SEXUALLY TRANSMITTED INFECTIONS

A STRATEGIC FRAMEWORK

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I. INTRODUCTION

More than 300 million new cases of curable sexually transmitted infections (STI) occur throughout the world each year, with a global distribution that closely mirrors that of HIV. Each new infection increases the risk of HIV transmission and carries the potential of other serious complications including fetal loss, stillbirths, infertility, ectopic pregnancy and severe congenital infections. Syphilis alone, when present during pregnancy, results in fetal loss in a third of cases, and half the surviving infants suffer congenital disability.

HIV infection is up to ten times more common in people with current or prior STI, and the risk increases with the number of STI episodes. These estimates actually underestimate the probability that a person with STI will transmit or acquire HIV during a single sexual exposure. Estimates of the increased risk per sexual exposure range as high as 300 times when an STI is present, making control of such cofactors vitally important in reducing HIV transmission.

One reason STIs are linked to HIV infection is that similar behavior puts a person at risk for both. But there are also several biological mechanisms whereby STIs directly increase the chances of transmitting and acquiring HIV. Genital ulcers provide easy access for the virus to the bloodstream through disruption of skin and mucous membrane barriers. Other STIs have been shown to greatly increase the amount of virus in genital secretions as well as the number of inflammatory target cells that HIV needs to replicate. Effective STI treatment restores the integrity of the body's defenses, reduces the amount of virus and returns target cells to normal levels.

There are a few large-scale interventions that demonstrate the potential impact of STI control on HIV transmission. Thailand reduced the incidence of curable STIs by more than 80 percent in less than five years through a comprehensive effort that included both improved STI treatment and targeted promotion of condom use in commercial sex establishments (100 percent condom policy). HIV prevalence, which had been increasing rapidly, began to fall. Through sustained application of these interventions, Thailand stabilized HIV transmission early and averted a far more extensive epidemic.

There is also evidence that more limited STI interventions can have an impact on HIV transmission. In rural Mwanza, Tanzania, merely improving the case management of STI through the syndromic approach in clinics reduced the incidence of new HIV infection by 40 percent. In nearby Rakai, Uganda, on the other hand, mass antibiotic treatment of the sexually active population reduced neither most curable STIs nor HIV transmission. While important in defining strategies, these experiences resulted in only small reductions in the prevalence of a few STI and tell us little about the potential impact of more effective STI control on HIV transmission. More work is needed not only to clarify the link between common STIs and HIV but also to define the most effective strategies for controlling both. Meanwhile, available evidence strongly supports two conclusions with important implications for programs:

- Reducing STI prevalence to levels seen in countries with low-level HIV epidemics is feasible; and
- Doing so is likely to have a major impact on HIV transmission in countries where both HIV and STI are common.

Effective STI control can help prevent HIV epidemics in low-prevalence countries, and can help reduce the extent and impact of epidemics where HIV infection is already widespread. Providing effective curative services has been shown to enhance people's receptiveness to prevention messages (the "care-prevention synergy"), while effective prevention ultimately reduces the demand for care. As

clinical services are expanded to provide needed care and support for people living with HIV/AIDS, it is critically important to maintain vigorous HIV prevention efforts, including effective treatment of curable STIs. As potent cofactors, STIs continue to facilitate HIV transmission—in as many as 80 percent of new infections by some estimates. Investing resources to eliminate or reduce such cofactors becomes highly cost-effective when measured against the cost of providing care and support in affected communities.

This document will review strategies that have been shown to be effective in limiting the transmission and reducing the burden of sexually transmitted diseases and their sequelae. It will emphasize the major curable infections—gonorrhea, syphilis, chancroid, chlamydial infection and trichomoniasis. STI control is defined here as sustainable reduction in the prevalence of infection.

II. STATE-OF-THE-ART: A COMPREHENSIVE STRATEGY FOR PREVENTION AND TREATMENT

Despite challenges, control of STI is feasible, as demonstrated in the large differences in prevalence levels from region to region around the world. Rates of most common curable STI (and HIV) are very low in Western Europe, North America, Australia and parts of Asia. In these areas factors such as access to effective antibiotic treatment and changing patterns of commercial sex alter the conditions under which STIs thrive. But it is possible to control the common curable STIs even in situations with more intensive transmission dynamics. Significant reductions in prevalence of curable STIs have been reported from such places as Thailand, Senegal, Nairobi and parts of South Africa.

