FOR INFORMATIONAL USE ONLY ■ FOR INFORMATIONAL USE ONLY

Not to be used for performing assay. Refer to most current package insert accompanying your test kit.

QUICKVUE® Influenza A+B TEST

CLIA Complexity: WAIVED

INTENDED USE

The QuickVue Influenza A+B test allows for the rapid, qualitative detection of influenza type A and type B antigens directly from nasal swab, nasopharyngeal swab, nasal aspirate, and nasal wash specimens. The test is intended for use as an aid in the rapid differential diagnosis of acute influenza type A and type B viral infections. The test is not intended to detect influenza C antigens. Negative results should be confirmed by cell culture; they do not preclude influenza virus infection and should not be used as the sole basis for treatment or other management decisions. The test is intended for professional and laboratory use.

SUMMARY AND EXPLANATION

Influenza is a highly contagious, acute, viral infection of the respiratory tract. The causative agents of the disease are immunologically diverse, single-strand RNA viruses known as influenza viruses. There are three types of influenza viruses: A, B, and C. Type A viruses are the most prevalent and are associated with most serious epidemics. Type B viruses produce a disease that is generally milder than that caused by type A. Type C viruses have never been associated with a large epidemic of human disease. Both type A and B viruses can circulate simultaneously, but usually one type is dominant during a given season.[1]

Influenza antigens may be detected in clinical specimens by immunoassay. The QuickVue Influenza A+B test is a lateral-flow immunoassay using highly sensitive monoclonal antibodies that are specific for influenza antigens. The test is specific to influenza types A and B antigens with no known cross-reactivity to normal flora or other known respiratory pathogens.

PRINCIPLE OF THE TEST

The QuickVue Influenza A+B test involves the extraction of influenza A and B viral antigens. The patient specimen is placed in the Extraction Reagent Tube, during which time the virus particles in the specimen are disrupted, exposing internal viral nucleoproteins. After extraction, the Test Strip is placed in the Extraction Reagent Tube where nucleoproteins in the specimen will react with the reagents in the Test Strip.

If the extracted specimen contains influenza A or B antigens, a pink-to-red Test Line along with a blue procedural Control Line will appear on the Test Strip indicating a positive result. The Test Line for influenza A or B will develop at separate specified locations on the same Test Strip. If influenza A or B antigens are not present, or are present at very low levels, only the blue procedural Control Line will appear.

REAGENTS AND MATERIALS SUPPLIED

25-Test Kit: Catalog Number 20183

- **Shelf box containing:**
  - Individually Packaged Test Strips (25): Mouse monoclonal anti-influenza A and anti-influenza B antibodies
  - Extraction Reagent Solution (25): Vials with 340 µL of salt solution
  - Extraction Tubes (25): Lyophilized buffer with detergents and reducing agents
  - Disposable Droppers (25)
  - Sterile Nasal Swabs (25)
  - Positive Influenza Type A Control Swab (1): Swab is coated with non-infectious recombinant influenza A antigen
  - Positive Influenza Type B Control Swab (1): Swab is coated with non-infectious recombinant influenza B antigen
  - Negative Control Swab (1): Swab is coated with formalin-inactivated, non-infectious Streptococcus C antigen
  - Package Insert (1)
  - Procedure Card (1)

MATERIALS NOT SUPPLIED

- Specimen containers
- Timer or watch

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use.
- Do not use the kit contents beyond the expiration date printed on the outside of the box.
- Use appropriate precautions in the collection, handling, storage, and disposal of patient samples and used kit contents.[2]
- Use of Nitrile or Latex gloves is recommended when handling patient samples.[2]
- Dispose of containers and used contents in accordance with Federal, State and Local requirements.
- The Test Strip must remain sealed in the protective foil pouch until use.
- The Extraction Reagent Solution contains a salt solution. If the solution contacts the skin or eye, flush with copious amounts of water.
- To obtain accurate results, you must follow the Package Insert.
- Inadequate or inappropriate specimen collection, storage, and transport may yield false negative test results.
- Seek specific training or guidance if you are not experienced with specimen collection and handling procedures.[3, 4]
- Use the Transport Media recommended in the Package Insert.
- If infection with a novel influenza A virus is suspected based on current clinical and epidemiological screening criteria recommended by public health authorities, specimens should be collected with appropriate infection control precautions for novel virulent influenza viruses and sent to state or local health departments for testing. Viral culture should not be attempted in these cases unless a BSL 3+ facility is available to receive and culture specimens.
- Although this test has been shown to detect cultured avian influenza viruses, including avian influenza A subtype H5N1 virus, the performance characteristics of this test with specimens from humans infected with H5N1 or other avian influenza viruses are unknown.

