PROCEDURE FOR EXTERNAL QUALITY CONTROL TESTING

1. Add 4 full drops of Reagent 1 and 4 full drops of Reagent 2 into an extraction test tube. Tap the bottom of the tube gently to mix the liquid.
2. Add 1 full drop of positive or negative control solution into the tube, holding the bottle upright.
3. Place a clean swab into the tube. Rotate the swab 10 times in the tube. Leave the swab in the tube for 1 minute. Then press the swab against the side of the tube and squeeze the bottom of the tube while removing the swab so that most of the liquid stays in the tube. Discard the swab.
4. Continue with Step 4 of Directions For Use.

LIMITATIONS

1. The Clearview Strep A Exact II dipstick is for in vitro diagnostic use only. The test should be used for the detection of Strep A antigen in throat swab specimens only. Neither the quantitative value nor the rate of increase in Strep A antigen concentration can be determined by this qualitative test.
2. This test will only indicate the presence of Strep A antigen in the specimen from both viable and non-viable Group A Streptococcus bacteria.
3. A negative result obtained from this kit should be confirmed by culture. A negative result may be obtained if the concentration of the Strep A antigen present in the throat swab is not adequate or is below the detectable level of the test.
4. Excess blood or mucus on the swab specimen may interfere with test performance and may yield a false positive result. Avoid touching the tongue, cheeks, and teeth5 and any bleeding areas of the mouth with the swab when collecting specimens.
5. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.

EXPECTED VALUES

Approximately 15% of pharyngitis in children ages 3 months to 5 years is caused by Group A beta-hemolytic Streptococcus.[6] In school-aged children and adults, the incidence of Strep throat infection is about 40%.[7] This disease usually occurs in the winter and early spring in temperate climates.[3]

PERFORMANCE CHARACTERISTICS

Using three medical centers for evaluation, a total of 499 throat swabs were collected from patients exhibiting symptoms of pharyngitis. Each swab was rolled onto a sheep blood agar plate, and then tested by the Clearview Strep A Exact II dipstick. The plates were further streaked for isolation, and then incubated at 37°C with 5-10% CO_2 and a Bacitracin disk for 18-24 hours. The negative culture plates were incubated for an additional 18-24 hours. Possible GAS colonies were subcultured and confirmed with a commercially available latex agglutination grouping kit.

Of the 499 total specimens, 375 were found to be negative by culture and 124 were found to be positive by culture. During this study, two Strep F specimens yielded positive results with the Test. One of these specimens was re-cultured, then re-tested and yielded a negative result. Three additional different Strep F strains were cultured and tested for cross-reactivity and also yielded negative results.

		Culture +	Culture –
Clearview Strep A Exact II Dipstick	+	120	20
	–	4	355

Sensitivity: 120/124 = 97% (91%-99%)*
Specificity: 355/375 = 95% (92%-97%)*
Accuracy: 475/499 = 95% (93%-97%)*
Prevalence: 124/499 = 25%
PPV (+): 120/140 = 86% (79%-91%)*
NPV (-): 355/359 = 99% (97%-100%)*

Positive Culture Classification	Rapid Strip/ Culture	% Correct
Rare	10/11	91
1+	9/9	100
2+	17/19	89
3+	36/37	97
4+	48/48	100

* denotes a 95% Confidence Interval

CROSS-REACTIVITY

The following organisms were tested at 1.0 x 10^7 organisms per test and were all found to be negative when tested with the Clearview Strep A Exact II dipstick. No mucoid-producing strains were tested.

Group B Streptococcus
Group F Streptococcus
Streptococcus pneumoniae
Streptococcus mutans
Staphylococcus aureus
Corynebacterium diptheria
Candida albicans
Pseudomonas aeruginosa
Group C Streptococcus
Group G Streptococcus
Streptococcus sanguis
Enterococcus faecalis
Staphylococcus epidermidis
Serratia marcescens
Klebsiella pneumoniae
Bordetella pertussis
Neisseria meningitidis
Neisseria sicca
Branhamella catarrhalis
Neisseria gonnorhea
Neisseria subflava
Hemophilus influenza

POL STUDIES

Three physicians' offices were used to conduct an evaluation of the Clearview Strep A Exact II dipstick. Personnel with various educational backgrounds performed the testing. Each physician's office tested a randomly coded panel of samples consisting of negative (20), low positive (20), and medium positive (20) for three days. The results obtained had a 96% correlation with the expected results.

