

PUBLIC HEALTH LABORATORY DIRECTORS OF TEXAS



Arlington Scientific, Inc. (ASI)

Introduction to:

**“Most important innovation to
RPR Testing in the last 30 years”**

November 13, 2013

Serology Lounge
Space Saver
SLE Hampton
Bioxy
Symmetry II
Parallax
CRP
RPR Individual Components
Innova II
Stationary
Mobile Coach
RPR VDRL Serum Control Sets
Hampton Lite
Rubella
ASiManager-AT
Mono Thunderbolt ASI ASO RPR Rhino Pro Bulk Reagents Staph
RF
Resolute
Mobile Lounge
Pregnancy Tests
Warming Pad
TPHA
Sickle Cell
Symmetry 2
Horizon
Novax
VDRL
ASI RPR Card Test for Syphilis
Portable lounges
Lounge Accessories



Your Syphilis Authority

Expertise

- RPR
- VDRL
CDC Licensed Synthetic Formula
- TPHA
- Syphilis Reference Panels
- Custom Kits and Controls

Industry Firsts

- Mercury Free
- EDTA, CPD or CPDA-1
- Liquid Controls
- Screwcap Lids
- Warp Resistant Cards
- Extended Dating
- ASiManager-AT™
RPR Digital Analyzer

ASI RPR Card Test for Syphilis

- Superior readability
- Carbon antigen supplied in screw cap vials
 - *no glass ampoule to break*
- Three level liquid controls included
- Cards plastic coated on both sides
 - *warp resistant*
- Complete kit – everything needed to perform the test is included in the kit
- Long dating
 - *up to 24 months*



RPR Testing

PROs

- CDC recommendation
- Proven reliability
- Cost effective technology
- Easy-to-use
- Solution for all size laboratories

CONs

- Subjective interpretation
- No image storage or retrieval
- Eye fatigue
- Transcription errors
- Data management

ASI Kit Validation Report



Validation Report
For RPR
(ASI KIT)
ESOTERIC DEPARTMENT

Validation Performed By: Agnes Madolid

Validation Accepted By: Michael Mahoney, MD

RPR	BD Results		
	P	N	
ASI (New)	P	A 215	B 0
	N	C 0	D 100

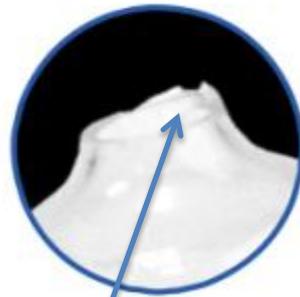
Relative Sensitivity	100%
Relative Specificity	100%

LabCorp Evaluation of ASI RPR

- “More defined endpoint”
- “Clearer, easier to read”
- “All testing materials included”
- “Coated cards resist warping”
- “Thicker cards easier to handle”
- “More defined test card wells”
- “One part number, packaging superior”
- “Convenience - ready to use controls”
- “Superior readability”

