

WHO Prequalification of Diagnostics Programme PUBLIC REPORT

**Product: Rapid Test for Antibody to Human
Immunodeficiency Virus (HIV) (Colloidal Gold Device)
Number: PQDx 0005-005-00**

Abstract

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device)¹ with product codes WJ-1810, WJ-1810E, WJ-1850, WJ-1850E, manufactured by **Beijing Wantai Biological Pharmacy Enterprise Co., Ltd, rest of world regulatory version**, was accepted for the WHO list of prequalified in vitro diagnostics and was listed on 15 February 2016.

Intended use:

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) is a single use, rapid device for qualitative detection of antibodies to Human Immunodeficiency Viruses (HIV) in whole blood, serum and plasma specimens). Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) is for use in health facilities by trained staff as an aid for the diagnosis of clinical conditions related to infection with HIV-1 and/or HIV-2 - the etiological agents of the acquired immunodeficiency syndrome (AIDS).

Assay description:

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) employs chromatographic lateral flow device in a cassette format. Colloidal gold conjugated recombinant antigens corresponding to HIV-1 (gp120, gp41) and HIV-2 (gp-36) are dry-immobilized at the end of nitrocellulose membrane strip. HIV 1+2 antigens are bond at the Test Zone (T) and antibodies are bond at the Control Zone (C). When the sample is added, it migrates by capillary diffusion rehydrating the gold conjugate. If present in sample, HIV 1/2 antibodies will bind with the gold conjugated antigens forming particles. These particles will continue to migrate along the strip until the Test Zone (T) zone where they are captured by the HIV 1+2 antigens generating a visible red line. If there are no HIV 1 or 2 antibodies in sample, no red line is formed in the Test Zone (T). The gold conjugate will continue to migrate alone until it is captured in the Control Zone (C) by the antibodies aggregating in a red line, which indicates the validity of the test.

¹ The product was originally submitted under the name *Anti-human Immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold)*. It was later renamed as *Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device)*.

For reactive results, line intensity cannot be used to evaluate the anti-HIV antibody levels. A test giving an invalid result should be repeated. Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) does not differentiate between recognition of HIV-1 antibodies and HIV-2 antibodies. Any reactive specimen should be confirmed by another methodology.

Test kit contents:

	10 tests (product code WJ-1810E)	10 tests (product code WJ-1810)	50 tests (product code WJ-1850E)	50 tests (product code WJ-1850)
Test cassettes, individually packed in foil pouch	10	10	50	50
Instructions for use	1	1	1	1
Diluent buffer	1x 3ml bottle	1x 3ml bottle	3x 3ml bottles	3x 3ml bottles
Safety Lancet, Single-use disposable safety lancets	10	N/A	50	N/A
Disposable Pipette, plastic, intended to deliver 40 -50µl per drop	10	N/A	50	N/A

Storage:

The test kit should be stored at 2°C to 30 °C.

Shelf-life:

18 months

Summary of prequalification status for Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device)

	Initial acceptance	
	Date	Outcome
Status on PQ list	15 February 2016	listed
Dossier assessment	28 August 2015	MR
Inspection status	24 April 2015	MR
Laboratory evaluation	6 January 2014	MR

MR: Meets Requirements

N/A: Not Applicable

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) was accepted for the WHO list of prequalified in vitro diagnostics on the basis of data submitted and publicly available information.

Background information

Beijing Wantai Biological Pharmacy Enterprise Co., Ltd submitted an application for prequalification of Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device). Based on the established prioritization criteria, Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) was given priority for prequalification.

Product dossier assessment

Beijing Wantai Biological Pharmacy Enterprise Co., Ltd submitted a product dossier for Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) 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 Anti-human immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold) for prequalification.

Commitments for prequalification:

1. Perform in-house testing on performance panels (including HIV-O specimens). Final reports of any studies performed will be reviewed at the next re-inspection.

Manufacturing site inspection

A comprehensive inspection was performed at the site of manufacture (No. 31 Life Science Park Road, Changping District, 102206, Beijing, China) of Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) in December 2014 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 to the quality management system found at the time of the inspection were accepted 24 April 2015.

Commitments for prequalification: N/A

Laboratory evaluation

Anti-human Immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold)² (Beijing Wantai Biological Pharmacy Enterprise Co., Ltd.) was evaluated by WHO in the third quarter of 2012 using serum/plasma specimens. From this evaluation, we drew the following conclusions:

Anti-human Immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold) is an immunochromatographic assay for the detection of HIV-1/2 antibodies in human whole blood, serum and plasma specimens. A volume of 80 µL of specimen is needed to perform the assay. This type of assay requires no sophisticated equipment and can therefore be performed in laboratories with limited facilities and non-laboratory settings. Reading of the results can be done visually i.e. subjectively read.

