



## Review article

## Reaching Youth With Out-of-Facility HIV and Reproductive Health Services: A Systematic Review

Donna M. Denno, M.D., M.P.H.<sup>a,\*</sup>, V. Chandra-Mouli, MBBS, M.Sc.<sup>b</sup>, and Majdi Osman, MBBS<sup>c</sup><sup>a</sup> Departments of Pediatrics and Global Health, University of Washington, Seattle, Washington<sup>b</sup> Department of Maternal Newborn Child and Adolescent Health, World Health Organization, Geneva, Switzerland<sup>c</sup> Centre for International Health and Development, University College London, London, UK

Article history: Received September 2, 2011; Accepted January 5, 2012

Keywords: Health services; Outreach; Out-of-facility health service delivery; Community-based delivery; HIV and reproductive health services; Sexually transmitted infections; Marginalized youth; Homeless youth

## A B S T R A C T

**Purpose:** Many young people, particularly those who are marginalized and most at risk for HIV and reproductive health-related problems, cannot or will not seek traditional facility-based health services. Policies and programs are being implemented to provide them with these health services in the community. We sought to review the effectiveness of such approaches in increasing HIV and reproductive health service use.

**Methods:** A systematic literature review was undertaken to identify policies promoting or programs delivering HIV or reproductive health services in the community. We reviewed studies that evaluated uptake of services or commodities. Data from studies meeting inclusion criteria were qualitatively analyzed.

**Results:** Twenty studies met inclusion criteria, including 10 containing comparative data (e.g., before and after study or control study design). The studies generally demonstrated positive impact, although results varied across settings and approaches. The most successful approaches included mail-based chlamydia screening in the Netherlands, condom distribution via street outreach in Louisiana, home-based HIV counseling and testing in Malawi, and promotion of over-the-counter access to emergency contraception in various countries.

**Conclusion:** Overall, this review suggests that out-of-facility approaches can be important avenues to reach youth. Continued evaluation is necessary to better understand specific approaches that can successfully deliver health services.

© 2012 Society for Adolescent Health and Medicine. All rights reserved.

IMPLICATIONS AND  
CONTRIBUTION

A paucity of rigorously evaluated studies was available that demonstrate the effectiveness of strategies to reach youth with out-of-facility HIV and reproductive health services. These studies suggested that such approaches are an important avenue to reach marginalized youth. Continued critical evaluation is needed to understand which strategies are most effective.

Adolescence is often considered a time of good, even optimal, health. Major changes in health take place during puberty and the postpubertal period including gains in strength and cognitive capacity. However, many health problems commence in adolescence in association with reproductive maturity and psychological developmental changes (e.g., risk-taking behavior, feelings of invincibility). Risk-taking behaviors such as unprotected sexual activity and injection drug use can have a profound impact on

health. The impact can extend beyond the adolescent period into adulthood because of unwanted pregnancies and infections such as chlamydia, HIV, and hepatitis C. Furthermore, it is increasingly understood that adolescence (aged 10–19 years) and young adulthood (aged 20–24 years) represent a time of increasing mortality worldwide [1,2]. HIV/AIDS is the sixth leading cause of death among adolescents and young adults (combined group hereafter referred to as youth, aged 10–24 years) globally, accounting for 142,000, or 6% of, deaths in this age-group. Maternal causes, especially hemorrhage and abortion-related deaths, account for an even greater proportion of mortality among females.

Health services and health education represent important strategies to prevent unnecessary morbidity and mortality re-

\* Address correspondence to: Donna M. Denno, M.D., M.P.H., University of Washington, Department of Global Health, Harris Hydraulics Building, Room 320, 1705 North East Pacific Street, MS 357965, Seattle, WA 98195-5065.

E-mail address: ddenno@uw.edu (D.M. Denno).

lated to pregnancies, especially unintended pregnancies, and sexually transmitted infections (STIs) including HIV. Health education and behavior change messages intended to impact risk reduction are increasingly being delivered not only in medical settings but also via community-based approaches. These approaches aim to reach youth where they are—schools, workplaces, detention facilities, youth centers, on the street, etc. Assessments have been made of such community-based messaging approaches, identifying successes, failures, and gaps in knowledge regarding their effectiveness [3–10]. In addition to improving knowledge, attitudes, and behaviors, access to HIV and reproductive health services and commodities is also vital to reducing mortality and improving the health of youth—both in terms of their current and future adult health status. Essential services and commodities such as condoms and contraceptives, emergency contraception (EC), needle and syringe exchange and bleach, HIV counseling and testing, and STI screening and treatment are traditionally delivered within health facilities, typically clinics. Youth often do not find these services to be accessible because of barriers such as cost; lack of privacy and confidentiality; physical, logistical, or administrative restrictions; or unwelcoming personnel—, that is, facilities may not be “youth friendly.” Increasing effort has been devoted to making facilities “youth friendly” as a way to increase uptake of health services and commodities by young people [6,10–15]. Despite the importance and impact of such approaches, a segment of this population still cannot or will not access facility-based health services. This is especially true of disenfranchised youth, those living at the edge of society—whether they are unemployed and out of school, homeless, incarcerated, or marginalized in other ways. Unfortunately, marginalized youth are also disproportionately affected by HIV, other STIs, and poor reproductive health outcomes and are least likely to access traditional health services [16–25]. For this segment of the population, community-based approaches may be an effective, and sometimes sole, strategy to deliver HIV and reproductive health services and commodities. Many government health agencies, public health institutions, and nongovernmental organizations, in developed and developing countries, have taken up the challenge to address youth health needs by providing health services to adolescents and youth where they live and “hang out” [26–34]. We sought to systematically review the effectiveness of community-based HIV and reproductive health service policies and programs delivered via outreach on increasing health service utilization among adolescents and young adults (i.e., among 10–24 year olds).

## Methods

### *Systematic search*

A systematic search strategy was constructed to comprehensively identify related articles in the following databases: PubMed, EMBASE, Popline, CINAHL, and all the WHO regional databases. Although resources did not permit an extensive search of the gray literature, we did include a search on Google and examined relevant references. We also identified published and gray literature using the “snowball” technique (i.e., reviewing the bibliographies of all references meeting our review inclusion criteria.)

### *Assessment of studies for inclusion in the review and analysis*

Studies that met the following criteria were included:

- At least half of the population studied was aged 10–24 years, or if broader age-groups were studied, results were presented separately for adolescents and/or young adults. Our original population of interest was youth in low- and middle-income countries; however, limited data exist regarding the impact of policies and programs of interest in these settings. Furthermore, because outreach-based programs are primarily aimed at reaching marginalized youth, whether in developed or developing countries, some lessons from developed country settings might be relevant to efforts to improve health service use among marginalized youth in developing countries.
- The interventions were either (1) policies promoting or mandating HIV or reproductive health services (including STI, HIV, or pregnancy testing) or commodities (including condoms, contraceptives, or EC; clean needles and syringes or exchanges) or (2) programs or projects providing these services.
- Intervention delivery took place outside of health facilities, including in pharmacies, in jails and detention centers, on the street, in parks, or in community centers. We searched for out-of-health facilities sites broadly defined. We excluded school-based outreach, as it is less likely to reach marginalized youth who are often not enrolled in school and because studies of this type might conceal the effects of outreach interventions that are of primary interest to this review.
- Randomized controlled trials, quasi-experimental studies, and observational studies with a control group or time series analyses were of primary interest. Evaluation studies examining the percentage of a target population reached with services were also secondarily assessed.
- Outcomes included measures related to use of HIV or reproductive health services or receipt of or use of related commodities. Measures assessing change over time or differences compared with controls were of primary interest, as they offer a higher level of evidence. However, these types of studies are few in number. To gain further insight into the extent of uptake of interventions of interest, we also included descriptive studies that did not include measures of causality inference but that did assess proportions of health services or commodity use among target populations.
- No language or date restrictions were set in the search or the selection of articles. The search included articles published before March 2010.

An initial total of 13,552 references were retrieved from the searched databases. The studies were initially assessed for relevance to the review by examination of titles and abstracts. Where it was not possible to exclude a publication by looking at the title or the abstract, the full article was retrieved. Forty-one potentially relevant references were identified. Two authors (MO and DD) independently applied the inclusion criteria to all potentially relevant studies and made decisions on which studies to include. Differences were resolved by discussion and consultation with a third author (VC) when in doubt. Data extraction was undertaken by two authors (MO and DD), using a standard data extraction form.

Analysis was qualitative, as interventions, outcomes, study methodologies, and populations were too heterogeneous for quantitative synthesis.

