



YOUTH RESEARCH WORKING PAPER SERIES

# Impact of Sex and HIV Education Programs on Sexual Behaviors of Youth in Developing and Developed Countries

by Douglas Kirby, B.A. Laris, and Lori Rolleri

Youth Research Working Paper No. 2



**USAID**  
FROM THE AMERICAN PEOPLE







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Family Health International, YouthNet Program  
P.O. Box 13950  
Research Triangle Park, NC 27709 USA

Telephone: 1.919.544.7040  
Fax: 1.919.544.7261  
Web site: [www.fhi.org](http://www.fhi.org)

## **CONTENTS**

<b>Executive Summary</b>	1
<b>Introduction</b>	5
<b>Methods</b>	7
<b>Results</b>	11
Characteristics of the Studies Reviewed	11
Impact of Programs on Sexual Risk Behaviors and Pregnancy and STI Rates	15
Impact of Programs on Mediating Factors for Sexual Risk Behaviors	21
Characteristics of the Curricula-Based Programs that Had Positive Effects on Behavior	26
<b>Discussion</b>	38
<b>Recommendations</b>	41
<b>Annex 1. Developing Country Studies Evaluated</b>	43
<b>Endnotes</b>	44
<b>Tables and Figure</b>	
Table 1. Characteristics of Studies and Their Interventions	13
Table 2. Number of Studies Reporting Effects on Different Sexual Behaviors and Outcomes by Study Setting	17
Table 3. Effects on Different Sexual Behaviors and Outcomes, Reported by Developing Country Studies	20
Table 4. Number of Programs Having Effects on Mediating Factors that May Affect Sexual Behavior or Condom or Contraceptive Use	24
Figure 1. Characteristics of Effective Programs	27



## EXECUTIVE SUMMARY

Sex and HIV education programs that are based on a written curriculum and that are implemented among groups of youth in school, clinic, or community settings are a promising type of intervention to reduce adolescent sexual risk behaviors. This paper summarizes a review of 83 evaluations of such programs in developing and developed countries. The programs typically focused on pregnancy or HIV/STI prevention behaviors, not on broader issues of sexuality such as developmental stages, gender roles, or romantic relationships.

The review analyzed the impact programs had on sexual risk-taking behaviors among young people. It addressed two primary research questions:

- 1) What are the effects, if any, of curriculum-based sex and HIV education programs on sexual risk behaviors, STI and pregnancy rates, and mediating factors such as knowledge and attitudes that affect those behaviors?
- 2) What are the common characteristics of the curricula-based programs that were effective in changing sexual risk behaviors?

The methods used in this review included three primary activities: 1) comprehensively searching for and retrieving all studies meeting specified criteria, 2) coding all the results of those studies, and 3) conducting a content analysis of 19 curricula that were clearly effective at changing behavior.

## Results and Discussion

The results are divided into four sections: characteristics of the studies reviewed, impact of programs on sexual risk behaviors and pregnancy and STI rates, impact of programs on mediating factors for sexual risk behaviors, and characteristics of the curricula-based programs that positively affected behaviors.

*Characteristics of the Studies Reviewed.* Of the 83 studies identified that matched the study criteria, 18 were conducted in developing countries: Belize, Brazil, Chile, Jamaica, Kenya, Mexico, Namibia, Nigeria, South Africa, Tanzania, Thailand, and Zambia. About half of the 83 focused only on preventing HIV/STIs; nearly one-third covered both HIV/STIs and pregnancy; and nearly one-fifth focused only on pregnancy. Virtually all the programs encouraged specific sexual risk reduction and protective behaviors. The vast majority encouraged abstinence but also discussed or promoted the use of condoms or contraception if young people chose to be sexually active.

More than four-fifths of the evaluations identified one or more theories that formed the basis for the program and often specified particular psychosocial mediating factors to be changed. Social learning theory and its sequel, social cognitive theory, formed the basis for more than half of the programs evaluated. About half of the studies employed an experimental design with random assignment of individual youth, classrooms of youth, or entire schools or communities, while the remaining half used a quasi-experimental design. Only 23 studies measured impact on pregnancy or STI rates, and of these, only nine used laboratory tests to measure these health outcomes. More than half (59 percent) of the studies measured impact for a year or longer, while 22 percent measured impact for two years or longer. Many of these studies or their published articles had significant limitations such as limited explanations of the programs, problems with implementation, weak evaluation designs, measurement issues, and statistical shortcomings.

*Impact of Programs on Sexual Risk Behaviors and Pregnancy and STI Rates.* The 83 studies generally reported on one or more of six aspects of sexual behavior: initiation of sex, frequency of sex, number of sexual partners, condom use, contraceptive use in general, and composite measures of sexual risk-taking. A few studies reported on pregnancy and STI rates.

- *Initiation of Sex.* Of the 52 studies that measured impact on this behavior, 22 (42 percent) found that the programs significantly delayed the initiation of sex among one or more groups for at least six months, 29 (55 percent) found no significant impact, and one (in the United States) found the program hastened the initiation of sex.
- *Frequency of Sex.* Of the 31 studies that measured impact on frequency, nine (29 percent) reduced the frequency, 19 (61 percent) found no significant change in frequency, and three (all in developed countries) found increased frequency among any major groups at any point in time.
- *Number of Sexual Partners.* Of 34 studies measuring this factor, 12 (35 percent) found a decrease in the number of sexual partners, while 21 (62 percent) found no significant impact.
- *Condom Use.* Of the 54 studies measuring program impact on condom use, almost half (48 percent) showed increased condom use; none found decreased condom use.
- *Contraceptive Use in General.* Of the 15 studies measuring impact, six showed increased contraceptive use, eight showed no impact, and one (in the United States) showed decreased contraceptive use.
- *Sexual Risk Taking.* Some studies (28) developed composite measures of sexual activity and condom use (e.g., frequency of sex without condoms). Half of them found significantly reduced sexual risk-taking. None of them found increased sexual risk-taking.
- *Pregnancy Rates.* Of the 13 studies that measured pregnancy rates, three found significant positive effects, nine found insignificant effects, and one (in the United States) found significant negative effects.
- *STI Rates.* Of the 10 studies that measured impact on STI rates, two found a positive impact, six found no significant impact, and two found a negative impact.

Overall, these results strongly indicate that these programs were far more likely to have a positive impact on behavior than a negative impact. Two-thirds (65 percent) of the studies found a significant positive impact on one or more of these sexual behaviors or outcomes, while only 7 percent found a significant negative impact. One-third (33 percent) of the programs had a positive impact on two or more behaviors or outcomes. Furthermore, some of these programs had positive impacts for two or three years or more. In general, the patterns of findings for all the studies were similar in both developing and developed countries. They were effective with both low- and middle-income youth, in both rural and urban areas, with girls and boys, with different age groups, and in school, clinic, and community settings.

A review of replication studies of four different curricula in the United States revealed that curricula did have similar positive behavioral effects when they were replicated, provided all activities were implemented as designed in the same type of setting and with similar populations of youth. When many activities were omitted or the setting was changed, the curricula were less likely to have a positive effect.



*Impact of Programs on Mediating Factors for Sexual Risk Behaviors.* The studies reported on various mediating factors that contribute to the behavior changes, such as knowledge, perceived risk, values and attitudes, perception of peer norms, self-efficacy and skills, and others. Most programs increased knowledge about HIV, STIs, and pregnancy (including methods of preventing STI/HIV and pregnancy). Half of the 16 studies that measured impact on perceived HIV risk were effective at increasing this perceived risk. More than 60 percent of the many studies measuring impact on values and attitudes regarding any sexual topic were effective in improving the measured values and attitudes. More than 40 percent of the 29 studies that measured impact on perceived peer sexual behavior and norms significantly improved these perceptions. More than half of those studies that measured impact on self-efficacy to refuse unwanted sex improved that self-efficacy, and more than two-thirds increased self-efficacy to use condoms. Regarding changing motivations, 10 of 16 programs increased motivation or intention to abstain from sex or restrict the number of sex partners, and 10 of 14 programs increased intention to use a condom. Eight of 11 programs increased communication with parents or other adults about sex, condoms, or contraception.

Thus, the evidence was strong that many programs had positive effects on relevant knowledge, awareness of risk, values and attitudes, self-efficacy, and intentions – the very factors specified by many psychosocial theories as being the determinants of behavior. Furthermore, all of these factors have been demonstrated empirically to be related to their respective sexual behaviors. Thus, it appears highly likely that changes in these factors contributed to the changes in sexual risk-taking behaviors.

*Characteristics of the Curriculum-Based Programs that Had Impact.* The analysis of these effective curricula led to the identification of 17 common characteristics of the curricula and their implementation. The large majority of the effective programs incorporated most of the 17 characteristics of successful curriculum-based programs identified in this analysis. Also, programs that incorporated these characteristics were much more likely to change behavior positively than programs that did not incorporate many of these characteristics. Five of the 17 characteristics involve the development of the curriculum; eight involve the curriculum itself; and four describe the implementation of the curriculum.

- *Developing the Curricula.* The development teams involved multiple people with varied backgrounds, used a logic model approach that specified health goals and other details, assessed relevant needs and assets of the target groups, designed activities consistent with community values and available resources, and pilot-tested the program.
- *Curricula Content.* Effective curricula commonly created a safe environment for youth, focused on clear goals of preventing HIV/STI and/or pregnancy, focused on specific behaviors leading to these health goals and gave a clear message about those behaviors, addressed psychosocial risk and protective factors affecting those sexual behaviors, included multiple activities to change the targeted risk and protective factors, employed instructionally sound teaching methods that actively involved the participants and helped them personalize the information, employed appropriate activities and messages (for participants' culture, age, sexual experience), and covered topics in a logical sequence.
- *Implementation of the Curricula.* When implementing curricula, effective programs commonly selected and trained educators with desired characteristics, secured at least minimal support from authorities, recruited youth if necessary, and implemented virtually all activities as designed.

## **Recommendations**

The results and discussion led to the programmatic and research recommendations that follow.

### *Programmatic*

- Communities should implement curriculum-based sex and HIV education programs, preferably those proven to be effective with similar populations or those incorporating as many of the effective curriculum characteristics as possible.
- Organizations developing their own curricula should follow the five characteristics for developing effective curricula and incorporate the eight content characteristics.
- Organizations should follow the five characteristics for implementing effective curricula.
- Programs may have their greatest impact in areas where issues of pregnancy and HIV/STIs are most salient. Thus, while programs should reach all youth, they should be especially certain to reach high-risk youth.
- Schools and other groups should provide adequate time and resources for these programs to be implemented.
- Organizations should encourage research to develop and evaluate programs that may be even more effective than current programs.
- Communities should not rely solely on these programs to address problems of HIV, other STIs, and pregnancy but should view them as an important component in a larger initiative that can reduce sexual risk-taking behavior to some degree.

### *Research*

- More rigorous studies of promising programs should be conducted in developing countries.
- Evaluations can and should use randomized experimental designs.
- Sample sizes should be sufficiently large to have adequate statistical power for important statistical analyses, including those among sub-groups.
- Laboratory tests rather than self-reported data should be used for measuring pregnancy and STI rates, whenever possible.
- Statistical analyses should assess program effect on mediating factors and the impact of these factors on behaviors.
- Researchers should determine which mediating factors are most important across cultures and then measure these more consistently so that studies can be compared more easily.
- Published results of evaluations should provide more complete descriptions of their programs.