In this limited evaluation on a panel of 1079 clinically-derived specimens, we found an initial sensitivity (95% CI) of 99.76% (98.7% - 100%) and an initial specificity (95% CI) of 98.33% (97.0% - 99.2%) compared to the reference assays. The final sensitivity (95% CI) was 100% (99.1% - 100%) and the final specificity (95% CI) was 98.48% (97.2% - 99.3%) compared to the reference assays. Lot to lot variation was acceptable with the exception of one dilution series for which there was a 2-fold difference between lots.

For eight seroconversion panels, Anti-human Immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold) detected on average 0.5 specimens later than the benchmark assay; Enzygnost Anti-HIV 1/2 Plus (Siemens Healthcare Diagnostics).

For the mixed titer panel, Anti-human Immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold) correctly classified all specimens.

² The product was later renamed *Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device)*

For the 1st International Reference Panel for anti-HIV [NIBSC code 02/210], Anti-human Immunodeficiency virus (HIV) antibody diagnostic kit (colloidal gold) correctly classified all specimens.

In this study, 0% of the results were recorded as indeterminate. Results were interpreted independently by three technicians; the inter-reader variability was 0.09%. The invalid rate was 0.09%.

Labelling

- 1. Labels**
- 2. Instructions for use**

1. Labels

Shipping box label



Beijing Wantai Biological Pharmacy Enterprise



Product Cat.No/ Name:

Carton No.

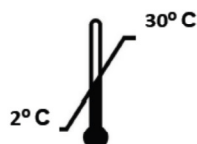
LOT:



EXP:

QUANTITY:

SHIP TO:



Kit box label for WJ-1810, WJ-1810E

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device)

Immunochromatographic test for qualitative detection of antibodies against HIV 1+2 in human serum, plasma and whole blood samples.

REF	<input type="checkbox"/> WJ-1810	<input type="checkbox"/> WJ-1810E
Test Cassette	x 10	x 10
Diluent Buffer	x 1	x 1
Safety Lancet		x 10
Pipette		x 10




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Kit box label for WJ-1850, WJ-1850E

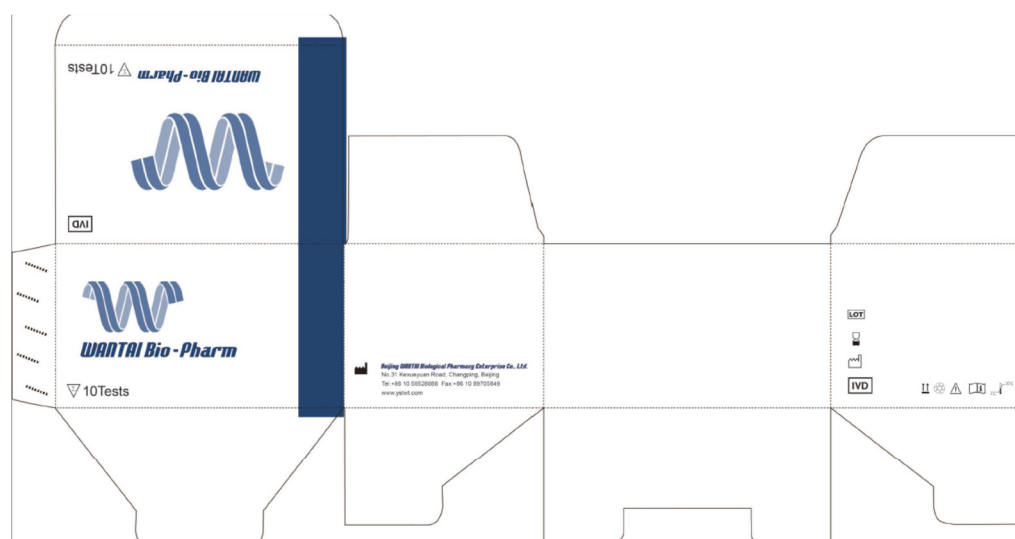
**Rapid Test for Antibody to Human Immunodeficiency Virus (HIV)
(Colloidal Gold Device)**

Immunochromatographic test for qualitative detection of antibodies against HIV 1+2 in human serum, plasma and whole blood samples.

