WHO Prequalification of Diagnostics Programme
PUBLIC REPORT

Product: VIKIA HIV 1/2
Number: PQDx 0150-016-00

Abstract

VIKIA HIV 1/2 with product code 31112, manufactured by bioMérieux SA, CE-marked regulatory version, was accepted for the WHO list of prequalified diagnostics and was listed on 12 December 2013.

VIKIA HIV 1/2 is an immunochromatographic test for the qualitative detection of antibodies to HIV-1 and HIV-2.

The test consists of a plastic device containing:
1. A chromatography membrane to which are fixed:
   - in the test region ("T"), synthetic peptides specific for HIV-1 (gp41 of group M and group O), and HIV-2 (gp36).
   - in the control region, two colour indicators.
2. A test strip impregnated with a conjugate consisting of a mixture of synthetic peptides specific for HIV-1 group M (gp41 of group M and group O), and HIV-2 (gp36), coupled to blue-dyed polystyrene microspheres.

The sample is added to the sample well and migrates by capillarity along the membrane. If the sample contains anti-HIV antibodies they form an antigen-antibody complex with the peptides, specific to this virus, present on the blue-dyed polystyrene microspheres. The antigen-antibody complexes migrate along the membrane and bind to the synthetic peptides immobilized on the nitrocellulose membrane. This is revealed by a blue line in the test region “T”.

The test is validated if the colour of the control line in region “C” changes from blue to pink/red. If this line does not change colour the test is invalid.

All positive samples should be retested using complementary tests. The results should be interpreted taking into account the overall clinical evaluation and the results of any other tests performed, before a diagnosis is made.

The test kit is marketed the following configuration:

VIKIA HIV 1/2 [25 Tests/kit] product code 31112:
- 25 sealed pouches (1 test device, 1 disposable specimen dropper and 1 desiccant);
- 1 coating buffer dropper bottle for whole blood sample analysis (3 ml);
- 1 package insert.

Storage:
The test kit should be stored at 4 - 30 °C.

Shelf-life:
21 months.

### Summary of prequalification status for VIKIA HIV 1/2

<table>
<thead>
<tr>
<th>Status on PQ list</th>
<th>Date</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 December 2013</td>
<td>listed</td>
</tr>
<tr>
<td>Dossier assessment</td>
<td>18 March 2013</td>
<td>MR</td>
</tr>
<tr>
<td>Inspection status</td>
<td>06 December 2013</td>
<td>MR</td>
</tr>
<tr>
<td>Laboratory evaluation</td>
<td>06 November 2013</td>
<td>MR</td>
</tr>
</tbody>
</table>

MR: Meets Requirements
NA: Not Applicable

VIKIA HIV 1/2 was accepted for the WHO list of prequalified diagnostics on the basis of data submitted and publicly available information.

### Background information

bioMérieux SA submitted an application for prequalification of VIKIA HIV 1/2. Based on the established prioritization criteria, VIKIA HIV 1/2 was given priority for prequalification.

### Product dossier assessment

bioMérieux SA submitted a product dossier for VIKIA HIV 1/2 as per the Instructions for compilation of a product dossier (PQDx_018 v1). The information submitted in the product dossier was reviewed by WHO staff and external experts (assessors) appointed by WHO in accordance with the internal report on the screening and assessment of a product dossier (PQDx_009 v2). Based on the product dossier screening and assessment findings, a recommendation was made to accept the product dossier for VIKIA HIV 1/2 for prequalification.

Commitments for prequalification:
The manufacturer has amended and submitted additional documentation as per the product dossier assessment findings. No further amendments are required.

Manufacturing site inspection

A comprehensive inspection was performed at the site of manufacture (Marcy l'Etoile, France) of the VIKIA HIV 1/2 test in September, 2013 as per the Information for manufacturers on prequalification inspection procedures for the sites of manufacture of diagnostics (PQDx_014 v1). The inspection found that the manufacturer had an acceptable quality management system and good manufacturing practices in place that ensured the consistent manufacture of a product of good quality. The manufacturer's responses to the nonconformities found at the time of the inspection were accepted 06 December 2013.

