

Current trends in congenital syphilis

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Abstract

In many parts of the world particularly sub-Saharan Africa, congenital syphilis is a significant public health problem. Though it is rare in most affluent countries there has been a slight resurgence recently in several European countries. The diagnosis of suspected cases and management of congenital syphilis may be confusing and the potential for severe disability is high when cases are missed. The cornerstone of congenital syphilis control is antenatal screening and treatment of mothers with penicillin and in affluent countries it should be strengthened among those at high risk. In developing countries antenatal care screening needs to be strengthened by implementing point-of-care decentralised screening and treatment, also alternative novel approaches to control congenital syphilis should be looked at and utilized. International health agencies and political parties should take steps urgently to support focused approaches to tackling the problem of continuing congenital syphilis.

Key words: Antenatal care, congenital syphilis, sexually transmitted infections, penicillin

INTRODUCTION

Congenital syphilis (CS) should have become a medical curiosity long ago. However, its ongoing occurrence symbolizes failure of existing antenatal care system and control of sexually transmitted infections (STIs). Antenatal screening for syphilis is cost beneficial and cost effective and penicillin (main drug) is effective, cheap, and easily available. Yet CS remains an important cause of neurological, developmental and musculoskeletal disability and death in infants, especially in resource poor settings.^[1] Furthermore, infected infants may experience severe sequelae which can be prevented by timely treatment of CS during pregnancy.^[2]

However, diagnosis and management of CS may be confusing and when cases are missed potential for severe disability is high. Furthermore, diagnosis may be problematic as more than half of infants are asymptomatic and signs in symptomatic infants may be subtle and nonspecific. Newer diagnostic tests like enzyme immunoassays, polymerase chain reaction, and immunoblotting are more sensitive and specific but are mostly unavailable.^[2]

Syphilis screening is implemented only sporadically in many countries, despite national policies on antenatal testing and widespread use of antenatal services, leaving disease undetected and untreated among pregnant women. Weak organization of services and costs of screening are major hurdles faced by programs. Guidelines developed for better-resourced settings are conservative, err on the side of overtreatment, difficult to implement in, or inappropriate for, poorly-resourced settings because of lack of investigative ability and pressure on health facilities to discharge infants early. Hence, decentralization of antenatal syphilis screening programs, on-site testing and immediate treatment can reduce CS cases.^[1]

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INCIDENCE OF CONGENITAL SYPHILIS

Adverse pregnancy outcomes are 12 times more likely in women with syphilis than seronegative women, with 2.5-fold higher risk even after treatment as compared to uninfected women. Adverse pregnancy outcomes occur in 80% of women with active syphilis, including stillbirth (40%), perinatal death (20%) and serious neonatal infection (20%).^[3]

CS is estimated to occur in 25-75% of exposed infants. Approximately, 10-12% of infants born to mothers with positive serology for syphilis would die if untreated (mortality rate 1-3%).^[4]

Incidence of CS in Eastern Europe and central Asia has increased. High rates of syphilis seropositivity (3-18%) have been reported from Africa with CS, accounting for 1% of pediatric admissions.^[1] From Delhi and Andhra Pradesh, 82 (1965-1978) and 7 cases (1980-1990) were reported, respectively.^[4] Case fatality rates of 6.4% in US, 15% in Africa and 38% in South Africa have been reported.^[1]

Table 1 gives estimates of annual incidence of CS.^[5]

TRANSMISSION OF INFECTION

Transmission occurs transplacentally and may occur any time during gestation; however, risk of transmission to fetus depends on stage of maternal infection. Longer time that primary infection occurs before pregnancy, more benign the outcome with respect to rate and severity of infection. Untreated primary or secondary syphilis in pregnancy results in 25% risk of stillbirth, 14% risk of neonatal death, 41% risk of giving birth to a live but infected infant and 20% chance of giving birth to uninfected infant. Untreated late syphilis results in 12% risk of stillbirth, 9% risk of neonatal death, 2% risk of giving birth to infected infant, and 77% chance

of giving birth to an uninfected infant. Women whose infection manifests itself during 1st year after delivery may also infect their infants.^[2]

CLINICAL FEATURES

Tables 2 and 3 mention clinical findings related to CS in children younger than 1 year and older than

