Effective strategies to improve health worker performance in delivering adolescent-friendly sexual and reproductive health services

https://doi.org/10.1515/ijamh-2019-0245
Received November 27, 2019; accepted March 22, 2020; published online November 12, 2020

Abstract

Background: Despite recognition of the important role of health workers in providing adolescent-friendly sexual and reproductive health services (AFSRHS), evidence on strategies for improving performance is limited. This review sought to address: (1) which interventions are used to improve health worker performance in delivering AFSRHS? and (2) how effective are these interventions in improving AFSRHS health worker performance and client outcomes? Methods: Building on a 2015 review, a search for literature on 18 previously identified programs was conducted to identify updated literature and data relevant to this review. Data was systematically extracted and analyzed. Results: Due to the parent review’s eligibility criteria, all programs included health worker training. Otherwise, supervision was the most frequently reported intervention used (n=10). Components and methods related to quality of trainings and supervision varied considerably in program reports. Nearly half of programs described employing processes to ensure availability of basic medicines and supplies (n=7). Other interventions (policies, standards, and job descriptions [n=5]; refresher trainings [n=5]; job aids or other reference material [n=3]) were less commonly reported to have been employed. No discernible patterns emerged in the relationship between interventions and outcomes of interest. Conclusions: Multi-faceted complementary strategies are recommended to improve health worker performance to deliver AFSRHS; however, this was uncommonly reported in the programs that we reviewed. Effectiveness and cost-effectiveness evaluations of interventions and intervention packages are needed to guide efficient use of limited resources to enhance health worker capacity to deliver AFSRHS. In the interim, programs should be developed and implemented based on available existing evidence on improving health worker performance within and outside adolescent health. Implications and contribution: This review is the first to examine the interventions commonly used to improve health worker performance in delivering AFSRHS. The findings indicate a need for additional effectiveness and cost-effectiveness evaluations of such interventions. In the meantime, existing evidence on improving health worker performance within and outside adolescent health must be integrated more thoughtfully into program planning and implementation.

Keywords: adolescent-friendly health services; adolescent sexual and reproductive health; health worker performance.

Introduction

Adolescent-friendly health services (AFHS) are defined as those that are accessible, acceptable, equitable, appropriate, and effective [1]. Adolescent-friendly health workers are a crucial component of AFHS, and require specific competencies (defined as the knowledge and skills to carry out their required roles and responsibilities, as well as judgment on when to do so) and attitudes to provide evidence-based, non-judgmental and non-discriminatory care, especially with regards to sexual and reproductive health (SRH). Specifically, they must be able to consider the evolving cognitive, emotional, and social capacities of adolescents, and
understand and evaluate each adolescent as an individual at a specific point of development within a unique social context. Furthermore, health workers should have a clear understanding of their roles and responsibilities, be supported to carry them out, and be held accountable for doing so.

Despite numerous systematic reviews of strategies to improve health worker performance in LMICs [2–20], extensive evidence shows that health worker performance in low- and middle-income countries (LMICs) is often inadequate [21–29]. Additionally, despite wide recognition of the important role of health workers in providing AFHS, there is little evidence synthesized on optimal interventions (or packages of interventions) for improving health worker performance in delivering adolescent-friendly SRH services (AFSRHS). Existing reviews typically focus on one intervention, limiting opportunities to compare effectiveness across types of interventions [2]. Meanwhile, decision-makers commonly ask broad questions and want to know, in general terms, which particular interventions (or packages of interventions) will be most cost-effective and have the greatest impact on improving health care worker performance for AFHS, especially AFSRHS.

Therefore, this review aims to examine interventions (or packages of interventions) used to improve health worker performance in delivering AFSRHS. To achieve this aim, this review sought to answer the following research questions: (1) which interventions (or packages of interventions) are used to improve health worker performance in delivering AFSRHS? and (2) how effective are these interventions (or packages of interventions) in improving health worker performance for AFSRHS delivery, client satisfaction, and health outcomes?

Methods

In 2015, our group conducted a review of effective interventions to improve AFSRHS, which identified four important components in improving uptake of SRH services or commodities and related clinical outcomes among adolescents: (1) generating demand among adolescents, (2) sensitizing communities to improve acceptability of SRH services for adolescents, (3) modifying facilities to make them more adolescent-friendly (e.g., expanded out-of-school hours, structural elements to maintain privacy and/or confidentiality), and (4) providing health workers with training to improve their competencies, attitudes, and practices in providing AFSRHS [30]. In this current review, we focused on the last component and closely re-examined the 18 programs in the original review to assess the types and characteristics of trainings that were provided, as well as other interventions used to improve health worker performance, and their effects on outcomes of interest.

Workforce performance is influenced by many factors interacting in a complex fashion at multiple levels – from national policies and regulatory frameworks across sectors (e.g., finance, health, education) to individual health worker characteristics and circumstances [31]. In this review we focus on workplace level interventions that might influence health worker performance.

Dieleman and Harnmeijer noted that there are an “abundance of theories” explaining health worker behaviors and practices, but evidence of the extent to which these theories actually predict behaviors and practices is limited and studies on health worker performance in LMICs are not often based on an individual theory or specific combination [31]. Therefore, we did not limit this review to programs utilizing a specific theory of change and included programs regardless of whether any theoretical approach was used. Our conceptual framework was that interventions that increase health worker competencies (e.g., knowledge and understanding of how to provide evidence-based care, skills in providing such care) and/or attitudes (e.g., non-judgmental attitudes towards adolescent sexuality) could lead to changes in performance1 (e.g., adherence to evidence-based care guidelines, empathetic communication with clients), which could in turn result in improved client satisfaction, increased health services utilization, and/or improved health outcomes – the latter mediated through increased service utilization and/or improved quality of delivered care.

Search strategy

Information was drawn from existing literature identified in the parent study [30]. In addition to the publications on the programs examined in our 2015 review, PubMed, Google and Google Scholar were searched for more recent literature on these programs, which may have been subsequently published [30]. Specifically, the strategy included search terms for names of programs, authors, and locations.

1 The World Health Organization defines health worker performance as a workforce that is available, competent, productive and responsive [65]. In this review, we included the latter components, but did not assess availability (e.g., retention, lack of absenteeism). Competency includes provision of care and advice that is adherent to guidelines. Productivity includes number of visits, services, or commodities provided. Responsiveness includes client perceptions of quality of care.
The inclusion and exclusion criteria, as was used in our 2015 review, followed a World Health Organization framework typology for systematic reviews [32].

**Data extraction**

The health worker performance interventions used by the programs were assessed and classified as: health worker trainings; refresher trainings; job aids/desk references/other written or electronic reference materials; processes to ensure that basic medicines/supplies/equipment are in place; policies/standards/job descriptions; and supervision, including trainings for supervisors. These categories were generated based on groups in existing literature, and were refined based on the descriptions of the interventions used by the programs.

**Outcome measures**

The outcome measures extracted in this review included several that were included in the original review (and updated for this review), including patient satisfaction, health service and commodity utilization, and biologic outcomes. We also included several new outcome indicators more proximally related to the interventions under study in this paper, including health worker competencies, attitudes, and practices.

**Findings**

Our original review included 18 programs; one program that was included in the parent review was excluded from this review due to lack of accessibility of the original article [33]. The search for updated information on the programs identified a scale-up follow-on of one of the original studies [34] that differed in approach from the initial project [35]; hence we assessed this as an independent program. Table 1 contains descriptions of the 18 programs included in this review and abstracted evidence on the interventions and outcomes of interest.

**Description of study designs**

Study designs included: case-control pre- and post-intervention assessments (n=10), case-control post-intervention assessments (n=4), pre- and post-intervention assessments (n=2), post-intervention assessments (n=1), and longitudinal assessments of health service utilization data (n=6). With regards to methods for assessing health worker performance, adolescent mystery client visits were the most common method reported, followed by in-depth interviews and focus group discussions.

**Overview**

Due to the content area of the 2015 parent review's eligibility criteria, all of the programs included health worker trainings on AFSRHS [30]. Among the other health worker performance interventions, the most frequently reported was supervision (n=10), followed by processes to ensure that basic medicines/supplies/equipment are in place (n=7), policies/standards/job descriptions (n=5), refresher trainings (n=5), training for supervisors (n=5), and job aid/desk reference/other written or electronic reference material (n=3). The majority (n=14) of the studies reported implementing two or fewer health worker performance interventions beyond trainings, including four that did not report any interventions beyond trainings.

**Trainings**

Most descriptions of the trainings were limited and did not include specific information of interest to this review. Training content was primarily described as ASRH curriculum (n=12), communication techniques (n=4), and counseling techniques (n=4), while the remainder were not specified (n=3). Only four programs described their trainings as interactive and/or participatory.

Training of trainers (TOT) strategies were reported in seven programs. Of these, one described using a training consultant and another reported using a training group (consisting of Ministry of Health (MOH) staff, program technical officers, and training consultants) to train trainers, while five programs did not specify the training personnel type. The remaining programs delivered trainings directly to health workers by MOH staff (n=1), program staff (n=2), or unspecified personnel (n=8). Training manuals were mentioned in six of the 18 programs, while training manuals for TOTs were mentioned in five of the seven programs using this approach.