Commitments for prequalification:

1. Improve the risk management to ensure design and development meet customer requirements.
2. Review and amend quality assurance processes for purchased products.
3. Perform additional shelf life stability studies and monitor shipping conditions.
4. Amend monitoring and measurement at lot release to verify that product requirements have been met and all performance claims verified.

Laboratory evaluation

VIKIA® HIV 1/2 (bioMérieux SA) was evaluated by WHO at the Institute of Tropical Medicine, Antwerp, Belgium - a WHO Collaborating Centre for HIV/AIDS Diagnostics and Laboratory Support. The laboratory evaluation was conducted according to the “WHO protocol for the laboratory evaluation of HIV serology assays” (PQDx_030 v1.0), and drew the following conclusions:

VIKIA® HIV 1/2 is an immunochromatographic rapid diagnostic test for the combined detection of HIV-1/2 antibodies in human serum, plasma, capillary and venous whole blood. A volume of 75µl of serum/plasma or whole blood is required to perform the test procedure. This type of assay requires no sophisticated equipment and can therefore be performed in laboratories with limited facilities and non-laboratory testing settings. Reading of the results can be done visually.

In this limited evaluation on a panel of 1118 specimens, we observed an initial sensitivity (95% CI) of 99.4% (98.1% - 99.9%) and an initial specificity (95% CI) of 99.9% (99.2% - 100%) compared to the reference assays. The final sensitivity (95% CI) was 100% (99.2 % - 100%) and the final specificity (95% CI) was 99.9% (99.2% - 100%) compared to the reference assays. In this study, 0% of the results were recorded as indeterminate. Results were interpreted independently by three technicians; the overall inter-reader variability was 0.18%. The invalid rate was 0%. Lot to lot variation observed was within the acceptance range.
For eight seroconversion panels, VIKIA® HIV 1/2 detected on average 0.125 specimens earlier than the benchmark assay (Enzygnost Anti-HIV 1/2 Plus [Siemens Healthcare Diagnostics]). For the mixed titer panel, VIKIA® HIV 1/2 correctly classified all anti-HIV positive and anti-HIV negative specimens; two of the six anti-HIV indeterminate/HIV-1 antigen specimens were detected. For the 1st International Reference Panel for anti-HIV [NIBSC code 02/210], VIKIA® HIV 1/2 correctly classified all subtypes tested (HIV-1 A, HIV-1 B, HIV-C, HIV-1 CRF01_AE, HIV-1 O and HIV-2).
Labelling

1. Labels
2. Instructions for use
1. Labels

8.1.1 *Outer package (box)*

8.1.2 *Traceability label*

This label, indicating the reference of the kit and its expiry date, batch numbers of the kit and components, is sticked on the left side of the box.
8.1.3 Identification of the pouch containing the cassette, the pipette and the dessicant

8.1.4 Labelling of the tube containing the whole blood buffer
2. Instructions for use

**VIKIA® HIV 1/2**

*Rapid test for the detection of serum antibodies to HIV in human serum, plasma or whole blood.*

**SUMMARY AND EXPLANATION**

VIKIA HIV 1/2 is a visually read rapid test, based on the immunochromatography technique (ICT or lateral flow) for the qualitative detection of serum antibodies to HIV-1 and HIV-2 in human serum, plasma, or whole blood.

The human immunodeficiency viruses (HIV) are RNA retroviruses which are mainly transmitted by parenteral, perinatal, or transplacental pathways, or through sexual contact (1).

Since the isolation of HIV-1 in 1983 and HIV-2 in 1986, in patients infected with AIDS (Acquired Immunodeficiency Syndrome), numerous genetic variants have been characterized (2, 3, 4). These mutations seemed to be without consequence for serological diagnosis until HIV-1 variants of group O (Outlier) were isolated, since they only 50% homology at the env gene level with those of group M (Major) (5).

