

VALIDATION OF A NEW “UNIVERSAL” CONTROL MATERIAL FOR CLIA-WAIVED RAPID HIV ANTIBODY TESTS USED FOR POINT OF CARE TESTING

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BACKGROUND

As part of a CDC sponsored research study, an alternative algorithm that uses multiple rapid point of care tests rather than relying on laboratory based Western blot confirmation is being evaluated in 5 sites in San Francisco.

The study seeks to evaluate the feasibility, performance, and cost-effectiveness of a rapid test algorithm relative to the conventional enzyme immunoassay (EIA)/Western blot algorithm used in HIV counseling and testing settings.

The Point of Care Rapid Testing (POCT) algorithm being evaluated in San Francisco uses three different rapid HIV tests.

OraQuick	Stat-Pak	Uni-Gold
<div>#1</div>	<div>#2</div>	<div>#3</div>
Oral fluid directly or fingerstick with a loop	Collect blood from the vacutainer tube using a loop (add 1 loop)	Collect blood from the vacutainer tube using specimen dropper (add only 1 drop)
Buffer in vial	3 drops of Stat-Pak buffer	4 drops of Uni-Gold buffer
Run time 20 – 40 min. Read window 20 min.	Run time 15 – 20 min. Read window 5 min.	Run time 10 – 12 min. Read window 2 min.
Run temps 59°F - 99°F	Run temps 59°F - 99°F	Run temps 59°F - 80°F
Storage temps 35°F - 80°F	Storage temps 46°F - 86°F	Storage temps 35°F - 80°F

Updated 4/7/2007

One issue sites implementing the algorithm have had to address is how to conduct appropriate Quality Control and Quality Assurance for three different rapid tests. Rapid test package inserts require the use of the manufacturers control products with their tests, thus sites currently must keep 3 different sets of control materials with 3 different rapid tests.

Regulations that govern CLIA-waived testing require that these package inserts be followed “to the letter.” Thus, a quality assurance program for sites using three different tests would require:

- Shelf life unopened = Monitor expiration dates for 3 different unopened materials
- Shelf life opened = Monitor expiration dates for 3 different open materials
- Unopened storage temperature = Document storage temperature for all unopened materials
- Opened storage temperature = Document storage temperature for materials once opened
- Cost = Incur costs of purchasing 3 different sets of control materials

In addition to keeping track of these requirements for 3 products, QA is further complicated by the fact that all the products have slight variations in one or more of these requirements. A single “Univeral” set of control materials such as the Xsera controls would simplify QA for sites using more than one rapid POCT.

Control Material	Volume in Vial	Unopened Shelf Life	Opened Shelf Life	Unopened Storage Temp	Opened Storage Temp
OraQuick Advance	0.2ml	1 year	56 days	2-8 °C (35-46 °F)	2-8 °C (35-46 °F)
Clearview Stat-Pak	0.25ml	2 years	2 years	2-8 °C (35-46 °F)	2-8 °C (35-46 °F)
Uni-Gold	0.5ml	1 year	1 month	2-8 °C (35.6-46.4 °F)	2-8 °C (35.6-46.4 °F)
Xsera	1.ml	2 years	60 days	2-8 °C (35-46 °F)	2-30 °C