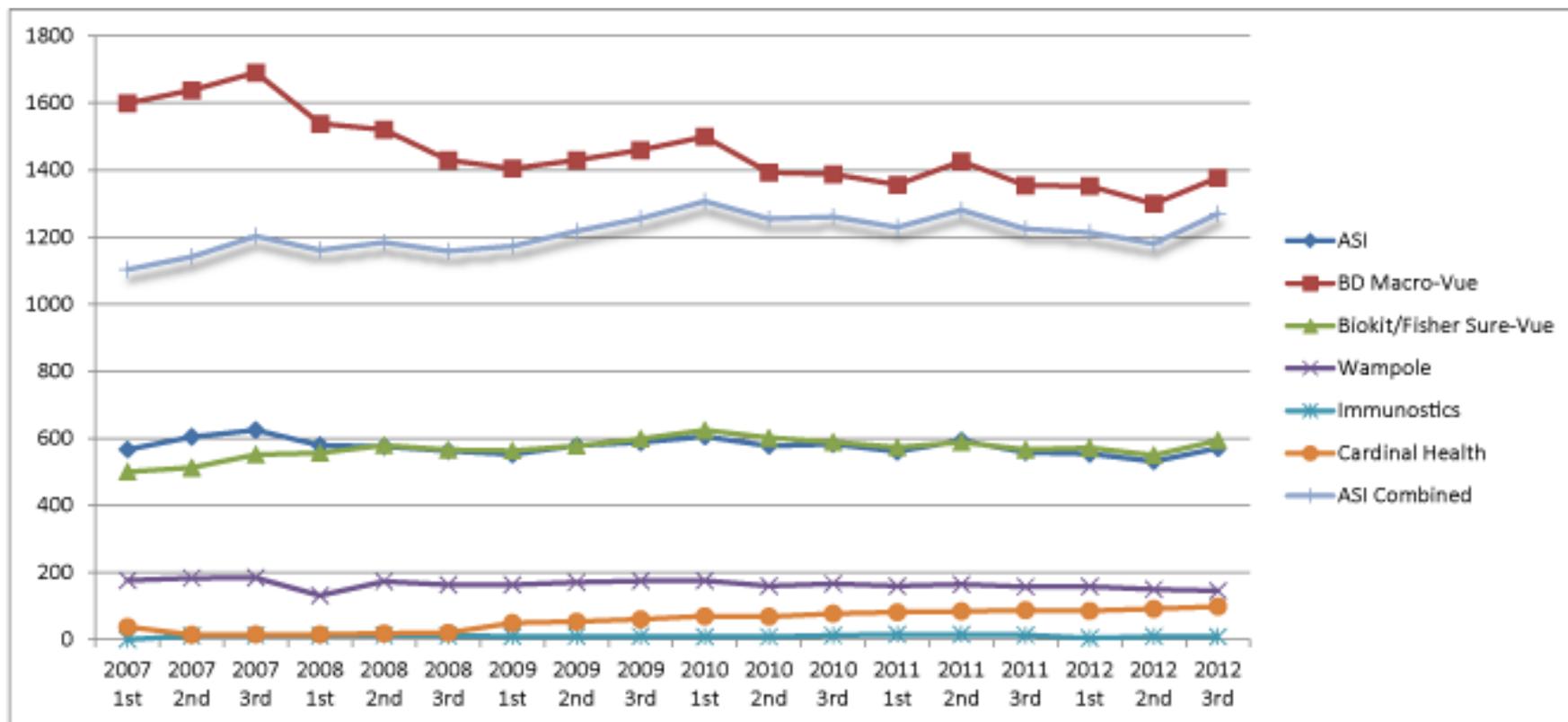
*LabCorp Esoteric Dept. Raritan, NJ
ASI Kit Validation*

BD



ASI

Combined CAP, AAB, and API Surveys



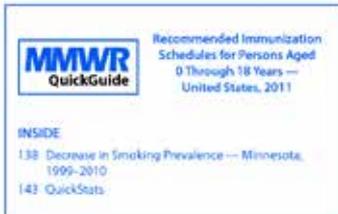
Discordant Results from Reverse Sequence Syphilis Screening — Five Laboratories, United States, 2006–2010

CDC recommends syphilis serologic screening with a nontreponemal test, such as the rapid plasma reagin (RPR) or Venereal Disease Research Laboratory (VDRL) test, to identify persons with possible untreated infection; this screening is followed by confirmation using one of several treponemal tests. Recently, the availability of automatable treponemal enzyme and chemiluminescence immunoassays (EIA/CIA) has led some laboratories to adopt a reverse sequence of screening in which a treponemal EIA/CIA is performed first, followed by testing of reactive sera with a nontreponemal test. To better understand the performance of reverse sequence screening for syphilis, CDC analyzed data from five laboratories that used reverse sequence screening during 2006–2010. This report describes the results of that analysis, which indicated that among sera reactive on initial screening with a treponemal EIA/CIA, 56.7% had a nonreactive RPR test. Among these discordant sera, 31.6% also were nonreactive by treponemal testing using *Treponema pallidum* particle agglutination (TP-PA) or fluorescent treponemal antibody absorbed (FTA-ABS) tests. Among discordant sera, the rate of nonreactive confirmatory treponemal tests was 2.9 times higher in a population with low prevalence of syphilis, suggesting that the low-prevalence population had a higher percentage of false-positive test results. Although CDC continues to recommend the traditional algorithm with reactive nontreponemal tests confirmed by treponemal testing, in this report CDC offers additional recommendations if reverse sequence syphilis screening is used.

