

DRIED PLASMA SPOT TESTING - THE ANSWER FOR MAKING BLOOD TRANSFUSION TESTING SAFER IN AFRICA?

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Blood Safety in Africa

Africa has a unique set of challenges pertaining to blood transfusion.

The two of largest contributing factors are:

- the most common disease states in SSA require large amounts of blood as lifesaving intervention e.g. malaria,
- the highest burden of infectious diseases transmissible through transfusion (Tapko, Toure and Sambo, 2014) is found in SSA.

Aim

The aim of this study is to validate a screening method using a novel sample type. We present the advantages of using this new method for screening donated blood for viral nucleic acid in resource constrained settings.

Research design and methodology

Study Population

Sample

Main Objective

Cohort A

900 Negative donor samples

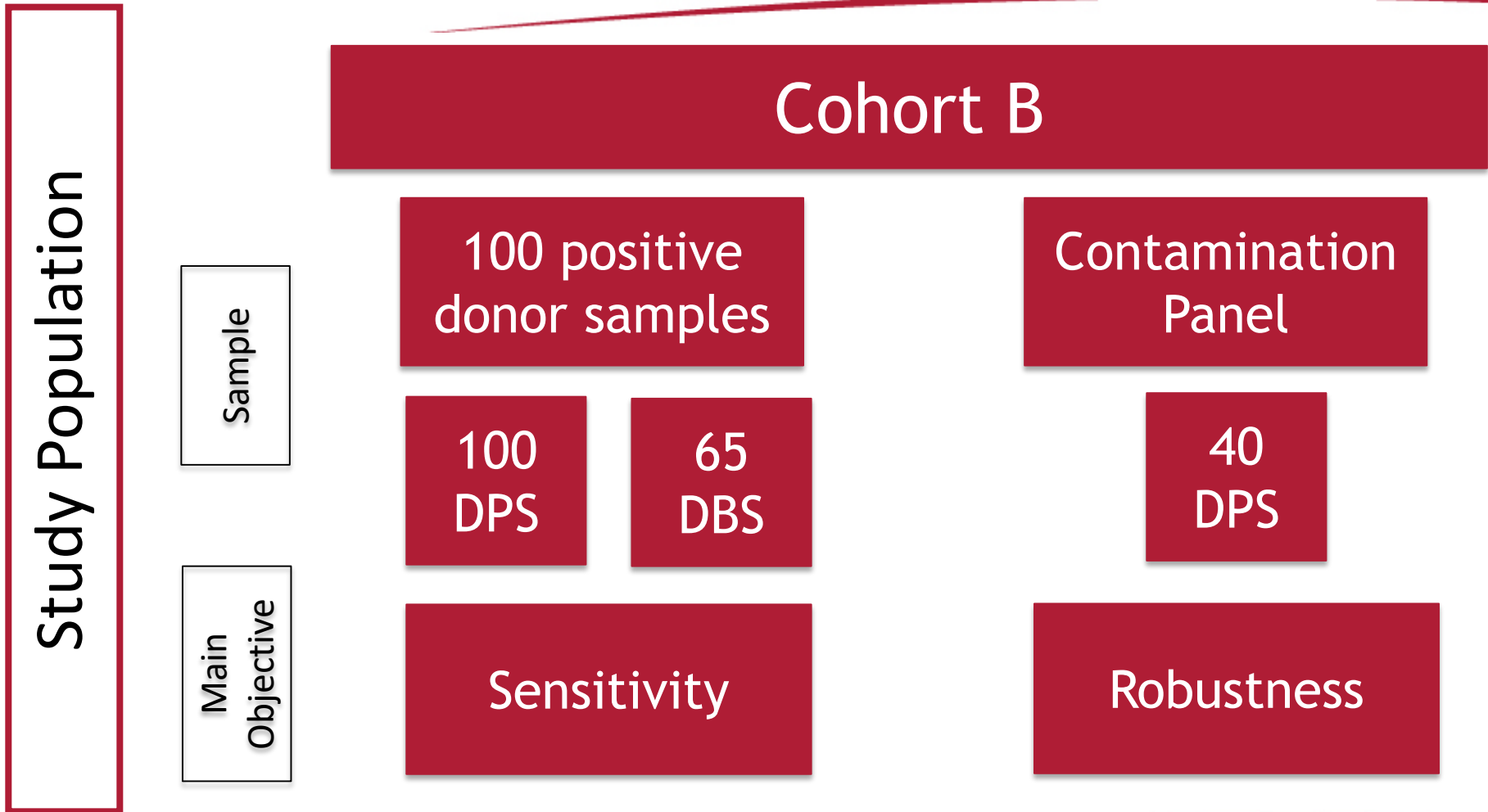
900
DPS

900
DBS

Specificity
Invalid rate
Initial reactive rate

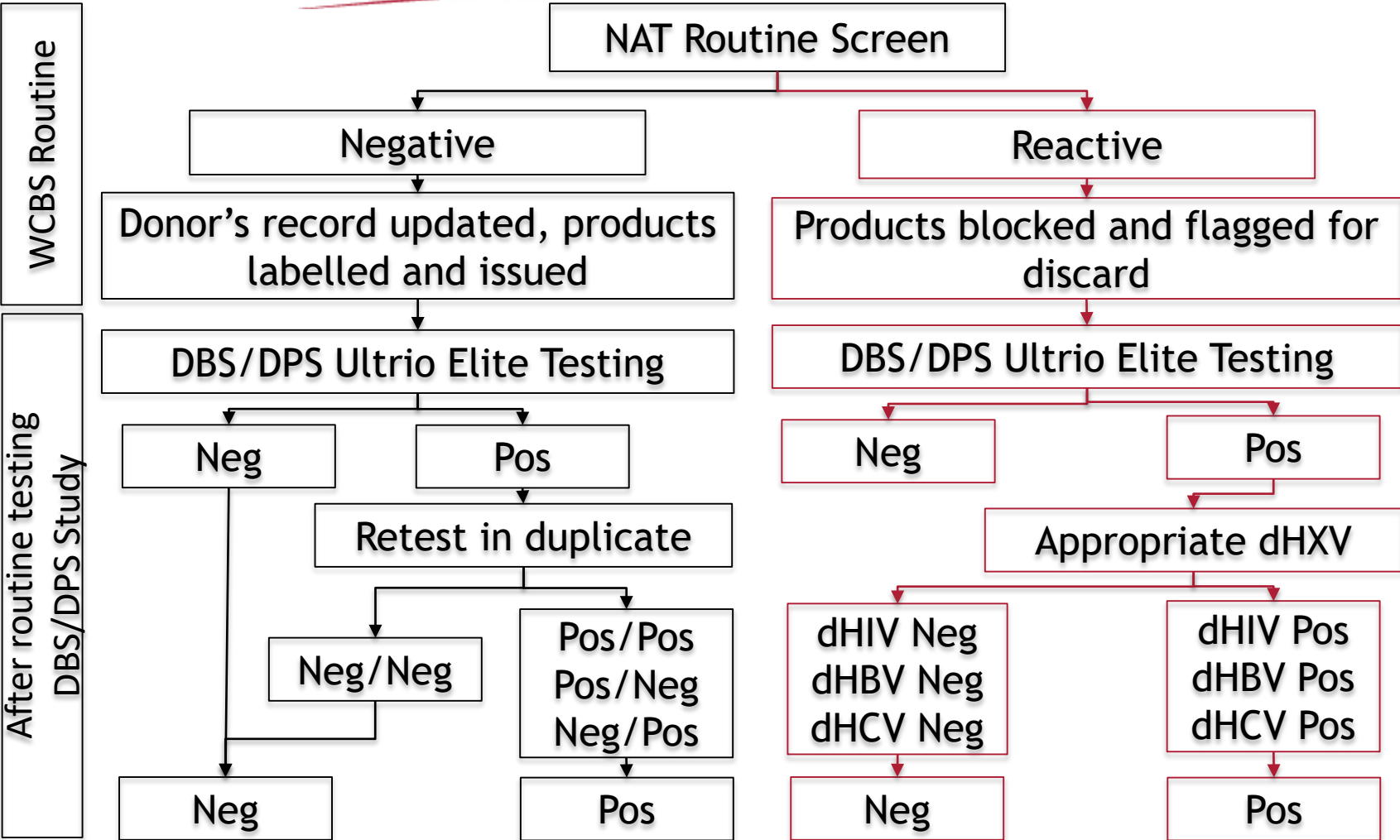


