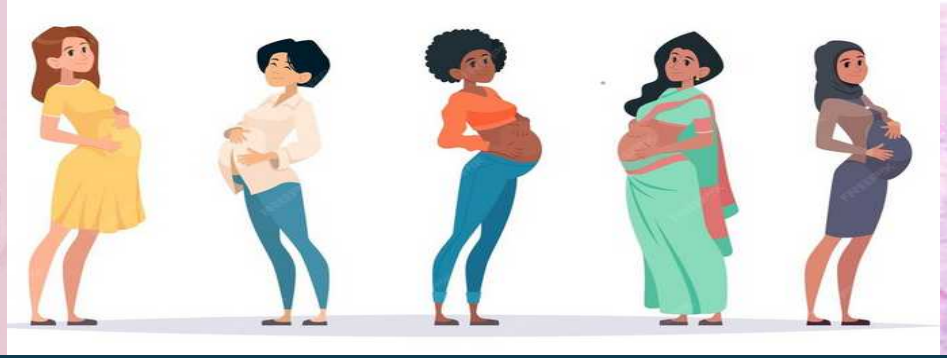

Syphilis in Pregnancy

Presented by

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Consultant, Obstetrician and Gynaecologist
Dr AG JEETOO HOSPITAL
Ministry of Health and Wellness

40 slides • Evidence-based

Background & Clinical Importance

"The Great Imitator"

Treponema pallidum is a systemic spirochaete with protean manifestations — its diverse presentation earns syphilis the enduring title of "great imitator" in clinical medicine.

Vertical transmission possible at any gestational age & any stage of disease.

- Maternal infection in pregnancy is strongly linked to fetal infection & adverse neonatal outcomes
- Disease often remains asymptomatic or subclinical — missed diagnosis is common
- Vertical transmission can occur at any gestational age & any stage of disease
- Universal antenatal screening is essential — clinical presentation is unpredictable

Ref: Desjardins et al., 2025

Global Burden

8M

new syphilis infections annually worldwide

700K

cases of congenital syphilis per year

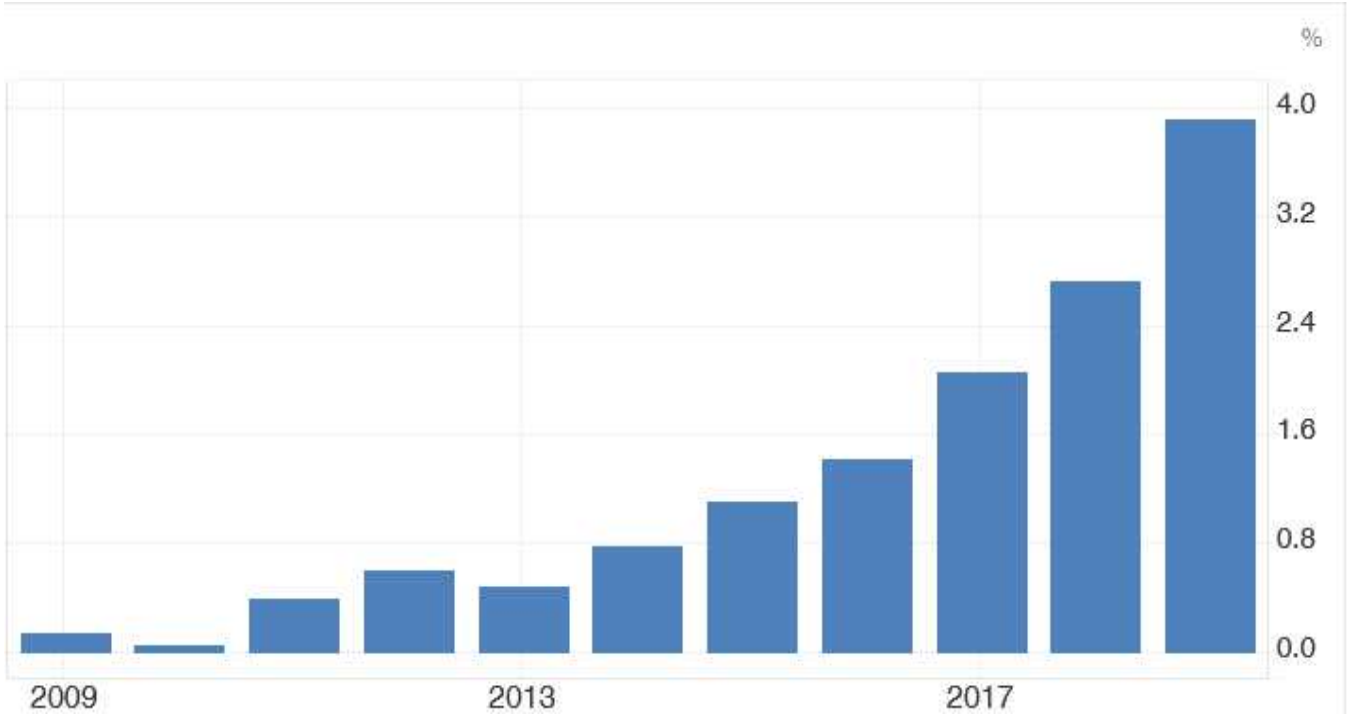
150K

fetal deaths attributed to syphilis annually

Burden concentrated in LMICs • Significant underestimation due to asymptomatic maternal & neonatal cases

