Although the use of structural approaches to improve population health has been gaining attention, especially since the formulation of the social determinants framework,^{6,10–13} there is still limited understanding about how structural determinants and approaches influence adolescent health, and particularly adolescent

SRH (ASRH). A shift in attention to the increased use of structural approaches could have a significant population health impact if better understood and incorporated into programs and policies. We have (1) summarized the key structural and environmental factors found to influence ASRH outcomes, emphasizing studies that have been conducted in LMIC contexts; and (2) presented 2 case studies that applied a structural determinants approach to improving ASRH.

As a basis for examining the influence of structural determinants, we adapted the structural model of health behavior of Cohen et al, which focuses on 4 main categories of structural determinants: (1) availability and accessibility of resources, (2) physical structures, (3) social structures and policies, and (4) media and cultural messages.¹⁴ Although other structural frameworks have been put forth by numerous HIV researchers,^{11,15-17} we adapted Cohen's model because it includes structural components that have been found to have an influence on ASRH outcomes and that are

particularly useful for identifying pragmatic approaches to improving ASRH.

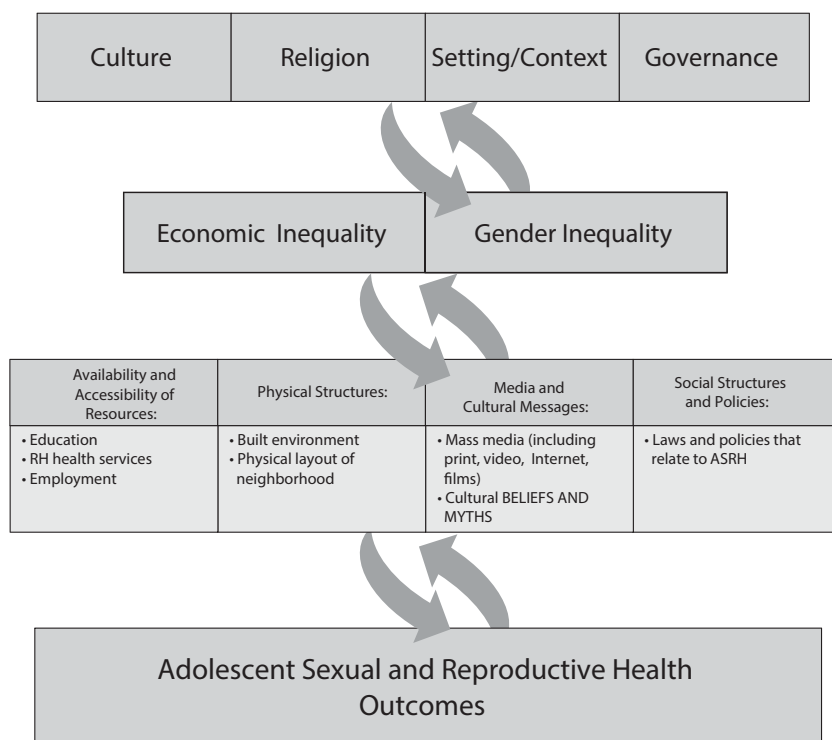
Figure 1 illustrates our conceptualization of how these 4 structural and environmental components are situated within the broader context of forces that shape ASRH outcomes. As observed, the 4 structural and environmental determinants are strongly influenced by economic and gender inequalities, which, in turn, are shaped by macrolevel forces that consist of cultural, religious, governmental, and geographical forces. The double arrows in the figure indicate the dynamic and bidirectional relationships between each level of influence and how changes in one level (particularly at the structural and environmental level) can influence ASRH outcomes and the broader contextual forces.

AVAILABILITY AND ACCESSIBILITY OF RESOURCES

Availability or accessibility of resources refers to items, both positive and negative, that

can influence ASRH. In this category, access to reproductive health services is a key resource for ASRH; however, it is also likely one of the least accessible and most underutilized resources for adolescents, particularly among the urban poor. Data from population-based surveys, for example, have shown that adolescents and young women from the poorest households are less likely to use preventative and curative SRH services and products than are those from the wealthiest households, including antenatal care, STI treatment, and modern contraceptives.¹⁸ Although there is a large body of literature that has documented the barriers that adolescents face when seeking reproductive health services,¹⁹⁻²⁴ health care providers have been recognized as playing a key role in the quality of SRH services and clients' access to them.²⁵⁻²⁸ As professionals who deal directly with the public, providers have considerable discretionary power in determining how policies and guidelines are implemented.