During 2000, 4.3 million individuals were newly infected with HIV, including 830,000 less than 15 years of age. An estimated 39.5 million people are infected with the HIV virus. From the beginning of the pandemic until December 2000, approximately 95 million people were infected with the virus, and AIDS has killed more than 25 million people since it was first diagnosed in 1981 (6).

**PRINCIPLE**

VIKIA HIV 1/2 is an immunochromatographic test for the qualitative detection of antibodies to HIV-1 and HIV-2.

The test consists of a plastic device containing:

1. A chromatography membrane to which are fixed:
   - in the test region (T), synthetic peptides specific for HIV-1 (gp41 of group M and group O), and HIV-2 (gp36),
   - in the control region, two color indicators.

2. A test strip impregnated with a conjugate consisting of a mixture of synthetic peptides specific for HIV-1 group M (gp41 of group M and group O), and HIV-2 (gp36), coupled to blue-dyed polystyrene microspheres.

The sample is added to the sample well and migrates by capillarity along the membrane.

If the sample contains anti-HIV antibodies they form an antigen-antibody complex with the peptides, specific to this virus, present on the blue-dyed polystyrene microspheres.

The antigen-antibody complexes migrate along the membrane and bind to the synthetic peptides immobilized on the nitrocellulose membrane. This is revealed by a blue line in the test region T.

The test is validated if the color of the control line in region “C” changes from blue to pink/red. If this line does not change color the test is invalid.

**CONTENT OF THE KIT (25 TESTS):**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 sealed pouches</td>
<td></td>
</tr>
</tbody>
</table>

R1

- Each pouch contains:
  - a ready-to-use test device (three synthetic peptides: HIV-1 group M, HIV-1 group O and HIV-2)
  - a disposable specimen dropper
  - a desiccant

R2

- Ready-to-use
- PBS buffer pH7.4 + EDTA + wetting agent

**MATERIAL REQUIRED BUT NOT PROVIDED**

- Timer

**Whole blood (fingerstick assay)**

- Lancets
- 75 μl EDTA capillary tubes, bulbs or other devices with or without EDTA, to collect and dispense 75 μl of whole blood.
WARNINGS AND PRECAUTIONS
- For in vitro diagnostic use only.
- For professional use only.
- This kit contains products of animal origin. Certified knowledge of the origin and/or sanitary state of the animals does not totally guarantee the absence of transmissible pathogenic agents. It is therefore recommended that these products be treated as potentially infectious, and handled observing the usual safety precautions (do not ingest or inhale).
- Do not use reagents after the expiry date indicated on the packaging.
- Do not touch the test device chromatography membrane with your fingers.
- During the test, the device must be placed on a flat vibration-free surface. Do not shake the device during the course of the test.
- The test device should be stored in the sealed pouch containing the desiccant until use.
- The test device is a disposable; it should not be reused.
- All specimens should be considered infectious and handled following the recommended precautions (CLSI/HICLAS MS2-A, Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline - Current Revision). For further information on handling precautions, refer to "Biosafety in Microbiological and Biomedical Laboratories – CDC/NIH – Latest edition", or the current regulations in the country of use.
- Do not mix reagents from different batches.
- As the specimens are potentially infectious, wear gloves when handling them.

STORAGE CONDITIONS AND STABILITY
- Store the kit at 4-30°C.
- DO NOT FREEZE.
- If stored according to the recommended conditions, all components are stable until the expiry date indicated on the packaging. Do not use after the expiry date.
- The test device should remain in the pouch until use.

SPECIMEN COLLECTION AND PREPARATION
Specimen type and collection
It is the responsibility of each user to validate the tube and/or sampling capillary used. If the capillary tube is used with a non-disposable bulb, the user is responsible for checking that the bulb has not been contaminated by previously collected samples.
1. Serum or plasma
Use sera or plasma collected in lithium heparin, EDTA or sodium citrate. Store the sera or plasma separated from the pellet. If necessary, clarify samples by centrifugation before testing.

None of the following factors have been found to significantly influence this assay:
- hemolysis, after spiking samples with hemoglobin, up to 5 g/l,
- lipemia, after spiking samples with lipids up to 30 mg/ml equivalent in triglycerides,
- bilirubinemia, after spiking samples with bilirubin, up to 300 mg/l,
- biotin, after spiking samples with biotin, up to 20 μg/ml.

