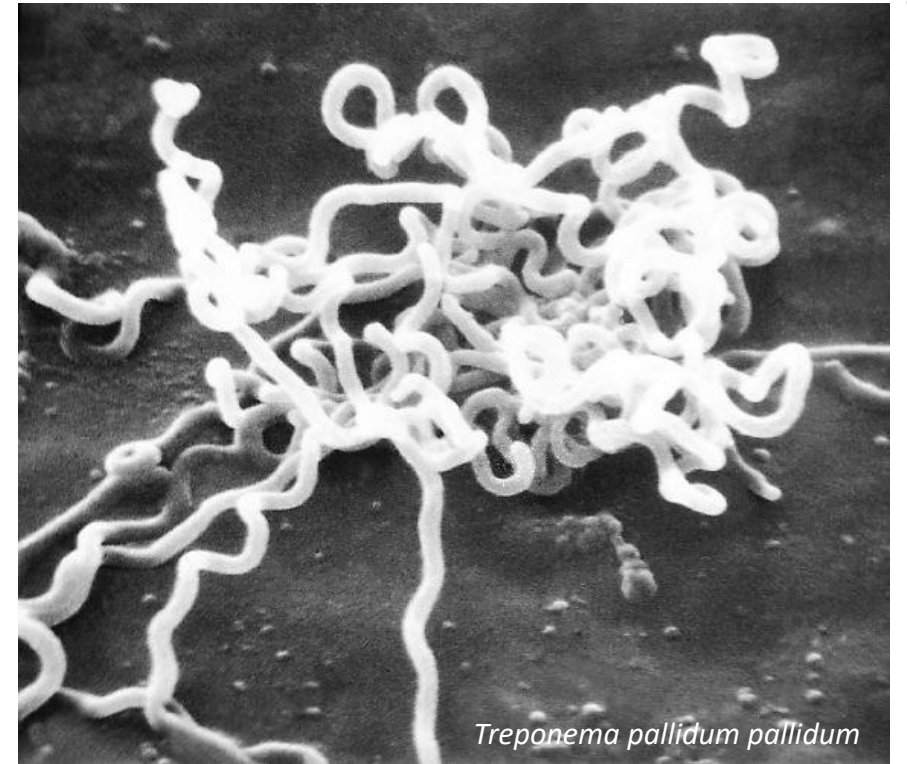


Contents/Objectives

- A quick overview of what is syphilis
 - A focus on congenital syphilis
- An overview of testing for syphilis
 - What do all those letters and titres mean?
- Treatment options and algorithms for various forms of syphilis
- The epidemiology of syphilis in Quebec's northern communities and what it means for them, and for us



*

Conflicts of Interest?

- None to declare

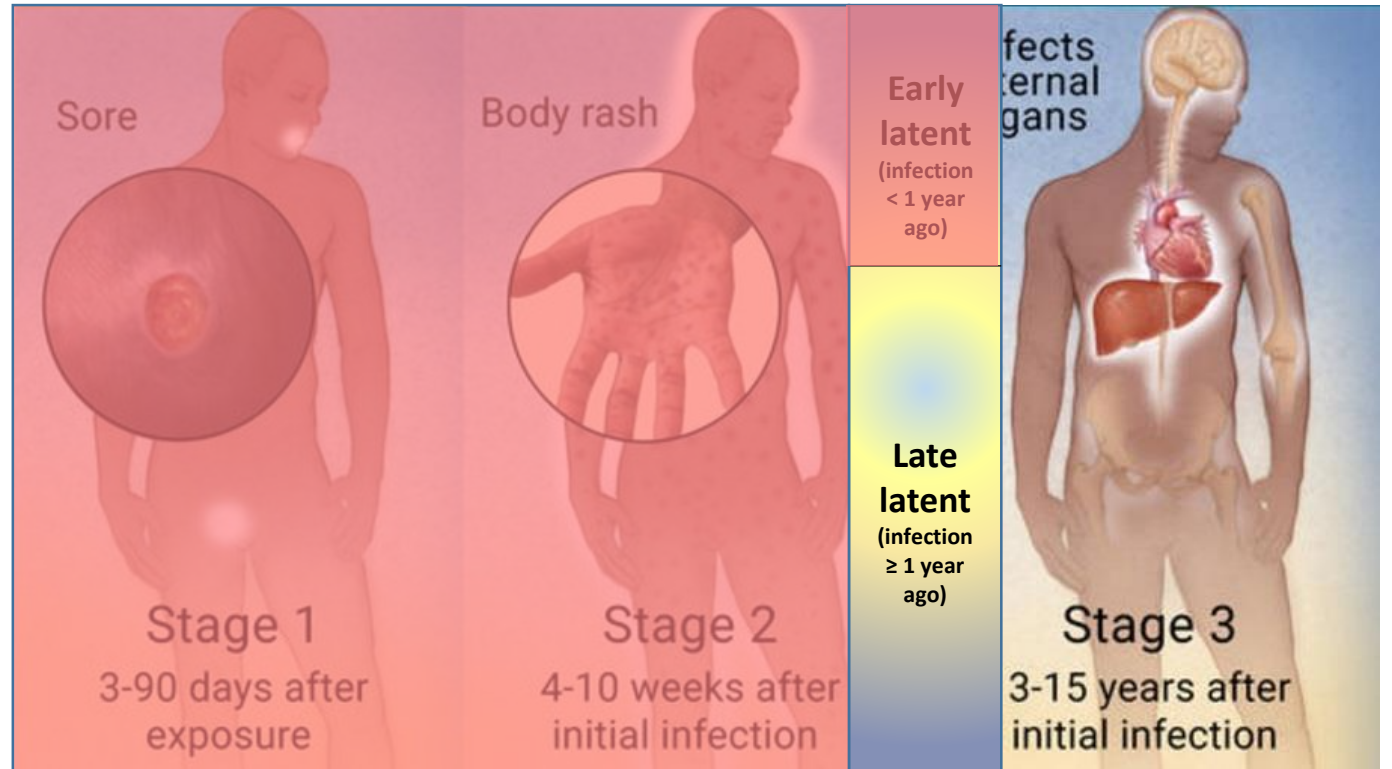
Clinical Microbiology of Syphilis

- **Multisystem disease** caused by the spirochete bacterium named *Treponema pallidum pallidum*
- Separated into **stages of illness** with varying symptoms/disfigurements, degrees of infectivity, and treatment recommendations.
- While serious complications may take decades to become apparent, syphilis can be **fatal if not treated**.
- Related to other disfiguring yet non-fatal diseases (endemic syphilis (bejel disease), pinta, yaws) caused by other subspecies of *Treponema pallidum* bacteria, or other *Treponema* species.
- Syphilis is **transmitted**:
 - Primarily **sexually**
 - All forms of sexual activity (penetrative or not)
 - Vaginal, anal, oral contact
 - From mother to newborn (**congenital syphilis**)
 - Pre and post-partum
 - **Mucosal or open skin contact** with open sores
 - Indirectly (sex toys)
 - Blood transfusion, injection needles
 - Less commonly