Adolescent clients of ASRH services are often embarrassed, anxious, or socially vulnerable, which in turn tends to increase the power exercised by the provider. In fact, one of the biggest challenges faced by adolescents seeking care is that the provider actually denies them services. A study in Kenya and Zambia, for example, found that 55%–67% of providers agreed that “a schoolgirl who is sexually active should not be allowed to use contraceptives.”²⁹ Similarly, in China, 40% of the providers did not approve of contraceptives being available to young people, and nearly three quarters felt that these types of services should not be provided to high school-aged individuals.³⁰ These studies are only the tip of the iceberg. Experts contend that although it may be difficult to measure how often services are denied to specific subpopulations, denial of services is rampant and has been underestimated.^{26,31} A study in Malawi that employed adolescent-simulated clients (otherwise known as “mystery clients”) found that about one third were denied oral contraceptives, primarily because providers deemed them to be too young.³² Although denial of services is clearly one of the most serious barriers, providers can also inhibit utilization of services by having clients wait for long periods as a means of punishing them for “immoral behavior,”²⁹ or when they



Note. RH = reproductive health.

FIGURE 1—Adolescent sexual and reproductive health (ASRH) outcomes.

do see a young client providers can treat them so rudely that they will not want to return.³³ Addressing the quality of provider–client interactions is an important strategy for improving both availability and access of resources for adolescents.

In addition to health services, another key resource for ASRH is education. The link between education and SRH has been found to be bidirectional: healthy adolescents are more likely to go to school, and when in school, adolescents are more likely to be knowledgeable about how to maintain good health.³⁴ In fact, in LMICs, one of the most dramatic trends over the past 2 to 3 decades has been the rapid rise in school participation and grade attainment, especially for adolescent girls. These changes have meant that more and more adolescents across these contexts are now spending some of their adolescent years in schools, with increasing numbers who are attending beyond age 15 years.³⁴ For girls, the advent of compulsory formal education has been shown to dramatically affect the rates of adolescent pregnancy, with educated girls much more likely to use contraception and to delay their first pregnancy.³⁵ Despite these encouraging trends, school participation and grade attainment rates still lag behind for girls in the poorest households.

In general, any investments in improving school access or quality where learning outcomes remain poor is likely to have beneficial effects on ASRH. Improved academic performance is associated with delayed sexual initiation and a reduced likelihood of pregnancy,³⁶ and improved school environments, which ensure safe, comfortable facilities for managing menstruation, are likely to improve girls' participation and attendance.³⁷ As the institution outside the family that plays the most important role in socializing young people, the school has the potential to directly influence students' aspirations, motivations, and risk-taking behaviors.

For older adolescents and young adults, access to decent work or livelihood opportunities is another critical resource for ASRH, yet a variety of barriers prevent adequate employment opportunities for many young people. In fact, many of the gains made in girls' access to education have not been met with the benefits of increased income and employment primarily because of the numerous obstacles

in the labor market, including distance to work, unsafe conditions in the workplace, and a mismatch between what is learned at school and the skills needed for employment.^{38,39} Indeed, workforce initiatives for girls have been shown to not only delay child marriage but also shift gender norms.⁴⁰ A randomized control trial in India, for example, demonstrated that when adolescent girls had greater access to work opportunities (via call center employment), they were less likely to get married and want higher numbers of children.⁴¹

Finally, although access to health services, education, and employment are indeed critical for ASRH, another resource that has recently received more recognition in relation to ASRH is access to safe recreational activities. For example, in a recent global study among adolescents across 5 urban areas (Baltimore, MD; Ibadan, Nigeria; Johannesburg, South Africa; Shanghai, China; and New Delhi, India), adolescent girls in both Baltimore and Johannesburg complained that the lack of recreational activities in their communities contributed to increased sexual risk-taking behaviors.⁴² One girl in Baltimore summed it up well:

So, I think there needs to be more activities for women than for us to just go to school, come home, and lay on our bed. There's no activities for us and it causes us to reproduce a lot. They don't understand that.