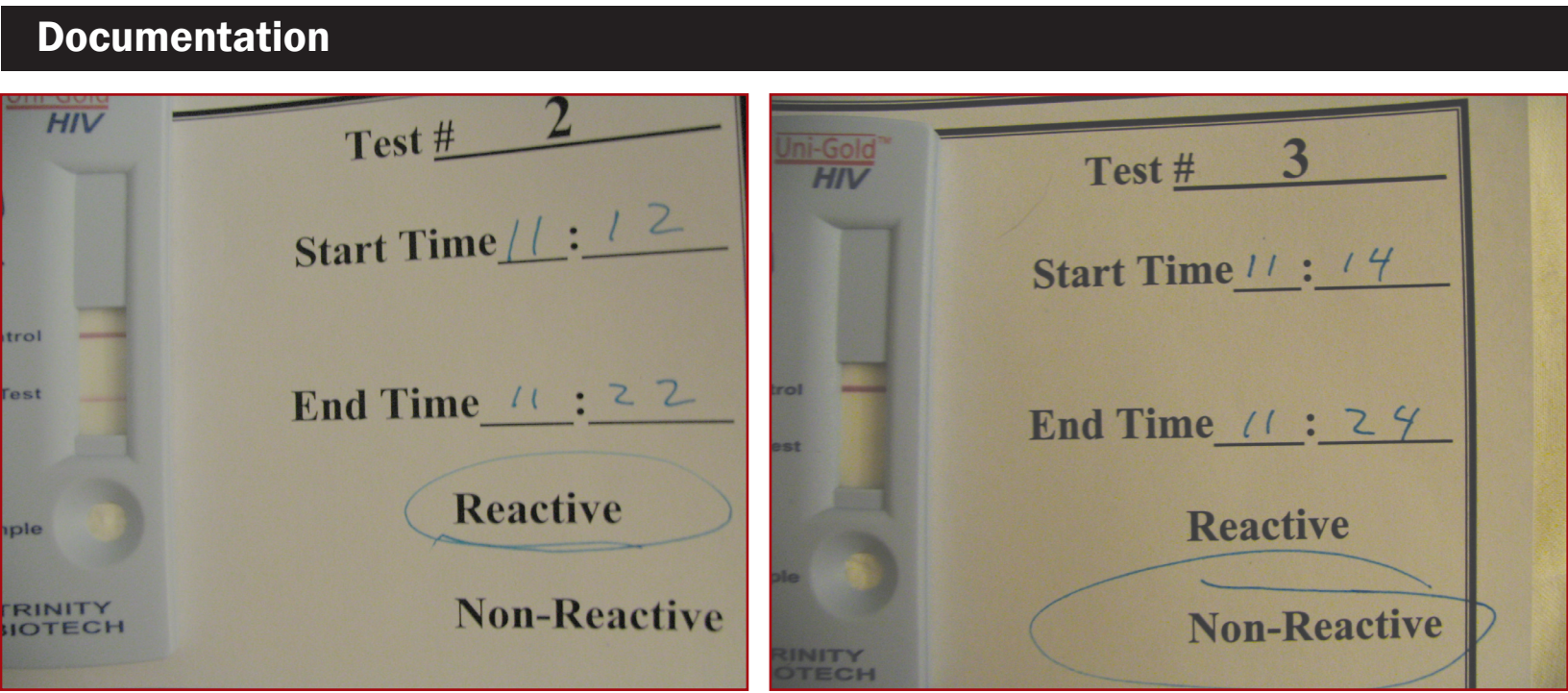
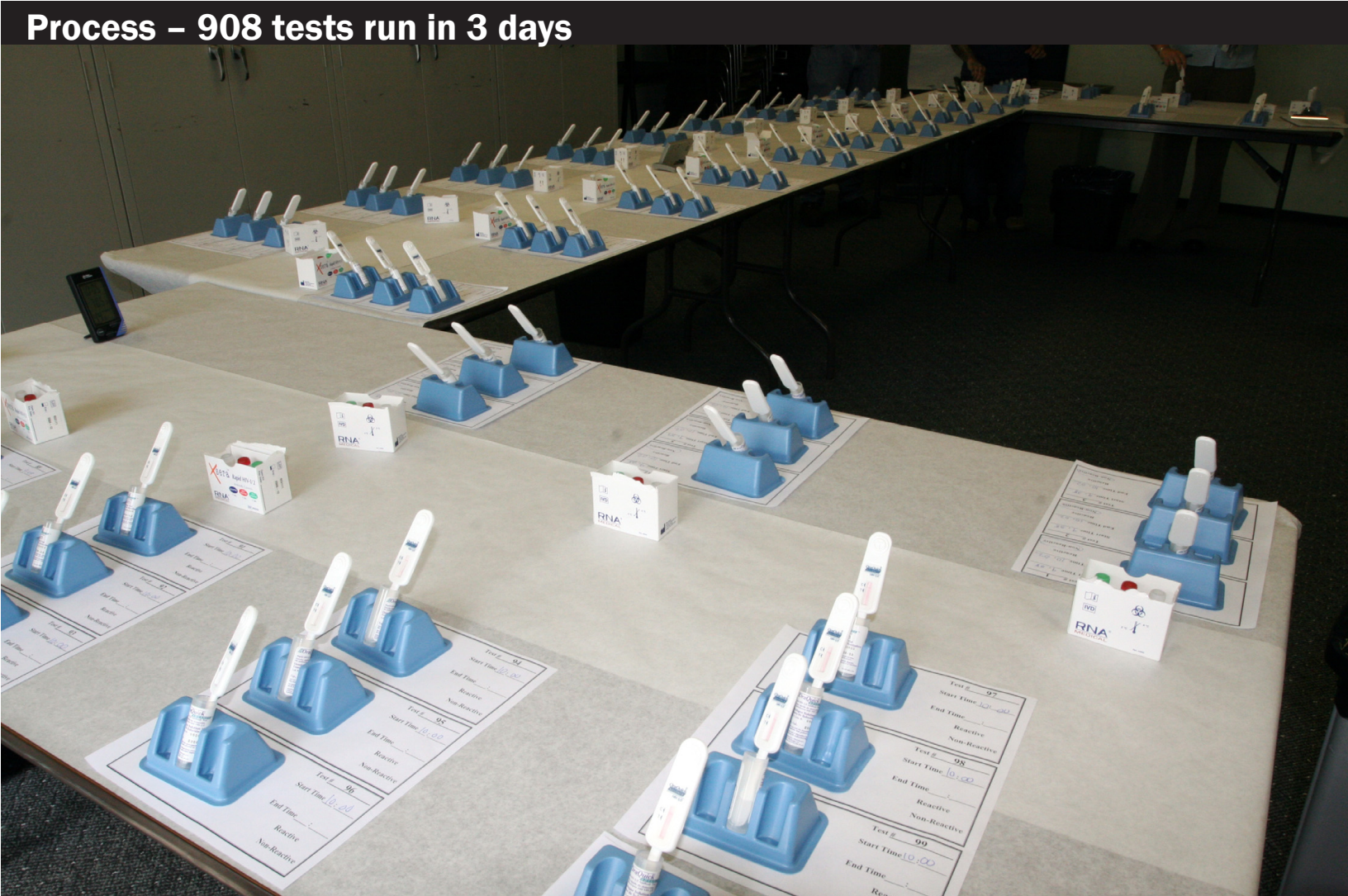
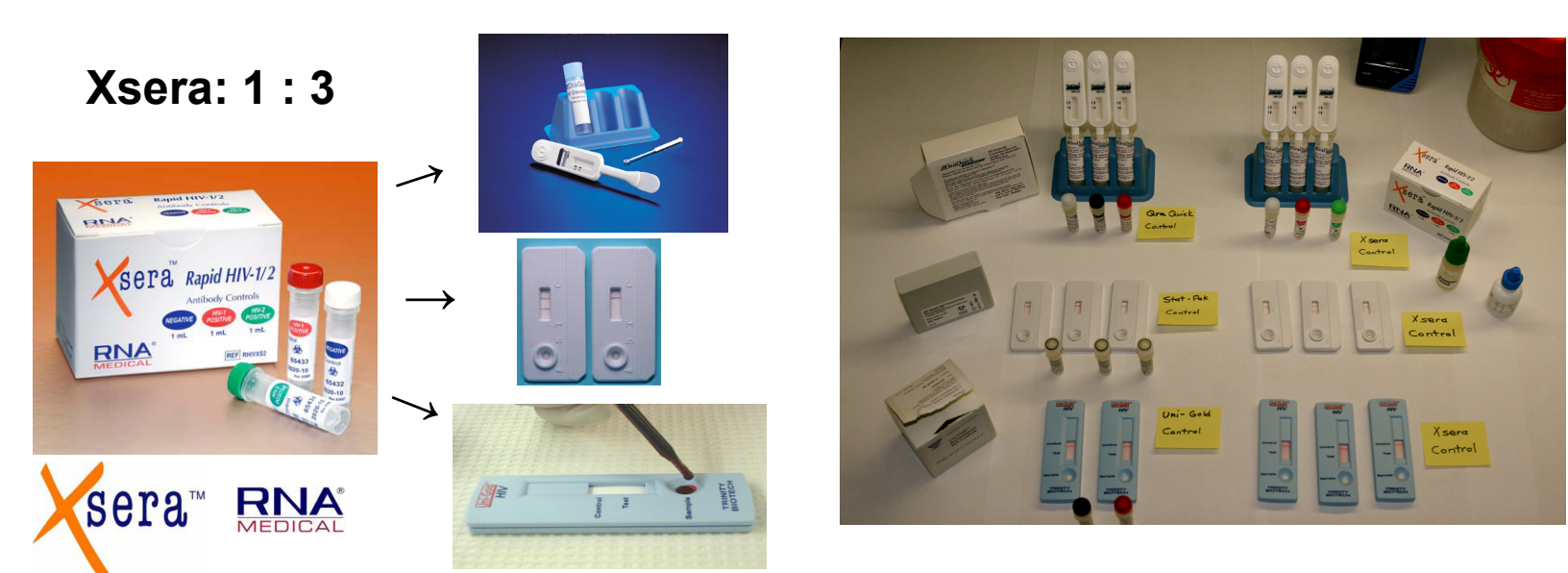
However, good laboratory practice requires that a validation of such universal control materials be conducted prior to the adoption of there use in a QA program.

