HENRY SCHEIN®
One Step+

Mononucleosis

Rapid Test Device

(Whole Blood/Serum/Plasma) Package Insert

A rapid test for the qualitative detection of Infectious Mononucleosis (IM) heterophile antibodies in whole blood, serum and plasma.

For professional in vitro diagnostic use only.

INTENDED USE

The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/Serum/Plasma) is a rapid chromatographic immunoassay for the qualitative detection of Infectious Mononucleosis heterophile antibodies in whole blood, serum or plasma to aid in the diagnosis of infectious Mononucleosis.

SUMMARY

Infectious Mononucleosis is caused by the Epstein-Barr virus, which is a member of the herpesvirus family. Symptoms of IM are fever, sore throat and swollen lymph glands. In very rare cases, heart or central nervous system problems may occur. Diagnosis of IM is made based on the presence of heterophile antibodies. Infectious mononucleosis heterophile antibodies belong to the IgM class. They are present in 80-90% of acute IM cases and can be detected in 60-70% of patients during the first week of clinical illness.[1-4]

The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/Serum/Plasma) is a simple test that utilizes an extract of bovine erythrocytes to qualitatively and selectively detect IM heterophile antibodies in whole blood, serum or plasma in just minutes.

PRINCIPLE

The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/ Serum/Plasma) is a qualitative membrane strip based immunoassay for the detection of IM heterophile antibodies in whole blood, serum or plasma. In this test procedure, bovine erythrocyte extracted antigen is coated on the test line region of the device. The sample reacts with bovine erythrocyte extracted antigen coated particles that have been applied to the label pad. This mixture migrates chromatographically along the length of the test strip and interacts with the coated bovine erythrocyte extracted antigen. If the sample contains IM antibodies, a colored line will appear in the test line region indicating a positive result. If the sample does not contain IM hetero-phile antibodies, a colored line will not appear in this region indicating a negative result. To serve as a procedural control, a colored line will always appear at the control line region, indicating that proper volume of specimen has been added and membrane wicking has occurred.

REAGENTS

The test device contains bovine erythrocyte extracted antigen-coated particles and bovine erythrocyte extracted antigen coated membrane.

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 specimen samples and kits are handled.
- The positive and negative controls contain human plasma. Handle controls and all specimen samples as if they contain infectious agents. Observe established precautions against microbiological hazards throughout all procedures and follow the standard procedures for proper disposal of specimen samples.
- The positive and negative controls contain sodium azide as a preservative, which may form potentially explosive metal azide if it reacts with lead or copper plumbing. Large quantities of water should be used to flush discarded controls down a sink.
- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimen samples are assayed.
- Humidity and temperature can adversely affect results.
- The dispensing bulb used with the capillary tubes to add fingerstick whole blood to the device may contain trace amounts of latex which may cause an allergic reaction in some individuals.

STORAGE AND STABILITY

The kit can be stored at room temperature or refrigerated (2-30°C/36-86°F). The test device is stable through the expiration date printed on the sealed pouch. The test device must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

SAMPLE COLLECTION AND PREPARATION

- The Mononucleosis Rapid Test Device (Whole Blood/Serum/Plasma) can be performed using whole blood (from venipuncture or fingerstick), serum or plasma.
- To collect Venipuncture Whole Blood samples: Collect anti-coagulated blood sample (sodium or potassium heparin, sodium or potassium EDTA, sodium or potassium citrate and sodium oxalate) following standard laboratory procedures.
- To collect Fingerstick Whole Blood samples:
  - Wash the patient's hand with soap and warm water or clean with an alcohol swab. Allow to dry.
  - Massage the hand without touching the puncture site by rubbing down the hand towards the fingertip of the middle or ring finger.
  - Puncture the skin with a sterile lancet. Wipe away the first sign of blood.
  - Gently rub the hand from wrist to palm to finger to form a rounded drop of blood over the puncture site.
  - Touch the end of the capillary tube to the blood until filled to the red line; avoid air bubbles.
  - Place the bulb onto the top end of the capillary tube.
  - Squeeze the bulb to dispense the whole blood.

- Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed samples.
- **Testing should ideally be performed immediately after the samples have been collected**. Do not leave the samples at room temperature for prolonged periods. Whole blood collected by venipuncture should be stored at 2-8°C (36-46°F) if the test is to be run within 2 days of collection. Whole blood collected by fingerstick should be tested immediately. Do not freeze whole blood samples. Serum or plasma samples may be stored at 2-8°C (36-46°F) for up to 3 days. For long term storage, samples should be kept below -20°C (-4°F).
- Bring samples to room temperature prior to testing. Frozen samples must be completely thawed and mixed well prior to testing. Samples should not be frozen and thawed repeatedly.
- If samples are to be shipped, they should be packed in compliance with federal regulations covering the transportation of etiologic agents.

MATERIALS

Materials Provided

- Test devices
- Disposable sample droppers
- Disposable heparinized capillary tubes and dispensing bulb
- Positive control (Diluted human plasma containing IM heterophile antibodies, 0.09% sodium azide)
- Negative control (Diluted human plasma, 0.09% sodium azide)
- Sample Buffer
- Procedure card
- Package insert

Materials Required But Not Provided

- Sample collection container (for venipuncture whole blood)
- Lancet (for fingerstick whole blood only)
- Centrifuge (for serum or plasma only)
- Timer

DIRECTIONS FOR USE

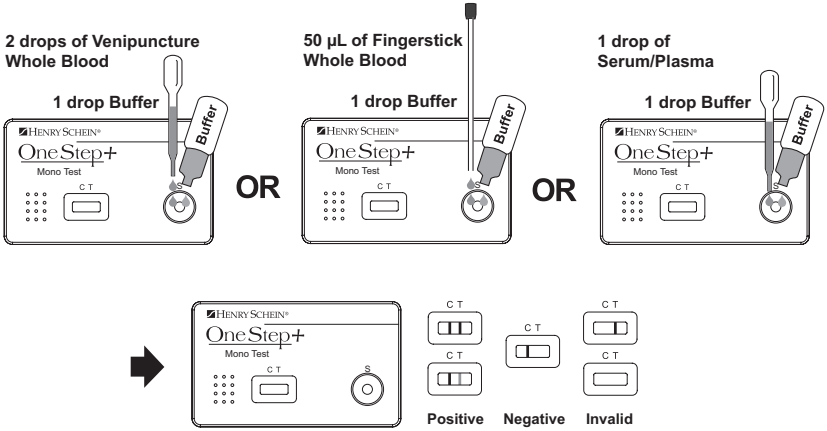
Allow the test device, sample, buffer and controls to reach to room temperature (15-30°C/59-86°F) before testing.

1. Remove the test device from the foil pouch and use it as soon as possible. For best results, perform the test immediately after opening the foil pouch.

2. Place the test device on a clean and level surface.
   - For **Whole Blood (Venipuncture)** samples: Hold the dropper upright and add **2 drops of whole blood** (about 50 µL) to the sample well (S) of the test device. Then add **1 drop of Sample Buffer** to the sample well. Start the timer.
   - For **Whole Blood (Fingerstick)** samples: Add **one capillary tube of blood** (about 50 µL) to the sample well (S) of the test device. Then add **1 drop of Sample Buffer** to the sample well. Start the timer.
   - For **Serum or Plasma** samples: Hold the dropper upright and add **1 drop of serum or plasma** (about 25 µL) to the sample well (S) of the test device. Then add **1 drop of Sample Buffer** to the sample well. Start the timer. Avoid trapping air bubbles in the sample well. See the illustration below.

3. Wait for the red line(s) to appear. The result should be read at 5 minutes. The background should be clear before the result is read.

Note: Low titers of IM heterophile antibodies might result in a weak line appearing in the test line region (T) after a long period of time. Do not read the result after 10 minutes.