Training location was noted for 10 programs; only one described conducting the trainings at service providers' work sites, while the remainder were noted as off-site. Training durations were usually not indicated (n=10), but when specified ranged from 3 to 5 days (n=2) or 6 to 10 days (n=4). Only one program specified training group size, with an average of 27 trainees per session, and no program
Table 1: Characteristics and evidence from included studies.

| Reference | Primary project/program aim and components | Target population | Location | Overview of health worker performance interventions | Study design | Sample size | Intervention specifics in the following domains: | Outcomes related to: | Comments | Conclusions |
|-----------|------------------------------------------|------------------|----------|-----------------------------------------------------|--------------|-------------|------------------------------------------------|------------------|-----------|-------------|
| African youth alliance (AYA) study [36–37] | Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service provider training, facility improvements, youth input, peer educators, and community sensitization. | 10–24 year-olds | Implementation sites throughout Botswana included four IPPF affiliated clinics and 16 government clinics. | 55 trainers underwent a 10 day training conducted by a team consisting of MOH staff, the program technical officer for AFHS, and a training consultant hired by AYA, using Pathfinder’s “Adolescent Sexual and Reproductive Health: A Training of Trainers Manual”. Trainers were selected by district matrons based on previous experience in working with adolescents and with providing SRHS. | | | A: Not reported | A: Health worker competencies | Surveys of adolescents were conducted for other AYA country programs, but not in Botswana due to resource constraints and the long lag period between the end of country program operations and the initiation of the survey-based evaluation. |
| | | | | | | | B: Not reported | B: Health worker attitudes | | |
| | | | | | | | C: Not reported | C: Health worker practices | | |
| | | | | | | | D: The Botswana ASRH training manual for service providers was developed to include international covenants, national policies, standards of practice, and institutional procedures. | D: Patient satisfaction | | |
| | | | | | | | E: Quarterly monitoring visits conducted by MOH and AYA staff. Monitoring team discussed with health workers implementation of the quality improvement plan, challenges and how to address them. Training courses held for 33 clinic supervisors. It was noted that this resulted from post-provider training surveys demonstrating that providers felt that supervisors were the main barriers to implementing AFHS strategies and that it was necessary to sensitize supervisors to the need for AFHS and what it included. Supervisors were trained using Pathfinder’s “Supportive Supervision for YFS Training Manual.” The training included information on AFHS, QI processes, and supervisory skills (including how to use a YFS supervision checklist). | E: Health service and commodity utilization | | |
| | | | | | | | F: Not reported | F: Biologic outcomes | | |
### Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|--------------------------------------------|-----------------------------------------------|-----------------------------------------------|----------------------|---------|
| AYA study [37–40] Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service provider training, facility improvements, youth input, peer educators, and community sensitization. 10–24 year-olds Implementation in 20 of Ghana’s 110 districts; facilities included five IPPF affiliated, 12 Christian health association of Ghana (CHAG), and 51 Ghana Health Service (GHS) public clinics. | 186 trainers were trained using either the GHS adolescent health training manual complemented by additional activities from Pathfinder’s AHFS curriculum or using Pathfinder’s AFHS training manual, which covers ASRH more extensively than the GHS manual, which covered adolescent health more generally. CHAG trainers were trained using Pathfinder’s YFS training manual. IPPF staff were trained using IPPF training manuals in the 1st year, while AFHS training manual was used in the 3rd year. Trainers were selected by district matrons based on previous experience and interest in working with adolescents. The CHAG-trained trainers conducted step-down training of CHAG facility-level staff. 685 service providers were trained. 22 trained 18–24 year-olds conducted 60 mystery client visits to the 14 IPPF and CHAG program facilities. Comparison of post-intervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities, compared to those from control communities. | A: Not reported  
B: Not reported  
C: Implementation activities not described; however, during assessments of facilities, they scored highly on provision of a minimum package of services and having sufficient supplies of commodities at baseline and at endline with some improvement in endline scores.  
D: Not reported  
E: “Regular supervision by trained supervisors and AYA/Pathfinder staff” to ensure quality of services; also reviewed planned activities and implementation status, discussed new developments, personnel issues, staff time, client attendance, and solicited feedback from clients, if available. | A: Not reported  
B: Not reported  
C & D: Qualitative mystery client visit data identified positive facility attributes. Areas found to require improvement included: Service providers with biases against providing services to adolescents and insufficient counseling on STIs, HIV/AIDS, and condom demonstrations.  
E: Reported use of condoms and contraceptives were assessed among 17–22 year olds. Many baseline reported behaviors regarding SRH commodity use were better among males prior to exposure to intervention. SRH commodity use was significantly higher among intervention exposed compared to control females; no statistically significant difference was found among males. Measure of change from baseline comparing exposed to unexposed was not provided, nor was data from individuals in intervention areas reporting no exposure to the intervention. There was a steady increase in clinic attendance over four quarters, but then a decrease in the final quarter. Significance testing was not provided.  
F: Not reported | Evaluation data was collected from a subset of program facilities. For example, no mystery client visits of GHS public clinics were conducted. There was some contamination of control communities due to mass media and peer education intervention components. |
Table 1: (continued)

| Reference | Primary project/program aim and components | Target population | Location | Overview of health worker performance interventions | Intervention specifics in the following domains: |
|-----------|--------------------------------------------|-------------------|----------|---------------------------------------------------|-----------------------------------------------|
| AYA study [37, 39, 41, 42] | Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service provider training, facility improvements, youth input, peer educators, and community sensitization. | 10–24 year-olds | Tanzania’s 129 districts. | # Surveyed: |

*Exposed* (i.e., intervention group):

M: 952
F: 1036

*Unexposed* (i.e., control group):

M: 628
F: 800

Longitudinal assessment of facility health service utilization data.
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|-------------------------------------------|--------------------------------------------------|-------------------------------------------------|---------------------|----------|
|           | Study design | Sample size | A: Refresher trainings | A: Health worker competencies | |
|           |               |           | B: Job aid/reference materials | B: Health worker attitudes | |
|           |               |           | C. Processes to ensure that basic medicines/supplies/equipment/services are in place | C: Health worker practices | |
|           |               |           | D: Policies/standards/job descriptions | D: Patient satisfaction | |
|           |               |           | E: Supervision | E: Health service and commodity utilization | |
|           |               |           | | F: Biologic outcomes | |

services; also reviewed planned activities and implementation status, discussed new developments, personnel issues, staff time, client attendance, and solicited feedback from clients, if available. Timing of visits was in accordance with the trained supervisors’ schedules. Additionally, a minimum of one monitoring visit by AYA/Pathfinder staff was conducted; included collection and analysis of facility service statistics. Training was provided to approx. 75 supervisors using Pathfinder’s “Supervision Training Manual”. Supervision guidance tools were also provided to facilitate comprehensive monitoring of AFHS. Supervisor training was oriented to provide “information and skills needed to help their providers adopt positive attitudes and practices for providing AFHS, understand and improve ASRH care, and learn monitoring and evaluation skills.”

AYA study [37, 39, 43, 44] Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service 20 trainers were trained by a consultant from Pathfinder on planning, conducting, and evaluating trainings, and addressed aspects of training A: Average service provider pre- and post-test scores were 50 and 70%, respectively. B: Not reported outside mention of one service

Evaluation data was collected from a subset of program facilities. There were data limitations due to lack of service statistics, lack of males. Change from baseline not reported, nor was data from individuals in intervention areas reporting no exposure to the intervention.

Increase in clinic attendance in first quarter and then a leveling off for subsequent quarters. Significance testing was not provided.

F: Not reported

those from control communities.

# Surveyed:
“Exposed” (i.e., intervention group):
M: 492
F: 843

“Unexposed” (i.e., control group):
M: 229
F: 336

Longitudinal assessment of facility health service utilization data.

AYA [37, 39, 43, 44] Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service

20 trainers were trained by a consultant from Pathfinder on planning, conducting, and evaluating trainings, and addressed aspects of training

A: Not reported
B: Not reported
C: See C above. Additionally, it was noted that, during assessments of five facilities, they
provider training, facility improvements, youth input, peer educators, and community sensitization.

10–24 year-olds
Implementation in 96 facilities across 20 of Uganda’s 56 districts. (The various citations referenced either 76 or 96 program facilities across 13 or 20 districts.) Implementation of activities varied, e.g., in 20 facilities implementation was limited to training.

management. These trainers plus additional AYA-trained trainers from Botswana then participated in a seven day training on ASRH/AFHS. 28 district trainers were also trained. 202 service providers underwent training using MOH’s “National Training Curriculum for Health Workers on Adolescent Health and Development”.

Districts selected a minimum of six service providers for training—at least one from each of the program facilities. Selection criteria included having a minimum education level of four years of secondary school and previous training in reproductive health. Trainings focused on ASRH knowledge, skills, and positive attitudes.

Trained 10–24 year-olds conducted 99 mystery client visits to 22 program facilities.

Comparison of post-intervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities, compared to those from control communities.

# Surveyed:
“Exposed”

scored moderately on provision of a minimum package of services at baseline and at endline, with modest improvement.

D: Not reported
E: Monthly supervision visits by the district supervisory teams looked at services being provided, availability of supplies and procurement plans, records prepared by the service providers, and progress on other planned activities.

provider training evaluation, which noted improved attitudes toward serving adolescents.

C & D: Mystery client visit results were largely positive; for example, 82% reported being satisfied with the services overall.

E: Reported use of condoms and contraceptives were assessed among 17–22 year-olds and rates were significantly higher among females in intervention areas who reported being exposed to the intervention compared to controls at endline; no statistically significant difference was found among males. Change from baseline not reported, nor was data from individuals in intervention areas reporting no exposure to the intervention.

There was a steady increase in clinic attendance over five quarters, followed by a decrease in the final quarter. Significance testing was not provided and data was incomplete across all quarters and all facilities.

F: Not reported

analysis of data, and critical staff turnover at the end of project.

Baseline data was retroactively scored from qualitative data and the scoring of the initial assessment of facilities was not done at the time of the baseline assessments.