Research design and methodology



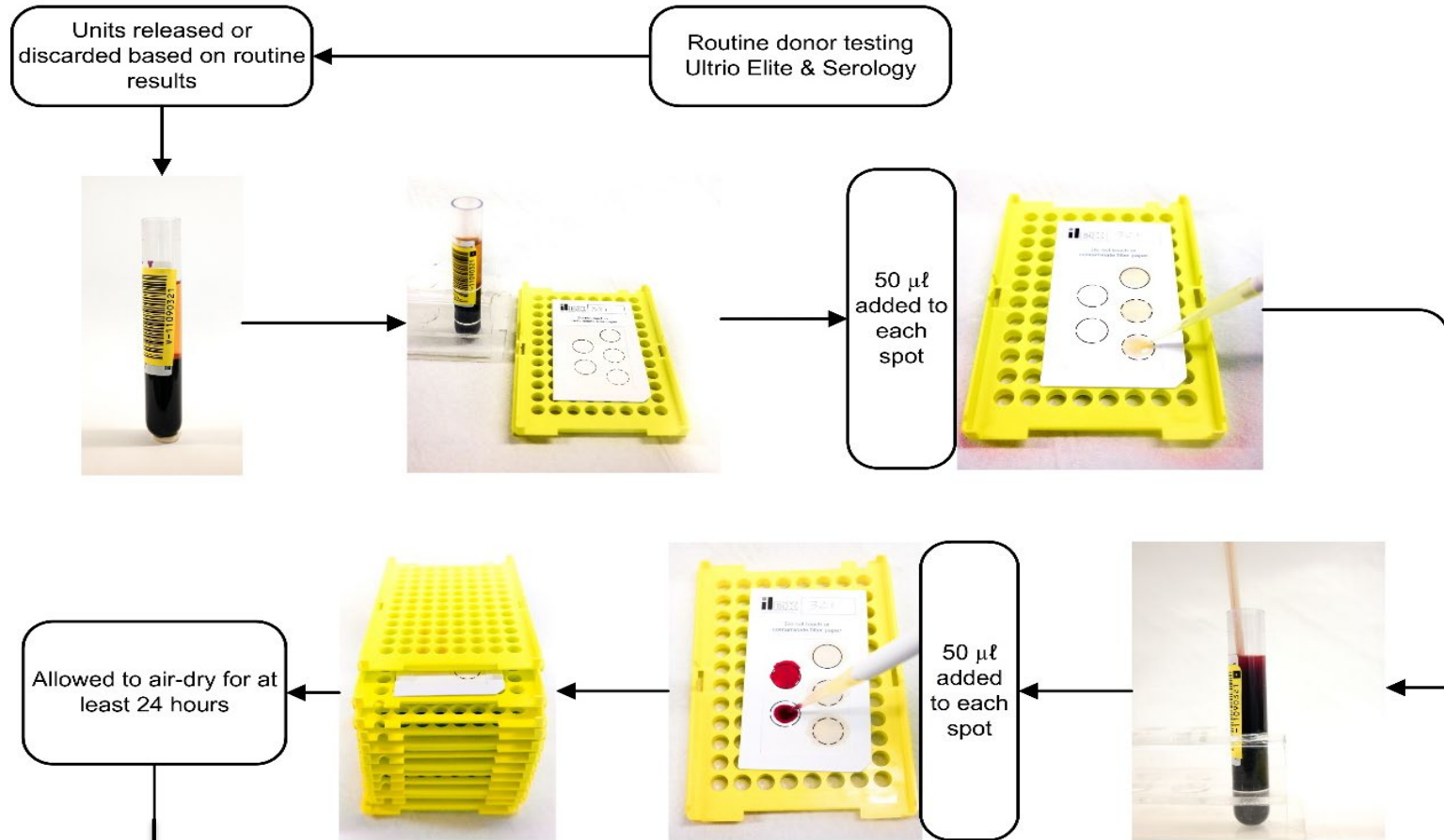
Research design and methodology

Study Design



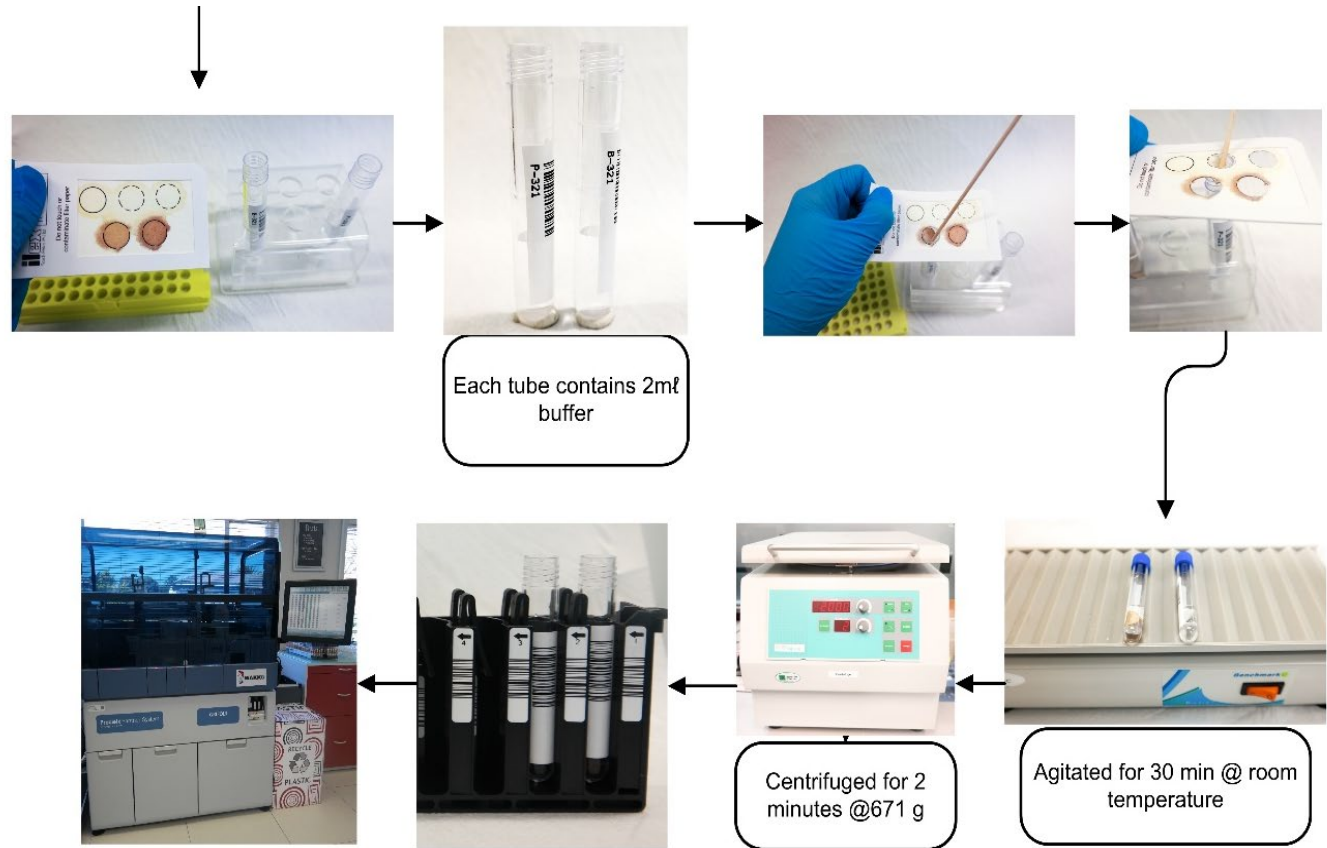
Research design and methodology

Specimen collection and preparation



Research design and methodology

Specimen collection and preparation



Results

Cohort A