KIT STORAGE AND STABILITY

Store the kit at room temperature, 59–86°F (15–30°C), out of direct sunlight. Kit contents are stable until the expiration date printed on the outer box. Do not freeze.

SPECIMEN COLLECTION AND HANDLING

Proper specimen collection, storage, and transport are critical to the performance of this Test.[3,4]

SPECIMEN COLLECTION

Nasal Swab Sample:
For optimal test performance with a nasal swab specimen, use the swabs supplied in the kit.
It is important to obtain as much secretion as possible. Therefore, to collect a nasal swab sample, insert the sterile swab into the nostril that presents the most secretion under visual inspection. Using gentle rotation, push the swab until resistance is met at the level of the turbinates (less than one inch into the nostril). Rotate the swab a few times against the nasal wall.

Nasopharyngeal Swab Sample:
It is important to obtain as much secretion as possible. Therefore, to collect a nasopharyngeal swab sample, carefully insert the sterile swab into the nostril that presents the most secretions under visual inspection. Keep the swab near the septum floor of the nose while gently pushing the swab into the posterior nasopharynx. Rotate the swab several times.

Nasal Wash or Aspirate Sample:
Follow your Institution's Protocol for obtaining wash specimens. **Use the minimal amount of saline that your procedure allows,** as excess volume will dilute the amount of antigen in the specimen. The following are examples of procedures used by clinicians:

For Older Children and Adults:
With the patient's head hyper-extended, instill sterile, normal saline (not supplied in the kit) into one nostril with a syringe. To collect the wash, place a clean, dry specimen container directly under the nose with slight pressure on the upper lip. Tilt the head forward and allow the fluid to run out of the nostril into the specimen container. Repeat for the other nostril and collect the fluid into the same specimen container.

For Younger Children:
The child should sit in the parent's lap facing forward, with the child's head against the parent's chest. Fill the syringe or aspiration bulb with the minimal volume of saline required per the subject's size and age. Instill the saline into one nostril while the head is tilted back. Aspirate the wash specimen back into the syringe or bulb. The aspirated wash sample will likely be at least 1 cc in volume.

Alternatively, following instillation of the saline, tilt the child's head forward and let the saline drain out into a clean collection cup.

SPECIMEN TRANSPORT AND STORAGE

Specimens should be tested as soon as possible after collection. However, if transport of swab samples is required, minimal dilution of the sample is recommended, as this may result in decreased test sensitivity. One (1) milliliter or less is suggested for optimal rapid test performance. The following transport media are compatible with the QuickVue Influenza A+B test:

Transport Media	Recommended Storage Condition		
	2–25°C for 8 hours	2–25°C for 24 hours	2–8°C for 48 hours
BD Universal Viral Transport Media	Yes	Yes	Yes
Bartels Flextrans Media	Yes	No	No
Copan Universal Transport Media	Yes	Yes	Yes
Hank's Balanced Salt Solution	Yes	No	No
M5 Media	Yes	No	No
Saline	Yes	No	No
Storage of sample in a clean, dry, closed container	Yes	No	No

The M4, M4-RT, Liquid Amies-D, Amies Clear, Modified Stuart's and Remel M6 transport media are not compatible with this device.

Nasal wash/aspirate specimens may also be stored frozen (-70°C or colder) for up to one month.

QUALITY CONTROL

Built-In Control Features

The QuickVue Influenza A+B test contains built-in procedural control features. The manufacturer's recommendation for daily control is to document these built-in procedural controls for the first sample tested each day.