## INTRODUCTION

Sex and HIV education programs that are based on a written curriculum and that are implemented among groups of youth in schools, clinics, or other community settings are a promising type of intervention for reducing adolescent sexual risk-taking behaviors.

This paper summarizes a review of 83 evaluations of such programs in developing and developed countries. The programs typically focused on pregnancy or HIV/sexually transmitted infection (STI) prevention behaviors, not on broader issues of sexuality such as developmental stages, gender roles, or romantic relationships. Thus, in this report, the term “sex” education is used to refer to programs focusing on pregnancy or HIV/STI prevention; this differs from “sexuality” education, which may encompass many more topics. It is also important to distinguish clearly from the outset that this paper is a review of research studies measuring the impact of programs, not an evaluation of the programs themselves.

Sex and HIV education programs are commonly implemented in schools, which offer a place to reach large numbers of youth on a regular basis. Most youth who attend school do so before they initiate sex, and some are enrolled in school when they do initiate sex. Schools are designed and structured to teach both knowledge and skills. Thus, with appropriate training, teachers can implement these programs. If the programs are effective, ministries of education can facilitate their replication throughout their countries.

Since not all youth are in school when they initiate sex, reaching youth who are out-of-school is also important. Throughout the world, curriculum-based sex and HIV education programs have been implemented in clinics, youth-serving agencies, housing projects, faith communities, community centers, juvenile detention centers, and elsewhere. Notably, some programs have been found to reduce sexual risk-taking behaviors when implemented in both school and community settings with only minor modifications of the curricula.<sup>1</sup>

Consequently, public health authorities and policy-makers may seriously consider curriculum-based programs for school, clinic, and community settings as a major component of their strategy for achieving the United Nations General Assembly Special Session (UNGASS) goals for HIV prevention among youth and other goals for prevention of other STIs and unintended pregnancy.

Numerous, well-conducted studies have demonstrated that sex and HIV education programs can increase knowledge about how to avoid HIV/STIs and unintended pregnancy. However, to actually reduce rates of HIV/STIs and unintended pregnancy, programs must change behavior, and the evidence for the impact of these programs on behavior has been less clear. Previous reviews of the impact of sex and HIV education programs on behavior have typically focused on a particular geographical area (e.g., the United States or sub-Saharan Africa), are now somewhat dated,<sup>2</sup> or have not analyzed the curricula of the programs in depth. Previous suggestions of key characteristics of effective programs are now more than 10 years old and are limited to the United States.<sup>3</sup>

In 2004-2005, researchers at ETR Associates, working through Family Health International/YouthNet, conducted a review of existing evaluations of sex and HIV education programs in developing and developed countries. The review analyzed the impact the programs had on sexual risk behavior among young people. It addressed two primary research questions:

- 1) What are the effects, if any, of curriculum-based sex and HIV education programs on sexual risk behaviors, STI and pregnancy rates, and mediating factors such as knowledge and attitudes that affect those behaviors?
- 2) What are the common characteristics of the curricula-based programs that were effective in changing sexual risk behaviors?

Studies from both developed and developing countries were included in the analysis to have a sufficiently large data base of studies from which to draw conclusions, particularly regarding common characteristics of effective programs. A longer version of this report with more tables is available on the FHI Web site under the YouthNet publications page, including one-page summaries of each of the studies evaluated.

## **METHODS**

This review is composed of two components that follow from the two research questions identified above. The first is a review and analysis of studies evaluating the impact of various curriculum-based programs. The second is a synthesis of the common characteristics of curricula found to be effective in these studies. The methods for accomplishing both these tasks are described in this section.

### **Identification of Evaluation Studies**

Studies evaluating curriculum-based sex and HIV education programs were identified through searches of 10 databases (including PubMed, PsychInfo, Popline, Psychological Abstracts, Bireme and others) and 12 journals; contacts with researchers at professional meetings and those in the process of completing studies; a review of reports, training materials, and process evaluation reports; and previous reviews from various authors and literature searches conducted by ETR Associates and the University of Minnesota. To be as inclusive as possible, studies did not have to be published in peer-reviewed journals to be included in the review.

### **Study Selection Criteria**

To be included in the analysis, each study had to meet the following criteria:

- The program evaluated was a curriculum-based sex and HIV education program for groups of youth (as opposed to an intervention involving only spontaneous discussion; only one-on-one interaction; or only broad school, community, or media awareness activities).
- The program focused on adolescents or young adults ages nine to 24 years.
- The study was completed or published after 1990.
- The research methods in the study:
  - Included a reasonably strong experimental or quasi-experimental design with both intervention and comparison groups and both pretest and posttest data collection.
  - Had a sample size of at least 100.
  - Measured program impact on one or more of the following: initiation of sex, frequency of sex, number of sexual partners, use of condoms or other contraception, composite measures of sexual risk (e.g., frequency of unprotected sex), pregnancy rates, birth rates, and STI rates.
  - Measured impact on those behaviors that can change quickly (i.e., frequency of sex, number of sexual partners, use of condoms, use of contraception or sexual risk-taking) for at least three months or measured impact on those behaviors or outcomes that change less quickly (i.e., initiation of sex, pregnancy rates or STI rates) for at least six months.

## Analysis of Study Results

All studies were reviewed and specific information from each study was summarized into a one-page summary sheet that included key data such as study results related to both sexual risk behaviors and mediating factors (e.g. relevant knowledge and attitudes). All effects on behaviors or mediating factors were considered significant if: 1) they were statistically significant at the  $p < .05$  level and 2) this significance was based on either the total study population or a large sub-group that was roughly at least one-third of the population (e.g., males or females, certain age groups, etc.).

Studies sometimes reported results for multiple measures of each behavior for different time periods, for different sub-populations, or for various combinations of the above. Thus, some studies reported one or a very small number of positive effects on behavior but also reported a large majority of results that were not significant. To avoid presenting only the positive results and to provide a more balanced overview of the results, the following rules for summarizing results were adopted.

- Regarding **different measures of the same outcome behavior**, all measures across all the studies were rank-ordered according to their probable impact on prevalence. For example, use of condoms over 12 months was ranked higher than was condom use at first sex. Only the results from the highest ranked measure reported in each study were included in tables.
- Because very **short-term effects on behaviors** would have had little impact on HIV prevalence, only those results for three months or longer were included in tables.
- Because some behaviors can change quickly as a result of an intervention (i.e., frequency of sex, number of sexual partners, use of condoms, use of contraception or sexual risk-taking), but other behaviors or outcomes change more slowly (i.e., initiation of sex, pregnancy rates or STI rates), only results measured for six months or longer were included for these longer-term behavioral outcomes.

Even these rules for summarizing results may have provided a more positive picture than all the results from all studies. However, this probable positive bias was at least partly offset by a different negative bias – many results presented in the studies were based on samples with insufficient power. Thus, some programs produced programmatically meaningful results that were found to be not statistically significant and were therefore coded as not significant.

About half of the studies reviewed lacked sufficient statistical power to detect meaningful program effects on behavior. For example, if a program reduced the percentage of young people who initiated sex (or who had sex without a condom) from 30 percent to 20 percent, this reduction would be programmatically meaningful. However, to have an 80 percent chance of finding a 10 percentage point change in a dichotomous outcome to be statistically significant at the  $p < .05$  level, a completed pretest-posttest sample size of close to 600 is needed. About half had a sample size smaller than 600 for the baseline and first follow-up survey three or more months later, and half of the studies also had a sample size smaller than 600 for their baseline and last follow-up analyses. This suggests that about half the studies lacked sufficient statistical power.

The problem of insufficient power was further aggravated by the fact that studies typically had to divide their samples into various sub-samples. For example, to measure the impact of the program

on sexual initiation, the sample was restricted to those who were sexually inexperienced at baseline. In other studies, data were analyzed separately by sex or by age. Because some underpowered studies did find statistically significant program effects, no rule was made to exclude them from the review.

## **Identification of Characteristics of Effective Programs**

Once the selected studies were analyzed to determine the effectiveness of the programs evaluated, researchers used a three-step process to identify the common characteristics of effective programs.

First, to generate a comprehensive list of potentially important characteristics of programs, the researchers examined reviews of health education and HIV education programs for adults, reviews of sex and HIV education programs for young adults, and individual studies of sex and HIV education programs for youth.

Second, to identify the common characteristics of **curriculum content** (as opposed to curriculum development and implementation), the researchers obtained and coded curricula that were either clearly effective or not effective. They identified 33 curricula that had strong evidence supporting positive effects on one or more sexual behaviors (N=28) or that clearly did not have significant impact on sexual behaviors (N=5). The results of the remaining studies were more equivocal. Of the 33 curricula requested, 21 were received. Among the other 12 requests, nine queries were never answered, two curricula were no longer available, and one was the wrong curriculum.

The researchers then coded most activities in the curricula according to the **risk and protective factors** they addressed. Activities from different curricula addressing the same risk and protective factor were photocopied, placed in a binder for each factor, and subsequently reviewed. The researchers followed a cross-checking procedure that ensured reliability in coding among curricula. Finally, the researchers rated the overall curriculum on each of the potentially important characteristics. Those characteristics that were incorporated into more than 90 percent of the effective curricula became the eight common characteristics of effective curricula described later.

Third, to determine more accurately the characteristics of the process for **developing and implementing** the effective curricula (as opposed to the content), the researchers then reviewed the one-page summaries of the effective curricula, the original research articles, and any other materials (e.g., the curricula themselves) that described how the curricula were developed and implemented. These descriptions became the basis for the five characteristics describing the development of the program and the four characteristics describing the implementation of the program, which are also described later.

This analysis process was iterative, so that final decisions on the characteristics were made after several passes through the data. Thus, the analysis was both qualitative and quantitative. There was a systematic coding scheme developed and a check on agreement by coders, but the results rely to some degree on the judgment of the coders. The lack of clear programmatic description or strong evidence of impact in some studies made these judgments difficult in some cases, with no way to demonstrate a perfect relationship between the characteristics and effectiveness. Thus, this list is the best approximation by the researchers of the fit between the evaluation results and the characteristics necessary to achieve effectiveness.

Although nearly all of the effective curricula incorporated nearly all of the effective characteristics, and although curricula with nearly all of the characteristics were highly likely to be effective, having most of the 17 characteristics present in a curriculum did not totally ensure significant changes in reported behavior. A few programs with curricula that incorporated many of the characteristics failed to have a significant impact on sexual behavior because their sample sizes were too small, they failed to follow study participants for sufficient lengths of time to observe delay in sex, their measurement of important outcome behaviors was poor, or their control groups received different but nevertheless potentially effective programs. Some programs may not have had a measured impact because they were not implemented as designed (e.g., the 12 studies that described implementation problems of varying degrees of severity).

Also, a few curricula that did not appear to incorporate characteristics commonly believed to be important nevertheless had a positive impact. This could have been because the curricula were poorly written (e.g., were simply broad outlines) and did not capture well what really happened in the classroom. In addition, some seemingly weak programs (as well as strong programs) may have had significant positive effects simply by chance because of the large number of significance tests conducted. Finally, in some cases, the published articles provided too little information about the intervention, the targeted population, or the evaluation methods to determine why programs did or did not have an impact.



