



## Background information on Congenital Syphilis and the impact of interventions

This document gives a brief overview about the condition, its epidemiology and specific interventions that may reduce its burden. A number of publications and resources relating to policy and syphilis prevention programmes can also be accessed via the WHO website.

### What is syphilis?

Syphilis is a sexually transmitted infection caused by the bacterium *Treponema pallidum* and has four stages. The primary stage usually starts 21 days after infection. Sores generally occur on the external genitals but can also occur on the mouth and lips. Secondary syphilis usually presents with a skin rash over the entire body often accompanied by fever and muscle pain, usually lasting between 2-6 weeks followed by a latent stage. Many people who are infected may remain asymptomatic for years but this can lead to severe complications later in life if correct treatment is not given. The late/tertiary stage usually occurs several years or decades after initial infection and may take the form of neurosyphilis affecting the brain or spinal cord; cardiovascular syphilis, affecting the heart and aorta; or late benign syphilis, which mainly involves the skin. Without antibiotic treatment, complications may occur in 40% of people with the latent infection. Although direct contact with sores is needed for transmission to occur, sores are non-specific and may remain undiagnosed, so transmission commonly occurs from people who are unaware of their infection. Syphilis can be vertically transmitted from mother to child, leading to congenital syphilis.

### Congenital Syphilis

Pregnant women with untreated primary or secondary syphilis usually transmit the infection to their fetus, causing adverse effects in most cases. This ranges from still births, premature or low birth weight babies, neonatal death or infection in infants leading to deafness, neurologic impairment or bone deformities. The overall risk of mother to child transmission is 60-80%, with odds of transmitting the infection increasing towards the second half of pregnancy. Tertiary or latent syphilis is unlikely to be transmitted vertically.

### What are the main risk factors?

An absence of treatment or delayed treatment for syphilis in pregnancy is a major risk factor for congenital syphilis. The titre of maternal non-specific treponemal antibodies has an

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impact on the risk of acquiring congenital syphilis. Close contact with someone who has syphilis, risky sexual behaviour and multiple sexual partners are all factors associated with the transmission of syphilis.

## Global epidemiology

### Pregnancy, birth & population prevalence

Annually 12 million people are thought to be infected with syphilis, and 2 million pregnant women test positive, accounting for 1.5% of all pregnancies worldwide. Of these, it is estimated that around 1.2 million transmit the infection to their fetus. Ten countries account for over 40% of the global burden of pregnancies and newborns affected by syphilis. The World Health Organisation (WHO) estimates that the majority of maternal syphilis infections remain untreated, leading to significant fetal exposure and causing an estimated 692 thousand to 1.53 million adverse pregnancies<sup>1</sup>. A study carried out on 22 Sub-Saharan African countries concluded that only 38% of women attending prenatal clinics were being screened and treated for syphilis; this translates to 600,000 missed positive cases which could have been treated to reduce the adverse fetal and infant outcomes in this region.

### Mortality

Untreated maternal syphilis is believed to have a similar fetal mortality rate to HIV, neonatal tetanus, or malaria during pregnancy. Untreated maternal syphilis worldwide accounts for up to a quarter of all stillbirths, and 11% of neonatal deaths. Most perinatal deaths occur in developing countries with moderate to high prenatal syphilis prevalence and weak health infrastructure.

### Disability and quality of life

Congenital syphilis can cause deafness, interstitial keratitis and learning disability. In 2007 an estimated 650,000 early fetal and neonatal deaths could have been prevented through effective syphilis screening and treatment in pregnancy. In addition, 600,000 infants per year are at increased risk of dying from low birth weight related to congenital syphilis.

## Reducing prevalence, morbidity and mortality

The WHO has based an action strategy around four pillars, aiming to reduce the burden of syphilis and congenital syphilis<sup>2</sup>. Figure 1 illustrates some of the opportunities for interventions.

Ensuring sustained political commitment and advocacy for a successful health initiative.

Increasing access to, and quality of, maternal and newborn health services. This should ensure that pregnant women are screened and adequately treated, and that fewer women remain unscreened as a result of lack of access to services.

Population screening and treatment of all pregnant women, their partners and infants born to infected mothers who had not been treated. Dependent on area and health care

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<sup>1</sup> Kamb et al. A Road Map for the Global Elimination of Congenital Syphilis, Obstetrics and Gynecology International 2010 doi: 10.1155/2010/312798

<sup>2</sup> World Health Organization, Department of Reproductive Health and Research The global elimination of congenital syphilis: rationale and strategy for action 2007 ISBN 978 92 4 159585 8

infrastructure there are various diagnostic tests available. More information is provided below.

Surveillance, monitoring and evaluation systems need to be established and strengthened to ensure that the burden of disease is continuously being reduced.

### **Interventions before pregnancy and population wide**

Control of syphilis in the general population would have an impact on the risk of congenital syphilis.

