



YOUTH RESEARCH WORKING PAPER SERIES

# Impact of Youth Peer Education Programs: Final Results from an FHI/YouthNet Study in Zambia

Gary Svenson, Holly Burke, and Laura Johnson

Youth Research Working Paper No. 9



**USAID**  
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## Executive Summary

Youth peer education (YPE) is a widely used approach for promoting sexual and reproductive health (SRH) and preventing HIV. This study sought to determine the effect of YPE programs on SRH behaviors among youth. Phase 1 of this study focused on identifying core components of YPE programs. In Phase 1, conducted March 2003 - December 2004, four successful YPE programs in Zambia and the Dominican Republic were followed, using a descriptive, process evaluation approach. Phase 1 identified core elements believed to be important for sustainability and peer educator retention. Examples include the importance of sound programming standards, trusting and respectful youth-adult partnerships, balanced youth involvement, gender sensitivity, good cooperation between the program and gatekeepers/ stakeholders, and active participation by the local community.

Phase 1 data were used to develop eight checklists: Technical Frameworks, Youth-Adult Partnerships, Youth Involvement, Peer Educator Cooperation, Gender Equity and Equality, Parental Involvement, Stakeholder Cooperation, and Community Involvement. Program inputs (cost, human resources, materials, etc) and their associations to outputs (peer educator activities) were also examined and instruments for measuring them were developed.

Phase 2 focused on programs in Zambia and was designed to assess the interrelationships among program inputs, outputs, exposure and outcomes. The objectives of the analyses presented in this report are to:

- Assess five YPE programs in Zambia, using Phase 1 instruments (inputs, processes, outputs)
- Measure exposure to YPE nationally using a population-based survey
- Measure exposure to YPE in program catchment areas using a survey in seven RH clinics
- Measure SRH outcomes in the national survey and in the clinics
- Qualitatively link quality of program components, exposure to YPE programs, and appropriate youth referrals to clinics

Phase 2 was conducted February 2005 - August 2006 and sought to link the quality of YPE programming to SRH behaviors. Instruments developed in Phase 1 were used to measure quantitatively the core components of YPE programs, including **inputs** (program quality and program processes using the eight checklists and information on costs and expenditures) and **outputs** (peer educator activities) in five YPE programs in Zambia. In order to determine the effectiveness of programs, the quality of specific YPE programs (measured through the Phase 1 instruments) was linked with **exposure** to YPE programs and **outcomes** of YPE programs including SRH behaviors, referrals for services, receiving an SRH diagnosis and obtaining sexually transmitted infection (STI) services. Exposure and outcomes were measured using population survey data and clinic-based data.

Regarding **inputs**, substantial variation was found in the quality of the five YPE programs studied during Phase 2. Not surprisingly, the highest quality program was also the most expensive overall and per peer educator (PE) trained. No one domain of quality stood out from the rest, as measured by the eight checklists. With the exception of the Parental Involvement

Checklist, on which all programs scored low, programs tended to either score high or low on all of the checklists.

In terms of **outputs**, peer educators from the highest quality YPE program on average spent the longest hours working on YPE activities, conducted the most activities, covered the greatest number of health topics, and made the largest number of contacts. Condom distribution was the most common activity.

Population-based survey data found that YPE **exposure** in Zambia was high and was associated with **outcomes** such as higher HIV knowledge, increased intentions to use condoms, lower stigma and discrimination towards people living with HIV/AIDS (PLWHA), and increased likelihood of using a condom at last sex with most recent partner.

Youth attending the clinics affiliated with the study were especially likely to have contact with YPE. According to data from 10,300 15-24 year old clients attending the seven study clinics, 74% were exposed to YPE. Making appropriate referrals for HIV testing was an intense focus of the YPE programs in Zambia, and according to data, over half (53%) of 15-24 year olds attending the study clinics were referred to the clinic by a peer educator. Referred youth were more likely to have a history of STIs; be highly vulnerable to STIs and HIV; and receive condoms, other contraceptive methods, and reproductive health counseling at the clinic. These findings indicated that appropriate referrals had been made by the peer educators.

In conclusion, this study found a chain of associations indicating that YPE in Zambia promotes HIV prevention behaviors. Overall, a significant number of young people in Zambia were exposed to YPE. Exposure to YPE programs was associated with some SRH risk-reduction behaviors, appropriate referrals, and use of SRH services by highly vulnerable youth.

The core components of YPE programming, as measured by eight checklists, appear to be equally important in terms of program quality – useful information when designing and implementing effective YPE programs. The higher quality YPE programs were clearly making a difference for Zambian youth. The remaining challenge is to raise the standards of all YPE programs so that they all make a difference in the lives of vulnerable youth.

## **I. Introduction**

The basis of many behavioral change interventions is that people who are similar to the target population will be the most effective change agents, due to their empathy and cultural understanding. Peer-to-peer programs have been widely used among younger and older people as well as special groups (cancer survivors, gangs, ethnic groups).

Programs that use youth to reach other youth are common in the areas of sexual and reproductive health (SRH) and preventing HIV. Yet, the proliferation of youth peer education (YPE) programs has outstripped evidence of their effectiveness, (1) and questions concerning their programmatic and cost-effectiveness continue to be raised. (2,3) Nevertheless, recent studies in developing countries have shown that YPE programs can have an impact on young people's knowledge, attitudes, and behavior. This includes YPE carried out as a component in community-based programs and as a component of some outreach programs involving peer education for groups such as sex workers and truck drivers. (4,5,6,7)

“Peer education” is a broad term and represents a variety of programming used with a diversity of target groups. (10) YPE programs have special dynamics making them more complex than adult programs. This is due to the direct involvement of youth in program design and implementation, the dynamics of youth-adult partnerships, gender equity and sensitivity, and the authoritative role of adult gatekeepers and stakeholders. (8,9,10)

Research on YPE programs and their effectiveness (including cost-effectiveness) is scarce. Several recent studies have reached mixed findings regarding the impact on behavior. (11,12) Because of the wide variations in programming, settings, and dynamics, it is difficult to generalize research findings from one program to another. This requires the development and use of instruments able to measure the core elements of effective YPE. Given the significant resources being put into YPE in many countries (particularly in recruitment, training, and supervision), there is a need to develop criteria or standards for effective YPE and instruments able to measure whether YPE programs are making a valuable contribution to behavior change.

### **Phase 1 of YPE Study**

During Phase 1 of this YPE study, four successful YPE programs, two in Zambia (YWCA in Lusaka and SEPO Centre in Livingstone) and two in the Dominican Republic (Profamilia in Santo Domingo and Adolplafam in San Cristobal) were identified. They were followed over a period of one year using a descriptive, process evaluation approach. The goal was to uncover the core components of successful YPE by examining programs in two culturally and geographically divergent countries. This process identified a number of core program elements that were important for sustainability and peer educator (PE) retention. Examples include the importance of sound programming standards, trusting and respectful youth-adult partnerships, balanced youth involvement, gender sensitivity, good cooperation between the program and gatekeepers/stakeholders, and active participation by the local community.

Phase 1 was used to develop eight checklists in the domains of 1) programming standards, 2) cooperation, and 3) community participation. The eight checklists were: Technical Frameworks, Youth-Adult Partnerships, Youth Involvement, Peer Educator Cooperation, Gender Equity and Equality, Parental Involvement, Stakeholder Cooperation, and Community Involvement. Program inputs (cost, human resources, materials, etc.) and their associations to outputs (peer educator activities) were also examined and instruments for measuring them developed. Phase 1 was conducted March 2003 to December 2004.

## Phase 2 of YPE Study

Phase 2 focused on programs in Zambia and was designed to assess the interrelationships among program inputs, outputs, exposure, and outcomes. The study was implemented in five YPE programs (see Table 1). Peer education has been unusually active in Zambia, with a large number of programs, many of them having established links with clinics. The objectives of the analyses presented in this report are to:

- Assess five YPE programs in Zambia, using Phase 1 instruments (inputs, processes, outputs)
- Measure exposure to YPE nationally using a population-based survey
- Measure exposure to YPE in program catchment areas using a survey in seven RH clinics
- Measure SRH outcomes in the national survey and in the clinics
- Qualitatively link quality of program components, exposure to YPE programs, and appropriate youth referrals to clinics

***Table 1: Overview of study sites, YPE programs, and study clinics in Phase 2***

<b>Sites</b>	<b>YPE programs</b>	<b>Clinics</b>
Lusaka	Human Resource Trust (HRT)	Kalingalinga
	Tiyanjane Development Project (TDP)	Chawama
		Chilenje*
Livingstone	Livingstone District Health Mgmt Team (DHMT)	Dambwa Clinic
	Contact Trust Youth Association (CTYA)	Maramba Clinic
Mongu	Adolescent Reproductive Health Association (ARHA)	Prisons Urban

\*Chilenje clinic was not linked to any YPE program in this study.

Phase 2 was conducted February 2005 to August 2006 and sought to link the quality of YPE programming to SRH behaviors, through a chain of associations among inputs, outputs and outcomes. Instruments developed in Phase 1 were used to measure quantitatively the core

components of YPE programs, including **inputs** (program quality and program processes using the eight checklists, information on costs and expenditures) and **outputs** (peer educator activities) in five YPE programs in Zambia. In order to determine the effectiveness of programs, the quality of specific YPE programs (measured through the Phase 1 instruments) was linked with **exposure** to YPE programs and **outcomes** of YPE programs including SRH behaviors, referrals for services, receiving an sexually transmitted infection (STI) diagnosis and obtaining SRH services. Exposure and outcomes were measured using population survey data and clinic-based data.

Multiple sources of information were used in this study (checklists, cost data, activity logs, survey data, and clinic data). Phase 2 is the focus of this report. Readers are encouraged to read the separate report on Phase 1 to learn more about the processes by which the instruments were developed. (13)

## Conceptual Model

Phase 2 examined YPE program **inputs** (resources and quality), program **outputs** (PE activities), **exposure** to YPE activities, and program **outcomes** (SRH knowledge, attitudes, behaviors and appropriate referrals for testing).<sup>\*</sup> It focuses on five YPE programs in Zambia using instruments developed during Phase 1. The five YPE programs in Zambia are described in Appendix A.

**Inputs** are the resources – i.e. material, equipment, localities, and personnel time – that go into the preparation and delivery of program outputs (services). The inputs for each of the five programs studied were identified, quantified, and valued to permit calculation of the costs of producing program outputs. Also included under inputs are measures of quality of services and processes. Processes within YPE programs are the mechanisms by which inputs are used to produce program outputs. These involve three domains:

- *Programming standards* are made up of the work plan and how it is implemented. This includes the clarity of program goals and the quality of peer educator recruitment, training, and supervision. For example, Phase 1 found that clear objectives and steadfast implementation of these objectives are important to success.
- *Program cooperation* describes the quality of youth involvement in decision making, youth-adult partnerships, gender sensitivity and equity, and youth peer educator and program staff relations with gatekeepers (e.g. religious leaders) and stakeholders (e.g. clinics). In Phase 1, a respectful and trustworthy relationship between peer educators and program adults was important to peer educator retention.

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<sup>\*</sup> We have combined inputs and processes into one concept for the analysis of Phase 2 data.

- *Community participation* describes the quantity and quality of support from the community and the responsiveness of the program to the community. For example, Phase 1 found that strong community support in Zambia contributed significantly to program sustainability despite financial hardships.

In general, these domains measure the quality of the program.

**Outputs** or services are all the activities that the peer educators engage in. This includes information dissemination, presentations, face-to-face discussions, use of media and drama, condom distribution, and so on. Program outputs were measured for four of the five programs studied using an activity log instrument developed in Phase 1.

**Exposure** is the reach of the program.

**Outcomes** of YPE programs include youth knowledge and attitudinal variables including higher HIV knowledge, increased intention to use condoms, lower stigma regarding HIV, less discrimination toward people living with HIV, SRH behaviors, referrals to clinic services, and use of clinic services, including voluntary counseling and testing (VCT) and STI services. Since the rationale for most YPE programs is behavior change, learning more about behavioral outcomes is especially important.

Table 2 (next page) describes the various components of the conceptual framework and provides a guide to measurement and data collection. The level of analysis varies across the model since inputs and outputs are based on data from the five YPE programs while exposure and outcomes are measured at the individual level in the target population using survey and clinic data.

## II. Methods

### A. Study Populations

Inputs and outputs are measured by program-level data and therefore, the study participants were members or stakeholders of those programs. The components of the study framework are summarized in Table 2. The level of analysis is both at an individual level and at the program level. Exposure and outcomes were measured only at the individual level, either in a population-based survey or among clients of clinics in the program catchment areas.

