



Review article

Effective Strategies to Provide Adolescent Sexual and Reproductive Health Services and to Increase Demand and Community Support



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 A B S T R A C T

Access to youth friendly health services is vital for ensuring sexual and reproductive health (SRH) and well-being of adolescents. This study is a descriptive review of the effectiveness of initiatives to improve adolescent access to and utilization of sexual and reproductive health services (SRHS) in low- and middle-income countries. We examined four SRHS intervention types: (1) facility based, (2) out-of-facility based, (3) interventions to reach marginalized or vulnerable populations, (4) interventions to generate demand and/or community acceptance. Outcomes assessed across the four questions included uptake of SRHS or sexual and reproductive health commodities and sexual and reproductive health biologic outcomes. There is limited evidence to support the effectiveness of initiatives that simply provide adolescent friendliness training for health workers. Data are most ample (10 initiatives demonstrating weak but positive effects and one randomized controlled trial demonstrating strong positive results on some outcome measures) for approaches that use a combination of health worker training, adolescent-friendly facility improvements, and broad information dissemination via the community, schools, and mass media. We found a paucity of evidence on out-of-facility-based strategies, except for those delivered through mixed-use youth centers that demonstrated that SRHS in these centers are neither well used nor effective at improving SRH outcomes. There was an absence of studies or evaluations examining outcomes among vulnerable or marginalized adolescents. Findings from 17 of 21 initiatives assessing demand-generation activities demonstrated at least some association with adolescent SRHS use. Of 15 studies on parental and other community gatekeepers' approval of SRHS for adolescents, which assessed SRHS/commodity uptake and/or biologic outcomes, 11 showed positive results. Packages of interventions that train health workers, improve facility adolescent friendliness, and endeavor to generate demand through multiple channels are ready for large-scale implementation. However, further evaluation of these initiatives is needed to clarify mechanisms and impact, especially of specific program components. Quality research is needed to determine effective means to deliver services outside the facilities, to reach marginalized or vulnerable adolescents, and to determine effective approaches to increase community acceptance of adolescent SRHS.

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IMPLICATIONS AND CONTRIBUTION

Programs that promote access to and uptake of adolescent sexual and reproductive health services are most effective when adolescent-friendly facility-based approaches are combined with community acceptance and demand-generation activities. More research is needed to determine how best to deliver sexual and reproductive health services outside the facilities, especially to vulnerable and marginalized populations.

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Adolescence is often considered a period of relatively good health. However, adolescents (aged 10–19 years) face particular health risks, especially in relation to reproduction and sexuality. Eleven percent of all births and 14% of maternal deaths worldwide are among 15- to 19-year-old females with 95% of adolescent births taking place in developing countries [1,2]. Adolescents are also vulnerable to unwanted pregnancies; each year 7.4 million [3] and 3 million [4] girls experience unintended pregnancies and unsafe abortions, respectively. An estimated 1,300,000 adolescent girls and 780,000 adolescent boys are living with human immunodeficiency virus (HIV) worldwide [5]. Over 800,000 young people are newly infected every year; 79% of these infections occur in sub-Saharan Africa (SSA). Globally, young people account for 41% of new infections among those aged 15 years or older [6]. Adolescent girls are especially vulnerable to HIV acquisition [7].

Poor, marginalized and disenfranchised youth suffer the highest burden of disease. For example, homeless adolescents face higher risks of HIV infection [8,9]. Adolescents with disabilities are particularly vulnerable to sexual abuse and resultant unplanned pregnancies and HIV and other sexually transmitted infections (STIs) [5]. Trends in SSA show that adolescent girls from the richest three quintiles have experienced declines in rates of pregnancy over time, whereas those from the poorest quintiles have faced increased rates [10].

Overall, improvements in adolescent health over the past five decades have not kept pace with those observed in children; mortality among 1- to 4-year-olds declined by more than 80% over the past five decades, whereas adolescent mortality rates only improved by 41%–48% [11]. Furthermore, risky sexual behaviors and reproductive health problems in adolescence can have long-lasting consequences into adulthood and into the subsequent generation. For example, impaired fetal growth is more common in pregnancies occurring before the age of 18 years, and low birth weight is an important risk factor for adult-onset diabetes [12].

Adolescence provides an important phase of life to capitalize on the potential and resources in this age group. The International Conference on Population and Development (ICPD) held in Cairo, Egypt, in 1994 established a comprehensive definition of reproductive health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes.” In line with the aforementioned definition of reproductive health, reproductive health care is defined as “the constellation of methods, techniques and services that contribute to reproductive health and well-being by preventing and solving reproductive health problems” [13]. The ICPD Program of Action further describes services included under the umbrella of sexual and reproductive health services (SRHS), such as family-planning counseling and services; prenatal and postnatal care and delivery; abortion services and postabortion care; treatment and prevention of reproductive tract and sexually transmitted diseases and infections including HIV; and information and counseling about human sexuality [13].

Despite the clear need for access to SRHS [14], coverage rates are low. Data from five countries in SSA with high rates of new HIV infections found that 7%–31% of males and 9%–58% of girls aged 15–24 years had been tested for HIV and received their results [5]. Less than half of young men in SSA reported using condoms at the time of the last sexual intercourse, and rates were even lower among young women [15]. In SSA, as many as 68% of adolescents have an unmet need for contraception [3]. Rates of skilled birth attendance—a critical intervention to

reduce maternal and newborn mortality—are 55% in developing countries; coverage is similarly low among adolescent births, despite the higher risk related to young maternal age [16].

Efforts in recent years have focused on not only ensuring health service availability but also making its provision adolescent friendly—that is, accessible, acceptable, equitable, appropriate, and effective [17]. These efforts aim to increase the ability and willingness to obtain services, particularly among those adolescents who need them the most.

This is one of the six articles in a series designed to take stock of progress toward achieving the ICPD Program of Action at its 20th anniversary mark. This article aims to review the current literature to synthesize current evidence on improving adolescent access to and use of SRHS.

Methods

This review consists of four specific and related review questions as listed in Table 1. We examined data within the context of a framework that defines the following parameters (Table 2):

- (1) “For whom?”—Population groups that are the beneficiaries of services. Of particular concern are marginalized groups (i.e., those who may be living at the fringes of society, such as adolescents who are homeless, incarcerated, or discriminated because of race, ethnicity, religion, social class, occupation (e.g., sex worker), or sexual orientation) because they are especially vulnerable to poor health outcomes. Other vulnerabilities to poor SRH outcomes include disability, gender inequalities and younger age, or developmental stage.
- (2) “Where?”—Types of settings where service delivery takes place.
- (3) “By whom?”—Types of provider delivering these services.
- (4) “What?”—Types of SRHS delivered.

Information was drawn from existing reviews of the literature found by searching the Cochrane database and PubMed. We preferentially included reports that used systematic review methodology (i.e., reproducible and broad search strategy, clear inclusion/exclusion criteria, examination of biases, and strength of evidence). We also sought updated data about initiatives that were included in identified review articles. Furthermore, because published reviews often do not include gray literature, we

Table 1
Review questions

A. How effective are interventions to establish or improve clinic- or hospital-based health services on adolescent use of SRHS or commodities and/or on adolescent SRH impact in resource-limited settings?
B. How effective are interventions to establish or improve out-of-facility or community-based health services on adolescent use of SRHS or commodities and/or on adolescent SRH impact in resource-limited settings?
C. How effective are interventions to establish or improve health services (facility- or community-based) on the use of SRHS or commodities or SRH impact among vulnerable or marginalized adolescents in resource-limited settings?
D. How effective are IEC, social marketing, or mass media interventions on adolescent use of SRHS or commodities or on community acceptance or support for such services or commodities among adolescents in resource-limited settings?

SRHS = sexual and reproductive health services.

Table 2
“For whom? Where? By whom? and What?” Framework of SRHS delivery

<p>“For whom?” SRHS beneficiaries</p> <ul style="list-style-type: none"> - Marginalized and vulnerable groups <ul style="list-style-type: none"> o Homeless, living on the street o Slum dwellers o Poor o Incarcerated o Living with HIV o Living with disabilities o Intravenous drug users o Sex workers o Lesbian, gay, bisexual, transgender o Orphans - Rural/urban - Un-married/married - In school/out-of-school, in work - Boys/girls <p>“Where?” SRHS delivery settings</p> <ul style="list-style-type: none"> - Facilities <ul style="list-style-type: none"> o Clinics, hospitals o Standalone (adolescent SRHS only) versus integrated within existing facilities (with primary care services and/or for all age groups) o Public, NGO-run, Private - Out-of-facility <ul style="list-style-type: none"> o Schools <ul style="list-style-type: none"> ■ School-based service delivery (e.g., clinics or nurses in schools) ■ School-linked service referral o Outreach/community—that is, where adolescents live or congregate <ul style="list-style-type: none"> ■ Homes, streets, parks, shopping malls ■ Informal health sector—for example, pharmacies, medicine sellers, traditional healers o Youth centers o Workplace o Detention facilities <p>“By whom?” Providers of SRHS and commodities</p> <ul style="list-style-type: none"> - Doctors, midlevel providers, midwives, nurses, counselors (including peer counselors) - Community health workers, community-based distributors (e.g., of condoms, contraceptives), peer counselors - Traditional birth attendants, traditional healers - Pharmacists, medicine sellers, shopkeepers <p>“What?” SRHS and commodities</p> <ul style="list-style-type: none"> - HIV counseling and testing; care, support, and treatment - STI counseling, testing, treatment, partner treatment - Condoms, contraceptives, emergency contraception distribution, and counseling - Pregnancy testing and pretest and posttest counseling and support - Maternity care - Safe abortion services - Postabortion care - Care for victims of sexual violence - Male circumcision - Immunizations—for example, HPV and TT - Promotive guidance regarding SRH and development

HIV = human immunodeficiency virus; HPV = human papilloma virus; NGO = nongovernmental organization; SRHS = sexual and reproductive health services; STI = sexually transmitted infection; TT = tetanus toxoid.

searched the Web sites of organizations involved in the delivery, funding, or evaluation of adolescent SRHS in resource-poor countries including Advocates for Youth, Family Health International, Guttmacher Institute, Interagency Youth Working Group, International Center for Research on Women, International Planned Parenthood Federation, Joint United Nations Program on HIV and AIDS, Marie Stopes International, Pathfinder

International, Population Council, United Nations Population Fund, United Nations Children’s Fund, and World Health Organization (WHO).

We assessed all identified review articles and individual studies and evaluations included in the reviews for their relevance to our inclusion/exclusion criteria as outlined in Table 3. Publications could address more than one review question.

In 2006, WHO developed a framework of intervention typologies for a systematic review of youth health service utilization [18], which was further applied to a 2011 systematic review of youth HIV prevention interventions [19]. We used this framework because it differentiates programs on the basis of the kinds of interventions that were used and classifies them in an additive form, theoretically allowing for determination of component effect.

The typology first categorizes according to the health facility intervention: type 1: training health providers and/or staff to improve their knowledge, attitudes, and skills to more appropriately respond to the needs of adolescents or type 2: provider/staff training *plus* adjustments in the facility to make them more adolescent friendly (e.g., extending operating hours, reducing prices, modifying physical layout to increase privacy or confidentiality). The programs are also subtyped to describe the out-of-facility interventions used to disseminate information via: type a: the community, type b: other sectors (most often school based or through mass media), or type c: the community *plus* other sectors. Using this typology, studies could fall into six different categories: 1a, 1b, 1c, 2a, 2b, and 2c.