Treponema pallidum, the bacterium that causes syphilis, cannot be cultured. As a result, serologic testing is the method most often used to diagnose syphilis in patients with suspected disease. Because syphilis can be asymptomatic, serologic screening is recommended for 1) persons at high risk, to detect latent infections; 2) pregnant women, to prevent congenital syphilis and 3) blood donors, to prevent transmission through transfusion. Serodiagnosis of syphilis involves the detection of two distinct types of antibodies: 1) nontreponemal antibodies

directed against lipoidal antigens released from damaged host cells and possibly from the treponemes themselves and 2) treponemal antibodies directed against *T. pallidum* proteins. Nontreponemal antibody tests can be nonreactive early in the course of infection and in late stages of disease, and often become nonreactive (serorevert) after treatment of early infection (1). Treponemal antibodies appear earlier than nontreponemal antibodies and usually remain detectable for life, even after successful treatment.

To reduce the time and labor required for syphilis screening, some laboratories have adopted reverse sequence screening in which sera are tested first by a treponemal EIA/CIA that permits automation for high throughput testing, followed by nontreponemal testing of reactive specimens. This reverse sequence can result in identification of discordant sera that are reactive with a treponemal test but nonreactive with a nontreponemal test. This result does not occur with the traditional algorithm because only nontreponemal-reactive sera are tested with a treponemal test. Discordant testing results could be caused by 1) previous syphilis infection, treated or untreated, with persistence of treponemal antibodies but seroreversion of nontreponemal antibodies, 2) a false-positive treponemal test result, or 3) early primary syphilis in a person who has yet to develop nontreponemal antibodies.



MMWR QuickGuide

Recommended Immunization Schedules for Persons Aged 0 Through 18 Years — United States, 2011

INSIDE

- 138 Decrease in Smoking Prevalence — Minnesota, 1999–2010
- 143 QuickStats



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CDC recommends the traditional algorithm with reactive nontreponemal tests confirmed by treponemal testing.

*Discordant Results from Reverse Sequence Syphilis Screening --- Five Laboratories, United States, 2006—2010

MMWR February 11, 2011

www.cdc.gov/mmwr/preview/mmwrhtml/mm6005a1.htm

CDC Letter to Colleagues



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention

February 10, 2011

Dear Colleague,

We are pleased to announce the publication of a *Morbidity and Mortality Weekly Report* entitled "Discordant Results from Reverse Sequence Syphilis Screening — Five Laboratories, United States, 2006–2010" on February 11, 2011. The availability of automatable treponemal enzyme immunoassays (EIA) and chemiluminescence immunoassays (CIA) has led some laboratories to adopt a reverse sequence of screening in which a treponemal EIA or CIA is performed first followed by testing of reactive sera with a nontreponemal test such as the rapid plasma reagin (RPR) test or Venereal Disease Research Laboratory (VDRL) test.

In this report, data from five laboratories that used reverse sequence screening were analyzed to better understand the performance of treponemal EIA/CIA. Among sera reactive on initial screening with a treponemal EIA/CIA, 56.7% were discordant with a nonreactive RPR test. Among these discordant sera, 31.6% were nonreactive by confirmatory testing using another treponemal test (i.e., *Treponema pallidum* particle agglutination (TP-PA) test or fluorescent treponemal antibody absorbed (FTA-ABS) test). EIA/CIA reactive test results without both a reactive RPR/VDRL and second treponemal test are likely false positive and the diagnosis of syphilis is unlikely, especially in low risk populations. In populations with higher or unknown risk, providers should retest patients with an RPR test in several weeks. Patients with concordant reactive treponemal serologic results and a non reactive RPR/VDRL test are considered to have past or present syphilis. If previously treated syphilis cannot be documented, then these patients should be administered therapy according to the [2010 STD Treatment Guidelines](#).

CDC continues to recommend the traditional screening algorithm using a nontreponemal test (e.g., RPR or VDRL), with reactive nontreponemal tests confirmed by treponemal testing. However, if reverse sequence screening is used, reactive sera by a treponemal test should be tested reflexively with a quantitative nontreponemal test. When test results are discordant (i.e., reactive EIA/CIA and nonreactive RPR/VDRL), the specimen should be tested reflexively using the TP-PA test as a confirmatory treponemal test. Results from all serologic testing should be reported promptly and concurrently to the clinician and public health department.

We would appreciate your sharing this letter with other colleagues who might benefit from this information.