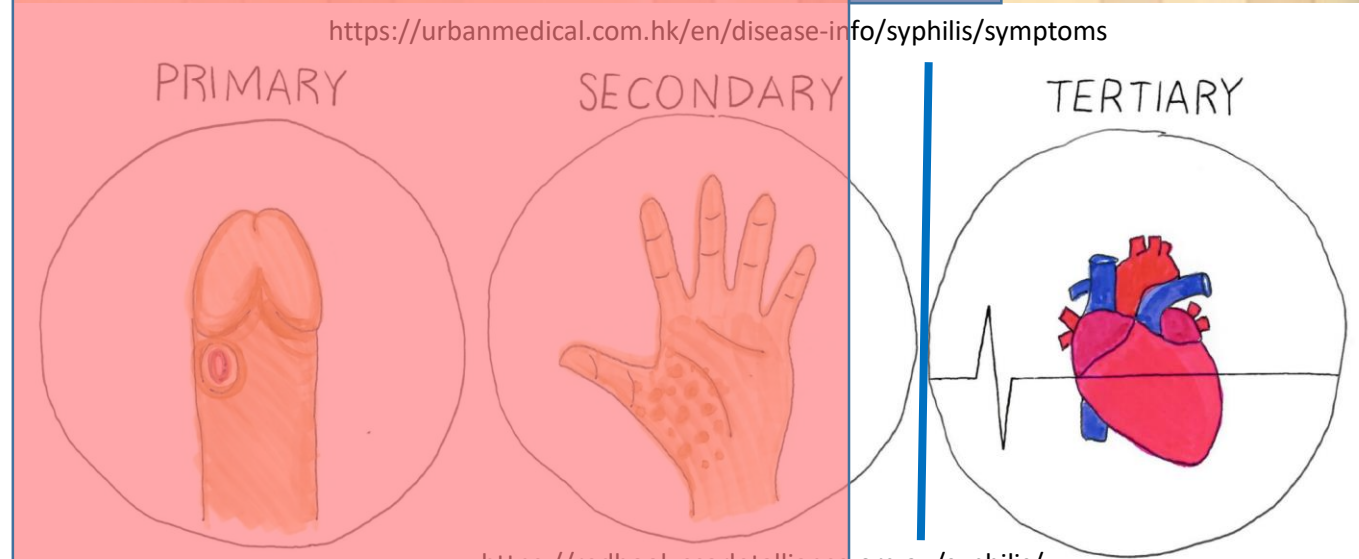
Stages of Syphilis

When does the disease establish asymptomatic latency?

When is the disease considered “infectious”?



<https://urbanmedical.com.hk/en/disease-info/syphilis/symptoms>

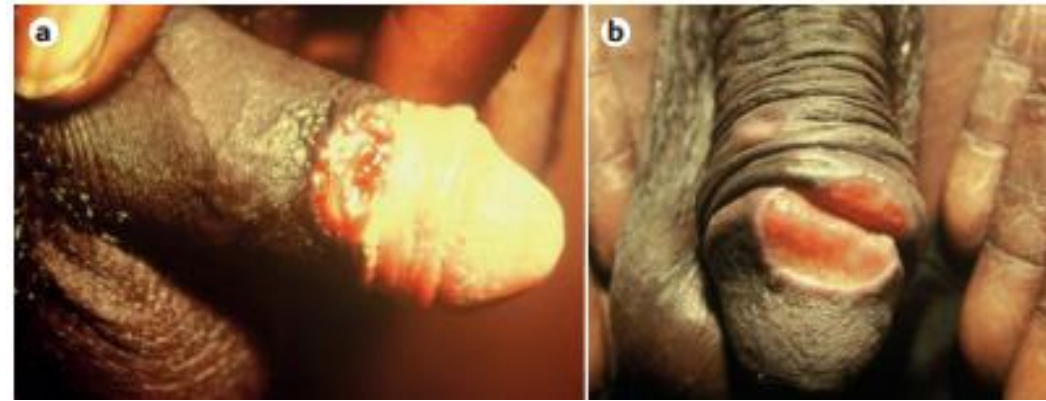


<https://redbook.scarletalliance.org.au/syphilis/>

Stages of Syphilis (Primary in more detail)



Image source: Vanessa Ngan, Staff Writer, 2003. Syphilis | DermNet NZ. Retrieved from <https://dermnetnz.org/topics/syphilis/>. Accessed January 22, 2021.



Peeling, R., Mabey, D., Kamb, M. *et al.* Syphilis. *Nat Rev Dis Primers* **3**, 17073 (2017). <https://doi.org/10.1038/nrdp.2017.73>

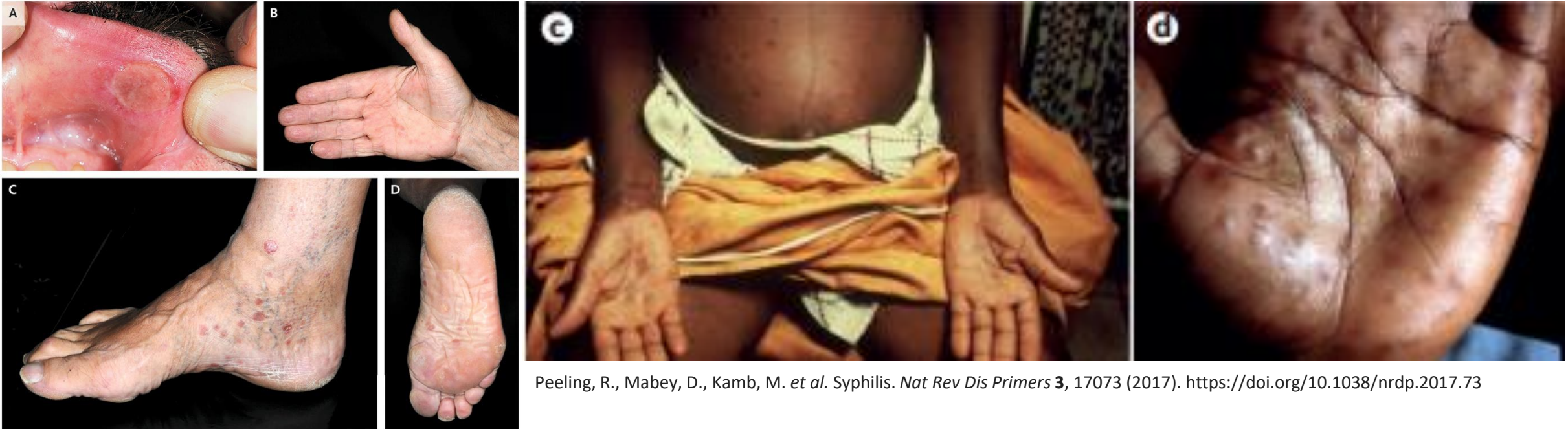


Image source: Ayurveda Treatment Venereal Diseases - KHOKAR. <https://www.khokardispensary.com/ayurveda-treatment-venereal-diseases/>. Accessed January 22, 2021.



Image source: Qiao J, Fang H. Syphilitic chancre of the mouth. *CMAJ*. 2011;183(17):2015. doi:10.1503/cmaj.110664. Retrieved from <https://www.cmaj.ca/content/183/17/2015>.

Stages of Syphilis (Secondary in more detail)



Peeling, R., Mabey, D., Kamb, M. *et al.* Syphilis. *Nat Rev Dis Primers* **3**, 17073 (2017). <https://doi.org/10.1038/nrdp.2017.73>

Stages of Syphilis (Tertiary gummatous and cardiovascular syphilis in more detail)

Late stages:

Without treatment, an infected person still has syphilis even though there are no signs or symptoms. It remains in the body, and it may begin to damage the internal organs, including the brain, nerves, eyes, heart, blood vessels, liver, bones, and joints.

Syphilitic gummas

Tertiary syphilitic gummas may mimic basal cell carcinoma. The gummatous tumors are benign and, if properly treated, in most cases will heal and the patient will recover.



A photograph of a patient with tertiary syphilis resulting in gummas seen here on the nose.

Photo Credit: CDC/ Susan Lindsley



This patient presented with a gumma of nose due to a long standing tertiary syphilitic *Treponema pallidum* infection.

Photo Credit: CDC/ J. Pledger



This patient presented with a swollen scrotum, which was diagnosed as a syphilitic gumma of the testicle.