INTERPRETATION OF RESULTS

(Please refer to the illustration above)

POSITIVE*: Two distinct red lines appear. One line should be in the control line region (C) and another line should be in the test line region (T). A positive result means that IM heterophile antibodies were detected in the sample.

***NOTE:** The shade of the red color in the test line region (T) will vary based on the amount of IM heterophile antibodies in the sample. Any shade of red in the test line region (T) should be considered positive.

NEGATIVE: One red line appears in the control line region (C). No apparent red or pink line appears in the test line region (T). A negative result means that IM heterophile antibodies were not found in the sample or are below the detection limit of the test.

INVALID: No line appears in the control line region (C). If this occurs, read the directions again and repeat the test with a new test device. If the result is still invalid, stop using the test kit and contact your distributor.

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 sample 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

It is recommended that external positive and negative controls be tested with each new kit, lot or shipment of product, with each change in operator within the test kit, weekly as a check on continued storage conditions, and as otherwise required by your laboratory's internal quality system procedures. External positive and negative controls are supplied in the kit. If controls do not perform as expected, assay results are invalid.

Procedure for External Quality Control Testing

Using the positive or negative external controls in place of a patient sample, add 1 drop of positive or negative control solution to the sample well (S) of a new test device, then add 1 drop of Sample Buffer. Start the timer. Continue with Step 3 in the Directions For Use section.

If unexpected results are seen when running the controls, review the Directions for Use, Interpretation of Results and Limitations sections and repeat the test with another device. If the problem persists, discontinue use of the test kit immediately and contact your distributor.

LIMITATIONS

1. The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/ Serum/ Plasma) is for *in vitro* diagnostic use only. The test should be used for the detection of IM heterophile antibodies in whole blood, serum or plasma samples only. Neither the quantitative value nor the rate of increase in Mononucleosis antibody concentration can be determined by this qualitative test.
2. The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/Serum/Plasma) will only indicate the presence of IM heterophile antibodies in the sample and should not be used as the sole criteria for the diagnosis of Mononucleosis infection.
3. Grossly hemolysed samples will yield invalid results. Strictly follow the Package Insert instructions to obtain accurate results.
4. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
5. This assay has not been established for patients under 18 years of age.

EXPECTED VALUES

Epstein-Barr virus infection during adolescence or young adulthood causes infectious mononucleosis 35% to 50% of the time.[1,5]

The incidence of EBV-associated infectious mononucleosis in the USA has been estimated at 45 per 100,000 and is highest in adolescent and young adults- about 2 out of 1,000. No seasonal pattern of EBV infection exists. The incubation period is 10 to 60 days, though 7 to 14 days is common for children and adolescents.

PERFORMANCE CHARACTERISTICS

A total of 611 clinical samples were tested by three independent sites in a clinical study. Slide agglutination served as the reference method for the study. Serum, plasma and whole blood were also collected for the detection of IM heterophile antibodies by the **One Step+ Mononucleosis Rapid Test Device**.

Of the 611 clinical samples collected, 185 were considered positive and 426 clinical specimens were considered negative by slide agglutination method. The results for each sample matrix are summarized below.

Serum		**Slide agglutination**	
		+	-
One Step+ Mono Rapid Test Device	+	72	0
	-	0	168

Positive Agreement = 72/72 > 99% (95%-100%)**
Negative Agreement = 168/168 > 99% (98%-100%)**
Overall Agreement = 240/240 > 99% (98%-100%)**

Plasma		**Slide agglutination**	
		+	-
One Step+ Mono Rapid Test Device	+	58	1
	-	0	181

Positive Agreement = 58/58 > 99% (94%-100%)**
Negative Agreement = 181/182 > 99% (97%-99%)*
Overall Agreement = 239/240 > 99% (98%-99%)*

Whole Blood

		Slide agglutination +	Slide agglutination -
One Step+ Mono	+	50	0
Rapid Test Device	-	5	76