*Table 2: Framework components*

<b>Component</b>	<b>Description</b>	<b>Indicators</b>	<b>Data collection methods</b>	<b>Populations</b>
Input	Resources Quality	Program costs Core elements of YPE programs	Cost analysis Checklists	Five programs
Outputs	Productivity	Program activities	Activity logs	Five programs
Exposure	Reach	% of people who have participated in peer education activity	Population-based survey Clinic-based survey	National Program catchment areas Attendees of seven clinics
Outcomes	Effects	Knowledge Attitudes Behaviors  Appropriate referrals	Population-based survey  Clinic-based survey	National Program catchment areas  Attendees of seven clinics

## Survey samples

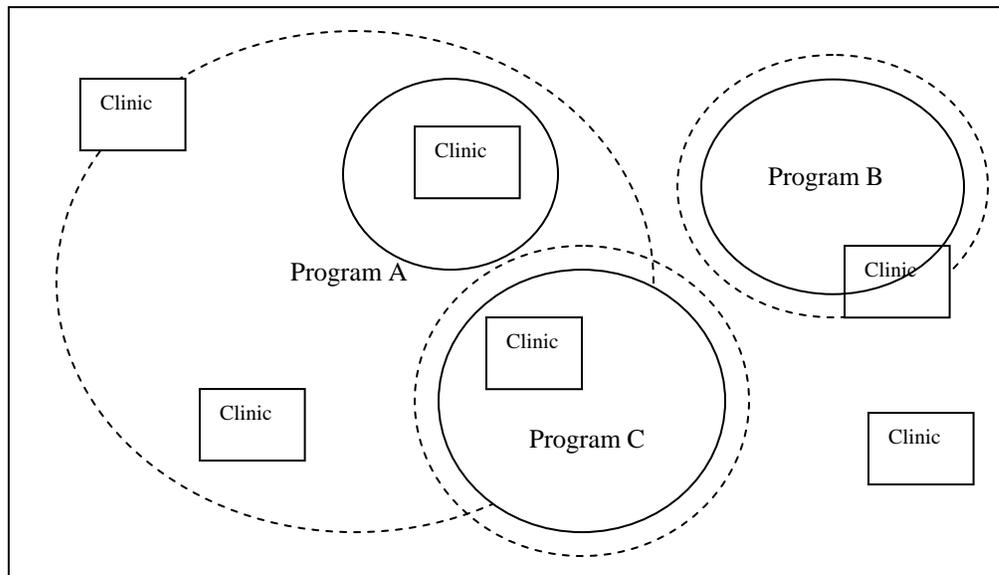
Exposure to YPE was measured using a national household survey in Zambia and in each of the selected catchment areas. The survey measured the characteristics of the population (socio-demographic variables), the type and dosage of exposure to program activities, and attitudes towards peer education. This study used the national ZSBS 2005 data to measure the association between exposure of youth to YPE programs and RH and HIV prevention behavioral outcomes. The analyses in this report are restricted to those respondents who were 15 to 24 years old during the time of the survey (n=1695).

The household surveys were carried out in conjunction with the USAID-sponsored Zambia Sexual Behavior Survey (ZSBS) 2005. The ZSBS 2005 survey was conducted by the Government of the Republic of Zambia through the Central Statistical Office and the National HIV/AIDS/STI/TB Council and the Central Board of Health, with technical assistance from MEASURE Evaluation (University of North Carolina). The ZSBS is a series of population-based surveys designed to monitor knowledge, attitudes and behaviors regarding HIV and AIDS in Zambia. The ZSBS 2005 was conducted from February to May 2005. Family Health International (FHI)/YouthNet provided financial and technical assistance for the module on YPE, HIV/RH, and community issues. The 2005 survey was the first ZSBS to include questions specifically about youth peer education.

The sample design for the ZSBS 2005 was a probability sample of approximately 2,500 households of eligible respondents (women aged 15-49 and men aged 15-59). The sample is nationally represented and designed to produce national, urban, and rural estimates by sex. The sampling and other survey procedures are described in detail in the official report of the ZSBS 2005. (14) Final weights for all households were computed based on the number of households selected in each Standard Enumeration Area (SEA) and accounting for the selection of clusters with probability proportional to size based on household counts as obtained from the 2000 Census of Population and Housing.

In addition to the ZSBS conducted at the national level, FHI/YouthNet oversampled youth aged 15-24 years in the study's six catchment areas in Zambia during the administration of the 2005 ZSBS. The purpose of this additional sample (n=1065) was to measure exposure to YPE program activities in the six catchment areas. The same procedures, instrument, and trained field teams who collected the data for the national ZSBS were used to collect the expanded sample. In some cases, more than one catchment area is served by a single large program (see Figure 1). However, the peer education programs in each catchment area are separate and distinct in that different peer educator groups, localities, and supervisors were used. The socio-demographics of the catchment populations and cultures also varied.

**Figure 1: Hypothetical example of spatial relationship of YPE programs (dashed circles), study catchment areas (solid circles), and clinics (squares) in one Phase 2 site (large rectangle).**



### **Clinic-based samples**

Information was collected from youth aged 15-24 attending seven study clinics from October to December 2005. Data were collected at seven clinics. The response rate was 93.1%; 10,343 youth completed the questionnaire. The YPE programs being evaluated referred young people to six of these seven clinics; the seventh clinic was not directly linked to any particular YPE program. The relationships between clinics and programs are shown in Figure 1.

## **B. Data Collection Methods**

### **Checklists (Program quality)**

Eight checklists were used to assess quality of each of the five YPE programs. The assessment required individual or group interviews with several individuals involved in the program. The assessment lasted two to three days depending on the size of the program, logistics, and the availability of the interviewees. The assessment team leader began by conducting a thorough desk review of the program using the literature available. This included program descriptions and reports, work plans, manuals and strategy documents. The goal was to gain an understanding of the program's organizational structure, operations, stakeholders, and collaborators in the community. This information was used by the team leader in making arrangements for the on-

site assessment. A pre-assessment visit to the program site was conducted by the team leader to gather program details and introduce the assessment to project staff, peer educators, and stakeholders.

The assessment teams for the YPE programs in Lusaka and Livingstone were composed of one adult and two youth experts on YPE. The team in Mongu included two youth experts on YPE. Ideally, the team would be composed of two adults and two young people of mixed gender in order to reduce bias and gain honest feedback on sensitive areas, such as youth-adult communication and gender. The team members were trained by the technical monitor in the use of the checklists and interview guides prior to data collection.

During the interviews, one team member conducted the interview while a second member recorded notes of the discussion. The notes from the interviews were used later for the checklist ratings. The checklist ratings were determined at the end of the assessment by the team.

The checklist ratings were based on written materials and onsite interviews conducted by the team. During the piloting of the checklists, it was found that many of the items on the checklists were too direct or strong to ask directly. When checklist items were asked directly it created much discussion or confusion because the items were controversial or simply had not been previously considered. As a result of this finding, the team developed interview guides to use during the assessment that drew out the information necessary to rate the programs.

Representatives from the various groups supporting a program were also interviewed. It was not possible to interview all of them so a sampling procedure was developed. The peer educator sample included:

- Recently recruited as well as experienced youth, i.e. not only “old timers”
- Females and males proportional to the program itself
- True peer educators and not young people who hang around the program
- Youth representing the ethnic and geographical diversity of the program

The stakeholder sample included organizations and individuals that:

- Work actively with a program and have an investment in its success
- Work directly with the peer educators in their activities especially schools, clinics, and youth centers
- Are community opinion leaders and decision makers such as faith leaders, traditional leaders, and governmental decision-makers such as ministerial representatives

The program assessments occurred in December 2005. Approximately, 12-14 peer educators, 3-5 program staff, 4-7 parents, and 4-5 stakeholders were interviewed for each of the five programs studied. The exception was for the DHMT/Dambwa program where no stakeholders were available for the interviews.

The notes from the interviews with the above groups were cross-referenced with each other. For instance, it was not unusual for peer educators, program staff, and stakeholder groups to have different perspectives on an issue or challenge. The team assessed the degree of cooperation between these groups and their support for the program and its goals. If peer educators, program

staff, and stakeholders had different opinions about the quality of youth-adult partnerships in a particular program, for example, the summary Youth-Adult Partnership checklist would incorporate those various viewpoints.

### **Cost data**

Understanding the costs of youth peer education programs focusing on HIV and AIDS is necessary for evaluating the potential scale-up of this intervention in various countries. In mid-2006, cost data pertaining to the five YPE programs located in Lusaka, Livingstone, and Mongu, Zambia were collected by FHI as part of the YPE Phase 2 Study. These data were collected to determine the resource base of these peer education programs and the costs per peer educator for each program.

Cost data collection worksheets were developed in Excel by FHI staff to track start-up and recurrent resource costs of these peer educator programs for an annual period. Resources and activities include peer educator and health service provider trainings, the development of “youth-friendly” corners in local health centers, facilitative supervision, peer educator incentives (such as t-shirts and meals), and additional peer educator resources such as videos and drama/teaching activities. The cost instrument includes a detailed worksheet which allowed for tracking of all peer educator training costs such as facilitator time and costs, venue costs, per diems and meals for participants, and travel costs in the field for supervisors.

A local consultant/accountant was hired to assist FHI with making contacts at each of the programs and follow up with peer educator program staff to collect and verify data required for the analysis. During May 2006, an economist from FHI visited the two Lusaka programs with the local consultant to collect cost data and train the consultant in the cost data collection and analysis process. Subsequently, the consultant followed up with the remaining programs to capture resource and cost data.

Data on program costs were collected retrospectively with some effort expended on verifying these data with observation of program activities. Spreadsheet-based data collection instruments were designed to record and organize cost data and allocate costs to specific activities. Program managers were trained in identifying the relevant cost information with the local consultant. Although each peer educator program was uniquely designed and organized, the data collection instrument enabled tracking of all pertinent resource costs over a year period including peer educator start-up training costs, training venue costs, per diems, transportation, incentives (such as t-shirts and refreshments), contraceptive supplies (condoms), and drama activity costs.

## **Activity logs (Outputs/productivity)**

Program outputs are all the activities that program peer educators engage in. This includes information dissemination, presentations, face-to-face discussions, media and drama, referrals, and so on. In addition to formal activities, peer educators have informal exchanges that help diffuse information and promote changes in attitudes and behaviors. The quantity and quality of these contacts can greatly influence program exposure and outcomes. Inactive, poorly motivated and improperly selected peer educators can reduce program effectiveness. A special instrument called an “activity log” was developed in Phase 1 for measuring these contacts. Activity logs measure PE contacts with 1) friends and family, 2) acquaintances, and 3) completely new persons. Peer educators used this instrument periodically to monitor activity levels.

Peer educators were trained by the technical monitor and lead consultant on how to use the activity logs. Peer educators were asked to record each activity they perform on the log. A PE activity was defined as any activity that a peer educator performs to carry out the mission of the YPE program. This includes informal and formal activities where peer educators talk about YPE topic(s) such as HIV, STIs, pregnancy, condoms, contraceptive methods, and any other health issues that affect their peers. PE activities also include participating in YPE meetings, trainings, supervision, and preparations such as making materials, practicing, reading, and setting up activities.

Peer educators recorded the date and duration of the activity, the type of activity, the topic covered during the activity (e.g., HIV, pregnancy prevention, PMTCT), the number of contacts or participants involved in the activity, the gender of the contacts/ participants, and the number of new attendees during the activity. One YPE activity could be coded in the log under two different activities. For example, the referral code could often be used with another activity code such as counseling and one-to-one discussions. This is because peer educators may talk with a participant and in addition to providing knowledge about a topic they may refer the participant to other services. Another example is when a peer educator conducts a discussion group with young people and distributes materials (YPE brochure or condoms) during the discussion. Similarly, more than one topic can be covered during an activity. For example, HIV, condoms, and VCT could all be addressed during a single discussion group.

Peer educators from the YPE programs studied were asked to record data for as long as they could, given that they are volunteers with their own program recording requirements. No one wanted to burden them with extensive extra work for this study. To enable the computation of hours worked per day and per year, peer educators recorded the specific dates they performed each activity and the reporting period (the inclusive dates). Peer educators used a separate log when they took a break between recording and non-recording periods.

YPE activities were recorded from September 2005 to June 2006 by members of four of the five YPE programs studied. Peer educators from CTYA recorded data from September to November 2005. Peer educators from DHMT/DAMBWA recorded data September to October 2005 and again from January to March 2006. ARHA peer educators recorded data from January to March 2006 in their logs. HRT peer educators recorded data in their logs from April to June 2006.