There was some contamination of control communities due to mass media and peer education intervention components.
Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|-------------------------------------------|-----------------------------------------------|-----------------------------------------------|----------------------|----------|
| Bhuiya et al. [45] | Make existing health services more accessible and enable adolescents to manage their reproductive health by providing a reproductive health curriculum for out-of-school adolescents, as well as health worker AFHS training, non-clinical staff AFHS orientation, and community sensitization activities. The research also aimed to evaluate the incremental impact of school-based reproductive health education and referrals to health services. | On-the-job training covered being welcoming, maintaining non-judgmental attitudes, offering minimal waiting time, privacy, confidentiality and affordable services. Quasi-experimental with longitudinal assessments comparing two intervention sites and one control site. | A: The project’s health provider training was considered to be refresher training because the providers had already received AFHS training. Therefore, the project training served to reinforce prior training. B: A flip chart on ASRH was developed and distributed to health service providers (six each in intervention clinics) as well as to teachers (I 2 and adolescent facilitators (I 1 and I 2). | A: Not reported | The study’s primary aim was to assess out-of-school and in-school reproductive health education. Since health worker training was included in both intervention groups along with the education, it is not possible to determine what contribution the health worker performance interventions had on the outcomes compared to the education and community sensitization components. |
| | | I1: Reproductive health education to out-of-school adolescents linked with AFHS. 25 service providers trained. | | | |
| | | I2: As per I 1 + school-based education and linkage with health facility. 20 service providers trained. | | | |
| | | C: Control | | | |
| | | Before and after household-based survey of adolescents intended to represent sample of adolescents in the sites. 6073 adolescents (~1000 from each intervention and control sites before and after intervention) interviewed. Also facility service utilization data. | | | |
| | | A: Not reported | | | |
| | | B: Not reported | | | |
| | | C: Not reported | | | |
| | | D: Not reported | | | |
| | | E: Not explicitly described in regard to health providers, but it appears that clinic managers were involved in monitoring and supervising the school-based component. | | | |
| | | A: Not reported | | | |
| | | B: Not reported | | | |
| | | C: Not reported | | | |
| | | D: There was no clear pattern of differences between intervention and control sites in terms of attitudes toward health facility contraceptive and STI services among adolescents (regardless of whether they had attended the health facilities); in some instances, control participants’ attitudes toward services were better than intervention participants. Authors only presented endline attitudes; changes over time were not reported. | | | |
| | | E: Condom use among unmarried adolescent males did not improve; data not presented among female participants. Utilization of SRH services increased more in the intervention clinics (especially in I 2) compared to the control clinic but statistical testing was not provided. | | | |
| | | F: Not reported | | | |
| Reference          | Primary project/program aim and components | Target population | Location                       | Overview of health worker performance interventions | Sample size | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|--------------------|--------------------------------------------|-------------------|-------------------------------|-----------------------------------------------------|-------------|------------------------------------------------|---------------------|----------|
| Cowan et al. [46, 47] | Reduce HIV and HSV-2 prevalence and change SRH-related behaviors among young people via YFHS training for clinic providers and school- and community-based interventions. Youth with mean age of 15 years South-eastern provinces in Zimbabwe | Five day residential adolescent-friendly clinic training for at least one nurse in each intervention clinic. On-site training provided for remaining intervention clinic staff. Cluster randomized trial with baseline and end-of-study (at four years) surveys of the population within the communities. 15 intervention and 15 control communities | A: Refresher training provided after two years. B: Not reported C: Not reported D: Standards for adolescent-friendly services provision were developed by clinic nurses. They were independently assessed by these standards at six month intervals and clinics received detailed independent performance feedback. Prizes were awarded to well-performing clinics. The district nursing leadership was an integral part of this process. E: Monthly support visits by project staff: key features of clinic accessibility were assessed and provision of on-site training tailored to any deficiencies noted. | A: Not reported B: Not reported C: Not reported D: Not reported E: Health clinic supervision mentioned, but details not provided. | A: Health worker competencies B: Health worker attitudes C: Health workers practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes | There was contamination of the control site – i.e., mass media messaging reached the control site and some school interventions reached I. There did not appear to be contamination of health service interventions. Perceptions regarding contraceptive care at health facilities and STI services at pharmacies were not reported. |
| Diop et al. [48]   | Improve reproductive health among adolescents by creating a supportive environment via community sensitization activities, school-based educational activities, and AFHS through health provider training and facility improvement. 10–19 year-olds Urban communities in northern Senegal | MOH was responsible for the health service component of the project. Training of trainers: WHO curriculum "Orientation of Health Providers on Adolescent Reproductive Health" was used. Service providers working in study clinics were then trained. Training was interactive and participatory, including games, visualization exercises, debates, and group work. An additional 5 school nurses underwent the | A: Not reported B: Not reported C: Not reported D: Not reported E: Health clinic supervision mentioned, but details not provided. | A: Not reported B: Not reported C: Not reported D: There was a significant increase in perceptions among adolescents about how well they would be received for STI care in almost all groups, including control sites. Similar results were observed regarding perceptions about seeking contraceptive care at pharmacies – this may have been influenced by health education and | A: Not reported B: Not reported C: Not reported D: |
Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|------------------------------------------|---------------------------------|-----------------------------------------------|------------------|----------|
| Doyle et al., Hayes et al., Larke et al., Ross et al. [35, 49–51] | Improve SRH outcomes via a multipronged program known as MEMA kwa Vijana (MkV), which included school-based SRH education, YFHS training and capacity building, community condom | Two to four health workers from 18 government health units (and always including the staff member in charge of facilities, total of 54 trained) received a six day, participatory training, which emphasized “adopting a welcoming and non-judgmental attitude to adolescents, and same training as service providers. I 1: Clinic and community interventions I 2: As per I 1 + school-based intervention C: Control Pre- and post- (approximately 2 years after baseline) surveys of 2893 (pre) and 2738 (post) adolescents from intervention and control sites using robust household-based sampling framework. | A: Refresher trainings B: Job aid/reference materials C: Processes to ensure that basic medicines/supplies/equipment/services are in place D: Policies/standards/job descriptions E: Supervision | A: Health worker competencies B: Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes | community sensitization activities (rather than health worker performance interventions, as pharmacists and pharmacy vendors did not receive this training) or may have reflected the different attitudes toward STI vs. contraceptive care services. E: Reported use of contraception declined significantly at all sites. The authors speculate that the decrease in contraceptive use can be partially explained by a shift toward more regular sexual partners and adolescents’ perceived risk of STIs, including HIV/AIDS, decreasing compared to baseline when they reported more casual sexual encounters. Use of health services was very low at baseline and did significantly increase, but levels of use remained low. F: Not reported | A: Not reported B: Not reported C: Mystery client visit analysis was not quantitative, but generally showed that intervention health workers tended to engage in adolescent-friendly practices more often than control health workers, including A: Not reported B: Not reported C: Regular supplies of STI drugs were ensured in both the intervention and control sites.
### Table 1: (continued)

| Reference | Primary project/program aim and components | Target population | Location | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments Conclusions |
|-----------|---------------------------------------------|-------------------|----------|-----------------------------------------------|------------------------------------------------|-------------------|-----------------------|
|           | Study design Sample size |                                |          | ensuring privacy and confidentiality”. Training was conducted by local NGO staff. A training manual was developed. Training on syndromic management of STIs was provided to both the intervention and control sites’ health workers. | D: Not reported E: Quarterly supervisor visit by trained adolescent-friendly SRH supervisor in intervention sites. All sites received quarterly visits for supervision of STI treatment. | A: Health worker competencies B: Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes | being more responsive and respectful toward simulated patients and being less judgmental and informative in providing condom-related services. D: Not reported E & F: No improvement in biologic outcomes or statistically significant increase in reported use of SRHS or commodities, except for strong evidence of a modest increase in initiation of condom use prevalence among males and females. |
| Hainsworth et al. [52, 53] | Improve adolescent SRHS and reduce unwanted pregnancy, STI, HIV, and unsafe abortion incidence by establishing a network of quality services, which included facility improvements, training health workers, training peer activists, and developing and disseminating IEC materials. 15–24 year-olds Maputo, Mozambique |                                 |          | Pre-service: ASRH incorporated into curriculum at Maputo Nursing Institute. TOT: Pathfinder International and the MOH translated Pathfinder’s AFHS curriculum. During the pilot phase (4 provinces—Gaza, Maputo, Maputo City, Zambezia), 11 trainers were trained via two TOT sessions. Trainers then conducted step-down training for service providers. By 2006, 82 TOTs were trained nationally. | A: Not reported B: Not reported C: Attention was paid to ensuring that essential equipment was available. D: Not reported E: Monthly supervisory meetings were held between service providers and MOH supervisory team. Difficulties encountered were discussed and monthly service statistics were reviewed. In Maputo, two psychologists from the central hospital | A: Not reported B: Not reported C: Not reported D: Varied findings regarding indicators of adolescent satisfaction with visit to health facilities. For example, more than two-thirds of adolescents across the 3 provinces reported satisfaction with providers’ discussion of importance of condom use but less than half were satisfied with providers’ discussion of gender-based violence. | No control sites. Significance testing not provided. The authors speculate that the initial increase in pregnancy rates was due to “girls … having unprotected sex with older people during the school long vacation. As a response, the program” introduced student education on intergenerational sex as a health threat. Average number of pregnancies per female student population not... |
Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|------------|-------------------------------------------|---------------------------------------------------|-------------------------------------------------|----------------------|----------|
| Kim et al. [54, 55] | Adoption of behaviors and utilization of services among young people in order to reduce the risk of pregnancy and HIV and other STIs, primarily through a multimedia campaign to promote sexual | Trained FP providers in communication and counseling skills. One week course; one health worker from each of 26 clinics in the intervention area were trained by the Zimbabwe National Family Planning Council in interpersonal | attended the monthly meetings to provide technical assistance on counseling. It was noted that technical assistance at both the central and provincial levels was continuously provided; further information not reported. | A: Not reported | Overall, 29 and 66% reported a great and a good deal of satisfaction with the health service provider, respectively. E: Higher prevalence of reported use of services and condom use among those in intervention areas who reported being exposed to the | There was contamination at control sites. |
| | | | | B: Not reported | | |
| | | | | C: Not reported | | |
| | | | | D: Not reported | | |
| | | | | E: Not reported | | |

[Trainings included theory and practice. Topics covered adolescent development, STI prevention and treatment, HIV prevention, AIDS, counseling, contraceptive options, pregnancy, gender-based violence, gender, and making services more adolescent-friendly. Service providers were selected for trainings if they were willing to work with adolescents, willing to learn, friendly, open, able to communicate, and able to treat people with respect. Longitudinal comparison of clinic attendance records at program start in eight clinics in three provinces at one and two years post-implementation. Additionally a satisfaction survey in 14 AFHS facilities was conducted; 1400 adolescents were interviewed by trained peer educators. Program then scaled up nationally over the subsequent six years.]