Positive Agreement = 50/55 = 91% (80%-97%)*
Negative Agreement = 76/76 > 99% (95%-100%)**
Overall Agreement = 126/131 = 96% (91%-99%)*

All Specimens

		Slide agglutination +	Slide agglutination -
One Step+ Mono	+	180	1
Rapid Test Device	-	5	425

Positive Agreement = 180/185 = 97% (94%-99%)*
Negative Agreement = 425/426 > 99% (99%-99.99%)*
Overall Agreement = 605/611 = 99% (98%-99%)*

*Denotes 95% Confidence Interval
**Denotes 97.5% Confidence Interval

In addition, the clinical samples were tested with a commercially available rapid diagnostic test kit. 611 serum, plasma and whole blood specimens were used to compare the **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/Serum/Plasma) to a comparator test. The results showed a >99% agreement between the two test kits. The results for each sample matrix are summarized below.

Serum

		Comparator test +	Comparator test -
One Step+ Mono	+	72	0
Rapid Test Device	-	1	167

Positive Agreement= 72/73 = 99% (93%-99%)*
Negative Agreement= 167/167 > 99% (98%-100%)**
Overall Agreement= 239/240 > 99% (98%-99%)*

Plasma

		Comparator test +	Comparator test -
One Step+ Mono	+	59	0
Rapid Test Device	-	1	180

Positive Agreement= 59/60 = 98% (91%-99%)*
Negative Agreement= 180/180 > 99% (98%-100%)**
Overall Agreement= 239/240 > 99% (98%-99%)*

Whole Blood

		Comparator test +	Comparator test -
One Step+ Mono	+	50	0
Rapid Test Device	-	1	80

Positive Agreement= 50/51 = 98% (90%-99%)*
Negative Agreement= 80/80 > 99% (96%-100%)**
Overall Agreement= 130/131 > 99% (96%-99%)*

All Specimens

		Comparator Test +	Comparator Test -
One Step+ Mono	+	181	0
Rapid Test Device	-	3	427

Positive Agreement = 181/184 = 98% (95%-99%)*
Negative Agreement = 427/427 > 99% (99%-100%)**
Overall Agreement = 608/611 > 99% (99%-99.9%)*

*Denotes 95% Confidence Interval
**Denotes 97.5% Confidence Interval

Interference Studies

No interference with the **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/Serum/Plasma) results was observed in samples containing high levels of hemoglobin (up to 1,000 µg/dL), bilirubin (up to 1,000 mg/dL) and human serum albumin (up to 2,000 mg/dL). The test results were also unaffected when the hematocrit was altered ranging from 20% to 60% and when icteric and lipemic samples were tested.

POL Studies

Three physicians' offices were used to conduct an evaluation of the **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/Serum/Plasma). Personnel with various educational backgrounds performed the testing. Each physician's office tested a randomly coded panel of samples consisting of negative (15), low positive (15), moderate positive (15) and invalid (15) for three days. The results obtained had a >99% correlation with the expected results.

Non-Laboratory User Study

A total of 77 untrained, inexperienced, non-laboratory participants were enrolled at three separate locations to demonstrate that they could follow the product instructions and perform the **One Step+ Mononucleosis Rapid Test Device** (Whole Blood/ Serum/Plasma) and obtain results similar to those obtained by trained laboratory technicians. Each participant received four blinded spiked whole blood samples: one negative, one invalid, one low positive and one medium positive.

