



## Intended Use

**Clearview IM** is a simple, rapid immunoassay for the qualitative detection of infectious mononucleosis IgM heterophile antibodies in human whole blood, serum or plasma specimens. It is intended for in vitro diagnostic use only.

## Introduction

Infectious mononucleosis (IM) is an acute herpes virus infection caused by the Epstein-Barr Virus (EBV). It is a disease of variable severity, being characterised by a range of symptoms that can include lethargy, sore throat, lymphadenopathy, splenomegaly, hepatitis and jaundice. Unusual consequences of the disease include autoimmune haemolytic anaemia, spontaneous splenic rupture and progression to acute lymphoblastic leukaemia. Treatment of the disease is primarily symptomatic, with enforced bed rest to prevent serious complications of the liver or spleen, and analgesics to control the pain<sup>1</sup>.

During the acute phase of illness, IM heterophile antibodies (primarily of the IgM class) appear in 80-90% of IM cases<sup>1,2,3</sup>. IM heterophile antibodies are usually demonstrable 1-12 weeks after the onset of the illness, but have been shown to persist for a year<sup>1,4</sup>.

IM heterophile antibodies can be detected by the agglutination of mammalian red blood cells. Differential absorption of sera to remove other non-specific heterophile antibodies increases specificity. Antigens obtained from the membranes of bovine erythrocytes are more specific to the IM heterophile antibodies than those antigens obtained from either sheep or horse erythrocytes<sup>1,4</sup>.

**Clearview IM** uses a glycoprotein from bovine erythrocytes and is therefore highly specific, requiring no pre-treatment of the specimen and producing clear, unambiguous results.

## Test Principle

Patient specimen (whole blood, serum or plasma) is added to the absorbent pad in the Sample Window (A) of the device. For whole blood specimens, a diluent (R1) is also added. The absorbent pad contains blue microspheres attached to bovine erythrocyte glycoprotein. Patient specimen mobilises these blue microspheres and moves up the attached test strip. The test strip contains a region of immobilised bovine erythrocyte glycoprotein in the Result Window (B). If IM heterophile antibody is present in the specimen, a blue line should form in the Result Window. If no antibody is present, the Result Window will remain clear.

**Clearview IM** also provides an integral control feature. The device contains a region of mouse antibody. The appearance of a blue line in the Control Window (C) shows the test has been performed correctly.

## Precautions

Standard guidelines for handling infectious agents and chemical reagents should be observed throughout all procedures.

It is recommended that disposable gloves should be worn while handling specimens.

Properly dispose of all contaminated waste such as IM devices and pipettes.

## Kit Contents & Storage

**Clearview IM** should be stored at 2-30°C. Do not use after the stated expiry date.

Each Clearview kit contains sufficient materials for 20 tests.

### Materials provided:

- 20 **Clearview IM** devices: containing separate regions of bovine erythrocyte glycoprotein and latex-labelled bovine erythrocyte glycoprotein.
- 20 Disposable Pipettes.
- 1 x 2ml R1: phosphate buffered saline.

### Materials required but not provided:

Blood collection tubes:

- **For whole blood:** 50µl capillary tubes coated with anti-coagulant for finger-prick or blood tubes containing anticoagulant. EDTA, citrate or heparin are suitable anti-coagulants. Follow the manufacturer's instructions.
- **For serum:** Use a standard blood tube followed by a separation step using centrifugation and, if desired, use a physical separator to isolate the serum. Follow the manufacturer's instructions.
- **For plasma:** Blood tubes containing any of the following anti-coagulants are suitable: EDTA, citrate or heparin. Follow the manufacturer's instructions.

## Specimen Storage

Whole blood specimens must be used immediately. Do not freeze.

Serum or plasma specimens can be stored for up to three days at 2-8°C, or frozen at ≤-20°C for up to one month.

