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.

Prepared with technical assistance from the Division of STD Prevention and Division of Reproductive Health, Centers for Disease Control and Prevention

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


More topics covered by the “at a glance” series are available at www.worldbank.org/hnp

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 infections (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:

- **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 surveillance.
- **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 policies, laws and initiatives related to stigma reduction and disease prevention and treatment.
- **DO ensure comprehensive STI clinical management for symptomatic individuals.** Prompt and effective 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 program should include education about drug compliance and abstaining from sex while symptoms persist. STI risk reduction counseling (preferably using non-judgmental, 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, pharmacists and others as part of the STI control program improves coverage of quality STI care 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 in a supportive national program.
- **DO prioritize targeted interventions for high risk and vulnerable populations.** Adolescents, along with women of reproductive age, are high-risk groups that “bridge” the gap between the general population (e.g., clients of sex workers, truckers, and other mobile populations) and disproportionate 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.**

**STI Prevention and Control: Core components and supportive elements**

- **STI Surveillance**
- **Facility-based STI Management**
- **STI Laboratory Capacity**
- **STI Vaccines**
- **Training**
- **DO’s and DON’Ts**

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):
and antiviral drugs such as acyclovir can reduce the spread of genital herpes (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. However, facility-based case management alone is not enough to control STIs.
- Core components of STI control involves a series of interventions working together:
  - **Leadership and advocacy** to ensure an environment supportive of STI control and prevention.
  - **STI surveillance** to track burden of disease and track program impact.
  - **Laboratory capacity** that is sufficient to monitor critical diseases and support programs.
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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**

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- **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 of a national program.
- **DO prioritize targeted interventions for high risk and vulnerable populations.** Adolescents, along with women, are relatively 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.

A new STI in an HIV-infected individual is an urgent situation. Genital ulcers in an individual with an AIDS diagnosis is the STI syndrome most strongly associated with HIV transmission and acquisition. Individuals with genital ulcers should be urgently 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 overlook the importance of ongoing program monitoring and evaluation.** Lack of periodical on-site monitoring of STI programs was highlighted in the WHO Global Strategy for Control of STI: 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 increases 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 continuously identifying new and effective prevention strategies, and these should be incorporated into programs when possible. For example, screening for gonorrhea can help prevent HIV transmission and reduce 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.

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

- **STI Prevention and Control:**
  - Leadership and Advocacy
  - STI Surveillance
  - STI Laboratory Capacity
  - Community Education
  - Training

- **Core components and supportive elements:**
  - Leadership and Advocacy
  - STI Surveillance
  - STI Laboratory Capacity
  - Community Education
  - Training

- **Supportive environment for STI prevention and control:**
  - Advocacy
  - Facility-based STI Management
  - Partner Management
  - Monitoring and Evaluation
  - STI Vaccines

- **Supporting Elements:**
  - Leadership and Advocacy
  - STI Surveillance
  - STI Laboratory Capacity
  - Community Education
  - Training

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):
## Costs and Cost Benefits of Major STI Control Strategies