Sincerely,

/Gail Bolan

Gail Bolan, MD
Director, Division of STD Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

- Dr. Gail Bolan, Director, Division of STD Prevention
- Recommends traditional screening algorithm using RPR or VDRL

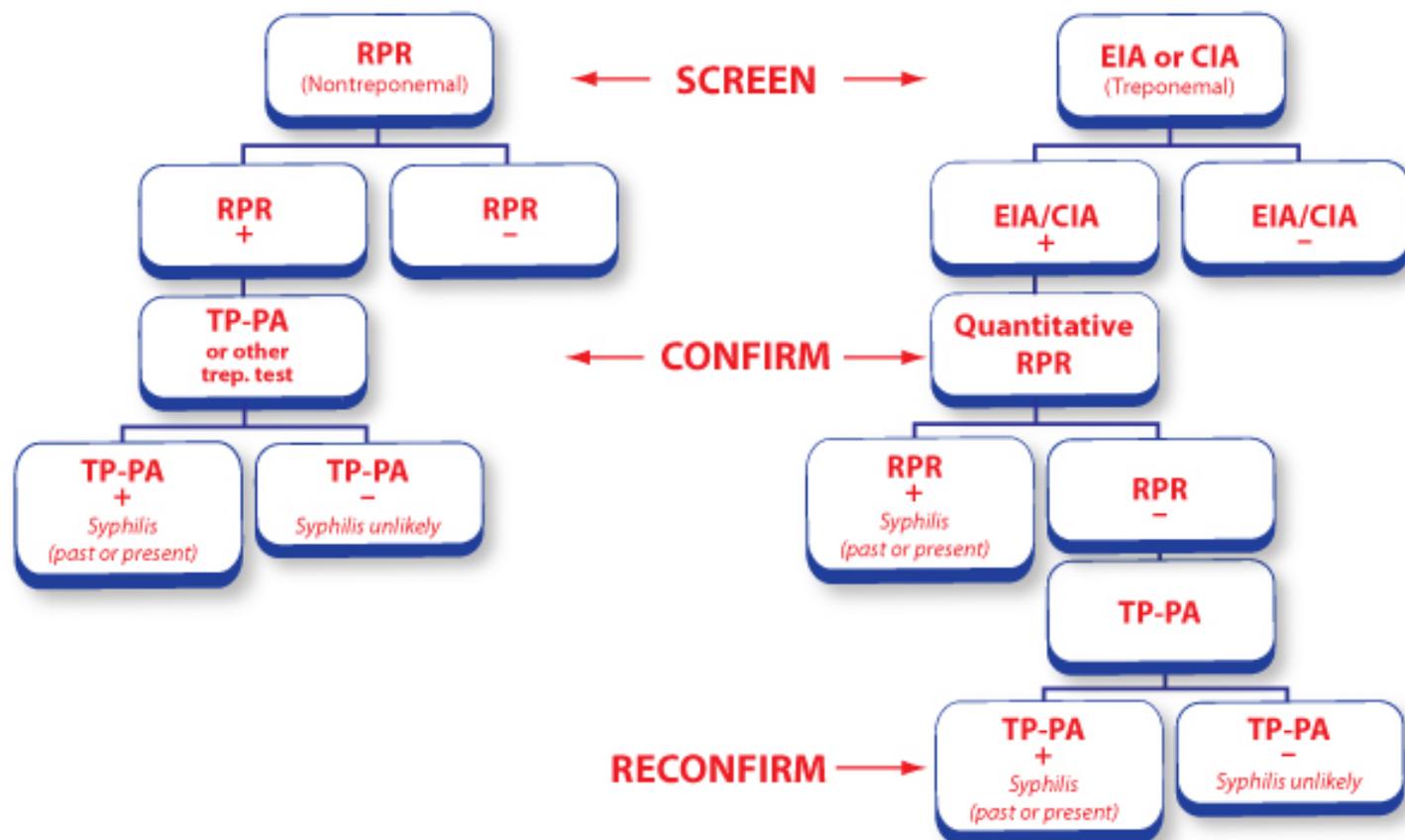
Letter to physicians from CDC about MMWR February 2011 Report:

www.cdc.gov/std/syphilis/DCL-Syphilis-MMWR-2-10-2011.pdf

Syphilis Screening Algorithms

CDC Recommended Screening

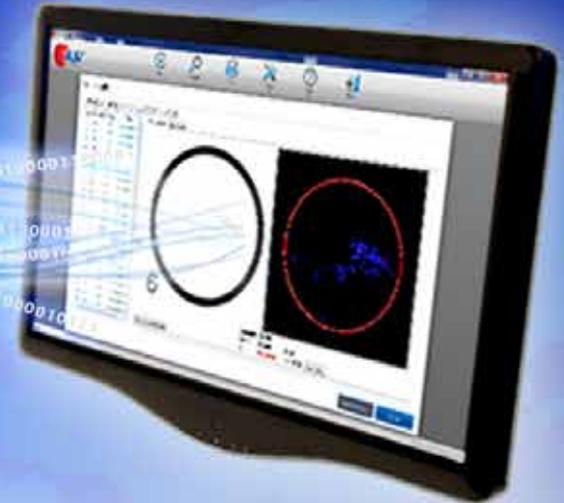
Reverse Sequence Screening





ASiManager-AT™

DIGITAL AGGLUTINATION TECHNOLOGY



**“Most important innovation to RPR testing
in the last 30 years”**

ARLINGTON SCIENTIFIC, INC.



Solution: Digital Analysis

- Objective and standardized interpretation
- Retrievable image and results
- Easy-to-use
- Cost effective
- LIMS capable
- Increased reliability
- RPR predictive titers
- Barcode reader



Established 1985

27+ years medical device manufacturing
USA serology market leader
All products made in the USA
Syphilis authority
Award winning quality & service

Certifications

U.S. Reg#1641328
U.S. small business
Europe
China

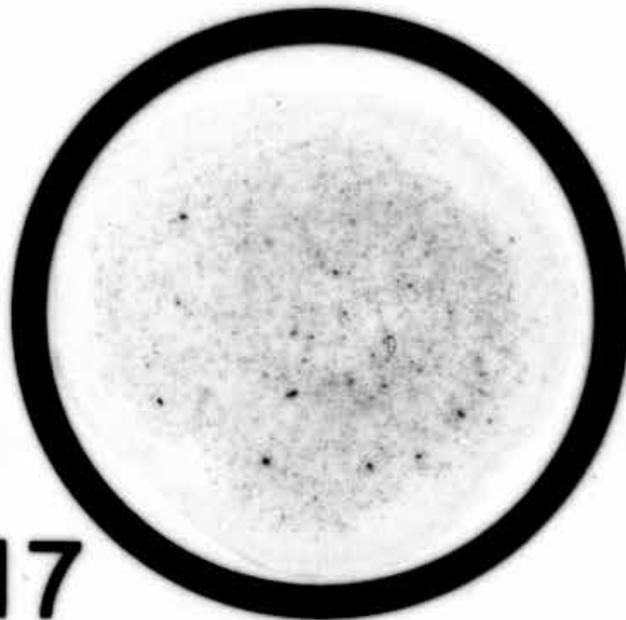


Test Results

Worklist: om 30w 12/6/2012 11:22:54 PI

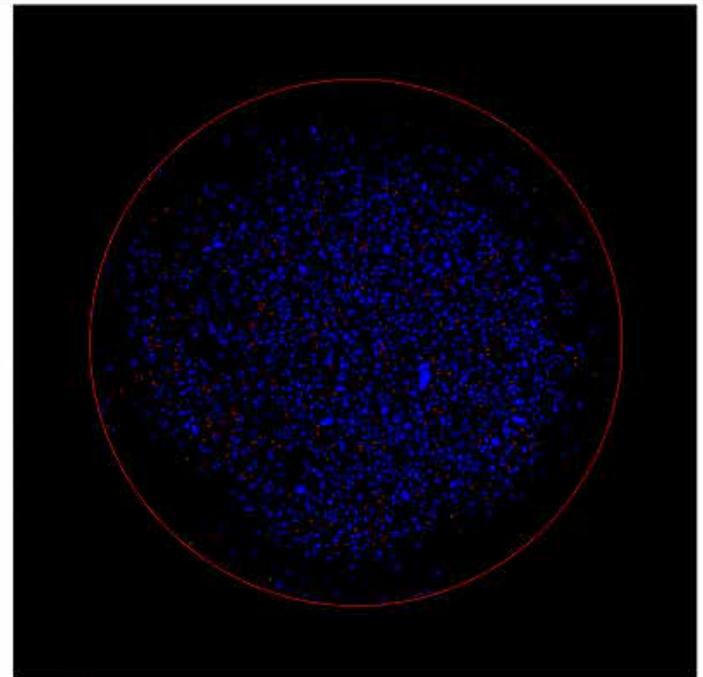
Well	Sample ID	Result	Titer
1	1	R	>= 1:16
2	2	R	1:2
3	3	R	1:1
4	4	R	1:4
5	5	R	1:4
6	6	N	Nonreac
7	7	R	1:2
8	8	R	>= 1:16
9	9	R	1:2
10	10	R	1:4
11	11	R	1:4
12	12	R	1:2
13	13	R	1:2
14	14	R	1:4
15	15	R	1:4
16	16	R	1:4
17	17	R	1:4
18	18	R	1:4
19	19	R	1:4
20	20	R	1:4
21	21	R	1:4
22	22	R	1:4