Similarly, in Nigeria, a mixed methods study among young men highlighted the lack of social or recreational structures as a constraint to safer sexual behavior, and in the interviews, young men made specific references to lack of organized social activities indirectly contributing to sexual risk.⁴³ In the United States, the relationship between lack of recreational activities and adolescent sexual risk behaviors has been more extensively studied. Although the majority of these studies have focused on the relationship between adolescent participation in school-based extracurricular activities and ASRH outcomes,^{44–47} a few studies have examined the availability of these community-based activities in relation to ASRH.^{45,47,48} Accordingly, these studies found that in communities that have more idle youths and higher proportions of adolescents not involved in some sort of community-based activity, sexual risk taking increases.

PHYSICAL STRUCTURES

Physical structures refer to characteristics of the built environment (e.g., housing, buildings) as well as the physical layout of a neighborhood, including where adolescents congregate or feel safe. A significant body of literature from high-income countries indicates the increased vulnerability to negative sexual health outcomes of adolescents who live in deteriorating neighborhoods.⁴⁹ Such neighborhoods have, for example, increased levels of litter, dilapidated buildings, lapses in school building codes, and increased graffiti. Cohen et al. demonstrated that such environments were a higher predictor of gonorrhea among youths than were such factors as unemployment or poverty rates.⁴⁹

Although evidence from LMICs is more scarce on the impact of deteriorating (or dilapidated) neighborhoods on youths, the Well-Being of Adolescents in Vulnerable Environments study found that adolescents living in 5 different urban areas (Baltimore, Shanghai, Johannesburg, New Delhi, and Ibadan) all perceived the physical environment as having a major impact on their health. In particular, adolescents from Baltimore and Johannesburg perceived that vacant homes and buildings were contributing to increased risks of unsafe sexual behaviors, such as sexual coercion and other forms of gender-based violence.^{42,50} Similarly, in Cape Town, South Africa, researchers developed a physical environment measure by using access to 4 commonly used municipal services: water, sanitation, electricity, and housing quality. With this measure, the physical environment was found to be significantly associated with sexual risk taking among adolescents: youths who scored high on the physical environment scale (meaning they had higher access to services) were much more likely to use a condom when they last engaged in sexual intercourse and more likely to have fewer sexual partners than did those with lower scores, controlling for sociodemographic variables.⁵¹ Although the exact mechanism of how the physical environment affects ASRH is still unclear, research in the United States suggests that a high rate of deprivation of the physical environment fosters institutional disruption and social control influencing adolescent health behaviors.^{52,53} In this

sense, having a poor physical environment may weaken self-efficacy and prosocial behavior at a critical stage of sexual development, and as a consequence, adolescents are much more likely to engage in risk-taking behaviors.

Another physical structure of relevance to adolescent sexual health is alcohol outlet density, with efforts in high-income countries to regulate the number of outlets at which alcohol can be purchased in a particular neighborhood or context.⁵⁴ Recent evidence from sub-Saharan Africa suggests growing consumption and heavy use of alcohol, with one contributing factor being the intensive marketing from commercial alcohol companies that may increasingly focus on youths.⁸ Limited evidence from South Africa suggests a decreasing age of alcohol initiation and possible differences in rural versus urban use because of the availability of homebrewed alcohol.^{55,56} Data also suggest that adolescents are particularly vulnerable to the negative effects of alcohol intake on sexual decision-making, with particularly limited skills in being able to negotiate (correct) condom use while under the influence.^{57,58} Restricting adolescents' physical access to alcohol, along with the cues and pressures in the physical environment to use alcohol (e.g., advertising billboards, commercial alcohol companies providing free drinks at concerts) may be potentially effective approaches for reducing adolescents' excessive alcohol use and in turn their increased likelihood of unsafe sexual behavior.