Study participants were instructed to follow the Package Insert and Procedure Card instructions to test the provided samples and record their test results. No other instruction or training was given. Upon completion of the test, participants filled out a brief questionnaire regarding the test procedure and ease of use of the labeling. The following results were obtained:

Site	Low Positive	Medium Positive	Negative	Invalid	Total Correct
A	23/27=85% (66-96%)*	25/27=93% (76-99%)*	27/27>99% (87-100%)*	27/27>99% (87-100%)*	102/108=94% (88-98%)*
B	25/27=93% (76-99%)*	25/27=93% (76-99%)*	27/27>99% (87-100%)*	27/27>99% (87-100%)*	104/108=96% (91-99%)*
C	23/23>99% (85-100%)*	23/23>99% (85-100%)*	23/23>99% (85-100%)*	23/23>99% (85-100%)*	92/ 92>99% (96-100%)*

*Denotes 95% Confidence Interval

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1. *Pediatr Clin North Am* 1997 Dec;44(6):1541-56
2. Omori, M. 2002 Mononucleosis. http://www.emedicine.com/EMERG/topic319.htm
3. Linde A. 1996, *Scand J Infect Dis Suppl*. 100:83-8
4. Papesch, M. & Watkins, R. 2001 *Clin. Otolaryngol*. 26, 3-8
5. CDC National Center for infectious Diseases: EBV & IM: www.cdc.gov/ncidod/diseases/ebv.htm

CLIA Category

Whole Blood	Waived
Serum/Plasma	Moderately Complex

HENRY SCHEIN®
One Step+

Mononucleosis

Rapid Test Device

(Whole Blood ONLY) Package Insert

A rapid test for the qualitative detection of Infectious Mononucleosis (IM) heterophile antibodies in whole blood.

For professional in vitro diagnostic use only.

INTENDED USE

The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) is a rapid chromatographic immunoassay for the qualitative detection of Infectious Mononucleosis heterophile antibodies in whole blood to aid in the diagnosis of infectious Mononucleosis. **A Certificate of Waiver is needed for your laboratory in order to run this test.**

SUMMARY

Infectious Mononucleosis is caused by the Epstein-Barr virus, which is a member of the herpesvirus family. Symptoms of IM are fever, sore throat and swollen lymph glands. In very rare cases, heart or central nervous system problems may occur. Diagnosis of IM is made based on the presence of heterophile antibodies. Infectious mononucleosis heterophile antibodies belong to the IgM class. They are present in 80-90% of acute IM cases and can be detected in 60-70% of patients during the first week of clinical illness.[1-4]

The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) is a simple test that utilizes an extract of bovine erythrocytes to qualitatively and selectively detect IM heterophile antibodies in whole blood in just minutes.

PRINCIPLE

The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) is a qualitative membrane strip based immunoassay for the detection of IM heterophile antibodies in whole blood. In this test procedure, bovine erythrocyte extracted antigen is coated on the test line region of the device. The sample reacts with bovine erythrocyte extracted antigen coated particles that have been applied to the label pad. This mixture migrates chromatographically along the length of the test strip and interacts with the coated bovine erythrocyte extracted antigen. If the sample contains IM antibodies, a colored line will appear in the test line region indicating a positive result. If the sample does not contain IM heterophile antibodies, a colored line will not appear in this region indicating a negative result. To serve as a procedural control, a colored line will always appear at the control line region, indicating that proper volume of specimen has been added and membrane wicking has occurred.

REAGENTS

The test device contains bovine erythrocyte extracted antigen-coated particles and bovine erythrocyte extracted antigen coated membrane.

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 specimen samples and kits are handled.
- The positive and negative controls contain human plasma. Handle controls and all specimen samples as if they contain infectious agents. Observe established precautions against microbiological hazards throughout all procedures and follow the standard procedures for proper disposal of specimen samples.
- The positive and negative controls contain sodium azide as a preservative, which may form potentially explosive metal azide if it reacts with lead or copper plumbing. Large quantities of water should be used to flush discarded controls down a sink.
- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimen samples are assayed.
- Humidity and temperature can adversely affect results.
- The dispensing bulb used with the capillary tubes to add fingerstick whole blood to the device may contain trace amounts of latex which may cause an allergic reaction in some individuals.