We also adopted the “Do not go, Steady, Ready, Go” classification. It was developed by WHO within the context of a 2006 series of adolescent HIV/AIDS systematic reviews, including the review mentioned previously on health service use. We found the classification useful because it translates the evidence base for various interventions into policy recommendations [20] (see Box). The criteria for the “Do not go, Steady, Ready, Go” classification in the 2006 review was based on the strength of evidence (assessing factors such as type and quality of study design) measured against predefined evidence thresholds for each individual type of intervention, taking into account factors such as feasibility, risk of adverse outcomes, and potential effect size with wide-scale implementation.

Results

Review Question A: facility-based SRHS

We identified five systematic reviews that met inclusion criteria [18,19,21–23] representing 18 unique initiatives to improve facility-based SRHS. They are presented in Table 4 according to their geographic location and the typology framework described previously.

Relevant data were drawn from three randomized controlled trials (RCTs); four and three quasi-experimental studies with and without longitudinal comparisons, respectively; and seven longitudinal assessments without comparison groups. Study characteristics and results are detailed in Table 5. We describe outcomes as delineated in our inclusion criteria (Table 3)—specifically those related to use of SRH services or commodities (either self-reported by survey or assessed by health facility data) or clinical SRH outcomes (e.g., rates of HIV or other STI infection, pregnancy rates).

Among the initiatives that involved health worker training without modifications to facilities (i.e., type 1a, 1b, and 1c), the three that demonstrated a significant effect pertaining to at least

Table 3
Inclusion/exclusion criteria

Inclusion criteria	Exclusion criteria
<p>Location: Study or evaluation carried out in low- or middle-income countries as defined by the World Bank^a. Limited to reports written in English.</p> <p>Population: The majority of the study population assessed was 10–19 years of age or results were age stratified and included 10- to 19-year-olds.</p> <p>Intervention:</p> <p>Review questions A–C: includes sufficient description of an SRHS intervention (as defined in Table 2) targeting adolescents (e.g., establishing or expanding services, improving facilities to make them more adolescent friendly, staff training, supervision).</p> <p>Review question D: includes sufficient description of an intervention such as IEC or outreach counseling aimed at increasing SRHS utilization by adolescents or community acceptance of such utilization.</p> <p>Review questions A–C: facility, out-of-facility, and vulnerable/marginalized populations defined per Table 2.</p> <p>Outcomes:</p> <p>Review questions A–C: utilization of SRHS or distribution of SRH-related commodity^a as assessed by health facility data, reported SRH service or commodity utilization, or clinical SRH outcome (e.g., rates of HIV or other STI infection, pregnancy rates).</p> <p>Review question D: because impact on SRHS utilization is a further downstream outcome of IEC to increase parental and community support for adolescent SRHS, we also included outcomes relating to changes in parental/community attitudes toward adolescent SRHS.</p> <p>Evaluation design:</p> <ul style="list-style-type: none"> • Randomized controlled trials • Quasi-experimental designs • Before/after comparison (without control group) • Cross-sectional comparison to unexposed group 	<p>Location: Study/evaluation carried out in high-income countries. Reports not written in English.</p> <p>Population: Study population predominantly >19 years of age or not clearly described.</p> <p>Intervention:</p> <p>Review questions A–C: those that only included IEC or counseling interventions. Insufficient description of intervention and its implementation.</p> <p>Review question D: insufficient description of intervention and its implementation.</p> <p>Outcomes:</p> <p>Review questions A–C: quantitative assessment of clinic visits or other measures of service utilization without assessment of change in catchment population/community over time or in comparison with control group.</p> <p>Evaluation design:</p> <ul style="list-style-type: none"> • Studies that did not use designs enabling evaluation of the impact of the intervention or inferences based on statistical tests.

HIV = human immunodeficiency virus; IEC = information, education, and communication; SRHS = sexual and reproductive health services; STI = sexually transmitted infection.

^a World Bank Classification of Country and Lending Groups. <http://data.worldbank.org/about/country-classifications/country-and-lending-groups> (accessed December 15, 2012).

some of our outcomes of interest were type 1c (i.e., those that included information dissemination both via the community and either the education sector and/or mass media or both). Two of these studies were rigorously designed cluster RCTs; both demonstrated mixed results. For example, Cowan et al. demonstrated a positive effect in terms of reduced pregnancy rates and increased likelihood of seeking contraceptive services among young females. However, they were neither able to affect uptake of other SRHS nor able to reduce prevalence of HIV or other STIs [26,27]. The other RCT was conducted in Tanzania. They were able to demonstrate some increase in condom distribution, numbers of males presenting for outpatient STI-related services, and self-reported condom use. However, biologic outcomes including prevalence of HIV and other STIs were not found to be

influenced by the intervention [28–30,54]. We identified one type 1a and one type 1b study; neither demonstrated a positive SRHS-related outcome of interest.

More evidence was available regarding type 2 interventions—that is, those that not only provided training for health professionals but also made adolescent-friendly facility-based modifications. Data from the two type 2a studies, both quasi-experimental, demonstrated positive outcomes. First, an

Box. “Do not go, Steady, Ready, Go” classification

<p><i>Go: Evidence threshold met</i> Sufficient evidence to recommend large-scale implementation coupled with careful monitoring of coverage, quality and cost, and research to better understand the mechanisms of action.</p> <p><i>Ready: Evidence threshold partially met</i> Evidence suggests intervention effectiveness but large-scale implementation must be accompanied by further research to clarify mechanisms and impact.</p> <p><i>Steady: Evidence threshold not met</i> Some promising evidence, but further development, pilot-testing, and evaluation are needed.</p> <p><i>Do not go: Strong enough evidence of lack of effectiveness or harm</i> Do not implement.</p>

Table 4
Typology of interventions (adapted^a from Dick et al. [18]); number of studies included by typology and location

Health service interventions (type 1–2)	And	Out-of-facility information dissemination channels (type a–c)		
Training health care providers/clinic staff	Type 1a The community Africa: 1	Type 1b The education sector and/or mass media South America: 1	Type 1c Both community and education sector and/or mass media Africa: 3	
Training health care providers/clinic staff and interventions to make facilities more adolescent-friendly	Type 2a The community Africa: 1 Asia: 1	Type 2b The education sector and/or mass media None identified	Type 2c Both community and education sector or mass media Africa: 9 Asia: 2	

^a Definitions of categories are the same as per Dick et al. [18]; it is only the numbering scheme that has been modified for purposes of clarity within this review.

Ugandan study assessed the impact of health center reorganization coupled with varying levels of health worker training and building district health teams' capacity for training and supervision. Adolescents were involved in various project stages. There was a more than twofold increase in self-reported use of health services, including family planning and STI services, and a more modest increase in self-reported use of family planning, among adolescents in intervention compared with the control communities [33].

The second type 2a initiative entailed multiple strategies including information distribution and awareness-building activities targeting unmarried Chinese youth and the distribution of free contraceptives. These measures resulted in a 14-fold increased odds of contraceptive and condom use among those in the intervention compared with the control community [34]. We did not identify any type 2b studies that met our inclusion criteria.

Eleven type 2c initiatives met our inclusion criteria. Only one, a quasi-experimental study from Senegal, did not demonstrate any positive SRHS-related outcomes related to the intervention, although there was an overall increase in self-reported use of health services in both the intervention and control groups [47].

The remaining 10 type 2c studies demonstrated at least some positive SRHS-related outcomes, although none of the type 2 studies measured biologic outcomes (e.g., pregnancy or HIV/STI prevalence) as study end points. The three type 2c initiatives with the weakest study designs assessed before/after or longitudinal trends in clinic attendance and lacked control groups and denominator information. Mozambique, for example, launched a multisectoral program, branded "Geracao Biz" ("Busy Generation") [48,49]. Adolescent-only clinics were refurbished, training materials were developed, and health workers met periodically to exchange technical information. Peer activists welcomed and educated clients in the waiting room. Longitudinal assessment of records from a subset of clinics demonstrated a dramatic increase in total clinic attendance and condom distribution.

In Madagascar, 15 private clinics "franchised" as a youth-friendly network and offered subsidized SRHS [50,51]. Extensive community outreach, social marketing, and mass media communication were also used. Clinic attendance increased almost twofold for males and fivefold for females. A national program in South Africa to improve adolescent-friendly health services (AFHS), including via national accreditation guidelines, was linked to a multimedia HIV prevention campaign. Overall clinic attendance by adolescents across 32 clinics increased but not for SRH visits specifically, although HIV testing did significantly increase [52].

Four African Youth Alliance (AYA) initiatives monitored service use and commodity distribution quarterly over 2 years [35–43]. These programs were implemented across four countries and involved the enhancement of clinics to improve their youth friendliness, although specific intervention components varied by AYA program country. Changes in clinic attendance varied by country and ranged from initial increases in attendance with subsequent leveling off or declines [37,38,40–43] to a steady increase in clinic attendance throughout [35]. Additionally, surveys of 17- to 22-year-olds were conducted 2–3 years after program inception for three of the four AYA programs. These data consistently demonstrated a positive effect on self-reported condom and contraceptive use among females (but not males) among those young people in intervention sites who recalled being exposed to AYA-specific activities as compared with those in control sites.

Two nonrandomized type 2c studies compared intervention to control groups with [44] or without [53] before/after intervention assessments. In Bangladesh, community- and school-based education coupled with referrals to services free of charge did not result in a significant difference in self-reported use of condoms. They did report an increase in service use, especially at sites that included the school-linked component. However, statistical testing of the difference between groups was not reported for this outcome [44]. An initiative in Mongolia focused on adolescent participation and community mobilization, often implemented by health workers, across a broad range of community members including teachers, health workers, and parents and adolescents themselves. They also trained health workers and provided basic commodities (e.g., contraceptives). Statistical methods were imperfect and did not take into account differences in the adolescent population in intervention versus control communities. Nonetheless, service use did statistically significantly increase in intervention compared with control sites [53].

One type 2c RCT, conducted in Nigeria, met inclusion criteria. It included training of private doctors along with clinic certification as adolescent friendly. Patent medicine vendors and pharmacists were also trained. Additionally, peer counselors and health providers delivered school-based health education on STI prevention and treatment. Self-reports of condom use and care seeking from a private physician or a pharmacist for STI symptoms increased among both males and females in intervention and control groups but with a more statistically significant outcome in the intervention group [45,46].

Four of the studies included in Review Question A review provided information on overall program costs [44,47,51,54]; however, none related costs to the scope of services provided or commodities distributed, number of beneficiaries reached, or health outcomes achieved. Without such analyses or data to calculate cost-effectiveness ratios, we were unable to compare costs. Therefore, these data are not included in this article.

Review Question B: out-of-facility SRHS

Although often delivered within the context of health facilities (e.g., clinics, hospitals), health services can also be delivered in the community—taking the services to where adolescents live and congregate. Potential locations for outreach services include schools, workplace, streets, malls, homes, youth centers, pharmacies, and storefronts. Review Question B deals with the effectiveness of approaches used to delivery SRHS in the community. We describe the related data from the eight initiatives [45,46,51,55–61], which we identified in four reviews [18,19,62,63] that met inclusion criteria.

Schools and workplaces. We were only able to identify evidence from one program that met our inclusion criteria. In Kenya, the delivery of messages regarding abstinence, faithfulness, and condom use to students from primary to university levels was combined with mobile HIV testing within school settings and an annual HIV testing day [56]. Although self-reported condom use did increase over time (there was no comparison group), outcomes regarding health service use were not reported.