Photo Credit: CDC/Susan Lindsley, VD

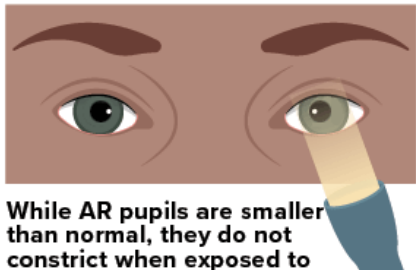


Stages of Syphilis (Tertiary neurosyphilis in more detail)



Argyll Robertson Pupil

N Engl J Med 2016; 375:e40. DOI: 10.1056/NEJMicm1507564



While AR pupils are smaller than normal, they do not constrict when exposed to light



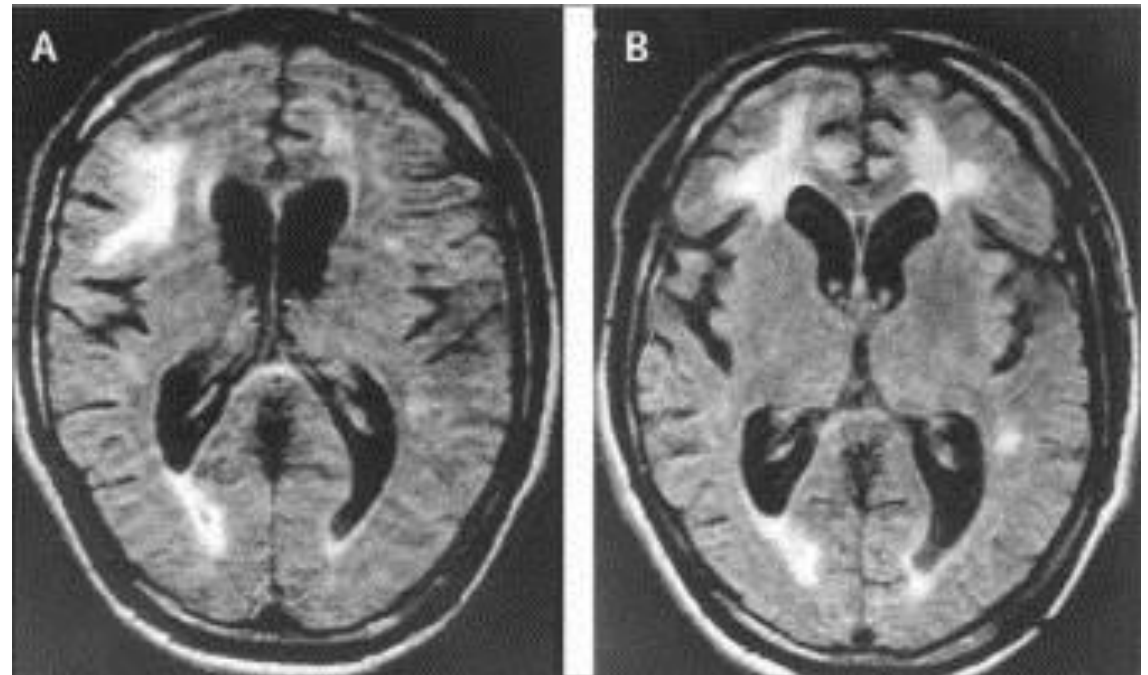
AR pupils constrict when focused on a near object

<https://www.allaboutvision.com/conditions/pupil/argyll-robertson-pupil/>

Tabes Dorsalis morphology: **DORSALIS**

- D**orsal column degeneration
- O**rthopedic pain (Charcot joints)
- R**eflexes decreased (deep tendon)
- S**hooting pain
- A**rgyll-Robertson pupils
- L**ocomotor ataxia
- I**mpaired proprioception
- S**yphilis

<https://www.study.pk.com/articles/nursing-mnemonics-tabes-dorsalis/>



The Lancet. DOI: [https://doi.org/10.1016/S0140-6736\(06\)69900-5](https://doi.org/10.1016/S0140-6736(06)69900-5)

Risk of congenital syphilis (risk of vertical transmission)

- Majority of infants are infected *in utero* (after 4th month of gestation)
 - Can be as early as 9 weeks or as late as peri-partum via direct inoculation from a vaginal lesion
- Primary or secondary untreated syphilis during pregnancy: 70-100%
- Early latent: 40% (can re-activate)
- Late latent: <10%

Stages of Syphilis (Early congenital syphilis in more detail)

Early Congenital Syphilis - Clinical Manifestations



- IUGR
- Nonimmune hydrops fetalis
- Enlarged placenta
- Mucocutaneous manifestation
 - Persistent rhinitis (snuffles)
 - Maculopapular eruption
 - Superficial desquamation
 - Pemphigus syphiliticus
 - Condylomata lata

Early Congenital Syphilis - Clinical Manifestations



Pneumonia alba



Metaphyseal dystrophy
Wimberger's sign

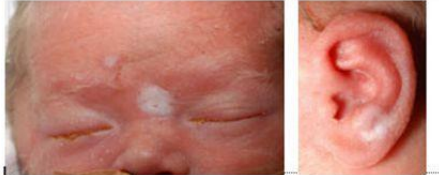
- Jaundice, hepatosplenomegaly
 - syphilitic hepatitis
- Generalized lymphadenopathy
- Hematologic manifestations
 - hemolytic anemia, thrombocytopenia
- Bone lesions
 - osteochondritis, -myelitis, periostitis
 - pseudoparalysis of Parrot
- Pneumonitis, nephrotic syndrome
- Syphilitic leptomeningitis
- Ocular manifestations
 - chorioretinitis, glaucoma, cataract

Congenital neurosyphilis

Stages of Syphilis (Congenital syphilis in more detail)

Early-onset congenital syphilis (before or at age 2 y)

- Maculopapular rash, may involve palms and soles.
- In contrast to acquired syphilis, a vesicular rash and bullae (*pemphigus syphiliticus*) may develop - highly contagious.
- Mucosal involvement may present as rhinitis ("snuffles") – **poor feeding**.
- Nasal secretions are highly contagious.



<https://www.cdc.gov/ncbddd/birthdefects/surveillancemanual/quick-reference-handbook/congenital-syphilis.html>



Peeling, R., Mabey, D., Kamb, M. et al. Syphilis. *Nat Rev Dis Primers* 3, 17073 (2017).
<https://doi.org/10.1038/nrdp.2017.73>

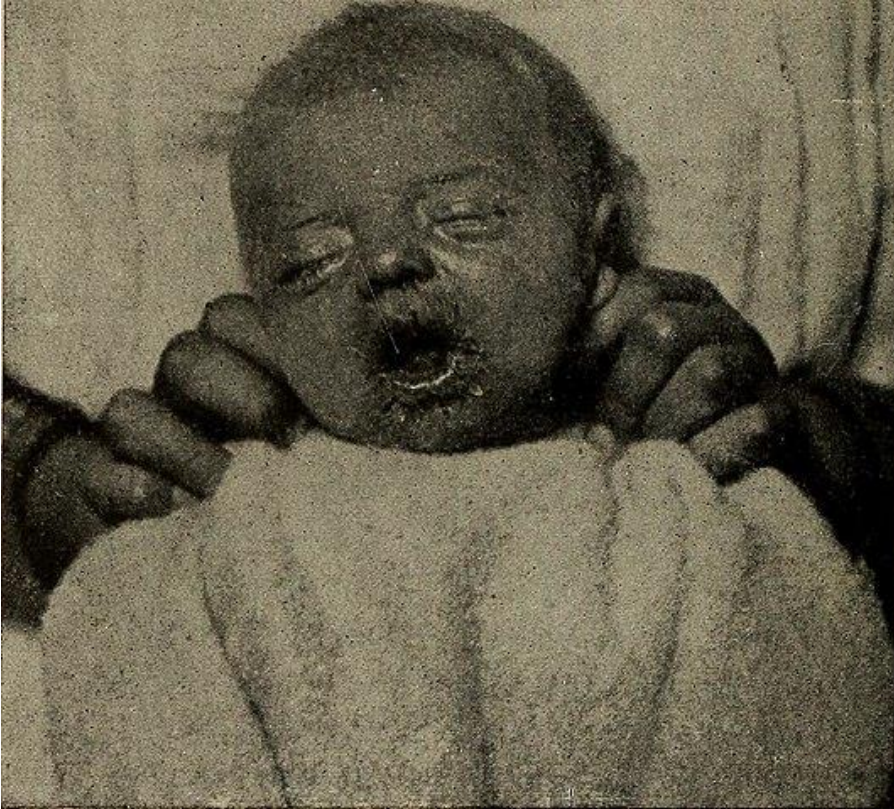


CDC/ Dr. Norman Cole - This media comes from the [Centers for Disease Control and Prevention's Public Health Image Library \(PHIL\)](#), with identification number [#2246](#). Public domain.



<https://doi.org/10.1053/j.semperi.2018.02.005>.