STORAGE AND STABILITY

The kit can be stored at room temperature or refrigerated (2-30°C/36-86°F). The test device is stable through the expiration date printed on the sealed pouch. The test device must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

SAMPLE COLLECTION AND PREPARATION

- The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) can be performed using whole blood from venipuncture or fingerstick.
- To collect Venipuncture Whole Blood samples: Collect anti-coagulated blood sample (sodium or potassium heparin, sodium or potassium EDTA, sodium or potassium citrate and sodium oxalate) following standard laboratory procedures.
- To collect Fingerstick Whole Blood samples:
  - Wash the patient's hand with soap and warm water or clean with an alcohol swab. Allow to dry.
  - Massage the hand without touching the puncture site by rubbing down the hand towards the fingertip of the middle or ring finger.
  - Puncture the skin with a sterile lancet. Wipe away the first sign of blood.
  - Gently rub the hand from wrist to palm to finger to form a rounded drop of blood over the puncture site.
  - Touch the end of the capillary tube to the blood until filled to the red line; avoid air bubbles.
  - Place the bulb onto the top end of the capillary tube.
  - Squeeze the bulb to dispense the whole blood.

- **Testing should ideally be performed immediately after the samples have been collected**. Do not leave the samples at room temperature for prolonged periods. Whole blood collected by venipuncture should be stored at 2-8°C (36-46°F) if the test is to be run within 2 days of collection. Whole blood collected by fingerstick should be tested immediately. Do not freeze whole blood samples.
- If samples are to be shipped, they should be packed in compliance with federal regulations covering the transportation of etiologic agents.

MATERIALS

Materials Provided

- Test devices
- Disposable sample droppers
- Disposable heparinized capillary tubes and dispensing bulb
- Positive control (Diluted human plasma containing IM heterophile antibodies, 0.09% sodium azide)
- Negative control (Diluted human plasma, 0.09% sodium azide)
- Sample Buffer
- Procedure card
- Package insert

Materials Required But Not Provided

- Sample collection container (for venipuncture whole blood)
- Lancet (for fingerstick whole blood only)
- Timer

DIRECTIONS FOR USE

Allow the test device, sample, buffer and controls to reach to room temperature (15-30°C/59-86°F) before testing.

1. Remove the test device from the foil pouch and use it as soon as possible. For best results, perform the test immediately after opening the foil pouch.

2. Place the test device on a clean and level surface.
   - For **Whole Blood (Venipuncture)** samples: Hold the dropper upright and add **2 drops of whole blood** (about 50 µL) to the sample well (S) of the test device. Then add **1 drop of Sample Buffer** to the sample well. Start the timer.
   - For **Whole Blood (Fingerstick)** samples: Add **one capillary tube of blood** (about 50 µL) to the sample well (S) of the test device. Then add **1 drop of Sample Buffer** to the sample well. Start the timer.

3. Wait for the red line(s) to appear. The result should be read at 5 minutes. The background should be clear before the result is read.

Note: Low titers of IM heterophile antibodies might result in a weak line appearing in the test line region (T) after a long period of time. Do not read the result after 10 minutes.

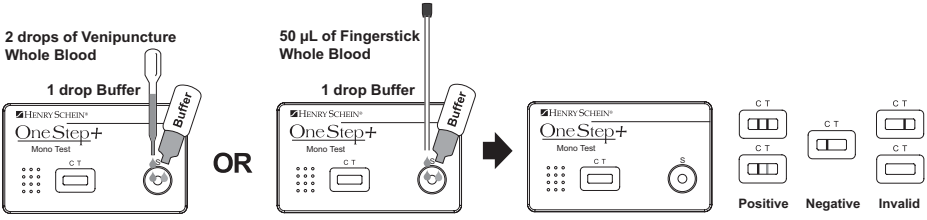
INTERPRETATION OF RESULTS

(Please refer to the illustration above)

POSITIVE*: Two distinct red lines appear. One line should be in the control line region (C) and another line should be in the test line region (T). A positive result means that IM heterophile antibodies were detected in the sample.
***NOTE:** The shade of the red color in the test line region (T) will vary based on the amount of IM heterophile antibodies in the sample. Any shade of red in the test line region (T) should be considered positive.