REF	<input type="checkbox"/> WJ-1850	<input type="checkbox"/> WJ-1850E
Test Cassette	x 50	x 50
Diluent Buffer	x 3	x 3
Safety Lancet		x 50
Pipette		x 50


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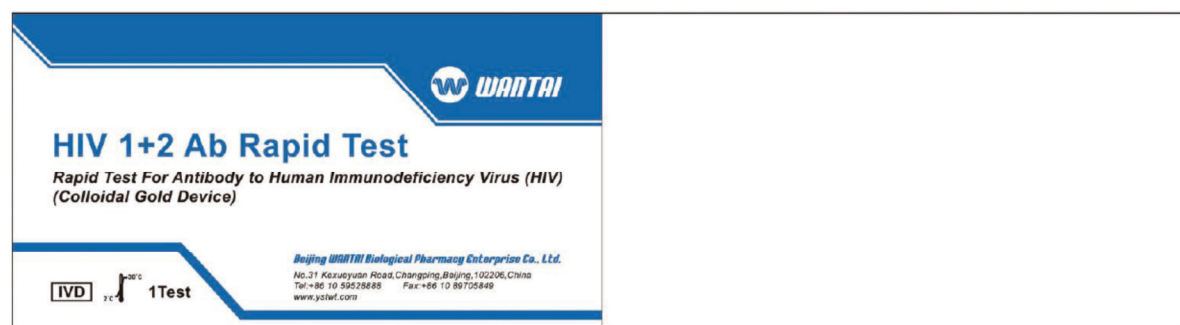
Box label for WJ-1810, WJ-1810E



Box label for WJ-1850, WJ-1850E



Pouch label for WJ-1810, WJ-1810E, WJ-1850, WJ-1850E



WANTAI RAPID TEST

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device)

Rapid Test for Detection of HIV-1 & HIV-2 Antibodies

FOR SERUM / PLASMA / WHOLE BLOOD SPECIMEN

INSTRUCTIONS FOR USE

Catalog No.:

WJ-1810, WJ-1850, WJ-1810E, WJ-1850E

INTENDED USE

Wantai Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) is a single use, rapid device for qualitative detection of antibodies to Human Immunodeficiency Viruses (HIV) in whole blood, serum and plasma specimens. The device is intended for use in medical institutions by trained staff as an aid for the diagnosis of clinical conditions related to infection with HIV-1 and / or HIV-2 - the etiological agents of the acquired immunodeficiency syndrome (AIDS).

SUMMARY

The Human Immunodeficiency Viruses type 1 and type 2 are etiological agents of the acquired immunodeficiency syndrome (AIDS). HIV has been isolated from patients with AIDS, AIDS related complex (ARC) and from healthy individuals at high risk for AIDS¹. Infection with HIV is followed by an acute flu-like illness. This phase may remain unnoticed and the relationship to HIV infection may not be clear in many cases². The acute phase is typically followed by an asymptomatic carrier state, which progresses to clinical AIDS in about 50% of infected individuals within 10 years after seroconversion. Serological evidence of HIV infection may be obtained by testing for HIV antigens or antibodies. Antigen can generally be detected during the acute phase and during the symptomatic phase of AIDS only. Antibodies to HIV can be detected throughout virtually the total infection period, starting at or shortly after the acute phase and lasting until

the end stage of AIDS. Therefore, the use of highly sensitive antibody assays is the primary approach in serodiagnosis of HIV infection³.

Over the past twenty decades, a number of important advances have been made in the area of HIV testing⁴. Serologic methods which use recombinant^{5,6,7} antigens have been developed to offer advantages in all testing settings. Among such advances, are the rapid tests⁸ that can be performed on fingerstick blood specimen and require only minimal procedural steps.

PRINCIPLE OF THE ASSAY

Wantai Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) employs chromatographic lateral flow device in a cassette format. Colloidal gold conjugated recombinant antigens corresponding to HIV-1 (gp120, gp41) and HIV-2 (gp-36) are dry-immobilized at the end of nitrocellulose membrane strip. HIV 1+2 antigens are bound at the Test Zone (T) and antibodies are bound at the Control Zone (C). When the specimen is added, it migrates by capillary diffusion rehydrating the gold conjugate. If present in specimen, HIV 1/2 antibodies will bind with the gold conjugated antigens forming particles. These particles will continue to migrate along the strip until the Test Zone (T) zone where they are captured by the HIV 1+2 antigens generating a visible red line. If there are no HIV 1 or 2 antibodies in specimen, no red line is formed in the Test Zone (T). The gold conjugate will continue to migrate alone until it is captured in the Control Zone (C) by the antibodies aggregating in a red line, which indicates the validity of the test.