Stages of Syphilis (Early congenital syphilis in more detail)



https://commons.wikimedia.org/wiki/File:Diseases_of_children_%281916%29_%2814597432110%29.jpg



Rhagades-

healed linear scar of radiating fissures produced due to movement of lips.

Condylomata lata-

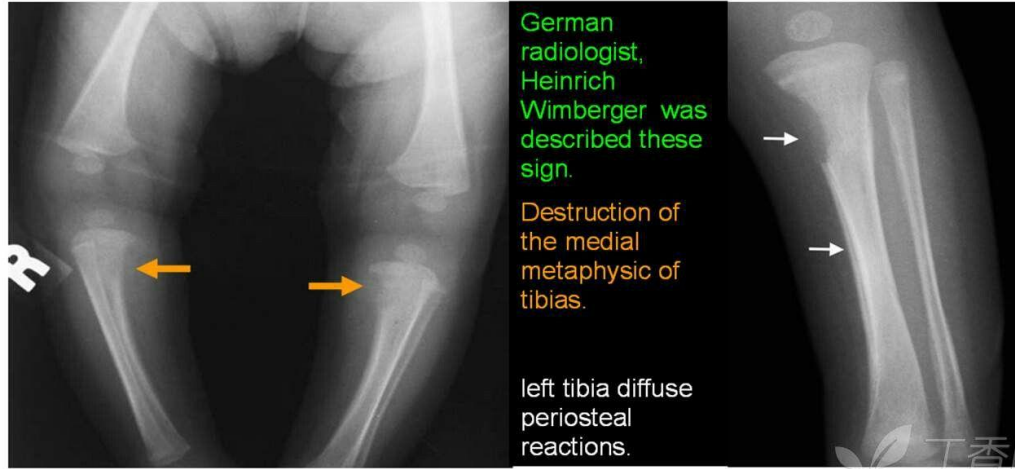
Flat topped, greyish white, hypertrophic, moist papules angle of mouth, nose, perianal, vulvar

<https://www.slideshare.net/chandraushavns/cong-syphilis-233147132>

Stages of Syphilis (Late signs of congenital syphilis in more detail)

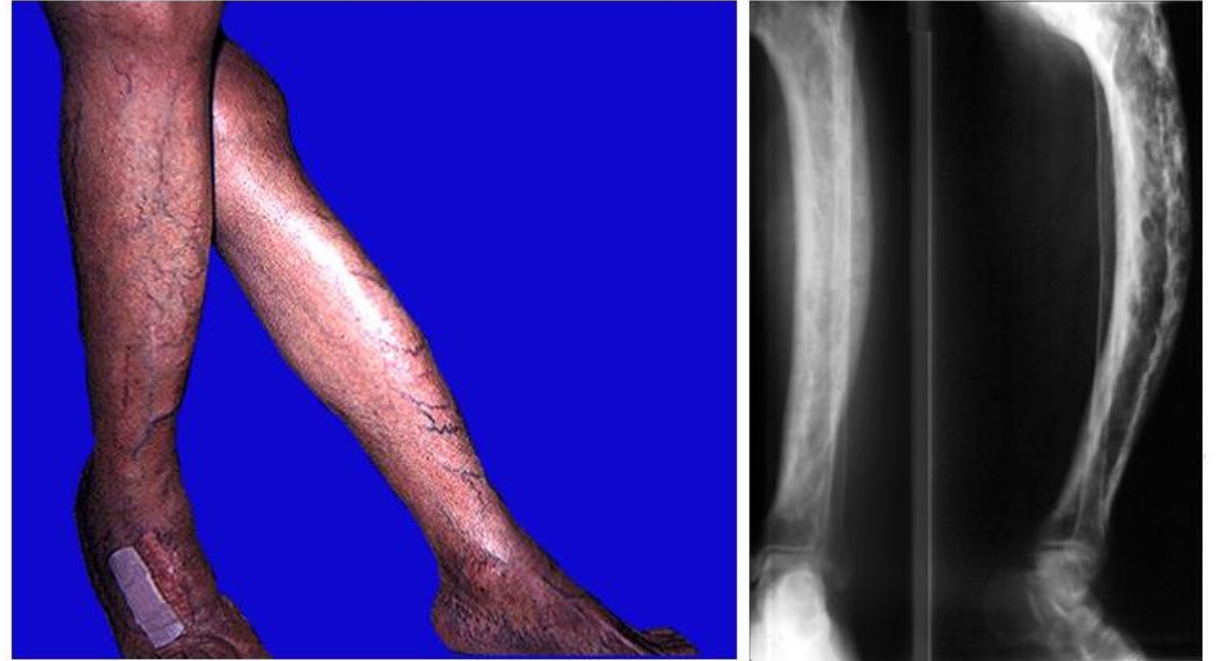
Wimberger's sign (伯格征)

The Wimberger's sign, also called Wimberger's corner sign, refers to localized bilateral metaphyseal destruction of the medial proximal tibia. It is a pathognomonic sign for congenital syphilis.



<https://in.pinterest.com/pin/320811173457871227/>

Sabre shins



IN THE NAME OF GOD. Published by Guadalupe Caley
<https://slideplayer.com/slide/4135658/>

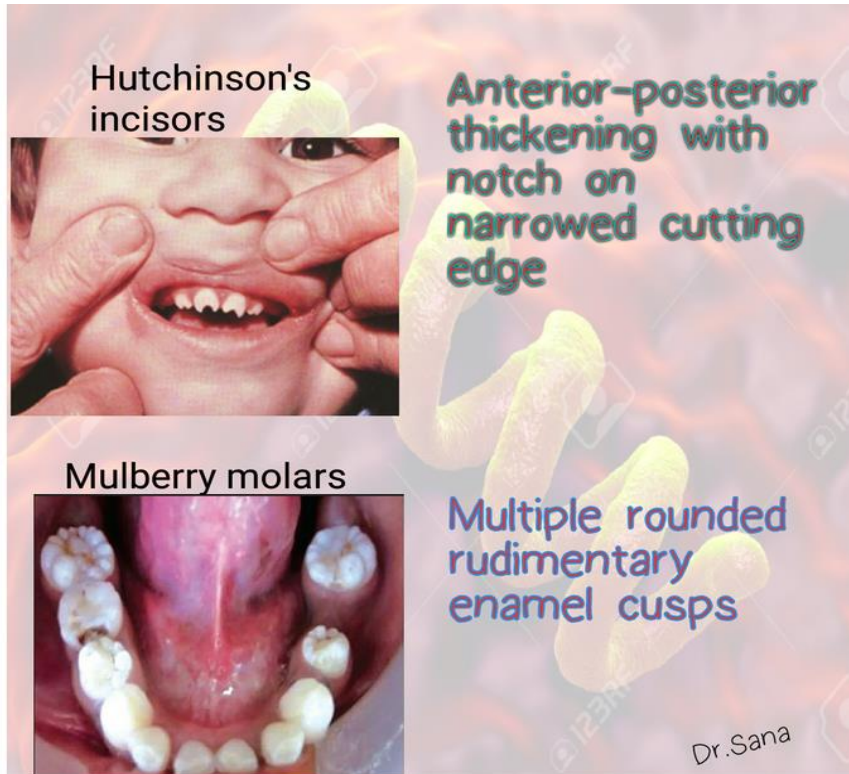
Stages of Syphilis (Late signs of congenital syphilis in more detail)

Higoumenaki's sign

Osteolysis of proximal 1/3 of clavicle

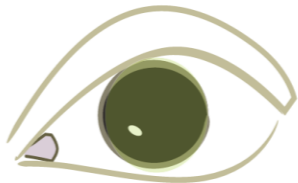


Stages of Syphilis (Late signs (> 2 years) of congenital syphilis in more detail)

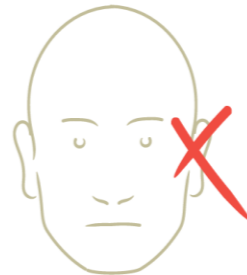


<https://medizy.com/feed/1187144>

Interstitial keratitis



Sensorineural deafness



<https://www.drawittoknowit.com/course/immunology/glossary/pathophysiologic-disorder/congenital-syphilis>

Snuffles lead to:



CDC/ Dr. Norman Cole - This media comes from the [Centers for Disease Control and Prevention's Public Health Image Library](#) (PHIL), with identification number [#2246](#). Public domain.