Denno et al.: Health worker performance for ASRH services
Table 1: (continued)

| Reference                  | Primary project/program aim and components | Target population | Location | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|----------------------------|-------------------------------------------|-------------------|----------|----------------------------------------------------|-------------------------------------------------|----------------------|----------|
|                            |                                          |                   |          | Study design                                       | A: Refresher trainings                           | A: Health worker competencies |                     |
|                            |                                          |                   |          | Sample size                                        | B: Job aid/reference materials                    | B: Health worker attitudes |                     |
|                            |                                          |                   |          |                                                    | C: Processes to ensure that basic medicines/supplies/equipment/services are in place | C: Health worker practices                     |                     |
|                            |                                          |                   |          |                                                    | D: Policies/standards/job descriptions             | D: Patient satisfaction   |                     |
|                            |                                          |                   |          |                                                    | E: Supervision                                    | E: Health service and commodity utilization |                     |
|                            |                                          |                   |          |                                                    |                                                   | F: Biologic outcomes     |                     |
|                            |                                          |                   |          |                                                    |                                                   |                       |                     |

Denno et al.: Health worker performance for ASRH services

LaVake et al., Neukom et al. [56, 57]
Prevent HIV/AIDS and unplanned pregnancies by encouraging youth to reduce sexual activity and/or use condoms and seek treatment for STIs through franchising clinics into a network ("Top Réseau") of youth-friendly clinics meeting minimal standards, subsidizing services, peer educators, community-based activities and mass media. 15–24 year-olds, although target groups were expanded to vulnerable populations outside this age group four years into the program and in the past four years the program has been expanded to include all low and middle income men and women. Also included a health worker component to improve access to reproductive health services. 10–24 year-olds, as well as four towns in rural districts.

Doctors and other clinic staff receive training, education, and support services from Top Réseau/Population Services International (PSI) staff. Program evaluation, including field visits, document reviews and interviews with "program and senior management, field managers and staff, outreach workers, network doctors, and a client". Before and after comparison of clinic attendance records at participating clinics. Program started with 30 providers in 17 private clinics (mostly for-profit). Expanded to a total of 170 providers and 140 clinics (latest figures available as of 2010).

A: Opportunities provided for continuing education to motivate providers to comply with franchise requirements. Additional opportunities for ongoing training to further improve services quality noted as a lesson learned. Doctors also "benefit from regular interface, exchange and support from program team members such as regional supervisors, medical delegates, interpersonal communication agents … [and] opportunities to meet and share technical ideas … on at least a semester basis."

B: Top Réseau developed a curriculum and handbook for training providers on AFHS, as well as operations manuals, client kits, technical reference descriptions.

B: Quantitative data was not reported on this outcome measure; however, it was noted that providers saw disadvantages to joining the franchise, such as loss of autonomy including due to the program supervisors. This was offset somewhat by regular feedback, and providers identified the training opportunity as a major benefit to membership.

C: Not reported

D: Exit interviews and mystery clients were used to ensure adherence to franchise standards, but results were not reported.

E: Numbers of adolescent visits to the franchise clinics increased as the franchise expanded (from less than 5000 clients not reported). No control data. Mystery client data not provided. Clinic attendance data estimated from figures.

In year 9, the program created a parallel franchise to serve non-adolescents with SRHS. This resulted in parallel supervisory systems which program management and doctors found complicated and cumbersome. This, along with other factors, led to the expansion of the scope of Top Réseau.
| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|------------------------------------------|-----------------------------------------------|-----------------------------------------------|-------------------|---------|
|           | **A:** Refresher trainings                | **A:** Health worker competencies             |                                 | **A:** Health worker competencies | **A:** Health worker competencies |
|           | **B:** Job aid/reference materials         | **B:** Health worker attitudes                |                                 | **B:** Health worker attitudes | **B:** Health worker attitudes |
|           | **C:** Processes to ensure that basic medicines/ | **C:** Health worker practices                |                                 | **C:** Health worker practices | **C:** Health worker practices |
|           | supplies/equipment/services are in place  | **D:** Patient satisfaction                    |                                 | **D:** Patient satisfaction | **D:** Patient satisfaction |
|           | **D:** Policies/standards/job descriptions | **E:** Health service and commodity utilization |                                 | **E:** Health service and commodity utilization | **E:** Health service and commodity utilization |
|           | **E:** Supervision                         | **F:** Biologic outcomes                      |                                 | **F:** Biologic outcomes | **F:** Biologic outcomes |

Tamatave, Madagascar and surrounding rural areas, later expanding to eight regions by 2011.

Adolescent visits in year one to over 110,000 in year 10. Data regarding visits per clinic were not reported.

F: Not reported

---

women of reproductive age.

newsletters, and job aids, including “flip charts, checklists, posters, and the patient register, [to] serve as tools for assuring client informed choice and following protocols and procedures.”

C: PSI ensures starter stocks of products (e.g., the pill, injectables, condoms, STI treatment kits, IUD insertion kits, and disinfection equipment) for free to the clinics. As a condition of membership, the clinics must ensure sufficient stock of FP methods, condoms, and condom demonstration models and meet minimum equipment stipulations.

D: “All franchise clinics meet minimum ‘youth-friendly’ standards relating to facilities, administrative systems, and staff and providers—latter characteristics included: Trained to serve youth, respect for youth, maintain confidentiality and privacy, allow enough time to receive and engage in exchange with clients, and serves young men as well as young women.”

E: Monthly (at a minimum) regional supervisor
Table 1: (continued)

| Reference | Primary project/program aim and components | Target population | Location | Overview of health worker performance interventions | Intervention specifics in the following domains: | Study design | Sample size | Outcomes related to: | Comments |
|-----------|-------------------------------------------|-------------------|----------|-----------------------------------------------------|------------------------------------------------|-------------|-------------|---------------------|----------|
| Lou et al. [58] | Increase contraceptive and condom use among unmarried youth via SRH counseling and services as well as community-based information dissemination and community sensitization activities. | 15–24 year-old unmarried youth | Suburban Songjiang District, Shanghai, China | FP staff trained on improving SRHS and counseling skills for unmarried adolescents and providing youth-friendly interactions. Before and after surveys of all unmarried 15–24 year-olds, who reported being sexually active, in one intervention and one control community. Number of adolescents surveyed: Baseline: I: 1220 C: 1007 Endline: 94 and 89% of the baseline I and C participants, respectively 28 months post-endline*: I: 1157 C: 1092 *Including 15–24 year olds who were included at baseline as well as newly eligible unmarried adolescents. | A: Not reported B: Not reported C: Not reported D: Not reported E: Not reported | A: Refresher trainings B: Job aid/reference materials C: Processes to ensure that basic medicines/supplies/equipment/services are in place D: Policies/standards/job descriptions E: Supervision | A: Health worker competencies B: Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes | A: Not reported B: Not reported C: Not reported D: Not reported E: Moderate evidence of increased reported use of condoms and contraceptives as a result of the intervention. A follow-up was also conducted 28 months after the program ended. The longer-term effect at the community level (i.e., including those who were not exposed to the intervention (especially younger adolescents who “aged into” the assessment age range)) on contraceptive use did not persist. However, the increased contraceptive use effect was retained among the sub-set of adolescents who were exposed to the intervention (albeit with a diminished but still |

visits; more often “depending on the needs of the provider”. Quarterly supervisory visits by centrally based quality assurance staff for health workers who provide HIV counseling and testing or long acting contraceptive methods. PSI supervision required as a condition of membership.

Statistical analysis did not take into account clustering. Number of health workers trained and number of clinics in control and intervention sites not reported. Ability to evaluate long term impact was hampered by the non-program related SRH IEC activities that were introduced in both the intervention and control communities.
| Reference          | Primary project/program aim and components                                                                 | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|--------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|----------------------|----------|
| Magnani et al. [59] | Reduce high adolescent pregnancy rates and number of new HIV infections among young adults via pilot project consisting of health and education sector integrated interventions, including provision of SRH education and referral by teachers to “partner” public health clinics. | Overview of health worker performance interventions | A: Refresher trainings                         | A: Health worker competencies | F: Not reported |
|                    | 11–19 year olds                                                                                           | Study design                                         | B: Job aid/reference materials                 | B: Health worker attitudes         | Intervention clinics were chosen based on being a reproductive health training center, evidence of demand for adolescent reproductive health services, and health worker interest in adolescent reproductive health services. |
|                    | Bahia state, Brazil                                                                                        | Sample size                                          | C: Processes to ensure that basic medicines/supplies/equipment/services are in place | C: Health worker practices         |                      |
|                    |                                                                                                           |                                                     | D: Policies/standards/job descriptions         | D: Patient satisfaction             |                      |
|                    |                                                                                                           |                                                     | E: Supervision                                 | E: Health service and commodity utilization |                      |
|                    |                                                                                                           |                                                     |                                                 | F: Biologic outcomes               |                      |
|                    |                                                                                                           |                                                     |                                                 |                                   |                      |

“Training courses in reproductive health services for adolescents for providers who were already delivering FP services … were carried out … in 19 training sessions” in the two years prior to the study observational period. 300 physicians, nurses, and social workers, attended the sessions with others trained (number not provided) subsequently.