VALIDATION PROCESS

- Run manufacturers product controls with the corresponding test:
1 HIV Negative, 1 HIV-1 Positive, and 1 HIV-2 Positive
- Run Xsera controls with each of the three rapid tests for which Xsera performance is being validated:
100 HIV Negative, 100 HIV-1 Positive, 100 HIV-2 Positive
- Record results of all tests

A total of 908 tests were run: 303 OraQuick, 303 Stat-Pak, 302* Uni-Gold. For this evaluation, multiple individuals ran the tests, and 2 different lots of XSera, 2 lots of Oraquick, 2 lots of Unigold and 1 lot of Stat-Pak were used.

**Note: The Uni-Gold test kit is not approved for detection of HIV-2 antibodies, hence no manufacturer’s HIV-2 control material was available for step 1. However, validation was conducted using the Xsera HIV-2 control material and a line was present for all 100 Uni-Gold tests.*



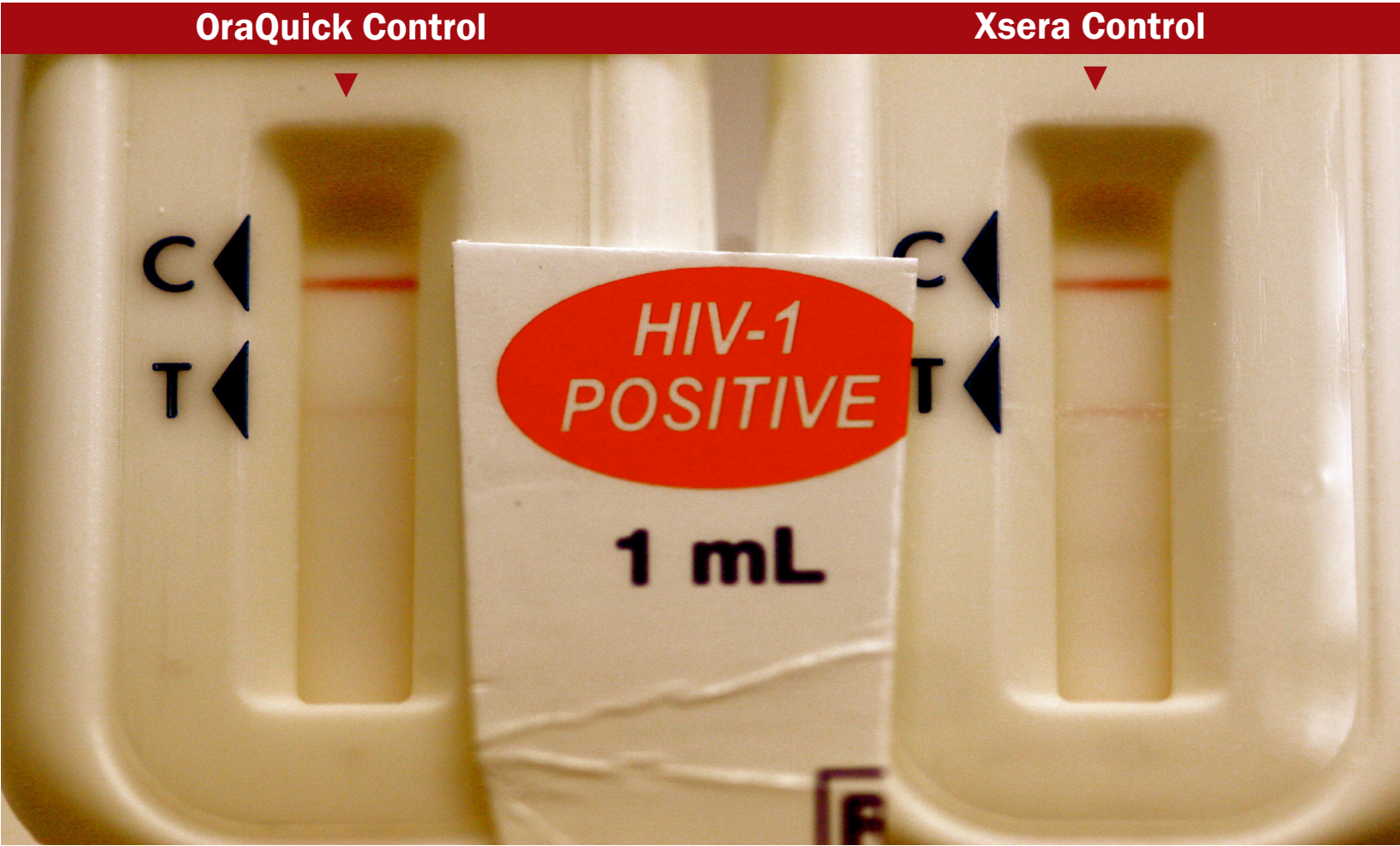
RESULTS

OraQuick Advance Test Results		
Number	Control Type	Results
1	OraQuick Control HIV-negative	1 Correct Result
1	OraQuick Control HIV-1	1 Correct Result
1	OraQuick Control HIV-2	1 Correct Result
100	Xsera Control HIV-negative	100 Correct Results
100	Xsera Control HIV-1	100 Correct Results
100	Xsera Control HIV-2	100 Correct Results

Clearview Stat-Pak Test Results		
Number	Control Type	Results
1	Stat-Pak Control HIV-negative	1 Correct Result
1	Stat-Pak Control HIV-1	1 Correct Result
1	Stat-Pak Control HIV-2	1 Correct Result
100	Xsera Control HIV-negative	100 Correct Results
100	Xsera Control HIV-1	100 Correct Results
100	Xsera Control HIV-2	100 Correct Results

Uni-Gold Test Kit Results		
Number	Control Type	Results
1	Uni-Gold Control HIV-negative	1 Correct Result
1	Uni-Gold Control HIV-1	1 Correct Result
100	Xsera Control HIV-negative	100 Correct Results
100	Xsera Control HIV-1	100 Correct Results
100	Xsera Control HIV-2	100 Correct Results