Archives of Diseases in Childhood, 1953
<https://adc.bmj.com/content/archdischild/29/144/123.full.pdf>

Saddle nose deformity (septum collapses), and frontal bossing



<https://quizlet.com/490904601/congenital-infections-micro-2-flash-cards/>

Diagnosis of syphilis (Algorithms of diagnosis)

- Start with non-treponemal test

- If positive then:

- Confirm with treponemal tests

- This used to be done in Quebec labs up until a few years ago.

- Issues arising:

- False negative

- Early acute syphilis (window period)
 - Prozone effect

- False positive

- Necessitating multiple confirmatory tests that may be un-needed

- **Start with treponemal test (EIA)**

- If positive then:

- Non-treponemal testing for titre level
 - Confirm with other treponemal tests

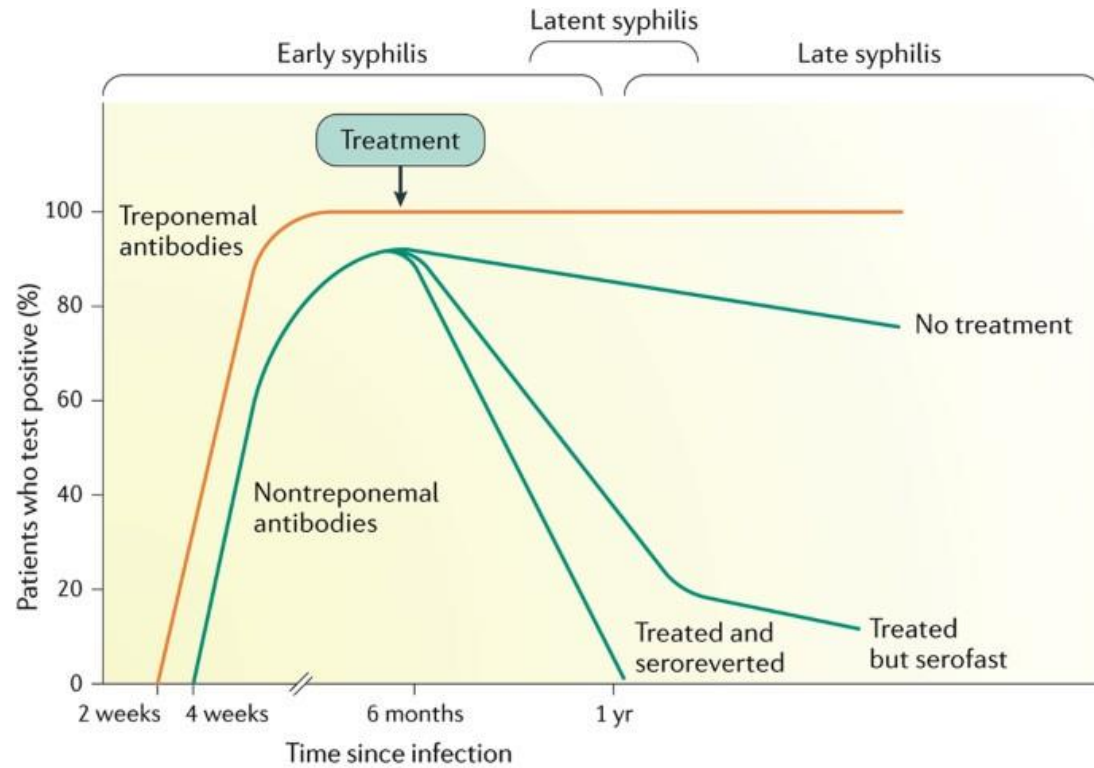
- **This is what is done in Quebec**

Of note: In Nunavik, due to the high prevalence in the community: **RAPID RPR** may be the first screen used **in conjunction** with the **regular algorithm**. **RAPID RPR** is **designed to be positive only with titres $\geq 1:8$** .

Diagnosis of syphilis (Serology)

- **Definition of “highly infectious” state: VDRL or RPR \geq 1:8**
- **Definition of treatment**
 - **More than 4-fold drop (2 dilutions) of any non-treponemal titre** post adequate treatment with antibiotics
 - Eg: 1:16 to 1:4
 - This has implications in pregnancy as to what to do with newborn baby (more later)
 - Beware the serofast state

Diagnosis of syphilis (Serology)



Nature Reviews | Disease Primers

Peeling, R., Mabey, D., Kamb, M. et al. Syphilis. *Nat Rev Dis Primers* 3, 17073 (2017). <https://doi.org/10.1038/nrdp.2017.73>

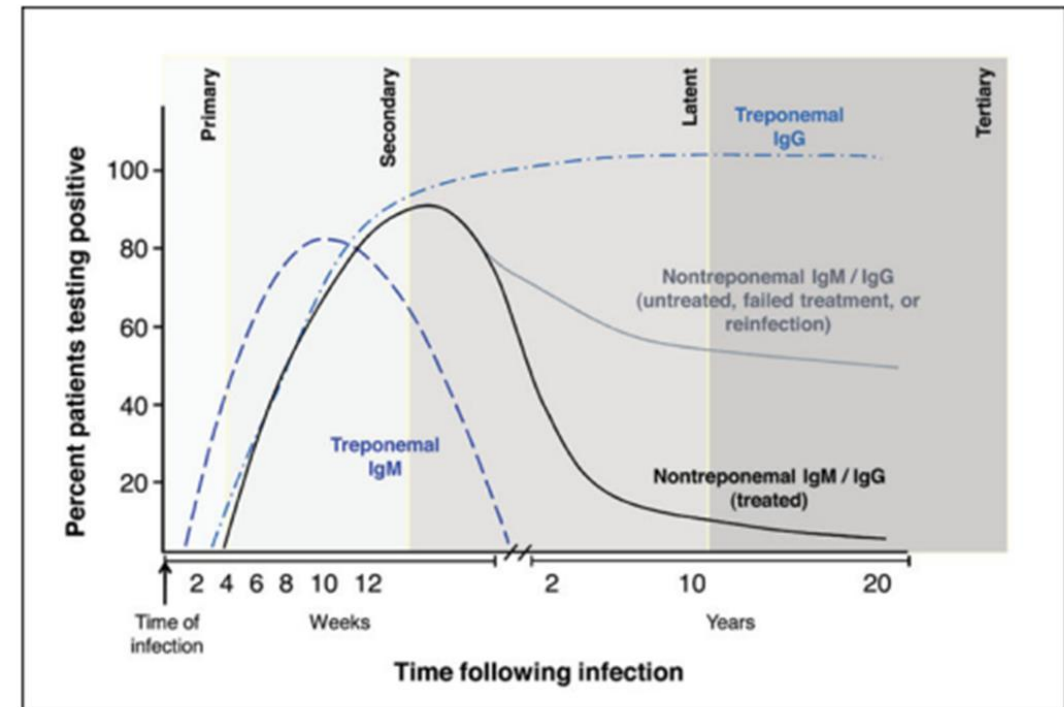


Figure 3. Syphilis staging and serology (based on Peeling et al. [9]).

Katherine Soreng, Ph.D.1, Roma Levy, M.S.2, and Yetunde Fakile, Ph.D.3
 . 2014 December 15; 36(24): 195–202. doi:10.1016/j.clinmicnews.2014.12.001.

Diagnosis of syphilis in pregnancy

- **Screening all pregnant women** during regular pre-natal testing is a **MUST**
- **Understanding high risk factors** is a **MUST** for re-testing at defined intervals during pregnancy
 - This includes thorough risk-factor history
- Allowing **enough time before delivery to gauge response to therapy** is a **MUST**
- Guidelines for interpretation of test results exist:
<https://cps.ca/en/documents/position/congenital-syphilis>
- Syphilis in pregnancy is treated a bit differently than syphilis out of pregnancy, and differently than congenital syphilis...