Depending on local risk and epidemiology, prevention programmes may involve preconception screening and surveillance among high risk groups. Health education activities and communication campaigns may be carried out to sensitise and raise awareness, and services to prevent and treat syphilis may operate alongside prevention programmes for other sexually transmitted diseases (STD). Counselling and confidential voluntary tests for high risk groups could also be offered. Condom use reduces the chance of infection; however they are not entirely effective, as a condom may not cover all of the sores or rashes in the affected area. Syphilis in adults is usually easily cured in the earlier stages of infection. Treatment may consist of a single or multiple doses of penicillin, which is usually available in primary health care facilities.

### **Interventions during pregnancy**

Interventions during pregnancy are aimed at reducing maternal morbidity, fetal loss, neonatal mortality and morbidity due to syphilis. Pregnant women are ideally screened for syphilis at their first prenatal care visit (ideally in the first trimester) and again later in pregnancy. Effective treatment should be offered to those tested positive, and testing for HIV infection may also be considered. Low cost interventions to increase coverage of screening and treatment of syphilis can help reduce the burden of disease<sup>3</sup>.

There are two types of diagnostic tests for syphilis: treponemal and non-treponemal tests. Non-treponemal tests detect non-specific treponemal antibodies. These include the Plasma Reagin (RPR) and Venereal Diseases Research Laboratory (VDRL) tests. These tests may result in false negatives especially in very late or early syphilis. Rapid treponemal tests are also available, effective, affordable and require minimal logistic support, providing a result immediately. Treponemal tests include enzyme immunoassays, which are over 98% sensitive and 99% specific. The WHO recommends using a treponemal test to confirm a positive non-treponemal test. However, in circumstances where it may not be feasible to carry out both tests, treatment should be provided with the first positive test.

National policies and locally adapted guidelines on syphilis prevention, management and care during pregnancy should be available and correctly implemented. All women should have access to care during pregnancy, childbirth and the postpartum period. It is also important that health care workers are trained and competent in syphilis prevention, screening during pregnancy, diagnosis and treatment of seropositive women and their partners, prophylaxis, treatment of newborns, and counselling on STD prevention, including prevention of re-infection during pregnancy and afterwards. Parenteral Penicillin G is the only treatment which has been documented as an effective treatment for syphilis during pregnancy. Transmission of congenital syphilis is increased during the second and third

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<sup>3</sup> Hawkes S, Matin N, Broutet N, Low N. Effectiveness of interventions to improve screening for syphilis in pregnancy: a systematic review and meta-analysis. *Lancet Infect Dis.* 2011 Sep;11(9):684-91. Epub 2011

trimesters; for this reason, early diagnosis and treatment of syphilis during pregnancy is important.

### **Interventions after birth**

Asymptomatic infants who are born to seropositive women may be given a prophylactic single dose of benzathine penicillin at birth. Newborns showing clinical signs of congenital syphilis should be treated with penicillin crystalline or procaine for 10 days. Presentation of congenital syphilis in the newborn may often be non-specific or asymptomatic, making diagnosis difficult. For this reason, any suspected case of congenital syphilis should be confirmed by testing the mother.

## **Cost-effectiveness of interventions**

Health care costs and services differ considerably in different regions. The package of prenatal screening and treatment of syphilis has generally been considered highly cost-effective. However, in many developed countries the prevalence of syphilis has dropped to a point where the cost effectiveness of screening services may be questioned. A study carried out in Botswana showed that antenatal screening remains cost-effective even at a prevalence as low as 2% (Romroen & Rahmen 2006). The new treponemal based diagnostic test costs between \$0.93 and \$1.44, making it affordable even for poorly resourced health services. Although the test is slightly more expensive than previous diagnostic tests, it translates to only \$7 for each case of congenital syphilis averted, thus proving to be very cost effective.

Relatively few economic evaluations have been carried out in developing countries, but a study analysing the direct medical costs of management have shown screening to be a highly cost effective intervention. The cost per disability adjusted life years (DALY) saved by screening ranged from \$11-\$15 (Kamb *et al*, 2000).

## **What are the main ethical legal and social issues (ELSI) to consider?**

Health services aimed at preventing STDs may not be equitable and accessible to all. For example, access may vary between rural and urban areas. Screening may lead to discrimination and stigmatisation of affected individuals, often due to lack of understanding and poor health education. For this reason it is essential to ensure that all those at risk have access to effective information, education and health care. The privacy and confidentiality of sensitive medical information must be carefully safeguarded.

## **KEY REFERENCES**

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[http://www.who.int/reproductivehealth/topics/rtis/cs\\_global\\_updates/en/index.html](http://www.who.int/reproductivehealth/topics/rtis/cs_global_updates/en/index.html)

## **RELATED TOPICS**

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**Figure 1:** Needs assessment flowchart for congenital syphilis