Many YPE activities which are similar in nature vary in name across YPE programs. For example, the activity “one-to-one discussions” is used by some YPE programs to describe what other programs call “counseling sessions.” To encourage the peer educators across the four programs to use the same terminology when recording data in the logs, definitions were developed for those activities with the greatest potential for overlap (see Appendix B).

### **ZSBS Survey (Exposure and outcomes)**

One method of measuring exposure to YPE and relevant behavioral outcomes was a population-based household survey conducted with a national sample and in each of the selected catchment areas. This survey was the USAID-sponsored Zambia Sexual Behavior Survey (ZSBS) 2005. The 2005 survey was the first ZSBS to include questions specifically about youth peer education. Other questions included characteristics of the population (socio-demographic variables), SRH behaviors, the type and dosage of exposure to program activities, and attitudes towards peer education. The analyses in this report are restricted to those respondents who were 15 to 24 years old during the time of the survey. A sub-sample of respondents from the program catchment areas were surveyed for the purpose of linking program-level data to individual level data.

### **Clinic data (Exposure and outcomes)**

The clinic-based study methodology allowed us to examine the extent to which YPE programs resulted in appropriate referrals and use of services, including STI/HIV testing and other RH services. Clinics and VCT centers within the program catchment areas were invited to participate in the clinic-based study. One-page anonymous questionnaires were distributed to clients aged 15-24 years attending the study clinics from October to December 2005. Respondents were asked their age, gender, area of residency, if they have been exposed to YPE programs, attitudes towards the program, and if the YPE program had influenced their decision to visit the clinic. Direct referrals by peer educators were also measured. Information was collected on 10,300 youth 15-24 who attended one of the clinics participating in the study.

In addition to collecting exposure information using the clinic-based study questionnaires, information on the types of services provided at the clinic and the results of HIV and STI tests performed (disease/no disease) was also collected. The anonymous questionnaires were kept in patient charts until an STI and/or HIV diagnosis was determined and then the completed questionnaire was placed in a locked container. For clients declining to participate, a blank questionnaire was placed in the locked container to determine the number of refusals to participate. The anonymous questionnaires were stored in locked containers until they were collected by the study principal investigator for entry into the database.

The purpose of keeping a record of testing results was to examine whether peer educators were appropriately referring and influencing young people at higher risk to HIV and STI (i.e. a positive diagnosis indicates a higher risk status). Higher disease levels among those referred or influenced were interpreted as peer educators effectively reaching and referring youth at higher

risk for SRH services. In addition, collecting these data made it possible to assess attitudes towards the peer education intervention in this higher-risk group.

Clinic staff and research assistants were trained in the use of the clinic-based study questionnaire and how to use it with confidentiality and to maintain anonymity. In some cases it was necessary for nursing staff to read the questionnaire to clients with low literacy. In such cases, the nurse did so in a confidential location and then signed the back of the questionnaire.

Over 99% of the youth who completed questionnaires in the seven clinics answered the question about exposure to YPE (n=10,300). Basic demographic information for the 10,343 youth who completed the questionnaire was compared to the 10,300 youth who provided exposure information. Examination of sex, age, education, literacy, marital status, STI history, and study clinic revealed no proportional differences between youth who provided and did not provide exposure information on the questionnaire. The proportional differences between the two groups varied at most by 0.1% (data not shown). Since the two groups do not differ the remaining analyses are of the 10,300 youth who provided exposure information on the questionnaire.

## **C. Data Analyses**

This section describes the data analyses for each part of the conceptual framework (inputs, outputs, exposure, and outcomes), measures of variables and, where appropriate, multivariable analyses.

### **Quality**

Program quality was measured through the checklists. YPE programs were scored for a number of factors in several major checklists based on the core components of PE learned from the first phase of the study: Technical Frameworks (including intervention, implementation, organization, and audience); Youth-Adult Partnerships; Youth Involvement; PE Cooperation; Gender Equity and Equality; Parental Involvement; Stakeholder Cooperation; and Community Cooperation.

A five-point scale was used for rating of the checklist items. These were classified as follows: 1-2= Low ; 3 = Medium and 4-5 = High. A low of 1 and a high of 5 were only considered in extreme cases and are included to highlight this point. Otherwise, the ratings are based on a 3-point scale where 2 indicated Low, 3 Medium and 4 High.

The checklist items had a small space for notes that were used for important comments in the final draft of the checklists. Longer comments that provide a background or justification for the rating were provided separately and numbered according to the checklists, i.e., “Checklist 2, item 5.” The Not Applicable (N/A) column was marked if, for some reason, the item could not be rated. For instance, the item may not be applicable to the program, or the interviewee(s) did not provide adequate responses.

After the assessments were completed, the three teams assembled for two days to discuss the individual programs, share notes, and cross reference checklist scoring. For instance, one team might tend to rate youth-adult partnerships higher or lower depending upon the views (bias) of the team members. The technical monitor and the teams determined that some groups involved in the ARHA program needed to be re-interviewed because the adult member of the team had not participated (youth bias). In addition, the HRT program was reassessed because the interviews had not included a representative sample of peer educators. The technical monitor and representatives from the teams then worked together to adjust or standardized the ratings across programs.

Information collected during the field assessment was consolidated to assess the overall program. Descriptive analyses were conducted to compute averages for each domain for each program. These values were used to examine associations among each program's processes, exposure and outcomes. Those interested in more information about using the checklists should refer to *Assessing the Quality of Youth Peer Education Programmes*. (15)

## **Costs**

Resources were grouped according to main activities such as peer educator training, support of youth-friendly corners, and training for health service providers. Annual costs of these resources were calculated by multiplying the unit cost by the quantity of the resource used in the one-year study period. Costs of capital items were annualized assuming a five or ten-year useful life (depending on the resource) and a three percent discount rate. Total cost of an activity was calculated by summing the costs of all resources listed for that activity. The cost per peer educator was calculated by dividing the total cost of all activities by the number of peer educators trained.

## **Outputs**

Data related to activities of peer educators was summarized by site in the following ways. First, characteristics of peer educator work were averaged per day and per year for each site. This included the number of hours worked, the number of contacts made, and the number of topics covered. Secondly, percentages of peer educators who participated in each activity were described by YPE program, and the percentages of peer educators who covered each topic were described by YPE program.

## **Exposure (Survey and clinic data)**

A dichotomous exposure variable was created using the *population-based survey data*. If the respondent reported "yes" to any of the following questions he/she was considered exposed to peer education:

- Have you ever been a peer educator?
- Are any of your friends or family members current or previous peer educators?

- Have you ever seen or heard a health message from a peer educator?
- Have you ever talked to a peer educator about any health topic?

If respondents reported “no” to all four of these questions then he/she was considered not exposed to peer education. If a respondent was missing all four of these variables he/she was considered missing for the exposure variable.

Unweighted frequencies and percentages are reported for categorical characteristics for the national sample. Unweighted frequencies and unweighted summary statistics (including mean and standard deviation) are reported for continuous characteristics. Significance tests included Chi square for categorical variables and Student’s t-test for continuous variables in the national sample. Unfortunately, not enough young people were sampled in the catchment areas to allow for statistical comparisons. Unweighted frequencies and weighted percentages are presented for each catchment area in the results section. Analyses for the catchment area sample employed the same definition of exposure to peer education that was used for the national sample.

The absence of randomization of exposure to peer education in this study may lead to differences in the characteristics of those who were exposed and not exposed affecting the estimate of effect of peer education. Propensity scores (16) were calculated to adjust for the potential bias of exposure in this study. Propensity scores are conditional probabilities where study participants with known characteristics are exposed to peer education. The probabilities were calculated using a PROBIT model in SAS. (17) The resulting propensity score was then entered as an additional covariate into the main effects linear regression model and used to predict the outcomes of interest.

We began the procedure of creating the propensity score by conducting weighted ANOVA and Chi square tests to see if there were significant differences ( $p < 0.05$ ) between the exposed and unexposed groups on each of a series of variables thought to influence exposure to YPE. Variables that had significant differences between exposure groups were included in the model to create the propensity score. To reduce the number of respondents with missing propensity scores, those variables with more than 15 missing values were eliminated from the model.

After the propensity score model was constructed, the variables that were initially unbalanced were re-checked following the initial procedure above to see if they were more balanced as a result of controlling for propensity score. This iterative process continued until the model stopped improving. The propensity score was then divided into quintiles and entered into the unweighted regression model as a covariate.

With regard to *clinic data*, a dichotomous exposure variable was created. If the respondent reported “yes” to the question, “Have you ever talked with, seen, or heard a health message from a trained peer educator?” then he/she was considered exposed to peer education. Respondents were also considered exposed if they provided the name of a peer education program when asked the question, “Which peer education program(s) have you been in contact with?” Otherwise the respondent was considered not exposed to peer education. If a respondent was missing all of these variables he/she was considered missing for the exposure variable. Descriptive results are

presented on exposure as measured through clinic data, as well as the associations between exposure and outcomes as described below.

### **Outcomes (Survey and clinic data)**

The following outcomes were measured from *national survey data* for use in the bivariate and multivariate analyses:

- HIV knowledge score
- Intentions to use condoms
- Stigma against people living with HIV and AIDS (PLWHA)
- Age of sexual debut (measured in years)
- Number of sexual partners in the past four weeks
- Ever had sexual intercourse
- Ever been tested for HIV
- Used a condom at last sex with most recent partner
- Always uses a condom with most recent partner in the past 12 months

A summary of these measures are available on the FHI Web site with this paper at:  
<http://www.fhi.org/en/Youth/YouthNet/Publications/YouthResearchWorkingPapers.htm>.

The primary outcome of interest from the *clinic data* was “referral.” A dichotomous referral variable was created. If the respondent reported “yes” to the question, “Were you asked to come to the clinic/center by a trained peer educator?” then he/she was considered referred to the clinic by a peer educator. Respondents were also considered to be referred if they provided the name of a peer education program when asked the question, “Which peer education program(s) asked you to come to the clinic?” Otherwise the respondent was considered not referred by a peer educator. If a respondent was missing all of these variables he/she was considered missing for the referral variable.

### **Association between exposure and outcomes**

#### *Survey data*

Multivariate analysis of the association of YPE exposure with outcome measures were conducted in SAS using the procedures REG and LOGISTIC, respectively for continuous and categorical outcome variables (15). Multivariate modeling used unweighted data from the national ZSBS 2005.

A crude estimate of effect of YPE was modeled for each of the outcomes where the explanatory variable is actual exposure to YPE. Adjusted estimates of effect of YPE using propensity scores for YPE were also modeled for each of the outcomes where the explanatory variables are a propensity score for YPE, actual exposure to YPE, and the following control variables: sex (male versus female), education (primary school or less versus greater than primary school

education), residence (rural versus urban), and community efficacy (continuous variable). A summary of the community efficacy measure is available with this paper at: <http://www.fhi.org/en/Youth/YouthNet/Publications/YouthResearchWorkingPapers.htm>.

The adjusted model which includes the propensity score is considered superior to the crude model because the study does not have a baseline, and propensity score matching is an acceptable way to control or reduce potential exposure bias in the sample. Effect of YPE on dichotomous outcomes were judged to be statistically significant if the 95% confidence interval (CI) for the coefficient associated with YPE exposure does not include 1.0. Effects of YPE on continuous outcomes were judged to be statistically significant if the p value was less than 0.05.

#### *Clinic data*

Clinic data were analyzed in SPSS. Dichotomous variables indicating whether or not respondents were exposed to YPE (yes/no) and referred to the clinic by a peer educator (yes/no) were created. Crude and adjusted logistic regression models were conducted to estimate the effect of exposure and referrals (separately) on the outcomes. The adjusted models controlled for sex, age, education, marital status, and the clinic where the respondent was recruited. The adjusted model is considered superior to the crude model. Odds ratios and 95% confidence intervals (CI) are presented. The effect of exposure/referrals on dichotomous outcomes were judged to be statistically significant if the 95% CI for the coefficient associated with YPE exposure/referral does not include 1.0.

#### *Inter-relationships among quality, cost, productivity, exposure, and referrals*

All five study programs were rank-ordered with regard to their measures of quality, cost, productivity, exposure and referrals (which were described in various tables). A table summarizing the rankings for each of these framework components provides the reader with a visual depiction of the consistency of program rankings across these framework components. This analysis is described in the results section.