Quasi-experimental, with clinics and schools from same area grouped into intervention and control groups.

Six intervention clinic/school pairs evaluated, schools not participating in the pilot served as controls. Control schools matched to intervention schools on SES factors and school size. Furthermore, data from 258 non-participating public clinics served were compared to intervention clinics.

Service standards and patient satisfaction with clinic services were assessed via 385 adolescent exit interviews. Large magnitude compared to immediately at the end of the intervention. Condom use was not reported at the long-term follow-up.

F: Not reported

A: Not reported  
B: Not reported  
C: Not reported  
D: >90% of adolescents at exit interview responded positively to questions regarding service providers’ confidentiality, attentiveness, responsiveness, respectfulness, and competence; and reported that they planned to return to the clinic at some time in the future and that they would recommend the clinic to a friend. No comparison data was reported for control sites.

E: Among clinic adolescent attendees, new contraceptive user prevalence increased two years after project start, but there was no difference between intervention and control sites.

F: Not reported
| Reference | Primary project/program aim and components | Study design | Sample size | Intervention specifics in the following domains: | Outcomes related to: | Comments | Conclusions |
|-----------|------------------------------------------|--------------|-------------|-----------------------------------------------|-------------------|----------|-------------|
| Mbonye et al. [60] | Reduce unwanted pregnancies, and HIV and other STIs through a pilot YFHS program consisting of trainings and reorganization of health centers to cater to adolescents. | Trained district health management teams and four health workers per health facility in ASRH, communication, and counseling. In total 16 health workers were trained. Quasi-experimental, with four intervention and four control health centers. | A: The “Delivery for Improved Health Service Project” provided technical supervision to the project team, which included three technical supervisors. The project team worked closely with the district health team to implement the project. Training was provided to the “district health team to build their capacity for further training and supervision within the district”, based on training modules that were developed on ARH, supervision, communication, and counseling guidelines. | A: Weak evidence for improved health worker knowledge sustained at two years after the baseline survey as result of the intervention. B: Not reported C: Weak evidence for improved health worker skills as a result of the intervention. D: Not reported E: Weak evidence for increase in reported use of services and commodities as a result of the intervention. F: Not reported | Control health centers were comparable in terms of level of service delivery, catchment size, and population characteristics. Statistical analysis did not take into account adjusting for potential confounding or clustering. |
| Mmari and Magnani [61] | Improve youth health and well-being by providing | All intervention sites trained health workers to communicate with | A: Not reported B: Not reported C: Not reported | A: Not reported B, C & D: Endline scores based on interview | This study was not designed to assess effectiveness of health |
Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|---------------------------------------------|-----------------------------------------------------|-----------------------------------------------|----------------------|----------|
|           |                                             | Study design                                        | A: Refresher trainings                         | A: Health worker competencies |          |
|           |                                             | Sample size                                         | B: Job aid/reference materials                 | B: Health worker attitudes |          |
|           |                                             |                                                     | C. Processes to ensure that basic medicines/   | C: Health worker practices |          |
|           |                                             |                                                     | supplies/equipment/services are in place      | D: Patient satisfaction   |          |
|           |                                             |                                                     | D: Policies/standards/job descriptions        | E: Health service and commodity utilization |          |
|           |                                             |                                                     | E: Supervision                                 | F: Biologic outcomes     |          |
|           |                                             |                                                     |                                               |                      |          |
|           |                                             |                                                     |                                               |                      |          |

**Notes:**
- YFHS, training health workers and peer educators, and conducting community sensitization activities.
- 11–24 year olds
- Lusaka, Zambia

**Intervention specifics in the following domains:**
- A: Refresher trainings
- B: Job aid/reference materials
- C: Processes to ensure that basic medicines/supplies/equipment/services are in place
- D: Policies/standards/job descriptions
- E: Supervision

**Outcomes related to:**
- A: Health worker competencies
- B: Health worker attitudes
- C: Health worker practices
- D: Patient satisfaction
- E: Health service and commodity utilization
- F: Biologic outcomes

**Comments:**
- Statistical analysis did not take into account clustering.
### Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|------------------------------------------|--------------------------------------------------|-------------------------------------------------|----------------------|----------|
| Renju et al. [34] | School, with one treatment site consisting of STI treatment providers near the school. Students randomly selected within schools to complete surveys: 1896 completed pre- and 1858 completed post-survey. | Phased scale-up using a cascade model whereby local government officials, who had themselves been trained, conducted the training in two rounds. Rounds one and two were six days (7 h/day) and 12 days (9 h/day) in duration, respectively. On average, 27 health workers were trained/session – 429 total covering 177 (99%) of the health units in the program area. The MkV training manual, which was developed and used in the initial project (see Doyle et al. above), was used in round one of scale up. The Ministry of Health and Social Welfare (MoHSW) launched an AFHS training manual partially based on the MkV manual, which was then utilized in round two of scale up. 208 health workers were trained in | A: None (as compared to initial intervention (see Doyle et al. above)). B: Round two trainings included handouts for participants. C: Not reported D: Not reported E: Not reported | A: The scaled up training was associated with slight improvements in health worker knowledge on HIV/AIDS and puberty in both training rounds comparing pre- to post-training multiple-choice questionnaires. Knowledge on STIs only improved among round two participants. B: The scaled-up training was associated with slight to modest improvements in health worker adolescent-friendly attitudes, comparing pre- to post-training multiple-choice questionnaires, with statistically significant or nearly statistically significant differences. Interviews supported these findings; intervention health workers reported themselves to be more aware of the importance of | This follow-up study is included as a separate listing in this evidence table, because the scale-up process differed from the initial procedures as followed in the RCT (see Doyle et al. above) Authors report that “the scale up faced challenges in the selection and retention of trained health workers and was limited by various contextual factors and structural constraints” including shortages of resources and time constraints. They particularly noted that “the effect of the overall intervention was limited by the small number and high turnover of trained health workers at each facility.” The interview responses between untrained health workers in intervention health units and those from control health units differed little. The |
Table 1: (continued)

| Reference | Primary project/program aim and components | Overview of health worker performance interventions | Intervention specifics in the following domains: | Outcomes related to: | Comments |
|-----------|-------------------------------------------|--------------------------------------------------|-------------------------------------------------|---------------------|----------|
| Svd et al. [64] | Improve access to quality SRHS for adolescents by training staff in adolescent health and development, provision of basic equipment and supplies, facility improvements, setting adolescent-friendly quality standards, community mobilization with adults and adolescents, and adolescent participation in the interventions, 10–19 year-olds | Staff trained on adolescent health and development. Training included communication and counseling skills. Quasi-experimental, with comparison service utilization data and client exit surveys. All 10–19 year olds visiting the clinics (982 at 51 intervention clinics and 310 at 31 control clinics) over a one week period were approached for participation; 982 and 310 participated at intervention and control clinics, | A: Not reported B: Not reported C: Basic equipment (e.g., weight scales and contraceptives) was provided to health facilities. D: Standards of quality of care were developed based on finding from a review of Mongolian health services and a WHO global consultation on AFHS. Policies and procedures on confidentiality were developed and | A: Intervention facility staff were statistically significantly more likely to feel that their practices are adolescent-friendly and that they have competencies to deliver ASRHS. There was no difference in how they responded to questions about their ability to deliver other types of adolescent health services (e.g., general health, mental health). B, C & D: Adolescents visiting intervention facilities were generally | Pre-intervention data not provided; comparison only made between intervention and control sites. Statistical methods did not take into account differences in adolescent population size in control vs. intervention (∼1.4 times greater) communities. Health worker characteristics were related to client satisfaction; however, facility characteristics such as privacy of and adequacy of physical environment were more |

 rund one and 221 in round two. Surveys were conducted in a sample of eight health units. Interviews were conducted with all health workers at these units at baseline, 6.5, and 10 months after the training. Mystery client visits were conducted by trained adolescents blinded to intervention/control status of clinic. Two pre-intervention (control) and two post-intervention health units were selected per district, including nine dispensaries, three health centers, and four hospitals. Confidentiality, privacy, and respect for adolescents. C: Mystery client visits demonstrated improved health worker performance in condom request and FP scenario, but lower performance scores in the STI scenario in intervention compared to control sites (pre- and post-intervention data was not compared). D: Not reported E: Not reported F: Not reported authors note that this lack of difference suggests that there was little transfer of knowledge between the intervention-trained health workers and their colleagues. The authors conclude that these factors suggest that more frequent refresher training would further enhance impact. Authors also note that while the MkV and MoHSW trainings both improved health workers’ knowledge and attitudes, the effect was greatest with the MoHSW manual which was more lengthy and detailed and provided a stronger focus on key technical areas (e.g., STIs and HIV prevention, counseling and stages of adolescence).
reported on the composition of trainee groups (e.g., by health worker cadre). Only one program indicated that its curriculum was also integrated into pre-service provider training.

**Refresher trainings**

The five programs that reported refresher trainings indicated a variety of approaches. One program based their one year training-to-refresher training interval based on process evaluations, including supervisory assessments. One program provided refresher trainings after two years but did not specify the rationale for the interval. A different program considered their initial trainings to be a refresher training, as the health workers had previously received AFHS training. Another program provided various opportunities for health workers to access continuing education as an incentive mechanism for complying with program requirements. Finally, one program provided refresher trainings as part of the ongoing supervision technical support. Meanwhile, qualitative information from the reports reiterated the need for refresher trainings. For example, one report noted that while half of “nurses had
received some type of adolescent-friendly health service training … all indicated that they needed more training in working with adolescents” [61]. Another program noted that ongoing training needs assessments could be used to identify specific areas of weakness, which could then be emphasized in periodic refresher trainings [42].