## Review of Relevant Literature

Twenty-one studies describing results of out-of-facility delivery of health services to youth or populations including youth were excluded (Table 1) [27,30,33,35–52]; 15 studies were excluded because none of this review's outcomes of interest were measured in those studies. Another three were excluded because the studies did not meet eligibility based on this review's age-of-subjects criteria. One of these also included school-based implementation for more than half of the study subjects; however, stratified data were not provided, so we were unable to select the non-school-related data of interest to this review. Another two examined outreach strategies, but recruitment into the study depended on and started with health facility access [42,45].

Twenty studies were identified that met the inclusion criteria, 10 of which contained comparative data (Table 2). Three of these were conducted in developing countries [53–55]. Study designs included one randomized controlled trial [56], two quasi-experimental studies [54,57], two time series with three measures [58,59], two before/after studies with control group [60], one before/after study without control group [58], and two cross-sectional surveys [53,61].

Half of the studies with comparison data investigated the delivery of EC through community-based pharmacies [54,58,59,61,62]. Four of these examined the impact of policies that allowed EC access through pharmacies without a prescription from a health care provider [58,59,61,62]. In France [58] and British Columbia, Canada [59], there was an overall increase in use of EC by 17% and >50%, respectively, virtually all accounted for by nonprescription EC obtained directly from pharmacies; numbers of prescriptions from providers did not change one way or another. In Great Britain, there was a steady increase in those obtaining EC from pharmacies without a prescription. However, there was no change in the overall proportion of those obtaining EC because the increase in nonprescription use was accompanied by a corresponding decrease in prescriptions obtained from health care providers [62]. Another study from the United Kingdom examined time delay from unprotected sexual intercourse (UPSI) to accessing EC among those obtaining EC from clinics (41 hours) compared with over the counter from pharmacies (16 hours) and found a statistically significant difference ( $p < .001$ ) [61]. These four EC studies represented the only studies that we identified that examined the impact of policies aimed at increasing access to community-based HIV or reproductive health services.

The last EC intervention study was set in Lusaka, Zambia and examined the impact of providing alternate sources of EC prescriptions (community sales agents [CSAs], peer counselors, and community-based pharmacies) and sites for filling EC prescriptions (community-based pharmacies) beyond traditional health clinics (for prescriptions) and clinic dispensaries (for filling prescriptions) [54]. The pharmacies were favored sources for both receipt of and filling of EC prescriptions (50% and 70%, respectively). Peer counselors, newly trained to provide EC advice and prescriptions, were also popular sources of prescriptions among 30% of prescription recipients; another 20% received the prescriptions from traditional health facilities. However, the CSAs, shopkeepers, and small-scale vendors newly trained to provide EC counseling and prescriptions were not consulted sources for EC prescriptions among those females who went on to fill such prescriptions. This is despite the fact that most condoms obtained by 10–19 year olds in the project area are from CSAs. Furthermore, in preimplementation focus group discussions,

youth reported a strong preference for obtaining EC information and services from such sources, hence the decision by program implementers to include CSAs as a prescription source.

The addition of youth center (reproductive health services delivered alongside recreational, educational and vocational activities) to ongoing community outreach (providing health education and contraceptive distribution, but not specifically targeting youth) resulted in a 44% increase in use of contraceptives among 15–22 year olds who had never previously used contraception in urban Mexican settings. This is compared to a 98% increase among those in settings where community-based reproductive health education outreach specifically targeting youth was added to existing outreach. Simply continuing the pre-existing outreach resulted in only a 2% increase [55]. A multiservice street and youth center-based outreach program that included referrals for HIV services (e.g., counseling and testing, STI diagnosis and treatment) targeting homeless youth in San Francisco resulted in a threefold increase in the odds of follow-through on HIV-related referrals, although this was not a statistically significant increase (95% confidence interval, 7–13.6).

Young adults in Denmark were 4–19 times more likely to be screened for chlamydia via a large randomized controlled outreach strategy trial, which tested two different mail-based interventions compared with controls who only had access to baseline routine clinic-based care [56]. The effect was most pronounced among males receiving the testing kits directly in the mail; they were 60% more likely to complete chlamydia screening compared with males who received an invitation to request a kit by mail. However, it is worth noting that the study was conducted in 1997, when the standard method of chlamydia testing was by urethral swab for males and endocervical swab for females. Hence, it is difficult to tease apart the reasons for intervention uptake, which could very well have been because of the urine-based testing in the intervention groups rather than, or in addition to, the mail-based strategy for screening.

A statewide program in high-risk neighborhoods (e.g., high prevalence of injection drug use) in Louisiana used street outreach workers to distribute condoms and deliver health education messages [57]. The program distributed nearly a half-million condoms over a two-year period. Compared with control neighborhoods, those in intervention neighborhoods were 37% more likely to use condoms at last intercourse.

All 10 studies without comparison of time intervals or groups described out-of-facility efforts to screen for chlamydia and gonorrhea (Table 3). Two of these studies had sample sizes exceeding 20,000 [63,64]. Gotz et al reported screening rates of 40% in their mail-based program in Rotterdam, slightly higher than those reported in an aforementioned study from Denmark, also using a mail-based strategy [56]. Furthermore, Gotz et al achieved high treatment rates (91%) among those testing positive, although treatment rates were statistically significantly lower among minority groups. The other large study assessed screening at various community and street venues in California [63], but it did not report screening rates; it only reported the proportion of participants testing positive for chlamydia who were treated—averaging 90.5% without much variation (although statistical comparisons not provided) between venues.

An additional five smaller studies described outcomes of STI screening via community/street outreach. Auerswald et al demonstrated both exceptionally high screening and treatment rates (99.5% and 94.1%, respectively) and moderate partner treatment

**Table 1**  
Characteristics of excluded studies

Author/title/publication year/country	Age (years)	Study descriptions	Reasons for exclusion
Bailey et al The use of needle exchange by young injection drug users. 2003 USA	18–30	Examined the prevalence and correlates of NEP use among IDUs.	Interviewed IDUs to identify correlates of NEP use; the study did not determine impact of NEP implementation or use. Outcomes (primarily HIV risk behaviors) were not pertinent to this review.
Bradshaw et al Screening injecting drug users for sexually transmitted infections and blood borne viruses using street outreach and self collected sampling 2005 Australia	17–45 Median age 24.2	Evaluated the prevalence of STI among IDUs via street outreach with counseling and further clinic-based STI testing.	No data on uptake of screening in study population.
Buhrer-Skinner et al The check is in the mail: Piloting a novel approach to <i>Chlamydia trachomatis</i> testing using self-collected, mailed specimen 2009 Australia	15–25	Examined specimen processing and management systems of a program marketing urine-based CT screening kits available at community-based distribution points or via e-mail or toll-free phone call.	Analyzed a subset of 100 returned kits. No data on uptake of testing.
Buhrer-Skinner et al Novel approach to an effective community based chlamydia screening program within the routine operation of a primary healthcare service 2009 Australia	15–27.5	Assessed feasibility of community-based CT testing at various venues. Further assessed prevalence and treatment rates among positive cases.	53% of participants were school based. Of the remaining, median age was 25 years in two of three venue sites.
Cunningham et al Health services utilization for people with HIV infection: Comparison of a population targeted for outreach with the U.S. population in care 2006 USA	>18	Assessed facility-based health service use (via number of ambulatory visits in preceding 6-month interval) among HIV-positive patients comparing those receiving outreach services versus regular clinic-based services.	Did not assess uptake of out-of-facility-based health services. Wide age range; only 25% were 18–34 years.
Gaydos et al Internet-based screening for <i>Chlamydia trachomatis</i> to reach non-clinic populations with mailed self-administered vaginal swabs 2006 USA	14–63 (Median age 23)	Assessed the acceptance of home-sampling kits promoted via a Web site and available in the community or via Internet, e-mail, or telephone. Users mailed self-collected vaginal swabs to the laboratory and called for results.	400 of 1,200 requested kits were returned to lab. Study design did not enable assessment of proportion of target population requesting or using screening.
Glover et al Youth Centres in Ghana: Assessment of the planned parenthood association of Ghana programme 1998 Ghana	Data only provided for youth aged 10–24 years, although minority of users were older (age range not provided)	Assessed use of outreach and youth center-based sexual health program, including some sites that provide reproductive health services.	No data on outcomes pertinent to review.
Harper et al The effect of increased access to emergency contraception among young adolescents 2005 USA	15–24	Adolescents and young adults randomized to assess the impact of different access to emergency contraception—pharmacy access, advance provision, or clinic access—on risk behaviors.	Clinic-based recruitment before randomization.
Hawkins et al Review of the youth programme of the family guidance association of Ethiopia 1992 Ethiopia	10–24	Evaluation of a school and community outreach program with sexual reproductive health services including education and condom distribution.	Data supplied on number of condoms distributed but not rates of uptake of the commodity. No age-stratified data.
Holtzman et al The influence of needle exchange programs on injection risk behavior and infection with hepatitis C virus among young injection drug users in select cities in the US, 1994–2004 2009 USA	18–30	Assessed whether participation in NEPs influenced incident hepatitis C virus infection through effects on injection risk behaviors among young IDUs.	Did not report any outcomes pertinent to this review.
John Snow International Evaluation of the African Youth Alliance Program in Tanzania 2007 Tanzania	17–22	The program comprised behavioral change communications and youth-friendly services including community-based condom distribution.	No data on outcomes pertinent to this review.