These experiences show that reducing high rates of STIs requires a comprehensive strategy for both prevention and treatment. This strategy would include such standard aspects of STI control programs as ensuring effective diagnosis and treatment, encouraging treatment compliance and partner treatment, and avoiding reinfection. Equally important, attention must be given to who uses existing clinical services and who does not. Even the most technologically advanced services will have little impact on STI prevalence if there is poor access to those services. One of the most important challenges in STI control is orienting services to reach the people who are most frequently exposed to infection and have the most opportunities to pass their infection on to others.

Figure 1 illustrates a model of STI transmission dynamics that was successfully used to guide STI control efforts in Thailand in the late 1980s. According to this analysis, most STIs were transmitted in brothel-based commercial sexual encounters. Although male clients of sex workers also acted as bridges for infection to the general population, it was argued that such secondary infections would decrease if control efforts concentrated on reducing STI transmission in commercial sexual encounters. STI rates in Thailand decreased dramatically following implementation in 1986-1987 of a program that strengthened STI prevention and treatment among sex workers and their clients and introduced quinolone antibiotics.

Figure 1 : Core group model of STD transmission dynamics

Core groups (e.g., Sex workers)	➔ ➔	**Bridge groups** (e.g., Clients of sex works, mobile men, etc.)	➔	**General population** ("Low risk")	➔	**Congenital transmission**

Another useful model (figure 2) starts with the subset of the population with STI and analyzes barriers to identification and effective treatment. Such a model is most useful for pointing out the areas in which improved services would maximize the proportion of STD cases that are effectively managed and rendered non-infectious. While improving STI care provided by health care facilities can address lower-level barriers, it should be clear that broader community-oriented approaches are needed to increase the coverage and use of those services, especially for populations at highest risk.

Figure 2: STD service delivery model

Barrier to STD control	Program objective
Many people with STI are asymptomatic or unaware of their risk.	Increased awareness of symptoms/risk.
Many people with symptoms delay seeking care or consult unqualified sources.	Improved health care seeking behavior.
Many STDs are not detected at HCFs.	Effective STD detection.
Detected STDs may be treated incorrectly.	Effective STD case management.
Reinfection is likely if partner treatment and prevention advice is neglected.	Promotion of partner treatment and prevention of reinfection.

Strategies can be formulated and adapted to local conditions by combining the above models of STI transmission dynamics and barriers to treatment. Among the components of STI control that have been effectively used together to reduce prevalence are:

- Communication strategies to promote services, improve symptom awareness and STI treatment seeking behavior.
- Efficient and effective management of STI in clinics accessible to the majority of the population, with particular attention to making services acceptable to adolescents and young adults.
- Targeted interventions to reach population groups with the greatest risk of acquiring and transmitting STI.
- Improved STI management in important informal sector outlets (such as pharmacies) where many people (especially male bridging groups) seek treatment.
- Screening or presumptive treatment of the most important core and bridging groups as short-term measures to reduce STI prevalence.
- Structural changes to modify underlying conditions that facilitate STI transmission. Examples include providing family housing for migrant workers to reduce demand for commercial sex, and promoting "safe house" rules in brothels where the pressure to use condoms comes from the management rather than from the individual sex worker.

III. FHI GOALS AND OBJECTIVES

Family Health International takes a comprehensive approach to reducing STI prevalence as an important public health objective in its own right that will also contribute to reducing HIV transmission. FHI's goal for STI control is to **achieve sustainable reductions in rates of the common curable STIs while reinforcing broader prevention behaviors that reduce risk, incidence and prevalence of both curable and incurable STIs**.

FHI has identified the following objectives for its STI programs and activities:

- Strengthen the public health response to STI through advocacy and strategic planning at central and peripheral levels.
- Improve the quality of STI preventive and curative services appropriate to local epidemiology and demand.
- Extend effective and appropriate interventions to population groups with the highest STI exposure as the most effective and efficient use of disease control resources.
- Support selective implementation of more focused disease control measures designed to rapidly reduce prevalence of specific STIs and/or their complications.
- Improve reliability and relevance of surveillance and evaluation data to guide control efforts and measure progress.