REFERENCES

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2. Webb, KH. *Pediatrics* (Feb 1998), 101:2, 2.
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6. Nussinovitch, M, Finkelstein Y, Amir J, Varsano, I. *Clinical Pediatrics* (June 1999), 357-360.
7. Woods WA, Carter CT, Stack M, Connors Jr AF, Schlager TA, *Southern Medical Journal* (May 1999), 491-492.

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Made in China 09/06 1155875301

Clearview® Strep A Exact II Dipstick

A rapid test for the qualitative detection of Strep A antigen in throat swab specimens. For professional *in vitro* diagnostic use only.

CLIA Complexity: Waived

INTENDED USE

The Clearview Strep A Exact II dipstick is a rapid chromatographic immunoassay for the qualitative detection of Strep A antigen from throat swab specimens to aid in the diagnosis of Group A Streptococcal infection.

SUMMARY

Streptococcus pyogenes is non-motile gram-positive cocci, which contains the Lancefield group A antigen that can cause serious infections such as pharyngitis, respiratory infection, impetigo, endocarditis, meningitis, puerperal sepsis, and arthritis.[1] Left untreated, these infections can lead to serious complications, including rheumatic fever and peritonsillar abscess.[2] Traditional identification procedures for Group A Streptococci infection involve the isolation and identification of viable organisms using techniques that require 24 to 48 hours or longer.[3]

The Clearview Strep A Exact II dipstick is a rapid test to qualitatively detect the presence of Strep A antigen in throat swab specimens, providing results within 5 minutes. The test utilizes antibodies specific for whole cell Lancefield Group A Streptococcus to selectively detect Strep A antigen in a throat swab specimen.

PRINCIPLE

The Clearview Strep A Exact II dipstick is a qualitative, lateral flow immunoassay for the detection of Strep A carbohydrate antigen in a throat swab. In this test, antibody specific to Strep A carbohydrate antigen is coated on the test line region of the strip. During testing, the extracted throat swab specimen reacts with an antibody to Strep A that is coated onto particles. The mixture migrates up the membrane to react with the antibody to Strep A on the membrane and generate a red line in the test region. The presence of this red line in the test region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a red line will

always appear in the control region if the test has been performed properly. If a red control line does not appear, the test result is not valid.

KIT CONTENTS

- 30 Test strips
- 30 Disposable extraction test tubes
- 30 Sterile Swabs
- Reagent 1 (2M Sodium Nitrite)
- Reagent 2 (0.4M Acetic Acid)
- Positive control (Non-viable Strep A; 0.09% NaN_3)
- Negative control (Non-viable Strep C; 0.09% NaN_3)
- 1 Package insert
- 1 Workstation

MATERIALS REQUIRED BUT NOT PROVIDED

- Timer

PRECAUTIONS

- For professional *in vitro* diagnostic use only. Do not use after expiration date.
- Do not eat, drink or smoke in the area where the specimens and kits are handled.
- Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout the procedure and follow the standard procedures for proper disposal of specimens.
- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
- Humidity and temperature can adversely affect results.
- Reagent 2 contains an acidic solution. If the solution contacts the skin or eye, flush with large volumes of water.
- The positive and negative controls contain sodium azide (NaN_3) as a preservative.
- Do not interchange reagent bottle caps.
- Do not interchange external control solution bottle caps.

STORAGE AND STABILITY

The kit can be stored at room temperature or refrigerated (2-30°C). The test strip must remain in the sealed pouch until use. **DO NOT FREEZE.** The test strip and the reagents are stable through the expiration date printed on the box. Do not use beyond the expiration date.

SPECIMEN COLLECTION AND PREPARATION

- Only use reagents provided in the kit.
- Collect the throat swab specimen with the sterile swab that is provided in the kit. Transport swabs containing modified Stuart's or Amies medium can also be used with this product. Swab the posterior pharynx, tonsils and other inflamed areas. Avoid touching the tongue, cheeks and teeth with the swab.[5]
- Testing should ideally be performed immediately after the specimens have been collected. Swab specimens may be stored at room temperature for up to four hours prior to testing.
- If a culture is desired, lightly roll the swab tip onto a Group A selective blood agar plate before using the swab in the Clearview Strep A Exact II dipstick.