### **III. Results**

#### **A. Inputs**

##### **Quality**

Peer education programs were scored on more than 100 items on the eight checklists developed from the first phase of the study: Technical Frameworks (including intervention, implementation, organization, and audience); Youth-Adult Partnerships; Youth Involvement; Peer Educator Cooperation; Gender Equity and Equality; Parental Involvement; Stakeholder Cooperation; and Community Cooperation.

Checklist scores tended to be low (Table 3). There was not a single score of 5 (the highest score) awarded for any program on any item. Thirty scores of 4 were awarded to the various programs; compared to a total of almost 200 scores of 1 (the lowest score).

Using the adjusted scores, HRT had the highest overall score at 254. ARHA was a close second with 252 total points. TDP had the lowest overall score at 156. DHMT/Dambwa was second lowest with 167; its overall score would have been higher if information had been available for the Stakeholder checklist. CTYA was in the middle of the range, with a score of 209. Table 3 shows overall and average scores for each checklist and each program.

Among the checklists, Stakeholder Cooperation had the highest average score at 2.4 for all programs; only TDP had an average score for this checklist of below 2. Parental Involvement had the lowest average score at 1.5; only one program had a score higher than this average: ARHA, whose average score of 3.1 was more than double the average scores of the other four programs. Both HRT and CTYA scored only one point for each item in the Parental Involvement checklist.

HRT had the highest scores among all programs for the Technical Frameworks, Stakeholder Cooperation, and, by an impressive margin of more than 20 points, Community Involvement checklists.

ARHA had the highest scores among all programs for the Youth-Adult Partnerships, Youth Involvement, Peer Educator Cooperation, Gender Equity and Equality, and, by a large margin, Parental Involvement checklists. Among all programs, ARHA was the only program with no average scores lower than 2.0.

CTYA did not have the highest scores in any checklist and tied with HRT for the lowest score in the Parental Involvement checklist. CTYA had average scores of 2.0 or greater for only four of the nine checklists. Peer Educator Cooperation was the strongest checklist for CTYA, where they received average scores of 2.4.

DHMT/Dambwa did not have the highest scores in any checklist and had the lowest scores for the Youth Involvement and Gender Equity and Equality checklists. No responses were given for

the Stakeholder Involvement checklist. The program scored their highest average scores in the Technical Frameworks and Community Involvement checklists (2.05).

TDP did not have the highest scores in any checklist and received the lowest scores on five: Technical Frameworks, Youth-Adult Partnerships, Peer Educator Cooperation, Stakeholder Cooperation, and Community Involvement. Looking at average scores received in each category, TDP's strongest checklist was Peer Educator Cooperation, where they received an average score of 1.8. TDP's weakest checklist was Parental Involvement.

**Table 3: YPE checklist scores (adjusted)**

	<b>HRT Lusaka</b>	<b>TDP Lusaka</b>	<b>CTYA Livingstone</b>	<b>DHMT/DAMBWA Livingstone</b>	<b>ARHA Mongu</b>
<b>Technical Frameworks</b>					
Total	53	32	43	47	43
Average	2.52	1.52	1.86	2.05	2.05
<b>Youth-Adult Partnerships</b>					
Total	31	23	27	28	35
Average	1.82	1.35	1.59	1.64	2.06
<b>Youth Involvement</b>					
Total	20	19	26	16	31
Average	1.54	1.46	2.0	1.23	2.38
<b>PE Cooperation</b>					
Total	20	14	19	15	21
Average	2.5	1.75	2.37	1.87	2.62
<b>Gender Equity and Equality</b>					
Total	25	14	24	13	28
Average	2.5	1.4	2.4	1.2	2.8
<b>Parental Involvement</b>					
Total	7	8	7	9	22
Average	1.0	1.14	1.0	1.29	3.14
<b>Stakeholder Cooperation</b>					
Total	39	16	28	-	34
Average	3.25	1.33	2.33	-	2.83
<b>Community Involvement</b>					
Total	59	30	35	39	38
Average	3.10	1.58	1.84	2.05	2.0
<b>Overall Score</b>					
Total	254	156	209	167	252
Average	2.37	1.46	1.95	1.76	2.35
# item responses	107	107	107	95	107

Interestingly, there was no one domain of quality that stood out from the rest, as measured by the eight checklists. With the exception of Parental Involvement, on which all programs scored low, programs tended to either score high or low on all of the checklists.

## Costs

Table 4 shows the total costs of the five peer educator programs along with the average unit cost per peer educator. Cost are shown both in Zambian Kwacha and \$US. The conversion rate is 3,000 Kwacha = \$US 1, based upon the average conversion during the 2005-2006 period.

**Table 4: Costs of five peer education programs in Zambia**

<i><b>YPE Program</b></i>	<b>Total Cost (Kwacha)</b>	<b>Total Cost (\$US)</b>	<b>Number of Peer Educators</b>	<b>Average Cost Per Peer Educator (\$US)</b>
<i><b>Lusaka</b></i>				
Tiyanjane Development Project (TDP)	96,466,761	\$32,156	80	\$402
Human Resource Trust (HRT)	622,003,502	\$207,335	170	\$1,219
<i><b>Livingston</b></i>				
Contact Trust Youth Association (CTYA)	139,654,400	\$46,551	70	\$665
DHMT/Dambwa Clinic	36,369,500	\$12,123	58	\$209
<i><b>Mongu</b></i>				
Association for the Reproductive Health of Adolescents (ARHA)	100,050,000	\$33,350	50	\$667

Table 5 shows the distribution of costs among the five youth peer educator programs by resource category. The largest proportion of costs generated by each of the programs was training costs (more than 50% of all costs). Supporting youth friendly corners in programs that included these totaled 20% to 30% of all costs, and peer educator supplies and incentives ranged from 5% to 12% of costs. Supervision of peer educators accounted for another 6% to 15% of costs across the different programs. HRT incurred the highest cost per peer educator. Not surprisingly, the highest quality program was also the most expensive overall.

**Table 5: Cost distribution of youth peer education programs by resource categories in \$US**

<i>YPE Program</i>	<i>Training Costs</i>	<i>Youth Friendly Corners</i>	<i>Peer Educator Supplies and Incentives</i>	<i>Supervision</i>
<b><i>Lusaka</i></b> Tiyanjane Development Project (TDP)	\$17,364	\$8,682	\$3,537	\$2,572
Human Resource Trust (HRT)	\$130,621	\$39,394	\$16,587	\$20,734
<b><i>Livingstone</i></b> Contact Trust Youth Association (CTYA)	\$25,603	\$11,638	\$2,328	\$6,983
DHMT/Dambwa Clinic	\$9,335	\$0	\$1,455	\$1,334
<b><i>Mongu</i></b> Association for the Reproductive Health of Adolescents (ARHA)	\$21,678	\$7,337	\$2,335	\$2,001

## **B. Outputs**

Peer educators participating in four YPE programs (HRT, CTYA, DHMT/Dambwa, and ARHA) completed activity logs; no peer educators from TDP completed activity logs. Activity logs collected information on hours worked, activities conducted, contacts, events, and topics covered.

Table 6 presents data on peer educator output per day and per year, based on the completed activity logs. Peer educators in the HRT program were generally the most productive, with the highest averages for: number of hours spent working, number of activities, number of topics covered, number of contacts, number of male contacts, and number of female contacts. DHMT/Dambwa had the highest average of new attendees per peer educator per year. ARHA had the lowest averages for: number of hours spent working, number of activities, number of topics covered, and number of new attendees. CTYA had the lowest averages for: average number of contacts, average number of male contacts, and average number of female contacts.

Table 7 shows activities performed by peer educators by site. The most common activity for all peer educators was condom distribution, followed by discussion groups, and referrals. Each program had different primary activities. Table 8 lists topics covered by peer educators as

recorded in their activity logs. The most common topic covered by all peer educators at all four programs was HIV/AIDS/STIs. Other commonly discussed topics were voluntary counseling and testing (VCT) and condoms/condom use.

**Table 6: Peer educator output per day and per year**

Output per PE	HRT		CTYA		DHMT/ DAMBWA		ARHA		Total	
	Per day	Per year	Per day	Per year	Per day	Per year	Per day	Per year	Per day	Per year
Average # of hours working	2.1	304.9	0.5	247.7	1.3	247.1	1.3	201.2	1.3	261.8
Average # activities	6.8	1537.3	1.2	270.2	2.7	742.5	1.4	256.0	3.4	794.9
Average # topics	5.9	1352.4	1.3	305.1	3.4	881.3	1.4	256.0	3.3	761.0
Average # of contacts	72.4	16472.4	10.6	2439.9	20.8	4347.7	19.5	3489.2	35.6	7928.5
Average # of male contacts	31.0	6968.0	5.6	1272.4	9.7	2037.4	9.7	1704.5	15.9	3499.6
Average # of female contacts	40.0	9298.3	4.8	1133.1	11.8	2419.8	9.8	1785.7	19.2	4358.7
Average # of new attendees	7.4	1694.9	7.9	1946.5	9.4	2007.8	6.4	1139.6	7.7	1752.4

Note: The number of peer educators who completed logs are: HRT n=14, CTYA n=25, DHMT/Dambwa n=14, and ARHA n=9. TDP did not complete logs.

**Table 7: Percentage of peer educators participating in each activity, by site**

Activity	HRT %	CTYA %	DHMT/Dambwa %	ARHA %	Total %
Condom distribution	42.0	8.1	18.6	13.0	32.8
Discussion groups	28.2	6.3	8.1	10.0	22.1
Referrals	22.0	3.3	8.1	1.6	16.4
One-to-one discussions	15.7	9.8	12.2	5.3	13.5
Distribute materials	15.6	9.4	8.1	4.2	13.0
Counseling	5.2	7.2	17.4	33.3	9.3
Encounters	8.6	16.2	17.4	0.8	9.2
Performance (skit, play, song)	9.4	3.3	5.8	10.0	8.4
Home visits/door-to-door	6.8	6.8	7.6	4.0	6.5
Debates	1.0	4.6	2.9	4.5	2.0
PE meetings	0.6	5.9	1.2	3.4	1.7
PE preparation (posters, rehearsal, etc.)	0.7	3.5	1.2	1.8	1.2
Sports related	0.5	3.9	2.9	1.1	1.2
Participate in radio or TV	0.4	3.5	-	1.8	0.9
PE team building	0.1	3.3	-	2.4	0.8
Training sessions	0.4	1.5	-	1.3	0.7
Lectures & workshops	0.2	1.5	1.2	0.8	0.5
Other	2.8	4.6	4.1	0.5	8.8

Note: The number of peer educators who completed logs are: HRT n=14, CTYA n=25, DHMT/Dambwa n=14, and ARHA n=9. TDP did not complete logs.

**Table 8: Percentage of peer educators covering each topic, by site**

Activity	HRT %	CTYA %	DHMT/DAMBWA %	ARHA %	Total %
HIV, AIDS, STIs	27.0	19.2	32.6	21.2	25.6
VCT	25.8	11.4	14.5	9.3	21.3
Condoms/condom use	15.5	9.2	23.8	11.1	14.6
PMTCT	14.9	3.5	4.1	6.4	11.8
Abstinence	10.1	12.0	10.5	6.6	10.0
Stigma & discrimination	7.1	3.7	2.9	3.4	6.0
Pregnancy prevention	5.5	2.6	12.2	3.2	5.2
Other contraceptive methods	4.9	2.6	3.5	4.2	4.4
Child abuse	3.1	7.6	3.5	3.2	3.7
Faithfulness/fidelity	2.4	5.9	4.1	8.7	3.7
Sexuality	2.3	5.0	2.9	3.2	2.8
Drugs/alcohol	2.0	4.4	5.8	3.2	2.6
Gender issues	0.7	6.6	5.8	4.0	2.1
Communicating with partners	1.5	1.1	2.3	2.4	1.6
Post-abortion care/abortion	1.2	1.8	2.3	1.6	1.4
Gender violence	0.4	5.9	-	1.6	1.3
Self-esteem and life skills	0.5	2.6	3.5	2.1	1.2
Being an adolescent	0.1	4.2	1.7	2.1	1.0
Family communication	0.6	2.0	1.7	1.3	0.9
Other	7.6	3.7	3.5	1.3	6.1

Note: The number of peer educators who completed logs are: HRT n=14, CTYA n=25, DHMT/Dambwa n=14, and ARHA n=9. TDP did not complete logs.