Table 2: Clinical findings related to CS in children younger than 1 year

System	Findings
Gestational	Stillbirth Prematurity Small stature for gestational age Nonimmune hydrops
Reticuloendothelial	Generalized, nontender lymphadenopathy Anemia (hemolytic and nonhemolytic) Leukopenia or leukocytosis Thrombocytopenia (in 30%) Hepatosplenomegaly (in 50-90%) from extramedullary hematopoiesis
Mucocutaneous (in 30-60%)	Snuffles (thick or bloody nasal discharge) Laryngitis A maculopapular (coppery-brown) skin rash followed by desquamation, blistering and crusting prominent on palms and soles Mucous patches (palate, perineum) Condyloma lata (perioral and perianal)
Skeletal (in 70-80%)	Symmetrical long bone lesions that are more common in lower than upper extremities Metaphyseal osteochondritis with mild to destructive lesions that develop within 5 weeks of infection Wimberger's sign (demineralization and destruction of the proximal tibial metaphyses) Diaphyseal periostitis with periosteal new bone formation that develops after 16 weeks of infection Osteitis-alternating linear bands of translucency and radiodensity of long bones that give a "celery stick" appearance Dactylitis with involvement of the metacarpals, metatarsals and proximal phalanges
Neurological	CSF abnormalities (e.g., pleiocytosis, elevated protein, low glucose) VDRL reactive in cerebral spinal fluid Signs and symptoms of acute meningitis Untreated neurosyphilis may lead to chronic meningovascular syphilis with hydrocephalus, cerebral infarctions and cranial nerve palsies
Ocular	Salt and pepper chorioretinitis, glaucoma, uveitis
Other organ involvement	Renal involvement:Nephrotic syndrome Pulmonary involvement:Pneumonia alba (obliterative fibrosis) Myocarditis Pancreatitis Gastrointestinal inflammation/fibrosis

VDRL=Venereal disease research laboratory; CSF=Cerebrospinal fluid; CS=Congenital syphilis

Table 1: Estimates of annual incidence of CS

Proportion of seropositive women	Conservative model (Watson-Jones <i>et al.</i>)	Mid-range model (Schulz <i>et al.</i>)	Less conservative model (global burden of disease, WHO, 2000)
Untreated syphilis	0.95	1.0	1.0
High serological titer (≥1:8)	0.73	-	-
Adverse pregnancy outcome due to syphilis	0.49	0.65	0.75
Global annual number of CS cases	713,600	1,365,000	1,575,000

CS=Congenital syphilis; WHO=World Health Organization

Table 3: Clinical findings related to CS in children older than 1 year

System	Findings
Gestational	Stillbirth Prematurity Small stature for gestational age Nonimmune hydrops
Reticuloendothelial	Generalized, nontender lymphadenopathy Anemia (hemolytic and nonhemolytic) Leukopenia or leukocytosis Thrombocytopenia (in 30%) Hepatosplenomegaly (in 50-90%) from extramedullary hematopoiesis
Mucocutaneous (in 30-60%)	Snuffles (thick or bloody nasal discharge) Laryngitis A maculopapular (coppery-brown) skin rash followed by desquamation, blistering and crusting prominent on palms and soles Mucous patches (palate, perineum) Condyloma lata (perioral and perianal)
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Neurological	CSF abnormalities (e.g., pleiocytosis, elevated protein, low glucose) VDRL reactive in cerebral spinal fluid Signs and symptoms of acute meningitis Untreated neurosyphilis may lead to chronic meningovascular syphilis with hydrocephalus, cerebral infarctions and cranial nerve palsies
Ocular	Salt and pepper chorioretinitis, glaucoma, uveitis
Other organ involvement	Renal involvement: Nephrotic syndrome Pulmonary involvement: pneumonia alba (obliterative fibrosis) Myocarditis Pancreatitis Gastrointestinal inflammation/fibrosis

CS=Congenital syphilis; VDRL=Venereal disease research laboratory; CSF=Cerebrospinal fluid

1 year, respectively. Table 4 gives surveillance case definition for CS.