IV. FHI's TECHNICAL AND PROGRAMMATIC APPROACHES

FHI assists government agencies and nongovernmental organizations in building their capacity to plan and implement effective STI control activities. At the national level, FHI focuses on strategic planning for STI control and development of standards and technical guidance. At the implementation level, FHI supports programs and activities by local agencies through training, technical assistance, monitoring and evaluation.

Technical approach

FHI's technical strategy for STI control is summarized below as it relates to the preceding objectives.

1) Strengthen the public health response to STI through advocacy and strategic planning at central and peripheral levels.

    - Consensus and active support for STI control objectives are developed through a process of advocacy involving decision makers from government, universities, professional associations and communities. Where available, local data are collected and synthesized, and supplementary formative research and biologic studies—such as prevalence assessments and antibiotic susceptibility testing of STI pathogens—are conducted to illustrate the extent of the problem and discover the limitations of the current response. From information on prevalence, transmission dynamics and health system capacity, a situation analysis is formulated, intervention strategies selected, and evaluation and operations research plans developed to guide implementation.

2) Improve the quality of STI preventive and curative services appropriate to local epidemiology and demand.

    - More effective STI service delivery is promoted through the widest range of formal and informal sector facilities. All primary health care facilities where patients present with STI symptoms or concern about exposure should be upgraded to offer a basic range of quality preventive and curative services. The goal is to effectively manage such encounters so there are no missed opportunities, while avoiding costly over-treatment in settings where STI prevalence is low. Appropriately balancing the sensitivity of approaches to identify infection and avoid over-treatment remains a central issue in STI control and must be determined by local priorities.

    - STI case management remains an important pillar of STI control within existing networks of health care facilities, both public and private. Patients should receive effective curative care, prevention education and commodities to shorten the duration of infection and reduce the chance of a subsequent infection. This will reduce the chances of complications for the patient and secondary transmission to others.

        - The syndromic approach, endorsed by WHO/UNAIDS, has become the standard of care in many countries for management of the most common STI syndromes. By directing treatment against the common causes of easily identified disease syndromes, primary health care workers can achieve high rates of cure without the delay and cost involved with laboratory workups. Syndromic algorithms also serve to reduce treatment failures and reinfection by

stressing the importance of treatment compliance, condom use and partner treatment. Syndrome management is most effective and cost-effective for syndromes such as urethral discharge and genital ulcer disease.

- Present approaches to managing vaginal discharge syndromes in women are less accurate, and better combinations of syndromic and laboratory diagnosis and screening are needed. For now, more sensitive and costly approaches can be adapted for populations in which prevalence and exposure are relatively high, while treatment of the more common vaginal pathogens may be more cost-effective in lower-risk populations.

- Just as STI case management is only one component of an STI control program, syndrome management is only one tool for improving case management. As simpler, more affordable and accurate diagnostics become available, case management guidelines recommending combinations of syndromic and laboratory diagnostic methods will become feasible under field conditions. FHI is experienced in conducting validation studies and other operations research to help adapt existing diagnostic and treatment approaches to local needs.

- Effective management requires treatment guidelines that take into account the drug sensitivities of the STI pathogens and the STI pathogen distribution in the country or region. FHI is experienced in designing, implementing and analyzing these types of studies to develop and modify treatment recommendations.

3) Extend effective and appropriate interventions to population groups with the highest STI exposure as the most effective and efficient use of disease control resources.

   - Outreach and peer education among high transmission networks are the foundations of targeted interventions. Through active participation of the intended beneficiaries, interventions can be developed that promote trust, lend credibility to prevention messages and encourage the use of curative services.

   - Preventive and curative services for sex workers go hand in hand. Effective STI treatment reduces rates of complications as well as efficiency of HIV transmission. Women are more receptive to condom use and other prevention messages when they are delivered along with quality, non-judgmental curative services (prevention-care synergy). FHI has developed, adapted and implemented several models for providing accessible, acceptable and effective STI services for women at high risk.

   - Improve access to effective STI treatment for male bridging groups. Men often avoid seeking qualified advice and treatment for STI complaints, preferring more confidential or cheaper options such as directly purchasing drugs from pharmacies or drug vendors, or advice from traditional healers or friends. FHI is experienced in training a range of informal caregivers as well as developing prepackaged STI treatment kits and syndromic guidelines.