Ref: Desjardins et al., 2025

Prevalence of syphilis (% of women attending antenatal care) in Mauritius was reported at 3.93 % in 2019, according to the World Bank collection of development indicators Mauritius



A rise in sexually transmitted infections (STIs), including syphilis,

Testing and Care: The Ministry of Health and Wellness provides free testing and treatment at hospitals. Screening is also conducted in antenatal clinics.

Screening Procedures: Pregnant women should be tested for syphilis at their first antenatal visit (booking), at the beginning of the third trimester (around 28–32 weeks), and upon admission for delivery.

All complicated STI cases (including HIV/AIDS) are referred to a specialized unit at Bouloux AHC in Port Louis

ISLAND OF MAURITIUS

DISTRIBUTION OF NOTIFIABLE DISEASES REPORTED TO SANITARY AUTHORITIES BY DISTRICT - 2024

DISEASE / DISTRICT	HIV / AIDS@ (MAURITIAN)	FOOD POISONING	GONORRHOEA	DENGUE		LEPTOSPIROSIS	MALARIA		SYPHILIS	TUBERCULOSIS PULMONARY	
				LOCALLY TRANSMITTED	IMPORTED		IMPORTED	INTRODUCED		MAURITIAN	NON MAURITIAN
PORT LOUIS	148	2	7	1,466	2	9	6	-	104	21	8
PAMPLEMOUSSES	67	38	5	1,216	6	9	7	-	71	7	3
RIVIERE DU REMPART	39	1	-	2,142	1	7	3	-	38	4	2
FLACQ	32	7	5	253	4	7	1	-	42	16	-
GRAND PORT	38	-	4	123	2	4	2	1	22	3	1
SAVANNE	20	1	-	39	-	8	2	-	17	2	-
PLAINES WILHEMS	121	5	7	762	7	26	15	1	66	17	7
MOKA	9	-	3	92	4	6	-	-	12	1	-
BLACK RIVER	52	-	3	685	5	4	1	-	58	4	1
TOTAL	**526**	**54**	**34**	**6,778****	**31**	**80**	**37**	**2**	**430**	**75**	**22**