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PRACTICE POINT

248
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Congenital syphilis: No longer just of historical interest

Posted: Apr 1, 2009 | **Updated:** Feb 8, 2018 | **Reaffirmed:** Feb 28, 2018

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Principal author(s)

JL Robinson; Canadian Paediatric Society, Infectious Diseases and Immunization Committee

The majority of paediatricians and family physicians in practice in Canada today have never seen a case of congenital syphilis. However, there have been outbreaks of syphilis across Canada since 2001, such that the incidence has increased from a low of 1.6 cases/100,000 in 1999 (499 cases) to 10.1/100,000 in 2014 (3589 cases)[1]. The initial increase in incidence was concentrated in men who have sex with men, but heterosexual transmission in inner-city populations is also documented. Rising incidence has led to an increase in reported congenital cases, with 49 cases being reported in the 2005 to 2014 period[1]. It is likely that other cases have been missed because infants are asymptomatic or the diagnosis has not been considered.

When should syphilis be suspected in a pregnant woman?

Syphilis is usually acquired by vaginal, anal or oral sex with a person who was infected with syphilis within the preceding year. Rarely, acquisition occurs by kissing, blood transfusion, sharing of needles, accidental inoculation or direct contact with an infected lesion [2]. Many infected persons have no distinctive clinical manifestations that lead to a diagnosis

In this section

[Position Statements and Practice Points](#)[Most current statements and practice points](#)[Search by topic](#)[About CPS position statements](#)

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Treatment of syphilis (depends on stages)

- **Post-exposure prophylaxis, Primary, Secondary, Early Latent:**
 - 1 dose of Penicillin G benzathine IM
- **Late latent, Unknown latency:**
 - 3 doses of Penicillin G benzathine IM (q weekly dosing)
- **Congenital and Neurosyphilis (including ocular and otosyphilis):**
 - Penicillin G IV every 4-6 hours for 10-14 days
- Syphilis in pregnancy is treated a bit differently than syphilis out of pregnancy, and differently than congenital syphilis...
- Screening of contacts as per Public Health:
 - Complicated because it depends on the stage of syphilis of the affected person in your office!

https://www.inesss.qc.ca/fileadmin/doc/INESSS/Outils/Guides_ITSS/ITSS_Syphilis_WEB_FR.pdf

Treatment of syphilis (depends on stages)

- Penicillin allergy?
 - Primary, secondary, early latent syphilis:
 - Desensitization
 - Doxycycline po BID for 14 days
 - Late latent or unknown latency:
 - Desensitization
 - Doxycycline po BID X 28 days
 - Pregnancy or neurosyphilis:
 - Desensitization

Treatment of syphilis (in pregnancy)

- Diagnosis is made using physical exam and/or screens
- A first dose of penicillin G benzathine IM is given
 - Patient is referred

Please note: Nunavik has decided to treat ALL pregnant women with syphilis diagnosed during pregnancy with 3 doses of penicillin G benzathine. This removes the burden from the physician of trying to establish what is an early vs a late infection during the current rise in cases.

- Various guidelines exist for treatment of syphilis in pregnancy

<https://cps.ca/en/documents/position/congenital-syphilis>

- Essentially though:
 - If primary, secondary, early latent:
 - 1 dose of penicillin G benzathine should be OK (USED TO BE 3!)
 - Some experts prefer 2 doses
 - Historical efficacy; not harmful
 - Altered pharmacokinetics of penicillin G benzathine in pregnant women (many low levels seen in some studies 1 week after first dose)
 - Nathan L, Bawdon RE, Sidawi JE, Stettler RW, McIntire DM, Wendel GD Jr. *Obstet Gynecol.* 1993;82(3):338.
 - If late latent:
 - 3 doses one week apart
 - If more than 9 days between any dose: REPEAT treatment series.

Now...what do to with the baby?

- Ideal scenario?

- Mom has been adequately treated for her stage of syphilis BEFORE pregnancy?
 - Nothing to do for the baby
 - Good physical exam

- Next best scenario?

- Mom treated for primary, secondary, early latent syphilis during pregnancy
 - Adequate treatment (DOCUMENTED)
 - Documented 4-fold drop in NT titres

- Good physical exam

Any other scenario:

Baby needs a good physical exam

Baby needs CBC, liver enzymes

Baby needs syphilis testing (EIA, TT)

Baby needs CSF VDRL

Baby needs long bone and clavicle radiographs

Baby needs ophthalmology and audiology screening

Start treatment: Penicillin G IV for 10-14 days

is testing (EIA and TT)

, 18 months

rays

treatment unless symptoms or positive

for late latent syphilis

treatment (DOCUMENTED)

ove but no need for 3 month testing

f infection to baby is low

Some clinical scenarios

Case 1: August 2022

- 26 year old woman; 14 weeks pregnant
 - EIA: Positive
 - RPR: 1:1
 - April 2022: negative
 - Confirmation to come.
 - No symptoms.
 - Baby going well.
 - All other screens are negative on same day as syphilis screen (*Chlamydia urethritis* treated)
 - Partner: recently had unprotected sex and is acutely positive and treated.
 - Went from 1:32 to 1:8 after treatment
 - Benzathine pen G one dose already given.
 - What to do next?
- She was treated for syphilis with pen G IM x 3 doses: 2022-08-26, 2022-09-02 et 2022-09-09.
 - Her titers:
 - 19/04/2021 RPR negative (all previous negative as well)
 - 22/08/2022 RPR 1:1
 - 29/09/2022 RPR 1:4
 - Decision to give her 2 more doses (like “acute” syphilis)
 - Eventually her titres climbed back up to 1:8
 - **Why did this happen?**
 - Her partner’s last RPR in December went back up to 1:32 (from 1:8) and there was a history of multiple partners on his part.
 - Mother transferred to deliver in Montreal (Feb. 2023).
 - Baby needed full investigations including starting treatment until results of syphilis testing on the baby come back.
 - In the end, baby did not have congenital syphilis.

Some clinical scenarios

Case 2: September 2022

- 39 year old woman; was recently diagnosed with pregnancy at 26-27 weeks (patient did not know she was pregnant).
- She had syphilis testing 2022/09/07 titers 1:16 in context of a contact with a patient diagnosed with syphilis titers 1:256 (still not treated to this date, no show to his appointments).
- Past titers
 - 2019/01/15 RPR non reactive
 - 2019/05/21 RPR reactive RPR 1:32
 - 2019/06/01 RPR reactive Titers 1:16
 - 2020/07/20 RPR reactive Titers 1:32
 - **treated as early latent syphilis**
- What to do next?
 - Given her recent diagnosis of pregnancy, she was treated with Pen G benzathine x 3 doses.
- Baby born at 31 3/7 weeks and is in NICU at a Montreal area hospital. Neonatologist is aware of above history and full baby testing was done.
- The baby started treatment.
- Mother given a dose of IV pen for ?GBS.
- Then: Mother was given one dose of IM benzathine penicillin.
- **Baby?**
 - Uncertain of the outcome (infected or not) because not in my hospital but got full treatment for congenital syphilis.