Do not inactivate samples.
2. Whole blood by venipuncture
Collect in lithium heparin, EDTA or sodium citrate.
The other anticoagulants have not been validated.
3. Whole blood by fingerstick
Use an EDTA capillary tube (75 μl) or another device (please refer to the section MATERIAL REQUIRED BUT NOT PROVIDED) to collect blood from the fingertip. The sample should be tested extemporaneously.

Specimen stability
- Samples (serum and plasma) can be stored for 5 days at 2-8°C and 4 hours at 15-37°C. If longer storage is required, freeze at -25 ± 6°C. A study performed on frozen samples over a period of 9 months, showed that the quality of results is not affected. Avoid successive freezing and thawing.
- The whole blood collected by venipuncture can be stored for 4 hours at 15-37°C. Do not freeze whole blood samples.
- Whole blood collected by fingerstick should be tested immediately.

INSTRUCTIONS FOR USE
Allow the required reagents to come to room temperature before use.

Serum or plasma samples:
1. Remove the test device from the sealed pouch and use it extemporaneously.
2. Place the test device on a clean and level surface.
3. Using the dropper, transfer 3 drops of sample (75 μl) to the sample well (5) of the test device without trapping bubbles, and then start the timer. See the illustration below.

Read the test at 30 minutes.
NB: Most of the positive samples can be interpreted as positive before 30 minutes.
Whole blood sample (venipuncture)
1. Remove the test device from the sealed pouch and use it extemporaneously.
2. Place the test device on a clean and level surface.
3. Using the dropper, transfer three drops of whole blood (75 μl) to the sample well (S) of the test device.
4. Dispense one drop of buffer (40 μl) without trapping bubbles in the sample well (S).
5. Start the timer. See the illustration below.

Capillary whole blood sample (fingerstick)
1. Remove the test device from the sealed pouch and use it extemporaneously.
2. Place the test device on a clean and level surface.
3. Collect 75 μl of sample using the capillary tube or another device (please refer to the section MATERIAL REQUIRED BUT NOT PROVIDED).
4. Using the syringe, dispense the sample in the sample well.
5. Dispense one drop of buffer (40 μl) without trapping bubbles in the sample well (S).
6. Start the timer. See the illustration below.

Read the test at 30 minutes.
NB: Most of the positive samples can be interpreted as positive before 30 minutes.

NB: Most of the positive samples can be interpreted as positive before 30 minutes.
RESULTS AND INTERPRETATION

POSITIVE: the line in the control region (C) changes from blue to pink/red and a blue line appears in the test region (T).
A pale blue to dark blue line (T), even if it is very thin, indicates a positive result.

NEGATIVE: the line in the control region (C) changes from blue to pink/red and no line appears in the test region (T).

INVALID: 2 possibilities:
- the line in the control region (C) does not change color; insufficient sample volume or incorrect procedural techniques are the most likely reasons. Difficulties may be encountered with certain samples: incomplete migration, highly viscous sera, presence of fibrin. Review the procedure and repeat the test after recentrifuging the sample.
- the line in the control region (C) does not change color and a blue line appears in the test region. Repeat the test after recentrifuging the sample.

NOTES:
Country-specific requirements for HIV diagnostics must be taken into account if necessary.
All positive samples should be retested using complementary tests.

The complementary tests can be Western-Blot analysis and/or a second screening test for detection of anti-HIV antibodies, p24 antigen detection and/or the determination of viral load.
These results should be interpreted taking into account the overall clinical evaluation and the results of any other tests performed, before a diagnosis is made.
- The intensity of the blue color in the test region (T) does not necessarily correlate with the concentration of specific anti-HIV antibodies in the sample.
- If testing whole blood, check for a red color in the sample well which indicates the sample has definitely been dispensed.
In case of a negative result, it is strongly recommended to test a second sample collected a few days later, particularly in the presence of clinical symptoms and/or risk factors.
Interpretation of test results should be made taking into consideration the patient's history and the results of any other tests performed.