Well Result Test Card



17

Reject Sample Well



Sample ID: 17

Well	Result	Titer
17	Reactive	1:4 <input type="button" value="Override..."/>

Test Next Card

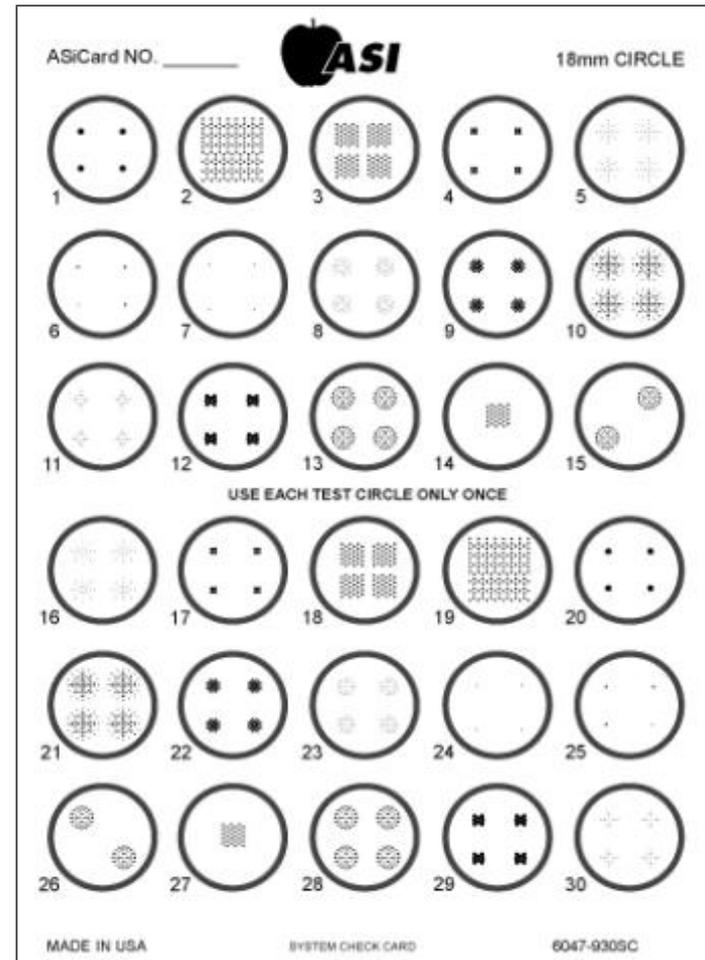
Close

Data Management



System Check

- System Check Card ensures the instrument is performing as expected



STD Study

Evaluation of a Digital Flocculation Reader for the Rapid Plasma Reagin Test for the Serological Diagnosis of Syphilis

Arnold R. Castro, PhD,* David D. Binks, BS, MT(ASCP), MBA,† Danny L. Raymer, MS,‡ Susan E. Kikkert, BS,* Heather A. Jost, BS,* Mahin M. Park, PhD,‡ Benjamin D. Card, BSc,† and David L. Cox, PhD*

Abstract: We described the ASiManager-AT digital flocculation reader to demonstrate concordance between visual and digital readings of the rapid plasma reagin test for detection of antibodies in the serum of patients with syphilis. A qualitative and quantitative rapid plasma reagin was performed on each serum samples giving a concordance of 98.6% and 99.7%, respectively, for reactives and 100% for nonreactives.