Youth centers. Youth centers (YCs) are meeting points that offer a youth-friendly, safe, nonthreatening environment for information and service delivery across various sectors such as health, education, job training, or recreation. A 1997 review, based on

Table 5
Characteristics and evidence from studies of facility-based SRHS

Reference/primary study aim	Target population/location	Intervention	Design/sample size	Outcome of interest	Results	Conclusion	Comments																																					
Type 1a																																												
Mmari and Magnani [24]	10–24 year olds Lusaka, Zambia	Train health workers and peer educators in adolescent SRH communication skills. Community sensitization activities. Major difference between sites was extent of community involvement.	Longitudinal service statistics with control clinics 1 1: Three intervention clinics 1 2: Three intervention clinics 1 3: Two intervention clinics C: Two control clinics	# Aged 15–24 years seen for FP services # Aged 15–24 years seen for STI services	I 1: I 2: I 3: C: I 1: I 2: I 3: C: I 1: I 2: I 3: C:	<table border="0"> <tr> <td></td> <td><u>Baseline</u></td> <td><u>Q1</u></td> <td><u>End line*</u></td> </tr> <tr> <td></td> <td>250</td> <td>250</td> <td>1,000</td> </tr> <tr> <td></td> <td>0</td> <td>50</td> <td>50</td> </tr> <tr> <td></td> <td>250</td> <td>750</td> <td>3,400</td> </tr> <tr> <td></td> <td>250</td> <td>n/a</td> <td>1,250</td> </tr> <tr> <td></td> <td>2,250</td> <td>500</td> <td>4,000</td> </tr> <tr> <td></td> <td>550</td> <td>550</td> <td>600</td> </tr> <tr> <td></td> <td>950</td> <td>500</td> <td>2,000</td> </tr> <tr> <td></td> <td>400</td> <td>n/a</td> <td>1,600</td> </tr> </table>		<u>Baseline</u>	<u>Q1</u>	<u>End line*</u>		250	250	1,000		0	50	50		250	750	3,400		250	n/a	1,250		2,250	500	4,000		550	550	600		950	500	2,000		400	n/a	1,600	No substantial increased utilization of services in intervention versus control clinics	Data are estimates from graphs. Significance testing was not provided Different organizations implemented each site group. Each organization had differing approaches, primarily varying based on how communities were engaged. However, implementation strategies precluded assessment of these approaches.
	<u>Baseline</u>	<u>Q1</u>	<u>End line*</u>																																									
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Magnani et al. [25]	10–24 year olds Bahia State, Brazil	Provision of SRHS for adolescents in public clinics via training of health workers, coupled with SRH education in schools	Quasi-experimental with clinics and schools from the same area grouped into intervention and control groups Six intervention clinics, 258 control clinics	Clinic average annual number of new adolescent contraceptive users	Intervention clinics: 1997 (Beginning of project): 390 1999 (End of project): 500 Control clinics: 1997: 110 1999: 200	Increase in new contraceptive users but no difference between intervention and control sites	Significance testing was not provided																																					
Type 1c																																												
Cowan et al. [26,27]	Youth with mean age of 15 years South-eastern provinces in Zimbabwe	Train and re-train health workers on youth friendliness and provide supportive supervisory visits, coupled with community-based programs to increase awareness for adults and parents as well as in- and out-of-school participatory comprehensive education programs to increase demand and provide education and negotiating skills around sexual activity, STIs, contraception, and SRHS	Cluster randomized trial with baseline and end-of-study (at 4 years) surveys of the population within the communities 15 Intervention and 15 control communities	HIV prevalence HSV-2 (genital herpes) prevalence Pregnancy prevalence Pregnancy during follow-up No condom use at the last sex No pregnancy prevention with the first partner No pregnancy prevention with the last partner No pregnancy prevention with any partner Went to clinic in the past 12 months	<table border="0"> <tr> <td></td> <td><u>M/F aOR (95% CI)</u></td> </tr> <tr> <td></td> <td>M 1.20 (.69–2.18)</td> </tr> <tr> <td></td> <td>F 1.15 (.81–1.64)</td> </tr> <tr> <td></td> <td>M 1.23 (.69–2.18)</td> </tr> <tr> <td></td> <td>F 1.24 (.93–1.65)</td> </tr> <tr> <td></td> <td>F .92 (.70–1.19)</td> </tr> <tr> <td></td> <td>F .64 (.49–.83)</td> </tr> <tr> <td></td> <td>M 1.03 (.83–1.29)</td> </tr> <tr> <td></td> <td>F .93 (.72–1.20)</td> </tr> <tr> <td></td> <td>M .90 (.69–1.17)</td> </tr> <tr> <td></td> <td>F .97 (.76–1.25)</td> </tr> <tr> <td></td> <td>M .87 (.64–1.17)</td> </tr> <tr> <td></td> <td>F 1.04 (.77–1.40)</td> </tr> <tr> <td></td> <td>M .97 (.63–1.21)</td> </tr> <tr> <td></td> <td>F .99 (.74–1.30)</td> </tr> <tr> <td></td> <td>M .99 (.76–1.29)</td> </tr> <tr> <td></td> <td>F .98 (.76–1.28)</td> </tr> </table>		<u>M/F aOR (95% CI)</u>		M 1.20 (.69–2.18)		F 1.15 (.81–1.64)		M 1.23 (.69–2.18)		F 1.24 (.93–1.65)		F .92 (.70–1.19)		F .64 (.49–.83)		M 1.03 (.83–1.29)		F .93 (.72–1.20)		M .90 (.69–1.17)		F .97 (.76–1.25)		M .87 (.64–1.17)		F 1.04 (.77–1.40)		M .97 (.63–1.21)		F .99 (.74–1.30)		M .99 (.76–1.29)		F .98 (.76–1.28)	Strong evidence of slight increase in reported contraception-seeking behavior among females and moderate reduction in reported pregnancies as a result of the intervention. Otherwise, no significant change in any of the other outcomes of interest.				
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Table 5
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Reference/primary study aim	Target population/location	Intervention	Design/sample size	Outcome of interest	Results	Conclusion	Comments
Doyle et al., Hayes et al., Larke et al., Ross et al. [28–30,54] Improve access to and utilization of high-quality SRHS for young people	12–24 year-olds with a particular focus on 12–19 year-olds Mwanza Region, Tanzania	Four-prongs: (1) a teacher-led, peer-assisted, school-based SRH education program; (2) youth-friendly health services training and capacity building for health workers; (3) youth condom promotion and distribution; and (4) community promotion activities	Cluster randomized trial with baseline, 10 intervention and 10 control communities 3,524 Attendees of intervention and 3,516 control schools surveyed at 3 years. 7,083 intervention and 6,731 control attendees surveyed at 9 years.	Sought treatment for STI symptoms (M)/contraception (F)	M 1.19 (.90–1.57) F 1.33 (1.05–1.69)	No improvement in biologic outcomes or statistically significant increase in reported use of SRHS or commodities, except for strong evidence of a modest increase in initiation of condom use prevalence among males and females	
				HIV prevalence: At 3 and 9 years	<i>Year: M/F aPR (95% CI)</i> 3y: M sample size ns F .75 (.34–1.66) 9y: M .91 (.50–1.65) F 1.07 (.68–1.67)		
				HSV-2 prevalence: At 3 and 9 years	3y: M .92 (.69–1.22) F 1.05 (.83–1.32) 9y: M .94 (.77–1.15) F .96 (.87–1.06)		
				Syphilis prevalence: At 3 and 9 years	3y: M .78 (.46–1.30) F .99 (.67–1.46) 9y: M 1.06 (.74–1.52) F .86 (.62–1.21)		
				Chlamydia prevalence: At 3 and 9 years	3y: M 1.14 (.53–2.43) F .99 (.67–1.46) 9y: M 1.24 (.66–2.33) F 1.27 (.87–1.86)		
				Gonorrhea prevalence: At 3 and 9 years	3y: M sample size ns F 1.93 (1.01–3.71) 9y: M .71 (.21–2.41) F .73 (.20–2.63)		
				Initiated condom use ^a	3y: M 1.41 (1.15–1.73) F 1.30 (1.03–1.63)		
				Condom use at the last sex: At 3 and 9 years	3y: M 1.47 (1.12–1.93) F 1.12 (.85–1.48) 9y: M 1.19 (.91–1.54) F 1.27 (.97–1.67)		
				Condom use at the last sex with nonregular partner: At 9 years	9y: M 1.1 (.97–1.36) F 1.34 (1.07–1.69)		
				Went to clinic for STI symptoms: At 3 and 9 years	3y: M .84 (.50–1.41) F 1.02 (.62–1.70) 9y: 1.19 (.91–1.56) F 1.02 (.77–1.37)		
		Longitudinal health service utilization, STI partner contact tracing, condom distribution statistics were also gathered on outpatient visits for 15–24 year-olds to 39 health facilities	Difference in mean number of visits or commodities distributed in intervention versus comparison group Outpatient visits, overall		<i>Adjusted mean difference from baseline (95% CI)</i> M, Year 1: –7 (–23 to 9) M, Year 2: 5 (–4 to 15) M, Year 3: 5 (–7 to 16), <i>p</i> = .691, <i>p</i> trend ^d = .026 F, Year 1: 6 (–17 to 28) F, Year 2: 16 (–9 to 42) F, Year 3: 17 (–5 to 38), <i>p</i> = .865, <i>p</i> trend = .135	Service statistics demonstrated increased health service utilization for STI symptoms by males (but was not statistically significant for females) as a result of the intervention	

				Outpatients presenting with STI symptoms	M, Year 1: .2 (-2 to .5) M, Year 2: .8 (.1 to 1.5) M, Year 3: 1.1 (.5 to 1.7), $p = .005$, p trend = .022 F, Year 1: .5 (-.8 to 1.7) F, Year 2: 1.7 (-.4 to 3.9) F, Year 3: 2.0 (.4-3.5), $p = .087$, p trend = .11		
				STI partner contact tracing ^b	Year 1: .4 (-2 to 1.1) Year 2: .7 (-.8 to 2.2) Year 3: 1.0 (.3-1.7), $p = .133$, p trend = .174		
				Condoms distributed ^c	Year 1: .3 (.2-.4) Year 2: .8 (.4-1.3) Year 3: .2 (-.4 to .7), $p = .008$, p trend = .647		
Kim et al. [31,32]	10–24 year olds Zimbabwe (urban Mutare and four towns in rural districts)	Train family planning providers in communication and counseling skills coupled with a campaign to refer young people to clinics. The campaign included multiple channels including community events, hotlines, radio program, posters, and leaflets distributed and dramas performed at schools, churches, and town centers. Peer educators also visited homes.	Before and after with control group; community surveys of ~1,400 10–24 year-olds at baseline and at the end of the 1-year program One intervention and two control community sites	Percent seeking services at health center at the end-of-study survey Percent use of modern contraceptives in intervention site	28.2% Intervention sites 9.5% Control sites aOR, 4.7; $p < .001$ 56% Baseline 67% End of study aOR, 1.7; $p < .05$	Weak evidence for increase in reported use of services as a result of the intervention Modest increase in contraceptive prevalence at intervention site; "use of modern methods did not change significantly in comparison areas"	No baseline data for service utilization. No control site data for contraceptive utilization There was contamination at control sites
Type 2a							
Mbonye et al. [33]	10–19 year-olds Jinja, Uganda	Train health workers and district health management team in adolescent SRH, communication, and counseling. Health centers reorganized to cater to adolescents and recreational services introduced. Basic SRH supplies provided to clinics.	Quasi-experimental with four intervention and four control health centers Survey of 128 adolescents at 17 months after implementation	12 Months after start of intervention % of adolescents: using outpatient health services over 12 months using FP services over 12 months using STI services over 12 months % currently using FP % ever used FP	Intervention group: 49.3% Control group: 13.1%, $p = .0001$ Intervention group: 69.4% Control group: 21.1%, $p = .0001$ Intervention group: 65.5% Control group: 31.9%, $p = .0001$ Intervention group: 65.6% Control group: 46.9%, $p = .006$ Intervention group: 68.8% Control group: 53.1%, $p = .020$ aOR, 14.5 (95% CI, 6.4–33.3)	Weak evidence for increased reported use of services and commodities as a result of the intervention	Control health centers were comparable in terms of level of service delivery, catchment size, and population characteristics Statistical analysis did not take into account adjusting for potential confounding or clustering
Lou et al. [34]	15–24 year-old unmarried youth Suburban Songjiang district, Shanghai, China	Train health workers to increase knowledge, sensitivity, and skills related to adolescent SRH, including counseling IEC materials and activities (lectures, videos, discussions) made available in the community Community sensitization meetings for community leaders and parents	Before and after with surveys of all unmarried 15–24 year-olds in one intervention and one control community 1,220 = number in intervention group 1,007 = number in control group	Condom use—accounting for both group and time interaction effects Contraceptive use—accounting for both group and time interaction effects	aOR, 13.8 (95% CI, 6.83–280.7)	Moderate evidence of increased reported use of condoms and contraceptives as a result of the intervention	Statistical analysis did not take into account clustering