Some clinical scenarios

Case 3: December 2022

- 17 month old boy with the following history:
 - Known congenital neurosyphilis.
- This child had congenital CMV but the PCR in blood was negative (only urine was positive).
- He was treated with 6 weeks of valgancyclovir because he had a normal head ultrasound and some hepatitis/hyperbilirubinemia which was attributed to “syphilis” or a metabolic disorder.
- He indeed has a fatty acid oxidation metabolic disorder as you may know.
- He had also been admitted to hospital with adenovirus + parainfluenza pneumonia followed by a PICU stay for RSV bronchiolitis back to back last year.
- He is now 17 months old and has a 7 dilutions increase in titers since his last screening.
- Initial CSF VDRL 1:1. Got treated adequately with pen G X 10 days. Then he has a negative CSF VDRL at 6 months after being treated. Recent RPR is back up by a lot after being 1:1. Here is his RPR history:
 - 2021-07-06: Positive VDRL (1:1) on CSF
 - 2021-07-08: EIA+, RPR 1:256, TPPA+, INNO-LIA + (14 days old) + Pen G IV x 10 days started
 - 2021-08-01: EIA+, RPR 1:8
 - 2021-10-10: EIA+, RPR Negative
 - 2021-12-02: EIA+, RPR 1:1
 - 2022-02-01: EIA+, RPR 1:1, TPPA+
 - 2022-11-18: EIA+, RPR 1:128 (increase of 7 dilutions)
 - Done serendipitously by nurse who thought he should have a RPR done at 18 months
- **Why did this happen?**
- This is bizarre. He seems re-infected but how and when and under what circumstances? Recommendations:
 - Repeat RPR ASAP (is this real?). **YES IT WAS.**
 - HIV serology ASAP. **NEGATIVE.**
 - LP VDRL if RPR is up. **DONE; SEE BELOW.**
 - Sexual abuse investigation? **DONE. NO EVIDENCE.**
- Started Pen G daily until neurosyphilis ruled out.
- Repeat CSF VDRL on baby: **NEGATIVE.**
- Treated with a few days of IV penicillin (3-4) then switched to IM benzathine penicillin once as per acute infection treatment guidelines.
- **Mom had gotten re-infected and developed secondary syphilis. She had ulcers on her palms and the baby must've kissed or licked the palms.**
- **This is how he got re-infected.**

Some clinical scenarios

Case 4: October 2023

- Patient is a 15 week old girl.
- She has a RPR neg and EIA positive.
- Her mother, was symptomatic in 2022
 - RPR + 1:16 2022-12-16
 - RPR + 1:2 2023-02-09
 - RPR – EIA + 2023-04-14
 - RPR + 1:2 2023-05-26
 - RPR – EIA + 2023-06-08
- Mother treated with 3 doses Pen G, last dose received 2023-01-12.

• What to do with the baby now?

- It seems that mom was well treated and did not re-infect herself.
- The baby should follow the algorithm below (Scenario 2 from CPS syphilis guidelines:

<https://cps.ca/en/documents/position/congenital-syphilis>

- 0, 3, 6, and 18 months. Drop the 18 month one IF the EIA and RPR on the baby are BOTH negative at 6 months.

Scenario	Baseline and monthly assessment for signs or symptoms for congenital syphilis for the first three months	Syphilis serological tests (RPR and TT) with clinical assessment each time ¹	Long-bone radiographs, complete blood cell count and differential, and sampling of CSF for cell count and differential, glucose, protein and VDRL, with a low threshold for doing ophthalmological and audiological assessments	Treatment for congenital syphilis
Mother has well-documented history of adequate treatment of any stage of syphilis before pregnancy, with no rise in her RPR titre during the pregnancy and no known risk factors for reinfection	No	No	No	No
Mother was treated for primary, secondary or early latent syphilis during pregnancy more than four weeks before delivery, with adequate fall in her RPR titres and no evidence of relapse or reinfection	Yes	0, 3, 6 and 18 months	No	No



Credit photo : Sylvie Ricard

Syphilis in pregnancy and congenital syphilis in Nunavik

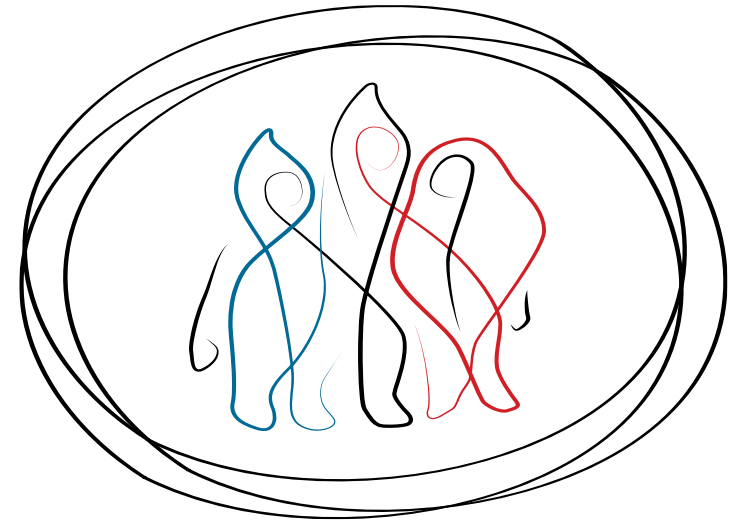
A public health perspective

Dr Jean-Sébastien Touchette, MD CCMF
Medical Advisor, STBBI, Public Health Nunavik



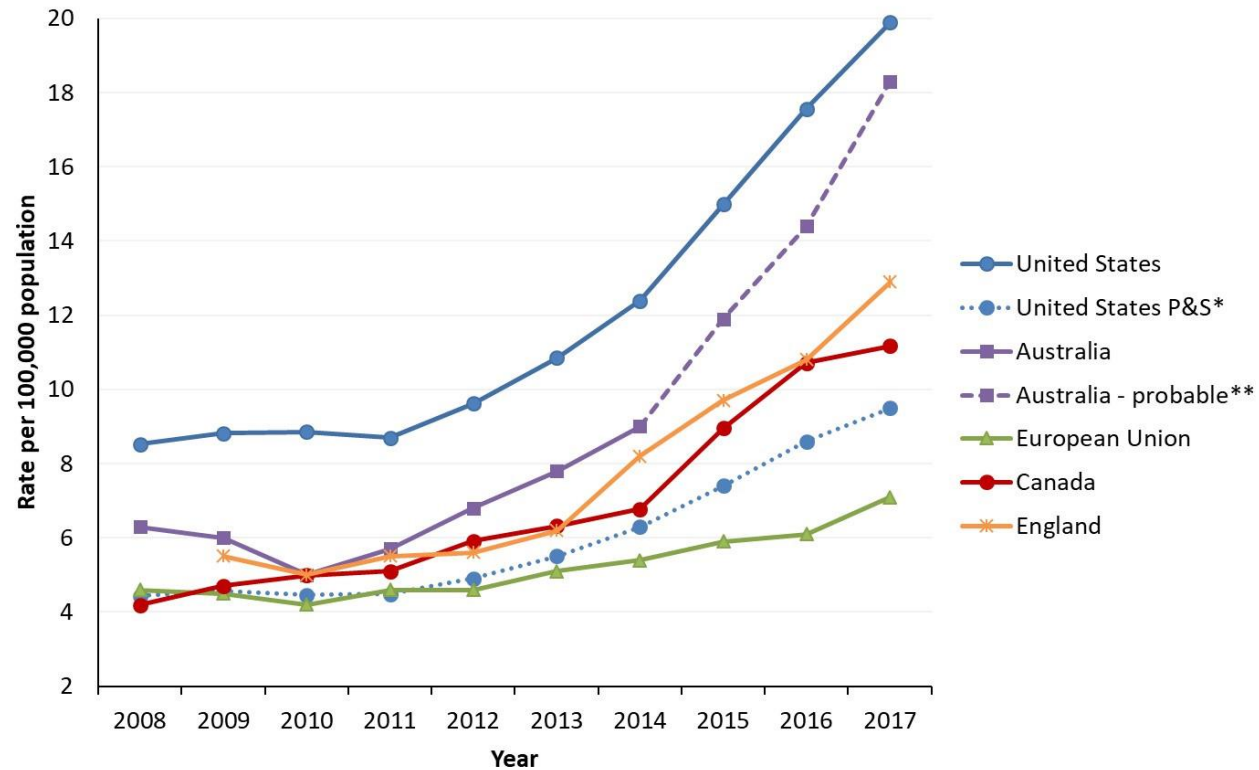
Plan

- Epidemiology of syphilis
- Situation overview
- Public Health Strategies in Nunavik
- Conclusion



Syphilis in the world

Comparison of rates of reported cases of infectious syphilis in OECD Countries, 2008-2017



Source : PHAC 2020

Syphilis outbreak in Nunavik

- First reported case in 2016;
- Total of 538 cases to date (Pop. 14658 in 2022);
- Cases concentrated in communities along the Hudson Coast (97/101 for 2023);
- 5 out of 7 Hudson communities in sustained community transmission;
- Human resources stability issues (STD nurses) : challenges in the identification and management of contacts ;

Syphilis outbreak in Nunavik



Known risk factors (congenital syphilis)

- Benoit P, Tennenhouse LG, Lapple A, Hill-Carroll G, Shaw SY, Bullard J, Plourde P. *Congenital syphilis re-emergence in Winnipeg, Manitoba*. Can Commun Dis Rep 2022 :
 - Winnipeg Regional PH Authority investigations for all 2018–2020 probable or confirmed cases of early congenital syphilis (n=60):
 - Lack of access to adequate prenatal care noted in **over 50%**;
 - *"Among cases with prenatal follow-up"*: suspicion of reinfection during pregnancy in nearly a **quarter (23,3%)**.