## RESULTS

The results are divided into four sections:

1. Characteristics of the studies reviewed
2. Impact of programs on sexual risk behaviors and pregnancy and STI rates
3. Impact of programs on mediating factors for sexual risk behaviors
4. Characteristics of the curricula-based programs that had positive impact

### 1. Characteristics of the Studies Reviewed

The analysis identified 83 studies that matched the study criteria. Of these, 18 were conducted in developing countries: Belize, Brazil, Chile, Jamaica, Kenya, Mexico, Namibia, Nigeria, South Africa, Tanzania, Thailand, and Zambia. Of the remaining 65, 56 were conducted in the United States and nine in Canada or Europe. About two-thirds of the studies were implemented in urban areas and one-third in mixed urban and rural areas. Only two were implemented only in rural areas. Two-thirds were implemented in communities at high risk of HIV/STIs, and most of the remaining programs were implemented in communities with medium or mixed risk. Fifty-four studies were conducted in schools, seven in clinics, and 17 in other community settings. Two were implemented in both school and community settings, and three were implemented in both clinics and other community settings. Most of the school-based programs were implemented in secondary schools; one was implemented in elementary schools and seven in colleges or night schools.

Despite the worldwide distribution of the studies, they had many characteristics in common, and many incorporated program characteristics previously identified as associated with effectiveness.<sup>4</sup> Table 1 summarizes many of the characteristics of the studies and the interventions. About half focused only on preventing HIV/STIs; nearly one-third covered both HIV/STIs and pregnancy; and nearly one-fifth focused only on pregnancy. Virtually all the programs encouraged specific sexual risk reduction and protective behaviors. The vast majority of the programs encouraged abstinence but also discussed or promoted the use of condoms or contraception if young people chose to be sexually active. Only 7 percent of the programs recommended only abstinence – most in the United States. The few that focused only on condoms were typically designed for older youth who were already likely to be sexually active.

More than four-fifths of the evaluations identified one or more theories that formed the basis for the program and often specified particular psychosocial mediating factors to be changed. Social learning theory and its sequel, social cognitive theory, formed the basis for more than half of the interventions. Other theories often mentioned were the theory of reasoned action (19 percent), the health belief model (12 percent), and at 10 percent each, the theory of planned behavior and the information, motivation, and behavioral skills model. Nearly all included at least two different interactive activities designed to involve youth and help them personalize the information. About nine of every 10 trained their educators before the educators implemented curriculum activities. Some of the remaining programs may also have trained their educators, but their respective studies did not mention the training.

The one area of great variation in these programs was their length, both the number of sessions and number of hours. While the mean program length was 12 hours, the actual lengths ranged from less than one hour to 48 hours. About two-thirds had between two and 15 sessions and lasted

two to 15 hours. But 11 percent included only one session, and 4 percent lasted an hour or less. In sharp contrast, 22 percent had 16 or more sessions, with 26 percent lasting 16 or more hours.

Regarding methodological characteristics, about half of the studies employed an experimental design with random assignment of individual youth, classrooms of youth, or entire schools or communities, while the remaining half used a quasi-experimental design. Nearly 90 percent of the studies used a cohort design in which they linked baseline and follow-up survey data, while the others used unmatched cross-sectional surveys. To measure sexual and contraceptive behavior, all relied on self-reports. While such data are generally believed to be reasonably reliable and valid in developed countries,<sup>5</sup> they may be less reliable and valid in developing countries where youth may be less accustomed to talking about sex and answering survey questions about personal behavior.<sup>6</sup>

Only 23 studies measured impact on pregnancy or STI rates, and of these, only nine used laboratory tests to measure these health outcomes. More than half (59 percent) of the studies measured impact for at least a year or longer, while 22 percent measured impact for two years or longer. Compared to past reviews, this review found large percentages of studies that used experimental designs, used a cohort design, and measured long-term impact on behavior. These changes and improvements in areas such as statistical analyses demonstrate that standards are becoming more rigorous.

Many of these studies or the published articles had important limitations. For example, few described their respective programs adequately; none studied programs for youth engaging in same-sex behavior; some had problems with implementation; a few had relatively weak quasi-experimental designs; an unknown number had measurement problems; many were statistically underpowered; most did not adjust for multiple tests of significance; few measured impact on either STI or pregnancy rates; and still fewer measured impact on STI or pregnancy rates with biomarkers. Also, there are inherent biases that affect the publication of studies. Researchers are more likely to try to publish articles if positive results support their theories and programs and journals are more likely to accept articles for publication if results are positive.

**Table 1: Characteristics of Studies and Their Interventions**

Characteristics	Percent
<b>Goals of the intervention (N=83)*</b>	
Reduce HIV and other STIs	52%
Reduce unintended teen pregnancy	17
Reduce both	31
<b>Behavioral focus (N=83)</b>	
Abstinence only (or abstinence until marriage)	7%
Abstinence plus condoms or contraception	93
<b>Identified theoretical basis (N=83)</b>	
Yes	83%
No	17
<b>Included two or more interactive methods (N=79)</b>	
Yes	90%
No	10
<b>Number of sessions (N=72)</b>	
1	11%
2 to 5	26
6 to 10	24
11 to 15	17
16 to 20	11
21 to 64	11
<b>Number of hours (N=74)</b>	
1 hour or less	4%
2 to 5 hours	23
6 to 10 hours	22
11 to 15 hours	26
16 to 20 hours	14
21 to 30 hours	7
31 to 48 hours	5
<b>Trained educators (N=83)</b>	
Training described in article	90%
Training not described but may have occurred	10
<b>Type of design (N=83)</b>	
Experimental	51%
Quasi-experimental	49

\* The sample sizes change among the study characteristics, because not all studies reported every characteristic.

*Table continues on page 14*

Table continued from page 13

Characteristics	Percent
<b>Survey design (N=83)</b>	
Matched cohort	88%
Unmatched cross-sectional	12
<b>Behaviors measured (N=83)</b>	
Sexual behavior only (e.g., delay in sex, number of partners, frequency of sex)	8%
Condom or contraceptive use only	4
Both sexual behavior and condom or contraceptive use	88
<b>Method of measuring pregnancy (N=13)</b>	
Self-reports	69%
Laboratory tests	31%
<b>Method of measuring STI (N=10)</b>	
Self-reports	50%
Laboratory tests	50%
<b>Number of months from baseline to last follow-up (N=83)</b>	
3 months	11%
4 to 6 months	26
8 to 10 months	6
12 months	16
14 to 18 months	16
20 to 24 months	13
27 to 32 months	4
36 to 57 months	9
<b>Sample size for first follow-up at three or more months (N=83)</b>	
100 to 199	13%
200 to 499	30
500 to 999	21
1,000 to 1,999	16
2,000 to 4,999	16
5,000 or more	5
<b>Sex (N=77)</b>	
Male	7%
Female	9
Mixed male and female	84
<b>Average Age** (N=83)</b>	
11.0 to 13.9	22%
14.0 to 17.9	57
18.0 to 23.0	22

\*\*Studies used means, medians, and ranges to describe age. In this table, the mean was used if available, the median was used if the mean was not available, and the midpoint of the range was used if neither the mean nor median was available.

## **2. Impact of Programs on Sexual Risk Behaviors and Pregnancy and STI Rates**

The 83 studies reviewed generally reported on six aspects of sexual behavior: initiation of sex, frequency of sex, number of sexual partners, condom use, contraceptive use in general, and sexual risk-taking behaviors. A few studies, most in developed countries, reported on pregnancy and STI rates. The sections that follow discuss each of these areas, based on the data shown in Table 2 (see page 17). Because FHI/YouthNet works primarily in developing countries, the data for the 18 developing countries are shown in a separate Table 3 (see page 20). Annex 1 contains a full list of references for these studies. (A similar table is not presented for the 65 developed country studies reviewed.)

### **Initiation of Sex**

An important measure of sexual activity is timing of initiation of sex. The studies reviewed demonstrate that a substantial percentage of programs delayed the initiation of sex and only one program hastened the initiation. Of the 52 studies that measured impact on the initiation of sex, 22 (42 percent) found that the programs significantly delayed the initiation of sex among one or more groups for at least six months, 29 (55 percent) found no significant impact, and one (in the United States) found the program was associated with earlier initiation of sex. Among developing countries, six out of 14 programs delayed the initiation of sex; among developed countries, 16 out of 38 did so. Roughly equal percentages of programs were effective in school, clinic, and community settings. Programs were also effective with both males and females and with all three age groups.

### **Frequency of Sex**

A second measure of sexual activity is the frequency of sex during a specified period of time (e.g., three months prior to the survey). This includes not having sex or “being abstinent.” This measure is important for both pregnancy and STI prevention. In general, programs did not increase frequency of sex and some reduced the frequency. Of the 31 studies that measured impact of programs on frequency, nine (29 percent) found reduced frequency, 19 (61 percent) found no significant change, and three (all in developed countries) found increased frequency among any major groups at any point in time. Both developing and developed countries had programs that significantly reduced the frequency of sex. Programs were effective on this measure in school, clinic, and community settings, among both males and females, and with all three age groups.

### **Number of Sexual Partners**

A third common measure of sexual activity is number of sexual partners during a specified period of time prior to the survey. This measure is especially important for STI transmission. Again, results indicated that in general, programs did not increase the number of sexual partners and some decreased the number. Worldwide, 12 out of 34 programs (35 percent) decreased the number of sexual partners, while 21 (62 percent) had no significant impact. The percentages of programs that had positive effects in the developing and developed world were virtually the same. Only one U.S. program significantly increased the number of partners. Programs were roughly equally effective in both community and school settings and with both males and females, but they tended to be somewhat more effective with younger youth.

## **Impact on Condom Use**

Worldwide, 54 studies measured program impact on condom use and almost half (48 percent) found increased condom use; none of them found decreased condom use. The proportion of effective programs in developing countries (seven out of 12) was similar to the proportion in the developed countries. Programs were effective in both school and community settings, were effective with both males (eight out of 17) and females (nine out of 17), and were equally effective with younger and older populations.

## **Impact on Contraceptive Use**

Far fewer studies measured impact on general contraceptive use (as opposed to condom use specifically). Of the 15 studies measuring impact, six showed increased contraceptive use, eight showed no impact, and one (in the United States) showed decreased contraceptive use. Neither of the two studies in the developing world had a significant impact. Most of these studies were based on programs in school settings; there were too few studies from clinic- or community-based programs to reach any conclusions. Programs were equally effective for both males and females and were effective in all three age groups.

## **Impact on Sexual Risk-Taking Behavior**

Some studies (28) developed composite measures of sexual activity and condom use, such as “frequency of unprotected sex” or “number of unprotected sexual partners.” These measures are strongly related to HIV/STI transmission and pregnancy. Half of them found significantly reduced sexual risk-taking. None of them found increased sexual risk-taking.

## **Impact on Reported Pregnancy and STI Rates**

Thirteen studies measured program impact on pregnancy rates. The results were typically mixed regardless of whether pregnancy was measured by self-report or laboratory tests and regardless of whether the studies were conducted in developed or developing countries. Of these 13 studies, three found significant positive effects, nine had nonsignificant effects, and one (in the United States) found significant negative effects.

Ten studies measured impact on STI rates. Again, the results were typically mixed across the method of measuring STI, although the results based on laboratory tests were slightly more positive than those based on self-reports. Across both methods and all countries, two studies found a positive impact, six found no significant impact, and two found a negative impact.

Thus, overall, these studies suggest that the programs might not have significantly affected pregnancy or STI rates in any particular direction. Although eight of 23 results were significant: five were in the positive direction and three were in the negative direction, suggesting they might have occurred by chance. A statistical meta-analysis is needed to properly assess their overall impact.