## C. Exposure

Turning now to *individual population-based survey data* measuring exposure to YPE, 43.1% of respondents were exposed to peer education (Table 9). The percentage of youth exposed in urban areas (45.4%) was slightly higher than in rural areas (41.7%). Almost 14% were exposed 10 or more times to peer education in the past six months. Table 10 presents characteristics of exposed and unexposed survey respondents. Women were less likely to be exposed to peer education than were men (data not shown). Exposed youth have received more education compared to not exposed youth. Exposed youth are also more likely to never have been married. The average age of the exposed youth in the total sample (19.6) is similar to that of the unexposed youth (19.3).

**Table 9: Exposure to peer education for youth in ZSBS 2005 by residence, in percentages**

	Rural N=1083	Urban N=612	Total N=1695
<b>Ever exposed to peer education</b>	41.7	45.4	43.1
<b>Frequency of exposure in last 6 months</b>			
Not Exposed	62.3	59.3	61.2
Only 1 time	6.8	10.8	8.3
2-5 times	13.2	14.2	13.6
6-9 times	3.5	3.3	3.4
10 or more times	14.1	12.4	13.5

**Table 10: Background information for youth in ZSBS 2005 by exposure to peer education, in percentages**

	Rural		Urban		Total	
	Exposed N= 452	Not Exposed N= 631	Exposed N= 278	Not Exposed N= 334	Exposed N= 730	Not Exposed N= 965
<b>Sex</b>						
Male	50.2*	39.0	47.1	45.2	49.0*	41.1
Female	49.8*	61.0	52.9	54.8	51.0*	58.9
<b>Age Group</b>						
15-19	47.3	47.5	51.1	57.8	48.8	51.1
20-24	52.7	52.5	48.9	42.2	51.2	48.9
<b>Ever attended school</b>	89.6*	83.8	98.6	97.0	93.0*	88.4
<b>Highest level of school</b>						
Primary or less	63.5*	80.2	17.3*	39.8	46.0*	66.1
Secondary or higher	36.5*	19.8	82.7*	60.2	54.0*	33.9
<b>Time at current residence</b>						
0-1 year	13.5	14.5	25.9	25.1	18.2	18.2
2-4 years	20.2	19.2	23.0	24.3	21.3	21.0
5+ years	66.3	66.3	51.1	50.6	60.5	60.9
<b>Attends church regularly</b>	90.7	88.8	89.9	86.7	90.4	88.1
<b>Primary care giver for children</b>	31.6	28.6	17.3	15.9	26.2	24.2
<b>Ever been married</b>	42.4	47.1	19.4	21.6	33.6*	38.2
<b>Ever had sexual intercourse</b>	71.5	74.0	53.6	55.4	64.7	67.5
	(N=381)	(N= 522)	(N= 260)	(N= 297)	(N= 641)	(N= 819)
<b>Among those who had ever heard of STIs :</b>						
<b>During the last 12 months, had a disease from sexual contact</b>	5.2	6.1	8.8	6.4	6.7	6.2

\* p<.05, Chi-square test

In the program catchment areas, 42.7% of youth surveyed overall have ever been exposed to peer education (Table 11). Exposure was highest among youth in Maramba (67.0%) and lowest in Mongu (34.4%). The majority of youth (65.6%) reported no exposure to peer education in the six months preceding the survey. Among those who had been exposed in the past six months, most had had multiple exposures. The Maramba area had the largest proportion of youth who had multiple exposures in the last six months.

**Table 11: Exposure information from youth in program catchment areas (unweighted frequencies and weighted percentages)**

	Chawama N=120	Chilenje N=172	Kalinga- linga N=202	Maramba N=257	Libuyu N=181	Mongu N=133	Total N=1065
<b>Ever exposure to peer education</b>	45.4	45.0	63.4	67.0	62.0	34.4	42.7
<b>Frequency of exposure in last 6 months</b>							
Not Exposed	57.8	61.7	36.9	37.6	41.6	77.4	65.6
Only 1 time	19.2	8.9	21.7	2.4	5.0	1.7	7.2
2-5 times	19.7	9.3	33.0	19.2	22.9	6.0	12.4
6-9 times	0.0	2.3	5.7	19.1	13.7	1.7	3.1
10 or more times	3.3	17.9	2.6	21.6	16.7	13.3	11.7

Table 12 shows the percentage of youth at each *clinic* that was exposed to any YPE program. Overall, 73.5% of youth at all clinics had been exposed to YPE. Kalingalinga had the highest exposure rate at 90.4%, and Chilenje, the only clinic not directly linked to a YPE program, had the lowest exposure rate at 48.6%. At four of the six clinics linked to a YPE program, the most common source of exposure was the YPE program evaluated. ARHA had the highest exposure rates at its two clinics: Prisons (38.3%) and Urban (35.1%). TDP and CTYA had the lowest exposure rates at their two clinics: only 3.3% of youth at Chawama had been exposed to the TDP program and only 4.4% of youth at Maramba had been exposed to the CTYA program. Sixteen percent of young people attending the Dambwa clinic were exposed to the DHMT/Dambwa YPE program.

Tables 12 and 13 also present the socio-demographic characteristics of youth surveyed at the clinic who were exposed and unexposed to peer education. The population of exposed youth is similar in age to the population of unexposed youth. Exposed youth are more likely to be male, more educated and literate, less likely to be married, and more likely to have a history of STIs compared to those not exposed to YPE. The highest percentage of exposed youth attended Kalingalinga clinic, at 21.9%. Chilenje clinic represents only 16.8% of all youth, but 32.6% of youth unexposed to YPE.

**Table 12: Exposure to YPE by clinic and by YPE program linked to clinic, in percentages**

	Total Exposure	Sex		Age	
		Males	Females	15-19 yrs	20-24 yrs
<b>All clinics (n=10300)</b>	<b>73.5</b>	<b>33.7</b>	<b>66.3</b>	<b>41.4</b>	<b>58.6</b>
<b>Kalingalinga clinic (n=1832)</b>	<b>90.4</b>	<b>28.9</b>	<b>71.1</b>	<b>30.4</b>	<b>69.6</b>
Human Resource Trust (HRT)	18.9	18.2	81.8	29.1	70.9
<b>Chawama clinic (n=1363)</b>	<b>72.4</b>	<b>45.3</b>	<b>54.7</b>	<b>55.3</b>	<b>44.7</b>
Tiyanjane Development Project (TDP)	3.3	40.0	60.0	44.4	55.6
<b>Chilenje clinic (n=1735)</b>	<b>48.6</b>	<b>29.3</b>	<b>70.1</b>	<b>33.9</b>	<b>66.1</b>
<b>Dambwa clinic (n=1326)</b>	<b>63.4</b>	<b>23.8</b>	<b>76.2</b>	<b>29.5</b>	<b>70.5</b>
Clinic-based programs (DHMT/DAMBWA)	16.0	26.4	73.6	30.2	69.8
<b>Maramba clinic (n=1452)</b>	<b>73.9</b>	<b>31.8</b>	<b>68.2</b>	<b>36.0</b>	<b>64.0</b>
Contact Youth Trust Association (CTYA)	4.4	46.9	53.1	50.0	50.0
<b>Prisons clinic (n=1729)</b>	<b>85.4</b>	<b>40.5</b>	<b>59.5</b>	<b>55.0</b>	<b>45.0</b>
Adolescent RH Association (ARHA)	38.3	45.7	54.3	49.9	50.1
<b>Urban clinic (n=906)</b>	<b>80.0</b>	<b>35.1</b>	<b>64.9</b>	<b>50.7</b>	<b>49.3</b>
Adolescent RH Association (ARHA)	35.1	37.4	62.6	44.0	56.0

**Table 13: Background information for exposed and unexposed youth in clinics, in percentages**

	<b>Exposed (n=7569)</b>	<b>Unexposed (n=2731)</b>	<b>Total (n=10300)</b>
<b>Sex</b>			
Male	33.7	20.3	30.2
Female	66.3	79.7	69.8
<b>Age (yrs)</b>			
15-19	41.4	39.5	40.9
20-24	58.6	60.5	59.1
<b>Education</b>			
0-8 yrs	19.8	38.4	24.7
9-11 yrs	46.5	37.7	44.1
12 or more yrs	33.7	23.9	31.1
<b>Literate</b>	90.9	74.8	86.7
<b>Married</b>	33.1	44.1	36.0
<b>STI history</b>	25.6	12.4	22.1
<b>Clinic</b>			
Kalingalinga	21.9	6.4	17.8
Chawama	13.0	13.8	13.2
Chilenje	11.1	32.6	16.8
Dambwa	11.1	17.8	12.9
Maramba	14.1	13.8	14.0
Prisons	19.3	9.2	16.6
Urban	9.5	6.6	8.7

## **D. Association between Exposure and Outcomes**

**Bivariate relationships** between exposure and selected outcomes found in the survey data are summarized below (data not shown in tables).

Knowledge:

- Young people exposed to peer education were more likely to know a place where a person can get condoms than those not exposed to peer education. Among those who knew a place to get condoms, exposed youth were more likely to say condoms can be obtained at government hospitals and from peer educators compared to those not exposed.

- More than 50% of the youth surveyed personally knew someone suspected to have or someone who is HIV-infected or has AIDS. A greater proportion of youth exposed to peer education knew someone with HIV infection or AIDS than did those not exposed. Moreover, exposed youth were more likely to have recently witnessed stigma against PLWHA including the denial of health services, refusal of involvement in community and social activities, or experienced verbal abuse.
- Almost all of the youth in the survey had ever heard of HIV and AIDS. The majority of youth had correct knowledge about the ways HIV is transmitted. Youth exposed to peer education were significantly more likely to answer the knowledge questions correctly compared to those who were not exposed.
- Youth exposed to peer education were more frequently able to recall spontaneously correct ways to reduce transmission of HIV compared to youth not exposed. In particular, exposed youth were more likely to say spontaneously that using condoms and limiting the number of sexual partners are ways to prevent getting infected with HIV.
- Most young people knew a place where they could go to get an HIV test. A greater proportion of exposed youth knew a place (86.0%) compared to those not exposed (76.9%). The youth who said they knew a place where someone could get an HIV test were asked where they themselves would go if they wanted to be tested for HIV.

Interviewers circled all of the testing sites respondents mentioned. Respondents could give more than one answer. More than 90% of both exposed and unexposed youth said they would go to a hospital or clinic for an HIV test. VCT centers were the next most common response. Twenty-seven percent of exposed youth and 18% of unexposed youth said they would go to a VCT center for testing. Exposed youth were more likely to say they would go to VCT centers and youth-friendly corners compared to unexposed youth.

#### Attitudes related to exposure to peer education:

- Young people exposed to peer education had more favorable opinions regarding peer education compared to those not exposed. Interestingly, peer education was also highly regarded by those who had not been exposed.
- Youth visiting the study clinics were asked questions about their experiences with, and attitudes about, YPE. Those who reported some exposure to YPE or who were referred to the clinic by a peer educator tended to have more experience and more positive opinions about YPE and peer educators.
- Youth exposed to peer education had higher trust in the local peer education programs, peer educators, and youth-friendly corners (YFC) with regard to the HIV and AIDS information they provide compared to youth not exposed.

- Youth exposed to peer education have significantly less stigma against PLWHA than youth not exposed to peer education.
- Exposed youth were more likely than unexposed youth to perceive that their same sex friends use condoms and view abstinence as an acceptable method of protections against HIV, STIs, and pregnancy. Exposed youth are also more likely to discuss condom use and abstinence with their same sex friends.
- More exposed youth (62%) felt that unmarried women should always be able to buy condoms than unexposed youth. On average, youth were more approving of women refusing sex than asking for a condom to be used during sex with a partner who is known to be infected with a STI. No significant difference was found between the exposure groups for the question about refusing sex. However, youth exposed to peer education were more likely than unexposed youth to believe a woman is justified in asking for a condom to be used during sex with an infected partner.
- Youth exposed to peer education had more positive attitudes towards condoms compared to those not exposed. For example, exposed youth were more likely to agree that condoms are for use with regular partners, believe there is support for condom use by young people, and believe that condoms are very effective for preventing against HIV/STI infection. Exposed youth were also more likely to disagree with negative beliefs about condoms such as condoms break easily, suppress sexual pleasure, promote promiscuity, and are embarrassing to suggest.

#### Behaviors:

YPE strives to change young people's behavior as well as their knowledge and attitudes.