@ Human Immuno-Deficiency Virus / Acquired immuno-deficiency syndrome

** 6,838 dengue cases reported in 2024, district is not available for 60 locally transmitted dengue cases

DISTRIBUTION OF CERTAIN NOTIFIABLE DISEASES REPORTED TO SANITARY AUTHORITIES

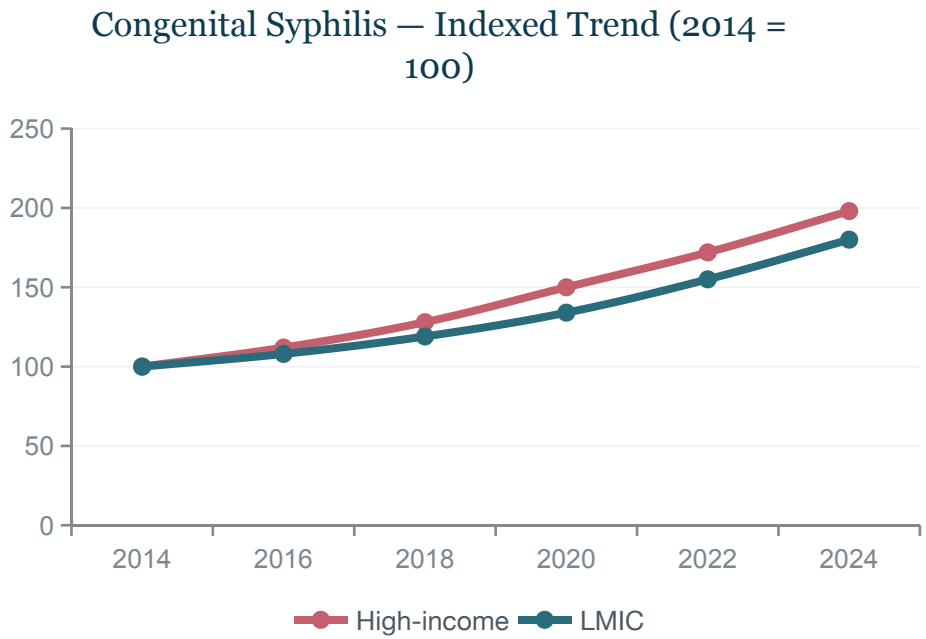
BY AGE-GROUP AND SEX - 2024

DISEASE & SEX / AGE-GROUP (YEARS)	HIV / AIDS@ MAURITIAN		FOOD POISONING		GONORRHOEA		MALARIA (IMPORTED/INTRODUCED)		SYPHILIS		PULMONARY TUBERCULOSIS MAURITIAN/NON-MAURITIAN	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Less than 1 0	2	3	-	1	-	-	-	-	-	-	-	1
10 - 19	7	9	1	2	3	-	-	-	3	34	-	4
20 - 29	144	44	1	27	14	-	7	3	59	149	9	4
30 - 39	121	37	-	13	6	1	14	1	58	60	13	7
40 - 49	60	30	3	3	6	-	6	1	30	15	17	6
50 - 59	28	13	-	2	4	-	1	2	12	2	15	1
60 & over	18	10	1	-	-	-	4	-	8	-	16	4
TOTAL	**380**	**146**	**6**	**48**	**33**	**1**	**32**	**7**	**170**	**260**	**70**	**27**

@ Human Immuno-Deficiency Virus / Acquired immuno-deficiency syndrome

See page 99 for additional statistics on Sexually Transmitted Infections

Epidemiological Trends



Contributing Factors

- Inadequate antenatal care access
- Socioeconomic inequalities
- High-risk sexual behaviors
- Failure of preventive screening & public health response

Rising incidence in BOTH high-income & developing countries — marked increase in congenital syphilis over the past decade.

Ref: Desjardins et al., 2025; ACOG, 2024

Public Health Significance

#2

Leading preventable cause of stillbirth globally

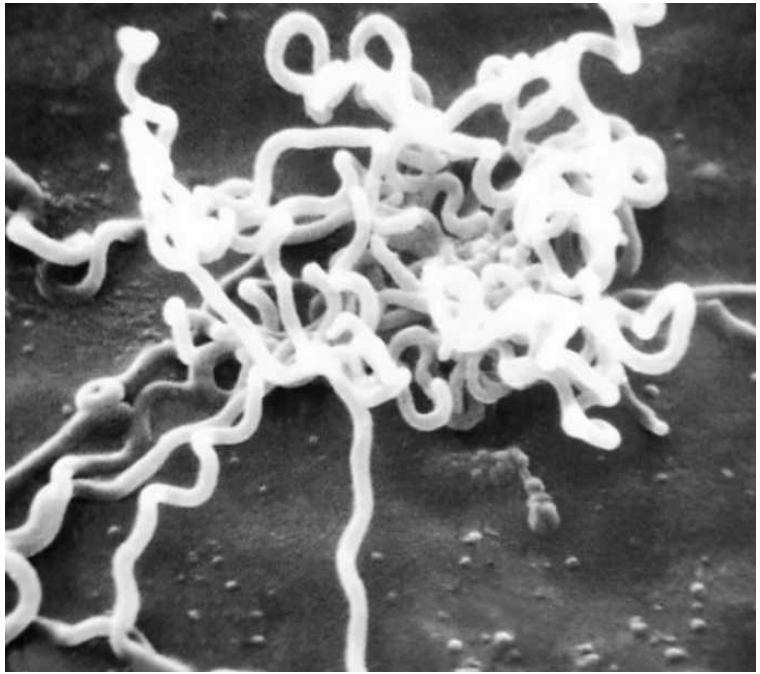
— a preventable tragedy

- **Preterm Birth**
- **Low Birth Weight**
- **Neonatal Mortality**
- **↑ HIV Acquisition**

Early intervention substantially reduces disease burden.

Ref: Kielaite et al., 2025; Adhikari et al., 2020

Etiology & Microbiology



Motile spirochaete

MOTILE

Spirochaete with high invasive capacity — rapid spread via bloodstream & lymphatics

UNCULTIVABLE

Cannot be cultured in vitro — diagnosis relies entirely on serology

IMMUNE-EVASIVE

Evades host immune response → chronic, persistent infection

PLACENTA-TROPIC

Shows tropism for placental tissue — facilitates vertical transmission

Ref: Adhikari et al., 2020

Modes of Transmission

Sexual (Primary)