**Table 1**  
Continued

Author/title/publication year/country	Age (years)	Study descriptions	Reasons for exclusion
Jones et al Home-based versus clinic-based self-sampling and testing for sexually transmitted infections in Gugulethu, South Africa: Randomised controlled trial 2007 South Africa	14–25	Comparing uptake of home-based versus clinic-based testing and evaluating the feasibility and acceptability of self-sampling. Young women were randomized to either a clinic appointment or to receive a home kit with prepaid addressed envelope for returning specimens by mail.	The vast majority were recruited for participation from a health facility (research clinic).
Kipke et al Drug-injecting street youth: A comparison of HIV-risk injection behaviors between needle exchange users and non-users. 1997 USA	16–24	Reported association between NEP and HIV risk behaviors as well as demographics.	Did not report any outcomes pertinent to this review.
Lloyd and Gale Provision of emergency hormonal contraception through community pharmacies in a rural area 2005 UK	No age restriction	Described use of pharmacy-based emergency contraception after a change in policy on over-the-counter access to reduce teen pregnancy.	Age-stratified data not reported.
McDonnell et al Risk factors for chlamydia among young women in a Northern California detention facility: Implications for community intervention 2009 USA	14–17	Assessed CT prevalence among young women booked into a county detention facility who were offered urine-based screening.	No data on uptake of testing.
Meekers et al Changing adolescents' beliefs about protective sexual behavior: The Botswana Tsa banana program 1997 Botswana	13–18	Evaluation of exposure and behavioral impact of multifaceted reproductive health program, including youth-oriented social marketing of condoms, community outreach, and development of adolescent-friendly outlets at retail sites.	Did not report any outcomes pertinent to this review.
Morris et al Relative efficiency of chlamydia screening in non-clinical settings in two California counties 2010 USA	<30 (majority < 24)	Assessed cost of CT screening at community locations.	Reported number, not proportion in study population, screened.
Speizer et al Evaluation of the ATBEF Youth Centre in 2003 Togo	10–24	Assessed contraceptive use among users and nonusers of youth center providing reproductive health services.	Does not compare data with before-intervention implementation or with a control group.
Sturrock et al Community-based sexual health care works: A review of the ACT outreach program 2007 Australia	15–63	Assessed screening for a variety of STI in various outreach settings.	Broad age range
Weiker et al A collaborative evaluation of a needle exchange program for youth 1999 USA	No age data provided	Described storefront facility/drop-in center offering multiple services including needle exchange and counseling.	Did not report any outcomes pertinent to this review.
Williams et al Evaluation of the African Youth Alliance Program in Ghana, Tanzania and Uganda 2007 Ghana, Tanzania, Uganda	17–22	Evaluated the level of exposure to a multicountry intervention and the impact on behavioral outcomes. This broad program comprised multiple approaches, including behavioral change programs, youth-friendly sexual health services, and outreach services such as peer education and other activities in the community.	Individual components of this broad program not assessed.

CT = *Chlamydia trachomatis*; IDU = injecting drug user; NEP = needle exchange program; STI = sexually transmitted infection.

rates (75%) among homeless youth in San Francisco [65]. By contrast, outreach in street and community settings geared toward minority youth in Rotterdam [66] and teen males in San Diego [67] resulted in approximately one-third and 14% screen-

ing rates, respectively, although some variation by type of setting was reported in the Rotterdam study. Other studies only reporting treatment rates among those testing positive for STI demonstrated variable results [68,69].



**Table 2**  
Studies with comparison group(s) and/or comparison time intervals

Reference/study objective(s)	Target population/location	Intervention	Design/sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Andersen et al. Assess effectiveness of two different mail-based CT screening strategies.	Random sample of 21–23 year olds Aarhus County, Denmark	Three groups: Intervention 1 (I1): Mailed test kit to participants <sup>a</sup> . Intervention 2 (I2): Mailed card that could be returned to request a test kit <sup>a</sup> . <sup>a</sup> Participants then mailed samples (Ms, urine; Fs, vaginal flush) directly back to laboratory. They also continued to have concurrent access to usual care as controls. Control (C): Usual care (availability of clinic-based testing by endocervical/urethral swab.)	Design: Randomized controlled trial Total: 30,439 I1: F = 2,000 M = 2,500 I2: F = 2,000 M = 2,500 C: F = 11,459 M = 9,980	% screened (by mail kits or conventional testing [i.e., intention to screen analysis])  Relative risk of being screened	I1: F, 38.6%; M, 26.8% I2: F, 33.0%; M, 16.5% C: F, 9.4%; M, 1.4% (CT prevalence rate 8.7%) RR (CI): I1 vs. C; F, 4.1 (3.8–4.4) M, 19.1 (16.0–22.8) I2 vs. C; F, 3.5 (3.2–3.8) M, 11.8 (9.8–14.2) I1 vs. I2, F, 1.2 (1.1–1.3) M, 1.6 (1.5–1.8)	Participants responded to availability of screening opportunities by mail, especially direct provision of test kits. Ms were particularly responsive.	Study was conducted when standard method of CT testing was more invasive, that is, by endocervical or urethral swab. Randomized controlled trial design minimizes potential for bias.
Gleghorn et al. Assess impact of youth-targeted HIV/AIDS outreach program.	12–23 year olds either homeless and/or engaged in street economy Six-block area in Haight-Ashbury, San Francisco, CA. Comparison sites with similar youth population in Berkeley and Santa Cruz, CA.	Street- and youth center-based outreach specifically targeting youth and consisting of health education, condom and bleach distribution, and referrals for HIV/sexually transmitted infection health services (e.g., HIV C&T).	Design: Before and after study with control group. (Six serial surveys were conducted but data were aggregated as preintervention [t1] and postintervention [t2].) 1,146 interviews conducted: t1 429 and t2 717	% and aOR <sup>b</sup> of following through on HIV-related referral  ( <sup>b</sup> Calculated comparing difference between t1/t2 and intervention/control)	t1 intervention group: 16% t2 intervention group: 30% t1 control group: 18% t2 control group: 33% aOR (CI): 3.2 (.7–13.6)	There was a nonstatistically significant increase in HIV-related referral follow-through in the intervention group over time compared with the control group.	Well-planned systematic sampling strategy for cases and controls, reducing potential bias.
Helleringer et al. Assess HIV prevalence and uptake of home-based HIV C&T among different SES groups.	18–35 year olds and their spouses; 52% aged <25 years Likoma Island, Malawi	Residents approached up to two times for C&T at home.	Cross-sectional study 852 eligible participants in study area identified from previous investigation of sexual networks and HIV transmission.	% receiving C&T      aOR of receiving home-based C&T and results among those who never previously received facility-based HIV testing compared with those who had (point estimate not reported with age stratification).	11.8% (101) were not home 18.1% (154) were at home but refused 66.9% (570) received C&T testing results. Among youth: aged <20 years—79.4% (131/165) aged 20–24 years—72.5% (200/276) (HIV prevalence rate 8.0%) aOR (CI): 1.1 (.7–1.6) Of note, those <20 years as well as those from the poorest SES were significantly less likely to receive home-based C&T compared with those >24 years and from higher SES levels, respectively.	Home-based HIV C&T uptake was high during a door-to-door campaign on this island setting, particularly among younger and poorer residents. 67.2% of those who had never previously received HIV C&T received this service via home testing (although there was no difference in home C&T rates among those who had and had not previously received C&T).	Study population was well enumerated and included 89.6% of island inhabitants in the target age-group, thereby reducing the risk of bias. 22.9% of the study population had previously received (facility-based) HIV C&T.