- Youth exposed to peer education, particularly those from rural areas of Zambia, were more likely to have ever talked about ways to prevent HIV infection with their sexual partner than those not exposed.
- The majority of youth (67.5%) had ever had sex and there was no significant difference between youth exposed or not exposed to peer education. Exposed females were less likely to ever been pregnant (51.8%) compared to unexposed females (59.4%).
- Transactional sex increases the risk of HIV infection. Fewer than 8% of young people had ever engaged in transactional sex in the past 12 months. No significant difference between exposure groups was detected.
- Youth exposed to peer education are more likely to have ever been tested for HIV (13.2%) than those not exposed (9.3%) ( $p < .05$ ). Almost half of the youth tested requested their most recent HIV test themselves and almost all received the results from the test. More than 70% of youth want to be tested for HIV in the future. Those exposed to peer education are more likely to want the test in the future compared to those not exposed.

- Some YPE programs focus on antenatal care and in particular on prevention of mother-to-child transmission (PMTCT) of HIV. With the exception of the likelihood of receiving information about STIs during antenatal care of the last pregnancy, no difference was detected between exposure groups for use of antenatal services.
- Encouragement of consistent condom use is a major programmatic emphasis for many peer education programs in Zambia. Youth exposed to peer education have higher self-efficacy to use condoms than those not exposed. More than 75% of those exposed believe that they could get condoms if they wanted to compared to 65% of youth not exposed to peer education. Similarly, more than 80% of exposed youth compared to 67% of unexposed youth believe they could persuade a new sex partner to use a condom at least some of the time. More than half of exposed youth are satisfied with their ability to use a condom correctly compared to only 40% of unexposed youth. No difference between exposure groups was found among females currently in a relationship, however, for self-efficacy related to refusing sexual intercourse or requesting condom use.
- Youth exposed to peer education had higher intentions to use condoms with new or casual sex partners. Only 20% of exposed youth compared to 35% of unexposed youth did not have any intention to use condoms with new sexual partners.
- Youth exposed to peer education were more likely to use a condom the first time they had sex, as well as the first and last time with the most recent partner than those who were not exposed to peer education. More than a quarter (25.5%) of exposed youth who ever had sex used a condom at last sex compared to only 11% of unexposed youth who ever had sex.

## Multivariate analyses

The multivariate analyses presented below demonstrate the association between **exposure to peer education and selected outcome measures** after controlling for (or removing the effects of) variables that may influence or bias the outcome. The control variables used in all of the multivariate analyses were: propensity score, community efficacy, gender, education level, and residence (rural/urban). The construction of the propensity score was described in the methods section. These results are summarized in Tables 14 and 15.

Youth exposed to peer education, on average, had higher HIV **knowledge scores** compared to unexposed youth after adjusting for potential confounders ( $p < .0001$ ). The regression results also show that youth with a higher propensity for exposure to peer education have higher HIV knowledge scores, as do females, those with more than a primary education, and youth living in urban communities in Zambia (Table 14).

Youth exposed to peer education, on average, had greater **intentions to use condoms** compared to unexposed youth after adjusting for potential confounders ( $p < .0001$ ). Youth with a higher community efficacy, males, those with more than a primary education and those living in urban communities in Zambia also had greater intentions to use condoms (Table 14).

Youth exposed to peer education, on average, had lower **stigma against PLWHA** compared to unexposed youth after adjusting for potential confounders ( $p=0.0016$ ). Youth with higher community efficacy, those with more than a primary education, and youth living in urban communities in Zambia have lower stigma against PLWHA. The effects of the propensity score and gender were not statistically significant at the  $p<.05$  level in this model (Table 14).

Exposure to peer education was not associated with **age of sexual debut** after adjusting for potential confounders ( $p=0.7582$ ). Furthermore, none of the control variables are statistically significant at the  $p<.05$  level in this model, so none of the variables in this model can explain the observed variation in age of sexual debut in our sample of youth (Table 14).

Exposure to peer education and the **number of sexual partners** in the past four weeks is slightly above the cut-off point for statistical significance ( $p=0.06$ ) (Table 14). Although only of marginal significance, this finding suggests that exposed youth may have fewer sexual partners over the specified time period than youth not exposed. The variable indicating residence is also slightly above the cut-off point for statistical significance ( $p=0.0529$ ) indicating that those youth living in the rural areas may have more partners in the past four weeks than urban youth. The only variable that is highly significant in the regression model is level of education ( $p=0.0022$ ). Most of the variability observed in the number of partners in the past four weeks is explained by level of education – those with primary or less education had a greater number of partners than those with more education.

Exposure was not associated with **ever having sexual intercourse**; the 95% confidence intervals for both the crude (OR=0.9 ; 95% CI 0.7-1.1) and adjusted (OR=0.9 ; 95% CI 0.8-1.2) odds ratios include 1.0 (Table 15).

The crude logistic model shows that youth exposed to peer education are 1.5 times more likely to **ever been tested for HIV** than those not exposed to peer education, which is marginally significant. This association is reduced after controlling for potential confounders. The association between exposure to peer education and ever tested for HIV falls just below the cut-off value for statistical significance in the adjusted model (OR=1.4; 95% CI 1.0-2.0) (Table 15).

The crude odds ratios shows that youth exposed to peer education are 2.8 times more likely to **use a condom at last sex** compared to those not exposed to peer education. After adjusting for potential confounders, this association is still significant, but attenuated. Young people exposed to peer education are 2.1 times more likely to have used a condom at last sex than those not exposed after adjusting for propensity score, community efficacy, sex, education, and residence (95% CI 1.4-3.1) (Table 15).

The crude odds ratios for the association between exposure to peer education and **“always” uses a condom with most recent partner** shows that youth exposed to peer education are 2.3 times more likely to report consistent condom use with most recent partner than those not exposed to peer education (Table 15). This association is reduced after controlling for potential confounders. The association between exposure to peer education and consistent condom use lies right at the cut-off value for statistical significance in the adjusted model (OR=1.6; 95% CI 1.043-2.669).

**Table 14: Regression of exposure onto selected variables, controlling for personal characteristics, among 15-24 year olds in ZSBS 2005 (n=1,695)**

<b>Variable</b>	<b>Beta</b>	<b>Standard Error</b>	<b>P value</b>
<b><i>HIV knowledge</i></b>			
Exposed to PE	0.9691	0.1612	<.0001
Propensity score	0.3518	0.0658	<.0001
Higher community efficacy	-0.0078	0.0296	0.7924
Male	-0.4254	0.1569	0.0068
Primary or less education	-0.8397	0.1923	<.0001
Rural residence	-0.4030	0.1900	0.0341
<b><i>Intentions to use condoms</i></b>			
Exposed to PE	0.3439	0.0846	<.0001
Propensity score	0.0324	0.0346	0.3491
Higher community efficacy	0.0508	0.0156	0.0011
Male	0.3408	0.0824	<.0001
Primary or less education	-0.2338	0.1009	0.0207
Rural residence	-0.5145	0.0998	<.0001
<b><i>Stigma against PLWHA</i></b>			
Exposed to PE	-0.2309	0.0728	0.0016
Propensity score	-0.0399	0.0297	0.1795
Higher community efficacy	-0.1015	0.0134	<.0001
Male	0.0171	0.0709	0.8092
Primary or less education	0.5611	0.0869	<.0001
Rural residence	0.6356	0.0859	<.0001
<b><i>Age at sexual debut*</i></b>			
Exposed to PE	0.0362	0.1175	0.7582
Propensity score	0.0577	0.0492	0.2416
Higher community efficacy	-0.0093	0.0213	0.6627
Male	0.1848	0.1170	0.1144
Primary or less education	0.0915	0.1453	0.5292
Rural residence	-0.1232	0.1421	0.3862
<b><i># of partners in past 4 weeks**</i></b>			
Exposed to PE	-0.0704	0.0374	0.0600
Propensity score	0.0062	0.0156	0.6908
Higher community efficacy	-0.0002	0.0067	0.9723
Male	0.0549	0.0372	0.1411
Primary or less education	0.1461	0.0475	0.0022
Rural residence	0.0903	0.0466	0.0529

\* among those who had ever had sex (n=1120)

\*\* among those who had sex within past 12 months (n=917)

**Table 15: Crude and adjusted odds ratios (OR) and 95% confidence intervals (CI) for the association between exposure to YPE and selected variables as measured among 15-24 year olds in ZSBS 2005 (n=1,695).**

Exposure to YPE	n	%	% variable	Crude odds ratios OR (95% CI)	Adjusted*** odds ratios OR (95% CI)
<i>Ever had sex</i>					
Unexposed	965	56.9	67.5	1.0	1.0
Exposed	730	43.1	64.7	0.9 (0.7-1.1)	0.9 (0.8-1.2)
<i>Ever had HIV test*</i>					
Unexposed	651	58.1	13.1	1.0	1.0
Exposed	469	41.9	18.9	1.5 (1.1-2.1)	1.4 (1.0-2.0)
<i>Used condom at last sex**</i>					
Unexposed	522	56.9	10.9	1.0	1.0
Exposed	395	43.1	25.2	2.8 (1.9-4.0)	2.1 (1.4-3.1)
<i>Always uses a condom**</i>					
Unexposed	522	56.9	7.4	1.0	1.0
Exposed	395	43.1	15.6	2.3 (1.5-3.6)	1.6 (1.0-2.7)

\* among those who had ever had sex (n=1120)

\*\* among those who had sex within past 12 months (n=917)

\*\*\* Adjusted for propensity score, community efficacy, sex, education, and residence

## Exposures, referrals, and clinic use

More than 99% of the surveyed youth in the clinics provided information about whether or not they were referred to the clinic by a peer educator (n=10,288). Just over half (52.6%) of youth at all clinics were referred to the clinic by a YPE program (Table 16). Prisons had the highest referral rate (72.5%) and Chilenje had the lowest referral rate at only 22.1%. At Kalingalinga, Dambwa, Prisons, and Urban, the YPE program responsible for the most referrals was the program linked to the clinic in our survey. ARHA did the best with referrals to its two clinics, with 42.9% of all youth at Urban being referred by ARHA and 40.6% of those at Prisons. TDP and CTYA had the lowest referral rates to their clinics, with only 1.2% of youth at Chawama referred by TDP and only 5% of youth at Maramba referred by CTYA. The DHMT/Dambwa program fell in the middle with 16% of youth referred to the Dambwa clinic.

While only 30.2% of the total population was male, 37.2% of all referred youth were males. Also, a larger percentage of youth who were referred had a history of STI diagnosis (30.6%) compared to those who were not referred (13%) and the total survey population (22.1%) (data not shown).

STI tests were performed for 39.4% of all youth who visited the survey clinics. Youth who were tested for STIs were more likely to be female, older, illiterate, married, and with a history of STI (data not shown). Youth at Kalingalinga were most likely to be tested for STIs (52.9%), and those at Chilenje were least likely to be tested (21.4%) (data not shown).

**Table 16: YPE referrals by clinic and by YPE program linked to clinic, in percentages**

	Total Referrals	Sex		Age	
		Males	Females	15-19 yrs	20-24 yrs
<b>All clinics (n=10288)</b>	<b>52.6</b>	<b>37.2</b>	<b>62.8</b>	<b>42.7</b>	<b>57.3</b>
<b>Kalingalinga clinic (n=1824)</b>	<b>71.2</b>	<b>27.9</b>	<b>72.1</b>	<b>28.2</b>	<b>71.8</b>
Human Resource Trust (HRT)	18.0	18.5	81.5	29.2	70.8
<b>Chawama clinic (n=1357)</b>	<b>41.4</b>	<b>47.0</b>	<b>53.0</b>	<b>61.7</b>	<b>38.3</b>
Tiyanjane Development Project (TDP)	1.2	41.2	58.8	47.1	52.9
<b>Chilenje clinic (n=1727)</b>	<b>22.1</b>	<b>41.9</b>	<b>58.1</b>	<b>34.3</b>	<b>65.7</b>
<b>Dambwa clinic (n=1324)</b>	<b>39.5</b>	<b>31.2</b>	<b>68.8</b>	<b>27.7</b>	<b>72.3</b>
Clinic-based programs (DHMT/DAMBWA)	15.9	35.2	64.8	27.1	72.9
<b>Maramba clinic (n=1445)</b>	<b>53.3</b>	<b>40.5</b>	<b>59.5</b>	<b>39.5</b>	<b>60.5</b>
Contact Youth Trust Association (CTYA)	5.0	44.4	55.6	50.0	50.0
<b>Prisons clinic (n=1719)</b>	<b>72.5</b>	<b>42.0</b>	<b>58.0</b>	<b>55.3</b>	<b>44.7</b>
Adolescent RH Association (ARHA)	40.6	44.3	55.7	49.7	50.3
<b>Urban clinic (n=897)</b>	<b>70.1</b>	<b>36.2</b>	<b>63.8</b>	<b>52.0</b>	<b>48.0</b>
Adolescent RH Association (ARHA)	42.9	34.8	65.2	53.5	69.5

Table 17 shows crude and adjusted odds ratios for the association between STI testing and exposure to YPE or referral by peer educators. There was no significant difference in STI testing between youth who had been exposed to PE and youth who were not exposed. No significant difference in STI testing was observed between youth who were referred by a peer educator compared to those not referred. Among those who were tested for STI (n=4065), 41.5% tested positive for at least one of the following: chlamydia, gonorrhea, syphilis, trichomoniasis, genital herpes, genital warts, hepatitis B, and hepatitis C (data not shown). Those who tested positive were more likely to be male and unmarried (data not shown). Prisons clinic had the highest rate of positive tests (57.9%) and Chilenje had the lowest rate of positive tests (9.4%) (data not shown).

