# Sexually Transmitted Infections in Developing Countries

at a glance

## Why address STIs in developing countries?

Sexually transmitted infections (STIs) are among the world's most common diseases, with an annual incidence exceeded only by diarrheal diseases, malaria, and lower respiratory infections. Every day nearly 1 million people acquire a new STI, and worldwide, more than 340 million new cases of curable STIs and even more new viral (non-curable) infections occur each year. Up to 80% of curable STIs occur in developing world settings, and adolescents and young adults have the highest rates of these STIs.

The burden of STIs on the health care system and healthcare expenditure is great. Even excluding HIV, STIs are consistently among the most common conditions leading to health care visits. In all nations, but particularly in developing countries, STIs result in substantial productivity losses for individuals and communities. In developing countries, STIs are among the leading causes of disability adjusted life years (DALYs) lost for women of reproductive age, exceeded only by maternal causes and HIV.

## Consequences of untreated STIs

If not identified and treated promptly, STIs can cause serious long term consequences, and most morbidity and mortality occurs in women and infants (WHO, 2006).

- Infertility, tubal pregnancy, and maternal mortality. Untreated bacterial STIs in women result in pelvic inflammatory disease in up to 40% of infections; and 1 in every 3 of these will result in infertility. Tubal damage from STIs can lead to ectopic (tubal) pregnancy, the cause of up to 10% of maternal mortality in settings with high STI prevalence. Chronic pelvic pain from untreated bacterial STIs is an important cause of health care visits among women.
- Infant blindness. Up to 4000 newborn babies become blind every year because of eye infections that are attributable to untreated maternal STIs, and that could be easily prevented with topical infant eye medications.
- Perinatal deaths. Syphilis is one of the most important causes of adverse pregnancy outcomes globally, estimated to account for up to 1,500,000 perinatal deaths each year—equal or exceeding the perinatal mortality associated with either HIV or malaria. In Africa and Latin America, 2 to 15% of all pregnancies are in women with untreated syphilis. Infected women will experience an overall perinatal mortality of 40%—including stillborn infants and early neonatal deaths.
- Chronic liver disease and death. Chronic infection with hepatitis B virus (HBV) is the most important cause of disability and death from liver disease in developing world settings—causing 1 in 40 deaths among adults globally each year. Most HBV is transmitted from mother to child at birth. Existing HBV vaccine if provided for neonates could prevent 30 to 70% of all deaths related to liver cancers and cirrhosis among adults living in developing settings.
- Cervical cancer and death. Cervical cancer is the most common cause of cancer mortality among African women, and its frequency and progression are increased with HIV infection. New vaccines against human papillomavirus (HPV) infection could stop the early death of approximately 240,000 women from cervical cancer every year in resource poor settings.

## Available, affordable solutions exist

The tragedy of the health and economic burden of STIs is that many of the serious consequences related to STIs could be prevented using available and affordable interventions that already exist. Early screening and treatment (a penicillin injection) for pregnant women infected with syphilis is simple and can cost as little as 1 USD and can also eliminate the associated perinatal mortality (including stillbirths) due to syphilis. But maternal syphilis screening, among the most cost-effective of all public health interventions, is still not effectively applied in many nations. Likewise, viral STIs such as hepatitis B virus (HBV) and human papillomavirus (HPV) can be prevented with vaccines;

and antiviral drugs such as acyclovir can reduce the spread of genital herpes infection (the most common cause of genital ulcer disease) and potentially prevent new HIV infections. Most STIs (including those caused by viruses) can be prevented with male latex condoms used consistently and correctly. Many common STIs can be cured with affordable antibiotic drug.

A number of evidence-based and effective strategies have emerged and become widely accepted over the past two decades:

*Prevention through treatment:* Prompt identification and treatment of bacterial STIs remains a cornerstone of STI control. Treating STIs reduces prevalence and breaks the chain of transmission in the community, and is therefore the most effective form of prevention in the absence of a vaccine. However, facility-based case management alone is not enough to control STIs. Core components of STI control involves a series of interventions working together:

- Clinic-based management of symptomatic STIs. Syndromic management has been demonstrated to be effective in the absence of laboratory capacity to support etiologic diagnosis.
- Identification and treatment of sex partners prevents re-infection and breaks the chain of transmission in the community
- Screening asymptomatic persons (particularly women) at risk for serious STI-related outcomes can prevent serious consequences such as congenital syphilis and cervical cancer.
- Sustained, targeted control strategies for "core" high risk groups who have high likelihood of infection and high rates of partner change (e.g. sex workers); populations that "bridge" to the general population (e.g. clients of sex workers, truckers, and other mobile populations); and highly vulnerable groups (e.g., adolescents) reduces morbidity and STI prevalence in the community.
- STI vaccines against HBV and HPV hold the promise of eliminating a substantial proportion of the world's STI-related cancers and chronic liver disease.