QUALITY CONTROL
Internal procedural controls are incorporated in the device. The line in the control region (C) should change from blue to pink/red. This color change confirms proper sample migration, sufficient specimen volume and correct procedural technique. If the control line does not change color, the test is invalid.

Note
It is the responsibility of the user to perform Quality Control in accordance with any local applicable regulations.
LIMITATIONS OF THE METHOD

- A negative VIKA HIV 1/2 result does not exclude the possibility of infection with HIV.
- If the anti-HIV concentration is low in the very early stages of infection.
- If the variant of the HIV virus is less detectable by the test format.
- In the case of HIV-2 infection, a “hook” effect may be observed for certain samples containing a very high concentration of specific antibodies.
- In countries where there is a high prevalence of HIV-2 infection, it is recommended to perform this test using whole blood.
- This test has been validated for serum, plasma and whole blood. It should not be used for other biological fluids such as saliva or urine.
- Do not use serum pools.
- Positive specimens should be retested using another method and the results should be interpreted taking into account the overall clinical evaluation and the results of any other tests performed, before a diagnosis is made.
- Whole blood or plasma specimens containing anticoagulants other than lithium heparin, EDTA or sodium citrate have not been validated.
- The use of recalcified plasma has not been validated.
- The hematocrit was not found to influence the test that was performed using whole blood, for values between 30 and 60%.
- Erroneous results may be obtained with serum or plasma samples which have a cloudy appearance due to bacterial contamination or several freeze/thaw cycles.
- Interference may be encountered with certain sera containing antibodies directed against reagent components. For this reason, assay results should be interpreted taking into consideration the patient’s history and the results of any other tests performed.

PERFORMANCE

Studies performed using VIKA HIV 1/2 gave the following results:

1. Specificity on a blood donor population:

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of tested samples with HIV-negative status</th>
<th>Sample type</th>
<th>Negative by VIKA HIV 1/2 Reading at 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>1000</td>
<td>Plasma</td>
<td>007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>999</td>
</tr>
<tr>
<td>West Africa</td>
<td>287</td>
<td>Plasma</td>
<td>287</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>287</td>
</tr>
</tbody>
</table>

Specificity of VIKA HIV 1/2 for the overall population:

- Plasma: 99.77% 95% CI [99.30 - 99.92]
- Whole blood: 99.92% 95% CI [99.55 - 99.99]
2. Specificity for hospitalized patients:
202 hospitalized patients from Europe with HIV-negative status were tested.

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of tested samples with HIV-negative status</th>
<th>Sample type</th>
<th>Negative by VIKIA HIV 1/2 Reading at 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>202</td>
<td>Plasma</td>
<td>201 Specificity: 99.50% with 95% CI [97.17 - 99.92]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>202 Specificity: 100% with 95% CI [98.66 - 100]</td>
</tr>
</tbody>
</table>

3. Specificity on samples from pregnant women
267 pregnant women from Europe and West Africa with HIV-negative status were tested.

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of tested samples with HIV-negative status</th>
<th>Sample type</th>
<th>Negative by VIKIA HIV 1/2 Reading at 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>219</td>
<td>Plasma</td>
<td>217 Specificity: 99.09% with 95% CI [98.68 - 99.75]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>219 Specificity: 100% with 95% CI [98.21 - 100]</td>
</tr>
<tr>
<td>West Africa</td>
<td>48</td>
<td>Plasma</td>
<td>48 Specificity: 100% with 95% CI [92.31 - 100]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>48 Specificity: 100% with 95% CI [92.31 - 100]</td>
</tr>
</tbody>
</table>

Specificity of VIKIA HIV 1/2 for the overall population:
Plasma: 99.25% 95% CI [97.25 - 99.80]
Whole blood: 100% 95% CI [98.52 - 100]

4. Specificity on high-risk patients:
344 patients from Europe and West Africa belonging to a “high-risk” population, with HIV-negative status were tested.