**Table 2**  
Continued

Reference/study objective(s)	Target population/location	Intervention	Design/sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Lewington and Marshall Evaluate the difference in time from UPSI to accessing EC from pharmacies compared with family planning clinics.	<21 year olds Kent, UK	A 2001 policy already allowed EC OTC pharmacy access for >15 year olds at a cost to patient of ~£24. Study intervention: no cost pharmacy EC access to those aged <20 years (including <16 years).	Cross-sectional study Data obtained retrospectively from medical records. 87 clients from two family planning clinics compared with 116 clients from an unknown number of pharmacies.	Time from UPSI to accessing EC. (EC clinical efficacy declines with increasing delay in administration after UPSI.)	Median time at clinics = 41 hours Median time at pharmacies = 16 hours $p < .001$	The time between UPSI and EC access was less among pharmacy clients compared with clinic clients across all age strata.	Unclear if ECs from clinics were also provided for free. In the pharmacy setting, older patients tended to have less delay compared with younger patients, but this was not statistically significant.
Marston et al. Examine impact of 2001 policy allowing OTC EC purchase for >15 year olds.	Weighted sample of >16-year-old Fs selected from 30 addresses in 9,900 postal sectors by probability proportionate to size. Age-stratified data available. Great Britain	2001 national policy allowing EC OTC pharmacy access for >15 year olds	Time series telephone survey using probability proportionate to size sampling strategy. (Part of a larger population survey.) Preintervention 2000: N = 1,978 Postintervention 2001: N = 2,078 2002: N = 2,202 N = eligible Fs responding to relevant questions (response rate was 96%)	1. Change in EC use among youth aged 16–24 years  2. Change in location of obtaining EC OTC versus clinic-based setting (among EC users)  3. Change in contraceptive use (but this was not reported by age-group)	1. Overall, no change: age 16–19 years: 15.3% (2000), 21.5% (2001), 8.9% <sup>d</sup> (2002) age 20–24 years: 17.3% (2000), 12.0% (2001), 19.7% (2002) <sup>d</sup> Change from 2000 to 2001 represents only statistically significant change between any two-year period for either of these two age-groups 2. In general, where OTC EC increased, there was a corresponding decrease in EC obtained in clinics (i.e., no overall increase in EC dispensed). No measure of statistical significance provided. Proportion of EC obtained OTC: age 16–19 years: 5.2% (2001), 16.7% (2002) age 20–24 years: 18.4% (2001), 21.1% (2002) 3. Overall no change.	Allowing access to OTC EC did result in OTC use but did not lead to overall increased proportions of EC use among young women.	<25 year olds were less likely to access EC OTC compared with older women. Cost of purchase of OTC ECs was ~£20–25. Well-designed sampling framework. Home telephone survey could have introduced sampling bias. Did not report EC use, figures restricted to Fs with UPSI or among those who were SA. Trends in UPSI or SA proportions could be important confounders in EC use trends.

**Table 2**  
Continued

Reference/study objective(s)	Target population/location	Intervention	Design/sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Moreau et al. Assess impact of a policy to make EC available OTC.	Weighted sample of 15–44-year-old Fs; data presented with age stratification. France	In May 1999, EC became available without prescription in pharmacies. Then, beginning in August 2001, minors could receive EC at no cost; others at 65% reimbursement or full cost if obtained with or without physician prescription, respectively.	Before and after telephone surveys using two-stage probability sampling Number of 15–24 year olds who had ever had intercourse: 1999: 753 surveyed 2004: 1,225 surveyed	1. Change in proportion of EC use among those who had ever had intercourse  2. Among those who obtained EC, change in proportion obtaining them from pharmacies.	From 1999–2004: 1. 15–17 year olds: 14.5–29.8 $p = .005$ 18–19 year olds: 10.4–30.7 $p < .001$ 20–24 year olds: 16.0–31.8 $p < .001$ 2. 15–17 year olds: 4.9–82.5 $p < .001$ 18–19 year olds: 13.2–79.6 $p < .001$ 20–24 year olds: 11.1–72.8 $p < .001$	Overall, EC use increased by 17% among <25 year olds. Pharmacy-accessed EC drove this increase.	Increase in EC use was seen among all age-groups, but increase was most pronounced among <25 year olds.  Well-designed sampling framework. Home telephone survey could have introduced sampling bias.
Skibiak et al. Assess the “efficacy” of four different provider groups in providing prescriptions for EC and supplying EC. The four groups of providers were determined based on previous data on youth preference regarding who to turn to for such information and services.	12–45-year-old Fs; >52% were aged <25 years Five residential compounds in Lusaka, Zambia	Four groups of providers: 1. 10 pharmacies given stock of ECs. (Unclear how actively they were distributing ECs before study.) 2. Five outpatient clinics 3. 25 peer counselors who conduct outreach in community settings. Project trained them to give prescriptions for ECs, which could be taken to pharmacy or clinic to be filled. 4. 18 CSAs (e.g., shopkeepers, small-scale vendors) were trained to give prescriptions for ECs, which could be taken to pharmacy or clinic to be filled. All four groups were given prescription cards for EC, which could be handed out to clients. Study information was recorded on these cards, which were collected at the site filling the prescription.	Quasi-experimental 2,517 prescription cards distributed to providers of which 1,798 (51.1%) were given to patients. 421 (23.4%) of prescriptions were redeemed for EC. 241/421 (57.2%) of EC recipients were 15–24 year olds.	Among 15–24 year olds who redeemed prescriptions, proportion receiving card from different sites and site EC obtained.	Source of EC prescription care (among those who filled it for EC): 50% pharmacist, 30% clinic, 20% peer counselor, and 0% CSA. 70% obtained EC from pharmacist and 30% from clinic. Statistical comparisons not provided.	Pharmacies were popular sites for getting EC prescriptions as well as the EC itself. Peer counselors were relatively popular sources of EC prescriptions among those who actually obtained ECs; CSAs were not. This was despite young people having identified CSAs as preferred sources of health information and services (previous study by same authors) and even though the fact that CSAs did distribute 366 prescription cards (age of recipients unknown) in present study.	Study design was such that data were collected from prescription cards only when they were actually turned in for EC. Therefore, data regarding people who received a prescription card but did not redeem it for EC were unavailable. Age-stratified data on outcomes of interest were not provided.
Soon et al. Determine impact of a policy to grant prescriptive authority to pharmacists to provide EC.	10–59 years old; data presented with age stratification British Columbia, Canada	In 2000, British Columbia became the first Canadian province to implement a policy allowing pharmacists to prescribe EC.	Time series: One 5-year preintervention measure and two postintervention measures, each more than 1 year. Data derived from administrative databases. 1. 4 million Fs aged 10–59 years living in study area. In 2001, 9,447 and 6,495 EC prescriptions were given by physicians and pharmacists, respectively.	Change in EC obtained per 1,000 Fs per year.	51.9, 54.9, and 83.0% increase among 10–14, 15–19, and 20–24 year olds, respectively. (Measures of statistical significance not provided.) EC obtained per 1,000 Fs per year from physicians did not change meaningfully comparing pre- versus postintervention rates. Increase in EC was because of increased provision by pharmacists.	There was an increase in EC dispensing rates driven by increased pharmacy-based provision.	Clients paid for EC regardless of venue of receipt. But they also paid a \$25 counseling fee in pharmacies in most cases. Physician fees were paid for via insurance plan.



**Table 2**  
Continued

Reference/study objective(s)	Target population/location	Intervention	Design/sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Townsend et al. Evaluate strategies for delivering sex education and family planning services to young adults and assess cost effectiveness.	15–22 year olds Six economically depressed communities in Monterrey, Mexico; Two communities per intervention group.	Six communities divided into three groups: Intervention 1 (I1): community youth program promoters provided sex education in schools and where youth congregate Intervention 2 (I2): Integrated youth center (YC) provided family planning (including free contraceptives) and other services. Control (C): Continuation of preexisting community-based distribution of contraceptives by adult promoters, not specifically targeting youth, community-based distribution continued in intervention sites as well.	Before and after study with control group. Data obtained through the project's information system. Project target population—"4,000 per treatment condition." Number surveyed not stated.	Change in number of contraceptive users over time	Number of contraceptive users: Before–After I1: 233–462 (98% increase <sup>e</sup> ) I2: 236–341 (44% increase <sup>e</sup> ) C: 243–249 (2% increase—not statistically significant) <sup>e</sup> Text implies that these figures are statistically significant, but this is not explicitly stated.	The interventions specifically targeting youth were more likely to result in increased contraceptive use.	Contraceptive use increased in YC sites. However, YCs were more expensive and less effective (for this outcome) compared with the community youth program, which just provided community-based sex education. Information about sampling framework not provided, thereby limiting assessment of risk of bias.
Wendell et al. Street outreach for HIV prevention: effectiveness of a state-wide programme	12–65 year olds (51% <25 years) with at least one sexual partner in preceding 12 months. 66 interventions and 13 comparison sites, all high risk (e.g., high prevalence of injection drug use) in Louisiana, USA.	Two groups: Intervention (I): Program street outreach workers distributed condoms and provided brief reproductive health education messages. Control (C): No program street outreach workers.	Quasi-experimental study using two postintervention implementation surveys conducted in community/street settings 4,950 cases surveyed 2,604 <25 years 1,597 controls surveyed 767 <25 years	% and aOR for condom use at last sexual encounter	I: 57% C: 48% aOR (CI): 1.4 (1.2–1.6) Note: 71% and 27% of those in the I and C groups, respectively, reported contact with any outreach worker (i.e., from study project or otherwise). Effect size diminished and lost statistical significance when adjusted for contact with an outreach worker.	Street outreach was effective at increasing condom use. The effect of street outreach on condom use was mediated by actual contact with an outreach worker; that is, the impact of the program did not extend via diffusion of health education messaging through the community at large.	Sites without preexisting known street outreach were chosen as comparison sites, but controls did report such contact. Contact with an outreach worker (as reported by respondents) was an important mediator of outcome. No age-stratified data provided on condom use.

aOR = adjusted odds ratio; C&T = counseling and testing; CSA = community sales agents; CI = 95% confidence interval; CT = chlamydia; EC = emergency contraception; F = female; M = male; OTC = over-the-counter; SA = sexually active; SES = socioeconomic status; UPSI = unprotected sexual intercourse.