### *Other Supporting Elements for Prevention and Control*

In addition to the core components of STI prevention and control, six additional supporting elements have proven important in ensuring the core programs can be effectively provided (Figure):

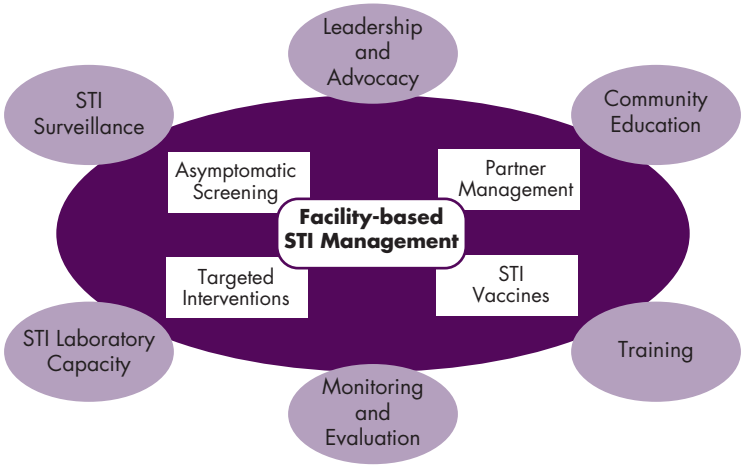
- ***Leadership and advocacy*** to ensure an environment supporting STI control and prevention.
- ***STI surveillance*** to track burden of disease and track program impact.
- ***STI laboratory capacity*** that is sufficient to monitor critical diseases and support programs.
- ***Training*** around STI clinical management and prevention.
- ***Monitoring and evaluation*** of STI programs to assess progress and make needed changes.
- ***Community education*** around STI risks and prevention, especially important for youth along with availability of preventive options such as male and female latex condoms.

Globally, the populations most vulnerable to STIs are those who are disproportionately affected by other health and social issues: adolescents, pregnant women and their unborn children, migrant populations, and other economically or socially marginalized groups.

## DO's and DON'Ts

- *DO involve leaders in supporting STI prevention and control.* Stigma around STIs exists in virtually every society, but people are often unaware of the consequences of acquiring an STI or of not seeking prompt treatment. Keeping leaders informed about the burden and consequences of STIs and involved in programs allows them to advocate for a supportive environment for STI prevention and control, including supportive polices, laws and initiatives related to stigma reduction and disease prevention and treatment.
- *DO ensure comprehensive STI clinical management for symptomatic individuals.* Prompt and effective

**STI Prevention and Control:**
**Five core components and supportive elements**



treatment of curable STIs reduces adverse health complications in individuals and breaks the chain of transmission in the community because—for STIs—treatment is prevention. Nonetheless, treatment alone is not enough. An adequate STI clinical encounter should include education about drug compliance and abstaining from sex while symptoms persist, STI risk reduction counseling (preferably using non-judgmentally, client-centered approaches), discussion of partner management, provision of condoms and how to use them, counseling (as appropriate) around contraception and recommendation of HIV testing—this is especially critical in settings with high or rising HIV prevalence.