COMPONENTS

Components	WJ-1810	WJ-1850	WJ-1810E	WJ-1850E
Test Cassette	x10	x50	x10	x50
Diluent Buffer	x1vial	x3vials	x1vial	x3vials
Safety Lancet			10	50
Disposable Pipette			10	50

Test Cassette: Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) in white plastic cassette housed in foil pouch. Single use only.

Diluent Buffer (Code "0", DIL[SPE]):

3ml per vial. The Diluent Buffer can be stored at

room temperature.

Stable for 18 months after opening.

Others:

- Instructions for use

- Safety lancets, and disposable pipettes for delivering of volume of 40µl-50µl per drop. **Do not use the lancet if the cap is already pulled off.**

Materials required but not provided: clock or timer, specimen collection container, centrifuge, biohazard waste container, sterile gauze or cotton.

SPECIMEN COLLECTION

Whole Blood specimen: Ask the person to clean hands. Choose a puncture site on his or her fingertip. Clean the fingertip with Alcohol Prep Pad. Place the Safety Lancet on a selected puncture site. Forcefully press the tip of the Safety Lance against the fingertip. **Wipe away the first drop of blood with sterile gauze or cotton.** Using the disposable specimen transfer device provided within the test kit, collect blood from the puncture site. Alternatively - draw blood following laboratory procedure for obtaining venous blood. **Do not test whole blood specimens if older than 3 days.**

Serum / Plasma specimens: Fresh serum or plasma specimen can be used. No special patient preparation required.

- **Plasma:** Collect whole blood into a collection tube (containing EDTA, citrate or heparin) by venipuncture. Separate the plasma by centrifugation.
- **Serum:** Collect whole blood into a collection tube (containing no anticoagulants) by venipuncture. Allow the blood to clot. Separate by centrifugation.

Any visible particulate matter in the specimen should be removed by centrifugation or filtration. **Avoid the use of hemolytic, turbid, microorganism contaminated specimens or specimens stored for over 30 days at 2-8°C.** Store specimen at 2-8°C. Specimens not required for assay within 3 days should be stored frozen (-20°C or lower). **Avoid specimen deterioration by multiple**

freeze-thaw cycles.

STORAGE AND STABILITY

The Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) can be stored at room temperature (2-30°C, do not freeze!) for 18 months from the date of manufacture.

PRECAUTIONS AND SAFETY

Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) is for *In Vitro* Use Only 

FOR PROFESSIONAL USE ONLY

1. All the waste and specimen should be treated in case of transmitting disease and must be properly disinfected (autoclaving is preferred) before disposal.
2. **Once you have taken the cassette out of the pouch, carry out your testing as early as possible (no more than 20 minutes) to avoid cassette becoming moist.** The nitrocellulose membrane can absorb water, which can affect the test chromatography performance.
3. Make sure that the test is not expired (EXP Date indicated on the kit box).
4. If micro pipettor is used, calibrate it frequently to assure the accuracy of dispensing. **Use different disposal pipette tips for each specimen in order to avoid cross-contaminations.**
5. Do not modify the test procedure.
6. Do not reuse the test cassettes, lancets and pipettes. Autoclave before disposal.
7. A test giving an invalid result should be repeated.
8. Always add accurate volume of specimen.
9. **Blood that has been chemically treated, heated, diluted, or otherwise modified may give inaccurate results.**
10. If the specimen is migrating too slowly on the test strip, add one drop of diluent buffer to the cassette after adding of the specimen.
11. Always interpret the results under good light conditions to avoid misreading of the test results.
12. Seek immediate medical attention in case of injuries due to improper handling of the kit components including the test cassette and the lancet.

- Use micro pipettor, or the supplied disposable pipettes for transfer of specimens onto the test cassette. If disposable pipettes are not provided, use pipettes from alternative suppliers which are capable of delivering of volume of 40µl -50µl per drop.

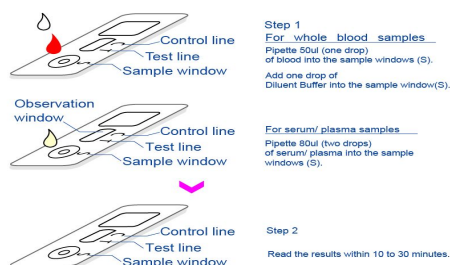
ASSAY PROCEDURE

Place the cassette on flat surface. Before opening, allow the test cassette to reach room temperature. Use it immediately (within 20 minutes) after opening.