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Table 5
Continued

Reference/primary study aim	Target population/location	Intervention	Design/sample size	Outcome of interest	Results	Conclusion	Comments		
Type 2c African Youth Alliance (AYA) study [35,36]	10–24 year-olds with a focus on 15–20 year-olds Botswana, implementation sites throughout the country	Staff and health working training along with clinic establishment or enhancement to improve youth friendliness. Peer educators provided information in the clinics and in the community. Community behavior change component.	Longitudinal assessment of health service utilization data from 18 clinics	Total number of visits among 10–24 year olds	<p><i>Visit type</i></p> <p>All visits, among reporting clinics</p> <p>STI test/treat</p> <p>VCT</p> <p>Pre- and post-natal care and pregnancy testing</p>	<p><i>Interval</i></p> <p>Q0</p> <p>Q1</p> <p>Q2</p> <p>Q3</p> <p>Q4</p> <p>Q5</p> <p>Q6</p>	<p>#</p> <p>130</p> <p>347</p> <p>424</p> <p>461</p> <p>375</p> <p>351</p> <p>449</p> <p>12</p> <p>51</p> <p>67</p> <p>22</p> <p>46</p> <p>50</p> <p>23</p> <p>0</p> <p>16</p> <p>18</p> <p>2</p> <p>21</p> <p>15</p> <p>12</p> <p>40</p> <p>75</p> <p>127</p> <p>229</p> <p>186</p> <p>93</p> <p>93</p>	There was a steady increase in clinic attendance	Surveys of youth were conducted for other AYA country programs but not in Botswana because of resource constraints and the long lag period between the end of country program operations and the initiation of the survey-based evaluation Significance testing on health service utilization data was not provided
AYA study [36–39]	10–24 year-olds with a focus on 15–20 year-olds Ghana, implementation sites throughout the country	Staff and health working training along with clinic establishment or enhancement to improve youth friendliness. Peer educators provided information in the clinics and in the community. Multiple sources of media used in information dissemination campaign. Life skills planning and other educational activities. Policy and advocacy campaign and institutional capacity building.	Comparison of postintervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities, compared with those from control communities # surveyed: “Exposed” in the intervention group: M: 952 F: 1,036 “Unexposed” (i.e., control group): M: 628 F: 800	Condom use at the first sex Ever used condom with current partner Always used condom with current partner Used modern contraceptive at the first sex Used modern contraceptive at the last sex	<p>M: 41% unexposed, 41% exposed, $p > .05$ F: 37% unexposed, 48% exposed, $p < .05$ M: 69% unexposed, 71% exposed, $p > .05$ F: 61% unexposed, 76% exposed, $p < .05$ M: 34% unexposed, 33% exposed, $p > .05$ F: 12% unexposed, 17% exposed, $p < .05$ M: 42% unexposed, 43% exposed, $p > .05$ F: 40% unexposed, 50% exposed, $p < .05$ M: 56% unexposed, 59% exposed, $p > .05$ F: 42% unexposed, 49% exposed, $p < .05$</p>	Reported use of condoms and contraceptives was significantly higher among “exposed” compared with “unexposed” females; no statistically significant difference noted among males	Many baseline reported behaviors regarding SRH commodity use were higher among males before exposure to intervention Measure of change from baseline comparing “exposed” to “unexposed” was not provided There was some contamination of control communities because of mass media and peer education intervention components Authors reported a preference in reporting analysis of “exposed” to “unexposed” rather than among intervention (i.e., including those who reported exposure to		

			Longitudinal assessment of health service utilization data from 24 clinics	Total number of visits among 10–24 year-olds	Visit type All visits, among reporting clinics	Interval Q3 Q4 Q5 Q6 Q7 Q8	# ~ 8,000 ~ 15,000 ~ 17,000 ~ 13,000 ~ 16,000 ~ 16,000	Increase in clinic attendance in first quarter and then a leveling off for subsequent quarters	intervention and those who did not within intervention communities) versus control communities, making the results more of an efficacy rather than effectiveness analysis
					STI testing	Q3 Q4 Q5 Q6 Q7 Q8	~ 450 ~ 250 ~ 300 ~ 400 ~ 600 ~ 400		Comparison to control clinics and significance testing on health service utilization data was not provided. Clinic attendance data from the first six months was not readily available.
					STI treatment	Q3 Q4 Q5 Q6 Q7 Q8	~ 500 ~ 250 ~ 300 ~ 500 ~ 1,200 ~ 500		
					VCT	Q3 Q4 Q5 Q6 Q7 Q8	~ 50 ~ 100 ~ 200 ~ 250 ~ 300 ~ 300		
AYA study [36,39–41]	10–24 year-olds with a focus on 15–20 year-olds Tanzania	Staff and health working training along with clinic establishment or enhancement to improve youth friendliness. Peer educators provided information in the clinics and in the community. Multiple sources of media used in information dissemination campaign. Life skills planning and other educational activities. Policy and advocacy campaign and institutional capacity building. Community behavior change component.	Comparison of postintervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities compared with those from control communities. # surveyed: “Exposed” in the intervention group: M: 492 F: 843 “Unexposed” (i.e., control group): M: 229 F: 336	Condom use at the first sex Ever used condom with current partner Always used condom with current partner Used modern contraceptive at the first sex Used modern contraceptive at the last sex	M: 24% unexposed, 44% exposed, $p < .05$ F: 33% unexposed, 54% exposed, $p < .05$ M: 78% unexposed, 81% exposed, $p > .05$ F: 59% unexposed, 75% exposed, $p < .05$ M: 14% unexposed, 28% exposed, $p < .05$ F: 15% unexposed, 25% exposed, $p < .05$ M: 22% unexposed, 43% exposed, $p < .05$ F: 37% unexposed, 56% exposed, $p < .05$ M: 68% unexposed, 67% exposed, $p > .05$ F: 39% unexposed, 64% exposed, $p < .05$		Reported use of condoms and contraceptives was significantly higher among exposed compared with unexposed females. Many outcomes related to contraceptive and condom use were also significantly higher among exposed males.	Measure of change from baseline comparing exposed to unexposed was not provided There was some contamination of control communities because of mass media and peer education intervention components Authors reported preference in reporting analysis of “exposed” to “unexposed” rather than among intervention (i.e., including those who reported exposure to intervention and those who did not within intervention communities) versus control communities, making the results more of an efficacy	

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Table 5
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Reference/primary study aim	Target population/location	Intervention	Design/sample size	Outcome of interest	Results	Conclusion	Comments																																	
AYA study [36,39,42,43]	10–24 year-olds with a focus on 15–20 year-olds Uganda	Staff and health working training along with clinic establishment or enhancement to improve youth friendliness. Peer educators provided information in the clinics and in the community. Multiple sources of media used in information dissemination campaign. Life skills planning and other educational activities. Policy and advocacy campaign and institutional capacity building. Community behavior change component.	Comparison of postintervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities compared with those from control communities. # surveyed: "Exposed" in the intervention group: M: 995 F: 1,933 "Unexposed" (i.e., control group): M: 633 F: 615	Condom use at the first sex Ever used condom with current partner Always used condom with current partner Used modern contraceptive at the first sex Used modern contraceptive at the last sex	M: 55% unexposed, 55% exposed, $p > .05$ F: 45% unexposed, 58% exposed, $p < .05$ M: 74% unexposed, 78% exposed, $p > .05$ F: 57% unexposed, 77% exposed, $p < .05$ M: 37% unexposed, 39% exposed, $p > .05$ F: 20% unexposed, 35% exposed, $p < .05$ M: 56% unexposed, 56% exposed, $p > .05$ F: 48% unexposed, 59% exposed, $p < .05$ M: 61% unexposed, 61% exposed, $p > .05$ F: 42% unexposed, 59% exposed, $p < .05$	Increase in clinic attendance in first quarter and then a leveling off for subsequent quarters	rather than effectiveness analysis Comparison to control clinics and significance testing on health service utilization data was not provided. Clinic attendance data from the first year was not readily available.																																	
								<table border="1"> <thead> <tr> <th>Visit type</th> <th>Interval</th> <th>#</th> </tr> </thead> <tbody> <tr> <td rowspan="8">All visits, among reporting clinics</td> <td>Q5</td> <td>8,720</td> </tr> <tr> <td>Q6</td> <td>11,197</td> </tr> <tr> <td>Q7</td> <td>11,103</td> </tr> <tr> <td>Q8</td> <td>10,900</td> </tr> <tr> <td rowspan="4">STI test/treat</td> <td>Q5</td> <td>1,675</td> </tr> <tr> <td>Q6</td> <td>2,350</td> </tr> <tr> <td>Q7</td> <td>2,967</td> </tr> <tr> <td>Q8</td> <td>3,272</td> </tr> <tr> <td rowspan="4">Pre- and post-natal care and pregnancy testing</td> <td>Q5</td> <td>1,634</td> </tr> <tr> <td>Q6</td> <td>2,349</td> </tr> <tr> <td>Q7</td> <td>2,877</td> </tr> <tr> <td>Q8</td> <td>2,622</td> </tr> <tr> <td rowspan="4">FP</td> <td>Q5</td> <td>1,719</td> </tr> <tr> <td>Q6</td> <td>2,120</td> </tr> <tr> <td>Q7</td> <td>3,924</td> </tr> <tr> <td>Q8</td> <td>4,596</td> </tr> </tbody> </table>	Visit type	Interval	#	All visits, among reporting clinics	Q5	8,720	Q6	11,197	Q7	11,103	Q8	10,900	STI test/treat	Q5	1,675	Q6	2,350	Q7	2,967	Q8	3,272	Pre- and post-natal care and pregnancy testing	Q5	1,634	Q6	2,349	Q7	2,877	Q8	2,622	FP	Q5
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All visits	Q1	16,383																																						
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					Pre and post-natal care and pregnancy testing	Q1 Q2 Q3 Q4 Q5 Q6 Q7	1,439 1,825 2,074 2,174 1,985 2,657 2,080		
					FP	Q1-3 Q5-8 ^e	18,071 16,882		
Bhuiya et al. [44]	13–19 year-olds Urban communities in northwestern Bangladesh	Health worker and nonclinical staff training to improve welcoming and nonjudgmental attitudes; modification of facilities to improve wait times, privacy, confidentiality, and affordability. Peer educators and teachers referred adolescents to services. Community-based information provided via telephone hotline. Questions could be anonymously submitted in boxes at schools or clinics. Responses posted on school bulletin boards or in newspaper columns in question and answer format.	Before and after interviews of ~6,000 adolescents from two intervention and one control site. Also longitudinal service utilization statistics. Site A: Reproductive health education to out-of-school adolescents linked with adolescent-friendly services at health facilities. Site B: As per site A + school-based education and linkage with health facility component. Site C: Control	Condom use at the last sex among unmarried male adolescents compared with baseline. Monthly average of SRHS visits	A: aOR 2.31, $p < .1$ B: aOR 2.41, $p < .1$ C: aOR 2.0, $p > .1$			No evidence of increased reported use of condoms among males due to the intervention. Evidence of increased service utilization due to the intervention, especially in the study arm that included school-based activities	Girls were the primary recipients of SRHS with the leading reason being for tetanus toxoid vaccination. Antenatal and postnatal care, FP, and STI services were also common reasons for SRHS visits. Statistical comparison of service utilization data was not provided
Coplan [45] Okonofua [46]	14–20 year-olds attending school Endo, Nigeria	Training on STI diagnosis and treatment for private providers (practitioners, patent medicine dealers, pharmacists) who were identified by adolescents as STI treatment providers for youth in the neighborhood. Private practitioners' clinics were certified as adolescent friendly; this list was provided to peer educators. Education through schools by health professionals, peer educators, films, and organized discussions.	Cluster randomized with one treatment site consisting of STI treatment providers near four schools and two control sites with STI treatment providers near four schools each. Surveys of students were conducted in schools	Percent reported seeking treatment from a private provider for STI symptoms Percent males reporting some condom use Percent females reporting some condom use	Intervention: before: 17.5%, after: 40.7% Control 1: before: 19.0%, after: 29.1% Control 2: before: 24.0%, after: 30.4% Change relative to control 1: OR, 1.85; 95% CI, 1.06–3.22 Change relative to control 2: OR, 2.35; 95% CI, 1.03–5.17 Intervention: before: 30.8%, after: 40.5% Control 1: before: 32.1%, after: 36.1% Control 2: before: 26.6%, after: 34.3% Change relative to control 1: OR, 1.32; 95% CI, .97–1.79 Change relative to control 2: OR, 1.08; 95% CI, .6–1.46 Intervention: before: 30.2%, after: 36.5% Control 1: before: 32.6%, after: 31.8% Control 2: before: 29.2%, after: 25.4% Change relative to control 1: OR, 1.82; 95% CI, 1.28–2.6 Change relative to control 2: OR, 1.96; 95% CI, .94–4.1			Strong evidence of increased reported service utilization as a result of the intervention No evidence of increased reported use of condoms as a result of the intervention	Statistical analysis did not take into account clustering
Diop et al. [47]	10–19 year-olds Urban communities	Clinic-based intervention: train health workers, peer	Before and after surveys of ~2,800 adolescents from two	Percent reporting use of health services	A B C			Weak evidence for no increase in the reported use of	There was contamination of the control site—that is, mass (continued on next page)