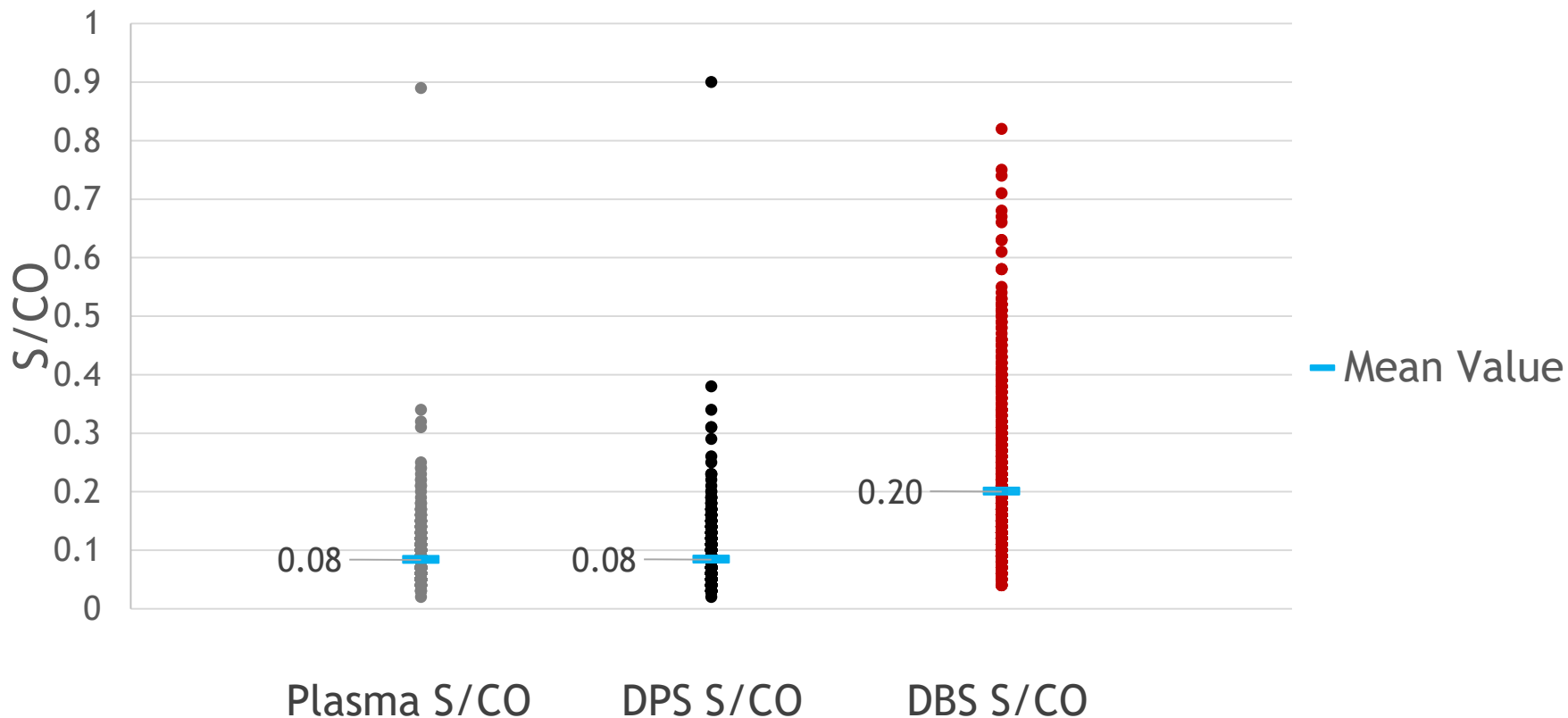
Cohort A	DBS	DPS
Number of samples found non-reactive	898/900	900/900
Number of samples found initially reactive	2/900	0/900
Number of samples found repeat reactive	0/2	N/A
Number of samples found initially invalid	5/900	0/900
Number of initially invalid samples found non-reactive on repeat testing.	5/5	N/A



