SSI DIAGNOSTICA

Instructions for use

IMMUVIEW®

S. pneumoniae Antigen Test

EN

Lateral flow test for qualitative detection of *S. pneumoniae* in urine and cerebrospinal fluid

IMMUVIEW® *S. PNEUMONIAE* ANTIGEN TEST

For *in vitro* diagnostic use

Intended use

The ImmuView® *S. pneumoniae* Antigen Test is an *in vitro* rapid lateral flow test, also known as a lateral flow immunochromatographic assay. The assay is intended for qualitative detection of *Streptococcus (S.) pneumoniae* in urine or cerebrospinal fluid (CSF) specimens from patients with symptoms of pneumonia. The ImmuView® *S. pneumoniae* Antigen Test can be read visually.

The assay is intended to aid in diagnosis of *S. pneumoniae*. Results from the ImmuView® *S. pneumoniae* Antigen Test should be interpreted in conjunction with the patient's clinical evaluation and other diagnostic methods.

Description

ImmuView® *S. pneumoniae* Antigen Test is a rapid lateral flow test for qualitative detection of *S. pneumoniae* antigens in human urine and CSF samples. The test is effective in presumptive diagnosis of pneumonia and meningitis caused by *S. pneumoniae*, in conjunction with culture and other methods. Correct and early treatment is vital for the prognosis and therefore quick methods to confirm the cause of diseases in the initial phase are very important in order to initiate the proper treatment as soon as possible. ImmuView® *S. pneumoniae* Antigen Test is for use by laboratory professionals only.

Principle

ImmuView® *S. pneumoniae* Antigen Test is a rapid lateral flow test for detection of *S. pneumoniae*.

Precautions

- Ensure that the test running buffer is added to all the test tubes. False positive results can occur if no running buffer is added to the test tubes.
- The presence of partial lines and/or dots represents invalid test results. The patient sample should be retested.
- Test results should be read within the recommended reading time.
- Let the kit components equilibrate to room temperature before testing.
- The intensity of a test line is not related to the antigen level in the sample.
- Do not mix the components of the specific kit lot with components from other kits.
- Do not use the ImmuView® *S. pneumoniae* Antigen Test after the expiry date.
- Inspect the tests and vials before use to ensure they are intact. Any damaged vials/tests should be discarded.
- Thioglycolate as a preservative can result in a cross-reaction, potentially causing false positive *S. pneumoniae* results.

Materials provided

- 1 tube with 22 tests
- CONTROL + • 0.5 mL positive control for *S. pneumoniae*
- CONTROL - • 0.5 mL negative control for *S. pneumoniae*
- RUN BUFF • 2.5 mL running buffer
- 1 tweezer
- 22 transfer pipettes
- 22 test tubes
- 1 cardboard test tube holder
- 1 scorecard

Quick guide can be found on the inside of the box and on page 8.

Materials required but not provided

- Timer
- Sterile standard urine or CSF collection containers/transport tubes

Storage and stability

Please find the information on the box and labels. This product does not require any additional storage conditions. Do not freeze the product.

Preservatives

The use of boric acid does not interfere with the ImmuView® *S. pneumoniae* Antigen Test.

Sample collection and storage

Collect the urine sample in a sterile standard container (with or without boric acid preservative). If the sample is run within 24 hours, it can be stored at room temperature. Alternatively, the sample can be stored at 2-8 °C for 1 week or frozen at -20 °C (avoid multiple freeze/thaw circles). Make sure that samples always reach room temperature before testing. CSF samples should be tested as soon as possible after sampling or be stored frozen until testing is possible. Follow your laboratory procedures for long term storage of CSF samples.

Quality control

The positive and negative controls provided with the ImmuView® *S. pneumoniae* Antigen Test function as the kit quality control. The positive and negative controls should follow the same procedure as if they were urine or CSF samples. The positive control should be visible at the control test line and the *S. pneumoniae* test line. The negative control should only be visible at the control line.