**Table 3**  
Studies without comparison groups or intervals

Reference/study objective(s)	Target population/location	Intervention	Sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Auerswald et al. Evaluate field-based STI screening and treatment in reaching homeless youth.	Homeless youth aged 15–24 years old Three neighborhoods in San Francisco, California, USA	CT and GC screening offered at 28 venues frequented by homeless youth.	218 approached for screening F, 34%; M, 66%	1. % screened  2. % treated  3. % partners treated	1. 99.5% (217/218) accepted screening. One specimen was mislabeled; 216 were tested. (6.9% [17/216] were positive) 2. 94.1% (16/17) 3. 31.3% (5/16) who were treated had partners who received patient-delivered partner therapy. 75.0% (12/16) had partners who received any treatment.	Acceptance of screening and index treatment rates were high. Partner treatment rates were modestly high.	Significant compensation given for participation.
Bauer et al. Determine prevalence of CT among high-risk youth and young adults in nonclinical settings.	Age <30 years (90% of participants were aged <25 years) Program area covered 24 of 61 local health jurisdictions in California, USA	Urine samples collected for CT screening in various nonfacility sites. Treatment offered in the field and in facilities.	21,727 test kits distributed through the program. Data collected on 17,110. Data completed and included in analysis for 16,279 kits distributed to 4,896 Fs and 11,383 Ms. 1,078 identified with CT. Treatment data available for 843.	% screening positive who were treated	90.5% (763/843) were treated (in the field or a clinic). By screening venue: 93.3% alternative high schools (high-risk youth), 93.8% colleges and universities, 87.8% juvenile detention facilities, 100% correctional facility, and 94.9% other youth sites (drug treatment and mobile clinics, street, health fairs, shelters, and community-based organization)	Treatment rates were high.	Variation in project duration between sites (7–340 days). No data on % screened; % treated in the field versus in clinics; or partner treatment. No details on how subjects were approached for participation; cannot assess potential risk of sampling bias.
Brabin et al. Assess targeted provision of CT screening in pharmacies to <25 year olds seeking EC.	Women aged <25 years requesting EC in pharmacies licensed to provide free EC Manchester, UK	CT urine-based screening kits offered to Fs requesting EC from the pharmacies. CT tests could be mailed in.	2,718 Fs who received EC from 33 pharmacies during a data audit covering ~1/4 study period; data not tracked during the entire 1-year study period. Pharmacists recorded that they offered 2,904 kits during the study period.	1. % offered screening  2. % accepted screening kit 3. % screened	1. 24.8% (675/2,718) (During the data audit covering 4 months) 2. 46.4% (1,348/2,904) 3. 8.1% (236/2,904) (9.1% of specimens tested were positive.)	The strategy did result in identification and treatment of CT positives. However, pharmacists were neither systematic in offering screening nor recording all instances when screening was offered. Kit return rate was low.	Younger EC clients were least likely to accept CT screening; 31.0% (<16 year olds), 47.3% (16–19 year olds), 50.0% (20–24 year olds), $p = .0005$ .

**Table 3**  
Continued

Reference/study objective(s)	Target population/location	Intervention	Sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Gotz et al. Determine feasibility and efficiency of CT outreach screening.	Nonethnically Dutch population, 15–29 year olds Rotterdam, The Netherlands	Outreach in community settings (e.g., immigrant or teen drop-out specific projects), street settings (e.g., parks, underground stations, street corners), and vocational training schools.  Distribute condoms and urine CT test. Urine CT test could be returned onsite or via mail. Written questionnaire collected on site.	556 approached of which 447 were SA	1. % accepted screening kit  2. % screened	1. 43.0% (239/556) Among SA, 46.5% (208/447) By setting: Community; 79% Street; 27% Vocational school; 52% 2. 34.2% (190/556) Among SA, 38.5% (172/447) By setting: Community; 80% Street; 17% Vocational school; 52% Overall, 14.5% of SA persons tested positive.	The strategy did result in identification and treatment of CT among a marginalized group of persons. Screening rates were higher among those in the community project compared with the street setting (no statistical comparison reported).	Also examined efficiency of screening based on time to identify one CT positive person: Community; ~40 min Street; ~130 min Vocational school; ~20 min  Refusal rates were systematically tracked when subjects were offered CT tests.
Gotz et al. Report on management of CT-infected patients and partners.	15–29 year olds living in four municipal public health service areas with a large non-Dutch ethnic population The Netherlands	CT urine test kit sent in mail. Kits could be mailed back. Notification of positive results by mail with option for treatment at general practitioner or public clinic.	21,000 received a kit	1. % screened  2. % treated  3. % partners treated	1. 39.7% (8,339 urine specimens examined) (2.0% tested positive) 2. Treatment confirmed among 90.9% testing positive (150/165); 80.6% (25/31) among non-Dutch ethnicity, $p = .03$ 3. 48.9% (86/176) partners (some patients had more than one partner) confirmed treated	Overall, treatment rates were high, although lower among non-Dutch ethnicity. Treatment rate of partners was low.	Very large population-based screening study.
Gunn et al. Evaluate feasibility and cost of field-based urine CT screening and treatment.	Male “teens” Nine zip code contiguous area San Diego, California, USA	Peer outreach workers approached teens at parks, recreational centers, athletic fields, shopping malls, and street corners. Urine samples and contact information collected.	1,860 Ms approached	% screened	~50% engaged in discussion on benefits of screening Of those, ~30% (261) provided urine specimens (14.0% of Ms approached). Of those screened, 82% aged 15–19 years, 85% African American or Hispanic	Peer outreach approach appeared to be accepted by the target population, but proportion engaging in screening was relatively small.	Cost per specimen screened was higher in this field-based approach (\$103) compared with in STI clinic (\$72) and medical clinics (\$50–80). (But may be less costly per positive specimen because of likely higher prevalence rate among field-based youth.)
Oh et al. Determine use of urine STI screening in juvenile detention facility setting in terms of acceptability, effectiveness, and potential use.	12–18 year olds admitted to short-term juvenile detention facility Birmingham, Alabama, USA	Consecutive adolescents admitted to detention facility offered urine-based CT and GC screening	267 approached F, 46; M, 221	% screened	98.5% screened, remainder refused	Very high uptake rate.	

**Table 3**  
Continued

Reference/study objective(s)	Target population/location	Intervention	Sample size	Outcome of interest	Results: change in outcome	Conclusion	Comments
Rietmeijer et al. Evaluate feasibility and yield of urine CT screening outside of “traditional settings.”	High-risk SA African American and Hispanic youth aged <26 years Denver, Colorado, USA	Peer volunteers delivered intervention kits in unspecified community settings, which included both a voucher for referral for comprehensive clinic-based STI screening and a voucher for urine CT screening with an outreach worker	486 screened for CT in the community. 6.6% (32/486) tested positive. (89 screened for STIs in clinics, data not available.)	% treated	96.9% (31/32) treated in the outreach setting	Very high treatment rates accomplished in outreach settings.	Outreach workers were employed in a community screening project, but no information on specific venue of first contact. % screened unknown. Only Ms included in nonclinic sample.
van Bergen et al. Evaluate a new program to provide CT home-based urine screening to young women collecting contraceptives from a health center-based pharmacy.	15–29-year-old Fs collecting contraceptives Multicultural low-income region in Amsterdam, The Netherlands	Pharmacy offered home-based urine CT screening kits to Fs picking up contraception. Clients could mail completed urine screening kits. Participation was allowed once annually.	614 Fs aged 15–29 years old picked up contraceptives at pharmacies (962 Fs 15–29 year olds in the setting)	1. % offered screening kits 2. % returned kits  3. % treated	1. 72.6% (446/614) 2. 27.1% (121/446) 59 were 15–24 year olds, 62 were 25–29 year olds, but denominator for these age-groups was not provided. (11 [9.1%] tested CT positive) 3. 100% (11/11)	Deemed costly because of low utilization rate.	Cost data indicated that it could be a cost-saving strategy among 15–24 year olds if price of tests come down. In qualitative assessment, women offered reasonable reasons for not testing (e.g., had recently been tested).
van Leeuwen et al. Describe the integration of urine CT screening into preexisting outreach program for homeless youth.	Homeless youth aged 15–20 years Denver, Colorado, USA	Urine CT screening offered by outreach staff within existing program serving homeless youth. Urine specimen collected in field. Those with positive tests notified and could be treated in the field or in clinic. Urine GC screening added on during study.	414 screened for CT 302 screened for GC 41/414 (9.9%) screened CT positive 8/302 (2.6%) screened GC positive	% treated	61.2% (30/49) treated either in field or in clinic	Moderate treatment rates accomplished in this outreach program.	Data not systematically recorded, but authors estimated that ~70% of those approached were offered screening and ~20% of those accepted.