DIAGNOSIS OF CONGENITAL SYPHILIS

Suspicion can be first raised by positive maternal serology results. When diagnosis is suspected before or during delivery, histological examination of the placenta and cord should be performed for typical

Table 4: Surveillance case definition for CS

A confirmed case of CS is an infant in whom *Treponema pallidum* is identified by darkfield microscopy, fluorescent antibody, or other specific stains in specimens from lesions, placenta, umbilical cord or autopsy material

A presumptive case of CS is when either of the following conditions are present

- Any infant whose mother had untreated or inadequately treated syphilis at delivery, regardless of findings in the infant (or)
- Any infant or child who has a reactive treponemal test for syphilis and any one of the following
 - Any evidence of CS on physical examination
 - Any evidence of CS on long bone X-ray
 - Reactive CSF VDRL
 - Elevated CSF cell count or protein (without other cause)
 - Quantitative nontreponemal serological titers which are four-fold higher than the mother's (both drawn at birth) (or)
 - Reactive test for IgM antibody by an approved method

A syphilitic stillbirth is defined as a fetal death in which the mother had untreated or inadequately treated syphilis at delivery of a fetus after a 20-week gestation or of 500 g

VDRL=Venereal Disease Research Laboratory; CSF=Cerebrospinal fluid; CS=Congenital syphilis

pathological changes and spirochetes. Ulcers or nasal discharge if present should be examined for spirochetes by dark field microscopy/fluorescent antibody techniques.

Definitive diagnosis can be established by demonstrating organism in tissue or body fluid by dark field microscopy, immunofluorescence or histopathology. Because maternal immunoglobulin M (IgM) does not cross placenta, detection of IgM by IgM assay (western blot) in infant indicates active infection. The sensitivity and specificity of the test is 83% and 90% respectively. Measurement of fetal IgM by fluorescent treponemal antibody absorption tests (FTA-ABS) or microhemagglutination assay-*Treponema pallidum* (MHA-TP) test is widely used, but it has high positive rate and the patient continues to have positive tests even after treatment. Newer tests include immunoassay, polymerase chain reaction and immunoblotting. Ideally all children should have both nontreponemal (venereal disease research laboratory [VDRL] or rapid plasma reagin [RPR]) and treponemal (FTA-ABS and/or MHA-TP) tests performed.

A presumptive serological diagnosis may also be made when

- a. Infant's nontreponemal titer is four-fold higher than that of mother when both blood samples are drawn at the time of delivery
- b. Infant's nontreponemal titer persists or increases after birth
- c. Infant's treponemal antibody titer remains positive at 12-18 months of age.

In resource poor settings tests are restricted to use of VDRL or RPR. These tests detect IgG which is transferred transplacentally from mother to fetus making interpretation of a positive result difficult. Therefore, it is necessary to compare infant's titers with maternal serological titers using the same tests. Where testing during pregnancy is inadequate, testing women at delivery would identify maternal cases not detected during pregnancy.

ROLE OF LUMBAR PUNCTURE AND RADIOLOGY

Table 5 mentions the situations where radiology and lumbar puncture is warranted.

MANAGEMENT OF CONGENITAL SYPHILIS

WHO recommends that treatment of CS in developing countries should be based on the following:

1. Identifying maternal syphilis (by RPR) during pregnancy and/or at time of delivery
2. Identifying whether an infant is clinically symptomatic.

Treatment protocol is mentioned in Table 6.

Full course of penicillin to be given to infants in the situations is mentioned in Table 7.

Algorithm for treatment and diagnosis of CS is mentioned in Figure 1.

Alternative to immediate treatment is close follow-up with initiation of therapy when signs/symptoms of CS develop or when nontreponemal titers increase or fail to decline. Single dose benzathine penicillin G is recommended especially when follow-up cannot be assured, but failures occur with this regimen. Therefore, if adequate follow-up of an exposed, asymptomatic infant cannot be guaranteed, full course of therapy should be considered. Infants born to HIV coinfecting mothers and in whom follow-up cannot be assured, should be treated for 10-14 days, regardless of maternal treatment history and symptomatology because the response to maternal treatment is unpredictable. Children born to mothers who develop signs or symptoms of secondary or early latent syphilis within 1 year after delivery should be tested and treated if serology is reactive.