4) Support selective implementation of more focused disease control measures designed to rapidly reduce the prevalence of specific STIs and/or their complications.

- FHI supports categorical (disease-specific) control targets when epidemiologically important and programmatically feasible.

    - Elimination of congenital syphilis is one example. One of the major preventable causes of infant morbidity and mortality, congenital syphilis can be controlled using existing, affordable technology. One component of congenital syphilis control—improved case management of genital ulcer disease—overlaps with STI service delivery objectives by reducing sexual transmission of syphilis among adults. Another component involves strengthening antenatal services to screen pregnant women for latent infection, and provide treatment to the women and their partners.

    - Other specific STI control targets—including enhanced control of genital ulcer disease and elimination of infectious adult syphilis or chancroid—may be appropriate in some settings. High genital ulcer prevalence is a marker for poor STI control and is commonly seen in urban and other high transmission networks where migrant labor and commercial sex are common. Effectively designed targeted interventions have reduced overall GUD rates and eliminated chancroid from previously endemic areas. Such specific STI control strategies reinforce general STI service delivery and STI/HIV prevention while developing complementary intervention strategies specific to the STI target.

- Emergency measures to reduce community STI prevalence may be justified. In areas where STI transmission is high and existing services poor or inaccessible to those who need them, short-term interventions may be indicated to rapidly bring down high rates of curable STI. Presumptive (epidemiologic) treatment of core groups with high STI prevalence and exposure has been effectively used as an emergency measure to reduce STI rates. Sex workers and their clients generally have the highest STI risk and numbers of partners and are the best candidates for either one-time or periodic presumptive treatment (PPT). As STI rates come down and conditions that justify presumptive treatment disappear, other interventions—increased condom use, effective STI case management—are needed to sustain control. FHI has experience in implementing PPT interventions and tapering them as adjuncts to more comprehensive and sustainable STI strategies that are capable of maintaining lower STI rates.

5) Improve the reliability and relevance of surveillance and evaluation data to guide control efforts and measure progress.

- Principles of second-generation surveillance for HIV/STI programs emphasize the importance of collecting meaningful data appropriate to the stage of epidemic. In countries with early HIV epidemics, where infection is concentrated in core and bridging populations, prevalence of infection and related behaviors is most efficiently measured in those groups, while a wider surveillance net is cast in more generalized epidemics. Where possible, data on STI, HIV and related behavior are collected to provide a more complete picture. FHI provides technical assistance in designing and implementing STI/HIV surveillance systems, STI prevalence studies and with building capacity in data management, analysis, interpretation and dissemination.

- Quality and coverage of services are essential areas of STI process evaluation. FHI has helped to develop indicators and methods and supports evaluation capacity building at all levels of project implementation.

Programmatic approach

STI control activities must be tailored to the local context, the stage of the epidemic and existing community and national resources. FHI recognizes that learning from field experience and research results is one of the best ways to make programs more effective. This is why FHI assists in building the capacity of local implementing agencies in developing the strategies and skills for applying effective practices and lessons learned in their programs.

The FHI programmatic approach consists of a sequence of steps at the national and community levels. For each program or project, FHI builds on lessons learned and applies them in a way that is responsive to the local context, norms and values using these steps:

- Assess the availability and quality of the essential elements of STI control, the strategies for delivering them, the systems to accommodate these strategies and the opportunities to strengthen linkages.
- Facilitate strategic planning to identify and prioritize the most effective approaches based on STI prevalence and transmission dynamics, contextual factors, cost, cost-effectiveness, feasibility and sustainability.
- Assist in developing or applying national standards for STI management and tools and guidelines for implementation, monitoring and evaluation.
- Develop training plans, training tools and training in the skills necessary to deliver the essential elements of STI prevention and care.
- Forge linkages with other technical assistance organizations that can provide skills and experiences to complement and enhance those of FHI.
- Develop, implement and evaluate interventions in specific sites (intervention-linked research) to prepare for scaling-up and applying innovative approaches.
- Ensure comprehensive monitoring and evaluation within a well-developed framework.
- Work with local partners to plan on going to scale from the outset of program activities.
- Provide technical assistance to support implementation and evaluation of STI control activities.