**Job aids/reference materials**

Of the three programs that reported providing job aids/reference materials, one provided flipcharts to service providers. Another provided handouts to participants during refresher trainings. The other provided an assortment of materials, including flip charts, checklists, and posters.

**Processes to ensure that basic medicines/supplies/equipment are in place**

Of the seven programs that reported processes to ensure that basic medicines/supplies/equipment are in place, three used facility assessments to determine whether a sufficient supply of a minimum package of services were available. With regard to the specific medicines/supplies assessed, three programs focused on essential SRH equipment and supplies and one focused on STI medicines. Another program provided clinics with an initial starter kit of necessary supplies and equipment and subsequently used assessments of basic medicines, supplies, equipment, and services as a condition for membership in the program.

**Policies/standards/job descriptions**

Of the five programs that reported providing policies/standards/job descriptions, one developed a training manual for health workers, which included international covenants, national policies, standards of practice, and institutional procedures. The other four programs mentioned standards for the provision of AFHS; one of these specified that the standards were developed by the MOH and one specified that the standards were developed by nurses and then independently assessed.

**Supervision, including trainings for supervisors**

Ten programs reported supervisory activities using a range of approaches. All reported the frequency of supervisory visits, which occurred on a quarterly (n=4), monthly (n=4), and “regular” (n=2) basis. The supervisors themselves were described as program staff (n=5), trained supervisors (n=5), MOH personnel (n=2), regional/district supervisory teams (n=2), and/or health clinic staff/managers (n=2). The focus of the supervisory visits in five of the 10 programs was to review implementation of planned activities and identify challenges and corresponding solutions. Additionally, one of these programs provided technical assistance for the provision of counseling by trained psychologists during the supervision visits. The focus of the visits in two other programs was to assess clinic accessibility in another program, and to monitor national standards and document satisfaction of clients. Two programs did not specify the focus of the visits.

**Associations between strategies and outcomes of interest**

To attempt to link health worker performance interventions to outcomes (health worker competencies, attitudes, and practices; patient satisfaction; health service and commodity utilization; and biological outcomes), we used a number of analytic strategies. These strategies included frequency tables, heat maps by positive and negative outcomes, and cross-tabulation. However, no discernible patterns emerged in terms of the number or types of interventions and their relationship to outcomes of interest.

**Discussion**

No discernible patterns between health worker performance interventions and outcomes could be extracted through this review. The wide variety of measurement tools and techniques, time frames, and outcome indicators used in the reports prohibits direct comparisons between interventions and outcomes. Additionally, the differences in type and strength of the study designs, and the corresponding strength of the evidence, varied tremendously across programs. However, several important themes can be drawn from this analysis when considered alongside evidence from the literature on the efficacy and effectiveness of specific health worker performance interventions.

**Trainings**

Training of health workers is one of the most commonly used interventions to improve health worker performance.
[2]. It is also one of the most effective interventions for doing so, as determined by the health-care provider performance review (HCPPR), a recent systematic review of strategies to improve health-care provider performance in LMICs [2]. However, evidence clearly suggests that certain types of trainings do not substantially or sustainably improve the competencies or attitudes of health workers [2, 65]. Careful consideration must be given to the training methodologies, preparation of trainers, location, duration, and group size and composition.

With regard to training methodologies, there is good evidence that participatory and interactive methodologies are much more effective in improving health worker competencies [2, 65]. It is thus highly concerning that only four of the 18 programs explicitly described participatory and/or interactive training methodologies. Although it is possible that more of the programs used participatory and/or interactive training methodologies without reporting them, this absence of information suggests an urgent need to reassess the factors involved in health worker performance interventions that we consider important enough to report on in studies. For example, without active learning opportunities to practice knowledge and skills in response to real-life problems, health workers are less likely to develop confidence in their abilities and transfer the knowledge and skills into practice [66, 67].

Preparation of trainers has important implications for the quality of trainings [68]. The majority of programs that we reviewed did not provide any information as to how trainers were trained to carry out their duties. Further, because one-third of the programs did not specify their training personnel, let alone the preparation that was provided to them, there are major barriers to assessing the quality of the training that was delivered. However, the fact that more than half of the programs described used training manuals of some sort may have encouraging implications for the quality and consistency of trainings.

With regard to training location, evidence suggests that while off-site trainings may be more convenient for programs, on-site trainings may be more effective in building health worker competencies [65, 69, 70]. It is thus logical, but perhaps concerning, that the vast majority of the programs that reported on this aspect of trainings held them in off-site locations.

With regard to training duration, evidence supports longer durations for multi-topic trainings with interactive methodologies; however, there are practical implications. Extended durations risk drop-out and place extra burden on the health centers where the trainees work [70]. These trade-offs were reflected by the fact that that durations of trainings among the programs that specified this information ranged from three to 10 days. Evidence also suggests smaller groups allow for more participatory engagement [65, 66, 69]. Meanwhile, there is a need for more research regarding when mixed gender and mixed cadre trainings should or should not be used. It is thus disappointing that only one of the 18 programs reported training group sizes and no programs reported information on group composition.

Taken together, these findings are discouraging both in terms of the design of training interventions and the lack of information included in program reports on important features of trainings. However, these findings are also not surprising; the pressure to train large numbers of health workers within short time periods with limited financial and human resources often requires concessions, and publication standards often limit the information that can be presented in journal articles.

**Refresher trainings**

Lack of opportunities to practice newly acquired knowledge and skills will result in waning of these competencies [71–73]. With regard to AFSRHS, this may be especially relevant in clinical environments with limited adolescent patient volumes. As such, regular refresher trainings are critical for ensuring retention of skills and knowledge [73, 74]. It was thus disappointing that only five of the 18 programs reviewed reported refresher trainings, despite the recurring theme in many of the reports regarding the need for refresher trainings.

**Job aids/reference materials**

It is well-established that disseminating job aids/reference materials as a solo intervention is generally ineffective at improving health worker performance [2]. However, combined with other interventions (such as trainings, peer group discussions, or supportive supervision) these materials can support health worker performance – if the information is accessible and relevant and if health workers are confident that the information is accurate [65]. It is worth noting that only three of the 18 programs in this review reported this potentially useful to ensure that basic medicines/supplies/equipment are in place.

Lack of medicines, supplies, equipment, infrastructure, and essential amenities such as water supply, sanitation and electricity are common problems that impede the ability of health workers to provide health services, including AFSRHS [31]. These health systems factors are often overlooked during program design and
implementation. Our findings echoed this problem, as less than half of programs reported processes to ensure that basic medicines/supplies/equipment/services were in place.

Policies/standards/job descriptions

Policies and standards communicate approved norms to health workers, and job descriptions clarify their roles and responsibilities. When they are communicated and applied, these types of guidance can help health workers be clear about what they are and are not responsible for, and may help improve job satisfaction [65, 74]. As only five of the 18 programs reported developing and/or providing policies, standards, and job descriptions, this appears to be an under-utilized intervention.

Supervision

Supervision can be a powerful tool to support health workers to carry out their roles and responsibilities and hold them accountable for doing so. While supervision on its own has been shown to have only moderate effects on performance, evidence suggests that alongside additional interventions, supervision can improve performance, increase motivation, and enhance job satisfaction [2]. The increasing attention to supervision in the health sector was reflected in the findings of this review; supervision was the most frequently reported health worker performance intervention after training.

Supervision style is critically important to its success. If supervision is supportive, consistent, educational, and specific, it can have a large positive impact on health worker motivation, job satisfaction, and performance [64]. On the other hand, when supervision is purely administrative, or worse yet fault-finding or punitive, it can result in more negative than positive effects [64]. Unfortunately, supervisory systems are often of poor quality, and supervisors commonly lack the skills, tools, and time with health workers required for a supportive style of supervision. Furthermore, the focus of supervision may be less on health worker performance and health worker support and motivation and more on behaviors such as obedience, punctuality, and respectfulness [75].

Just as with trainers, the preparation of supervisors is critical for delivering quality supportive supervision. Supervisors are often selected based on seniority or strong performance in a previous role (i.e., health worker, administrator), which may or may not translate into strong performance as a supervisor [31]. As such, supervisors themselves also require training and support. This was reiterated in the findings of this review; for example, one program noted that health workers identified lack of support from and competing priorities of supervisors as a primary barrier to providing AFSRHS [36].

Group problem solving and collaborative learning

Although not addressed in this review, two health worker performance interventions that have potential to support AFSRHS are group problem solving and collaborative learning. While group problem solving can be used as a participatory methodology within trainings, it can also be used as a separate intervention to improve health worker performance on an ongoing basis. Delivering AFSRHS requires health workers to respond to nuanced and complex social, ethical, and legal situations – such as an adolescent who becomes pregnant but does not want her parents to know, or one who presents with abortion-related complications in a context where abortion is illegal and sexual activity at her age (even when consensual) is considered statutory rape – with sensitivity and empathy. Health workers must apply specific competencies in a specific manner and, where relevant, must recognize and put aside their own biases and beliefs to serve the best interests of their patients. Group problem solving and collaborative learning, whereby peers engage in bottom-up problem identification on an ongoing basis, share their experiences and learn from each other, can promote contextualized problem-solving and creation of communities of practice whereby quality AFSRHS becomes normalized and expected within the local health system’s environment. The HCPRR identified group problem solving as one of the most effective interventions for improving health worker performance [2].

