



# Screening Veterans for Syphilis: Implementation of the Reverse Sequence Algorithm

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## Introduction

- The incidence of syphilis in the United States is increasing, making accurate diagnosis essential.
- Laboratories have begun to utilize the reverse syphilis screening (RSS) algorithm, which may lead to diagnostic dilemmas when there are discordant results between the treponemal and nontreponemal serologic tests.

## Objective

The objective of this study was to assess the impact of RSS implementation in a Veterans Affairs (VA) population, including (1) characterization of veterans with discordant results and (2) analysis of interpretation of discordant results by VA providers.

## Methods

- We performed a retrospective review of all veterans tested for syphilis at the Durham VA Medical Center (DVAMC) between September 1, 2009 and August 31, 2015.
- Discordant results were defined as a reactive *Treponema pallidum* IgG enzyme immunoassay (BioPlex 2200 Syphilis IgG Kit, Bio-Rad), followed by a non-reactive Venereal Disease Research Laboratory (VDRL, Becton Dickinson) test. *Treponema pallidum* particle agglutination assay (TP-PA, Serodia-TP-PA Fujiirebio Diagnostics Inc) testing was performed on discordant results to determine true positives.
- Patients with cancelled or inconclusive TP-PA tests were excluded.
- Data were extracted using a systematic query of the electronic medical record, supplemented by manual record review for a random sample of veterans with discordant serologic testing (100 with reactive TPPA results and 25 with non-reactive TPPA results).
- Chart review was performed methodically using the search function of CPRS. Each chart was searched for the following terms: "syphilis," "VDRL," "RPR," and "TP PA"; all records for the year following the discordant test were searched.

Figure 1: Reactive Syphilis IgG EIA Results

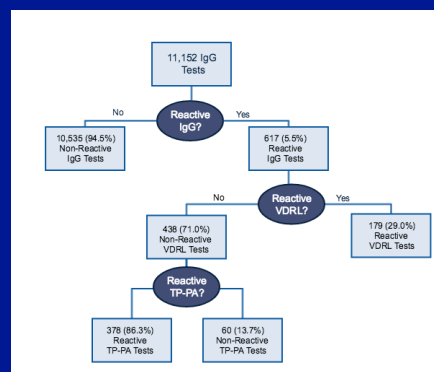


Figure 2: Chart review of EIA+ /VDRL- /TPPA+ serologies

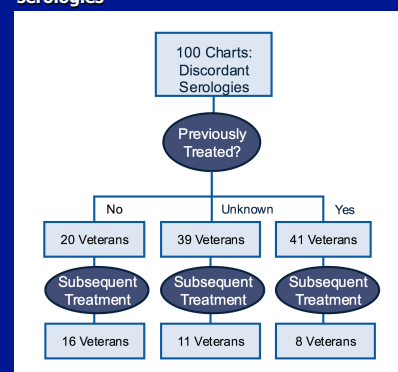


Table 1: Baseline Characteristics

	TPPA+ Median or % (n=100)	TPPA- Median or % (n=25)
Age, median	62.0	65.0
Male sex, %	94.0	88.0
HIV-infected, %	21.0	8.0
Reason for Testing, %		
Neuropsychiatric	40.0	52.0
Ocular Symptoms	2.0	0.0
Genital Symptoms	7.0	0.0
Fever/Rash	2.0	0.0
Routine/Screening	45.0	28.0
Unknown	4.0	20.0
Risk Factor, %		
MSM	9.0	8.0
MSW	21.0	12.0
WSM	4.0	8.0
Unknown	66.0	72.0
Previously Treated		
Yes	41.0	8.0
No/Unclear	59.0	92.0

Table 2: Management

	TPPA+ % (n=100)	TPPA- % (n=25)
Lumbar Puncture	13.0	4.0
Underwent Treatment		
Yes	34.0	4.0
No	66.0	96.0
Treatment Regimen, (% of those treated)		
Benzathine PCN, 2.4 MU	11.8	
Benzathine PCN, 7.2 MU	67.6	100
Doxycycline x 14 d	2.9	
Doxycycline x 28 d	5.9	
IV Penicillin x 10-14 d	11.8	
ID Consultant Involved		
No	47.0	64.0
Yes	31.0	24.0
ID was Primary Provider	22.0	12.0

Abbreviations: MSM: men who have sex with men, MSW: men who have sex with women, WSM: women who have sex with men, PCN: Penicillin, IV: intravenous, ID: Infectious Diseases

## Summary of Results

- There was a high prevalence (5.6%) of reactive Syphilis IgG EIA tests at the DVAMC.
- Most reactive IgG tests (438/617, or 71.0%) yielded discordant results (i.e. non-reactive VDRL followed), and most of the discordant results (378/438, or 86.3%) were true positives.
- Those with positive TP-PA results were more often HIV-infected (21.0% vs 8.0%) and had more frequently undergone prior treatment (41.0% vs 8.0%).
- Only 46% (27/59) of those with unknown or no prior therapy underwent subsequent treatment.
- Often there was no acknowledgement in the chart regarding discordant results or management plan.
- The Infectious Diseases (ID) team was consulted by other providers in 37% of cases.

## Conclusions

- We found a high rate of reactive syphilis IgG tests among veterans using the RSS, and a majority of these had discordant results.
- Similar to other studies, those with true positive results (+TPPA) were more often HIV-infected and previously treated.
- Unfortunately, providers continue to face diagnostic and management dilemmas when using the RSS.
- In those without a clear history of receiving therapy for syphilis, only a minority were treated.
- The ID team was consulted infrequently, but consideration should be given to required ID consults for all discordant results.

## Limitations

This was a retrospective study subject to inherent biases such as misclassification by chart review. Patients who did not have a documented syphilis treatment history were considered to have "unknown" previous treatment, although in some cases the patient may have been treated previously but without documentation. Similarly, patients with no syphilis history may have received subsequent treatment outside of the VA system, but we had no knowledge of this unless it was documented in the medical record.

## References

- Syphilis - 2014 STD Surveillance. <http://www.cdc.gov/std/stats14/syphilis.htm>.
- Park IU, Chow JM, Bolan G, Stanley M, Shah J, Schapiro JM. Screening for syphilis with the treponemal immunoassay: analysis of discordant serology results and implications for clinical management. J Infect Dis. 2011;204(5):1297-1304. doi:10.1093/infdis/jir224.
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