SOCIAL STRUCTURES AND POLICIES

According to Cohen et al., social structures are those laws and policies that limit high-risk behaviors and provide a framework for encouraging low-risk behaviors.^{49(p149)} These can be enforced formally (i.e., through government agents) or informally (i.e., through family or neighbors). In numerous LMICs, a low legal age of marriage for girls in particular may promote adolescent marriages that contribute to adolescent pregnancy and increased maternal morbidity and mortality. Even in countries where the legal age of marriage has been raised, government and social enforcement may be insufficient. Education policies that expel pregnant girls from school (or social stigma about staying in school when pregnant)

may contribute to diminishing the educational outcomes of adolescent girls.

The illegality of abortion in many LMICs may contribute to adolescent girls seeking out illegal procedures, thereby influencing the high rates of unsafe abortions and negative sequelae among them.⁵⁹ Other social structures related to ASRH include policies regulating underage alcohol use in high-income countries. Findings from Kenya indicate that a range of structural factors might influence increased uptake of alcohol, including gender, neighborhood characteristics, and enrollment in school. Recommendations included the development of recreational facilities to encourage safer socializing behaviors.⁶⁰ Although interventions in LMICs to date are minimal, responses might include fining the owner of an alcohol outlet for selling alcohol to underage youths.⁶¹ Such regulations of alcohol sales serve a protective function for youths, aiming to reduce alcohol intake and the related unsafe sexual behaviors that may be more likely to occur when adolescents are intoxicated.

Education policies that include sanctions against young people found to be in possession of condoms while in school in many LMICs also hinder safer sex behaviors.⁶² Punishment in many countries may include beatings or suspension from school. In many LMICs, as in high- and middle-income countries, perceptions still abound about the likelihood of condom possession increasing the risk of sexual relations. A tendency of adults to push for abstinence continues to predominate, along with extensive adolescent secrecy about discussing sexuality with teachers or parents.^{63,64} This hinders the effective implementation of sexuality education messages and the changing of social structures that would enable young people to acquire and possess condoms without fear and stigma.

A rigorously evaluated multilevel intervention aimed at improving young people's sexual health outcomes in Mwanza, Tanzania, attempted to adhere to national education policies to demonstrate a model intervention that could go to scale. This included teaching about safer sex in schools but not being permitted to demonstrate the use of condoms in classrooms. Although the program took interested young people to nearby clinics for demonstrations, the inability to more openly demonstrate how to

use a condom in the classroom may have hampered the effectiveness of the interventions. The final evaluation demonstrated improved levels of knowledge and attitudes about safer sex behaviors. However the study biomarker data indicated increased levels of pregnancy and some STIs among the participating adolescents.⁶⁵ To offer some explanation about these findings, the authors acknowledged that when interventions are introduced in contexts where both implementers and participants have very limited educational levels and resources, basic standards about teaching and information need to be established before more complicated and interactive activities can be implemented.⁶⁵ Evidence from high-income countries suggests that government-mandated comprehensive sexuality education may only minimally contribute to adolescents' increased use of contraceptives, although this finding was limited by the difficulty of evaluating the content of statewide mandated sexuality education.^{66,67}

MEDIA AND CULTURAL MESSAGES

The media is a powerful force on ASRH. According to a recent literature review on the social and emotional factors that influence condom use among adolescents in LMICs, when adolescents were exposed to mass media (radio, television, the Internet), they were much more likely to use condoms.⁶⁸ At the same time, however, mass media can have negative influences on adolescent health.⁶⁹ A recent study conducted in the United States found that adolescents who watched sexual content on television over a period of 3 years were more likely to become pregnant or be responsible for someone's pregnancy than were those with lower exposures to sexual content on television.⁷⁰ The suggestion is that exposure may either accelerate earlier initiation of sex or promote lax attitudes about contraceptive use because of the very limited messaging on television about the risks and responsibilities of sexual relations.