Table 5
Continued

Reference/primary study aim	Target population/location	Intervention	Design/sample size	Outcome of interest	Results	Conclusion	Comments																					
health among adolescents by creating a supportive environment for dealing with adolescent reproductive health problems, improving existing services, and providing reproductive health information and skills in schools	in northern Senegal	educators, modification of the layout of clinics to make them more adolescent friendly (e.g., increase privacy) Community-based intervention: sensitization on adolescent reproductive health for parents and community and religious leaders. Education sessions for adolescents led by peer educators using a life skills curriculum. Educational materials distributed at community events. Mass media messaging via radio. School-based intervention: reproductive health curriculum delivered by teachers and peer educators and events outside school hours	intervention and one control site	Boys aged 10–14 years: before/after, <i>p</i> value	1%/7%, <.05	services as a result of the intervention	media messaging reached the control site and some school interventions reached site A Robust sampling framework of survey participants																					
			Site A: Clinic and community interventions	Boys aged 15–19 years: before/after, <i>p</i> value	6%/7%, >.05			2%/9%, <.05	0%/10%, <.05																			
			Site B: As per site A + school-based intervention	Girls aged 10–14 years: before/after, <i>p</i> value	1%/7%, <.05			8%/13%, <.05	9%/12%, <.05																			
			Site C: control	Girls aged 15–19 years: before/after, <i>p</i> value	8%/18%, <.05			1%/4%, >.05	0/15%, <.05	12%/14%, >.05	8%/20%, <.05																	
Hainsworth et al. [48,49] Improve adolescent SRHS, reduce unwanted pregnancy, STI, HIV, and unsafe abortion incidence by establishing a network of quality services	15–24 year-olds Maputo, Mozambique	Three adolescent-only clinics refurbished and equipped to make them adolescent friendly, services except STI treatment offered for free; health worker training; periodic meetings of health workers to exchange information; IEC materials developed; peer activists trained	Longitudinal comparison of clinic attendance records at program start and 1 and 2 years postimplementation at eight clinics	# Attending clinic # Of condoms distributed	Maputo Zambezia Maputo Zambezia	<table border="1"> <thead> <tr> <th></th> <th>Baseline</th> <th>Year 1</th> <th>Year 2</th> </tr> </thead> <tbody> <tr> <td>Maputo</td> <td>1,173</td> <td>11,726</td> <td>18,809</td> </tr> <tr> <td>Zambezia</td> <td>NA</td> <td>11,669</td> <td>16,271</td> </tr> <tr> <td>Maputo</td> <td>2,472</td> <td>91,500</td> <td>146,894</td> </tr> <tr> <td>Zambezia</td> <td>26,800</td> <td>158,000</td> <td>230,661</td> </tr> </tbody> </table>		Baseline	Year 1	Year 2	Maputo	1,173	11,726	18,809	Zambezia	NA	11,669	16,271	Maputo	2,472	91,500	146,894	Zambezia	26,800	158,000	230,661	Weak evidence of increased use of services and distribution of condoms	No control sites. Significance testing not provided
	Baseline	Year 1	Year 2																									
Maputo	1,173	11,726	18,809																									
Zambezia	NA	11,669	16,271																									
Maputo	2,472	91,500	146,894																									
Zambezia	26,800	158,000	230,661																									
LaVake [50] Neukom et al. [51] Prevent HIV/AIDS and unplanned pregnancies by encouraging youth to reduce sexual activity and/or use condoms and seek treatment for STIs	15–24 year-olds Tamatave, Madagascar, and surrounding rural areas	Franchise 13 for-profit and two private nonprofit clinics into a network of youth-friendly clinics meeting a minimum standard, which included having trained providers, flexible hours, welcoming and discreet facilities. Services were subsidized.	Before and after comparison of clinic attendance records at 15 clinics	# Attending clinic	Before: Males: 138, Females: 389 After: Males: 250, Females: 1,959	Weak evidence of increased use of services	No control sites. Significance testing not provided																					

loveLife [52] Reduce HIV, STI and unwanted pregnancy prevalence among youth by improving adolescent-friendliness of South African government clinics	10–24 year-olds with a particular focus on 12–17 year-olds South Africa (national)	Advertisements through mass media and peer educators through individual and small group interactions via mobile units. Sessions held with parents and religious leaders to promote dialog on SRH issues. Implement clinic quality-assessment teams to assess and make improvements based on national adolescent-friendly quality standards. Participating clinics also undergo repeated external assessments and are eligible to receive two-year renewable rating as an adolescent-friendly clinic. Simultaneous multimedia HIV prevention campaign.	Before and after clinic utilization by 10–19 year-olds based on service utilization data from 32 participating clinics	Average monthly: Clinic attendance STI treatment visits HIV VCT Pregnancy-related visits Contraception-related visits	Baseline: 340 2 years: 420, $p < .05$ Baseline: 30 2 years: 48, $p > .05$ Baseline: 23 2 years: 52, $p < .001$ Baseline: 48 2 years: 54, $p > .05$ Baseline: 237 2 years: 264, $p > .05$	Weak evidence of increased use of HIV, VCT and overall services. No evidence of increased use of other SRHS.	No data from control sites provided
Sovd et al. [53] Improve access to quality SRHS for adolescents	10–19 year-olds Districts in the capital and rural districts, Mongolia	Training staff in adolescent health and development, providing basic equipment and supplies (e.g., contraceptives, weight scales) to clinics; making facilities more attractive to and confidential for adolescents, setting adolescent-friendly quality standards, community mobilization with adults and adolescents, adolescent participation in the interventions	Quasi-experimental with comparison of service utilization in 52 intervention and 28 control sites	# Of adolescent visits to clinic at end of 3-year project	<u>Males</u> Intervention: control ratio = 1.6, $p < .05$ <u>Females</u> Intervention: Control ratio = 1.8, $p < .05$	Weak evidence of increase in service utilization as a result of the intervention	Pre-intervention data (for control sites) not provided; comparison only made between intervention and control sites Statistical methods did not take into account differences in adolescent population size in control versus intervention (~1.4 times greater) communities

aOR = adjusted odds ratio; aPR = adjusted prevalence ratio; C = control; CI = confidence interval; F = female, FP = family planning; IEC = information, education, communication; HSV-2 = herpes simplex virus–type 2; I = intervention; M = male; NA = data not available; OR = odds ratio; Q = quarter (with Q0 corresponding to baseline, Q1 to 3-month period after baseline, Q2 to 3-month period following Q1, and so on); RCT = randomized controlled trial; STI = sexually transmitted infection; SRH = sexual and reproductive health; SRHS = sexual and reproductive health services; VCT = voluntary counseling and testing for HIV.

^a Prevalence of reported condom use at 36 months among those who had reported no condom use at recruitment.

^b Contact tracing data disaggregated by gender were not provided.

^c Condoms were not distributed before the start of the intervention. Data disaggregated by gender were not provided.

^d p Value represents comparison of difference by trial arm in average monthly attendance over 3 postimplementation years. p Trend value represents test for trend in mean difference over time from post-implementation year 1 to postimplementation year 3.

^e Data not reported for quarter 4.

the best available evidence at that time, suggested that YCs were not likely to be a cost-effective way to increase the use of SRHS because of high operating costs associated with provision of multiple (including non-health related) services [64]. Further and more rigorous studies have since been published. In fact, a systematic review specifically on the effectiveness of 18 YC initiatives in increasing the use of SRHS was published in 2012 [63]; their findings were consistent with other relevant reviews [18,62,64]. YCs are overwhelmingly accessed by older male youth (often outside the intended age target range) who are repeat visitors residing in close proximity to the centers. They largely use the centers for recreational purposes. Indeed, YC attendees infrequently accessed the facilities' health services. Although 27% and 97% of attendees of two different South African YCs reported using the facilities' SRHS [65–67], the proportion was much lower across all other studies, ranging from 14% in Accra, Ghana [68], to <5% across five SSA and Caribbean studies [55,57,69–71]. Females constituted 92% of YC attendees who used clinic services [63]; however, uptake even among this group was low—females tended to use the centers for vocational reasons [57,69].

Five initiatives [51,55,57,58,60,61] measured outcomes meeting our inclusion criteria; results were mixed. For example, visitors to a Togo YC were significantly more likely to report using contraceptives [60]. In Rwanda, attendees were significantly more likely to have had an HIV test; yet there were no positive impacts on condom or contraceptive use [51,58]. A before/after analysis of an YC strategy in Monterey, Mexico was compared with both a community-based youth promoters strategy and a control community. They demonstrated a 44% increase in individuals under the age of 23 years who received condoms or contraceptives in the YCs, compared with a 2% increase in the control communities. There was an even more striking 98% increase in the youth promoter intervention communities. The authors reported that the YC intervention was more costly than the youth promoter intervention [61].