Programmatic linkages within FHI

FHI's STI activities also will build on the agency's longstanding expertise in technical support and research in reproductive health, comprehensive HIV prevention programming, program evaluation and STI case management. Opportunities exist to coordinate STI control activities with behavior change communication (BCC), HIV voluntary testing and counseling (VCT), care and support, and mother-to-child transmission (MTCT) prevention. FHI's expertise in developing indicators for monitoring and evaluation will benefit both prevention and care programs.

V. FHI'S GUIDING PRINCIPLES

FHI's approach to implementing STI control/HIV prevention programs is guided by the following principles:

- People for whom services are intended ("target groups") must be involved in designing, planning and implementing STI control activities. Since most STI transmission takes place within sexual networks with the highest rates of partner change, effective interventions reaching core and bridging populations are essential to STI control. Implementing effective,

non-stigmatizing targeted interventions requires an appreciation and understanding of their needs as well as their active participation.

- The "prevention-care synergy." Prevention and care approaches are mutually reinforcing in several ways. Comprehensive, high-quality services create a receptive audience for prevention messages, and effective prevention ultimately reduces the demand on curative services. It also helps build trust and decrease stigmatization, particularly among marginalized populations, that is critical to the success of STI control efforts. Providing STI diagnosis and treatment, other reproductive health services, counseling and testing, care and support for HIV offers opportunities to make prevention interventions more acceptable and available and encourages those who receive such services to practice safer behaviors.

- The community must be involved in the process of planning and ensuring a network for effective STI education, referral and follow-up. This means working with local partners to promote linkages among public, private and traditional services in the community.

- STI services, like those addressing HIV directly, must address denial and stigma. These pervasive reactions to STI/HIV epidemics hamper both prevention and care efforts.

VI. ILLUSTRATIVE ACTIVITIES

FHI's STI strategy is based on solid principles of public health and social science and borrows from other effective disease control efforts. Illustrative activities are outlined in Table 1 and include:

- ***Reliable data to inform decision-making and monitor progress:*** FHI supports a range of activities to provide reliable data for decision-making, including: STI prevalence studies linked to behavioral data; formative research and situation analysis to define transmission dynamics, identify important sexual networks, etc.; special surveys to assess access to and quality of STI preventive and curative services; operations research to evaluate new methods for screening, diagnosis, treatment and prevention; antimicrobial susceptibility studies to monitor local efficacy of STI treatment regimens.

- ***Appropriate STI case management for clinical facilities serving the general population:*** FHI played a significant role in rationalizing and standardizing STI case management during the 1990s. Syndromic algorithms stressing the importance of prevention and partner treatment improved quality by reducing ineffective, incomplete and delayed treatments. To support implementation, FHI assists with developing and testing flowcharts, training and supervising health workers, upgrading health care facilities, drug and supply logistics, monitoring and evaluation. Current priorities include operations research to better tailor syndromic algorithms—with selective laboratory testing where appropriate and feasible—to local needs.

- ***Targeted interventions for core transmission*** **networks:** Recognizing the vulnerability of sex workers and their importance in STI transmission, FHI promotes improved preventive and curative services in commercial sex settings. FHI also has developed and evaluated innovative approaches in building strong peer interventions; providing accessible, non-judgmental services; validating sensitive STI screening/treatment algorithms; and using presumptive treatment to rapidly reduce STI prevalence. To assist in needs assessment and planning, a special version of the Targeted Intervention Research for Commercial Sex Settings was developed as a guide for formative research. FHI also recognizes that current interventions in injecting drug-using

populations need to include STI prevention and control as part of a comprehensive prevention strategy.

- ***Improved treatment for male bridging populations***: STI transmission is greatly facilitated by conditions such as migrant labor that separate families for extended periods. FHI has extensive experience supporting interventions for transport workers, military personnel, and in industries that employ migrant labor. Activities include peer education, condom promotion, and improved STI clinical services as well as development of STI screening algorithms for men returning home on leave.

- ***Accessible, acceptable services for youth:*** Adolescents and young adults present special challenges to STI control programs. Although rates of STI are often highest in the teens and twenties, youth are often reluctant to seek treatment at regular clinics. Many adolescents also have misconceptions about STI symptoms and what is normal for their bodies. FHI has worked to raise awareness among youth about STI symptoms and risk among broader reproductive health issues and supports peer education and innovative youth-friendly ways to provide clinical and other services.