Although empirical evidence about adolescent television viewing of sexual content in LMICs is limited, findings from some countries indicate that the growing presence of video huts in sub-Saharan Africa, where rural and urban boys in particular watch extremely explicit sexual content (i.e., pornographic movies), may affect their sexual expectations

of girls and women.^{37,71} Parents in LMICs may be able to mitigate the influence of exposure to videos with sexual content on boys by increasing their monitoring of boys' free time, but there has been insufficient research conducted in most LMICs about parental approaches to monitoring and explaining sexual content that their adolescents may be exposed to in or outside the home.

New concerns are also arising as increasing numbers of young people, boys in particular, are reported to be accessing pornographic material and other sexual content from mobile phones and the Internet in LMICs.³⁷ To date there is minimal empirical evidence on the extent of sexual content access (both information and pornographic material) by young people in LMICs, but there is growing interest in the potential impact such access may have on enhancing young people's sexual knowledge and their sexual expectations.^{72–76}

Cultural messages may also be a strong influence on ASRH in LMICs. In rural Kenya, for example, continued cultural messages or stories conveying misbeliefs about the dangers of condom use, the immorality of youths who are found to be carrying condoms, and perceptions of such youths as deviant or plotting to have sex continue to hinder the uptake of condoms by adolescents.⁶² One proposed solution to the view of adolescents possessing condoms as immoral was to promote through a new health media campaign the idea of condoms as “disaster preparedness” for responsible young people, thereby aiming to take away the stigma of adolescent possession. Masculinity norms in numerous contexts play a role in influencing adolescent boys' decisions to use condoms. The uptake of condoms is hindered in South Africa by continued beliefs being conveyed to boys such as “If you use condoms, your friends will tell you that you are stupid; you eat meat in the plastic” and in Tanzania by social norms messages indicating to boys that condom use is like eating a lollipop with the wrapper on.^{77,78}

THE 4 FACTORS AND ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH

As the framework of Cohen et al. delineates, the 4 structural factors can be synergistically

addressed through structural and environmental approaches targeting a particular sexual or reproductive health problem. For example, in Thailand, the 100% condom program targeting availability and access to resources (e.g., health services for STIs), physical structures (e.g., condom provision in sex workers' rooms), social structure and policies (e.g., a health regulation mandating 100% condom use), and media and cultural messages (e.g., mass media campaigns on using condoms to prevent HIV) has been extremely successful.⁷⁹ A critical aspect of the program's success was taking the onus of HIV prevention off the sex workers themselves (who had less power to negotiate safer sex) and placing it on the sex worker establishments. The multipronged effort that included enforcement of the use of condoms (e.g., shutting down sex worker establishments where the workers were found to be infected with STIs) was extremely effective at reducing the incidence of HIV in the population.⁸⁰ The success of the program was likely both contextual (e.g., Thai cultural hierarchies) and related to the existence of an established public health infrastructure already focused on preventing and treating STIs.^{79,81,82} Although adolescents were not the focus of the Thai example, a recent systematic review of HIV prevention interventions for South African youths by Harrison et al. reinforced the importance of addressing HIV social risk factors (e.g., gender, poverty, alcohol, and targeting the structural and institutional context) to have an impact.⁸³ Such structural approaches—using the framework of Cohen et al.—can also be effectively applied to understanding and addressing ASRH in LMICs.

TWO CASE STUDIES

The 2 case studies are intended to (1) provide more in-depth examples of the types of structural and environmental influences that shape ASRH in LMICs today and (2) highlight the importance of applying structural and environmental interventions to more effectively ensure healthy transitions into adulthood. What should be clear from these case studies is that there is no magic structural driver that should be targeted to improve ASRH; instead, multiple pathways exist and it is important to consider the other contextual factors that may have a role in shaping ASRH.