CT = chlamydia; EC = emergency contraception; F = female; GC = gonorrhea; M = male; SA = sexually active; STI = sexually transmitted infection.

Oh et al reported 99% screening rates when chlamydia and gonorrhea screening was offered to adolescents admitted for short-term stays in juvenile detention facilities [70]. Two other studies described outcomes of projects where pharmacies served as intervention sites for young women accessing EC in Manchester, UK [71] or contraceptives in Amsterdam, the Netherlands [72]. The females were offered chlamydia screening kits that could be mailed back to a laboratory. Only 25% and 73% of pharmacy staff in Manchester and Amsterdam, respectively, offered the kits to eligible young women. Furthermore, acceptance of screening was not high among the pharmacy clients; only 8% and 21% of those offered screening in Manchester and Amsterdam, respectively, accepted and return-mailed their screening kits.

## Discussion

Rigorous studies examining the effectiveness of out-of-facility strategies to increase access to HIV and reproductive health services for youth are limited. Indeed, this review was only able to identify one trial randomized at the individual level and no cluster randomized trials. However, information from nonrandomized investigations can provide valuable information, especially when pooled together. The evidence available on youth HIV and reproductive health service interventions suggests that such interventions offer promise to reach those who cannot or will not be reached by traditional health facility-based approaches. Outreach via the mail achieved 40% response rates in the Netherlands and Denmark [56,64], which was remarkably successful for a population-wide approach. Three studies assessed the impact of policies allowing over-the-counter access to EC from pharmacies; overall, EC use increased in France and Canada [58,59], whereas it remained constant in Great Britain [62]. Another study from Great Britain demonstrated a decreased interval between the time of UPSI and receipt of EC when EC was obtained from pharmacies compared with traditional clinic settings. This is important because time between UPSI and EC use is inversely proportional to EC efficacy.

The study from Lusaka, Zambia demonstrated that not all out-of-facility informal providers identified by youth end-users in preimplementation participatory research as desired sources of EC were well used, whereas others were indeed important sources of EC. A recent systematic review of interventions aimed at expanding and/or improving health service delivery among such informal providers of care in low- and middle-income countries demonstrated mixed results in terms of health outcomes and/or behavior change among populations served; uptake of health services interventions was not assessed [73]. The authors concluded that more rigorous evaluation is needed to understand such strategies.

Although the focus of this review is on health service delivery, certainly many other interventions, such as health education [3,74], are also needed to improve health among marginalized youth. Although many of the studies in this review included some health education component, only Townsend et al's analysis of a project in Monterrey, Mexico provided some insight into the relative importance of the components [55]. The project demonstrated increased uptake of contraceptive use in sites implementing two different community-based interventions specifically targeting youth. In the first intervention, youth centers provided multidisciplinary services including reproductive health education and contraceptive distribution. The second in-

tervention, youth promoters providing community-based reproductive health education, was more effective, and especially more cost-effective compared with the youth centers, in terms of increasing use of contraceptives. This is consistent with a cost analysis of youth centers conducted by Phiri et al [75] and a review that included assessment of youth center reproductive health activities in developing countries published in 1997 [9]. Another study of Mexican youth centers offering comprehensive services noted that only 16% of center clients were in the target age-group, necessitating an outreach into the community to recruit youth users [76]. However, youth centers are involved in much more than reproductive health education and services. It is not clear how effective youth centers are at improving health and social outcomes more generally, which was beyond the scope of this review.

Regarding the issue of the relative importance of outreach health service delivery and commodity distribution, the program in Monterrey, Mexico did not demonstrate added benefit related to such interventions compared with health education. However, one cannot draw definite conclusions that health education alone without increased reproductive health service access is more effective at increasing contraceptive prevalence because the two interventions in this study were different in many respects, not just whether they included health service delivery (as was provided in the youth center intervention). Comprehensive public health approaches, using multiple strategies, will likely be needed to improve HIV and reproductive health outcomes among youth. Evaluations that carefully deconstruct the effectiveness of different components of complicated, multidimensional programs are needed. Nevertheless, the Monterrey study lends evidence to support community approaches that specifically target youth.

Eleven studies in this review reported outcomes related to chlamydia screening strategies, but only one was of a study design that allowed causality inference to be drawn [56]; the other 10 studies did not have comparison time intervals or controls. There are many unresolved questions about how to increase access to HIV and reproductive health services, especially via outreach and among marginalized youth. Many such projects and programs are being implemented around the world. They provide good opportunities for formally assessing the effect of such public health endeavors. More program/project evaluation and publication of such analyses would help close the gap in knowledge on how to best design outreach HIV and reproductive health services to fulfill unmet needs for such services among youth, particularly marginalized youth who cannot access traditional facility-based health services. Furthermore, close evaluation of health care delivery strategies is critical to ensure that limited resources are used to maximize effectiveness in increasing access to care and to improving health outcomes.

Mobile "clinics" represent another approach to delivering health services, education, and commodities and are not uncommonly used to reach marginalized youth [77–80]. Although reports detailing effectiveness of these approaches are limited, a recent randomized trial found that 16–32 year olds used HIV counseling and testing services 3–10 times more often from mobile compared with fixed facilities in three developing countries [81]. Cell phone and Internet-based strategies are also being used in health programs with increasing frequency [41,82–84], especially in low- and middle-income countries [83,85]. Although we did not identify any reports of the use of these strategies that met our inclusion criteria, they also warrant mention.



Two recent literature reviews identified only a handful of programs that evaluated Internet- or cell-based HIV intervention and prevention programs [86,87]. These reviews call attention to the need for research on the effectiveness of such approaches, particularly among key target populations, including adolescents. Cell phone or Internet approaches tend to focus on health education. For example, Bull et al tested a condom promotion intervention among young adults comparing Internet- versus clinic-based settings and found that the former resulted in a slight increase in condom use, whereas no such effect was seen with the clinic intervention [88]. It is not often possible to separate health education from health care or commodity delivery components within programs or encounters with youth. It is challenging to separate out the degree to which each of these two important approaches contributes to uptake of services and commodities and ultimately to better health outcomes. Although both approaches are needed, there is a need for evaluations of programs and dissemination of such results so that better identification of the best balance of approaches can be made.

Limitations of this review include the heterogeneity of interventions, outcomes, and populations, and issues with study design limit the ability to pool data and draw definitive conclusions about the efficacy, much less effectiveness, of outreach HIV and reproductive health services. We included outcomes related to measures of uptake of HIV and reproductive health services and commodities; the scope of the review and paucity of available information prevented assessment of health outcomes. Also, our search of the gray literature was limited to a Google search; we did not contact experts and agencies in the field of adolescent health policy planning and service delivery. Despite these limitations, this review does represent a systematic examination of the published peer-review literature.

## Summary

The studies we reviewed demonstrate generally positive uptake of health services via out-of-facility-based approaches, although results did vary across settings and approaches. The most successful approaches included mail-based STI screening and condom distribution via street outreach in developed country settings, home-based HIV counseling and testing in a rural developing country setting, and policies allowing (in several developed countries) and a program promoting (in an urban developing country setting) pharmacy over-the-counter-based access to EC. Overall, the studies suggest that out-of-facility approaches can be important avenues to reach marginalized youth. Rigorous implementation research is needed to assess the true impact that such strategies can have. This is perhaps especially true in developing settings because their youth carry the greatest burden of disease, disability, and mortality relative to the rest of the world. Costing determinations and cost-benefit analyses are needed in the face of limited resources for health services. Determining ways to effectively reach adolescents and young adults with HIV and reproductive health services is crucial in reducing not only youth morbidity and mortality but also in mitigating adult disease burden.