NEGATIVE: One red line appears in the control line region (C). No apparent red or pink line appears in the test line region (T). A negative result means that IM heterophile antibodies were not found in the sample or are below the detection limit of the test.

INVALID: No line appears in the control line region (C). If this occurs, read the directions again and repeat the test with a new test device. If the result is still invalid, stop using the test kit and contact your distributor.



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 sample 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

It is recommended that external positive and negative controls be tested with each new kit, lot or shipment of product, with each change in operator within the test kit, weekly as a check on continued storage conditions, and as otherwise required by your laboratory's internal quality system procedures. External positive and negative controls are supplied in the kit. If controls do not perform as expected, assay results are invalid.

Procedure for External Quality Control Testing

Using the positive or negative external controls in place of a patient sample, add 1 drop of positive or negative control solution to the sample well (S) of a new test device, then add 1 drop of Sample Buffer. Start the timer. Continue with Step 3 in the Directions For Use section.

If unexpected results are seen when running the controls, review the Directions for Use, Interpretation of Results and Limitations sections and repeat the test with another device. If the problem persists, discontinue use of the test kit immediately and contact your distributor.

LIMITATIONS

1. The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) is for *in vitro* diagnostic use only. The test should be used for the detection of IM heterophile antibodies in whole blood samples only. Neither the quantitative value nor the rate of increase in Mononucleosis antibody concentration can be determined by this qualitative test.
2. The **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) will only indicate the presence of IM heterophile antibodies in the sample and should not be used as the sole criteria for the diagnosis of Mononucleosis infection.
3. Grossly hemolysed samples will yield invalid results. Strictly follow the Package Insert instructions to obtain accurate results.
4. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
5. This assay has not been established for patients under 18 years of age.

EXPECTED VALUES

Epstein-Barr virus infection during adolescence or young adulthood causes infectious mononucleosis 35% to 50% of the time.[1,5]

The incidence of EBV-associated infectious mononucleosis in the USA has been estimated at 45 per 100,000 and is highest in adolescent and young adults- about 2 out of 1,000. No seasonal pattern of EBV infection exists. The incubation period is 10 to 60 days, though 7 to 14 days is common for children and adolescents.

PERFORMANCE CHARACTERISTICS

A total of 611 clinical samples were tested by three independent sites in a clinical study. Slide agglutination served as the reference method for the study. Serum, plasma and whole blood were also collected for the detection of IM heterophile antibodies by the **One Step+ Mononucleosis Rapid Test Device**.

Of the 611 clinical samples collected, 185 were considered positive and 426 clinical specimens were considered negative by slide agglutination method. The results for each sample matrix are summarized below.

Serum		**Slide agglutination**	
		+	-
One Step+ Mono Rapid Test Device	+	72	0
	-	0	168

Positive Agreement = 72/72 > 99% (95%-100%)**
Negative Agreement = 168/168 > 99% (98%-100%)**
Overall Agreement = 240/240 > 99% (98%-100%)**

Plasma		**Slide agglutination**	
		+	-
One Step+ Mono Rapid Test Device	+	58	1
	-	0	181

Positive Agreement = 58/58 > 99% (94%-100%)**
Negative Agreement = 181/182 > 99% (97%-99%)*
Overall Agreement = 239/240 > 99% (98%-99%)*

Whole Blood		**Slide agglutination**	
		+	-
One Step+ Mono Rapid Test Device	+	50	0
	-	5	76

Positive Agreement = 50/55 = 91% (80%-97%)*
Negative Agreement = 76/76 > 99% (95%-100%)**
Overall Agreement = 126/131 = 96% (91%-99%)*

All Specimens		**Slide agglutination**	
		+	-
One Step+ Mono Rapid Test Device	+	180	1
	-	5	425

Positive Agreement = 180/185 = 97% (94%-99%)*
Negative Agreement = 425/426 > 99% (99%-99.99%)*
Overall Agreement = 605/611 = 99% (98%-99%)*

*Denotes 95% Confidence Interval
**Denotes 97.5% Confidence Interval

In addition, the clinical samples were tested with a commercially available rapid diagnostic test kit. 611 serum, plasma and whole blood specimens were used to compare the Mononucleosis Rapid Test Device to a comparator test. The results showed a >99% agreement between the two test kits. The results for each sample matrix are summarized below.