Mucocutaneous contact — the dominant route

Vertical

Transplacental spread (most common) OR intrapartum exposure via genital lesions

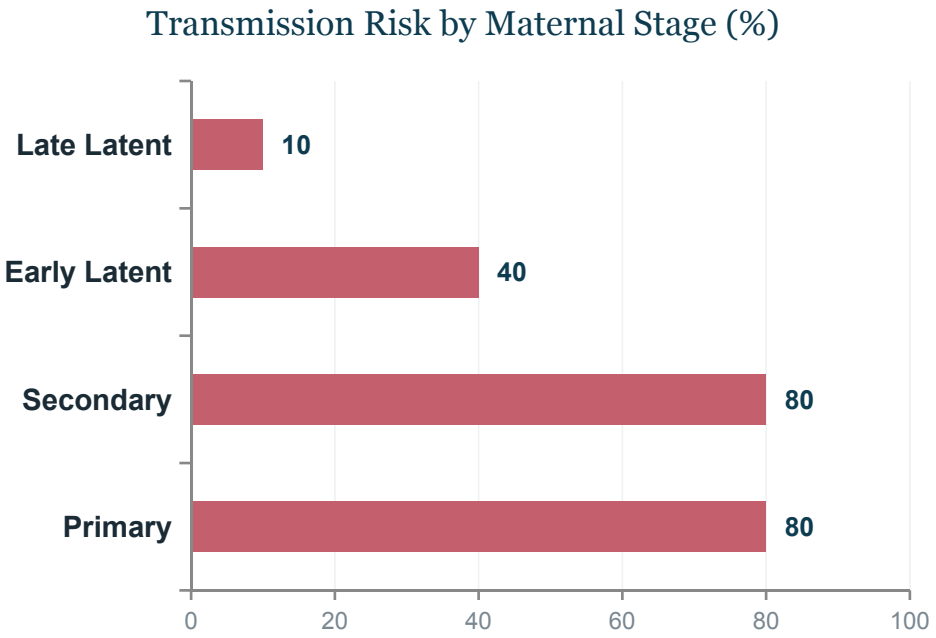
Blood-borne (Rare)

Transfusion or needle sharing

Transmission risk ∝ bacterial load. Infectivity is HIGHEST during early (primary & secondary) stages.

Ref: Desjardins et al., 2025

Vertical Transmission — Key Concepts



- Can occur at ANY stage of maternal infection — including latent phase
- Highest risk in primary & secondary syphilis due to high spirochaetemia
- Strong correlation with non-treponemal titres (RPR level)
- Risk rises as gestation advances — placental permeability changes
- Untreated infection → major fetal morbidity & mortality

Ref: Kingston et al., 2024

Determinants of Fetal Infection

01

Maternal Stage

Early stages carry highest transmission risk

02

Serological Titre

RPR ≥ 1:8 significantly increases transmission risk

03

Treatment Adequacy

Both timing & regimen matter — delayed therapy fails

04

Partner Reinfection

Untreated sexual partner → recurrent maternal infection

05

Antenatal Access

Screening coverage directly impacts detection rates

Ref: Kingston et al., 2024

Natural History of Syphilis

- Chronic infection through distinct clinical stages
- Alternating symptomatic & asymptomatic phases
- Latent stage = ongoing infection without symptoms
- Untreated → tertiary disease with multisystem involvement
- Natural history remains unchanged during pregnancy

Ref: Adhikari et al., 2020

Primary Syphilis

STAGE 1

~3

weeks after exposure

Painless chancre at inoculation site

Clinical Features

- Painless chancre at site of inoculation
- Often unnoticed in females (cervical / vaginal location)
- Regional lymphadenopathy usually present
- Spontaneous healing occurs
- Disease progresses if untreated

Ref: Adhikari et al., 2020

Secondary Syphilis

STAGE 2

MOST

INFECTIOUS STAGE

Haematogenous dissemination of spirochaetes

Classic Features

- **Generalized Rash** — Classically involves palms & soles
- **Condyloma Lata** — Moist, flat wart-like lesions in intertriginous areas
- **Mucosal Lesions** — Mucous patches in oral cavity & genitalia
- **Systemic Symptoms** — Fever, malaise, arthralgia, lymphadenopathy

Ref: Adhikari et al., 2020

Latent Syphilis

STAGE 3

SILENT

but not harmless

Positive serology, no clinical signs — diagnosis is entirely serological.

Early vs Late Latent

EARLY LATENT	LATE LATENT
< 1 year	> 1 year
Higher risk of transmission	Lower but persistent transmission risk

Important contributor to vertical transmission due to asymptomatic nature.