SEROLOGICAL FOLLOW-UP

In children with CS, serial nontreponemal serology should be repeated at 1, 2, 4, 6, and 12 months. Transplacentally acquired nontreponemal antibody

Table 5: Situations where radiology and lumbar puncture is warranted

If infant or child has signs or symptoms of CS
If there is no documented maternal treatment in pregnancy
If the mother was treated within 4 weeks of delivery
If maternal treatment was inadequate or inadequately documented
A four-fold decline in titer following therapy was not documented

CS=Congenital syphilis

Table 6: Treatment protocol

Type of patient	Treatment protocol	Alternative treatment
Symptomatic infants	IV or IM crystalline penicillin G 50,000 units/kg every 12 h for first 7 days of life and then every 8 h after 7 days of life, for 10-14 days	IM procaine penicillin G 50,000 units/kg as single daily dose for 10-15 days
Symptomatic infants at least 4 weeks of age or older children	Aqueous penicillin G, 50,000 units/kg/dose every 6 h intravenously for 10-14 days (because of difficulty in excluding neurosyphilis in this age group)	-
In asymptomatic neonates born to PRP positive mothers	Single IM dose of benzathine penicillin G 50,000 units/kg is given	

Table 7: Situations where full course of penicillin to is given to infants

Situations where full course of penicillin to is given to infants
Who are asymptomatic (with normal CSF and radiographic examination)
Who have an inadequate/no maternal treatment history
Who have insufficient penicillin treatment
Who have failed penicillin therapy
Who have received adequate therapy given less than 1 month before delivery
Who have received treatment with a nonpenicillin regimen

CSF=Cerebrospinal fluid

disappears in uninfected infants by 6 months of age and in treated children it becomes nonreactive by 12 months of age. Children with persistently positive titers, even at a low level, should be considered for the second course of treatment. Infants with treated neurosyphilis should have repeat cerebrospinal fluid (CSF) examination at 6-month intervals until results are normal. A positive CSF VDRL 6 months after treatment requires second course of treatment. Uninfected infants should also have serial nontreponemal titers, which should become nonreactive by 6 months.

WHY CONGENITAL SYPHILIS STILL CONTINUES TO BE A PROBLEM?

Poor antenatal care is a major factor for continued high incidence of CS, other factors being mentioned in Table 8.