<table>
<thead>
<tr>
<th>STI Control Strategy, Target audience</th>
<th>Country</th>
<th>Unit cost (Total Cost/N)</th>
<th>Cost/ treatment</th>
<th>Cost/ outcome averted</th>
<th>Measure of health-adjusted life year</th>
<th>Comment:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Syndromic STI management</strong></td>
<td>Indonesia</td>
<td>$3 per male urethritis case</td>
<td>$3 per correctly treated confirmed inflammatory STI</td>
<td>Not reported</td>
<td>Not reported</td>
<td>1998 USD Lab confirmed GC/CT prevalence = 75%</td>
</tr>
<tr>
<td>Symptomatic adults</td>
<td>Symptomatic males 19–50 yrs</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(Djajakusumah et al., 1998)</td>
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<tr>
<td></td>
<td>China</td>
<td>$2 per male urethritis case</td>
<td>$3 per correctly treated confirmed inflammatory STI</td>
<td>Not reported</td>
<td>Not reported</td>
<td>2002 USD Lab confirmed GC/CT prevalence = 69%</td>
</tr>
<tr>
<td>Symptomatic men (age not reported)</td>
<td>(Liu et al., 2003)</td>
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<tr>
<td></td>
<td>Tanzania</td>
<td>Not reported</td>
<td>$10 per symptom treated (genital ulcer or discharge syndrome)</td>
<td>$218 per HIV infection averted (based on study of HIV incidence)</td>
<td>$9–10 per DALY saved</td>
<td>1993 USD Community STI prevalence: Syphilis = 6% HIV = 4% Urethritis symptoms = 10%</td>
</tr>
<tr>
<td>Symptomatic men and women (discharge &amp; ulcers)</td>
<td>(Mayaud et al., 1998)</td>
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<td></td>
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<tr>
<td></td>
<td>South Africa</td>
<td>$2 per packet (drugs, info sheet, condoms, partner card)</td>
<td>$7 per correctly treated confirmed inflammatory STI</td>
<td>Not reported</td>
<td>Not reported</td>
<td>1997 USD Estimated STI prevalence among women in region (≥ 1 STI) = 25% HIV prevalence among pregnant women in region = 30%</td>
</tr>
<tr>
<td>Male and female STI patients (age not reported)</td>
<td>Estimated syndromic STI packets (Harrison et al., 2000)</td>
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<tr>
<td></td>
<td>Kenya</td>
<td>$2 per woman screened</td>
<td>$34 per woman treated $22 per person treated (including partners)</td>
<td>$280 per perinatal outcome averted</td>
<td>$17 per DALY saved</td>
<td>2001 USD Maternal syphilis prevalence = 7%</td>
</tr>
<tr>
<td>Syphilis Screening</td>
<td>(Terris-Presthold et al 2003 based on Jenniskens et al., 1995)</td>
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<tr>
<td>Pregnant women</td>
<td>Kenya</td>
<td>$1 per woman screened</td>
<td>$40 per woman treated $26 per person treated (including partners)</td>
<td>$300 per perinatal outcome averted</td>
<td>$19 per DALY saved</td>
<td>2001 USD Maternal syphilis prevalence = 3%</td>
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<td></td>
<td>(Terris-Presthold et al 2003 based on Fonck et al., 2001)</td>
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<tr>
<td></td>
<td>Tanzania</td>
<td>$1 per woman screened</td>
<td>$20 per woman treated $15 per person treated (partners)</td>
<td>$187 per perinatal outcome averted</td>
<td>$11 per DALY saved</td>
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<tr>
<td></td>
<td>Zambia</td>
<td>$1 per woman screened</td>
<td>$22 per woman treated $12 per person treated (partners)</td>
<td>$181 per perinatal outcome averted</td>
<td>$11 per DALY saved</td>
<td>2001 USD Maternal syphilis prevalence = 9%</td>
</tr>
<tr>
<td></td>
<td>(Terris-Presthold et al 2003 based on Hira et al., 1990)</td>
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<tr>
<td><strong>Hepatitis B vaccine (3 dose series)</strong> Infants</td>
<td>High Endemicity (Beutels 2001 based on Liu 1995)</td>
<td>$3 per person</td>
<td>$4.2</td>
<td>$30–40 per carrier case averted</td>
<td>Not reported</td>
<td>1998 USD Population Hep B prevalence = 70–90%</td>
</tr>
<tr>
<td>Homosexual men age 15–40</td>
<td>France (Beutels, 2001 based on Kerleau et al 1995)</td>
<td>Not reported</td>
<td>$161 per vaccinated person</td>
<td>$765 per case prevented</td>
<td>Not reported</td>
<td>1998 USD Population Hep B prevalence = 2002 USD</td>
</tr>
<tr>
<td><strong>HPV Vaccine (coupled with cytologic screening) (3 dose series)</strong> Pre-adolescent girls</td>
<td>United States (Goldie et al., 2004)</td>
<td>$377 per woman</td>
<td>Not reported</td>
<td></td>
<td>$20,600 per QALY gained (compared to screening alone)</td>
<td>HPV Prevalence = (modeled) 1–3% age&lt;35 yrs 2000</td>
</tr>
<tr>
<td></td>
<td>Brazil (Goldie, et al., 2007)</td>
<td>I$25–I$450 per woman</td>
<td>Not reported</td>
<td></td>
<td>I$700–I$9,600/YL saved (not quality-adjusted) compared to screening alone</td>
<td>International Dollars ($)</td>
</tr>
<tr>
<td></td>
<td><strong>Targeted outreach</strong> (syndromic STI management, condoms, and periodic presumptive treatment)</td>
<td>South Africa (Vickerman et al., 2006)</td>
<td>$44 per clinic visit</td>
<td>$102 per syndrome treated</td>
<td>$2,093 per HIV infection averted</td>
<td>$78 per DALY saved (full intervention) $31 per DALY saved (incremental cost of adding periodic presumptive treatment to others)</td>
</tr>
<tr>
<td>Female sex workers</td>
<td></td>
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</tbody>
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* All costs in US dollars unless otherwise noted.
** Includes interventions and programmatic costs
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Resources


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