Ref: Adhikari et al., 2020

Tertiary Syphilis

STAGE 4

YEARS

after untreated infection

Rare in pregnancy — but indicates longstanding untreated disease

Chronic Inflammatory Damage

Cardiovascular

Aortitis, aortic regurgitation, aneurysm

Neurosyphilis

Tabes dorsalis, general paresis, meningovascular

Gummatous

Granulomatous lesions in skin, bone, viscera

Ref: Kielaite et al., 2025

Effects on pregnancy:

Mother:
Syphilis accelarates the course of HIV in pregnant woman

Fetus:
There is transplacental migration of spirochaetes
The spirochaete bacteria can cross the placenta as early as 14 weeks of gestation to cause fetal infection.
Basic pathology is obliterative endarteritis,
Abortion, preterm, stillbirth, NIH , IUFD, early neonatal death, survival with congenital syphilis

Pathophysiology in Pregnancy

1

Placental Invasion

Spirochaetes cross placenta

2

Fetal Circulation

Systemic fetal inflammatory response

3

Multi-organ Involvement

Liver, spleen, bone marrow

4

Placental Dysfunction

Impaired function → fetal hypoxia

Placental Changes

- Placentomegaly from increased connective tissue
- Edema of villi with diminished vascularity
- Increased vascularity

Ref: Kingston et al., 2024

Timing of Fetal Infection

60–90%

transmission rate in early maternal syphilis

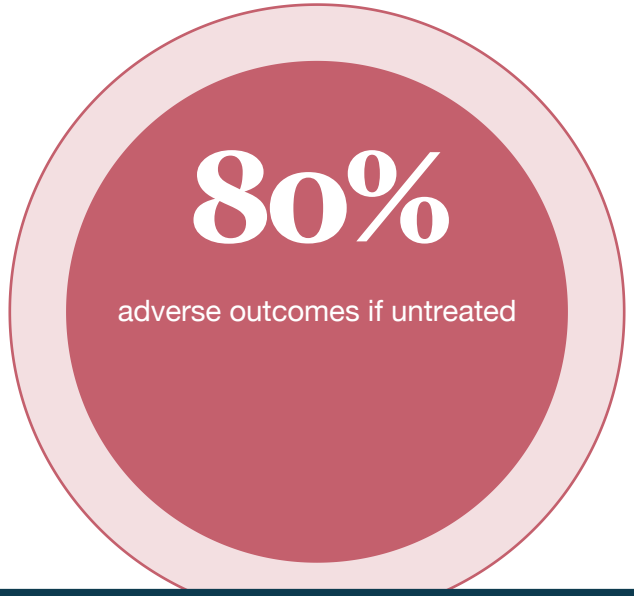
Transplacental transmission may occur as early as 8–9 weeks of gestation.

Gestational Timeline

- Early stages: transmission rates 60–90%
- Early latent: moderate risk • Late latent ~10%
- Earlier treatment = better fetal outcomes
- Treat before mid-pregnancy to significantly reduce risk

Ref: Kingston et al., 2024; Desjardins et al., 2025

Adverse Pregnancy Outcomes

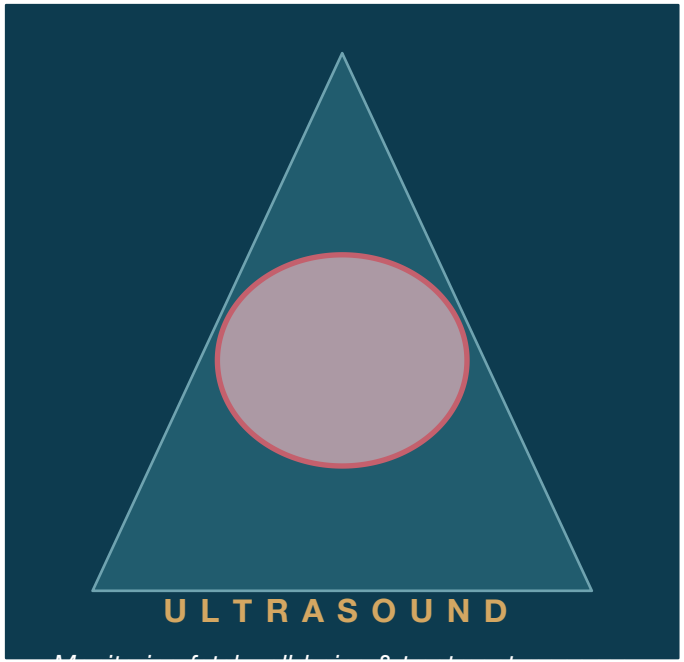


- Miscarriage
- Stillbirth / IUFD
- Preterm Delivery
- Low Birth Weight
- Neonatal Mortality
- Reduced with treatment

Majority of complications are PREVENTABLE with early intervention.