The two-color result format provides a simple interpretation for positive and negative results. The appearance of a blue procedural Control Line provides several forms of positive control by demonstrating sufficient flow has occurred and the functional integrity of the Test Strip was maintained. **If the blue procedural Control Line does not develop at 10 minutes, the test result is considered invalid.**

A built-in negative control is provided by the clearing of red background color, verifying that the test has been performed correctly. Within 10 minutes, the result area should be white to light pink and allow the clear interpretation of the test result. **If background color appears and interferes with interpretation of the test result, the result is considered invalid.** Should this occur, review the procedure and repeat the test with a new Test Strip.

External Quality Control

External controls may also be used to demonstrate that the reagents and assay procedure perform properly.

Quidel recommends that positive and negative controls be run once for each untrained operator, once for each new shipment of kits — provided that each different lot received in the shipment is tested — and as deemed additionally necessary by your internal quality control procedures, and in accordance with local, state, and federal regulations or accreditation requirements.

If the controls do not perform as expected, repeat the test or contact Quidel Technical Support before testing patient specimens.

External Positive and Negative Control Swabs are supplied in the kit and should be tested using the Nasal Swab Test Procedure provided in this Package Insert or in the Procedure Card.

TEST PROCEDURE

All clinical specimens must be at room temperature before beginning the assay.

Expiration date: Check expiration on each individual test package or outer box before using. *Do not use any test past the expiration date on the label.*

Nasal/Nasopharyngeal Swab Procedure

1. Dispense all of the Extraction Reagent Solution from the Reagent Tube. Gently swirl the Extraction Tube to dissolve its contents.

2. Place the patient swab with sample into the Extraction Tube. Roll the swab at least three (3) times while pressing the head against the bottom and side of the Extraction Tube.

Leave the swab in the Extraction Tube for one (1) minute.

3. Roll the swab head against the inside of the Extraction Tube as you remove it. Dispose of the used swab in accordance with your biohazard waste disposal protocol.

4. Place the Test Strip into the Extraction Tube with the arrows on the Test Strip pointing down. Do not handle or move the Test Strip until the test is complete and ready for reading.

5. Read result at ten (10) minutes. Some positive results may appear sooner. Do not read result after ten (10) minutes.

Nasal Wash/Nasal Aspirate Procedure

1. Fill the dropper to the top/uppermost notch with nasal wash or nasal aspirate sample.

2. Add entire contents of the dropper to the Extraction Tube. Swirl the Extraction Tube gently to dissolve its contents.

3. Place the Test Strip into the Extraction Tube with the arrows on the Test Strip pointing down. Do not handle or move the Test Strip until the test is complete and ready for reading.

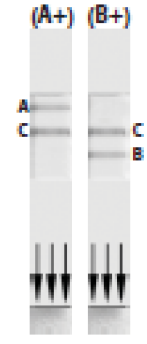
4. Read result at ten (10) minutes. Some positive results may appear sooner. Do not read result after ten (10) minutes.

INTERPRETATION OF RESULTS

Positive Result*:
At ten minutes, the appearance of **ANY** shade of a pink-to-red Test Line, either above or below the blue Control Line, **AND** the appearance of a blue procedural Control Line indicates a positive result for the presence of Influenza A and/or B viral antigen.

Hold the test strip with the **arrows pointed down.**

- If the red line is **above** the Control Line, the test results are positive for type A. See image to the immediate right (A+).
- If the red line is **below** the Control Line, the test results are positive for type B. See image to the far right (B+).



**A positive result does not rule out co-infections with other pathogens or identify any specific Influenza A virus subtype.*

Negative Result**:
At ten minutes, the appearance of **ONLY** the blue procedural Control Line indicates Influenza A and B viral antigen were not detected. A negative result should be reported as a presumptive negative for the presence of Influenza antigen.

***A negative result does not exclude Influenza viral infection. Negative results should be confirmed by cell culture.*

Invalid Result:
If at ten minutes, the blue procedural Control Line does not appear, even if any shade of a pink-to-red Test Line appears, **the result is considered invalid.** If at ten minutes, the background color does not clear and it interferes with the reading of the test, the result is considered invalid. If the test is invalid, a new test should be performed with a new patient sample and a new Test Strip.