Known risk factors (congenital syphilis)

- U.S.A., 2022, n = 3871 : *Vital Signs: Missed Opportunities for Preventing Congenital Syphilis, CDC - MMWR* :
 - The **lack of timely screening** (36.8% of cases, n = 1385) and **lack of adequate treatment** (39,7%, n = 1494) during pregnancy contributed to 88% of congenital syphilis cases in 2022;
 - 11.2% (n = 423) of all congenital syphilis cases had **no (or no mention of) treatment during pregnancy**;

"Missed opportunities to prevent morbidity associated with maternal syphilis"...

Our vision: Systemic failure in the identification and management of syphilis cases during pregnancy.



Public Health strategies

- Congenital syphilis action plan :
 - Review of screening recommendations
 - Regional screening program assessment
 - Harmonization of clinical management
 - Strengthening partnerships in prenatal care
 - Populational education and promotion
 - Global syphilis control
 - Reducing delays in cases diagnosis and management
 - Future strategies



Review of screening recommendations

- Boodman C, Bullard J, Stein DR, Lee S, Poliquin V, Van Caesele P., *Expanded prenatal syphilis screening in Manitoba, Canada: a direct short-term cost-avoidance analysis in an outbreak context.* Can J Public Health. 2023 Apr;114(2):287-294.
 - "Applying screening costs to the 125 adequately prevented cases of congenital syphilis in 2021, the screening program is associated with a cost-avoidance ratio of **16.25.**"
 - "If no prenatal syphilis program existed in Manitoba, an expanded screening program would be associated with a cost-avoidance ratio of **26.8.**"

Review of screening recommendations

- In Nunavik :
 - Recommended to add syphilis screenings in prenatal and then postnatal care, progressing to 4, and then 5 recommended screenings;
 - Notably following a case of congenital syphilis where the mother's diagnosis was only established late in the postpartum period.
- Recommendations in Nunavik (since 2021) :

Recommended Syphilis Screenings for Pregnant Women in Nunavik					
<i>Timing of the screening</i>	1 st visit	2 nd trimester (6-8 wks after 1 st)	3 rd trimester	34 to 36 weeks	6 to 8 weeks post partum

Assessment of the prenatal and perinatal syphilis screening program in Nunavik

- Quantitative evaluation phase :
 - Conducted in the summer of 2023, in collaboration with midwives;
 - Charts reviews of syphilis cases during pregnancy (n = 27) and controls (n = 54) in the 2 most affected villages since 2016;
 - Including the 5 cases (5/27) that led to the diagnosis of congenital syphilis;
 - Quantitative methods:
 - Descriptive analysis;
 - Case-control study;
 - Retrospective cohort study;

Assessment of the prenatal and perinatal syphilis screening program in Nunavik

- Quantitative evaluation phase

- Key findings :

- First prenatal follow-up visit and initial syphilis screening are generally conducted later than recommended;
 - **Only 3 out of 81 reviewed charts had all 5 recommended screenings** (and none at the recommended times);
 - The risk of contracting syphilis during pregnancy is higher in patients with mental health issues;
 - The risk of contracting syphilis during pregnancy is lower in patients with more prenatal follow-up visits;
 - **The risk of congenital syphilis increases the later the initial screening is in pregnancy but decreases with the number of prenatal visits.**

Assessment of the prenatal and perinatal syphilis screening program in Nunavik

- Qualitative evaluation phase (ongoing)
 - Ongoing since the fall of 2023;
 - Qualitative approach: interviews (x20) conducted in 2 villages affected by the outbreak;
 - **To analyze individual and systemic factors influencing access to prenatal care and syphilis screenings, as well as the implementation of the screening recommendation;**
 - Integration of the IQI Model of Health and Well-being in Nunavik in the analysis phase;
 - Objective: provide recommendations on adapting the screening program and reducing individual and systemic risk factors.

Harmonization of Clinical Management

- Consensus achieved :
 - **3 doses** (every 1 week) of Penicillin G 2.4 million units IM for the treatment of syphilis during pregnancy, **regardless of the stage**;
 - Criteria to consider a pregnant patient (syphilis +) adequately treated regarding the risk of transmission to the fetus;
 - **Serological follow-up every 1 month** before delivery (then every 1-3-6-12 months post-diagnosis at a minimum) for the mother;
 - Guidelines for the newborn examination and his serological follow-up (depending on the situation);

Strengthening partnerships with prenatal follow-up providers



- Maternity services and midwifery in Nunavik
 - Pride of Nunavik;
 - Since 1987 in Puvirnituuq, then 2009 in Kuujuuaq;
 - Maternity services established in the 4 main villages of the territory;
 - Births on the territory and even at home;
 - Previously, pregnant women had to give birth outside the territory;
 - On-the-job training (in Nunavik);
 - Culturally adapted care, Inuit midwives + qallunaat;
 - Health professionals highly respected in Nunavik.

Strengthening partnerships with prenatal follow-up providers

- Maternity services at the center of the congenital syphilis prevention strategy:
 - They are the best positioned to inform us about barriers to accessing prenatal care and STBBI screenings;
 - They are the best positioned to have a direct impact on the implementation of screening recommendations;
- Consulted for the regional guidelines;
- Consulted and partners during our program evaluation;
- Preferred targets for our training offerings (webinars, on-site, etc.);
- Receive constant support from our advisory teams;
- Our PH team leader has worked as a midwife in Nunavik;

Support to other stakeholders

- SIPPE Program in Nunavik
 - Integrated Perinatal and Early Childhood Services (SIPPE);
 - Supporting the most vulnerable families and mothers (all of them in Nunavik);
 - Targeted training for SIPPE workers and support in their activities (prevention and promotion) with patients;
 - Objectives: Increase the level of knowledge and adherence to prenatal care and screenings for patients;
- PHO Program (Public Health Officer)
 - Similar training offerings;
 - Information dissemination agents; empowerment;

Populational education and promotion

- **Goal** : Increase the overall knowledge level of Nunavimmiut regarding syphilis (and congenital syphilis);
- Training for HCP (webinars);
- Audio capsules (radio), video capsules, social media;
- PH communication team involved:
 - Sensitive content;
 - Cultural and religious issues;
 - Culturally safe;
- Supporting the development of the sexual education curriculum (PP and KI team);



Comprehensive Syphilis Control

- Strengthening global strategies to fight syphilis :
 - Mass screening campaigns, opportunistic screening, school screenings;
 - Strategies targeted at certain groups, including young men :
 - Outreach initiatives;
 - **Low-threshold approaches (Eg. *Quick Check-Up*)**
 - Identification and management of contacts;
 - Analysis of transmission chains and social networks (support from PHAC);
 - Improvement of our surveillance and data management tools.

Social determinants (and inequities)

- ***The social and structural determinants of health and health inequalities undoubtedly play a crucial role in the inequitable occurrence of syphilis in different populations. These determinants include housing instability, experiences of violence, lack of access to culturally sensitive care, and experiences of stigma, discrimination, and racism, especially within the healthcare system.***

Aho J, Lybeck C, Tetteh A, Issa C, Kouyoumdjian F, Wong J, Anderson A, Popovic N., *Rising syphilis rates in Canada, 2011-2020. Canada communicable disease report, 2022*

Conclusion

- Congenital syphilis :
 - Linked to the increase in syphilis cases among women of childbearing age;
 - Represents a systemic failure to screen and manage syphilis cases during pregnancy;
 - Clear recommendations exist, implementation needs strengthening;
 - Midwives and perinatal follow-up staff involvement;
 - Increase public awareness;
 - Contributing social determinants and inequities;
 - Promising avenues for reducing delays in managing cases.

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Questions?