Before use check the vials to ensure there is no damage and/or leak. In case of damage or leak discard the vial.

Before using a new lot of a kit, or a new shipment of the same lot, or if the test is performed by a new operator, perform quality control testing before testing clinical samples. Follow your local or state requirements for frequency of quality control testing.

Procedure

1. Bring the patient urine or CSF sample to room temperature. Whirl sample prior to testing.*

2. Apply a test tube in the cardboard holder.

3. Fill the transfer pipette with urine or CSF and add 3 drops (120 µL) of sample to the test tube (hold the pipette vertically).

4. Add 2 drops (90 µL) of running buffer to the test tube (hold the buffer bottle vertically).

5. Whirl the test tube gently.

6. Take the container with tests, open it and take out the number of tests needed, and close it firmly afterwards.

7. Insert the test into the test tube.

8. Wait 15 minutes.

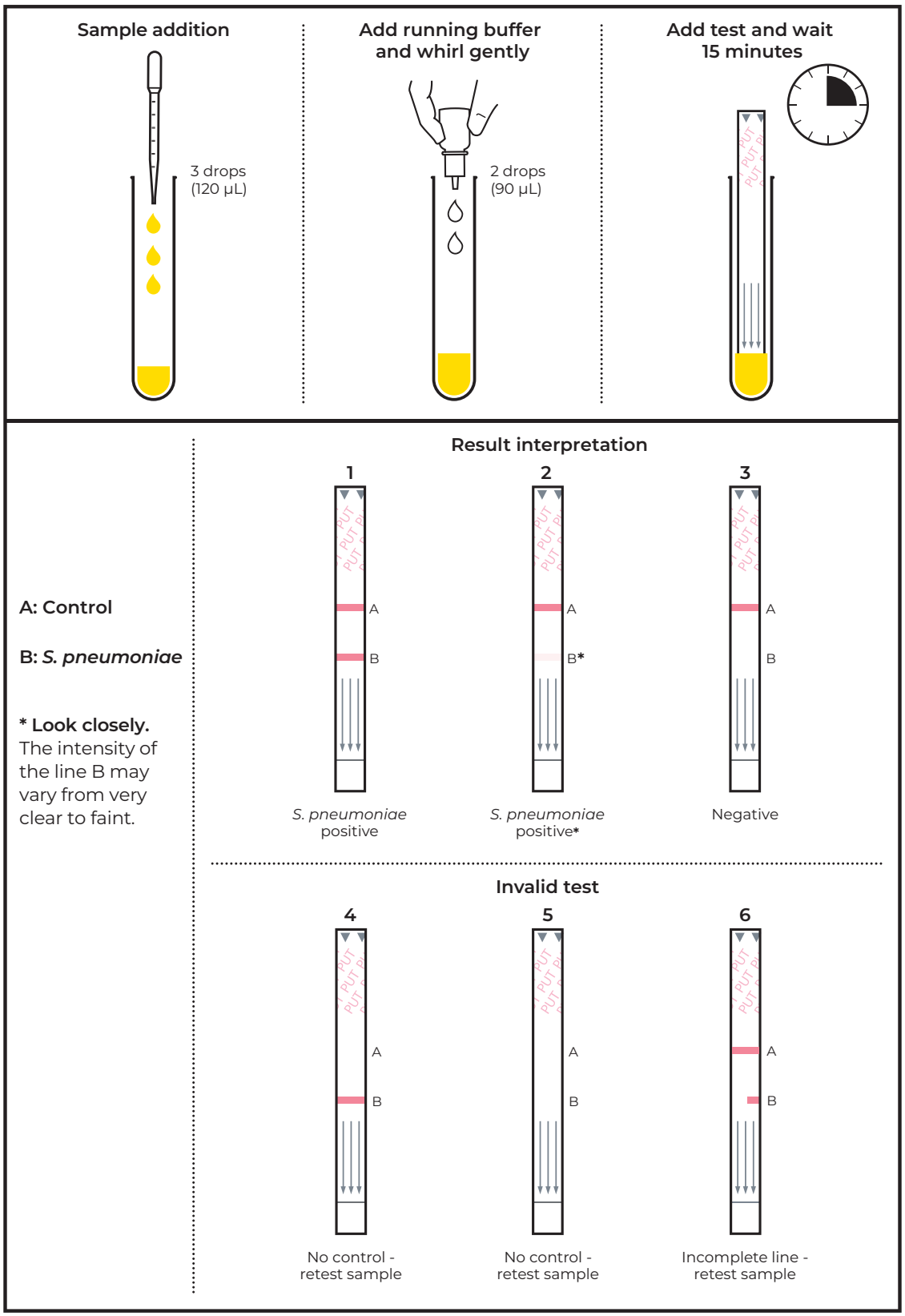
9. Lift the test out of the test tube. Read the result within 5 minutes.**