Table 17 also shows crude and adjusted odds ratios for the association between a positive STI test and exposure to YPE or referral by a peer educator. Tested youth who were exposed to YPE were twice as likely to test positive for STIs, compared to unexposed youth. Tested youth who were referred to the clinic by a peer educator were three times more likely to test positive for STIs than those who were not referred. Higher disease levels among those referred or influenced indicate that peer educators are effectively reaching and referring youth at higher risk for SRH services.

**Table 17: Odds ratios (OR) and 95% confidence intervals for the association between exposure to YPE (n=10,300) or referral by peer educators (n=10,288) and STI tests performed and positive diagnosis in clinics**

	n	%	STI test or diagnosis (%)	Crude odds ratios (95% CI)	Adjusted* odds ratios (95% CI)
<b>STI tests performed</b>					
<b>Exposed to YPE</b>					
Unexposed	2731	26.5	38.5	1.0	1.0
Exposed	7569	73.5	39.8	1.1 (1.0-1.2)	0.9 (0.8-1.0)
<b>Referred by peer educator</b>					
Not referred	4957	48.2	37.3	1.0	1.0
Referred	5331	51.8	41.5	1.2 (1.1-1.3)	1.1 (1.0-1.2)
<b>Positive STI diagnosis</b>					
<b>Exposure</b>					
Unexposed	1052	25.9	20.2	1.0	1.0
Exposed	3009	74.1	49.0	3.8 (3.2-4.5)	2.2 (1.8-2.7)
<b>Referred by peer educator</b>					
Not referred	1848	45.5	21.7	1.0	1.0
Referred	2212	54.5	58.0	4.9 (4.3-5.6)	3.2 (2.8-3.8)

\*Adjusted for sex, age, education, marital status and clinic.

HIV tests were performed for 31.1% of all youth surveyed. Youth who were tested for HIV tended to be female, older, illiterate, and married (data not shown). Youth at Chawama were most likely to be tested for HIV (40.2%) and those at Chilenje were least likely to be tested (24.2%) (data not shown). Table 18 shows odds ratios for the association between HIV testing and exposure to YPE and referral by a peer educator. No difference was found in the likelihood of being tested for HIV between youth exposed and not exposed to YPE. Youth who were referred by a peer educator, however, were less likely to be tested for HIV than youth who were not referred (OR=0.7; 95% CI 0.6-0.8).

Among those who were tested for HIV (n=3203), 24.3% tested positive for the virus. The only notable difference between those who tested positive and those who tested negative was age: older youth who were tested for HIV were more likely to test positive (27.5%) than younger youth (18.4%) (data not shown). The highest percentage of youth who tested HIV-positive was at Dambwa (34.6%) and the lowest percentage were at Chawama (16.1%) (data not shown). Table 18 also shows that among youth who were tested for HIV, there was no difference in diagnosis between youth who were exposed to YPE and those who were not exposed. Tested youth who were referred to the clinic by a peer educator were less likely to test positive for HIV than those who were not referred (OR=0.6; 95% CI 0.5-0.7).

**Table 18: Odds ratios (OR) and 95% confidence intervals for the association between exposure to YPE (n=10,300) or referral by peer educators (n=10,288) and HIV test performed and positive diagnosis in clinics**

	n	%	HIV test performed or diagnosis (%)	Crude odds ratios (95% CI)	Adjusted* odds ratios (95% CI)
<b>HIV test performed</b>					
<b>Exposed to YPE</b>					
Unexposed	2731	26.5	31.5	1.0	1.0
Exposed	7569	73.5	31.0	1.0 (0.9-1.1)	1.0 (0.9-1.1)
<b>Referred by peer educator</b>					
Not referred	4876	47.4	34.8	1.0	1.0
Referred	5412	52.6	27.6	0.7 (0.7-0.8)	0.7 (0.6-0.8)
<b>Positive HIV diagnosis</b>					
<b>Exposed to YPE</b>					
Unexposed	860	26.8	24.2	1.0	1.0
Exposed	2343	73.2	24.4	1.0 (0.8-1.2)	1.0 (0.8-1.1)
<b>Referred by peer educator</b>					
Not referred	1698	53.1	26.7	1.0	1.0
Referred	1502	46.9	21.6	0.8 (0.6-0.9)	0.6 (0.5-0.7)

\*Adjusted for sex, age, education, marital status and clinic.

Table 19 shows data for specific RH services received for exposed and unexposed youth. Using adjusted odds ratios, the data show that youth who were exposed to YPE were twice as likely to receive condoms as unexposed youth. Exposed youth were significantly more likely to receive most RH services, including pregnancy tests, other contraceptives, RH counseling, HIV counseling, and STI counseling. Exposed youth were significantly less likely to receive antenatal care than unexposed youth (OR=0.7 ; 95% CI 0.6-0.8).

**Table 19: Odds ratios (OR) and 95% confidence intervals for the association between exposure to YPE and RH services received (n=10,300)**

Service	n	%	% receiving services	Crude odds ratios (95% CI)	Adjusted* odds ratios (95% CI)
<b>Pregnancy test</b>					
Unexposed	7569	73.5	2.6	1.0	1.0
Exposed	2731	26.5	4.8	1.9 (1.4-2.4)	1.6 (1.2-2.2)
<b>Condoms</b>					
Unexposed	7569	73.5	13.1	1.0	1.0
Exposed	2731	26.5	29.0	2.7 (2.4-3.1)	2.1 (1.8-2.4)
<b>Other contraceptives</b>					
Unexposed	7569	73.5	14.4	1.0	1.0
Exposed	2731	26.5	13.8	0.9 (0.8-1.1)	1.3 (1.1-1.5)
<b>Antenatal care</b>					
Unexposed	7569	73.5	29.7	1.0	1.0
Exposed	2731	26.5	17.4	0.5 (0.4-0.6)	0.7 (0.6-0.8)
<b>RH counseling</b>					
Unexposed	7569	73.5	48.7	1.0	1.0
Exposed	2731	26.5	57.0	1.4 (1.3-1.5)	1.4 (1.2-1.5)
<b>HIV counseling</b>					
Unexposed	7569	73.5	53.0	1.0	1.0
Exposed	2731	26.5	59.6	1.3 (1.2-1.4)	1.3 (1.2-1.4)
<b>STI counseling</b>					
Unexposed	7569	73.5	54.6	1.0	1.0
Exposed	2731	26.5	63.5	1.4 (1.3-1.6)	1.2 (1.1-1.3)

\*Adjusted for sex, age, education, marital status and clinic.

Table 20 shows data for specific RH services provided for youth who were referred by a peer educator and youth who were not referred. Referred youth were almost three times more likely to receive condoms at their visit than youth who were not referred. Referred youth were also significantly more likely to have been provided other contraceptives and slightly more likely to receive RH counseling. Referred youth were significantly less likely to receive antenatal care (OR=0.5 ; 95% CI 0.4-0.6) than non-referred youth. There was no significant difference for pregnancy test, HIV counseling, and STI counseling.

**Table 20: Odds ratios (OR) and 95% confidence intervals for the association between referral by peer educators and RH services received (n=10,288)**

Service	n	%	% receiving service	Crude odds ratios (95% CI)	Adjusted* odds ratios (95% CI)
<b>Pregnancy test</b>					
Not Referred	5412	52.6	3.5	1.0	1.0
Referred	4876	47.4	4.9	1.4 (1.2-1.7)	1.2 (1.0-1.6)
<b>Condoms</b>					
Not Referred	5412	52.6	14.0	1.0	1.0
Referred	4876	47.4	34.6	3.3 (3.0-3.6)	2.8 (2.5-3.1)
<b>Other contraceptives</b>					
Not Referred	5412	52.6	14.3	1.0	1.0
Referred	4876	47.4	13.6	0.9 (0.8-1.1)	1.5 (1.3-1.7)
<b>Antenatal care</b>					
Not Referred	5412	52.6	28.2	1.0	1.0
Referred	4876	47.4	13.8	0.4 (0.4-0.5)	0.5 (0.4-0.6)
<b>RH counseling</b>					
Not Referred	5412	52.6	52.7	1.0	1.0
Referred	4876	47.4	56.7	1.2 (1.1-1.3)	1.2 (1.1-1.3)
<b>HIV counseling</b>					
Not Referred	5412	52.6	57.7	1.0	1.0
Referred	4876	47.4	57.8	1.0 (0.9-1.1)	1.0 (0.9-1.1)
<b>STI counseling</b>					
Not Referred	5412	52.6	58.2	1.0	1.0
Referred	4876	47.4	63.6	1.3 (1.2-1.4)	1.0 (1.0-1.2)

\*Adjusted for sex, age, education, marital status and clinic.

## **E. Interrelationships among quality, cost, outputs, exposure, and referrals**

In Table 21, we find that program cost and quality are highly related to one another, with higher cost being associated with higher quality. The relationship with outputs or productivity held at the upper end, though is more difficult to interpret because of the missing data from one of the programs. In terms of the relationship between quality/cost and exposure and referrals, the programs at the top were associated with greater exposure and referrals and those at the bottom were associated with the least exposure.

**Table 21: Ranking of programs by framework components/measures**

<b>Rankings</b>	<b>Component</b>				
	<b>Quality*</b>	<b>Cost</b>	<b>Outputs**</b>	<b>Exposure in clinics</b>	<b>Referrals in clinics</b>
1	HRT	HRT	HRT	ARHA	ARHA
2	ARHA	ARHA	DHMT	HRT	HRT
3	CTYA	CTYA	ARHA	DHMT	DHMT
4	DHMT	TDP	CTYA	CTYA	CTYA
5	TDP	DHMT	--	TDP	TDP

\*Ranking based on total checklist scores.

\*\*Ranking based on average number of contacts. No data available for TDP.

## IV. Discussion and Recommendations

**YPE Programs Vary in Quality.** Substantial variation was found in the quality of programming among the five YPE programs studied. HRT had the highest overall score and also scored the highest in Technical Frameworks, Stakeholder Cooperation, and Community Involvement checklists. ARHA had the second highest total score on all of the checklists, and scored the highest on five checklists: Youth-Adult Partnerships, Youth Involvement, PE Cooperation, Gender Equity and Equality, and Parental Involvement.

**More Parental Involvement Desirable.** Overall, the programs tended to score the highest on the Stakeholder Cooperation checklist and lowest on the Parental Involvement checklist. This finding suggests that all of the programs studied would benefit from improving their relationships with parents.

**Scores on Checklists Correlated.** Interestingly, there was no one domain of quality that stood out from the rest, as measured by the eight checklists. With the exception of the Parental Involvement Checklist which all programs scored low on, programs tended to either scored high on all of the checklists (HRT and ARHA) or low on all of the checklists (TDP). Furthermore, the generally positive relationship between checklist scores and appropriate YPE referrals to the clinics observed in this study suggests that the checklists appear to be measuring the quality of the programs accurately. In this case, the study demonstrates the importance of cooperation between the many actors and institutions involved in YPE, including young people (peer educators) themselves. Youth, parental, stakeholder, and community involvement as well as gender equity/equality and balanced youth-adult partnerships contribute to peer educator retention, program sustainability, and impact.

**Checklists are Useful.** We recommend that the checklists be used routinely by managers of peer education programs to identify areas where improvements can be made in the quality of the programs they implement. The checklists can also be utilized by donors and governments when making decisions about which programs to scale-up or replicate in other locations. Lastly, the checklists can serve as a guide for the development of new local programs.

**Cost Analyses are Useful.** The cost analyses conducted in this study can be useful for determining the full cost of scaling-up the peer educator intervention. Potentially, the cost per peer educator could be reduced by increasing the number of trainees. The site visits revealed this capability for each of the programs. Also, altering resource inputs could reduce costs. For example, a training of trainers (ToT) model could spread the initial facilitator training costs among a larger pool of trainees supported in a ToT model.