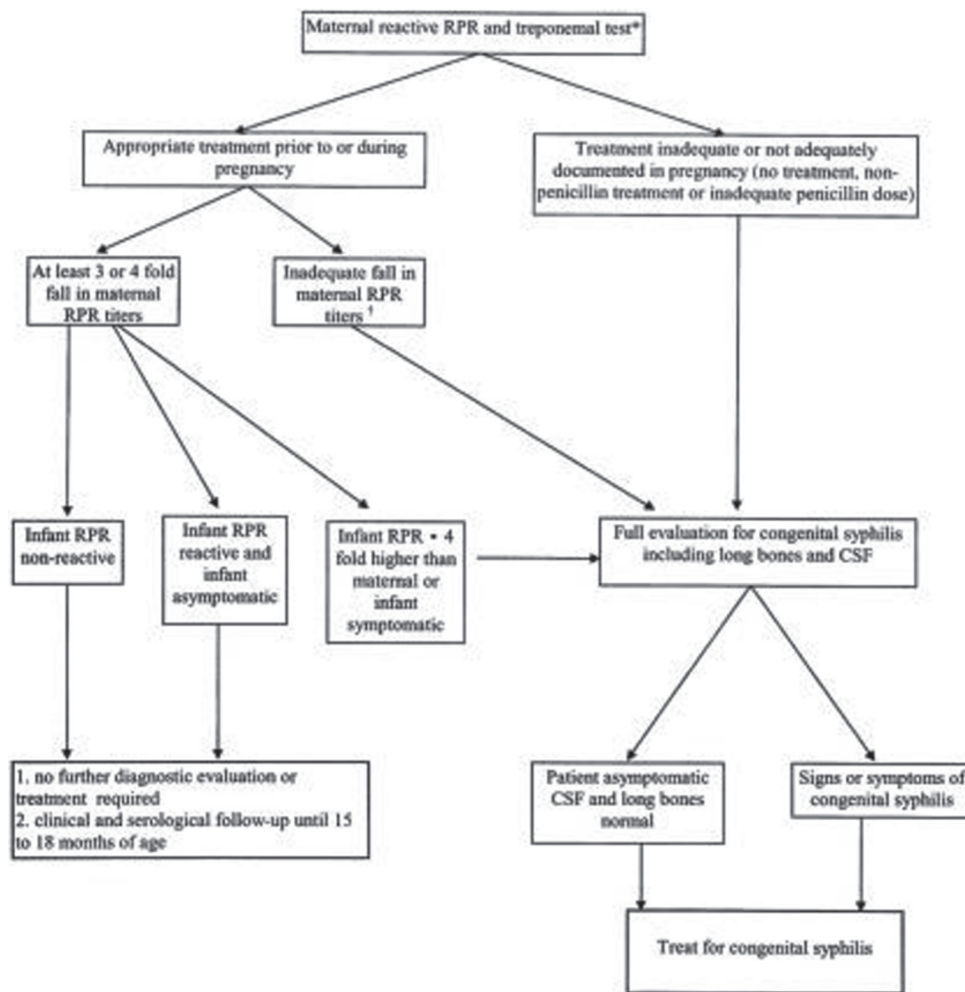


Figure1: Algorithm for treatment and diagnosis of congenital syphilis

REDUCING SEVERITY AND BURDEN OF CONGENITAL SYPHILIS

Provider efforts to reduce CS in high-risk populations should focus on factors mentioned in Table 9. Since incidence of CS is related to prevalence of syphilis in population, strategies should be complemented by programs to prevent and control STIs and by syndromic management of STIs. Adjuvant strategies include establishing clear indicators and targets to ensure the adequacy of screening and monitoring and linking STIs services with mother and child health (MCH) services.

Following factors are important in reducing the severity and burden of CS:

Preventing infection in women

CS can be prevented either by prevention or detection of infection in pregnant women. Programs promoting safe sex or control of STIs will prevent maternal infection, but if women become infected only screening programs can

prevent effects of maternal infection on fetus. Hence these programs must be implemented during ANC.^[8]

Access to ANC with emphasis on early access

In developing countries ANC is not available or not accessed; reasons ranging from fear of medical care to nonexistence of ANC. In industrialized countries problems like drug abuse interfere with access to ANC, while in developing countries women with syphilis are less likely to have risk factors which distinguish them from women without syphilis. Furthermore, women must access ANC early. It was earlier thought that fetus was protected from infection until 20th week of gestation due to placenta barrier which is not true. In developing countries first ANC visit occurs at 5th-6th week of gestation which may be late to prevent CS.^[8]

Screening/testing of women

Ideal approach would be to screen women during the first trimester with nontreponemal tests and again early in the third trimester even in low prevalence

Table 8: Factor responsible for continued high incidence of CS**Factors responsible for continued high incidence of CS**

Poor antenatal care in mother
Presence of primary syphilis or illness of unknown duration in mother
Higher VDRL titer (>1:16) in mother at the time of treatment or delivery
Shorter interval between delivery treatment and delivery
Untreated syphilis
Poor understanding of the purpose of antenatal care
Nonattendance at antenatal clinics (resulting in failure of timely detection and treatment) due to perceived high cost of antenatal services and inadequacies of services provided
Difficult access to prenatal care and screening services
Nonavailability of syphilis screening tests as a part of routine antenatal services
A low demand for test among users
Loss of samples in transit and delayed receipt of serological reports resulting in failure to comply with recommended treatments
Faulty tracking systems for mothers and their partners who are tested VDRL positive
High costs of tests
Lack of health insurance acting as a barrier to health care during pregnancy
Nonperception of CS as a problem because of lack of its visibility due to high number of fetal deaths
Lack of awareness of the seriousness of the problem among politicians, health officials, and health care providers
Stigma and discrimination that surrounds STIs
VDRL=Venereal disease research laboratory; CS=Congenital syphilis; STIs=Sexually transmitted infections

Table 9: Important factors to be focused on to reduce CS in high-risk populations