## Acknowledgments

The authors thank the Departments of HIV and Maternal newborn Child and Adolescent Health, World Health Organization, Geneva, Switzerland for financial support for this work.

## References

- [1] 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.
- [2] 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.
- [3] 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 programmes. Geneva, Switzerland: WHO, 2009.
- [4] UNICEF. Opportunity in crisis: Preventing HIV from early adolescence to early adulthood. New York, NY: UNICEF, 2011.
- [5] DiCenso A, Guyatt G, Willan A, Griffith L. Interventions to reduce unintended pregnancies among adolescents: Systematic review of randomised controlled trials. *BMJ* 2002;324:1426.
- [6] 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, Switzerland: World Health Organization, 2006:151–99.
- [7] Hoffman O, Boler T, Dick B. Achieving the global goals on HIV among young people most at risk in developing countries: Young sex workers, injecting drug users, and men who have sex with men. In: Dick B, Ferguson J, Ross DA, eds. *Preventing HIV/AIDS in Young People: A Systematic Review of the Evidence from Developing Countries*. Geneva, Switzerland: World Health Organization, 2006:287–306.
- [8] Oringanje C, Meremikwu MM, Eko H, et al. Interventions for preventing unintended pregnancies among adolescents. *Cochrane Database Syst Rev* 2009;4:CD005215.
- [9] Senderowitz J. Reproductive health outreach programs for young adults. Washington, DC: Focus Young Adults, 1997.
- [10] 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.
- [11] Dickson KE, Ashton J, Smith JM. Does setting adolescent-friendly standards improve the quality of care in clinics? Evidence from South Africa. *Int J Qual Health Care* 2007;19:80–9.
- [12] Ministry of Health and Social Welfare Reproductive CHS. Standards for adolescent friendly reproductive health services. Tanzania: Directorate of Preventive Services, 2004.
- [13] 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.
- [14] 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.
- [15] Zielinski Gutierrez E, Magnani RJ, Lipovsek V, et al. Who can we trust with our problems? Barriers to Adolescent Use of Reproductive Health Services in 3. Bolivian Cities, Washington, DC: Focus on Young Adults Program/ Pathfinder International, 2000.
- [16] Interagency Youth Working Group. Young people most at risk of HIV: A meeting report and discussion paper from the Interagency Youth Working Group. Research Triangle Park, NC: Family Health International, 2010.
- [17] Anarfi JK. Vulnerability to sexually transmitted disease: Street children in Accra. *Health Transit Rev* 1997;7(Suppl):281–306.
- [18] Arno PS, Bonuck KA, Green J, et al. The impact of housing status on health care utilization among persons with HIV disease. *J Health Care Poor Underserved* 1996;7:36–49.
- [19] Boivin JF, Roy E, Haley N, Galbaud du Fort G. The health of street youth: A Canadian perspective. *Can J Public Health* 2005;96:432–7.
- [20] Lambert ML, Torrico F, Billot C, et al. Street youths are the only high-risk group for HIV in a low-prevalence South American country. *Sex Transm Dis* 2005;32:240–2.
- [21] Marshall BD. The contextual determinants of sexually transmissible infections among street-involved youth in North America. *Cult Health Sex* 2008; 10:787–99.
- [22] Marshall BD, Kerr T, Shoveller JA, et al. Structural factors associated with an increased risk of HIV and sexually transmitted infection transmission among street-involved youth. *BMC Public Health* 2009;9:7.
- [23] Marshall BD, Kerr T, Shoveller JA, et al. Homelessness and unstable housing associated with an increased risk of HIV and STI transmission among street-involved youth. *Health Place* 2009;15:753–60.
- [24] Noell J, Rohde P, Ochs L, et al. Incidence and prevalence of chlamydia, herpes, and viral hepatitis in a homeless adolescent population. *Sex Transm Dis* 2001;28:4–10.
- [25] Tyler KA, Whitbeck LB, Chen X, Johnson K. Sexual health of homeless youth: Prevalence and correlates of sexually transmissible infections. *Sex Health* 2007;4:57–61.