Ref: Kielaite et al., 2025; Kingston et al., 2024

Fetal Manifestations — Ultrasound Findings



Common Findings

- **Hepatosplenomegaly**
  Classic hepatic & splenic enlargement
- **Placentomegaly**
  Thickened, edematous placenta
- **↑ MCA Doppler velocity**
  Indicates fetal anaemia
- **Hydrops fetalis**
  Severe — indicates advanced disease
- **Polyhydramnios**
  Associated with severe infection
- **IUGR**
  Growth restriction frequently observed

Ref: Kingston et al., 2024

Placental Pathology

Enlarged & Edematous

Villitis + Vascular Proliferation

Direct Spirochaete Invasion

Clinical Consequences

- Impaired maternal–fetal exchange
- Contributes to fetal hypoxia
- Promotes intrauterine growth restriction
- May offer diagnostic clue in unexplained stillbirths

Ref: Kingston et al., 2024

Neonatal Outcomes

50–90% of neonates are asymptomatic at birth — diagnosis requires a high index of suspicion

EARLY DISEASE

< 2 years

- Rash
- Hepatosplenomegaly
- Anaemia
- Respiratory distress

LATE DISEASE

> 2 years

- Dental abnormalities
- Skeletal deformities
- Neurological deficits
- Permanent disability risk

Ref: Desjardins et al., 2025; Kielaite et al., 2025

Importance of Antenatal Screening

> *Universal screening is the cornerstone of prevention of congenital syphilis.*
>
> — *Kingston et al., 2024*

Why Screen?

- Enables early detection & timely maternal treatment
- Protects the fetus when initiated early
- Significantly reduces adverse pregnancy outcomes
- Must be performed in every pregnancy — irrespective of risk
- Repeat screening needed due to ongoing risk
- Integral to comprehensive antenatal care

Ref: Kingston et al., 2024

Key Recommendations from FIGO (Committee on Infections During Pregnancy)

Screening Strategy:

- **First Visit:** Universal screening at the first prenatal visit.
- **Delivery:** Mandatory screening at delivery, regardless of risk factors, especially in countries that have not met WHO eradication goals.
- **Intermediate:** Consider intermediate screening around 28 weeks gestation.
- **Rapid Tests:** Use on-site rapid tests if rapid access to lab services is scarce.
- **Ad-hoc:** Test any pregnant person with symptoms, and test following stillbirth/fetal demise.

Treatment and Management:

- **First-line:** Benzathine penicillin G is the only documented effective therapy, with 2.4 million units intramuscularly (IM) recommended.
- **Partner Management:** Screening and treatment of sexual partners is essential to prevent maternal reinfection.
- **Allergy:** If a penicillin allergy is proven, desensitization is required, as other treatments are not effective for the fetus.
- **Follow-up:** Monthly non-treponemal titred tests are recommended to ensure treatment effectiveness.

Best Practices:

- Offer screening for other sexually transmitted infections (STIs), including HIV.
- Provide counseling on condom use and avoidance of sexual intercourse until treatment is complete.

Screening Recommendations

Pregnancy Screening Timeline

FIRST VISIT
All pregnant women

28–32 WEEKS
Repeat screen

DELIVERY
High-risk populations

Opportunistic Screening

Encouraged at any healthcare contact for at-risk women.

Universal — Not Risk-Based

Risk-based screening alone is insufficient — cases will be missed.

Ref: ACOG, 2024

Indications for Repeat Testing

New or multiple sexual partners during pregnancy

Known exposure to STI or infected partner

Substance abuse — especially IV drug use

Clinical suspicion of STI symptoms

Residence in high-prevalence area

Negative early test does NOT exclude later infection

Ref: Kingston et al., 2024

Diagnostic Approach

Serology is the foundation

Treponemal

Specific antibody detection

EIA · TPHA · CLIA

Non-treponemal

Quantitative titres — reflects activity

RPR · VDRL

- Reverse sequence screening is increasingly adopted
- Clinical findings alone are insufficient due to variability
- Integrate history + examination + serology
- Repeat testing may be required in early infection

Ref: Desjardins et al., 2025

Treponemal Tests

EIA • TPHA • CLIA

Antibody-specific

Lifelong positive — even after treatment

What they detect

Antibodies specific to Treponema pallidum

Limitation

Cannot differentiate active from past infection

Interpretation

Must be correlated with non-treponemal tests

Ref: Desjardins et al., 2025

Non-Treponemal Tests

RPR • VDRL

Quantitative titres

Titres decline with effective therapy

Reflects
Disease activity — titres correlate with infection

Monitoring
Used to track treatment response over time

False positives
Pregnancy, autoimmune disease, acute viral illness

Prozone phenomenon
High antibody titres → false-negative results

Ref: Desjardins et al., 2025

Interpretation of Serology

Treponemal	Non-treponemal	Interpretation
POSITIVE	POSITIVE	Active infection
POSITIVE	NEGATIVE	Past or early infection
NEGATIVE	POSITIVE	Possible false positive — confirm