Early identification of infection in pregnant women via screening (both at first prenatal visit and during third trimester)
Screening all pregnant women attending emergency clinics
Performing on-site testing and same-day treatment of infected women
Providing appropriate treatment to infected women with penicillin allergy
Identification and referring sex partners and treatment of infected partners to prevent reinfection
Modification of high risk behavior
Promotion of access to and use of health care (especially antenatal care)

CS=Congenital syphilis

population. Optimal approach would be to retest women who are at high risk or from high prevalence areas at 28 weeks gestation and closer to delivery as primary infection may occur after initial screening and there is a possibility of reinfection, especially if the partner is untreated. Minimal requirement would be that all women should undergo one screening test in their early pregnancy and if this does not happen they should be tested at delivery.

Provision of syphilis testing in ANC programs

Many ANC programs do not provide testing for syphilis and there is no national policy for this. Inability to maintain syphilis testing service that requires transportation of blood to centralized laboratory for testing is a major obstacle.^[8]

On site testing

Solution to the problem of disassociation between testing and administering treatment is use of on-site testing in antenatal clinics, allowing early receipt of reports leading to earlier treatment of mothers attending clinics late in their pregnancy. Furthermore, it would allow immediate identification of mothers who test positive, eliminating the need for costly and unreliable tracing. Onsite testing may have low sensitivity and may vary with site. Reduced sensitivity at lower titers is a minor concern since infants born to these mothers have a low risk of being infected. Furthermore, because the test has low positive predictive value about 9% women will be treated unnecessarily, which though not ideal, is unlikely to expose them to serious risks. However, there are difficulties like availability of trained staff and material. Furthermore, results obtained at clinics differ from those obtained from centralized laboratory. But decentralized testing leads to more women being detected and treated than centralized testing. Difficulties of conducting RPR at clinics has led to the development of technologically simple immunochromatographic strip tests, which is cost effective than centralized testing.^[8]

Prompt receipt of results

For prompt receipt of results, tested women must return to clinic, or there must be notification system in place; frequently neither occur. Confidential system to notify women of their results at home would be a good alternative.^[8]

Notification resulting in treatment

Treatment must be available at clinic itself as referral for therapy results in women being treated.

Interventions targeting vulnerable groups

Eliminating CS will only become possible if interventions targeting vulnerable groups are also implemented. Pan American Health Organization's role in eliminating CS being a good example.^[6]

ECONOMIC PERSPECTIVE

Various analysis conclude that syphilis screening is cost effective and cost saving at threshold prevalence's <1% and therefore should continue because treating CS is expensive. Preventing an

occasional case is economically worthwhile; also screening, detecting and treating infection in women can prevent consequences in women and their partners.^[8]

PROGRAM PERSPECTIVE

In industrialized countries despite recommendations of screening for syphilis early in pregnancy many stillbirths and infections occur in infants (in US between 1992 and 1998 a mean of 135 infants annually died of CS). Biggest contributor to the occurrence of CS being failure to attend ANC. Programs focus on ensuring that pregnant women are tested at least once by the time of delivery, while some mandate that women at high-risk be tested again in the third trimester and yet again at the time of delivery.^[8]

RECOMMENDED INTERVENTIONS

The WHO global strategy to eliminate congenital syphilis

Goal of WHO Strategy is an elimination of CS as public health problem, prevention of mother-to-child transmission (PMTCT) of syphilis through early antenatal care, treatment of sexual partners of infected women, and prophylactic treatment with a single dose of penicillin of all neonates born to RPR-positive mothers.^[3]

Table 10 mentions four pillars of WHO strategy (country level).^[3] Table 11 gives four guiding principles for implementation.^[3]

For success, work has to be done at following levels.