- [26] Youth Net Publications: Reaching socially marginalized youth. 2011 [cited 2011 15 July]; Available from: <http://www.fhi.org/en/youth/youthnet/publications/focus/infocus/socmarginalized.htm>.
- [27] Glover EM, Erulkar A, Nerquaye-Tetteh J. Youth centres in Ghana: Assessment of the planned parenthood association of Ghana programme. In: Accra, Ghana: Planned Parenthood Association of Ghana, 1998.
- [28] Kasirye R. Empowering street and slum young people to prevent HIV/AIDS in Kawempe division-Kampala city: A case study of Uganda youth development link (UYDEL). Kampala, Uganda: UYDEL, 2004.
- [29] McCormick B, Newald J. Outreach works in treating homeless youth. *Hospitals* 1986;60:162.
- [30] Meekers D, Stallworthy G, Harris J, et al. Changing adolescents' beliefs about protective sexual behavior: The Botswana Tsa Banana program. Research Division, Washington, DC: Population Services International, 1997.
- [31] Moss NJ, Gallaread A, Siller J, Klausner JD. "Street Medicine": Collaborating with a faith-based organization to screen at-risk youths for sexually transmitted diseases. *Am J Public Health* 2004;94:1081–4.
- [32] Shaw C, Aggleton P. Preventing HIV/AIDS and promoting sexual health among especially vulnerable young people. In: Southampton, University of Southampton: Safe Passages to Adulthood, 2002.
- [33] Weiker RL, Edgington R, Kipke MD. A collaborative evaluation of a needle exchange program for youth. *Health Educ Behav* 1999;26:213–24.
- [34] Woods ER, Samples CL, Melchione MW, Harris SK. Boston HAPPENS Program: HIV-positive, homeless, and at-risk youth can access care through youth-oriented HIV services. *Semin Pediatr Infect Dis* 2003;14:43–53.
- [35] John Snow International Research and Training Institute, Inc. Evaluation of the African Youth Alliance Program in Tanzania: Impact of sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute, Inc., 2007.
- [36] Bailey SL, Huo D, Garfein RS, Ouellet LJ. The use of needle exchange by young injection drug users. *J Acquir Immune Defic Syndr* 2003;34:67–70.
- [37] Bradshaw CS, Pierce LJ, Tabrizi SN, et al. Screening injecting drug users for sexually transmitted infections and blood borne viruses using street outreach and self collected sampling. *Sex Transm Infect* 2005;81:53–8.
- [38] Buhner-Skinner M, Muller R, Bialasiewicz S, et al. The check is in the mail: Piloting a novel approach to *Chlamydia trachomatis* testing using self-collected, mailed specimen. *Sex Health* 2009;6:163–9.
- [39] Buhner-Skinner M, Muller R, Menon A, Gordon R. Novel approach to an effective community-based chlamydia screening program within the routine operation of a primary healthcare service. *Sex Health* 2009;6: 51–6.
- [40] Cunningham WE, Sohler NL, Tobias C, et al. Health services utilization for people with HIV infection: Comparison of a population targeted for outreach with the U.S. population in care. *Med Care* 2006;44:1038–47.
- [41] Gaydos CA, Dwyer K, Barnes M, et al. Internet-based screening for *Chlamydia trachomatis* to reach non-clinic populations with mailed self-administered vaginal swabs. *Sex Transm Dis* 2006;33:451–7.
- [42] Harper CC, Cheong M, Rocca CH, et al. The effect of increased access to emergency contraception among young adolescents. *Obstet Gynecol* 2005; 106:483–91.
- [43] Hawkins K, Ojakaa D, Meshesha B. Review of the youth programme of the Family Guidance Association of Ethiopia. London: International Planned Parenthood Federation, 1992.
- [44] Holtzman D, Barry V, Ouellet LJ, et al. The influence of needle exchange programs on injection risk behaviors and infection with hepatitis C virus among young injection drug users in select cities in the United States, 1994–2004. *Prev Med* 2009;49:68–73.
- [45] Jones HE, Altini L, de Kock A, et al. Home-based versus clinic-based self-sampling and testing for sexually transmitted infections in Gugulethu, South Africa: Randomised controlled trial. *Sex Transm Infect* 2007;83: 552–7.
- [46] Kipke MD, Unger JB, Palmer R, et al. Drug-injecting street youth: A comparison of HIV-risk injection behaviors between needle exchange users and nonusers. *AIDS Behav* 1997;1:225–32.
- [47] Lloyd K, Gale E. Provision of emergency hormonal contraception through community pharmacies in a rural area. *J Fam Plann Reprod Health Care* 2005;31:297–300.
- [48] McDonnell DD, Levy V, Morton TJ. Risk factors for chlamydia among young women in a Northern California juvenile detention facility: Implications for community intervention. *Sex Transm Dis* 2009;36(2 Suppl):S29–33.
- [49] Morris SR, Bauer HM, Chartier M, et al. Relative efficiency of chlamydia screening in non-clinical settings in two California counties. *Int J STD AIDS* 2010;21:52–6.
- [50] Speizer IS, Kouwonou K, Mullen S, Vignikin E. Evaluation of the ATBEF Youth Centre in Lome, Togo. *Afr J Reprod Health* 2004;8:38–54.
- [51] Sturrock CJ, Currie MJ, Vally H, et al. Community-based sexual health care works: A review of the ACT outreach program. *Sex Health* 2007;4: 201–4.
- [52] 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. Rosslyn, VA: JSI Research & Training Institute, Inc., 2007.
- [53] HELLERINGER S, KOHLER HP, FRIMPPONG JA, MKANDAWIRE J. Increasing uptake of HIV testing and counseling among the poorest in sub-Saharan countries through home-based service provision. *J Acquir Immune Defic Syndr* 2009; 51:185–93.
- [54] Skibiak JP, Chambeshi-Moyo M, Ahmed Y. Testing Alternative Channels for Providing Emergency Contraception to Young Women. Nairobi: The Population Council, 2001.
- [55] Townsend JW, Diaz de May E, Sepúlveda Y, et al. Sex education and family planning services for young adults: Alternative urban strategies in Mexico. *Stud Fam Plann* 1987;18:103–8.
- [56] Andersen B, Olesen F, Møller JK, Østergaard L. Population-based strategies for outreach screening of urogenital *Chlamydia trachomatis* infections: A randomized, controlled trial. *J Infect Dis* 2002;185:252–8.
- [57] Wendell DA, Cohen DA, LeSage D, Farley TA. Street outreach for HIV prevention: Effectiveness of a state-wide programme. *Int J STD AIDS* 2003;14:334–40.
- [58] Moreau C, Bajos N, Trussell J. The impact of pharmacy access to emergency contraceptive pills in France. *Contraception* 2006;73:602–8.
- [59] Soon JA, Levine M, Osmond BL, et al. Effects of making emergency contraception available without a physician's prescription: A population-based study. *CMAJ* 2005;172:878–83.
- [60] Gleghorn AA, Jones TS, Doherty MC, et al. Acquisition and use of needles and syringes by injecting drug users in Baltimore, Maryland. *J Acquir Immune Defic Syndr Hum Retrovirol* 1995;10:97–103.
- [61] Lewington G, Marshall K. Access to emergency hormonal contraception from community pharmacies and family planning clinics. *Br J Clin Pharmacol* 2006;61:605–8.
- [62] Marston C, Meltzer H, Majeed A. Impact on contraceptive practice of making emergency hormonal contraception available over the counter in Great Britain: Repeated cross sectional surveys. *BMJ* 2005;331:271–3.
- [63] Bauer HM, Chartier M, Kessel E, et al. Chlamydia screening of youth and young adults in non-clinical settings throughout California. *Sex Transm Dis* 2004;31:409–14.
- [64] Götz HM, Hoebe CJ, Van Bergen JE, et al. Management of chlamydia cases and their partners: Results from a home-based screening program organized by municipal public health services with referral to regular health care. *Sex Transm Dis* 2005;32:625–9.
- [65] Auerswald CL, Sugano E, Ellen JM, Klausner JD. Street-based STD testing and treatment of homeless youth are feasible, acceptable and effective. *J Adolesc Health* 2006;38:208–12.
- [66] Götz HM, Veldhuijzen IK, Ossewaarde JM, de Zwart O, Richardus JH. *Chlamydia trachomatis* infections in multi-ethnic urban youth: A pilot combining STI health education and outreach testing in Rotterdam, Netherlands. *Sex Transm Infect* 2006;82:148–52.
- [67] Gunn RA, Podschun GD, Fitzgerald S, et al. Screening high-risk adolescent males for *Chlamydia trachomatis* infection. Obtaining urine specimens in the field. *Sex Transm Dis* 1998;25:49–52.
- [68] Rietmeijer CA, Yamaguchi KJ, Ortiz CG, et al. Feasibility and yield of screening urine for *Chlamydia trachomatis* by polymerase chain reaction among high-risk male youth in field-based and other nonclinic settings. A new strategy for sexually transmitted disease control. *Sex Transm Dis* 1997;24: 429–35.
- [69] van Leeuwen JM, Rietmeijer CA, LeRoux T, et al. Reaching homeless youths for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* screening in Denver, Colorado. *Sex Transm Infect* 2002;78:357–9.
- [70] Oh MK, Smith KR, O'Caín M, et al. Urine-based screening of adolescents in detention to guide treatment for gonococcal and chlamydial infections. Translating research into intervention. *Arch Pediatr Adolesc Med* 1998;152: 52–6.
- [71] Brabin L, Thomas G, Hopkins M, et al. Delivery of chlamydia screening to young women requesting emergency hormonal contraception at pharmacies in Manchester, UK: A prospective study. *BMC Womens Health* 2009; 9:7.
- [72] van Bergen JE, Postma MJ, Peerbooms PG, et al. Effectiveness and cost-effectiveness of a pharmacy-based screening programme for *Chlamydia trachomatis* in a high-risk health centre population in Amsterdam using mailed home-collected urine samples. *Int J STD AIDS* 2004;15:797–802.
- [73] Shah NM, Brieger WR, Peters DH. Can interventions improve health services from informal private providers in low and middle-income countries? A comprehensive review of the literature. *Health Policy Plan* 2011;33:275–87.
- [74] 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.
- [75] Phiri A, Erulkar AS. A situation analysis of the Zimbabwe National Family Planning Council's Youth Centres: Baseline assessment. Nairobi: Population Council, 1997.
- [76] Monroy A, Esteve C, Lundgren R, et al. Prospective cost-effectiveness study to determine a strategy of expansion of services to young adults in Mexico

- city. Informe Técnico Final Centro de Orientación para Adolescentes CORA 1987;1:1986–2031.
- [77] National Clearinghouse on Families and Youth. A day in the life of a mobile health clinic. 2011 [cited Dec 28 2011]; Available from: <http://ncfy.acf.hhs.gov/tools/exchange/street-outreach/a-day-in-the-life>.
- [78] Mobile clinic provides comprehensive medical home for homeless and at-risk youth, reducing emergency department visits and increasing followup care 2009. [cited Dec 28 2011]; Available from: <http://innovations.ahrq.gov/content.aspx?id=2477>.
- [79] Howe EC, Buck DS, Withers J. Delivering health care on the streets: Challenges and opportunities for quality management. *Qual Manag Health Care* 2009;18:239–46.
- [80] Lewis DA, Pillay C, Mohlamonyane O, et al. The burden of asymptomatic sexually transmitted infections among men in Carletonville, South Africa: Implications for syndromic management. *Sex Transm Infect* 2008;84:371–6.
- [81] Sweat M, Morin S, Celentano D, et al. Community-based intervention to increase HIV testing and case detection in people aged 16–32 years in Tanzania, Zimbabwe, and Thailand (NIMH project accept, HPTN 043): A randomised study. *Lancet Infect Dis* 2011;11:525–32.
- [82] Chai SJ, Aumakhan B, Barnes M, et al. Internet-based screening for sexually transmitted infections to reach nonclinic populations in the community: Risk factors for infection in men. *Sex Transm Dis* 2010;37:756–63.
- [83] Levine D, McCright J, Dobkin L, Woodruff AJ, Klausner JD. Sexinfo: A sexual health text messaging service for San Francisco youth. *Am J Public Health* 2008;98:393–5.
- [84] Lim EJ, Haar J, Morgan J. Can text messaging results reduce time to treatment of *Chlamydia trachomatis*? *Sex Transm Infect* 2008;84:563–4.
- [85] Halpern CT, Mitchell EM, Farhat T, Bardsley P. Effectiveness of web-based education on Kenyan and Brazilian adolescents' knowledge about HIV/AIDS, abortion law, and emergency contraception: Findings from TeenWeb. *Soc Sci Med* 2008;67:628–37.
- [86] Lim MS, Hocking JS, Hellard ME, Aitken CK. Sms STI: A review of the uses of mobile phone text messaging in sexual health. *Int J STD AIDS* 2008;19:287–90.
- [87] Ybarra ML, Bull SS. Current trends in internet- and cell phone-based HIV prevention and intervention programs. *Curr HIV/AIDS Rep* 2007;4:201–7.
- [88] Bull S, Pratte K, Whitesell N, Rietmeijer C, McFarlane M. Effects of an internet-based intervention for HIV prevention: The Youthnet trials. *AIDS Behav* 2009;13:474–87.