Studies require large sample sizes to have the power to detect as statistically significant even quite large programmatic effects on pregnancy or STI rates. This is because pregnancy and STIs

are relatively uncommon events. Given that only five of the 13 studies measuring impact on pregnancy had sample sizes greater than 2,000 and given that only two of the 11 studies measuring impact on STI rates had sample sizes greater than 2,000, the failure of these results to provide many statistically significant results does not necessarily mean that the programs did not have a programmatically meaningful impact on pregnancy or STI rates.

**Table 2: Number of Studies Reporting Effects on Different Sexual Behaviors and Outcomes by Study Setting**

Outcome	N*	Developing Country Studies N=18			Developed Country Studies N=65			Total N=83		
		Neg	NS	Pos	Neg	NS	Pos	Neg	NS	Pos
Delay initiation of sex	52	0	8	6	1	21	16	1	29	22
Reduce frequency of sex	31	0	3	2	3	16	7	3	19	9
Reduce number of partners	34	0	5	3	1	16	9	1	21	12
Increase condom use	54	0	5	7	0	23	19	0	28	26
Increase contraceptive use	15	0	2	0	1	6	6	1	8	6
Reduce sexual risk-taking	28	0	2	0	0	12	14	0	14	14
Reduce pregnancy: Self-reports	9	0	0	0	1	6	2	1	6	2
Reduce pregnancy: Laboratory tests	4	0	1	1	0	2	0	0	3	1
Reduce STIs: Self-reports	5	0	2	0	1	2	0	1	4	0
Reduce STIs: Laboratory tests	5	1	0	0	0	2	2	1	2	2

\* Number of studies that reported the outcome  
Pos=Positive (desirable) effect on factor; NS=no statistically significant impact; Neg=negative (undesirable) effect on factor.

## Impact on Any of These Behaviors or Outcomes

Overall, these studies strongly indicate that these programs were far more likely to have a positive impact on behavior than a negative impact. Across all 83 studies, two-thirds (65 percent) found a significant positive impact on one or more of these sexual behaviors or outcomes, while only 7 percent found a significant negative impact on one or more of these behaviors or outcomes. Given both the large proportion of studies that found significant positive results and the large number of tests of significance across all of these studies, some, but not all, of these positive results may have occurred by chance. On the other hand, given that multiple coefficients were examined in each study, the percentage of negative coefficients that was found is roughly equal to or less than the number that is likely to have occurred by chance, suggesting that some or all of them may have occurred by chance.

## Impact on Multiple Behaviors and Outcomes

One-third (33 percent) of the programs had a positive impact on two or more behaviors or outcomes. For example, the *MEMA Kwa Vijana* intervention in Tanzania both reduced the number of sexual partners among boys and increased condom use among both boys and girls.<sup>7</sup> Similarly, the *Safer Choices* intervention in the United States delayed the initiation of sex among Hispanic youth and increased both condom and contraceptive use among both boys and girls of all races/ethnicities.<sup>8</sup> Finally, the *BART (Becoming A Responsible Teen)* curriculum in the United States increased abstinence, reduced the number of sexual partners, increased condom use, and reduced unprotected sex.<sup>9</sup> These effects are particularly noteworthy, because all of these studies employed experimental designs and measured impact on behavior for at least one year.

## Maximum Duration of Impact

While the positive effects of some curriculum-based programs lasted only a few months, the effects of other programs lasted for years. For example, the *MEMA Kwa Vijana*<sup>10</sup> intervention found positive behavioral effects over a 36-month period, and *Safer Choices*<sup>11</sup> found positive behavioral effects over a 31-month period. Even though these periods included the periods during which the interventions were implemented, these were long periods of time. The programs might have had even longer effects, but they were not evaluated longer.

## Replications of Programs

Four curricula initially found to be effective have been implemented multiple times in different communities by different program staff and evaluated. The first, which was implemented in four different studies by three different research teams, consistently delayed sex and sometimes increased condom use.<sup>12</sup> The second, when implemented out-of-school in five different studies, consistently increased condom use and/or improved other sexual risk behaviors;<sup>13</sup> it was then implemented in-school but did not have a significant impact on any sexual behavior there.<sup>14</sup> The third, which was implemented and evaluated in two different studies, had positive effects on multiple sexual behaviors;<sup>15</sup> when greatly shortened, it did not significantly change behavior.<sup>16</sup> The fourth curriculum had positive effects on condom use when implemented in the community, but when some of the condom activities had to be removed, it failed to have an impact on condom use.<sup>17</sup>



Overall, the results of these replication studies are quite encouraging, providing evidence that curricula can often be effective when they are implemented as designed by others in different communities. Less clear is whether effective programs will remain effective if 1) they are shortened considerably, 2) they omit activities that focus on increasing condom use, or 3) they are designed for and evaluated in community settings but are subsequently implemented in classroom settings.

### **Overall Impact of Programs**

Programs were effective in different countries and cultures throughout the world – Belize, Brazil, Chile, Mexico, Kenya, Namibia, Nigeria, South Africa, Tanzania, Thailand, the Netherlands, Canada, the United Kingdom, and the United States. In general, the patterns of findings for all the studies were similar in both developing and developed countries. They were effective among both low- and middle-income youth and in both rural and urban areas. In general, the programs were effective with girls and boys, all age groups, and in school, clinic, and community settings.

All of these findings indicate that these curriculum-based programs are quite robust; they can be effective in different countries, in different cultures, in different communities and with different types of young people. On the other hand, this robustness should not be confused with magnitude of impact. In general, these programs did not dramatically reduce sexual risk-taking, or STI or pregnancy rates. Typically, the most effective programs tended to reduce the amount of sexual risk-taking by about a third or less. Thus, these programs are not a complete solution to the problems of HIV, other STIs, or unintended pregnancy, but they can be an effective component in a larger effort.

**Table 3. Effects on Different Sexual Behaviors and Outcomes, Reported by Developing Country Studies**

Author	Country	Delay sex			Reduce frequency of sex			Reduce number of partners			Increase condom use			Increase contraceptive use			Reduce sexual risk-taking		
		Neg	NS	Pos	Neg	NS	Pos	Neg	NS	Pos	Neg	NS	Pos	Neg	NS	Pos	Neg	NS	Pos
Agha	Zambia						√				√								√
Antunes	Brazil	√			√						√								
Baker	Thailand	√					√				√								
Cabezón*	Chile																		
Eggleston	Jamaica	√											√						
Erulkar	Kenya	√			√					√									
Fawole	Nigeria			√						√									
Harvey	South Africa	√						√		√									
Kinsler	Belize										√								
Klepp	Tanzania	√																	
Martinez-Donate	Mexico			√		√													√
Maticka-Tyndale	Kenya			√									√						
McCauley	Mexico	√										√							
Murray	Chile			√															√
Reddy	South Africa					√				√									
Ross	Tanzania	√																	√
Seidman	Chile			√															
Stanton	Nambia			√		√				√									√

Pos=Positive (desirable) effect on factor; NS=no statistically significant impact; Neg=negative (undesirable) effect on factor.

\*This study by Cabezon measured impact on pregnancy but did not measure any of the behaviors in this table.

### **3. Impact of Programs on Mediating Factors for Sexual Risk Behaviors**

The studies reviewed above reported on various mediating factors that contribute to the behavior changes, such as knowledge, perceived risk, values and attitudes, self-efficacy and skills, and others. While many programs had an impact on sexual risk behaviors, the studies did not necessarily discuss how or why these programs had these impacts. Those questions can be partially answered by examining impact on the mediating factors that the programs attempted to change in order to change behavior. Not surprisingly, the mediating factors measured in these studies are consistent with the psychosocial theories on which the programs were based.

Among the 83 studies, there were more than 400 tests of significance, and one would expect that about 5 percent or roughly 20 to be significant at the  $p < .05$  level by chance alone. However, it is not likely that as many as three positive significant findings would have occurred by chance for any given mediating factor. Thus, if three or more studies found that a particular factor was significantly improved, those findings would strongly suggest that at least one program was able to improve it. Following this logic, the analysis highlights factors where at least three programs found a significant improvement.

If a majority of the studies that measured a particular factor actually significantly improved that factor, these results indicate that that factor was particularly amenable to change by the kinds of programs implemented. Note that these reported results may not be representative of the effects of all studies. If a study measured a particular factor, the intervention may have been more likely to focus on and change that factor than interventions that did not measure it.

The group of 83 studies as a whole examined most frequently the following factors: knowledge, perceived risk, personal values and attitudes, perceived peer behavior and norms, self-efficacy and skills, motivations and intentions, and communication. A small handful of studies examined other factors such as perceived severity of risks and perceived partner values. Table 4 shows the number of programs that had an impact on mediating factors that may affect sexual behavior, including the use of condoms or other contraceptives (see page 24).

#### **Knowledge**

Of the many studies that measured impact on knowledge, most demonstrated that their respective sex and HIV education programs did increase knowledge about a wide variety of topics involving sexual risk behavior. The evidence is particularly strong that programs increased knowledge about HIV, STIs, and pregnancy (including methods of preventing them). The evidence is also strong that programs increased overall knowledge about a variety of sexual topics. Only a small number of programs failed to increase knowledge about the topics that were measured.

#### **Perceived Risk**

Sixteen studies measured impact on perceived HIV risk, and half were effective at increasing perceived risk of HIV. While many programs strived to increase awareness of HIV risk, if they actually reduced participants' sexual risk behavior, then these programs would logically reduce their perceived risk and thus possibly negate the positive effects of the programs creating greater awareness of HIV risk in their communities. Only three studies measured impact on perceived risk of pregnancy, and they were not effective at changing this perception.

## **Perceived Severity**

Eight studies measured perceived severity of the consequences of HIV, other STIs, and pregnancy, and more than half were effective. More specifically, three of four studies found increased perceived severity of HIV/AIDS; only one measured impact on perceived severity of STIs and it was effective; and two of five programs were effective at increasing perceived severity of pregnancy.

## **Personal Values and Attitudes**

Numerous studies measured impact on values and attitudes, especially values regarding abstinence and having sex and attitudes toward condoms, and most were effective. Of all the studies measuring impact on values and attitudes regarding any sexual topic, more than 60 percent improved the measured values and attitudes. For example, they influenced attitudes to be more supportive of abstinence or condom use. These results clearly demonstrate that in general it is possible to improve values and attitudes. It should also be noted, however, that the magnitude of the measured changes in these values and attitudes was frequently quite small and not always long lasting.

Of the studies that measured impact on these values and attitudes, at least half the studies (and a minimum of three) found that the programs improved values about sex and abstinence. At least half also improved attitudes about pressuring someone to have sex and attitudes towards condoms (including perceived barriers to using condoms), towards risky sexual behavior and prevention of risk, and towards people living with HIV.

## **Perceived Peer Behavior and Norms**

Twenty-nine studies measured impact on perceived peer sexual behavior and norms. More than 40 percent of them significantly improved these perceptions. For example, the programs helped teens realize that fewer of their peers had had sex, that their peers supported abstinence or that their peers used or supported condom use. At least three studies found improved perceived norms about sex, condoms, and avoiding risk, indicating that it is possible to change these perceptions. However, it is also true that fewer than half of the programs improved perceptions of peer behavior and norms about sex and condom use. This may reflect the fact that, in some cases, the perceptions of the young people were roughly correct.