YCs were the only intervention type related to our Review Question B for which cost data were available and demonstrate that, with the generally low uptake of clinical services, the cost per beneficiary was high—ranging from US\$4–US\$200 per clinic visit or contraceptive adopter [55,67,72]. Furthermore, the more recreational, educational, and/or vocational services provided, the higher the cost per clinic visit [67].

Households, streets, parks, malls, markets, or other such settings. Data on the effectiveness of community-based distribution (by community health workers or community-based distributors, for example) of SRH services and commodities are not readily available in the context of resource-limited settings. A 2012 review of the effectiveness of out-of-facility approaches to increase the use of SRHS [62] included one study meeting criteria for our review question. Data relating to YCs from this quasi-experimental study from Mexico was described previously. The authors also demonstrated that a community-based condom and contraception distribution strategy that specifically targeted youth was more effective in increasing commodity utilization (98% increase) than either community-based distribution without a youth-specific strategy (2% increase) or distribution in YCs (44% increase) [61].

Informal private health sector. As described previously for Review Question A, an initiative in Nigeria trained three groups that youth identified as providers whom they turn to treatment for

STIs: private doctors, pharmacists, and patent medicine dealers. Training was on the syndromic management of STIs. Self-reported condom use and care seeking for STI symptoms from private physicians or pharmacists increased in both intervention and control groups, but with a more statistically significant outcome in the intervention group [45,46].

A Zambian quasi-experimental study evaluated the efficacy of providing emergency contraception (EC) prescriptions via four different provider groups: clinic-based providers, pharmacy staff, peer outreach counselors, and community sales agents such as shopkeepers and small-scale vendors [59]. The target group was 12- to 45-year-olds, but separate data were available for 15- to 24-year-olds. Among those who actually completed a prescription, pharmacies were popular sites for the receipt of and filling of EC prescriptions (50% and 70%, respectively), as were traditional health facilities where 20% received EC prescriptions. Thirty percent received the prescriptions from peer counselors. Interestingly, community sales agents were not popular choices for getting EC prescriptions despite prestudy qualitative assessments that identified the community sales agents as a preferred source of health services and the fact that most condoms obtained by adolescents in the project areas were from community-based distributors. This highlights the need for continued monitoring and evaluation of intervention implementation.

Review Question C: vulnerable and marginalized populations

We were unable to identify any initiatives meeting this article's inclusion criteria that reported outcomes specifically for vulnerable or marginalized groups. In fact, the 2012 review of out-of-facility SRHS was coauthored by two authors of this article (D.M.D. and V.C.-M.). We initially set out to examine the impact of community-based health service interventions on marginalized youth. However, although the programs and projects often specifically intended to target such groups, none of the studies or evaluations reported outcome data disaggregated by such groups.

Review Question D: generating demand and community support

The preceding three questions deal with supply-side strategies. However, improving health service use also involves generating demand for services among adolescents and acceptance among gatekeepers in the community, such as parents and community leaders, who may question or oppose the provision of SRHS for adolescents. Aply, the vast majority of the initiatives described previously not only included supply-side strategies such as health provider training and/or making facilities more adolescent friendly but also incorporated marketing or information dissemination to create demand and/or support for adolescent SRHS. In fact, as described under Review Question A and depicted in Tables 4 and 5, evidence of impact on the uptake of SRHS is most plentiful for type 2c interventions—that is, those that include training and facility improvements coupled with activities to increase demand and acceptance at the community level and via the education sector and/or mass media. It is nearly impossible to disentangle the attributable contributions of each component as study designs did not allow for such analyses.

In their systematic review published in 2010, Kesterton and Cabral de Mello specifically summarize the evidence base for interventions to create or increase young people's demand for SRHS and those to increase community support [73].

Most studies included in our review were identified from their publication.

Generating demand. We identified 21 initiatives [25–32,34–54,74–79] from three reviews [18,19,73] on SRHS demand-generation interventions among adolescents that met our inclusion criteria. The demand-generation activities were primarily school based in six of these programs [25,44–47,74,79], of which two demonstrated mixed results using referral systems linked to schools. There was strong evidence of increased care seeking for STI symptoms among those in the intervention schools/communities in a cluster RCT in Nigeria. However, there was no impact on self-reported use of condoms [45,46]. A Brazilian quasi-experimental study found no difference in new contraceptive use among adolescents in intervention compared with control clinics [25].

The three-arm quasi-experimental study design used in the Population Council's Frontiers in Reproductive Health Program in four countries allowed for the examination of the impact of adding school-based in addition to community-based demand-generation and youth-friendly clinic activities. The Senegal and Bangladesh programs are described in Table 5. (Details on supply-side interventions were insufficient in the Mexico and Kenya program reports to allow for inclusion pertaining to Review Question A/Table 5.)

Results differed across the four programs. In Kenya, self-reported use of contraceptives increased in communities where school-based activities were applied compared with those with only community-based activities. However, self-reported use also increased in control communities. Furthermore, self-reported health service use was low across all three arms [74]. The program in Mexico showed no change in self-reported use of condoms and decreased overall self-reported health service use across all sites [79]. Results from Senegal demonstrated that self-reported use of health services increased for boys in both the school-based intervention and the control communities but not significantly so for girls in the school-based arm [47]. Finally, in Bangladesh, the number of SRHS visits increased more in sites with school-based activities compared with the sites with community-based activities alone and especially compared with the control sites [44].

Community-based information, education, and communication (IEC) strategies were the primary focus of demand-generation interventions in four initiatives which also included AFHS activities and are, therefore, represented in Table 5. The program with the strongest study design measured multiple outcomes and showed mixed results [26,27]. However, all four initiatives demonstrated some increased SRH commodity uptake or service use [26,27,34,50,51,53]. A community-based IEC program with a female youth empowerment focus from India, but without a health services component, demonstrated higher self-reported health service use among girls in the program compared with the controls [75].

A South African initiative used demand-generation activities that were primarily via media messaging [52], whereas a Zimbabwean program used a combination of media- and school-based strategies [31,32]. Weak evidence for the increased use of SRHS was seen in both studies (Table 5).

Nine initiatives aimed to increase demand generation by implementing multicomponent activities. Six of these also included AFHS interventions; data are portrayed in Table 5. The four AYA programs demonstrated increased self-reported use of

condoms and contraceptives among females, but health service use results differed by country [35–43]. Clinic data from Tanzania [28–30,54] and Mozambique [48,49] demonstrated increased SRHS use; yet the RCT from Tanzania also demonstrated an increase in self-reported condom use, condom distribution, and STI-related service use. However, HIV and other STI prevalence were not impacted.

Two initiatives not portrayed in Table 5 that included multicomponent demand-generation activities reported before/after implementation data. A nationwide program without comparison groups in Jamaica demonstrated a small increase in adolescent clinic attendance at year one followed by a 123% increase at year two, including a 59% increase in family planning visits; however, detailed data and significance testing were not reported [73,78]. Investigators in Nepal compared a participatory approach using activities such as youth clubs and street theater to more traditional peer- and teacher-led education [76]. Among first-time pregnant young women, self-reported utilization of health facilities for delivery increased more significantly in the intervention site (17.4%–45%) than in the control (11.8%–22.5%) site. The effect was even more profound for self-reported use of antenatal services, increasing from 4.8% to 66.7% in intervention participants while decreasing from 41.2% to 36.6% among those in the comparison community.

Generating community support. Seventeen initiatives to increase community support met our inclusion criteria [24,26,27,31,32,35–44,47–51,53,74,77–82], of which 15 assessed SRHS uptake outcomes [24,26,27,31,32,35–44,47–51,53,74,77–79]; 12 of these also included AFHS interventions sufficiently explained for data to be included in Review Question A/Table 5 [24,26,27,31,32,35–44,47–51,53]. Fourteen of the 17 initiatives included assessments of community outcomes relevant to this review [24,26,32,35–44,47–49,74,77–82].

Many of the same types of strategies (e.g., radio and other media, IEC dissemination, launch events, drama, discussions in community groups) used to generate demand among adolescents were also used to mobilize parental and more general community support for SRHS. In fact, 14 of the 17 initiatives which aimed to improve community acceptance also met criteria for our demand-generation review question [24,26,27,31,32,35–44,48–51,53,74,77–79].

Reports from two multicountry programs, Reproductive Health Initiative for Youth in Asia (RHIYA) [80,81] and Frontiers in Reproductive Health [44,47,74,79], depicted how differences in baseline levels of community acceptance for young people's SRH and SRHS guided the extent and content of community mobilization. The Frontiers reports also identified differences in the degree of acceptance, according to topics of specific concern and sensitivity. For example, contraception was a sensitive topic in Senegal [47], despite 90%–100% adult baseline approval of adolescents receiving information about other SRH issues including STI/HIV/AIDS, sexuality, and early/unwanted pregnancies. Support for information provision to adolescents regarding contraception increased in one intervention group but did not do so in the second intervention nor control groups and was only statistically significant among adult women. Furthermore, less than three-quarters of adults in the postintervention groups approved of contraception information provision. The study also aimed to increase parent-adolescent communication on reproductive health. Although parent-reported unwillingness to discuss reproductive health issues declined significantly among women

(from approximately 25% at baseline to approximately 15%), the change was seen in both the intervention and control groups. A comparable magnitude of change was seen among males in the control and intervention groups, yet males started and ended with higher rates of acceptance.

Mixed findings on parent–youth communication were also found in the Mexico and Kenya Frontiers programs [74,79]. The Bangladesh Frontiers study found a reasonably high acceptance for SRH education and service provision at baseline because parents found it difficult to personally address SRH issues with their children. As such, evaluation of change in these attitudes was not felt to be necessary [44]. The reports on the RHIYA program [73,80] noted substantial variation in attitudes toward sexuality and sexual health of young people in the seven Asian countries served by the project. Interestingly, they noted that adolescent SRH is widely considered to be a sensitive and private issue in Bangladesh (perhaps in contrast with the findings of the Frontiers program) and in Vietnam where there is a great reluctance to speak openly about the topic. Similarly, sensitivity was quite high in Pakistan, where it was recognized that community-based activities to generate support was vital to reach program goals. In Nepal, support groups were important to help parents develop communication skills to discuss and educate their children on SRH.

Overall, the other eight initiatives [24,31,32,35–43,48,49,82] demonstrated improved community acceptance of [24,35–43,48,49,82] and/or adolescent–parent (or other adult stakeholder) communications [31,32,35–43,48,49,82] regarding adolescent SRHS, mostly via qualitative measures of these outcomes. Three studies included related quantitative analyses. In Burkina Faso, the percentage of adolescents who reported feeling comfortable talking to their parents about sexuality issues rose from 36% at baseline to 55%; however, neither comparison group data nor significance testing was reported [82].

Kim et al. demonstrated a fivefold increased odds of young people reporting having had discussions about reproductive health because of the program among intervention participants compared with controls [31,32]. A study of Zambian youth found a weak positive correlation with one use of family planning services, no correlation with STI services uptake, and a negative correlation with overall SRH services uptake. However, all three service use indicators were positively correlated with community acceptance, albeit weakly, and none of these findings were statistically significant. The authors report that the study was not powered to detect such a difference [24].

Strategies targeting religious leaders as important channels led to their endorsement of AYA activities in Uganda and Botswana. However, SRHS use results varied between the two initiatives with increases in Botswana and declines in Uganda [35,42,43]. Religious leaders played an important role in a national program in Jamaica with a before/after assessment demonstrating declines in negative attitudes among community members toward adolescent sexual activity, although acceptance of SRHS was not measured. SRHS use declined slightly in the first year but increased by 123% in the second year [73,78].

Community acceptance and demand generation activities were primarily parts of packages that also included facility-based activities. We were unable to find cost-effectiveness analyses related to community acceptance and demand-generation activities. For the most part, even costing data were not provided. When included, the most expensive components were those

aimed at creating demand and community support as opposed to the health facility interventions to train providers and make the clinics more adolescent friendly [44,47,54].