- *DO involve the private sector.* Most STI care is done by private providers, whether in formal or informal sectors. Including private providers, practitioners and pharmacists, as part of the STI control program improves coverage of quality of STI care and surveillance.
- *DO include STI surveillance as a key component of STI program.* Surveillance systems allow clarification of disease burden and epidemiology, monitoring of STI trends useful in evaluating program impact over time, and help in projecting resource needs. Basic components of STI surveillance should at least include case-reporting by syndrome (if etiology unavailable) disaggregated by age and sex, prevalence assessments in defined populations, linking of related program data and limited laboratory studies assessing STI etiologies.
- *DO invest in laboratory capacity.* While extensive laboratory capacity is unnecessary at all local levels, capacity should exist at the national level to ensure quality of lower level services, ensure adequacy of treatment protocols and support surveillance to guide national programs.
- *DO prioritize targeted interventions for high risk and vulnerable populations.* Adolescents, along with young adults, have high risk for STIs but are often hard-to-reach. Specialized user-friendly, affordable clinical and prevention services for adolescents can reduce STI burden and subsequent serious health care consequences for young people.
- *DO ensure affordable, effective interventions are scaled up.* Syphilis screening in pregnant women is among the most cost-effective health interventions that exist in developing nations, but is often not universally applied in remote settings despite availability of rapid point-of-care diagnostics. Hepatitis B vaccine is safe and affordable and recommended routinely in infant immunization programs, but is often overlooked—probably because the significant morbidity and mortality associated with HBV occurs among adults.
- *DON'T overlook STIs in HIV-infected individuals.* A new STI in an HIV-infected patient represents behavioral and biologic likelihood of HIV transmission to other partners and should be considered an urgent situation. Genital ulcer disease (GUD) is the STI syndrome most strongly associated with HIV transmission and acquisition. Individuals with genital ulcers should be promptly treated and counseled, with strong emphasis on the importance of partner management regardless of whether the individual's HIV status is known. If HIV status is negative or unknown, HIV testing should be strongly encouraged.
- *DON'T forget the importance of ongoing program monitoring and evaluation.* Lack of periodical onsite monitoring of STI programs was highlighted in the *WHO Global Strategy for STI Control: 2006–2015* as an important gap for STI control that should be addressed. Program Indicators, such as measure of adequate STI management and of adequate prevention counseling and condom distribution go a long way in ensuring program quality.
- *DON'T miss opportunities for integration of services.* Although vertical programs may increase focus and expertise for a particular health issue, more often men and women presenting for specific services leave with important health issues unaddressed. Integrating STI, HIV, and reproductive health services at point of care increase patient access, improves efficiencies and improves health outcomes. Incorporating syphilis screening into routine antenatal care services, and HIV testing and counseling into STI clinical encounters are examples of opportunities for service integration.
- *DON'T overlook new information.* Public health researchers are continually identifying new and effective prevention strategies, and these should be incorporated into programs when possible. For example, increasing global antimicrobial resistance to gonorrhea strains means national treatment protocols may need to be updated. Recent development of safe and effective vaccines against HPV mean programs should begin to consider possible ways to roll out this intervention. Findings that herpes treatment may help prevent HIV means that antiviral drugs against herpes should be made available, especially in high HIV prevalence settings. Findings of substantial HIV prevention benefits and subsequent focus on development of specialized men's health care facilities offers an opportunity to incorporate STI screening and control for men who do not access primary health care services.

## Costs and Cost Benefits of Major STI Control Strategies*

| STI Control Strategy, Target audience | Country | Unit cost (Total Cost/N) | Cost/ treatment** | Cost/ outcome averted** | Measure of health-adjusted life year** | Comment: |
|---|---|---|---|---|---|---|
| **Syndromic STI management** Symptomatic adults | **Indonesia** Symptomatic males 19–50 yrs (Djajakusumah et al., 1998) | $ 3 per male urethritis case | $3 per correctly treated confirmed inflammatory STI | Not reported | Not reported | 1998 USD Lab confirmed GC/CT prevalence = 75% |
| | **China** Symptomatic men (age not reported) (Liu et al., 2003) | $2 per male urethritis case $3 per GUD case | $3 per correctly treated confirmed inflammatory STI $14 per correctly treated confirmed genital ulcer/STI | Not reported | Not reported | 2002 USD Lab confirmed GC/CT prevalence = 69% Lab confimed GU (syphilis) prevalence = 25% |
| | **Tanzania** Symptomatic men and women (discharge & ulcers) (Mayaud et al., 1998) | Not reported | $10 per syndrome treated (genital ulcer or discharge syndrome) | $218 per HIV infection averted (based on study of HIV incidence) | $9–10 per DALY saved (based on HIV-1 morbidity) | 1993 USD Community STI prevalence: Syphilis = 6% HIV = 4% Urethritis symptoms = 10% |
| | **South Africa** Male and female STI patients (age not reported) —pre-packaged syndromic STI packets (Harrison et al., 2000) | $2 per packet (drugs, info sheet, condoms, partner card) | $7 per correctly treated confirmed inflammatory STI | Not reported | Not reported | 1997 USD Estimated STI prevalence among women in region (≥ 1 STI) = 25% HIV prevalence among pregnant women in region = 30% |
| **Syphilis Screening** Pregnant women | **Kenya** (Terris-Prestholt et al 2003 based on Jenniskens et al., 1995) | $2 per woman screened | $34 per woman treated $22 per person treated (including partners) | $280 per perinatal outcome averted | $17 per DALY saved | 2001 USD Maternal syphilis prevalence = 7% |
| | **Kenya** (Terris-Prestholt et al 2003 based on Fonck et al., 2001) | $1 per woman screened | $40 per woman treated $26 per person treated (including partners) | $300 per perinatal outcome averted | $19 per DALY saved | 2001 USD Maternal syphilis prevalence = 3% |
| | **Tanzania** (Terris-Prestholt et al., 2003) | $1 per woman screened | $20 per woman treated $15 per person treated (partners) | $187 per perinatal outcome averted | $11 per DALY saved | 2001 USD Maternal syphilis prevalence = 7% |
| | **Zambia** (Terris-Prestholt et al 2003 based on Hira et al., 1990) | $1 per woman screened | $22 per woman treated $12 per person treated (partners) | $181 per perinatal outcome averted | $11 per DALY saved | 2001 USD Maternal syphilis prevalence = 9% |