- ***Support to categorical disease control efforts:*** Under the umbrella of general STI control/HIV prevention programs, more focused STI control objectives are often appropriate. FHI supports other interventions and operations research—for example, eliminating congenital syphilis and enhancing control of genital ulcer disease in areas where such conditions are prevalent.

Table 1. Selected STI control program activities

Strengthen the public health response to STI through advocacy and strategic planning at central and peripheral levels.	• Conduct formative research including baseline assessments of behavior, service quality and utilization. • Conduct STI prevalence surveys coordinated with HIV and behavioral data. • Conduct validation studies where indicated to evaluate existing STI case management and/or screening algorithms. • Synthesize data into situation analysis and facilitate dissemination, policy and strategy development. • Support capacity building in technical areas and program management.
Improve the quality of STI preventive and curative services appropriate to local epidemiology and demand.	• Improve awareness of STI and related health care-seeking behavior within communities. • Standardize STI case management guidelines and conduct training, monitoring, supervision, validation studies, antibiotic susceptibility studies, and ancillary operations research to assure their effective implementation. • Address health worker attitudes as a priority determinant of STI service utilization. • Emphasize health education as integral to STI prevention and case management. • Implement partner referral and treatment and conduct operations research to improve methods.
Extend effective and appropriate interventions to population groups with highest STI exposure as the most effective and efficient use of disease control resources.	• Support development of peer networks. • Conduct training for peer educators to promote prevention and utilization of services. • Support structural changes in commercial sex settings to decrease risk behavior (such as 100 percent condom policy)
Support selective implementation of more focused disease control measures designed to rapidly reduce prevalence of specific STIs and/or their complications.	• Promote enhanced control of genital ulcers as a priority STI control objective in countries where chancroid and syphilis are still prevalent. • Build antenatal syphilis screening capacity where pregnant women go for care. • Extend coverage of routine eye prophylaxis at birth.
Improve reliability and relevance of surveillance and evaluation data to guide control efforts and measure progress.	• Integrate STI surveillance into "second generation" systems according to level of STI/HIV epidemics. • Conduct community surveys to determine coverage of services. • Conduct health facility surveys to evaluate quality of services provided by formal and informal care providers.

VII. INTERVENTION-LINKED RESEARCH

Better methods are always needed to refine interventions and adapt them to local conditions. FHI supports practical intervention-linked research as an extension of its other evaluation activities. Examples of intervention-linked research priorities with potential relevance in many settings include:

- ***Raising STI awareness and promoting services***: Many people continue to spread infection because they are unaware that they have a curable condition. Some have minimal or no symptoms while others seek alternative sources of care because of confidentiality or other concerns. STI awareness campaigns can be designed to inform people and promote services. FHI provides technical assistance in designing and implementing communication interventions and in evaluating success by tracking clinic attendance rates.

- ***Providing preventive and curative services for vulnerable core groups***: Often the people most at risk of STI are the least likely to use existing services. This may be because of judgmental attitudes of staff, inconvenient clinic hours, cost or other barriers. FHI has experience implementing and evaluating STI services for sex workers and other marginalized populations though mobile and satellite STI clinics at or near places of work. Areas of intervention research include factors influencing attendance, effectiveness and efficiency of clinical algorithms, quality of services and effectiveness of counseling approaches.

- ***Developing better treatment strategies for bridging populations***: Men at high risk for STI, including clients of sex workers, often seek advice or care for STI symptoms directly from pharmacies, or from drug vendors, traditional healers or friends. A number of interventions—from educating pharmacy staff to marketing pre-packaged STI treatment/prevention kits—can improve STI treatment available to men and interrupt secondary transmission to other partners. FHI conducts intervention-linked research to evaluate factors that contribute to the success of such interventions and help in defining models that can be adapted to other settings.

- ***Developing more effective methods for assuring treatment of sexual partners of people with STI***: Although contact tracing and/or partner treatment is a recognized component of STI case management, partner treatment rates in practice are often disappointing. While recognizing the limitations of partner treatment (usually only regular, lower-risk partners are referred), innovative approaches—such as providing enhanced counseling or a second prescription to the index patient—can be evaluated.