Discussion

This review summarizes a considerable body of knowledge that has been generated since the 1994 Cairo ICPD which defined SRHS and explicitly declared SRHS as a fundamental human right, including for adolescents. These data can help policy makers, programmers, and researchers improve adolescent access to quality SRHS. Table 6 summarizes the evidence related to Review Question A within the “Do not go, Steady, Ready, Go” classification framework. We adopted the policy recommendations as determined in the 2006 WHO review for each intervention typology unless our additional findings indicated a need for a classification shift.

Programs that did not include adolescent-friendly facility improvements or use a combination of information dissemination channels to promote demand/community acceptance are categorized as “Steady” or “Do not go.” This exemplifies the need for going beyond training health workers on the supply-side, carrying out multicomponent demand-side activities, and integrating demand- and supply-side strategies. Type 2c interventions, that is, those that include training and facility adjustments on the supply-side coupled with broad demand generation/community acceptance approaches, is “Ready” for large-scale implementation. Concomitant research remains necessary to clarify impact and mechanisms of action. The evidence base did not support a “Go” designation for any of the intervention types.

Thresholds and evidence quality rankings for questions B–D have not been determined; therefore, we did not formally apply the “Do not go, Steady, Ready, Go” classification to these intervention types. We are, however, able to comment on the degree of evidence related to these questions on the basis of our analysis. First, there is a relatively large body of literature that does not support YCs as an effective or cost-effective strategy to deliver SRHS. This emphasizes the important role research may have in not only ascertaining and disseminating positive outcomes but also determining the ineffectiveness of seemingly worthwhile interventions and thereby saving precious public health resources. Caution must be exercised, however, as this review did not address employment, educational attainment, or other social benefits which may or may not justify the deployment of YCs. The evidence base regarding the impact of SRHS delivery in other community venues on service use or on SRH is very limited; further research is needed.

Three-quarters of the 21 initiatives related to our review of demand-generation interventions overlapped with those included in our Question A review [25–32,34–54]. As such, many of them were subjected to the evidence threshold and quality assessment determination that was conducted in the 2006 WHO review for classification into the “Do not go, Steady, Ready, Go” framework. Seventeen of the 21 programs demonstrated at least some positive outcomes of interest including from three RCTs, suggesting that demand generation interventions are effective and “ready” for large-scale implementation if accompanied by further research to clarify mechanisms and impact. Evidence regarding activities to increase community support is not as plentiful or robust. Seventeen initiatives overall provide at least some positive, albeit

Table 6
Summary of interventions using the “Do Not Go, Steady, Ready, Go” classification

Typology	Classification in 2006 review	Classification based on this review	Explanation if change in classification
Type 1a Supply side: training Demand side: community based	Steady (or Do not go)	Steady (or Do not go)	
Type 1b Supply side: training Demand side: mass media or school based	Steady (or Do not go)	Steady (or Do not go)	
Type 1c Supply side: training Demand side: community based + mass media or school based	Steady (or Do not go)	Steady	We identified a third study of this typology which was published after the 2006 review. This randomized controlled trial was unable to demonstrate an impact on biologic outcomes, but did show strong evidence of a slight increase in reported contraception-seeking behavior among females and a moderate reduction in reported pregnancies as a result of the intervention. The evidence added by this study makes the evidence base for this typology more consistent with that required for a “Steady” designation.
Type 2a Supply side: training + facility adjustments Demand side: community based	Go	Steady	Two of the four studies that were included as type 2a interventions in the 2006 review examined community-based health service delivery and therefore did not meet inclusion criteria for our review. Therefore, the evidence for health facility-based delivery of type 2a interventions was more restricted; we suggest that “Steady” is a more appropriate classification than “Go” on the basis of two studies with weak designs, but positive results.
Type 2b Supply side: training + facility adjustments Demand side: mass media or school based	No data	No data	
Type 2c Supply side: training + facility adjustments Demand side: community based + mass media or school based	Ready	Ready	

generally weak, evidence. Strategies to generate community support hold promise; further research and evaluations of existing projects and programs are needed.

Finally, it should be noted that no studies or evaluations of programs or projects addressing vulnerable or marginalized populations' uptake of SRHS were identified. Research from the child health field demonstrates that strategies implemented among the general population often do not reach those in most

need and that proactive strategies can produce equitable coverage [83–85]. Such research is critically needed in the adolescent health field. For example, analyses stratified by socioeconomic status and by other vulnerability groups (e.g., sex workers, out-of-school adolescents, orphans, disabled) can illuminate strategies best able to reach populations most in need of services.

Additional recommendations drawn from our results are portrayed in Table 7.

Table 7
Summary of recommendations

<p><i>Researchers</i> need to continue to build the evidence base for how to best deliver and improve access to SRHS and their impact on clinical outcomes. The evidence base needs strengthening on both the supply and demand creation side.</p> <ul style="list-style-type: none"> • Cost-effectiveness analyses to inform the most efficient use of limited resources. • Determination of attributable contributions of specific components of multicomponent intervention packages. This represents a challenging area of implementation research, but it is critical to ascertain effective/noneffective implementation strategies. • When possible, analyses should stratify results by socioeconomic status and by other vulnerabilities to determine which strategies are effective at reaching populations most in need. <p><i>Donors</i> need to support not only the implementation of interventions with evidence of effectiveness but also fund evaluation, implementation research, and information dissemination.</p> <ul style="list-style-type: none"> • Repositories of metadata to allow for access to relevant study details not currently readily available in peer review reports, because of publication constraints. Until the specific components (e.g., length of health worker training, inclusion of supportive supervision, specifics regarding facility improvements and demand generation, and community support activities) are comparable across studies, it will be difficult to tailor programs to meet needs within specific contexts. <p><i>Program designers and implementers</i> can use the existing evidence base by designing and implementing programs that reach beyond simply training health workers without the other components of an effective package—adolescent-friendly facility improvements and components that address the demand creation side by adolescents and wider community acceptance of adolescents making use of SRHS.</p> <ul style="list-style-type: none"> • Formative and summative evaluation coupled with dissemination can leverage individual program results to more widely useful information. • Program design and implementation should strive to reach populations in most need. <p><i>Policy makers</i> should address adolescent health as a global priority with access to SRHS as a key component.</p> <ul style="list-style-type: none"> • The evidence base can be used to set policies and laws that promote a package of interventions, including linkages to other settings (e.g., schools) to promote utilization of services. • Action must be taken to amend policies and laws that prohibit school-based comprehensive sexuality education, including SRH and information regarding accessing SRHS.

SRHS = sexual and reproductive health services.

Our review does have some limitations. First, publication bias is a vexing issue in any such review because of limited disclosure of negative results. Interventions common to non-Anglophone settings could have been underrepresented as we only included reports published in English. In addition, intervention components or details (e.g., length or type of health worker training, costs of services borne by beneficiaries, content of demand generation, and community-sensitization activities) were often not reported and may have influenced outcomes; we were unable to assess the impact of interventions not stated explicitly. Furthermore, virtually all programs were multicomponent in nature—teasing out the impact of one component was usually impossible as studies and evaluations were not designed for the assessment of individual elements' contribution to outcomes. Finally, not all research and evaluations were methodologically rigorous. Randomized trials were infrequent, control groups were often not included in longitudinal studies impeding the ability to attribute outcome to intervention, significance testing was sometimes not provided, and adjustment for confounding factors or baseline differences between intervention and control groups was often not included.

Many of the limitations encountered point to the pressing need for further research on how to best deliver adolescent SRH intervention packages and determine which components are most effective. Cost-effectiveness analyses and even cost data were largely unavailable. Fiscal responsibility and constrained budgets demand research to determine the best buys to improve adolescent SRH.

Much progress has been made since the 1994 ICPD meeting in Cairo, but coverage of SRHS among adolescents remains low. Concentrated efforts in policy, legislation, programming, research, and funding can point the way to improved and more equitable adolescent access to SRHS.

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References

- Patton GC, Coffey C, Sawyer SM, et al. Global patterns of mortality in young people: A systematic analysis of population health data. *Lancet* 2009;374:881–92.
- Mortality estimates by cause, age, and sex for the year 2008. Geneva: World Health Organization (WHO); 2011.
- Facts on the sexual and reproductive health of adolescent women in the developing world. Guttmacher Institute, International Planned Parenthood Federation; 2010.
- Preventing early pregnancy: What the evidence says. Geneva: WHO; 2011.
- Opportunity in crisis: Preventing HIV from early adolescence to early adulthood. New York: United Nations Children's Fund (UNICEF); 2011.
- Global report: UNAIDS report on the global AIDS epidemic. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS); 2010.
- Leclerc-Madlala S. Age-disparate and intergenerational sex in southern Africa: The dynamics of hypervulnerability. *AIDS* 2008;22(Suppl 4):S17–25.
- Kissin DM, Zapata L, Yorick R, et al. HIV seroprevalence in street youth, St. Petersburg, Russia. *AIDS* 2007;21:2333–40.
- Busza JR, Balakireva OM, Teltschik A, et al. Street-based adolescents at high risk of HIV in Ukraine. *J Epidemiol Community Health* 2010;65:1166–70.
- How universal is access to reproductive health? A review of the evidence. New York: United Nations Population Fund (UNFPA); 2010.
- Viner RM, Coffey C, Mathers C, et al. 50-Year mortality trends in children and young people: A study of 50 low-income, middle-income, and high-income countries. *Lancet* 2011;377:1162–74.
- Norris SA, Osmond C, Gigante D, et al. Size at birth, weight gain in infancy and childhood, and adult diabetes risk in five low- or middle-income country birth cohorts. *Diabetes Care* 2012;35:72–9.
- Population and development: Programme of action adopted at the International Conference on Population and Development, Cairo, 5–13 September 1994. New York: United Nations, Dept. for Economic and Social Information and Policy Analysis; 1995.
- Programming for adolescent health and development. Geneva: WHO, UNFPA, UNICEF; 1999.
- The Millennium Development Goals Report: United Nations; 2011.
- UNICEF. Progress for children: A report card on adolescents. Available at: <http://bibpurl.oclc.org/web/20025http://www.unicef.org/progressforchildren/index.html> Accessed October 25, 2012.
- Quality assessment guidebook. A guide to assessing health services for adolescent clients. Geneva: WHO; 2009.
- Dick B, Ferguson BJ, Chandra-Mouli V, et al. Review of the evidence for interventions to increase young people's use of health services in developing countries. In: Dick B, Ferguson J, Ross DA, eds. Preventing HIV/AIDS in Young People: A Systematic Review of the Evidence from Developing Countries. Geneva: WHO; 2006:151–99.
- Napierala Mavedzenge SM, Doyle AM, Ross DA. HIV prevention in young people in sub-Saharan Africa: A systematic review. *J Adolesc Health* 2011;49:568–86.
- Dick B, Ferguson J, Ross DA. Introduction and rationale. In: Dick B, Ferguson J, Ross DA, eds. Preventing HIV/AIDS in Young People: A Systematic Review of the Evidence from Developing Countries. Geneva: WHO; 2006:1–13.
- James-Traore T, Magnani R, Murray N, et al. Intervention strategies that work for youth: Summary of FOCUS on young adults end of program report. Family Health International; 2002.
- Speizer IS, Magnani RJ, Colvin CE. The effectiveness of adolescent reproductive health interventions in developing countries: A review of the evidence. *J Adolesc Health* 2003;33:324–48.
- Tylee A, Haller DM, Graham T, et al. Youth-friendly primary-care services: How are we doing and what more needs to be done? *Lancet* 2007;369:1565–73.
- Mmari KN, Magnani RJ. Does making clinic-based reproductive health services more youth-friendly increase service use by adolescents? Evidence from Lusaka, Zambia. *J Adolesc Health* 2003;33:259–70.
- Magnani RJ, Gaffikin L, de Aquino EM, et al. Impact of an integrated adolescent reproductive health program in Brazil. *Stud Fam Plann* 2001;32:230–43.
- Cowan FM, Pascoe SJ, Langhaug LF, et al. The Regai Dzive Shiri project: A cluster randomised controlled trial to determine the effectiveness of a multi-component community-based HIV prevention intervention for rural youth in Zimbabwe—study design and baseline results. *Trop Med Int Health* 2008;13:1235–44.
- Cowan FM, Pascoe SJ, Langhaug LF, et al. The Regai Dzive Shiri project: Results of a randomized trial of an HIV prevention intervention for youth. *AIDS* 2010;24:2541–52.
- Doyle AM, Ross DA, Maganja K, et al. Long-term biological and behavioural impact of an adolescent sexual health intervention in Tanzania: Follow-up survey of the community-based MEMA kwa Vijana Trial. *PLoS Med* 2010;7:e1000287.
- Hayes RJ, Chagalucha J, Ross DA, et al. The MEMA kwa Vijana project: Design of a community randomised trial of an innovative adolescent sexual health intervention in rural Tanzania. *Contemp Clin Trials* 2005;26:430–42.
- Larke N, Cleophas-Mazige B, Plummer ML, et al. Impact of the MEMA kwa Vijana adolescent sexual and reproductive health interventions on use of health services by young people in rural Mwanza, Tanzania: Results of a cluster randomized trial. *J Adolesc Health* 2012;47:512–22.
- Kim YM, Kols A, Nyakauru R, et al. Impact of the promotion of youth responsibility project campaign on reproductive health in Zimbabwe. Baltimore: Johns Hopkins University/Center for Communication Programs; 1998.
- Kim YM, Kols A, Nyakauru R, et al. Promoting sexual responsibility among young people in Zimbabwe. *International Family Planning Perspectives* 2001;27.
- Mbonye AK. Disease and health seeking patterns among adolescents in Uganda. *Int J Adolesc Med Health* 2003;15:105–12.
- Lou CH, Wang B, Shen Y, et al. Effects of a community-based sex education and reproductive health service program on contraceptive use of unmarried youths in Shanghai. *J Adolesc Health* 2004;34:433–40.
- Youth-friendly services: African Youth Alliance (AYA) Botswana end of program evaluation report. Washington DC: Pathfinder International; 2005.
- Daniels U. Improving health, improving lives: Impact of the African Youth Alliance and new opportunities for programmes. *Afr J Reprod Health* 2007;11:18–27.
- Youth-friendly services: African Youth Alliance (AYA) Ghana end of program evaluation report. Washington DC: Pathfinder International; 2005.