10. Discard the test after interpretation of the result.

* If the urine sample contains visible blood, please confirm a positive result by boiling[1,2] the sample at ≥ 95 °C for 5 minutes (e.g. heating block) and retest.

** Otherwise, the test result may be inaccurate.

Quick guide


Sample addition
3 drops
(120 µL)
Add running buffer
and whirl gently
2 drops
(90 µL)
Add test and wait
15 minutes
A: Control
B: S. pneumoniae
* Look closely.
The intensity of
the line B may
vary from very
clear to faint.
Result interpretation
1
2
3
A
B
B*
S. pneumoniae
positive
S. pneumoniae
positive*
Negative
Invalid test
4
5
6
No control -
retest sample
No control -
retest sample
Incomplete line -
retest sample

Interpretation of results

A positive sample for *S. pneumoniae*:

A red line for *S. pneumoniae* in the bottom of the test, and a red control test line at the top (see test results number 1 and 2, page 8).

Look closely. A faint line for *S. pneumoniae* should be considered a positive result (see test result number 2, page 8). The enclosed "Scorecard" can help to determine if the test result is positive or negative.

A negative sample

A single red control line in the top of the test (see test result number 3, page 8).

Invalid sample

If no control line is observed, and/or incomplete test lines are present, the test is invalid and the sample should be retested (see test results number 4, 5, and 6, page 8).

Disposal

Follow local procedures and/or guidelines from national authorities for disposal of biological materials.

Limitations

- ImmuView® *S. pneumoniae* Antigen Test has not been validated to be used with urine samples from children under 8 years.

- ImmuView® *S. pneumoniae* Antigen Test has been validated using urine and CSF specimens only. Other specimens (e.g. serum or other body fluids), which may contain antigen, have not been validated.

- The diagnosis of an *S. pneumoniae* infection cannot be based on clinical or radiological evidence alone.

- A negative result does not exclude an *S. pneumoniae* infection. The result of this test as well as culture, serology or other antigen detection methods should be used in conjunction with clinical findings to make an accurate diagnosis.

- *S. pneumoniae* vaccine may cause false positive results in urine in ImmuView® *S. pneumoniae* Antigen Test up to 10 days after vaccination.

- The test is not intended to replace culture.

- High levels (≥ 10%) of water-based personal lubricant might cause invalid test results.

Clinical sensitivity and specificity for urine samples

(Retrospective study)

In a population of thirty (30) culture positive *S. pneumoniae* urine samples, 28/30 were *S. pneumoniae* positive with the ImmuView® *S. pneumoniae* Antigen Test using visual interpretation for a sensitivity of 93.3% (95% CI 78.7-98.2%). In the negative control population 119/121 were *S. pneumoniae* negative with the ImmuView® *S. pneumoniae* Antigen Test using visual interpretation for a specificity of 98.4% (95%CI 94.2-99.6%).

	Blood culture *S. pneumoniae*		
ImmuView®	Positive	Negative	Total
Positive	28	2	30
Negative	2	119	121
Total	30	121	151

ImmuView®	***S. pneumoniae***
Sensitivity	93.3% (28/30 CI: 79-98%)
Specificity	98.4% (119/121 CI: 94-100%)

Analytical studies - urine

Specificity (cross-reactivity)

The panel was tested with bacteria at 10^7 CFU/mL.

