

October 2009

Syphilis (*Treponema pallidum*) Serology Testing and Interpretation – Update

To health care providers:

The Ontario Agency for Health Protection and Promotion Public Health Laboratories use the Chemiluminescent Microparticle Immunoassay (CMIA) test to screen clotted blood and serum specimens for evidence of syphilis infection.

The CMIA test detects both IgG and IgM antibodies to *Treponema pallidum*. The CMIA has a high sensitivity and specificity for syphilis infection during all stages of disease, but may be falsely negative in early infection. If positive, in most cases, the CMIA will remain positive for life.

When the CMIA syphilis screen test is positive, we perform additional testing to confirm syphilis infection.

If the CMIA test is reactive, confirmatory testing for syphilis infection is performed with both the rapid plasma reagin (RPR) and *Treponema pallidum* Particle Agglutination (TP.PA) tests.

- The RPR test detects antibodies to cardiolipin-lecithin-cholesterol. A reactive RPR suggests active infection or recently treated infection. The RPR titer decreases with treatment and time, and is most useful for assessing acute disease, monitoring treatment and identifying re-infection.
- The TP.PA test detects both IgG and IgM treponemal antibodies, similar to the CMIA. It provides confirmation of the CMIA screening result.
- If the RPR and TP.PA results are non-reactive or indeterminate, the Fluorescent Treponemal Antibody Absorbance (FTA-Abs) test may also be included. The FTA-Abs is a third test that detects IgG and IgM treponemal antibodies.

As with any diagnostic test, the positive predictive value (PPV) is dependant on the prevalence of the infection in the population being tested. Clinicians ordering syphilis serology should consider the clinical indication for performing the test and interpret the results based on clinical history, signs, and symptoms.

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Table 1. Interpretation of Syphilis Serological Results

Screening Test	Confirmation Testing			
CMIA	RPR	TP.PA	FTA-Abs	INTERPRETATIONS
Non-reactive	Not tested	Not tested	Not tested	No serological evidence of current or past infection If primary syphilis is suspected a repeat sample is suggested in ~ 4 weeks
Reactive	Reactive (high titre, RPR _≥ 16)	Reactive	Not tested	Most likely interpretations include: <ul style="list-style-type: none"> Active infectious syphilis (primary, secondary or early latent) Latent or treated syphilis
Reactive	Reactive (low titre, RPR ≤ 8)	Reactive	Not tested	Most likely interpretations include: <ul style="list-style-type: none"> Active infectious syphilis (primary, secondary or early latent) Latent or treated syphilis
Reactive	Non-reactive	Reactive	Not tested	Most likely interpretations include: <ul style="list-style-type: none"> Treated syphilis Early primary syphilis Latent syphilis
Reactive	Non-reactive	Non- Reactive	Non-reactive	Most likely interpretations include: <ul style="list-style-type: none"> Early syphilis Previously treated syphilis Biological false positive
Reactive	Non-reactive	Non- Reactive	Indeterminate	Suggest: Repeat serology in 2 to 4 weeks. If no change with repeat serology, likely biological false positive
Reactive	Non-reactive	Indeterminate	Non-reactive	
Reactive	Non-reactive	Indeterminate	Indeterminate	
Age < 12 MONTHS Reactive	Reactive	Reactive	Not tested	Most likely interpretations include: <ul style="list-style-type: none"> Congenital infection Maternal antibody (as can be present in infant for up to 12 months) Repeat serology in 4 weeks
Age < 12 MONTHS Reactive	Non-reactive	Reactive	Not tested	Most likely interpretations include: <ul style="list-style-type: none"> Maternal antibody (as can be present in infant for up to 12 months) Does not rule out congenital infection Repeat serology in 4 weeks

- In rare cases, syphilis serology may be falsely positive with non-syphilis treponemal infections (e.g. yaws, pinta, or bejel), other infections (including HIV), rheumatological illness, intravenous drug use, pregnancy, and recent immunization.
- Interpretation of results must be based on clinical history, signs, and symptoms.

This document does not apply to testing for syphilis in primary lesions and cerebrospinal fluid (CSF).

For further information, please contact:

- Dr. Vanessa Allen, medical microbiologist at **416-235-5806**
- OAHPP syphilis confirmatory laboratory at **416-235-5713** or your local OAHPP laboratory
- OAHPP laboratory Helpline **1-800-640-7221**
- Public Health Agency of Canada web site: www.phac-aspc.gc.ca
- For the Specimen Collection Guide refer to www.oahpp.ca