## Costs and Cost Benefits of Major STI Control Strategies* (*continued*)

| STI Control Strategy, Target audience | Country | Unit cost (Total Cost/N) | Cost/ treatment** | Cost/ outcome averted** | Measure of health -adjusted life year** | Comment: |
|---|---|---|---|---|---|---|
| **Hepatitis B vaccine (3 dose series)** Infants | **High Endemicity** (Beutels 2001 based on Liu 1995) | $3 per person | $4.2 | $30–40 per carrier case averted | Not reported | 1998 USD Population Hep B prevalence = 70–90% |
| | **Medium Endemicity** (Beutels 2001 based on Antonanzas 1995, Ginsberg 1996, Garuz 1997) | Not reported | $13–30 per person | $385–2,108 per infection averted | Not reported | 1998 USD Population Hep B prevalence = 20–55% |
| | **Low Endemicity** (Beutels 2001 based on Margolis 1995, Wiebe 1993, Szucs 1998, Mangtani 1995, Fenn 1996, Williams 1996) | Not reported | $31–127 per person | $57–43,264 per infection | $5,499 per QALY gained $5,615–14,271 per life-year gained | 1998 USD Population Hep B prevalence = 5–20% |
| Homosexual men age 15–40 | **France** (Beutels, 2001 based on Kerleau et al 1995) | Not reported | $161 per vaccinated person | averted $ 765 per case prevented | Not reported | 1998 USD Population Hep B prevalence = 2002 USD |
| **HPV Vaccine** (coupled with cytologic screening) **(3 dose series)** Pre-adolescent girls | **United States** (Goldie et al., 2004) | $377 per woman | Not reported | | $20,600 per QALY gained (compared to screening alone) | HPV Prevalence = (modeled) 1%–3% age<35 yrs 2000 |
| Adolescent girls | **Brazil** (Goldie, et al., 2007) | I$25–I$450 per woman | Not reported | | I$700–I$9,600/YL saved (not quality-adjusted) compared to screening alone | International Dollars (I$) HPV Prevalence = (modeled) 41.5% age 12–14 yrs 2001 USD |
| **Targeted outreach** (syndromic STI management, condoms, and periodic presumptive treatment) Female sex workers | **South Africa** (Vickerman et al., 2006) | $44 per clinic visit | $102 per syndrome treated | $2,093 per HIV infection averted | $78 per DALY saved (full intervention) $31 per DALY saved (incremental cost of adding periodic presumptive treatment to others | Prevalence HIV = 45% –54% Prevalence CT or GC = 39% |

* All costs in US dollars unless otherwise noted.

** Includes interventions and programmatic costs

## Useful websites

Millennium Development – Goals: http://www.undp.org/mdg

WHO Guidelines for STI management: http://www.who.int/reproductive-health/publications/rhr_01_10_mngt_STDs

WHO Fact Sheet, STDs and young people: http://www.who.int/mediacentre/factsheets/fs186

WHO Fact Sheet, Women and STIs: http://www.who.int/mediacentre/factsheets/fs249

WHO STI Diagnostics Initiative (SDI): http://www.who.int/std_diagnostics

WHO Vaccine Preventable Diseases (VPD): http://www.afro.who.int/ddc/vpd

CDC STD Program Operations Tools: http://www.cdc.gov/std/program

CDC 2005 CDC STD Treatment Guidelines: http://www.cdc.gov/std/treatment/

HIV/AIDS Integration Partners Working Group: http://www.fpandhiv.org

UN, 1994 Conference on Population Development, Cairo: http://www.iisd.ca/Cairo.html

Alliance for Microbicide Development: http://www.microbicide.org

Demographic and Health Surveys: http://www.measuredhs.com

## Resources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