LIMITATIONS

- The contents of this kit are to be used for the qualitative detection of influenza A and B antigen from nasal swab, nasopharyngeal swab, nasal wash and nasal aspirate specimens.
- A negative test result may occur if the level of antigen in a sample is below the detection limit of the test.
- Failure to follow the Test Procedure and Interpretations of Test Results may adversely affect test performance and/or invalidate the Test Result.
- Test Results must be evaluated in conjunction with other clinical data available to the physician.
- Negative test results do not rule out possible other non-influenza viral infections.
- Positive test results do not rule out co-infections with other pathogens.
- Positive test results do not identify specific influenza A virus subtypes.
- Children tend to shed virus more abundantly and for longer periods of time than adults. Therefore, testing specimens from adults will often yield lower sensitivity than testing specimens from children.
- Positive and negative predictive values are highly dependent on prevalence. False negative test results are more likely during peak activity when prevalence of disease is high. False positive test results are more likely during periods of low influenza activity when prevalence is moderate to low.
- Individuals who received nasally administered influenza A vaccine may have positive test results for up to three days after vaccination.
- Monoclonal antibodies may fail to detect, or detect with less sensitivity, influenza A viruses that have undergone minor amino acid changes in the target epitope region.
- If differentiation of specific influenza A subtypes and strains is needed, additional testing, in consultation with the state or local public health department, is required.

EXPECTED VALUES

Seasonal outbreaks of influenza occur worldwide in both the northern and southern hemispheres causing widespread illness each winter. The average attack rate of influenza is 26–33 cases per 100 people per year. The risk of hospitalization is roughly 1/300 of those infected among the very young and elderly. Approximately 36,000 deaths in the U.S. are attributed to influenza or its complications each year. Ninety percent (90%) of deaths occur in those 65 years of age and older. During each of three major epidemics occurring in 1957 and 1968, more than 40,000 people died of influenza in the U.S. alone. In the 1918 pandemic, an estimated 50 million deaths resulted worldwide. In the multi-center clinical study conducted by Quidel during an influenza season in North America, an illness prevalence of 24% for type A and 15% for type B influenza was observed.

PERFORMANCE CHARACTERISTICS

QuickVue Influenza A+B Test Performance vs. Cell Culture

Background on the 2005 Clinical Studies in Australia

The performance characteristics for influenza A were established when influenza A/H3 and A/H1 were the predominant influenza A viruses in circulation in Australia. When other influenza A virus subtypes are emerging as human pathogens, the performance characteristics described below could vary. During this particular influenza season in this region of Australia, 82% of the type A influenza viruses isolated from culture were H3N2 and 18% were H1N1.

In the 2005 clinical study, the performance of the QuickVue Influenza A+B test was compared to cell culture methods and confirmed with DFA in a multi-center field clinical study during the influenza season in Australia. This study was conducted at eight General Practice physician offices located across the Sydney metropolitan area in New South Wales, Australia. In this multi-center, point-of-care (POC) field trial, two (2) nasal or two (2) nasopharyngeal swab specimens were collected from each of a total of 238 patients. All clinical samples were collected from symptomatic patients. Seven percent (7%) of the population tested were <5 years of age, 24% 5 – <18 years of age, 68% ≥18 years of age, and 56% were male.

On-site testing of one nasal swab or nasopharyngeal swab specimen in the QuickVue Influenza A+B test was performed by physician office personnel within one hour of collection. This swab was incubated for one minute with the Extraction Reagent Solution before addition of the dipstick. The other swab was placed in viral transport media and stored at 2–8°C for up to 18 hours prior to culture. Madin-Darby Canine Kidney (MDCK) cells were inoculated with a portion of the nasal swab or nasopharyngeal swab specimen and incubated at 36°C for 48–96 hours. The inoculated cells were recovered from tissue culture and tested for influenza A or B by direct fluorescent antibody (DFA) staining.

Background on the 1998/1999 Clinical Studies in the United States

The performance characteristics for Influenza A were established when Influenza A/H3 and A/H1 were the predominant Influenza A viruses in circulation. When other Influenza A virus subtypes are emerging as human pathogens, the performance characteristics described below could vary. During this particular influenza season, 99% of the type A Influenza viruses isolated from culture were H3N2 and 1% was H1N1.