Organisms tested for interference	
Acinetobacter spp. (4)	*Streptococcus* Gr. A (2)
Enterobacter cloacae (3)	*Streptococcus* Gr. B
Enterococcus durans	*Streptococcus* Gr. C
Enterococcus faecalis (7)	*Streptococcus* Gr. F
Enterococcus faecium	*Streptococcus* Gr. G
Escherichia coli (10)	*Streptococcus* Gr. L
Gardnerella vaginalis	*Streptococcus mitis*
Haemophilus influenzae (11)	*Streptococcus mutans*
Haemophilus parainfluenzae	*Streptococcus parasanguinis*
Klebsiella pneumoniae (3)	*Streptococcus sanguinis*
Legionella pneumophila (SG 3)	

None of the organisms in the table cross-reacted with the ImmuView® *S. pneumoniae* Antigen Test.

Sensitivity (limit of detection (LoD))

Antigen or whole cell	LoD
S. pneumoniae antigen	125 pg/mL
S. pneumoniae type 1 whole cell	$0.5x10^5$ CFU/mL

The limit of detection for *S. pneumoniae* antigen (CWPS) is found to be 125pg/mL using the ImmuView® *S. pneumoniae* Antigen Test. For whole-cell organisms the limit of detection is $0.5x10^5$ CFU/mL. Boiling and preservatives might lower the limit of detection if whole-cell organisms are present in the urine due to the accessibility of the antigens.

Strain reactivity

ImmuView® *S. pneumoniae* Antigen Test was able to detect 92 serotypes at 10^8 CFU/mL and 60 of those at 10^6 CFU/mL.

Interfering substances

ImmuView® *S. pneumoniae* Antigen Test was tested with forty-two (42) interfering agents at different concentrations in urine samples.

Agent	Concentration	Agent	Concentration
Acetaminophen	0.1 mg/mL	Itraconazole	0.22 mg/mL
Acetylsalicyclic acid	0.1 mg/mL	Miconazole	5%
Amantadine	0.03, 0.02, 0.01 mg/mL	Mix*	-
Amoxicillin	0.075 mg/mL	Mucin	0.086 mg/mL
Amphotericin B	0.22, 0.11, 0.06, 0.03 mg/mL	Oseltamivir (Tamiflu)	0.03 mg/mL
Antihistamine	0.22 mg/mL	Oxalic acid	0.01%
Ascorbic acid (c-vitamin)	1 mg/mL	pH (acidic)	4,7,9,
Augmentin (Amoxicillin Clavulanate)	0.22 mg/mL	Plasma	60%, 50%, 40%
		Prednisone	0.22 mg/mL
Azithromycin	0.012 mg/mL	Protein (albumin) (Low)	0.6, 5, and 10 mg/mL
Beet root	0.01%	Pyridium	1 mg/mL
Bilirubin	0.2 mg/mL	Rifampicin	0.09 mg/mL
Bromhexin/Cough drops/ cough syrup	0.22 mg/mL	Spinach	1%
		Tobacco, purified	0.4 mg/mL
Caffeine	15 mg/mL	Triglycerides	5 mg/mL
Chlorophyll	0.81 mg/mL	Urea 50%	20 mg/mL
Ciprofloxacin	0.22 mg/mL	Urea 75%	20 mg/mL
Cold and flu tablet+decongestant	5%, 10%, 20%, 50%	Vancomycin	0.1 mg/mL
		Water-based personal lubricant	1%, 5%, 10%, 15%
Corticosterone (Corticosteroids)	0.015 mg/mL		
		Washed red blood cells	10%
Erythromycin	0.067 mg/mL	Whole blood	5%, 10%, 15%
Glucose	3, 10, 20 mg/mL		
Hemoglobin	5 mg/mL		
Ibuprofen	0.1 mg/mL		

*(pH, whole blood, protein and glucose)

Red blood cells may result in difficult correct visual interpretation of the results. Thus, it is recommended to boil the urine sample if excessive colour on the test is present. Furthermore, water-based personal lubricant might cause invalid results (no control line) when tested at high concentrations (10% or higher).