Menstruation and Girls' Education

Increasing evidence suggests that schoolgirls across many LMICs struggle to manage their menstruation comfortably in school environments because of insufficient school quality (the availability of resources).^{37,84–88} Numerous girls report missing class because of inadequate water and sanitation facilities, expressing fears of having a menstrual accident among other reasons.^{84,85} Many schools in LMICs lack adequate numbers of safe, private, and clean latrines for girls to use and have insufficient mechanisms for disposal of used sanitary materials inside latrines (physical structures).^{86,89} They also often lack easily accessible water supplies for girls to privately wash off blood from their hands and skirts in the toileting stalls.^{37,90} In addition, many girls reach menarche without any prior guidance on menstruation, leading them to feel fear and shame when they see blood for the first time.^{91,92} Taboos and stigma attached to menstruation hinder the conveyance of guidance about menstruation to prepubescent girls in many contexts, and the belief that menstruation is polluting may compound girls' feelings of embarrassment (cultural messages and social structures).^{93,94} A predominance of male teachers and staff in rural schools may augment girls' feelings of embarrassment and shame about having to manage menses in class.⁸⁹

Although findings from rigorous impact evaluations of menstrual hygiene management interventions' effectiveness in schools have not yet been published, there are numerous structural interventions currently being applied and evaluated.⁸⁶ These include efforts by UNICEF and nongovernmental organizations to address the availability of resources that pertain to school quality in a range of country contexts, such as improving the safety, quality, and number of water and sanitation facilities (physical structures) in schools (e.g., UNICEF WASH in Schools policies).⁹⁵ There are also efforts to change the social norms and cultural taboos about menstruation by providing guidance, including via materials on menstrual management, to schoolgirls (e.g., girls' puberty books developed by Grow & Know and Save the Children).⁹⁶ UNICEF, the Forum for African Women Educationalists, and other national and international organizations are raising awareness of current school

environments' gender discrimination related to menstrual hygiene management as well as the need for educational policies and systems to reduce this discrimination (social structures and policies). This includes the private sector working in collaboration with women's organizations to remove the value added tax on imported sanitary materials.⁹⁷

New global and national efforts are also underway to address this significant structural challenge for girls in schools across LMICs, with advocacy efforts that include attention to menstrual hygiene management in schools in the post-2015 sustainability goals, thereby mandating national attention to the issue.^{88,98} The private sector is working in partnership with some nongovernmental organizations and national governments to convey messages about menstruation that will help overcome stigma (e.g., Procter & Gamble's Like a Girl campaign). However, with 50% of schools across LMICs lacking adequate water and sanitation facilities,⁹⁹ there remains much work to be done. Because of the decades of evidence indicating the importance of girls' education for improving population health outcomes (including increased use of contraceptives and decreased rates of HIV/AIDS infection), a structural approach that will enable menstruating girls to regularly and confidently attend school is an important area of investment.¹⁰⁰⁻¹⁰²

Early Pregnancy and Childbirth

Approximately 16 million girls aged 15 to 19 years give birth each year, accounting for 11% of all births worldwide.¹⁰³ Although complications from early pregnancy and childbirth continue to be a leading cause of death among adolescent girls in LMICs, the incidence of adolescent pregnancy varies dramatically by world region. Whereas more than 50% of women in sub-Saharan Africa give birth before they are aged 20 years, only 2% of births occur among adolescent mothers in China.¹⁰⁴ The influence of structural and environmental factors on adolescent pregnancy and childbirth likely explains many of these large regional differences. For instance, in sub-Saharan Africa, where inequalities among men and women remain large and where income inequalities continue to widen, these factors often underlie behaviors such as transactional sex between girls and older men, in

which girls seek out specifically older men for money and gifts. Because girls who engage in transactional sex with older partners often have little to no negotiating power for using condoms, their risks for getting pregnant are very high.^{105,106} A related factor to adolescent pregnancy and childbearing is child marriage, which is considerably high in countries such as Ethiopia and Nigeria, where educational attainment is low and income inequalities are high.¹⁰⁷

In an effort to address adolescent pregnancy and childbearing through specific structural interventions, 2 large studies stand out. One was a 3-armed randomized trial of different intervention strategies that included training teachers in the Kenyan government's HIV/AIDS education curriculum, encouraging students to debate and write essays about the role of condoms, and reducing the cost of education through the distribution of free school uniforms. The study found that the intervention arm that reduced the cost of education had the largest impact on reducing adolescent childbearing because it encouraged school attendance and reduced incentives for early dropout and childbearing.¹⁰⁸