At international level

At international level prevention of CS should be made health system priority and following should be provided

1. Estimates of the global burden of CS
2. Active advocacy for CS prevention
3. Assessment of global CS prevention program policies
4. Program guidance for nation prevention programs
5. Links with international groups resulting in focused, coordinated international level effort.^[8]

At national level

At national level, policy for testing and treating all pregnant women for syphilis should be developed giving it political and health care priority. At National level antenatal screening should be linked to programs for PMTCT of HIV and other programs to improve ANC. Evaluation of pilot programs to look for combined efficiencies would be useful. Community syphilis prevention and control efforts

Table 10: Four pillars of the WHO strategy (country level)

Pillars of the WHO strategy

Ensure advocacy-sustained political commitment to achieving goal of eliminating CS

Increase access to, and quality of, maternal and newborn health services ensuring that all pregnant women are adequately screened and treated and decrease the frequency of missed opportunities for screening women outside maternal and newborn care

Use of diagnostics that are effective, affordable, and require minimal logistic support, with effective management of all infected women and their partners and the treatment of infants born to seropositive mothers

Establish surveillance, monitoring, and evaluation systems (improving surveillance systems, developing indicators, and strengthening monitoring and evaluation systems)

CS=Congenital syphilis; WHO=World Health Organization

Table 11: The four guiding principles for implementation

A country driven process taking into account wide range of cultures and readiness of health services, but having a common approach which be adapted to local situations

An integrated approach-linking with other maternal and newborn health services e.g., prevention of mother-to-child transmission of HIV

A rights based approach giving women right to information, counseling, and confidentiality

Partnership and collaboration-cross-sectoral collaboration at the government level (Ministry of Health, Ministry of Education etc.); collaboration and partnership with other reproductive health services/community-based health programs run through nongovernmental organizations, donors and foundations and United Nations agencies

HIV=Human immunodeficiency virus

should be reinforced. Improvement of STIs services outside ANC, with efforts to notify infected male partners, would help achieve the goal of preventing women from getting infected.^[8]

At local level

At the local level attendance early in pregnancy at ANC clinic should be encouraged. Laboratory testing should be decentralized.^[8]

Challenges for congenital syphilis prevention at different levels

Successful implementation of syphilis screening programs depends on identifying barriers and then improving the healthcare system's capacity to provide services required. Challenges faced include

1. Lack of policy adherence
2. Lack of clarity regarding roles, responsibilities and accountability
3. Importance of integration of programs and services
4. Adequate access to maternal and newborn health services

Table 12: Recommendations from the review of evaluations of programs

Compare and contrast any existing CS control programs with present WHO to identify any gaps or implementation issues
 If no local or subnational policy currently exists, then adapt WHO proposed action plan to the local context
 Create programmatic links with international agencies working in the areas of STIs and HIV prevention and MCH
 Sufficient attention to be paid to implementation of comprehensive monitoring and evaluation systems to assess program efficiency and impact
 Promote, through various media and other dissemination channels, political and stakeholder commitment to the goals of eliminating CS
 Standardize and strengthen international and national surveillance systems to allow better assessment of the magnitude of syphilis in pregnant women and CS

CS=Congenital syphilis; MCH=Mother and child health; STIs=Sexually transmitted infections

5. Availability of onsite screening and prompt treatment
6. Lack of surveillance data
7. Lack of monitoring and evaluation.

Recommendations from review of evaluations of various programs are mentioned in Table 12.

CONCLUSION

The elimination of CS can be achieved through implementation of various proven measures but requires technical support, funding and commitment among political forces, health officials, and public to prevent and treat CS cases and help countries reach their Millennium Development Goals. Stronger partnerships with clearly defined responsibilities should be developed among agencies responsible for national STI control, HIV/AIDS control, and making pregnancy safer initiatives to ensure universal coverage of CS control interventions.^[10]

Clinicians should adhere to standardized protocols in evaluation and management of at-risk newborns. Vigilant screening prenatally and at delivery and adequate follow-up are critical to reduce CS. Improved surveillance data and resources are needed for identification and follow-up of newborns at risk for CS.^[11]