- [38] Evaluation of the African Youth Alliance Program in Ghana. Impact on sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute; 2007.
- [39] Williams T, Mullen S, Karim A, et al. Evaluation of the African Youth Alliance Program in Ghana, Tanzania, and Uganda: Impact on sexual and reproductive health behavior among young people. JSI Research & Training Institute, Inc; 2007.
- [40] Youth-friendly services: African Youth Alliance (AYA) Tanzania end of program evaluation report. Washington DC: Pathfinder International; 2005.
- [41] Evaluation of the African Youth Alliance Program in Tanzania. Impact on sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute; 2007.
- [42] Youth-friendly services: African Youth Alliance (AYA) Uganda end of program evaluation report. Washington DC: Pathfinder International; 2005.
- [43] Evaluation of the African Youth Alliance Program in Uganda. Impact on sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute; 2007.
- [44] Bhuiya I, Rob U, Chowdhury AH, et al. Improving adolescent reproductive health in Bangladesh. Washington DC: Frontiers Reproductive Health Program, Population Council, Family Health International; 2004.
- [45] Coplan P, Okonofua FE, Oronsaye F. Impact of an intervention to improve treatment-seeking behavior and prevent sexually transmitted diseases among Nigerian youth: A randomized control trial. 39th Interscience Conference on Antimicrobial Agents and Chemotherapy. San Francisco, CA, 1999.
- [46] Okonofua FE, Coplan P, Collins S, et al. Impact of an intervention to improve treatment-seeking behavior and prevent sexually transmitted diseases among Nigerian youths. *Int J Infect Dis* 2003;7:61–73.
- [47] Diop NJ, Bathidja H, Toure ID, et al. Improving the reproductive health of adolescents in Senegal. Dakar, Senegal: Frontiers in Reproductive Health, Population Council; 2004.
- [48] Hainsworth G. Providing sexual reproductive health and STI/HIV information and services to this generation: Insights from the Geracao Biz experience. Maputo, Mozambique: Ministry of Youth and Sports, Ministry of Education, Ministry of Health, AMODEFA (Associação Moçambicana para Desenvolvimento da Família) and youth associates, UNFPA, Pathfinder International; 2002.
- [49] Hainsworth G, Zilhao I. From inception to large scale: The Geracao Biz Programme in Mozambique. Geneva: WHO, Pathfinder International; 2009.
- [50] LaVake SD. Applying social franchising techniques to youth reproductive health/HIV services. Arlington, VA: Family Health International, YouthNet Program; 2003.
- [51] Neukom J, Ashford L. Changing youth behaviour through social marketing: Program experiences and research findings from Cameroon, Madagascar, and Rwanda. Washington, DC: Population Services International, Population Reference Bureau; 2003.
- [52] loveLife 2004: Report on activities and progress. Capetown, Parklands: loveLife; 2004.
- [53] Sovd T. Assessment of adolescent-friendly health services initiative in Mongolia. Ulaanbaatar, Mongolia: WHO, Ministry of Health Mongolia, UNFPA; 2004.
- [54] Ross DA, Changalucha J, Obasi AI, et al. Biological and behavioural impact of an adolescent sexual health intervention in Tanzania: A community-randomized trial. *AIDS* 2007;21:1943–55.
- [55] Erulkar AS, Mensch BS. Youth centres in Kenya: Evaluation of the family planning association of Kenya programme. Nairobi: Population Council; 1997.
- [56] Miller AN, Mutungi M, Facchini E, et al. An outcome assessment of an ABC-based HIV peer education intervention among Kenyan university students. *J Health Commun* 2008;13:345–56.
- [57] Moyo I, Bond K, Williams T. Reproductive health antecedents, attitudes, and practices among youth in Gweru, Zimbabwe: Findings prior to and following the introduction of youth-friendly services. Washington, D.C.: Pathfinder International, Focus on Young Adults Project; 2000.
- [58] Plautz A, Meekers D. The reach and impact of the PSI adolescent reproductive health program in Butare Province, Rwanda. Washington, D.C.: Research Division, Population Services International; 2003.
- [59] Skibiak JP, Chambeshi-Moyo M, Ahmed Y. Testing alternative channels for providing emergency contraception to young women. Nairobi: The Population Council; 2001.
- [60] Speizer IS, Kouwonou K, Mullen S, et al. Evaluation of the ATBEF Youth Centre in Lome, Togo. *Afr J Reprod Health* 2004;8:38–54.
- [61] Townsend JW, Diaz de May E, Sepulveda Y, et al. Sex education and family planning services for young adults: Alternative urban strategies in Mexico. *Stud Fam Plann* 1987;18:103–8.
- [62] Denno DM, Chandra-Mouli V, Osman M. Reaching youth with out-of-facility HIV and reproductive health services: A systematic review. *J Adolesc Health* 2012;51:106–21.
- [63] Zuurmond MA, Geary RS, Ross DA. The effectiveness of youth centers in increasing use of sexual and reproductive health services: A systematic review. *Stud Fam Plann* 2012;43:239–54.
- [64] Senderowitz J. Reproductive health outreach programs for young adults. Washington, DC: FOCUS on Young Adults; 1997.
- [65] South Africa youth: Who uses youth centers and why? Washington DC: Population Council, Frontiers in Reproductive Health; 2001.
- [66] Erulkar AS, Bekinska M, Cebekhulu Q. An assessment of youth centres in South Africa. Washington, DC: Frontiers in Reproductive Health, Population Council; 2001.
- [67] Janowitz B, Cuthbertson C, Bekinska M, et al. The costs of programmes at selected youth centres in South Africa. Population Council, Reproductive Health Research Unit, USAID, DFID; 2003.
- [68] Glover EM, Erulkar A, Nerquaye-Tetteh J. Youth centres in Ghana: Assessment of the planned parenthood association of Ghana programme. Accra: Planned Parenthood Association of Ghana; 1998.
- [69] Solo J, Pollard F, Mugambi M. Enjoy your youth, be wise: An evaluation of the Innovate project in Ghana. London: International Planned Parenthood Federation; 2001.
- [70] Ethiopia young adult survey: A study in seven regions. Addis Ababa: Population Council, UNFPA; 2010.
- [71] Evaluation of the Indicate Project Family Planning Association of Trinidad and Tobago. London: International Planned Parenthood Federation; 2001.
- [72] Detscher S. Situation analysis of youth (health) centres in Tanzania. Dar es Salaam, Tanzania: Tanzania German Programme to Support Health (TGPSH); 2004.
- [73] Kesterton AJ, Cabral de Mello M. Generating demand and community support for sexual and reproductive health services for young people: A review of the literature and programs. *Reprod Health* 2010;7:25.
- [74] Askew I, Chege J, Njue C, et al. A multi-sectoral approach to providing reproductive health information and services to young people in western Kenya: Kenya adolescent reproductive health project. Washington, DC: Frontiers in Reproductive Health, Population Council; 2004.
- [75] Levitt-Dayal M, Motihar R. Adolescent girls in India choose a better future an impact assessment. Washington, DC: Centre for Development and Population Activities (CEDPA); 2001.
- [76] Mathur S, Malholtra A, Mehta M. Youth reproductive health in Nepal: Is participation the answer? Washington, D.C.: International Center for Research on Women (ICRW), Engender Health; 2004.
- [77] Tiffany T, Conly S, Hosen E, et al. Mid-term evaluation: The USAID/Jamaica adolescent reproductive health program. USAID/Jamaica; 2003.
- [78] Russell-Brown P. Assuring sustainable ASRH services: Challenges and early successes; 2003.
- [79] Vernon R, Dura M. Improving the reproductive health of youth in Mexico. Washington, DC: Frontiers in Reproductive Health, Population Council; 2004.
- [80] Case studies from RHIYA: Good practices in advocating for policy development. Brussels: EU, UNFPA Reproductive Health Initiative for Youth in Asia (RHIYA); 2006.
- [81] Adolescent sexual and reproductive health: The way forward for Asia. Brussels: EU, UNFPA RHIYA; 2007.
- [82] Yaro Y, Mukenge M, Calvès A. Community participation to improve adolescent sexual and reproductive health in Burkina Faso (Final Evaluation). Los Angeles: Pacific Institute for Women's Health; 2003.
- [83] Barros AJ, Ronsmans C, Axelson H, et al. Equity in maternal, newborn, and child health interventions in Countdown to 2015: A retrospective review of survey data from 54 countries. *Lancet* 2012;379:1225–33.
- [84] Victora CG, Barros AJ, Axelson H, et al. How changes in coverage affect equity in maternal and child health interventions in 35 Countdown to 2015 countries: An analysis of national surveys. *Lancet* 2012;380:1149–56.
- [85] Victora CG, Wagstaff A, Schellenberg JA, et al. Applying an equity lens to child health and mortality: More of the same is not enough. *Lancet* 2003;362:233–41.