Similarly, in a randomized trial of a conditional cash transfer program in Malawi, researchers tested whether providing school fees and cash transfers to current schoolgirls and girls who had recently dropped out of school to return to school would also affect their SRH behaviors. After 1 year, the authors found that with increased school enrollment, adolescent pregnancy rates had decreased by 40% from baseline.¹⁰⁹ To further evince the benefit of keeping girls in school, the World Bank has shown that for every year a young woman remains in school after age 11 years, the risk of unplanned pregnancy decreases by 7% for women with at least a primary education and 6% for women with a secondary degree.¹¹⁰ Yet this is only 1 of several types of structural factors that can be addressed. In the United States, adolescent pregnancy rates have been steadily declining every year since the peak rate in 1990. The rate has declined not only in the country as a whole but also in every state and across all racial and ethnic groups.¹¹¹ The evidence for this decline has overwhelmingly pointed to adolescents having greater access to and use of contraceptives. In LMIC contexts, because of the strong social pressures against modern contraception and the laws and

policies that prevent their use, developing strategies that focus on contraceptive access may be another key structural intervention strategy for pregnancy prevention.

Finally, another key structural strategy that should be mentioned is the use of media. According to a recent review of factors that influence adolescent condom use in LMICs, Mmari et al. found that mass media campaigns had one of the largest impacts on improving condom use.⁶⁹ Circling back to the declining rates of adolescent pregnancy in the United States, Boonstra also points out that the media has likely played a strong role.¹¹¹ For example, she points out that television programs such as "Teen Mom" and "16 and Pregnant" have greatly influenced the adolescent birthrate in more recent years. Because the media is able to reach large audiences, both adolescent and adult, in LMIC contexts, it could be a key strategy for challenging gender and societal norms about condoms and contraception.

MORE STRUCTURAL AND ENVIRONMENTAL INTERVENTIONS FOR YOUNG PEOPLE'S HEALTH

Why has there been less attention to such approaches to date? As with the overall efforts to implement structural approaches, many practitioners and policymakers in public health shy away from proposing structural and environmental change out of concern that such approaches are on the macro level, hard to measure and evaluate, and difficult to finance.¹¹³

However, because of the growing success of structural and environmental approaches in general—such as the reduction in smoking rates, the reduction in birth defects owing to nutrient fortification, the reduction in dental caries owing to water fluoridation, the decrease in morbidity and mortality rates owing to the increased use of seatbelts and helmets, and the reduction in HIV infection incidence in select contexts—we strongly suggest that the time has come for more structural and environmental approaches to promoting youths' health in low-income countries.

To help overcome some of the concerns associated with these types of programs, we recommend that multiple sectors collaborate to not only design and evaluate such programs but also finance them. In fact, recent studies have

suggested that cofinancing by sectors (rather than sectors funding components of interventions in isolation) would be the most effective approach.¹¹² There is evidence that multisectoral structural programs have demonstrated a powerful impact on improving adolescent health outcomes, and they have been proven to be scalable. One well-known example is Berhane Hewan, which now reaches 10 000 girls in 12 communities in Ethiopia and is currently in the process of being scaled up in 12 countries through the United Nations Population Fund's Adolescent Girl's Initiative.¹¹³ This program is designed to increase access to education and reproductive health services, and it creates safe spaces for the most vulnerable and isolated girls; previous evaluations demonstrate that it greatly reduces child marriage.¹¹⁴

CONCLUSIONS

As the adolescent population across LMICs is expected to increase exponentially in the coming decades, there is an urgent need to more creatively and more effectively tackle the ongoing SRH challenges that young people face that in turn are negatively affecting their health outcomes. One such response would be to improve the global health understanding of the relevance of structural and environmental factors to the health and well-being of young people while also better applying and evaluating approaches that address these factors. We have attempted to provide an overview of current understandings of the use of structural and environmental approaches in relation to ASRH and the potential strategies that can be used for moving forward toward better application. ■

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