- ***Scaling up antenatal syphilis screening***: Control of congenital syphilis is one of the most cost-effective public health interventions available, yet implementation of antenatal screening is incomplete in many countries. FHI works with local counterparts to upgrade laboratory capacity, decentralize testing and treatment, train health workers and monitor program outcomes. Operations research focuses on the quality of laboratory and clinical services as well as effective coverage and outcomes. Indicators include the proportion of antenatal attendees who are screened, return for test results and are treated, as well as the proportion of sexual partners who receive treatment. Antenatal syphilis rates and congenital syphilis surveillance are outcome measures.

- ***Improving STI screening strategies***: Other screening strategies may be useful to detect asymptomatic STI in populations with high exposure. FHI conducts validation studies and other operations research to test various screening strategies for such groups as sex workers, migrant and transport workers, and adolescents.

- ***Using presumptive treatment strategies***: Where STI prevalence is high and accurate screening is not feasible or affordable, other approaches can be used to rapidly reduce the prevalence of curable STIs. Presumptive or epidemiologic treatment is analogous to partner treatment in that individuals at high risk of infection are treated regardless of symptoms. Such interventions have been shown to be effective in reducing STI prevalence in high transmission areas. More experience is needed to determine optimal treatment intervals and target pathogens for periodic presumptive treatment (PPT), as well as to establish maintenance STI control measures to sustain reduced rates.

- ***Modeling and cost-effectiveness analyses***: Decisions about whether or not to implement a given public health strategy often hinge on estimates of cost and projected benefits. FHI has developed tools to model the impact of STI/HIV interventions on HIV transmission, and conducted cost-benefit analyses to advocate for support for successful interventions.

VIII. MONITORING AND EVALUATION

STI control programs must adapt strategies that respond to the heterogeneity of STI pathogens and transmission dynamics within their populations as well as to the limitations of finance, infrastructure, and personnel. As such, STI control programs vary widely among countries and, consequently, monitoring and evaluation of such programs also varies. But there are essential elements of monitoring and evaluation regardless of the program type:

- ***Formative evaluation:*** The first step in the program cycle should be collecting information that describes the current situation, identifies need, and will help in designing an appropriate response.
- ***Process evaluation:*** These data monitor how efficiently program activities are carried out and help keep services on track. Much of the data for process evaluation can be collected routinely as part of service delivery. Monitoring the quality and coverage of STI services is essential and requires that special studies and surveys are undertaken. Antibiotic susceptibility of key pathogens should also be routinely monitored.
- ***Effectiveness evaluation:*** These data estimate the impact of the STI control program on the prevalence and incidence of STIs and STI-related behavior, both in the general population and in specific target populations. A combination of passive data collection and special biologic and behavioral surveys—that is, an STI surveillance system—can be used to estimate the outcomes of STI control efforts on disease trends.

Evaluating STI control programs begins with program and strategic planning when indicators are selected for each objective and activity. Effectiveness evaluation relies on biological and behavioral indicators, with the desired endpoint being reduced disease prevalence. Process indicators are chosen to monitor program inputs and outputs including quality and coverage of training, outreach and educational efforts and service utilization. STI trends as biologic markers for HIV prevention programs are best interpreted with behavioral information in the population, as treatment and specific interventions in sub-populations can affect STI prevalence in the general population.
FHI has collaborated in developing a range of evaluation and surveillance guidelines and promotes their use to inform STI control and HIV prevention efforts. A forthcoming evaluation handbook (see additional reading) includes a chapter on evaluating STI control programs.

IX. LINKAGES AND PARTNERSHIPS

Because effective STI control is instrumental in reducing HIV transmission and adverse reproductive health outcomes, strengthening STI services is an important component of broader reproductive health programs and essential in comprehensive HIV prevention programming. STI preventive and curative services are integral to the continuum of care that should be accessible and acceptable to both women and men of reproductive health age in the community. Outreach and services for special populations such as sex workers, their clients and other epidemiologic core groups should be coordinated with other programs and services. STI services for youth should likewise be linked to a wider range of health and social programs.

FHI collaborates with NGOs, community-based organizations, and other national and international organizations involved in STI prevention and control activities. We also collaborate with international organizations working on laboratory upgrade of STI diagnostics and STI surveillance activities. In this context we have collaborated with the World Health Organization, the United Nations Joint Programme on AIDS, the Centers for Disease Control, Institution of Tropical Medicine, University if Ghent, the London School of Hygiene and Tropical Medicine, Population Services International, HORIZONS/Population Council, and others.

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