From the *Division of STD Prevention, Centers for Disease Control and Prevention, Atlanta, GA; †Arlington Scientific, Inc, Springville, UT; and ‡Georgia Public Health Laboratory, Atlanta, GA. The authors thank the Georgia Department of Health Laboratories for supplying specimens for the study and Arlington Scientific, Inc for supplying all the necessary diagnostic reagents for this study. Supported by the Centers for Disease Control and Prevention in the form of allowing the principal investigator and CDC coauthors to devote time and effort in testing and evaluating the ASiManager-AT digital flocculation reader instrument. Arlington Scientific, Inc funded the developmental phase of the final commercial instrument.

A.R.C. was the project microbiologist, developed the test protocol, designed the test parameters and functional components of the test, analyzed the data, and is the lead author for the paper. D.D.B. contributed to the design of the study. D.L.R. designed the resolution and parameters of the digital reader. S.E.K. assisted in performing the evaluation. H.A.J. assisted in performing the evaluation. M.M.P. provided the laboratory specimens and assisted in the data analysis. B.D.C. assisted in the data analysis. D.L.C. assisted in the data analysis. All authors contributed to the write up and critically reviewed the manuscript and approved the final draft.

Not commissioned; externally peer reviewed.

One of the functions of the Laboratory Reference and Research Branch (LRRB) of the Division of STD Prevention of the National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention of the Centers of Disease Control and Prevention is to evaluate new diagnostic reagents and/or instruments for the serological diagnosis of syphilis by providing unbiased assessment of the efficacy and relevance of reagents or instruments for the benefit of public health. Consequently there is no apparent conflict of interest between the CDC and Arlington Scientific, Inc.

There is no related paper or publications in reference to this work. Arlington Scientific, Inc, is the sole proprietor of the ASiManager-AT digital flocculation reader instrument and ARS and CDC coauthors have no financial interest in the commercialization of this device. This study was performed on archived sera from which all patient identifiers had been removed. Protocol for studies using these sera for the evaluation of new devices for the serological test for syphilis was reviewed by institutional review board of the CDC (protocol no 2018) and determined to be exempt from further review.

Correspondence: Arnold R. Castro, PhD, Division of STD Prevention, NCHSTP, Centers for Disease Control and Prevention, 1600 Clifton Rd, MS A-12, Atlanta, GA 30333. E-mail: acastro@cdc.gov. Received for publication July 6, 2011, and accepted September 19, 2011. DOI: 10.1097/OLQ.0b013e3182389ab9

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The Centers for Disease Control and Prevention (CDC) recommends syphilis serologic screening with a nontreponemal test, such as the rapid plasma reagin (RPR) to identify persons with possible untreated infection. The RPR is a macroscopic, nontreponemal flocculation card test used to screen for antibodies in patients suspected of having contracted syphilis.²⁻⁴ The RPR test is highly subjective and lends itself to misinterpretation when performing the qualitative or quantitative tests. Different observers can arrive at different conclusions, especially when reading the endpoint of a quantitative test or the interpretation of a minimal reactive or slight roughness in the qualitative test. The ASiManager-AT digital flocculation reader is designed to read objectively each well of the RPR test. The purpose of the study was to demonstrate concordance between the visual and digital readings and to avoid any bias in reading the test.

METHODS

The antigen is prepared from a Venereal Disease Research Laboratory antigen suspension containing cardiolipin, lecithin, and cholesterol. Ethylenediaminetetraacetic acid is added to enhance the stability and choline chloride to eliminate the need to heat inactivate the serum. Finely divided charcoal particles are added as a visualizing agent. In the RPR test, if antibodies are present, they combine with the lipid particles of the antigen causing them to aggregate trapping the charcoal particles and showing them as black clumps within the circle of a white card. If antibodies are not present, the test mixture appears as uniformly gray. The RPR antigen will detect IgG and IgM antibodies to lipoidal material released from damaged host cells as well as to lipoprotein-like material, and possibly cardiolipin released from the treponemes. The antilipoidal antibodies are produced as a consequence of an active infection of syphilis and other treponemal diseases as well as in response to nontreponemal diseases in which tissue damage occurs.

The qualitative and quantitative RPR test is performed according to the procedures described in the manual of tests for syphilis.⁵ The visual reading of the test is reported as reactive or nonreactive. Reactive is characterized by clumping, ranging from marked and intense to slight but definite, often called minimal reactive. Nonreactive is the absence of clumps or slight roughness in a smooth background. Minimal reactive and slight roughness is often misinterpreted as positive or negative because of the subjectivity of visually interpreting the results. This condition leads to variability in results from different operators reading the same test and lab-to-lab variability.