**YPE Outputs and Activities Vary.** In terms of outputs, the PEs from HRT (the highest scoring program on the checklists) on average spent the most hours working on YPE activities, conducted the most activities, covered the greatest number of health topics, and made the largest number of contacts. It was not surprising that HRT was also the most expensive program overall and in terms of the costs per trained peer educator. Interestingly, ARHA (the second highest scoring program on the checklists) had the lowest output of all the programs. Peer educators from ARHA spent the fewest number of hours working, conducted the fewest number of

activities, covered the fewest number of topics, and recruited the fewest number of new attendees.

A possible explanation for this finding appears in reviewing the specific types of activities conducted by the peer educators. The most frequent activity conducted by HRT peer educators is condom distribution (42% of activities), followed by discussion groups (28% of activities), suggesting that HRT's primary approach is to reach the masses. This is in contrast to counseling sessions, which are the most frequently conducted activity by ARHA peer educators (33%). ARHA's strategy in Mongu was to spend more time with fewer people using counseling and other more intensive activities. Another Mongu NGO was responsible for larger-scale awareness raising activities. Neither strategy – reaching the masses with a diffuse program versus intensive training of a few “beneficiaries” – appears to be “superior,” given that both HRT and ARHA are the top performing programs according to the data generated by this study.

**Exposure to PE Widespread in Zambia.** Exposure to peer education is high among youth in Zambia. The national, population-based survey found that 43% of youth aged 15-24 were exposed to peer education and according to the clinic study, 74% of 10,300 youth attending seven clinics in Zambia were exposed to peer education. The main goal of this study, however, is to determine the impact peer education has on sexual and reproductive health outcomes of Zambian youth.

**Positive Attitudes toward PE.** One important finding from the population survey was that young people's attitudes towards peer education are positive in Zambia. Youth expressed favorable attitudes even if they had not reported being exposed to peer education. This finding speaks to the acceptability of peer education among young people in Zambia, the large potential reach of properly implemented and technically sound peer education programs, and the potential for impact on SRH behaviors of many young people. The ZSBS 2005 revealed that adults aged 25 or older had positive attitudes towards YPE and YPE activities in their communities. (14) We also observed more favorable attitudes towards peer education among youth exposed to peer education in the clinic sample than among those not exposed. Nonetheless, more than 20% of unexposed youth feel the services peer educators provide are appropriate for young people.

**Exposure Affects Knowledge and Attitudes.** The multivariate results of the population-based survey data indicate that exposure to peer education is associated with higher HIV knowledge, increased intentions to use condoms, and lower stigma and discrimination towards PLWHA.

**PE Exposure Related to Some Sexual Behaviors:** Exposure to peer education was associated with an increased likelihood of using a condom at last sex with the most recent partner. The results also indicate there may be a relationship between exposure and consistent condom use with the most recent partner and a decreased number of sexual partners in the past four weeks. No association was found between exposure to peer education and ever having sex and age of sexual debut. Unfortunately, given that the survey was cross-sectional, we cannot determine causality because we do not know whether exposure to peer education or the SRH outcome came first.

**PEs Make Frequent and Relevant Clinic Referrals.** According to the data from 10,300 youth aged 15-24 attending the seven study clinics, 74% of them were exposed to YPE, and more than half (53%) were referred to the clinic by a peer educator. Exposed youth were more likely to have a history of STIs, more likely to test positive for at least one STI during the clinic visit, and more likely to receive reproductive health services at the clinic – specifically, condoms, other contraceptive methods, and pregnancy tests. Referred youth were more likely to have a history of STIs, more likely to test positive for at least one STI during the clinic visit, and more likely to receive condoms, other contraceptive methods, and reproductive health counseling at the clinic. These findings indicate that peer educators are effectively reaching and referring youth at higher risk for SRH services.

**No Effect for Antenatal Care.** Exposed and referred youth were significantly less likely to receive antenatal care services at the clinic. Presumably, fewer of the exposed and referred youth are pregnant. If this is the case, we do not know if the disparity exists because pregnant youth are not seeking out peer education activities or if peer education programs are not effectively targeting pregnant youth. This is an important research question that requires investigation because pregnant youth are obviously sexually active and at risk of HIV and other STIs.

**PE Exposure Not Related to HIV or STI Testing.** No association was found between exposure to peer education and the likelihood of having a test performed for HIV or other STI diagnosis. Testing may depend on the staff and on current funding levels at the specific clinics.

**Referred Youth Not More Likely to Test HIV Positive.** While almost a quarter of the youth tested for HIV had a positive test (24%), there was no association between exposure to peer education and testing positive for HIV. Youth referred by a peer educator were less likely to test positive for HIV than youth who were not referred. The cross-sectional nature of the clinic survey means that we cannot establish temporality or causality. In other words, we do not know if referred youth engage in more HIV prevention behaviors because of their exposure to peer education or if youth who initially practice HIV prevention behaviors are more likely to seek out and participate in peer education activities.

**Some YPE Programs Had Strong Links to Clinics.** Clinic data were directly linked to the peer education programs studied. The ARHA program had the highest exposure with its linked clinic, followed by HRT, DHMT/DAMBWA, CTYA, and TDP. The identical pattern was found for the referrals – ARHA had the highest proportion of referrals to its linked clinic and TDP had the lowest.

## **Conclusions**

YPE has high exposure among young people in Zambia with more than 40% of the youth population (15-24 years) exposed. This study found that YPE is having a positive impact on HIV and RH behaviors and their mediating variables. YPE exposure is associated with SRH risk reduction behaviors and increased diagnosis and treatment of highly vulnerable youth. YPE programs are making appropriate clinic referrals to vulnerable youth.

However, the study also reveals the wide variation in the quality, impact and cost of YPE programs. Depending on the quality of the programs, exposure and effectiveness of YPE varies considerably at the program level. A small number of high-quality programs appear to be responsible for impacts measured in the clinical and national surveys.

Programs tend to be high or low on all core components of YPE programming, as measured by the eight checklists. We believe that the eight checklists can play an important role in designing and implementing effective YPE programs.

This study suggests an urgent need for the development of evidence-informed YPE guidelines and minimal criteria for YPE programs at the national level so that more youth are reached by high quality YPE programs. YPE programs, especially when closely linked with clinics, have a strong potential to improve knowledge and attitudes and reduce SRH risk behaviors among Zambian youth.

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# Appendices

## A. Study Sites and Programs

The study worked with five youth peer education (YPE) programs representing rural, semi-urban, and urban settings of Zambia. Each program setting was treated as a case study because of complications in pooling multi-cultural survey data. The factors for choosing the study sites included having programs with criteria listed below, geographical region, and the availability of local research organizations with proven experience in the data collection methodologies and analysis required.

The programs are community-based and target general but vulnerable youth (described below). Highly vulnerable groups such as sex workers that require an outreach approach rather than a community-based type of program are not included. Outreach programs usually target marginalized or non-mainstream groups and the implementing agency's staff is often from outside this group. Community-based programs are embedded in the target population socially and geographically. Community organizations support these programs and medical and social services are directly involved. The programs were selected strategically in close collaboration with USAID/Zambia, the Central Board of Health (COB), key stakeholders, the FHI country offices, and government ministries. Minimal criteria include:

1. Addresses RH and HIV
2. Targets general but vulnerable youth (e.g. high HIV incidence) principally in out-of-school settings
3. Utilizes youth peer educators between 15 and 24 years old
4. Is community-based rather than outreach-based
5. Has clear aims and objectives
6. Uses a clear strategy and an explicit program design
7. Has sound management support and financial sustainability
8. Generates local funding or support through community involvement
9. Has multiple peer education activities
10. Has at least two years successful running experience
11. Has the capacity to sustain accurate data collection

### **Lusaka** (pop. 1.2 million)

The capital city Lusaka has an HIV prevalence of approximately 20%. There are several marginalized neighborhoods (compounds) with YPE programs promoting reproductive health (RH) and STI/HIV prevention. These are community-based, and nearly all collaborate to various degrees with local health services on youth-friendly services and voluntary counseling and testing (VCT) referrals. Three compounds were included in the study as catchment areas: Chawama, Chilenje, and Kalingalinga, with a clinic in each compound by this name. The two YPE programs studied were Human Resource Trust (HRT) and one sponsored by the Christian Children's Fund, Tiyanjane Development Project (TDP). Peer

educators from HRT run the youth-friendly corner (YFC) at Kalingalinga clinic and primarily refer youth to that clinic. The TDP is located in the Chawama compound and refers primarily to Chawama clinic. The Chilenje clinic did not have a formal YPE program attached to it.

**Livingstone** (pop. 175,000)

Livingstone has a high, stable HIV prevalence of around 31%. The two compounds in semi-urban Livingstone that were included as study catchment areas were Maramba and Libuyu. The two YPE programs studied are the Livingstone District Health Management Team (DHMT)/Dambwa Clinic and Contact Trust Youth Association (CTYA). YPE is a key component of the Livingstone DHMT's program for RH and HIV prevention efforts for youth and is linked to youth-friendly services provided by its clinics. The two clinics included in the study are: Dambwa and Maramba. The DHMT Dambwa program is based in the Dambwa clinic. The peer educators from the program run the YFC and refer primarily to the Dambwa clinic. Peer educators from CTYA refer mainly to Maramba clinic since they were located across the street from the clinic. However, CTYA's target area was all of Livingstone and their peer educators may refer youth to other local clinics when working outside of the Maramba area. The YFC at Maramba clinic is run by peer educators from several YPE programs. Due to a misunderstanding during data collection, the Libuyu area was surveyed instead of the Dambwa catchment area.

**Mongu District** (pop 172,000)

Mongu District in the Western Province is composed of the town of Mongu and many outlying villages. The small town of Mongu served as the single rural site. Mongu District is a rural agricultural/livestock area strong in local tradition, and USAID/Zambia requested its inclusion in the study because of its increasing HIV prevalence (31%-37%). The study examined the Adolescent Reproductive Health Association (ARHA) YPE program carried out in collaboration between the Mongu District DHMT, the YWCA Western Regional Office, and the Barotse Royal Establishment (Paramount Chief and Council of Elders for Western Province). This includes the DHMT's medical clinics and VCT centers. The two clinics included in the study were Prisons and Urban. Peer educators from ARHA ran the YFCs in both Prisons and Urban clinics and referred youth primarily to these two clinics.

## **B. Terminology for Peer Educator Activities – Codes for Log Records**

*Counseling:* The peer educator is providing counseling to a participant about a specific topic. For example, they counsel a participant on whether HIV or STI testing is right for them, or on contraception and sexual relationships.

*Encounters (spontaneous, informal):* This refers to situations when the peer educator did not plan to talk to a person or group but did talk to a person or group about reproductive health or HIV and AIDS, etc. This could happen because a person came up to them and asked a question, or the peer educator was hanging out with their friends and provided information or advice on a topic related to reproductive health or HIV and AIDS. This includes when a peer educator influences attitudes, for example, gender or stigma norms. This code was used only when the activity was not planned but just came up. Most likely this was the hardest activity for the peer educators to remember because they tend to provide unplanned information and/or advice frequently to their friends or families informally.

*Home visits/door-to-door:* These occur when a peer educator visits the home of a participant. To use this code, the peer educator made a trip to a person's home to talk to them.

*Lectures and workshops:* Used for formal sessions where information is shared or conveyed to participants. These events are usually pre-planned and contain a group of participants and someone (or a small group) who leads/teaches the lecture or workshop. Lectures and workshops usually take more time to set up and complete than other activities. Additionally, the participants of lectures/workshops are usually a more "captive" audience because they may have been invited prior to the event, and/or the event takes place in a specific room or building.

*One-to-one discussions:* When the peer educator talks to someone one-on-one (i.e., it is just the two of them). One-to-one discussions were used to clarify issues with participants or to provide them with additional information on a one-to-one basis. This activity can happen anywhere.

*PE meetings:* The peer educators attend meetings held for the peer educators. During these meetings peer educators may hear about what other peer educators have been doing or receive assignments or meet with a team of researchers to talk about their program. If, however, the peer educators receive instruction or training, then the activity should be coded "training sessions."

*Referrals:* The peer educator provides a referral to a participant to receive additional services. This could be a referral to the clinic for HIV/STI testing or pregnancy testing or a referral to a person such as a social worker or legal aid, etc.

*Training:* The training code should have been used whenever the peer educators were learning new information or received a refresher course.



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