REFERENCES

1. Saloojee H, Velaphi S, Goga Y, Afadapa N, Steen R, Lincetto O. The prevention and management of congenital syphilis: An overview and recommendations. *Bull World Health Organ* 2004;82:424-30.
2. Arnold SR, Ford-Jones EL. Congenital syphilis: A guide to diagnosis and management. *Paediatr Child Health* 2000;5:463-9.
3. Schmid GP, Stoner BP, Hawkes S, Broutet N. The need and plan for global elimination of congenital syphilis. *Sex Transm Dis* 2007;34:S5-10.
4. Sharma VK, Khandpur S. Changing patterns of sexually transmitted infections in India. *Natl Med J India* 2004;17:310-9.
5. Syphilis during pregnancy. The Global Elimination of Congenital Syphilis: Rationale and Strategy for Action. WHO; 2007. p. 3-5.
6. Valderrama J, Zacarías F, Mazin R. Maternal syphilis and congenital syphilis in Latin America: Big problem, simple solution. *Rev Panam Salud Publica* 2004;16:211-7.
7. Warner L, Rochar RW, Fichtner RR, Stoll BJ, Nathan L, Toomey KE. Missed opportunities for congenital syphilis prevention in an urban southeastern hospital. *Sex Transm Dis* 2001;28:92-8.
8. Schmid G. Economic and programmatic aspects of congenital syphilis prevention. *Bull World Health Organ* 2004;82:402-9.
9. Challenges for congenital syphilis prevention at different levels of the health system. The Global Elimination of Congenital Syphilis: Rationale and Strategy for Action. WHO; 2007. p. 10-3.
10. Hossain M, Broutet N, Hawkes S. The elimination of congenital syphilis: A comparison of the proposed World Health Organization action plan for the elimination of congenital syphilis with existing national maternal and congenital syphilis policies. *Sex Transm Dis* 2007;34:S22-30.
11. Martin D, Bertrand J, McKegney C, Thompson L, Belongia E, Mills W. Congenital syphilis surveillance and newborn evaluation in a low-incidence state. *Arch Pediatr Adolesc Med* 2001;155:140-4.

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MULTIPLE CHOICE QUESTIONS

- Q1. What is the most common adverse pregnancy outcome in primigravida female having active syphilis?
 - A. Neonatal Syphilis
 - B. Stillbirth
 - C. Prenatal Death
 - D. Small for Date
- Q2. By what time does the transplacentally acquired nontreponemal antibody disappear in infected infants treated with penicillin?
 - A. 12 months of age.
 - B. 8 months of age
 - C. 14 months of age
 - D. 10 months

- Q3. Following are situations where radiology and lumbar puncture is warranted. Which is false?
- A. If an infant or child has signs or symptoms of CS
 - B. If there is no documented maternal treatment in pregnancy
 - C. If the mother was treated within 4 weeks of delivery
 - D. If maternal treatment was inadequate or inadequately documented
 - E. An eight-fold decline in titer following therapy was not documented
- Q4. Infants with neurosyphilis should have repeat CSF examination at six month intervals until results are normal. A second course of treatment is recommended if CSF VDRL is positive after _____ months of the first dose.
- A. 4months
 - B. 12months
 - C. 8months
 - D. 6 months
- Q5. In which condition a presumptive serological diagnosis of neonatal syphilis may be made?
- A. Infant's nontreponemal titer is eight-fold higher than that of mother when both blood samples are drawn at the time of delivery.
 - B. Infant's nontreponemal titer is four-fold higher than that of mother when both blood samples are drawn at the time of delivery.
 - C. Infant's nontreponemal titer persists or decreases after birth.
 - D. Infant's treponemal antibody titer remains positive at 20 months of age.
- Q6. A syphilitic stillbirth is defined as _____
- A. A fetal death in which the mother had untreated or inadequately treated syphilis at delivery of a fetus after a 22-week gestation or of 500 g.
 - B. A fetal death in which the mother had untreated or inadequately treated syphilis at delivery of a fetus after a 24-week gestation or of 1500 g.
 - C. A fetal death in which the mother had untreated or inadequately treated syphilis at delivery of a fetus after a 20-week gestation or of 500 g.
- Q7. What is Wimberger's sign?
- A. demineralization and destruction of the proximal tibial metaphyses.
 - B. demineralization and destruction of the distal tibial metaphyses.
 - C. demineralization and destruction of the proximal femoral metaphyses.
 - D. demineralization and destruction of the distal femoral metaphyses.
- Q8. Cutaneous manifestation seen in congenital syphilis but not in acquired syphilis.
- A. Maculopapular rash
 - B. Vesiculo-Bullous rash
 - C. Mucous patch
 - D. Condyloma lata

Answers: 1. B, 2. A, 3. E, 4. D, 5. B, 6. D, 7. A, 8. B