Multi-intervention approaches

Despite being one of the most commonly used interventions, there is good evidence that the effect of training alone on health worker performance is minimal for lay health workers and only moderate for professional health workers [2]. Furthermore, while trainings may improve health worker competencies or attitudes in
the short-term (e.g., as evidenced in post-training assessments), they do not guarantee retention or translation of these new competencies or attitudes into practice in the workplace [31]. Meanwhile, evidence also suggests that multi-intervention approaches addressing multiple determinants or levers of performance, especially at various levels of the health system, may be more effective at improving health worker performance than single interventions, including training [2, 31]. However, the majority of the studies in this review reportedly used two or fewer health worker performance interventions beyond training, including four that did not report any interventions beyond training. While it is important to consider using multi-intervention approaches to take advantage of their synergies, decision-makers should be cautioned against the assumption that increasing the number of interventions will automatically increase the effectiveness of the approach in improving health worker performance [2]. Especially where resources are limited, approaches that contain fewer interventions, but which strategically select the interventions based on evidence and context and deliver them with quality and fidelity, may have greater potential to achieve the desired result.

Limitations

This review is limited in that it is not a systematic review; instead, we re-examined the programs assessed in the parent 2015 review [30]. Additionally, we were unable to identify associations between the types and combinations of health worker performance interventions and the outcomes of interest, due to a number of challenges described previously. Attempts to determine whether relationships between improved knowledge and attitudes among health workers and patient-level outcomes (e.g., patient satisfaction, health service and commodity utilization, and biologic outcomes) are mediated through improved health worker performance were similarly constrained for these reasons. Furthermore, the data included is limited to the information reported in the studies. It is possible that programs may have used interventions or achieved outcomes that were not reported, especially in journal articles which may have been constrained by publication standards which limit the information that can be presented. This may have challenged our ability to identify and describe the strategies that were employed and associate them with outcomes of interest. The lack of reported information on costs of interventions similarly hindered our ability to examine intervention cost-effectiveness.

Additionally, this review is restricted to workplace level interventions and does not address wider health systems and community factors that either help or hinder health workers’ abilities and/or motivation to apply their competencies in practice. For example, staff shortages and turnover can impact health workers’ workloads and the time available for clinical interactions with individual patients [31]. Low pay, lack of opportunity for career progression, and limited recognition has consequences for health worker motivation and retention [76]. Likewise, if there is lack of recognition of, or opposition to, the need for adolescent SRH services by the community, health workers may be unwilling to risk their reputation, or even their personal security, by providing AFSRHS [77]. Health systems and community factors are important considerations, especially given that job satisfaction and motivation can be adversely affected if health workers have the required competencies to provide AFSRHS and are obliged to do so, but are unable to because of issues outside their control. Lastly, we did not examine accountability mechanisms (i.e., that hold health workers responsible for their performance) outside of supervision. We recognize, though, that regulation through professional associations or civil society/community groups or by means of regulatory frameworks may also influence health worker performance [78].

Despite these limitations, to our knowledge this paper is the first to review the health worker performance interventions commonly used to support AFSRHS. AFSRHS require competent, confident and empathic health workers who can deliver quality services. Thus, efforts to improve health worker performance in AFSRHS need to be maximized. The findings of this review indicate that there is a critical need for ongoing and systematic evaluations of interventions to improve health worker performance to build an evidence-base for effective – and cost-effective – strategies in diverse settings. In the meantime, the evidence we do have on improving health worker performance within and outside adolescent health must be integrated more thoughtfully and concertedly into program planning and decision-making.

Research funding: This work was funded by the UNDP-UNFPA-UNICEF-WHO-World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), a cosponsored program executed by the World Health Organization (WHO).

Author contributions: VC conceived the review. DD prepared the evidence tables. MP and VC drafted the paper. DD, MP, and VC reviewed, revised, and finalized the paper.