Comparison of Xsera and Manufacturer product lines Xsera Produced Darker Test Line than Oraquick



Comparison of Xsera and Manufacturer product lines Xsera Produced lines of similar intensity to Clearview and Unigold product lines



RESULTS — SUMMARY

All 908 control tests produced the expected results, validating the performance of Xsera controls with the OraQuick Advance, Clearview Stat-Pak and Uni-Gold tests. Compared to the Oraquick Advance kit control materials, the Xsera controls produced slightly darker reactions with the test antigen. The Uni-Gold and Clearview HIV control materials produced reactions of similar intensity to those produced by the Xsera materials on their respective tests.

LESSONS LEARNED

After validation, the San Francisco Department of Public Health began using the Xsera control materials as part of their HIV rapid test Quality Assurance program.

The Xsera controls have simplified the logistics of QA program implementation for agencies, increasing the likelihood they will be able to maintain laboratory best practices, and allowing them to successfully provide HIV POCT with multiple different rapid HIV tests.

However, some rapid test package inserts still require use of the manufacturers control materials in specific instances (e.g. upon receipt of a new kit lot.) CLIA-waived HIV test sites may have difficulty implementing this protocol unless package inserts can be modified to allow for the use of unassayed HIV-1 and HIV-2 controls commercially available for use with multiple different rapid tests as part of a validated Quality Assurance plan.

The findings and conclusions in this presentation have not been formally disseminated by the Centers for Disease Control and Prevention and should not be construed to represent agency determination or policy.