## **Self-Efficacy and Skills**

Many studies measured impact on self-efficacy, especially self-efficacy to refuse sex, use condoms, and avoid unprotected sex. Of those studies that measured impact, more than half found improved self-efficacy to refuse unwanted sex, and more than two-thirds found increased self-efficacy to use condoms. Almost half of the programs improved self-efficacy to avoid HIV/STI risk. These studies demonstrate that it is possible to improve self-efficacy for critical risk-avoidance behaviors.

## **Motivation and Intentions**

Many studies measured motivation or intention to abstain from sex, restrict sexual partners, or use a condom. Two-thirds of these studies showed increased motivation or intention. More specifically, 10 of 16 programs studied increased motivation or intention to abstain from sex or restrict sex partners, 10 of 14 programs increased intention to use a condom, and three of five programs increased intention to avoid sex or unprotected sex (a factor that overlapped the previous two factors). All of these studies in combination clearly demonstrate that it is possible to improve motivation and intentions to reduce sexual behavior or to use protection.

## **Communication Behavior**

More than 20 studies measured impact on reported communication, especially communication with parents or adults. More than half found improved communication. Four of seven studies found increased reported communication between participants and their current partner about AIDS, STIs, and/or past sexual partners. Similarly, eight of 11 programs increased communication between participants and their parents or other adults about sex, condoms, or contraception. These results demonstrate that it is possible to improve reported communication between youth and these important individuals in their lives.

## **Other Behavior**

A majority of programs (and a minimum of three programs) found a positive impact on avoiding places and situations that might lead to sex and on obtaining and/or carrying a condom. On the other hand, of the 11 studies that measured alcohol or drug use, a large majority found no reduction in use. Moreover, none of the three studies that measured alcohol or drug use before sex reported any impact. These discouraging results may reflect the fact that few, if any, of the programs placed much emphasis on reducing alcohol and drug use.

Few studies measured the impact of programs on relationships with parents or on psychological states (e.g., self-esteem or mental health). For those that did, the results were generally mixed. While the results regarding relationships with parents were typically positive, those for psychological states were typically not significant.

## **Overall Impact**

The review of studies found strong evidence that many programs can improve knowledge about HIV, other STIs, pregnancy, and methods of preventing these risks; awareness of risk of HIV; values and attitudes about sex, condoms, risky sexual behavior, and people living with HIV; self-efficacy to refuse sex and to use condoms; intention to abstain from sex or restrict sex and numbers of partners; and communication with past partners, current partner, and parents. Relevant knowledge, awareness of risk, values and attitudes, self-efficacy, and intentions are the very factors specified by many psychosocial theories as being the determinants of behavior. Furthermore, all of these factors have been demonstrated empirically to be related to their respective sexual behaviors. Thus, it appears highly likely that changes in these factors contributed to the changes in sexual risk-taking behaviors.

**Table 4: Number of Programs Having Effects on Mediating Factors that May Affect Sexual Behavior or Condom or Contraceptive Use**

	Pos*	NS	Neg
<b>Knowledge</b>			
Overall knowledge of sexual issues**	7	2	0
Knowledge of pregnancy	5	0	0
Knowledge of STIs	8	3	0
Knowledge of HIV	28	3	0
Knowledge of abstinence	2	0	0
Knowledge of methods of contraception	4	2	0
Knowledge of condoms	5	3	0
Knowledge of methods to prevent HIV/STIs	6	1	0
Knowledge of community or reproductive health services	1	1	0
Knowledge of one's own sexual limits	1	2	0
<b>Perceived Risk</b>			
Perception of pregnancy risk	0	3	0
Perception of STI risk	1	1	0
Perception of HIV risk	8	8	0
<b>Perceived Severity of Consequences</b>			
Perception of severity of pregnancy and childbearing (including attitude toward childbearing)	2	3	0
Perception of severity of STIs	1	0	0
Perception of severity of HIV/AIDS	3	1	0
<b>Personal Values and Attitudes</b>			
Values about sex/abstinence	14	10	0
Regret about initiating sex	1	0	0
Attitude about pressuring someone to have sex (including right to say no to sex)	3	2	0
Attitudes toward condoms	14	8	0
Belief that condoms are a hassle and reduce pleasure	2	3	0
Perceived barriers to using condoms	4	3	0
Attitude toward risky sexual behavior and AIDS prevention	5	2	0
Self-approval to use condoms	1	1	0
Attitudes toward HIV+ people (including interacting with them)	6	0	0
Homophobia	1	0	0

\* Pos = Positive (desirable) effect on factor; NS=Not significant; Neg = Negative (undesirable) effect on factor.

\*\* Lightly shaded factors meet two criteria and therefore have stronger evidence that programs can modify them: 1) at least three programs significantly improved them and 2) at least half of the studies that measured them found significant improvements.

*Table continues on page 25*

Table continued from page 24

<b>Perceived Peer Values and Behavior</b>			
Perception of peer norms/behavior regarding sex	9	13	1
Perception of peer norms/behavior regarding condoms	4	6	0
Perception of peer norms/behavior regarding avoiding risk	3	2	0
Influences of peers	0	1	0
<b>Perceived Partner Values</b>			
Perceived partner norms and reaction to condom use	0	3	0
<b>Self-Efficacy and Skills</b>			
Self-efficacy to show love and affection without sex	1	3	0
Self-efficacy to discuss sex, condoms, or contraception with partner	0	3	0
Self-efficacy to refuse sex	8	4	2
Self-efficacy to obtain condoms	1	3	0
Self-efficacy to use condoms	12	4	1
Condom use skills	1	0	0
Self-efficacy to avoid HIV/STI risk and risk behaviors (e.g., to abstain or use condoms)	7	9	0
General sexual negotiation skills	2	1	0
Social competency/locus of control	2	0	1
Self-esteem	0	1	0
Self-efficacy to provide information to peers	0	1	0
<b>Motivation/Intentions</b>			
Intention to discuss AIDS, STIs, and past partners with new partner	1	0	0
Intention to discuss condoms with partner	2	1	0
Intention to abstain from sex, restrict sex, or restrict partners	10	6	0
Intention to use a condom	10	4	0
Intention to avoid unprotected sex (including perceived likelihood of having sex)	3	2	0
<b>Communication</b>			
Communication with partner regarding AIDS, STIs, and past partners	4	3	0
Communication with boy/girlfriend or partner regarding abstinence or condom use	1	4	0
Communication with parents or other adult about sex, condoms, or contraception	8	2	1
Comfort talking with parents about sex, condoms, or contraception	1	0	0
<b>Other Possible Mediating Behaviors</b>			
Using alcohol or drugs	3	7	1
Using alcohol or drugs before sex	0	3	0
Having a boyfriend or girlfriend	0	2	0
Engaging in coercive behavior	0	1	0
Experiencing violence in relationship	0	2	0

Table continues on page 26

Table continued from page 25

Avoiding places and situations that could lead to sex (including pre-coital sexual activities)	4	2	0
Attending reproductive health clinic	0	1	0
Obtaining and carrying a condom	3	2	0
Putting a condom on partner (females only)	1	0	0
Being tested for STIs	0	1	0
Being tested for HIV	0	1	0
<b>Relationship with Parents</b>			
Relationship with parents	1	0	0
Parental respect	2	0	0
Relevance of parents' concern about sex	1	0	0
Perceived parent concern or values about having sex and using condoms	1	1	0
<b>Psychological States</b>			
Self-esteem	0	1	0
Depression and mental health	0	1	0
Concern about health	0	1	0
Future orientation	1	0	0
Enjoyment of sex	0	1	0

#### 4. Characteristics of the Curricula-Based Programs that Had Positive Effects on Behavior

This review undertook a qualitative analysis of the curricula to determine the common characteristics of those that were effective in changing sexual risk-taking behaviors. The analysis identified 17 common characteristics (see Figure 1). The 17 characteristics can logically be divided into three categories. Five of the 17 involve the development of the curriculum; eight involve the curriculum itself; and four describe the implementation of the curriculum.

A few programs that appeared to have most of these characteristics did not have a significant impact on behavior, and a few programs without all of these characteristics did have an impact on behavior. However, those programs with the large majority of these characteristics were much more likely to have an impact on behavior than those with fewer of these characteristics.

Also, the analysis included a review of the 18 studies from the developing world. Virtually all of the studies that included most of the 17 characteristics had either significant positive results (12 studies) or had large programmatically significant results that were not quite statistically significant (two studies). In one of the latter two studies, the program reduced the percent of youth who initiated sex from 17 percent to 7 percent.<sup>18</sup> In the other, the odds ratio (OR=2.25) showed marked increase in contraceptive use but at  $p=.08$ .<sup>19</sup> In contrast, three of the four developing country programs having fewer of the common characteristics failed to have a significant impact on behavior.

It is important to note that the characteristics of the curriculum and its implementation are certainly important factors contributing to behavior change. However, two other factors also play a critical



role. One is the needs, deficits, and assets of the youth being served by the program (including their prior saturation with this topic). The other is the characteristics of the youths' environment, especially the saliency of AIDS, other STIs, or teen pregnancy. All of these factors can affect the outcome of sex and HIV education programs.

**Figure 1: Characteristics of Effective Programs**

<b>Process of Developing the Curriculum</b>	<b>Content of the Curriculum</b>	<b>Implementation of the Curriculum</b>
<ol style="list-style-type: none"> <li>1. Involved multiple people with different backgrounds in theory, research and sex/HIV education to develop the curriculum</li> <li>2. Used a logic model approach to develop the curriculum that specified the health goals, the behaviors affecting those health goals, the risk and protective factors affecting those behaviors, and the activities addressing those risk and protective factors</li> <li>3. Assessed relevant needs and assets of target group</li> <li>4. Designed activities consistent with community values and available resources (e.g., staff time, staff skills, facility space, and supplies)</li> <li>5. Pilot-tested the program</li> </ol>	<ol style="list-style-type: none"> <li>1. Created a safe social environment for youth to participate</li> <li>2. Focused on clear health goals – the prevention of HIV/STIs and/or pregnancy</li> <li>3. Focused narrowly on specific behaviors leading to these health goals (e.g., abstaining from sex or using condoms or other contraceptives), gave clear messages about these behaviors, and addressed situations that might lead to them and how to avoid them</li> <li>4. Addressed multiple sexual psychosocial risk and protective factors affecting sexual behaviors (e.g., knowledge, perceived risks, values, attitudes, perceived norms, and self-efficacy)</li> <li>5. Included multiple activities to change each of the targeted risk and protective factors</li> <li>6. Employed instructionally sound teaching methods that actively involved the participants, that helped participants personalize the information, and that were designed to change each group of risk and protective factors</li> <li>7. Employed activities, instructional methods, and behavioral messages that were appropriate to the youths' culture, developmental age, and sexual experience</li> <li>8. Covered topics in a logical sequence</li> </ol>	<ol style="list-style-type: none"> <li>1. Whenever possible, selected educators with desired characteristics and then trained them</li> <li>2. Secured at least minimal support from appropriate authorities such as ministries of health, school districts, or community organizations</li> <li>3. If needed, implemented activities to recruit youth and overcome barriers to their involvement (e.g., publicized the program, offered food, or obtained consent)</li> <li>4. Implemented virtually all activities with reasonable fidelity</li> </ol>

## Development of the Curriculum

There are five common characteristics of effective curriculum development teams and their efforts. These teams:

- 1. Included individuals (and sometimes groups) with expertise in different areas in the design of the curriculum.* They often included people with different backgrounds and expertise especially in the areas of health behavior theory, research on adolescent sexual behavior and risk and protective factors affecting that behavior, theory of instructional design (how to change each risk and protective factor), elements of good curriculum design, specific activities used to teach youth about sexual topics, cultural knowledge, and evaluation. Sometimes the same person had expertise in more than one of these areas. Knowledge about evaluation may not have been a prerequisite for developing an effective curriculum but may have been an artifact of the research component of all of these studies.
- 2. Used a logic model approach to develop the curriculum.* The discussion of the development of the curriculum, the use of theory, and the measurement of sexual and contraceptive behaviors and the mediating factors affecting those behaviors all suggest that consciously or unconsciously, the team:
  - specified the health goal(s) they were trying to achieve, often focusing on preventing the sexual transmission of HIV and sometimes preventing other STIs and unintended pregnancy (matches characteristic No. 2 under curriculum content, see page 29)
  - identified the particularly important behaviors that lead to HIV/STI transmission or pregnancy or their prevention, such as abstaining from sex or using condoms (matches No. 3, curriculum content)
  - used their knowledge of theory and research, focus groups and/or interviews with youth and professionals working with youth, and personal experience to identify the psychosocial sexual risk and protective factors affecting those behaviors such as knowledge about risk of sex and methods of protection, personal values and attitudes about sex and condoms, etc. (matches No. 4, curriculum content)
  - developed particular activities to address many or all of these risk and protective factors that they identified (matches No. 5, curriculum content)
- 3. Assessed the needs and assets of the young people they were targeting.* The curriculum developers typically reviewed quantitative data on rates of HIV, other STIs, and pregnancy, as well as any survey data on young adult sexual behavior. To the extent feasible, they reviewed these data for their targeted population. They sometimes conducted focus groups or interviews with youth and also interviews with adults working with youth on reproductive health concerns. During these focus groups and interviews they sometimes asked questions about why youth had sex – even if unwanted – and barriers to their using condoms or other forms of contraception.
- 4. Designed activities consistent with community values and available resources (i.e., facility, staff availability, staff skills, supplies, and time).* For example, in communities that highly valued abstinence among young people, the curriculum emphasized abstinence as the safest or best approach for young people. In schools with teachers inexperienced in using role plays, less

or no emphasis was placed on students practicing role plays. In communities that lacked video equipment, videos and films were not incorporated. In schools that lacked paper and pencils, individual worksheets were not used.

5. *Pilot-tested some or all activities.* Many of the curriculum developers pilot-tested some or all of the activities and then made modifications in the activities before implementing the version that was actually evaluated. This allowed them to assess what did or did not work.

## **Curriculum Content**

Effective curricula had eight common characteristics. The curricula:

1. *Created a safe environment.* Virtually all of the effective programs started by creating a set of ground rules for class involvement, such as not asking personal questions, respecting the right to refrain from answering questions, recognizing that all questions are legitimate questions, not interrupting others, respecting the opinions of others, and maintaining the confidentiality of views expressed. Consistent with this, to help youth be more comfortable talking about sexual topics, some curricula encouraged educators to give positive recognition and positive reinforcement to students' questions or comments. In addition, some programs tried to create a safe environment by separating the class into same-sex groups for certain topics, or by occasionally limiting the entire course to only one sex.
2. *Focused on at least one of three health goals: the prevention of HIV, other STIs, and/or unintended pregnancy.* The curricula typically focused on young people's susceptibility to HIV, other STIs, and/or pregnancy and the negative consequences of these outcomes. They gave a clear message about these health goals, namely that if young people have unprotected sex, they would be likely to contract HIV or another STI or to become pregnant (or cause a pregnancy) and that there were negative consequences associated with these outcomes. In the process of doing this, the curricula strived to motivate young people to want to avoid STIs and unintended pregnancy.
3. *Focused narrowly on the specific behaviors that cause HIV, other STIs, or pregnancy and on the protective behaviors that prevent these outcomes.* The curricula designed to prevent HIV and other STIs focused on abstinence and frequency of sex, number of sexual partners (less commonly), and condom use. Curricula designed to prevent pregnancy focused on abstinence, frequency of sex (less commonly), and contraceptive use.

Effective curricula focused on these behaviors in a variety of ways. First, they talked explicitly about sex, condom use, and contraceptive use. They identified specific situations that might lead to unwanted sex or unprotected sex and discussed how to avoid these situations and how to get out of them. They described how to use condoms or contraceptives correctly and how to overcome barriers for obtaining and using condoms or other forms of contraception. Most of the effective curricula spent relatively little time talking about broader issues of sexuality, being in love, etc. Only a few related gender roles to sexual or protective behaviors.

Second, effective curricula gave a clear and consistent behavioral message about these sexual and protective behaviors. Nearly all the effective programs repeated numerous times and in

different ways a very clear and consistent message about sexual and contraceptive behaviors. Most activities in the curricula were designed to change behaviors so that they would be more consistent with the message. Since most programs were designed to reduce HIV/STIs and were often designed for sexually experienced youth, the most common message was to use a condom every time they had sex with any partner. Programs concerned with pregnancy prevention emphasized that young people should use contraception every time they had sex. Several programs emphasized that abstinence was the safest choice, that unprotected sex was risky, and that using condoms was safer than unprotected sex.

Although most programs emphasized abstinence and/or condom/contraceptive use, a few programs recognized that condoms do not provide complete protection against all STIs and thus encouraged youth to limit their sexual partners, especially older male partners. Programs in some developing countries, especially Africa, emphasized the dangers of “sugar daddies” – older men who offer gifts or treats but later want sex in return.

Some programs identified important values in their communities and then appealed to those values. For example, they repeated “be proud,” “be responsible,” or “respect yourself.” Without exception, when the programs appealed to these values, they made very clear what sexual and protective behaviors were consistent with these values.

The messages in these effective programs were appropriate to the age, sexual experience, sex, and culture of the youth. For example, programs designed for younger youth who were less likely to be sexually experienced were more likely to place greater emphasis on abstinence than on condom use, while programs designed for older, more sexually experienced youth were more likely to place greater emphasis on condom use. A couple of programs for only young women emphasized that they were capable, powerful and “could be in control” – both generally and more specifically in regard to resisting unwanted or unprotected sex and insisting on condom use.

This particular characteristic of effective curricula appeared to be one of the most important. Some ineffective curricula provided information, discussed the pros and cons of different sexual choices, and implicitly let the youth decide what was right for them. In contrast, most of the activities in effective curricula were directed toward convincing the students that abstaining from sex, using condoms consistently, or using other forms of contraception consistently was the right choice, and that unprotected sex was clearly an undesirable choice. To the extent possible, the curricula tried to use group activities to change values, attitudes, and norms about what was the expected behavior (see next characteristic).

4. *Focused on specific sexual psychosocial factors that affect the specified behaviors – and changed some of those factors.* Programs designed to reduce sexual activity (i.e., delaying initiation of sex, reducing the number of partners, or reducing the frequency of sex) focused on one set of factors, while programs designed to increase condom or contraceptive use tended to focus on a different but somewhat overlapping set of factors. Many studies did not clearly specify or did not measure all of the factors they addressed.

The mediating factors below were frequently targeted and were improved. To be on the list, at least three programs that significantly reduced reported sexual behavior (or increased reported

condom or contraceptive use) had to significantly improve the mediating factor, and other research studies must have previously demonstrated that the factor reduced sexual activity (or increased condom or contraceptive use). At least three programs that **reduced sexual activity** and at least three programs that **increased condom use** focused on and improved the following factors:

1. Knowledge, including knowledge of sexual issues, HIV, other STIs, and pregnancy (including methods of prevention)
2. Perception of HIV risk
3. Personal values about sex and abstinence
4. Attitudes toward condoms (including perceived barriers to their use)
5. Perception of peer norms and behavior about sex
6. Self-efficacy to refuse sex and to use condoms
7. Intention to abstain from sex or to restrict sex or partners
8. Communication with parents or other adults about sex, condoms, or contraception

In addition, at least three programs that **reduced sexual activity** focused on and improved:

9. Self-efficacy to avoid STI/HIV risk and risk behaviors
10. Actual avoidance of places and situations that might lead to sex

In addition, at least three programs that **increased condom use** focused on and improved:

11. Intention to use a condom

Just as some programs that reduced sexual activity also increased condom or contraceptive use, some programs that reduced sexual behavior also improved mediating factors for condom or contraceptive use, and vice versa. The fact that programs that reduced sexual activity and programs that increased condom use affected eight of the same mediating factors provides more evidence that it is possible to do both with the same programs.

5. *Included multiple instructionally sound activities to change each of the targeted risk and protective factors.* In order to meet the needs of the targeted young people and to change the selected risk and protective factors, effective programs incorporated multiple activities to change these factors. Often individual activities were linked to specific factors; others times they addressed multiple factors. These activities employed teaching strategies designed to change each of the different factors. For example, they used role playing to teach skills to avoid sex.

The particular topics, teaching strategies, and activities used to improve important groups of risk and protective factors follow:

*5A. Basic information about risks of having sex and methods of avoiding sex or using protection.* To increase knowledge, the curricula focusing on HIV/STI prevention most commonly covered modes of HIV/STI transmission, symptoms of STIs, susceptibility to and consequences of STIs, prevention methods, and related topics. Fewer effective curricula covered testing and

treatment of HIV and other STIs. Those covering pregnancy prevention addressed chances of becoming pregnant if sexually active, consequences of pregnancy, sources of contraception, and related topics. Various activities were used to convey and help personalize this knowledge, including short lectures, class discussions, competitive games, simulations (discussed below), skits, videos, and other techniques. Notably, many of these activities required that the students obtain and share their information rather than passively listen to the educators.

*5B. Perceptions of risk (both susceptibility and severity).* Virtually all of the effective curricula focused on both susceptibility to and severity of HIV/STIs or pregnancy risk. Curricula commonly provided country or local data on the incidence or prevalence of HIV/STIs or pregnancy, sometimes on youth. These curricula also used class discussions, videos with true stories of young people having HIV or stories of young people becoming pregnant, handouts, skits, and other approaches, often involving people similar to the students. Some curricula included activities that further personalized the severity of STIs and pregnancy by asking students to write a paragraph about how they would feel if they just learned they had contracted HIV or another STI, or were pregnant (got someone pregnant). The paragraph was also to include what they could or could not do, both in the short term or in the long term.

*5C. Personal values about having sex or premarital sex and perception of peer norms about having sex.* Many programs, especially those for younger youth, promoted abstinence by repeatedly emphasizing that abstaining from sex was the safest method of avoiding HIV/STIs and pregnancy. Several programs included group discussions about the advantages and disadvantages of engaging in sex, with educators guiding the discussion so that avoiding sex was viewed as the best choice by youth. A few curricula discussed methods of showing you care about someone without engaging in sex. A few included “values voting” activities in which youth had to take a position about having sex and then defend it. Several programs provided data from broader representative surveys or from anonymous class surveys showing that many youth their age were not having sex and that many peers their age believed their best option was to avoid having sex at that time. Other activities included talking about ways people use to get someone to have sex when they may not want to, role-playing activities in which students practiced saying “no” to sex, and identification of common situations that might lead to sex. In the process of discussing and practicing refusal lines and discussing methods of avoiding situations that might lead to sex, students implicitly conveyed less permissive values and norms about having sex.

*5D. Individual attitudes and peer norms toward condoms and contraception.* Effective curricula gave a clear message about using condoms and contraception if sexually active. Typically they discussed the effectiveness of condoms and contraception, often stating that they did not provide complete protection against STIs or pregnancy, but that using them was much safer than unprotected sex. They also stated that condoms provided the only significant protection against STIs during sexual activity. Some effective curricula included survey data either from large samples of youth or from the students in each classroom showing that students believed that young people should use condoms or contraception if they do have sex.