Clinical sensitivity and specificity for CSF

In a population of eleven (11) culture positive *S. pneumoniae* CSF samples, 11/11 were *S. pneumoniae* positive with the ImmuView® *S. pneumoniae* Antigen Test using visual interpretation for a sensitivity of 100% (95%CI 74.1-100%). In the negative control population 161/163 were *S. pneumoniae* negative with the ImmuView® *S. pneumoniae* Antigen Test using visual interpretation for a specificity of 98.8% (95%CI 95.6-99.7%).

	Blood culture *S. pneumoniae*		
ImmuView®	Positive	Negative	Total
Positive	11	0	11
Negative	2	161	163
Total	13	161	174

ImmuView®	***S. pneumoniae***
Sensitivity	100% (11/11 95%CI 74.1-100%)
Specificity	98.8% (161/163 95%CI 95.6-99.7%)

Analytical studies - CSF

Sensitivity (limit of detection (LoD))

The limit of detection of ImmuView® *S. pneumoniae* Antigen Test in CSF was 10^5 CFU/mL using *S. pneumoniae* type one.

CSF	LoD
S. pneumoniae type 1 whole cell	10^5 CFU/mL

Co-infection

E. coli, *Streptococcus* Gr. B, *H. influenzae* Type B, and *N. meningitidis* Type B tested at a concentration of 10^7 CFU/ mL in artificial CSF samples did not cross react with the ImmuView® *S. pneumoniae* Antigen Test.

Reproducibility and repeatability

The reproducibility is 40/40 or one hundred percent (100%) (CI 95% 95-100%) using ImmuView® *S. pneumoniae* Antigen Test.

The repeatability is 80/80 or one hundred percent (100%) (CI 95% 95-100%) using ImmuView® *S. pneumoniae* Antigen Test. There have been no discordant results in repeatability by time, by day or by the operator.

Incident reporting

Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the member state in which the user and/or patient is established.

Quality certificate

SSI Diagnostica's development, production and sales of *in vitro* diagnostics are quality assured and certified in accordance with ISO 13485.

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References

1 Rota MC, Fontana S, Montaño-Remacha C, et al.; Legionnaires' disease pseudoepidemic due to falsely positive urine antigen test results. J Clin Microbiol. 2014;52(6):2279-2280. doi:10.1128/JCM.00493-14.

2 Briones ML, Blanquer J, Ferrando D, Blasco ML, Gimeno C, Marín J.; Assessment of analysis of urinary pneumococcal antigen by immunochromatography for etiologic diagnosis of community-acquired pneumonia in adults. Clin Vaccine Immunol. 2006;13(10):1092-1097. doi:10.1128/CVI.00090-06

Legal manufacturer, information and ordering:

SSI Diagnostica A/S
Herredsvejen 2
3400 Hillerød
Denmark
T +45 4829 9100
info@ssidiagnostica.com
immuview.com

UKRP:

Emergo Consulting (UK) Limited
c/o Cr360 – UL International
Compass House, Vision Park Histon
Cambridge CB24 9BZ
United Kingdom

CH REP

MedEnvoy Switzerland

Gotthardstrasse 28
6302 Zug
Switzerland

Revision history

- Change of logo of notified body
- Art names revised in section “Analytical studies”.
- Symbols added - not for self testing/near patient, in section “Quality certificate”.
- Text “for health care professionals” removed in section “Description”.
- CH REP and UKRP added.

IFU’s in other languages

https://ssidiagnostica.com/ifu/immuview-s-pneumoniae/

SSI Diagnostica A/S
Herredsvejen 2
3400 Hillerød
Denmark

IMMUVIEW.COM