- False positives must be considered in low-risk individuals
- Clinical context is essential for accurate staging
- Repeat testing advised if diagnosis remains uncertain
- Misinterpretation may lead to inappropriate management

Ref: Desjardins et al., 2025

Management Principles

- Treat mother, prevent fetal transmission
- Early diagnosis & treatment are critical
- Multidisciplinary approach improves outcomes-
- Partner treatment — prevents reinfection
- Follow-up serology to assess response
- Public health reporting & contact tracing

Ref: Kingston et al., 2024

Drug of Choice

Benzathine Penicillin G

The only antibiotic proven to prevent congenital syphilis

TREATMENT OF CHOICE IN PREGNANCY

Placental Crossing

Effectively crosses placenta — treats mother & fetus

No Substitutes

Alternative antibiotics are NOT reliable substitutes

Time-sensitive

Delayed treatment increases fetal risk

Ref: ACOG, 2024

Treatment Regimens

Stage	Regimen	Notes
Early syphilis	Benzathine Penicillin G 2.4 MU IM (single dose), a 2nd dose is recommended while treating early syphilis in 3rd trimester due to low serum level of this drug and risk of treatment failure	*Primary, secondary, early latent*
Late latent syphilis	Benzathine Penicillin G 2.4 MU IM — 3 weekly doses	*Missed dose → restart regimen*
Neurosyphilis	IV Aqueous Penicillin G -Procaine penicillin G 2.4 million units intramuscularly daily plus probenecid 500 mg PO 4 times a day for 10 to 14 days.	*Hospital-based*

Treatment must be completed ≥ 30 days before delivery

Adherence is critical for preventing congenital infection.

Ref: Adhikari et al., 2020

Alternatively- Ceftraixone 500mg i/m daily x10days

If pt is unable to tolerate an I m regime , but not allaergic to penicillin, she can be prescribed oral amoxycillin 500mg with probenecid 500mg via oral route QID x 14days

In case of allergy to penicillin: oral azithromycin 2 gm single dose

Penicillin Allergy Management

NO

substitutes

Alternative antibiotics do NOT reliably prevent fetal infection

Desensitization Protocol

1. Confirm true penicillin allergy
2. Perform desensitization in monitored setting (e.g., ICU)
3. Administer penicillin therapy immediately after
4. Critical to ensure fetal protection

Ref: ACOG, 2024

Jarisch–Herxheimer Reaction

What is it?

An acute febrile reaction following initiation of antibiotic therapy.

Cause

Rapid destruction of spirochaetes

Clinical Features

- Fever, chills
- Myalgia, headache
- Uterine contractions
- May precipitate preterm labor / fetal distress

Usually self-limited within 24 hours

Counsel patients prior to treatment.

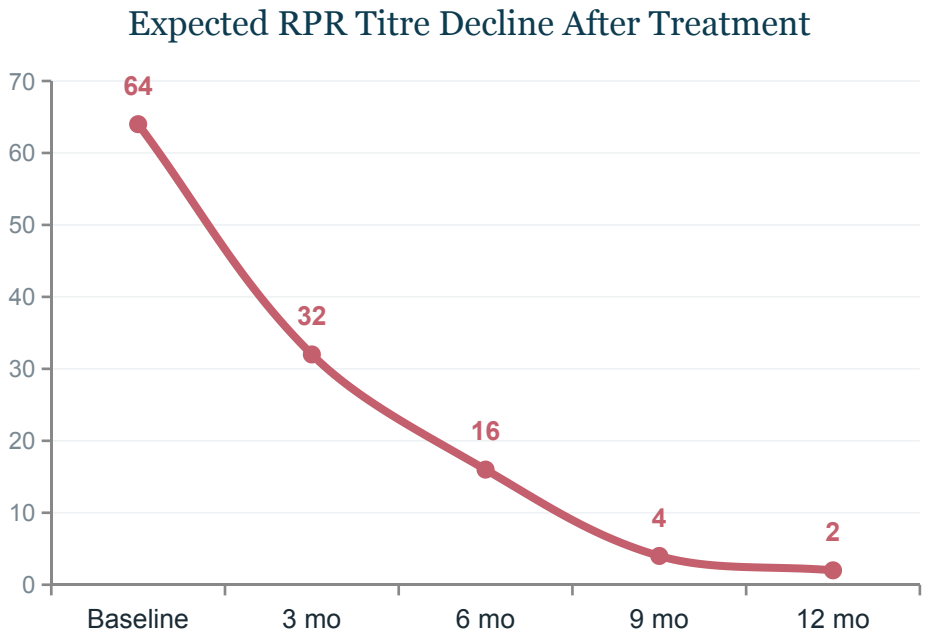
Ref: Adhikari et al., 2020

Partner Management

- Sexual partners MUST be screened & treated
- Prevents reinfection during pregnancy
- Partner notification is essential
- Treatment based on exposure & maternal stage
- Counsel on safe sexual practices
- Failure to treat partner → treatment failure