Effective curricula addressed a variety of attitudes towards condoms and contraception and perceived barriers to using condoms, e.g., perceived effectiveness in preventing STIs and pregnancy, difficulties obtaining and carrying condoms, embarrassment in asking one’s partner to use a condom, the hassle of using a condom, and the loss of sensation while using a condom. These were addressed by lectures and class discussions that talked about condoms and described their



effectiveness if used properly, by discussions about where to obtain condoms with little embarrassment, by visits to drug stores to assess the characteristics of the condoms sold there, by fact sheets about condoms, and by practicing role plays in which each partner insisted on using condoms.

*5E. Both skills and self-efficacy to use those skills.* Curricula typically focused on the ability 1) to refuse unwanted, unintended, or unprotected sex; 2) to insist on using condoms or contraception; and 3) to use condoms correctly. In addition to teaching these skills, a few effective curricula strived to improve general assertiveness skills, ability to obtain condoms or contraception, and ability to obtain STI testing and treatment. Role playing was used extensively to improve skills. Many of the curricula first described the components of the skills verbally, then modeled them in role plays, and then provided individual practice through role plays in groups of two to four. Often the role plays started with a plausible scenario for the youth and then followed with a fully scripted role play in which both actors (the person pressuring to have sex and the person resisting having sex) simply read scripts. During the role plays in the small groups, the observers used a check list to see if the important components of effective skills were used. Skills commonly taught included saying “no,” repeating the refusal, explaining why, using direct words and appropriate body language, being assertive, using delaying tactics, and others. The role-playing practice may have both improved the skills and increased the participants’ confidence in their skills. (See box on page 37 for examples of activities that build skills.)

*5F. Communication with parents or other adults.* Some programs provided homework assignments for participants to discuss selected topics with their parents or other adults. Some provided parents with information about HIV/STIs and pregnancy, adolescent sexual behavior, and skills to talk more comfortably with their own children about sex. A few curricula described a variety of values widely held in the communities that parents might wish to emphasize to their children. Because parents knew that their children were going to have these homework assignments, they could be better prepared and also could understand why their children were asking questions about sex.

6. *Employed instructionally sound teaching methods that actively involved the participants, that helped participants personalize the information, and that were designed to change each group of risk and protective factors.* The following teaching methods were most commonly implemented: short lectures, class discussions, small group work, video presentations, stories, live skits, role plays, simulations of risk, competitive games, forced-choice activities, surveys of attitudes and intentions with anonymous presentation of results, problem solving activities, worksheets, homework assignments (including assignments to talk with parents or other adults), drug store visits, clinic visits, question boxes, hotlines, condom demonstrations, quizzes, and a variety of other interactive activities.

Nearly all of these instructional methods were interactive and engaged youth; some directly encouraged youth to apply the concepts to their own lives. The interactive quality of many of these methods may have helped them change some of the risk and protective factors above that include much more than knowledge. In addition, consistent with educational theory, the teaching strategies were designed to change their respective risk and protective factors. For example, to increase perceived risk of contracting STIs, students participated in simulations showing how rapidly STIs can spread among youth. To change values and norms, students expressed the advantages of abstaining or using condoms and expressed lines that could be used to refuse sex. To learn various refusal skills, students practiced role playing.

7. *Employed activities, instructional methods, and behavioral messages that were appropriate to the youths' culture, developmental age, and sexual experience.* Some curricula were designed for specific racial or ethnic groups and emphasized the high rates of HIV, other STIs, or pregnancy among those groups. The curricula identified the need for young people to be responsible not only to themselves but also to their communities, by avoiding unprotected sex. Some curricula were designed specifically for women and emphasized that women can be powerful and can be in control in sexual situations. Most curricula were consistent with the developmental age and sexual experience of the students. Activities for younger youth sometimes included more basic information, less advanced cognitive tasks, and less difficult activities, while those for older youth did the reverse. For example, role playing without scripts was more commonly implemented among older youth than among younger youth. As described above, programs for younger, less sexually experienced youth focused more on abstinence, while those for older, more sexually experienced youth focused more on condoms.

8. *Covered topics in a logical sequence.* In many, but not all, of the curricula, the risk and protective factors and the activities addressing them were presented in a logical sequence. That sequence often included:

- Basic information about HIV/STIs or pregnancy, including susceptibility and severity
- Behaviors to reduce vulnerability
- Knowledge, values, attitudes, and barriers involving these behaviors
- Skills needed to perform these behaviors

Thus, the curricula first enhanced the motivation to avoid HIV/STIs and pregnancy by emphasizing susceptibility and severity of these events and then addressed the knowledge, attitudes, and skills needed to avoid them.

## **Implementation of the Curriculum**

Four characteristics of effective implementation were identified. When implementing curricula, effective programs:

1. *Selected educators with desired characteristics (whenever possible) and then trained them.*

While some programs were implemented by classroom teachers in whatever classes were appropriate, other programs hired their own educators. Commonly they hired people whom they believed could relate to youth and who had a background in health education, especially sex or HIV education.

Notably, most studies did not examine the impact of the characteristics of the educators on behavior change. However, one study did randomly assign youth to different types of educators and found that matching the youths' race/ethnicity or gender with that of the educators did not have a significant impact on behavior change.<sup>20</sup> Similarly, three studies randomly assigned youth to receive either adult-taught or peer-taught sex and HIV education and found that the age of the educators did not affect program effectiveness.<sup>21</sup> Qualitative evaluations of multiple programs have found that what is most important to young people is whether the educator can relate to them, not the age of the educator.<sup>22</sup>



Virtually all of the programs trained their educators in the implementation of the curriculum. This training varied considerably in length and approach. Some of the trainings were based on skill development and allowed trainees to practice teaching some of the activities; others did not.

2. *Secured at least minimal support from appropriate authorities.* Virtually all of the effective programs obtained approval from authorities such as ministries of health or education, school principals, or directors of local youth-based organizations. This approval may have provided needed support or sanction for educators who were covering topics that were controversial in some cultures. It should be noted, incidentally, that all of the programs, whether effective or not, received some approval, because these were visible research studies that required approval, often from multiple organizations.
3. *Implemented needed activities to recruit youth.* If needed, effective programs implemented activities necessary to recruit youth and avoided or overcame obstacles to their attendance. For example, if appropriate, they provided program information to youth through schools or community organizations, provided food and/or other incentives, ensured parental notification, provided transportation, implemented activities at convenient times, and assured safety. Although this characteristic may be obvious, there are many reported examples in the field in which too few youth chose to participate in voluntary sex or HIV education programs, and the programs were not effective. Some programs also implemented activities for parents to attend. Often few parents attended these sessions. Typically, programs were more effective at reaching parents through homework assignments.
4. *Implemented curricula with reasonable fidelity.* Most of the effective programs implemented all or nearly all the activities in the curriculum. Once again, this was in part because these programs were being evaluated through research.

Because some studies provided relatively little information about implementation and also because other studies provided different types of process information (e.g., percentage of activities implemented or distributions of numbers of sessions received by intervention participants), it was not possible to make a more definitive statement about implementation across all the studies. On the other hand, the results of the replication studies do provide some information about the importance of implementation as designed for those few curricula that were evaluated multiple times. As noted above, those studies suggested that intervention may be less likely to be effective if 1) they are shortened considerably, 2) they omit activities that focus on increasing condom use, or 3) they are designed for and evaluated in community settings but are subsequently implemented in classroom settings.

### **Additional Characteristics of Effective Short Programs**

Most of the effective programs incorporated most of the 17 characteristics described above. A few programs were effective even though they were remarkably short, e.g., one to five hours. These short programs shared several characteristics that may have contributed to their success:

1. *The programs were implemented after school or in non-school settings.* This meant that when youth participated, they had not just completed several hours of classroom instruction and were presumably fresher and more ready to learn and to be involved.

2. *Youth volunteered to participate in them.* Thus, the youth may have been more open to the information provided and may not have resented being there. They may have been more open to behavior change. There also may have been a self-selection bias – those who agreed to participate in the study may have been different from those who did not. This self-selection would not have affected the internal validity of the study, because study participants were randomly assigned after arriving at the program site, but the self-selection might limit the generalizability of the findings.
3. *The programs focused primarily on one behavior, typically condom use.* This enabled the programs to be more focused, to cover fewer topics, and to give a simpler message.
4. *The programs were implemented in small groups of about six or so youth.* This enabled the programs to be more efficient. Educators could spend less time managing the classroom and more time addressing the specific questions and concerns of the individual youth. It also meant that interactive small group activities could be more easily and more quickly implemented. Finally, it meant that each group participant could speak up and be involved in discussion a larger percentage of the time.

### **Additional Characteristics of Effective Programs Having a Long Term Impact**

Some programs had a positive impact for more than two years. They shared several qualities:

1. *Programs with long term impact were likely to be implemented in schools.* Eight of the 10 programs that measured and found behavioral effects for two years or more were school-based programs. However, a few of them had community components.
2. *Programs with long term impact included 12 or more sessions.* The larger number of sessions may have enabled them to address more risk and protective factors more intensely.
3. *Programs with long term impact included sequential sessions over multiple years.* Nine of the 10 programs that measured and found behavioral effects for two or more years were either multi-year programs with sequential sessions offered over two or three years or were programs with most of the sessions offered during one year and then booster sessions offered many months or even years later. This enabled the programs to implement more sessions than they might have been able to in one year, and it enabled them to reinforce important concepts over successive years. A few of these programs also implemented school- or community-wide activities during subsequent years. Thus, students could be exposed to curriculum instruction in the classroom for two or three years and then their knowledge, attitudes, and values could continue to be reinforced as long as they remained in their schools.

## Sample Activities that Address Perceptions of Risk and Build Skills

*STI Handshake.* Youth shake hands with others and write down the names of those people with whom they shook hands. They are then told that shaking hands represented having sex and that one or more youth had specially marked cards indicating that they hypothetically had an STI. Thus everyone who shook hands with them contracted the STI. The youth with cards indicating they had an STI read the names of the people they infected, and those youth whose names were read then read the names of the people with whom they subsequently shook hands (and infected). This process continues until all appropriate names are read. As names are read off the cards, students clearly see how rapidly an STI can spread and how it can spread exponentially. Some curricula elaborated on this basic concept by having some students receive a card telling them not to shake hands with anyone (representing abstinence) or to shake hands with only a glove on (representing condom use).

*Pregnancy Risk.* Students choose numbers from one to six (roughly representing the risk of pregnancy during each month of unprotected sex) and then have someone draw the numbers from a hat (which represents a pregnancy test). With each passing month (and draw from the hat), more and more youth become pregnant and must stand. This vividly shows how youth may not become pregnant the first month, but most youth do become pregnant within a few months of unprotected sex.

*Increase Condom Use Skills.* Each of the steps for using condoms correctly is put on a separate sheet of paper. Teams of students, holding these sheets of paper, have to stand in the correct chronological order (e.g., the step “pinch the air out of the tip of the condom” should come before “roll the condom down the penis”). The first team to arrange themselves in the proper order wins the contest. In another activity, teachers first demonstrate how to use a condom properly by checking the date, taking the condom out of the wrapper, and properly putting it over either their own fingers or an object representing an erect penis, squeezing the excess air out, etc. Then students are given condoms and practice the same behaviors.