If specimen stored at 2-8°C or at -20°C are to be tested, such specimen should be completely thawed and equalibrated at room temperature first. All specimens and cassettes should be properly labeled and identified to avoid mixing up of testing results.

- For whole blood specimens:** Open the pouch and add 50µl (or one drop using the provided pipette) of whole blood into the specimen window (S). Immediately add one drop diluent buffer into the specimen window.
- For serum / plasma specimens:** Open the pouch and add 80µl (or two drops using the provided pipette) of serum or plasma into the specimen window (S).
Avoid dropping specimen or buffer in the observation window. Do not allow the specimen to overflow.
- Read the results from 10minutes after specimen and buffer loading, to maximum of 30 minutes. Do not read the results after 30 minutes.**

PROCEDURE DIAGRAM

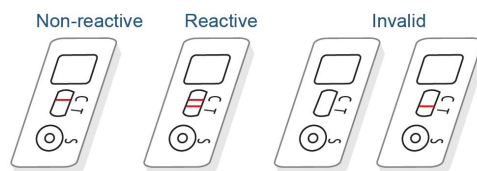


RESULTS

Quality Control: One red line will always appear next to the Control Zone (C) indicating the validity of the test. **Invalid Test run:** If no red line appears, the test is invalid - discard the test and repeat with new specimen and new cassette.

Reactive Results: One red line appears within 10 to 30 minutes next to the Test Zone (T) which indicates that antibodies to HIV 1+2 have been detected using this test.

Non-reactive Results: No red line appears within 30 minutes next to the Test Zone (T) which indicates that no antibodies to HIV 1+2 have been detected with this test. However, this does not exclude the possibility from infection with HIV.



The reactive result obtained with Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) alone cannot be the final diagnosis of HIV. Any reactive result must be interpreted in conjunction with the patient clinical history and another laboratory testing results. Follow-up and supplementary testing of all reactive specimen with other tests is required to confirm any reactive result.

PERFORMANCE DATA

- In a clinical evaluation of the performance of Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) conducted in China between 2002 and 2003, using 2657 confirmed negative and 667 positive specimen, sensitivity was 99.40% (666/667) and specificity was 100% (2657/2657).
- Additional studies both conducted in 2012, in Thailand, and in Belgium, demonstrated sensitivity of 100% (200/200), and specificity of 99.20% (992/1000) of the test in the

Thailand study, and sensitivity of 100% (424/424) and specificity of 98.48% (648/658) in the Belgium study.

- Beijing Wantai Biological Pharmacy Enterprise hold data to demonstrate that the test reacts positive to HIV-1 subtypes A, B, C, D, F, G, H, J, K, HIV-1CRF01-AE, HIV-1 subtype-O *, and HIV-2. The test can detect all HIV-1 subtypes and HIV-2 contained in 1st International Reference Panel for anti-HIV [NIBSC code 02/210].
- Results from HIV seroconversion panels: The mean seroconversion index on 8 different seroconversion panels which have been tested was 0.5 specimens compared to the benchmark assay Enzygnost Anti-HIV 1/2 Plus EIA. Thus the test detected HIV-1/2 antibodies on average, 0.5 specimens later than the benchmark assay. The seroconversion performance of Wantai's test was also compared against another, well-established on the market rapid test for detection of antibodies against HIV-1/2. Among the 8 tested panels, Wantai and the reference test showed equal detection on six panels, while the reference test showed better detection in two of the panels included in this study.

LIMITATIONS

- Non-reactive results do not exclude the possibility of HIV exposure or infection. Infection through recent exposure (seroconversion) to HIV, or late AIDS may not be detectable. For reactive results, line intensity cannot be used to evaluate the anti-HIV antibody levels. A test giving an invalid result should be repeated. Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) does not differentiate between recognition of HIV-1 antibodies and HIV-2 antibodies.
- *The Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) has not been sufficiently validated for HIV-1 subtype O.
- If, after retesting of the initially reactive specimen, the test results are non-reactive, these specimen should be considered as non-repeatable (false reactive) and interpreted as non-reactive. As with many very sensitive rapid diagnostic tests, false reactive results can occur due to the several

reasons, most of which are related but not limited to the quality of the specimen, operator error, and exposition of the test to humidity. For more information contact Beijing Wantai technical support for further assistance.

- Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) is intended ONLY for testing of individual specimen. Do not use it for testing of cadaver specimen, saliva, urine or other body fluids, or pooled (mixed) blood.
- Rapid Test for Antibody to Human Immunodeficiency Virus (HIV) (Colloidal Gold Device) is a qualitative assay and the results cannot be used to measure antibodies concentrations.

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