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of tested samples with HIV-negative status</th>
<th>Sample type</th>
<th>Negative by VIKIA HIV 1/2 Reading at 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>94</td>
<td>Plasma</td>
<td>94 Specificity: 100% with 95% CI [95.92 - 100]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>94 Specificity: 100% with 95% CI [95.92 - 100]</td>
</tr>
<tr>
<td>West Africa</td>
<td>250</td>
<td>Plasma</td>
<td>250 Specificity: 100% with 95% CI [98.43 - 100]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>250 Specificity: 100% with 95% CI [98.43 - 100]</td>
</tr>
</tbody>
</table>

Specificity of VIKIA HIV 1/2 for the overall population:
Plasma: 100% 95% CI [98.85 - 100]
Whole blood: 100% 95% CI [98.85 - 100]
5. Diagnostic sensitivity:

- A study was performed using 479 patients characterized as HIV-1-positive or coinfected with HIV-1 and HIV-2.

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of tested samples with confirmed HIV-positive status</th>
<th>Sample type</th>
<th>Positive by VKIA HIV 1/2 Reading at 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>218</td>
<td>Plasma</td>
<td>218</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 100% with 95% CI [98.20 - 100]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>218</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 100% with 95% CI [98.20 - 100]</td>
</tr>
<tr>
<td>West Africa</td>
<td>281</td>
<td>Plasma</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.62% with 95% CI [97.80 - 99.93]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.62% with 95% CI [97.80 - 99.93]</td>
</tr>
<tr>
<td>Total</td>
<td>479</td>
<td>Plasma</td>
<td>479</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.79% with 95% CI [98.79 - 99.98]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous whole blood</td>
<td>479</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.79% with 95% CI [98.79 - 99.98]</td>
</tr>
</tbody>
</table>

* One blood donor sample was positive result by ELISA with a value approaching the cutoff, and was found to be negative by the VKIA HIV1/2 test and another rapid test marketed in Europe. For this sample, the Western-blot HIV-1 was positive but showed lines with weak color intensity, and the P24 Ag was negative (the viral load could not be tested for this sample).

- A study was performed using 247 patients individually infected with HIV-2.

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of tested samples with confirmed HIV-positive status</th>
<th>Sample type</th>
<th>Positive by VKIA HIV 1/2 Reading at 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>102</td>
<td>Serum or plasma</td>
<td>101*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.02% with 95% CI [94.51 - 99.83]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Whole blood</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 100% with 95% CI [96.23 - 100]</td>
</tr>
<tr>
<td>West Africa</td>
<td>145</td>
<td>Plasma</td>
<td>144*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.31% with 95% CI [96.06 - 99.88]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Whole blood</td>
<td>145</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 100% with 95% CI [97.32 - 100]</td>
</tr>
<tr>
<td>Total</td>
<td>247</td>
<td>Serum or plasma</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 99.19% with 95% CI [97.03 - 99.76]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Whole blood</td>
<td>247</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensitivity: 100% with 95% CI [98.41 - 100]</td>
</tr>
</tbody>
</table>

* 2 false negative serum or plasma samples associated with a HOOK effect. This phenomenon was not observed for the same 2 samples when the test was performed with whole blood.

In order to verify the sensitivity of VKIA HIV 1/2 for the non-B subtypes, 30 group M serum or plasma samples (3A, 3B, 3C, 3D, 3F, 4G, 3H, 2CRF01, 5 CRF02 and 10RF11) and 11 group O serum or plasma samples were tested. All the samples were found to be positive except one group O sample which was found to be negative and then systematically positive after retesting.

The study was also performed after these samples were spiked with an equivalent volume of group O erythrocytes. All the results were found to be positive.

- 100 fresh samples with a positive status (sample < 24 hours old) were tested and found to be positive.
6. Sensitivity on seroconversion panels

During the different studies, 29 commercial seroconversion panels and the SFTS panel were tested, showing how early detection can be obtained with VKIA HIV 1/2.

This study was also performed using the 29 commercial seroconversion panels after spiking with an equivalent volume of group O erythrocytes.

At least 40 early HIV seroconversion samples were tested. The results are conform with the state of the art.