## **DISCUSSION**

This review of 83 studies from developing and developed countries provided important findings regarding impact on sexual risk behaviors, changes in mediating factors, and common characteristics of curriculum-based programs that were effective in changing sexual risk behaviors. Other findings related to length of impact, replication, type of teacher/leader, and length of intervention.

Research limitations presented challenges in reaching these findings. Many of the studies of sex and HIV education programs had methodological flaws such as poor evaluation designs, poor measurement, insufficient statistical power, or failure to measure impact on pregnancy or STI rates. Also, inherent biases affect the publication of studies – researchers are more likely to try to publish articles if positive results support their theories and programs, and journals are more likely to accept articles for publication if results are positive. In addition, this review could have introduced a bias through the process of examining and coding so many significant research results (both positive and negative), despite coding rules to reduce this bias. Fortunately, some of these biases counteract each other. For example, insufficient statistical power partially counteracts the coding of so many statistical results.

In addition to the research issues, it is important to note that while the characteristics of the curricula – their development, content, and implementation – affect sexual behaviors of youth, other factors may also affect these behaviors. These factors include the needs and assets of participating youth and the characteristics of the youth’s environment, especially the saliency of HIV, other STIs, and unintended teen pregnancy.

### **Impact on Sexual Risk Behaviors**

This review found substantial evidence that curriculum-based programs can have a positive effect on sexual risk-taking behaviors among youth. A large majority (65 percent) of the 83 programs had a significant positive impact on behaviors affecting risk of HIV, other STIs, or pregnancy among either the entire study sample or important study sub-samples (e.g., males or females). Of the 42 studies that employed an experimental design and in general were more rigorous, essentially the same percent (66 percent) found one or more positive significant effects, suggesting that these results do not reflect weak evaluation designs.

The sex and HIV education programs evaluated by these studies did not increase sexual behavior, as some people have feared. To the contrary, nearly half (45 percent) of the studies that measured impact on sexual initiation, frequency of sex, or number of sexual partners found positive results – the programs either delayed sex or reduced the frequency of sex or the number of sexual partners. Almost all of the rest had no effect. Only one of 52 programs measuring the impact on the initiation of sex reported earlier sexual initiation. Given the large number of studies, that finding could have occurred by chance. Other scattered negative findings regarding other behaviors could also have occurred by chance.

Close to half the programs (47 percent) significantly increased condom or contraceptive use. In addition, one-third of the studies (22 of 66) that measured impact on at least two behaviors found a positive impact on at least two behaviors (e.g., the programs both delayed sex and increased condom use).

The findings on program effectiveness were quite robust. The programs were just as likely, if not more likely, to be effective in developing countries as they were to be effective in developed countries. They were effective in both urban and rural areas; in both low- and middle-income communities; and in school, clinic, and community settings. They were also effective with both advantaged and disadvantaged youth, both males and females, different racial and ethnic groups, both younger and older youth, and both sexually experienced and inexperienced youth. There is some indication that they were especially effective with youth who were most likely to engage in unprotected sex with multiple partners and thus were at highest risk of HIV, other STIs, and pregnancy.

Given that many programs reduced sexual behavior and/or also increased condom or contraceptive use, they logically would be expected to reduce both STI and pregnancy rates. However, in general, the results of the few studies that measured impact on STI or pregnancy rates did not produce many significant positive effects. This may have been because sample sizes were too small to detect programmatically meaningful effects or there were other methodological limitations. Also, the changes in behavior may have been too small or too short term to produce marked changes in STI or pregnancy rates, or perhaps the behaviors that changed were not those that have the strongest impact on STI rates. While these programs alone cannot solve the problems of STIs, HIV, and unintended pregnancy, many of them can change sexual and protective behaviors in desired directions, and they can be an important component in larger more comprehensive initiatives.

### **Impact on Mediating Factors**

Many studies found positive effects on both sexual behaviors and the mediating factors known to be related to those behaviors. These studies provide strong evidence, both for the impact of the programs and for an understanding of how and why these programs changed behavior.

Many of the programs improved knowledge about HIV, other STIs, pregnancy, and methods of preventing these risks; awareness of risk of HIV; perceived severity of HIV/AIDS; values and attitudes about sex, condoms, risky sexual behaviors, and people living with HIV; self-efficacy to refuse sex and to use condoms; intention to abstain from sex (or restrict sex and numbers of partners); communication about AIDS or past partners with current partner; and communication with parents or other adults about a variety of sexual topics.

Those programs that had a positive effect on sexual behavior and on condom and contraceptive use had an impact on eight mediating factors including knowledge, perception of HIV risk, personal values about sex and abstinence, perception of peer norms, and others. Other research demonstrates that these factors affect sexual and contraceptive behaviors. Thus these programs were successful in changing risky sexual behavior at least in part by modifying these mediating factors.

### **Characteristics of Successful Curriculum-Based Programs**

The large majority of the effective programs incorporated most of the 17 characteristics of successful curriculum-based programs identified in this analysis. Also, programs that incorporated these characteristics were much more likely to change behavior positively than programs that did not incorporate many of these characteristics.

In addition to the rigorous procedures used to identify these 17 characteristics, other kinds of evidence also demonstrate their importance. For example, several studies involved a comparison of the impact of skill-based curricula that incorporate all (or nearly all) of these characteristics with the impact of knowledge-based curricula that did not incorporate many of these characteristics. Consistently, the skill-based programs were more effective at changing behavior than were the knowledge-based programs.<sup>23</sup>

Identifying the 17 common characteristics required both a qualitative and quantitative review of the available curricula and published studies. However, inadequate published descriptions of the programs and numerous methodological limitations meant that it was not possible to assess quantitatively the relative importance of each of the 17 characteristics.

## **Other Findings**

*Long term impact.* At least 10 interventions had long term effects lasting two or more years; some lasted for close to three or more years – as long as the effects were measured. These interventions were typically implemented in schools, had sequential curriculum activities that were implemented for at least two years, and had either additional school curriculum activities or school-wide activities that extended into subsequent years. These results suggest that having sequential curriculum activities over multiple years may enhance long term impact.

*Age of educators.* While both adult-led and peer-led programs have been found to be effective, the evidence is stronger that adult-led programs are effective, in part because there have been more studies of these programs. Some effective programs were taught by adults but used peer educators to help with various classroom and school-wide activities.

*Length of intervention.* There were wide variations in the length of the interventions, in terms of number of sessions and number of hours. A few very short programs were also effective, provided that 1) they were implemented after school or on weekends when participants were fresher, 2) they were implemented in small groups, and 3) youth volunteered to participate (and may have been more open to change).

*Replication.* When three programs were replicated carefully in different locations in the United States but in the same type of setting, the original positive effects were confirmed. This is encouraging and suggests that effective programs can remain effective when they are implemented by other people in other communities. However, when curricula were shortened, when important activities were removed, or when a program originally implemented among volunteer youth in a community setting was then implemented among students in the classroom, the positive changes in behavior were not always replicated. These findings reinforce the importance of implementing effective programs as designed.

## **RECOMMENDATIONS**

The results and discussion sections lead to recommendations in areas of programmatic implementation and future research designs.

### **Programmatic Recommendations**

- First and foremost, communities should implement curriculum-based sex and HIV education programs in their schools, clinics, and youth-serving agencies. To the extent possible, organizations should either: 1) implement as designed specific curricula that have already been demonstrated to be effective with populations and in cultures similar to their own or 2) implement or adapt programs that incorporate as many of the effective curriculum characteristics as possible.
- If organizations develop their own curriculum or adapt existing ones, then they should strive to create curricula that incorporate as many of the eight content characteristics as possible. During their process of developing their own curricula, they should also: 1) include multiple individuals with expertise in different areas in the design of the curriculum, 2) assess the needs and assets of the young people they are targeting, 3) develop a logic model for the curriculum, 4) design activities consistent with community values and resources available, and 5) pilot-test and revise the activities.
- When organizations implement programs, they should select educators who have desired characteristics, train them, secure any needed support from appropriate authorities, assure adequate recruitment of youth, and implement the curricula as designed.
- The issues of pregnancy and STI/HIV prevention are most salient among high-risk youth in the highest risk areas; some programs may have had their greatest impact in these areas. Thus, while programs should reach all youth, they should be especially certain to reach high-risk youth.
- Schools and youth-serving organizations should provide adequate time in the classroom or in their organizations for these programs. Organizations should also provide both training and support so that educators can implement effective programs as designed.
- Organizations should encourage and facilitate research to develop and evaluate programs that may be even more effective. This will help advance the field.
- Communities should not rely solely on these programs to address problems of HIV, other STIs, and pregnancy, but should view these programs as a component that can reduce sexual risk-taking behavior to some degree and can contribute to long term success in efforts to reduce rates of HIV, other STIs, and unintended pregnancy among young people.

### **Research Recommendations**

Rigorous program evaluation is critical to the improvement of pregnancy and HIV prevention programs for youth. Findings from this review have several implications for how program evaluations can produce the most meaningful findings.



- More evaluations of curriculum-based programs should be conducted in developing countries and rural areas, and with youth at highest risk because there are gaps in these areas in the existing literature.
- Evaluations should and can use randomized designs. One of the largest and most rigorous studies in the entire world was conducted in Mwanza, Tanzania. Other studies have implemented rigorous evaluation designs in developing countries. They require greater cooperation with implementing and funding agencies, but they provide much stronger evidence for causal impact.
- Impact evaluation studies should not be undertaken unless there are adequate resources for a large enough sample size to find statistically significant those positive results that are program-matically meaningful. Calculations of sample size need to take into account the need for sub-group comparisons. Studies should also adjust for multiple tests of significance when a number of outcomes are being measured and should always report results for all primary hypotheses. If there are not enough resources for a large enough sample size, then it is still important to collect process data to assess the implementation of the program and the numbers of participants.
- If studies have sufficient statistical power, they should measure impact on pregnancy and STI rates, and if possible, they should use laboratory tests as opposed to self-reports to measure these rates.
- Statistical analyses should include analyses of mediating factors to better determine which risk and protective factors are affected by effective programs and in turn change behavior.
- To the extent possible, researchers should determine how overlapping concepts – especially psychosocial concepts – relate to one another and which are most important in different cultures, and then use agreed upon measures more consistently across studies so that the effects of different programs can be more easily compared.
- In their published materials, studies should provide much more complete descriptions of their programs, as well as more informative process evaluations, so that reviewers can better ascertain why some programs were effective and others were not. If these descriptions are too long for professional journals, they should be readily available upon request by interested parties.

## **Conclusion**

In summary, enormous progress has been made in the development of effective sex and HIV education programs. About 20 years ago, no programs had demonstrated significant changes in behavior; by now a large majority have done so, and a few have even demonstrated a positive impact for three years or more. Today one important challenge is to develop programs that not only reduce sexual risk-taking behavior, but also significantly reduce HIV and STI transmission and unintended pregnancy. Five programs have accomplished that; more need to follow, and they undoubtedly will. And a second important challenge is to implement far more broadly those programs with strong evidence of behavioral change or at the very least, to implement programs that incorporate the 17 characteristics found to be common among effective curricula. This is beginning to happen, but much more effort should be devoted to it.



## ANNEX 1. DEVELOPING COUNTRY STUDIES EVALUATED

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P.O. Box 13950  
Research Triangle Park, NC 27709 USA

Telephone: 1.919.544.7040  
Fax: 1.919.544.7261  
Web site: [www.fhi.org](http://www.fhi.org)