Ref: Kingston et al., 2024

Follow-Up & Monitoring



Monitoring Rules

- Serial non-treponemal titres used to monitor
- Expect ≥ 4-fold decline within 6–12 months
- Lack of decline → treatment failure or reinfection
- Repeat testing throughout pregnancy
- Essential to prevent congenital infection

Ref: Adhikari et al., 2020

Key challenges

Resurgence & Systemic Issues: Congenital syphilis cases have seen a 10-fold rise over the last decade.

Missed Opportunities: Data shows that 88% of 2022 congenital syphilis cases were preventable through more timely testing and treatment, particularly in the third trimester.

Focus on High-Risk Areas: The CDC and WHO recommend that in areas with high prevalence, screening must be mandatory at delivery, even if the patient has no reported risk factors

Managing Shortages: Due to global BPG shortages, there is a push to secure supply chain transparency and use alternative, non-penicillin regimens (such as ceftriaxone) with extreme caution, while understanding these may not cross the placenta to treat the fetus.

Recent advances

Universal & Multi-point Screening: The American College of Obstetricians and Gynecologists (ACOG) and other bodies now emphasize screening at three points: the first prenatal visit, early third trimester (28 weeks), and at delivery.

Reverse Sequence Algorithm: More labs are using the reverse algorithm (starting with treponemal testing) to detect latent cases earlier.

Dual Point-of-Care (POC) Testing: The use of dual HIV/syphilis finger-prick tests allows for immediate, on-site, same-day diagnosis and treatment, which is crucial for reducing missed opportunities.

Molecular Diagnostics: Molecular testing (PCR) of placental or umbilical tissue is emerging to better identify congenital infection at birth.

Future Research Directions

Long-Acting Alternatives: Researchers are investigating long-acting, non-penicillin treatments like **dalbavancin**.

Newborn Diagnostics: There is an urgent need for better testing for neonates in the first few days of life, as current serology is often difficult to interpret

Congenital Syphilis — Overview

Transplacental infection of the fetus

High morbidity if untreated • many infants asymptomatic at birth

Requires HIGH index of suspicion

Two Clinical Presentations

EARLY

< 2 years

Symptoms apparent in early infancy

LATE

> 2 years

Manifestations emerge in later childhood

Ref: Desjardins et al., 2025

Early Congenital Syphilis

Rash

Papular, vesicular or bullous

Hepatosplenomegaly

Classic finding

Anaemia

With thrombocytopenia

Bone Involvement

Pseudoparalysis may occur

“Snuffles”

Respiratory distress / rhinitis

Prompt Diagnosis

Early treatment is critical

Ref: Kielaite et al., 2025

Late Congenital Syphilis

Dental Abnormalities

Hutchinson teeth — peg-shaped, notched incisors

Skeletal Deformities

Saber shin, frontal bossing

Neurological Deficits

Deafness, cognitive impairment

Interstitial Keratitis

Classic late finding affecting vision

Represents untreated or inadequately treated early disease.

Ref: Adhikari et al., 2020

Prevention Strategies

Universal Antenatal Screening

Early Initiation of Prenatal Care

Timely & Adequate Treatment

Partner Management & Counseling

Public Health Surveillance

Education & Awareness Programs

Ref: Desjardins et al., 2025

TAKE HOME MESSAGE

01 Screen EARLY and repeat in high-risk cases

02 Do NOT rely on symptoms for diagnosis

03 Penicillin remains the gold standard — no substitutes

04 Ensure partner treatment to prevent reinfection

05 Monitor titres to confirm treatment success

06 Early intervention prevents nearly all adverse outcomes

Ref: Kingston et al., 2024; ACOG, 2024

REFERENCES

Further Reading

1. **Kingston M et al.** (2024) — *BASHH Guidelines on Syphilis in Pregnancy*
2. **ACOG Practice Advisory** (2024) — *Management of Syphilis in Pregnancy*
3. **Desjardins M et al.** (2025) — *FIGO Guidance on Syphilis in Pregnancy*
4. **Kielaite V et al.** (2025) — *Review Article — Syphilis in Pregnancy*
5. **Adhikari EH et al.** (2020) — *Syphilis in Pregnancy — Obstet Gynecol*

Thank you.