## Assay Procedure

Ensure all devices and specimens are at 18-30°C. When ready to test, tear open the foil wrapper and remove the **Clearview IM** device and place it on a flat surface. Follow **one** of the following procedures:

- 1 **Whole Blood:** Using the pipette provided, add 2 drops of whole blood to the Sample Window. Then immediately add 2 drops of R1 straight from the bottle. The test **must** be read 15 minutes after the addition of the specimen. **OR**
- 2 **Whole Blood (Finger prick):** Obtain blood from the finger using a 50µl/ml capillary tube coated with anti-coagulant. Directly add the whole blood to the Sample Window. Then immediately add 2 drops of R1. The test **must** be read 15 minutes after the addition of the specimen. **OR**
- 3 **For Serum or Plasma:** Using the pipette provided add 4 drops of the specimen to the Sample Window. The test **must** be read 5 minutes after the addition of the specimen.

## Interpretation of Results

A blue line appearing in the Control Window (C) within the specified read time indicates the test has worked correctly. If no line appears within the specified time, then the test must be repeated using a new **Clearview IM** device.

A **positive result** is indicated by a blue line in the Result Window (B) within the specified time. A difference in intensity may occur between the lines in the Result and Control Windows, but this does not affect the interpretation of the results.

A **negative result** is indicated if the Result Window (B) has no blue line within the specified read time.

## Limitations of the Test

- 1 **Clearview IM** is for use only with blood specimens (whole, serum or plasma). The performance of the test taken from other sources has not been established.
- 2 Specimens which are contaminated or grossly haemolysed should not be used. Serum or plasma specimens must be clear and particle free.
- 3 Negative results may be obtained if insufficient antibody is present in the specimen. Where negative results are obtained and symptoms still persist, it is recommended that a further test be carried out at a later date, allowing time for the antibody to develop.
- 4 It has been reported that up to 10-20% of infected adults and 50% of children under 4 years of age may fail to produce any IM heterophile antibody at all<sup>2,3</sup>.
- 5 The presence of heterophile antibodies has been demonstrated in other disease states such as leukaemia, Burkitts lymphoma, rheumatoid arthritis, viral hepatitis and cytomegalovirus infections<sup>5</sup>.

- 6 As heterophile antibody may persist for several months after recovery<sup>1</sup>, a positive result should not be regarded as indicative of acute infectious mononucleosis in isolation from the clinical and haematological information. Therefore the result obtained from **Clearview IM** must be considered with both haematological findings and the clinical symptoms of the patient before a diagnosis of infectious mononucleosis is made.
- 7 Do not use devices that have become wet or have a damaged foil pouch.

## Expected Results

The peak incidence of infectious mononucleosis occurs between 15 and 19 years of age with 345-671 cases per 100,000 per year<sup>1</sup>. Infection during childhood is usually sub-clinical, whereas infection of adolescents or young adults results in IM in 30-70% of cases<sup>1</sup>. After 35 years of age the incidence of the disease declines rapidly and is uncommon in persons over 40 years of age<sup>1</sup>.

## Calibration

**Clearview IM** is calibrated using in-house standards produced from dilutions of a stock preparation derived from a serum pool of high titre IM positive patients.

## Performance Characteristics

The performance of **Clearview IM** has been determined in a multi-centre clinical evaluation. Specimens from patients with suspected infectious Mononucleosis were tested using the **Clearview IM** kit and a commercially available differential red cell test (Test A). Any discordant specimens were tested further in a specific Epstein-Barr Virus immunoassay for the presence of antibodies (IgG or IgM) against either capsid or nuclear antigen.

The resolved data are as follows:

Specimen tested	Test A	Clearview IM Result		Sensitivity	Specificity
		+	-		
Whole Blood	+	64	0	95.5%	100.0%
	-	3	187		
Serum/plasma	+	66	0	98.5%	100.0%
	-	1	187		

These findings are supported in independent studies<sup>1,4</sup>.

## Advice Line

Further information can be obtained from [www.clearview.com](http://www.clearview.com), your distributor or UK customers can call Unipath Customer Services on **08705 134952**.

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