Serum samples (1091) that had been submitted to the Georgia Public Health Laboratory for serological testing for syphilis with all identifiers removed were sent to CDC for this study. The patterns of reactivity were determined at CDC by

“...the ASiManager-AT digital reader can aid in the standardization of RPR, avoiding the subjectivity and interpretation of visual reading and provides a tool for retrieval of documentation and archival of records.”

Division of STD Prevention, Centers for Disease Control and Prevention
Arlington Scientific, Inc.
Georgia Public Health Laboratory

ASiManager-AT Performance

Sensitivity - 98.1%

Specificity - 99.4%

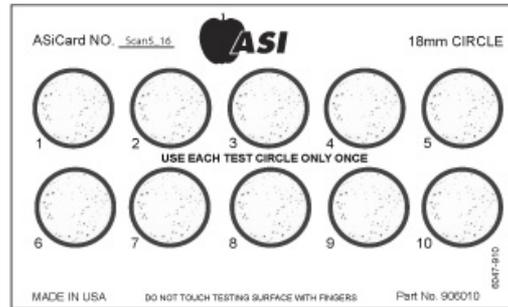
INDEPENDENT TESTING AT 5 SITES

ASiManager-AT™

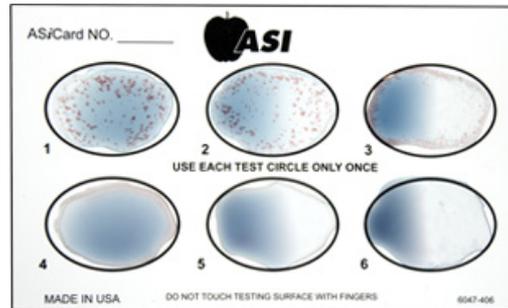
**Visual
Results**

	Reactive	Nonreactive
Reactive	2178	43
Nonreactive	20	3274

Available Tests



RPR



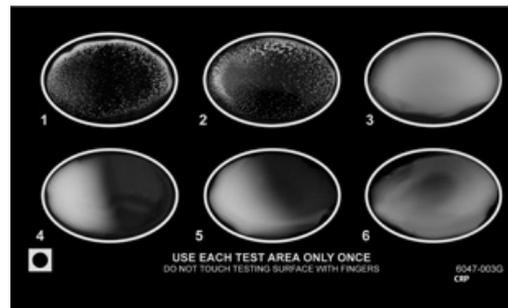
MONO



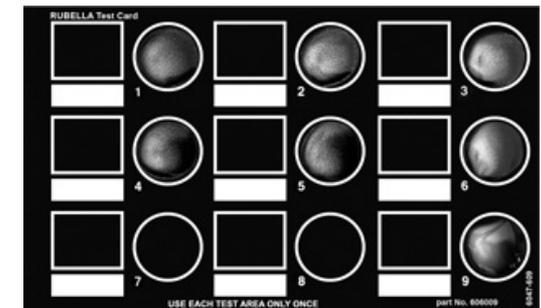
ASO



SLE



CRP



Rubella



RF



ASiManager-AT™

- World's first digital RPR analyzer
- Objective and Standardized results
- Results and image management
 - Analyze
 - Document
 - Store
 - Retrieve
- CDC proven and FDA cleared
- RPR reliability, quality and cost effectiveness
- Removes RPR Subjectivity

ASI Offers Data Management Innovative and Intuitive Software

- Analyze – Archive – Retrieve Digital Data
- Objective interpretation removes subjectivity
- Reduced labor costs & Workflow increase
- Proprietary technology – Proprietary software
- State-of-the-art graphic user interface
- Create and print patient reports, actual test images and QC reports
- LIMS compatible with bi-directional interface

ASI – “Your Syphilis Authority” Creating The Future of Syphilis Testing

- Affordable – lowest cost per test
RPR Reagents are far less expensive than treponemal reagents
- Easy-to-use with minimal training
- Installation, validation, training, service and support provided

ASI..Devoted to The Future of Syphilis Testing

- *ThunderBolt ASI Fully Automated Syphilis Analyzer* (Pending FDA Clearance)
- *National Institute of Health Product Development*
- *Dual Platform Nontreponemal / Treponemal Test*

THANK YOU