The results of the study show that detection with the VKIA HIV 1/2 test is obtained as early as with most ELISA tests (2nd and 4th generation).

7. Cross-reactivity

119 HIV-negative samples from patients whose disease states are likely to interfere with the VKIA HIV 1/2 test, and a commercial panel of 9 samples characterized as potential interferents were tested. The study was also performed after these samples were spiked with an equivalent volume of group O erythrocytes. The following results were obtained:

<table>
<thead>
<tr>
<th>Interferent samples</th>
<th>Sample type</th>
<th>VIKIA HIV 1/2, positive at 30 minutes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>anti-Toxoplasma gondii antibody</td>
<td>Serum or plasma</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-CMV antibody</td>
<td>Serum or plasma</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-EBV antibody</td>
<td>Serum or plasma</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-HAV antibody</td>
<td>Serum or plasma</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-HCV antibody</td>
<td>Serum or plasma</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-HBV antibody</td>
<td>Plasma/Serum</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-HSV antibody</td>
<td>Serum or plasma</td>
<td>0/9</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/9</td>
</tr>
<tr>
<td>anti-Treponema pallidum antibody</td>
<td>Plasma/Serum</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-Gag antibody</td>
<td>Plasma/Serum</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>anti-nuclear antibody</td>
<td>Plasma/Serum</td>
<td>0/8</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/8</td>
</tr>
<tr>
<td>Rheumatoid factor</td>
<td>Plasma/Serum</td>
<td>0/9</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/9</td>
</tr>
<tr>
<td>Subjects vaccinated against hepatitis B</td>
<td>Plasma/Serum</td>
<td>0/10</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/10</td>
</tr>
<tr>
<td>Subjects vaccinated against influenza</td>
<td>Serum or plasma</td>
<td>0/5</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/5</td>
</tr>
<tr>
<td>Zeptometrix 9027 interferent panel</td>
<td>Serum or plasma</td>
<td>0/9</td>
</tr>
<tr>
<td></td>
<td>Reconstituted whole blood</td>
<td>0/9</td>
</tr>
<tr>
<td>Total</td>
<td>Serum or plasma</td>
<td>0/128</td>
</tr>
<tr>
<td></td>
<td>or reconstituted whole blood</td>
<td>0/128</td>
</tr>
</tbody>
</table>
8. Equivalence study of the different types of specimens
The study was performed using VIKIA HIV-1/2 on 146 paired samples, including 40 with a negative status and 106 with a positive status: fresh plasma, venous whole blood and capillary whole blood. The results showed perfect concordance between the 3 types of samples.

9. Stability of the reading
For all the samples tested, no significant difference in performance was observed for readings performed at 30 minutes and 60 minutes.

WASTE DISPOSAL
Disposal of used or unused reagents as well as any other contaminated disposable materials following procedures for infectious or potentially infectious products.
It is the responsibility of each laboratory to handle waste and effluents produced according to their nature and degree of hazardousness and to treat and dispose of them (or have them treated and disposed of) in accordance with applicable regulations.

LITERATURE REFERENCES
7. CONSTANTINE N. T., ABOUSEIF N. E., FOX E. To mix or not to mix: the effects of not mixing sera of HIV serologic results. Laboratory Medicine, 1990, 21, 749-751.

INDEX OF SYMBOLS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>REF</td>
<td>Catalogue number</td>
</tr>
<tr>
<td>IVD</td>
<td>In Vitro Diagnostic Medical Device</td>
</tr>
<tr>
<td>MAN</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>TLM</td>
<td>Temperature limitation</td>
</tr>
<tr>
<td>USE</td>
<td>Use by</td>
</tr>
<tr>
<td>LC</td>
<td>Batch code</td>
</tr>
<tr>
<td>CON</td>
<td>Consult Instructions for Use</td>
</tr>
<tr>
<td>CCF</td>
<td>Contains sufficient for &quot;n&quot; tests</td>
</tr>
<tr>
<td>DR</td>
<td>Do not reuse</td>
</tr>
</tbody>
</table>

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