Results

Cohort A

Sample to Cut-off distribution



Results - HIV

Cohort B

Sample type	Matched samples		Additional samples
	DBS	DPS	DPS
Number of samples that tested reactive on Ultrio Elite	29/30	30/30	9/10
Sensitivity	96.67% (95% CL 82.87 to 99.92%)	97.50% (95% CL: 86.84% to 99.94%)	
Number of samples that tested reactive on discriminatory assay for HIV-1/2 (dHIV)	29/29	29/29	9/10



Results - HBV

Cohort B

Sample type	Matched samples		Additional samples
	DBS	DPS	DPS
Number of samples that tested reactive on Ultrio Elite	19/33	19/33	10/17
Sensitivity	57.58% (95% CL: 39.22% to 74.52%)	58.00% (95% CL: 43.21% to 71.81%)	
Number of samples that tested reactive on discriminatory Assay for HBV (dHBV)	18/19	19/19	6/10

Results - HCV

Cohort B

Sample type	Matched samples		Additional samples
	DBS	DPS	DPS
Number of samples that tested reactive on Ultrio Elite	2/2	2/2	8/8
Sensitivity	100% (95% CL: 15.81% to 100.00%)	100% (95% CL: 69.15% to 100.00%)	
Number of samples that tested reactive on Discriminatory Assay for HCV (dHCV)	2/2	2/2	7/7

Result samples tested 3 weeks after spotting the sample on the DPS card

Comparison of S/CO values obtained for the DPS samples within one week (test 1) and three weeks (test 2) after preparation

	S/CO of Test 1	S/CO of Test 2
HIV	9.88	10.37
HBV	14.78	14.56
HCV	9.69	9.58

Discussion - Specificity

- Identifies donor as **NOT** being infected
- Poor specificity
 - Additional expenses
 - Repeat testing
 - Confirmatory testing
 - Discard of unit
 - Loss of potential income

Discussion - Sensitivity


Benefit of NAT

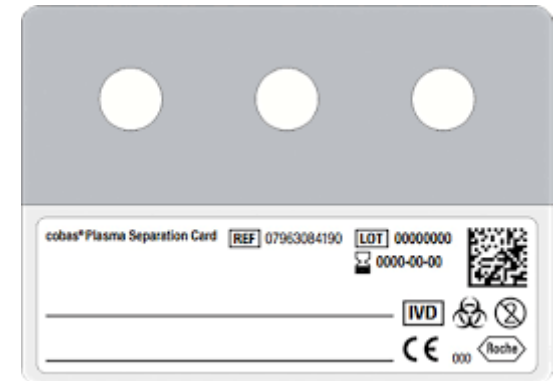
- Window period or Occult phase
 - HIV
 - Window period was detected
 - HBV
 - Window/Occult was not reliably detected
 - HCV

Discussion - Practical application

- DBS
 - Easiest
- DPS
 - is the best for testing



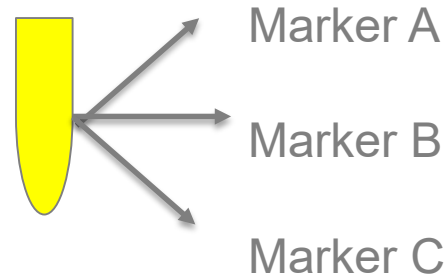
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Plasma Separation Cards



Discussion - Screening strategies

Conventional testing

- Simultaneous testing



Novel screening strategies

- Sequential testing
- Pre-donation Rapid tests
- Rapid tests and NAT



Conclusion

- Transport
- Diagnostic specificity
- Sensitivity
 - HBV assay development
- Sample integrity
- Innovative screening strategies





THANK YOU



Western Cape Blood Service

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Stellenbosch University

Prof Wolfgang Preiser



Ilex South Africa