DIRECTIONS FOR USE

Allow the test strip, reagents, and/or controls to reach room temperature (15-30°C) prior to testing.

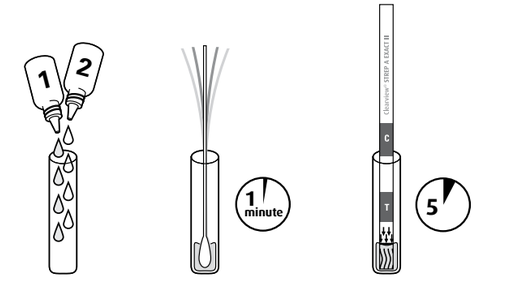
1. Remove the test strip from the sealed foil pouch and use it as soon as possible. Best results will be obtained if the test is performed immediately after opening the foil pouch.

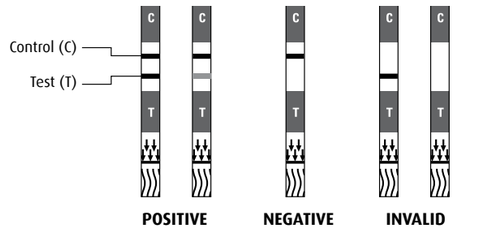
2. Hold the Reagent 1 bottle upright and add 4 full drops (approximately 240 µL) to an extraction test tube. Reagent 1 is red in color. Hold the Reagent 2 bottle upright and add 4 full drops (approximately 160 µL) to the tube. Reagent 2 is colorless. The addition of Reagent 2 to Reagent 1 changes the color of the solution from red to pale yellow. Tap the bottom of the tube gently to mix the liquid.

3. Immediately add the throat swab into the tube of pale yellow solution. Rotate the swab 10 times in the tube. Leave the swab in the tube for 1 minute. Then press the swab against the side of the tube and squeeze the bottom of the tube while removing the swab so that most of the liquid stays in the tube. Discard the swab.

4. With arrows pointing down, place the test strip into the tube of solution and then start the timer. If the procedure is followed correctly, the liquid should be at or just below the maximum line (MAX) on the test strip. See the illustration below.

5. Leave the strip in the tube and read the result at 5 minutes.
   Note: Very low concentrations of Strep A might result in a weak line appearing in the test region (T) after an extended period of time; therefore, do not read the result after 10 minutes.





INTERPRETATION OF RESULTS

(Please refer to the illustration)

POSITIVE: Two distinct red lines appear. One line should be in the control region (C) and another line should be in the test region (T). A positive result indicates that Strep A was detected in the sample.

NOTE: The intensity of the red color in the test line region (T) will vary depending on the concentration of Strep A present in the sample. Therefore, any shade of red in the test region (T) should be considered positive.

NEGATIVE: One red line appears in the control region (C). No apparent red or pink line appears in the test region (T). A negative result indicates that Strep A is not present in the sample, or is present below the detectable level of the test. The patient's sample should be cultured to confirm the absence of Strep A infection. If clinical symptoms are not consistent with results, obtain another sample for culture.

INVALID: Control line fails to appear. Insufficient sample volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test strip. If the problem persists, discontinue using the test kit immediately and contact Inverness Medical Technical Support at (800) 637-3717.

QUALITY CONTROL

INTERNAL QUALITY CONTROL

Internal procedural controls are included in the test. A red line appearing in the control region (C) is an internal positive procedural control. It confirms sufficient specimen volume and correct procedural technique. A clear background is an internal negative background control. If the test is working properly, the background in the result area should be white to light pink and not interfere with the ability to read the test result.

EXTERNAL QUALITY CONTROL

Quality control requirements must be performed in accordance with local, state, and federal regulations or accreditation requirements. Minimally, Inverness Medical Professional Diagnostics recommends that positive and negative external controls be run with each new lot and with each new untrained operator. External positive and negative controls are supplied in the kit. Alternatively, other Group A and non-Group A *Streptococcus* ATCC reference strains may be used as external controls. Some commercial controls may contain interfering preservatives; therefore, other commercial controls are not recommended.