Serum

		Comparator test +	Comparator test -
One Step+ Mono Rapid Test Device	+	72	0
	-	1	167

Positive Agreement= 72/73 = 99% (93%-99%)*
Negative Agreement= 167/167 > 99% (98%-100%)**
Overall Agreement= 239/240 > 99% (98%-99%)*

Plasma

		Comparator test +	Comparator test -
One Step+ Mono Rapid Test Device	+	59	0
	-	1	180

Positive Agreement= 59/60 = 98% (91%-99%)*
Negative Agreement= 180/180 > 99% (98%-100%)**
Overall Agreement= 239/240 > 99% (98%-99%)*

Whole Blood

		Comparator test +	Comparator test -
One Step+ Mono Rapid Test Device	+	50	0
	-	1	80

Positive Agreement= 50/51 = 98% (90%-99%)*
Negative Agreement= 80/80 > 99% (96%-100%)**
Overall Agreement= 130/131 > 99% (96%-99%)*

All Specimens

		Comparator Test +	Comparator Test -
One Step+ Mono Rapid Test Device	+	181	0
	-	3	427

Positive Agreement = 181/184 = 98% (95%-99%)*
Negative Agreement = 427/427 > 99% (99%-100%)**
Overall Agreement = 608/611 > 99% (99%-99.9%)*
*Denotes 95% Confidence Interval
**Denotes 97.5% Confidence Interval

Interference Studies

No interference with the **One Step+ Mononucleosis Rapid Test Device** results was observed in samples containing high levels of hemoglobin (up to 1,000 µg/dL), bilirubin (up to 1,000 mg/dL) and human serum albumin (up to 2,000 mg/dL). The test results were also unaffected when the hematocrit was altered ranging from 20% to 60% and when icteric and lipemic samples were tested.

POL Studies

Three physicians' offices were used to conduct an evaluation of the **One Step+ Mononucleosis Rapid Test Device**. Personnel with various educational backgrounds performed the testing. Each physician's office tested a randomly coded panel of samples consisting of negative (15), low positive (15), moderate positive (15) and invalid (15) for three days. The results obtained had a >99% correlation with the expected results.

Non-Laboratory User Study

A total of 77 untrained, inexperienced, non-laboratory participants were enrolled at three separate locations to demonstrate that they could follow the product instructions and perform the **One Step+ Mononucleosis Rapid Test Device** (Whole Blood) and obtain results similar to those obtained by trained laboratory technicians. Each participant received four blinded spiked whole blood samples: one negative, one invalid, one low positive and one medium positive.

Study participants were instructed to follow the Package Insert and Procedure Card instructions to test the provided samples and record their test results. No other instruction or training was given. Upon completion of the test, participants filled out a brief questionnaire regarding the test procedure and ease of use of the labeling. The following results were obtained:

Site	Low Positive	Medium Positive	Negative	Invalid	Total Correct
A	23/27=85% (66-96%)*	25/27=93% (76-99%)*	27/27>99% (87-100%)*	27/27>99% (87-100%)*	102/108=94% (88-98%)*
B	25/27=93% (76-99%)*	25/27=93% (76-99%)*	27/27>99% (87-100%)*	27/27>99% (87-100%)*	104/108=96% (91-99%)*
C	23/23>99% (85-100%)*	23/23>99% (85-100%)*	23/23>99% (85-100%)*	23/23>99% (85-100%)*	92/ 92>99% (96-100%)*

*Denotes 95% Confidence Interval

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