Competing interests: Authors state no conflict of interest.
References

1. WHO. Making health services adolescent friendly: developing national quality standards for adolescent friendly health services. Geneva: WHO; 2012.
2. Rowe AK, Rowe SY, Peters DH, Holloway KA, Chalker J, Ross-Degnan D. Effectiveness of strategies to improve health-care provider practices in low-income and middle-income countries: a systematic review. Lancet Glob Health 2018;6: e1163–75.
3. Amaral JJ, Victora CG. The effect of training in integrated management of childhood illness (IMCI) on the performance and healthcare quality of paediatric healthcare workers: a systematic review. Revista Brasileira de Saúde Materno Infantil 2008;8: 151–61.
4. Knebel E. The use of manual job aids by health care providers: what do we know? Operations research issue paper 1(1). Quality assurance project. Bethesda, MD: Center for Human Services, University Research Company, LLC; 2000.
5. Knebel E. The use and effect of distant education in healthcare: what do we know? Operations research issue paper 2(2). Quality assurance project. Bethesda, MD: Center for Human Services, University Research Company, LLC; 2001.
6. Bosch-Capblanch X, Liaqat S, Garner P. Managerial supervision to improve primary health care in low- and middle-income countries. Cochrane Database Syst Rev 2011;9:CD006413.
7. Ratanawijirasin S, Soumerai SB, Weerasuriya K. Do national medicinal drug policies and essential drug programs improve drug use? A review of experiences in developing countries. Soc Sci Med 2001;53:831–44.
8. Ross-Degnan D, Laing R, Santoso B, Ofori-Adjei D, Lamoureux C, Hogerzeil H, et al. Improving pharmaceutical use in primary care in developing counties: a critical review of experience and lack of experience. In: Presented at the international conference on improving use of medicines. Chiang Mai, Thailand; 1997.
9. Briggs CJ, Capdegelle P, Garner P. Strategies for integrating primary health services in middle-and low-income countries: effects on performance, costs and patient outcomes. Cochrane Database Syst Rev 2001;4:CD003318.
10. Grace C, James J, Hadi Y. Selective review of work aids for alternative health care providers in developing countries. Report prepared for the Bill and Melinda Gates Foundation 2008.
11. Bose S, Oliveras E, Edson WN. How can self-assessment improve the quality of healthcare? Researches operations issue paper 2(4). Baltimore, MD: U.S. Agency for International Development by the Quality Assurance Project, Bethesda, MD, and JHPIEGO Corporation; 2001.
12. Witter S, Fretheim A, Kessy FL, Lindahl AK. Paying for performance to improve the delivery of health interventions in low-and middle-income countries. Cochrane Database Syst Rev 2012;2: CD007899.
13. Wootton R. Telemedicine and developing countries—successful implementation will require a shared approach. J Telemed Telecare 2001;7:1–6.
14. Wells S, Tamir O, Gray J, Naidoo D, Bekhit M, Goldmann D. Are quality improvement collaborative effective? A systematic review. BMJ Qual Saf 2017. https://doi.org/10.1136/bmjqs-2017-006926.
15. Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay C, Vale L, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. Health Technol Assess 2004;8: https://doi.org/10.3310/hta8060.
16. Siddiqi K, Newell J, Robinson M. Getting evidence into practice: what works in developing countries? Int J Qual Health Care 2005; 17:447–54.
17. Shah NM, Brieger WR, Peters DH. Can interventions improve health services from informal private providers in low and middle-income countries? A comprehensive review of the literature. Health Pol Plann 2011;26:275–87.
18. WHO. Interventions and strategies to improve the use of antimicrobials in developing countries. Drug management program. Geneva: WHO; 2001.
19. Nguyen DTK, Leung KK, McIntyre L, Ghali WA, Sauer R. Does integrated management of childhood illness (IMCI) training improve the skills of health workers? A systematic review and meta-analysis. PLoS One 2013;8:e66030.
20. Opiyo N, English M. In-service training for health professionals to improve care of the seriously ill newborn or child in low and middle-income countries (review). Cochrane Database Syst Rev 2010;4:CD007071.
21. Abas M, Baingana F, Broadhead J, Iacoponi E, Vanderpyl J. Common mental disorders and primary health care: current practice in low-income countries. Harv Rev Psychiatr 2003;11: 166–73.
22. Bickler SW, Rode H. Surgical services for children in developing countries. Bull World Health Organ 2002;80:829–35.
23. Bitera R, Alary M, Masse B, Viens P, Lowndes C, Baganizi E, et al. Quality of disease management of sexually transmitted diseases: investigation of care in six countries in West Africa. Sante 2002; 12:233–9.
24. Bryce J, Arifeen S, Pariyo G, Lanata CF, Gwatkin D, Habicht JP, et al. Reducing child mortality: can public health deliver? Lancet 2003;362:159–64.
25. Hill J, D’Mello-Guyett L, Hoyt J, van Eijk A, Webster J. Women’s access and provider practices for the case management of malaria during pregnancy: a systematic review and meta-analysis. PloS Med 2014;11:e1001688.
26. Holloway KA, Ivanovska V, Wagner AK, Vialle-Valentin C, Ross-Degnan D. Have we improved use of medicines in developing and transitional countries and do we know how? Two decades of evidence. Trop Med Int Health 2013;18:656–64.
27. Mills A, Brugha R, Hanson K, MckPake B. What can be done about the private health sector in low-income countries? Bull World Health Organ 2002;80:325–30.
28. Whitling DR, Hayes L, Unwin NC. Diabetes in Africa. Challenges to healthcare for diabetes in Africa. J Cardiovasc Risk 2003;10: 103–10.
29. Zurovac D, Rowe AK, Ochola SA, Noor AM, Midia B, English M, et al. Predictors of the quality of health worker treatment practices for uncomplicated malaria at government health facilities in Kenya. Int J Epidemiol 2004;33: 1080–91.
30. Denno DM, Hoopes AJ, Chandra-Mouli V. Effective strategies to provide adolescent sexual and reproductive health services and to increase demand and community support. JAH 2015;56:S22–41.
31. Dieleman M, Harmmeijer JW. Improving health worker performance: in search of promising practices. Geneva: World Health Organization; 2006.
32. WHO. Preventing HIV/AIDS in young people: a systematic review of the evidence from developing countries. Geneva: WHO; 2006.
33. LoveLife L. Report on activities and progress. Capetown, Parklands: LoveLife; 2004.
34. Renju J, Andrew B, Nyalali K, Kishimawe C, Katao C, Changalucha J, et al. A process evaluation of the scale up of a youth-friendly health services initiative in northern Tanzania. J Int AIDS Soc 2010;13:32.
35. Doyle AM, Ross DA, Maganja K, Baisley K, Masesa C, Andreasen A, et al. Long-term biological and behavioural impact of an adolescent sexual health intervention in Tanzania: follow-up survey of the community-based MEMA kwa Vijana trial. PLoS Med 2010;7:e1000287.
36. Youth-friendly services: African youth alliance (AYA) Botswana end of program evaluation report. Washington DC: Pathfinder International; 2005.
37. Daniels U. Improving health, improving lives: impact of the African youth alliance and new opportunities for programmes. Afr J Reprod Health 2007;11:18–27.
38. Evaluation of the African Youth Alliance Program in Ghana: Impact on sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute; 2007.
39. Williams T, Mullen S, Karim A, Posner J, et al. Evaluation of the African youth alliance program in Ghana, Tanzania, and Uganda: impact on sexual and reproductive health behavior among young people. JSI Research & Training Institute, Inc; 2007.
40. Youth-Friendly Services: African youth alliance (AYA) Ghana end of program evaluation report. Washington DC: Pathfinder International; 2005.
41. Evaluation of the African Youth Alliance Program in Tanzania. Impact on sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute; 2007.
42. Youth-Friendly Services: African youth alliance (AYA) Tanzania end of program evaluation report. Washington DC: Pathfinder International; 2005.
43. Evaluation of the African Youth Alliance Program in Uganda: Impact on sexual and reproductive health behavior among young people. Rosslyn, VA: JSI Research and Training Institute; 2007.
44. Youth-Friendly Services: African youth alliance (AYA) Uganda end of program evaluation report. Washington DC: Pathfinder International; 2005.
45. Bhuiya I, Rob U, Chowdhury AH, Rahman L, Haque N, Adamchak SE, et al. Improving adolescent reproductive health in Bangladesh. Washington DC: frontiers reproductive health program. Popul Council, Family Health Int 2004. https://doi.org/10.31899/rh4.1114.
46. Cowan FM, Pascoe SJ, Langhaug LF, Dirawo J, Chidiya S, Jaffar S, et al. The Regai Dzive Shiri project: a cluster randomized controlled trial to determine the effectiveness of a multi-component community-based HIV prevention intervention for rural youth in Zimbabwe-study design and baseline results. Trop Med Int Health 2008;13:1235–44.
47. Cowan FM, Pascoe SJ, Langhaug LF, Mavhu W, Chidiya S, Jaffar S, et al. The Regai Dzive Shiri project: results of a randomized trial of an HIV prevention intervention for youth. AIDS 2010;24:2541–52.
48. Diop NJ, Bathidja H, Toure ID, Dieng T, Mané B, RamaRao S, et al. Improving the reproductive health of adolescents in Senegal. Dakar, Senegal: Frontiers in Reproductive Health, Population Council; 2004.
49. Hayes RJ, Changalucha J, Ross DA, Gayvole A, Todd J, Obasi AI, et al. The MEMA kwa Vijana project: design of a community randomised trial of an innovative adolescent sexual health intervention in rural Tanzania. Contemp Clin Trials 2005;26:430–42.
50. Larke N, Cleophas-Mazige B, Plummer ML, Obasi AI, Rwakatare M, Todd J, et al. Impact of the MEMA kwa Vijana adolescent sexual and reproductive health interventions on use of health services by young people in rural Mwanza, Tanzania: results of a cluster randomized trial. J Adolesc Health 2012;47:512–22.
51. Ross DA, Changalucha J, Obasi Al, Todd J, Plummer ML, Cleophas-Mazige B, et al. Biological and behavioural impact of an adolescent sexual health intervention in Tanzania: a community randomized trial. AIDS 2007;21:1943–55.
52. Hainsworth G. Providing sexual reproductive health and STI/HIV information and services to this generation: insights from the Geracao Biz experience. Maputo, Mozambique: Ministry of Youth and Sports, Ministry of Education, Ministry of Health, AMODEFA (Associação Moçambicana para Desenvolvimento da Familia) and youth associates, UNFPA, Pathfinder International; 2002.
53. Hainsworth G, Zilhao I. From inception to large scale: the Geracao Biz Programme in Mozambique. Geneva: WHO, Pathfinder International; 2009.
54. Kim YM, Kols A, Nyakauru R, Marangwanda C, Chibatamoto P, et al. Impact of the promotion of youth responsibility project campaign on reproductive health in Zimbabwe. Baltimore: Johns Hopkins University/Center for Communication Programs; 1998.
55. Kim YM, Kols A, Nyakauru R, Marangwanda C, Chibatamoto P, et al. Promoting sexual responsibility among young people in Zimbabwe. Int Fam Plann Perspect 2001:27. https://doi.org/10.2307/2673800.
56. LaVake SD. Applying social franchising techniques to youth reproductive health/HIV services. Arlington, VA: Family Health International, YouthNet Program; 2003.
57. Neukom J, Ashford L. Changing youth behaviour through social marketing: program experiences and research findings from Cameroon, Madagascar, and Rwanda. Washington, DC: Population Services International, Population Reference Bureau; 2003.
58. Lou CH, Wang B, Shen Y, Gao ES, et al. Effects of a community-based sex education and reproductive health service program on contraceptive use of unmarried youths in Shanghai. J Adolesc Health 2004;34:433–40.
59. Magnani RJ, Gaffikin L, de Aquino EM, Seiber EE, de Conceição Chagas Almeida M, Lipovsek V. Impact of an integrated adolescent reproductive health program in Brazil. Stud Fam Plann 2001;32:230–43.
60. Mbonye AK. Disease and health seeking patterns among adolescents in Uganda. Int J Adolesc Med Health 2003;15:105–12.
61. Mmari KN, Magnani RJ. Does making clinic-based reproductive health services more youth-friendly increase service use by adolescents? Evidence from Lusaka, Zambia. J Adolesc Health 2003;33:259–70.
62. Coplan P, Okonofua FE, Oronsaye F. Impact of an intervention to improve treatment-seeking behavior and prevent sexually transmitted diseases among Nigerian youth: a randomized control trial. In: 39th Interscience conference on antimicrobial agents and chemotherapy. San Francisco, CA: 1999.
63. Okonofua FE, Coplan P, Collins S, Oronsaye F, Ogunsakin D, Ogonor JT, et al. Impact of an intervention to improve
treatment-seeking behavior and prevent sexually transmitted diseases among Nigerian youths. Int J Infect Dis 2003;7:61–73.

64. Sovd T. Assessment of adolescent-friendly health services initiative in Mongolia. Ulaanbaatar, Mongolia: WHO, Ministry of Health Mongolia, UNFPA; 2004.

65. Smith A. Chapter four: making the most of the existing health workers. World health report 2006: working together for health. Geneva: World Health Organization; 2006.

66. Davis D, O’Brien MA, Freemantle N, Wolf FM, Mazmanian P, Taylor-Vaisey A. Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? J Am Med Assoc 1999;282:867–74.

67. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance. A systematic review of the effect of continuing medical education strategies. J Am Med Assoc 1995;274:700–5.

68. Mormina M, Pinder S. A conceptual framework for training of trainers (ToT) interventions in global health. Glob Health 2018;14:100.

69. Bluestone J, Johnson P, Fullerton J, Carr C, Alderman J, BonTempo J. Effective in-service training design and delivery: evidence from an integrative literature review. Hum Resour Health 2013;11:51.

70. Rowe AK. Health care provider performance review: presentation in Washington, DC for USAID and other partners. 2015 Powerpoint. Available at: <http://www.worldbank.org/content/dam/Worldbank/Event/SIEF/20140905-quality-of-health-care-services-products/01-Health-care-provider-performance-review-Alexander-Rowe.pdf>.

71. Venkatachalam J, Kumar D, Gupta M, Aggarwal AK. Knowledge and skills of primary health care workers trained on integrated management of neonatal and childhood illness: follow-up assessment three years after the training. Indian J Pubs Health 2011;55:298–302.

72. Steinhardt LC, Onikpo F, Kouamé J, Piercefield E, Lama M, Deming MS, et al. Predictors of health worker performance after integrated management of childhood illness training in Benin: a cohort study. BMC Health Serv Res 2015;15:276.

73. Lehmann U, Sanders D. Community health workers: what do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers. Geneva: WHO; 2007.

74. Franco LM, Bennett S, Kanfer R. Health sector reform and public sector health worker motivation: a conceptual framework. Soc Sci Med 2002;54:1255–66.

75. Dovlo D, Sagoe K, Ntow S, Wellington E. Ghana case study: staff performance management. In: Reforming health systems. Liverpool: Liverpool School of Tropical Medicine; 1998.

76. Bhatnagar A, Scott K, Govender V, George A. Pushing the boundaries of research on human resources for health: fresh approaches to understanding health worker motivation. WHO South East Asia J Public Health 2018;7:13–17.

77. Beyond Bias: Provider survey and segmentation findings. Washington DC: Pathfinder; 2018.

78. Brinkerhoff D. Accountability and health systems: overview, framework, and strategies. Bethesda, MD: The Partners for Health Reform Project, Abt Associates Inc; 2003.