In the winter of 1998/1999, the performance of the QuickVue Influenza A+B test was compared to cell culture methods in a multi-center field clinical study. This study was conducted in pediatric, adult and geriatric patient populations in six geographically distinct regions in the United States. In this multi-center, point-of-care (POC) field trial, a combination of nasal swabs and nasal wash/aspirate specimens were collected from a total of two hundred seventy-five (275) patients.

On-site testing of the nasal swab and nasal wash or nasal aspirate specimens in the QuickVue Influenza A+B test was performed by physician office personnel within one hour of specimen collection. The patient's nasal swab was swirled three times in the Extraction Reagent Solution and removed before addition of the dipstick. Viral transport medium was added to all nasal specimens intended for culture transport. Swab specimens in viral transport media and nasal wash/aspirate specimens were stored at 2–8°C for up to 24 hours prior to culture. Rhesus Monkey Kidney (RMK) cells or Madin-Darby Canine Kidney (MDCK) cells were inoculated with a portion of the nasal swab specimen and nasal wash/aspirate and tested for the appearance of cytopathic effect (CPE). Infected cells were recovered from tissue culture and confirmed for Influenza A or B by direct fluorescent antibody (DFA) staining. A total of 363 specimens were tested from 275 patients (270 nasal swabs and 93 nasal wash/aspirate specimens).

Results with Nasal Swab Specimens (2005 Clinical Study)

Results for All Age Groups:

Nasal swab specimens from one hundred twenty-two patients were tested in QuickVue Influenza A+B and in cell culture. The QuickVue Influenza A+B test correctly identified 94% (16/17) culture-positive Influenza A specimens, 70% (14/20) culture-positive Influenza B specimens, 90% (95/105) culture-negative for Influenza A, and 97% (99/102) culture-negative for Influenza B, with an overall accuracy of 91% (111/122) and 93% (113/122) for Influenza A and B specimens, respectively. These results with nasal swabs are shown in Table 1.

Table 1
QuickVue Influenza A+B Nasal Swab Results versus Culture (All Age Groups)

TYPE A

	Culture +	Culture –
QV Pos	16	10*
QV Neg	1	95

Sens = 16/17 = 94% (95% C.I. 71–100%)
Spec = 95/105 = 90% (95% C.I. 83–95%)
Accur = 111/122 = 91% (95% C.I. 84–95%)
PPV = 16/26 = 62%
NPV = 95/96 = 99%

TYPE B

	Culture +	Culture –
QV Pos	14	3**
QV Neg	6	99

Sens = 14/20 = 70% (95% C.I. 48–86%)
Spec = 99/102 = 97% (95% C.I. 91–99%)
Accur = 113/122 = 93% (95% C.I. 86–96%)
PPV = 14/17 = 82%
NPV = 99/105 = 94%

* Of the 10 discrepant results, 7 were subsequently found to be positive by the QuickVue test and by an investigational RT-PCR.

** Of the 3 discrepant results, 2 were subsequently found to be positive by the QuickVue test and by an investigational RT-PCR.

Results Stratified by Age Group:

The results obtained with nasal swab specimens from each age group are shown in Table 2.

Table 2
QuickVue Influenza A+B Nasal Swab Results versus Culture (by Age Group)

	<5 years of age N=14			5 – <18 years of age N=28			≥18 years of age N=80		
	Sens	Spec	Accur	Sens	Spec	Accur	Sens	Spec	Accur
Type A	100% (5/5)	89% (8/9)	93% (13/14)	100% (3/3)	100% (25/25)	100% (28/28)	89% (8/9)	87% (62/71)	88% (70/80)
Type B	100% (1/1)	100% (13/13)	100% (14/14)	70% (7/10)	89% (16/18)	82% (23/28)	67% (6/9)	99% (70/71)	95% (76/80)

Results with Nasal Swab Specimens (1998/1999 Clinical Study)
Compared to culture and confirmed for Influenza A or B by DFA, the QuickVue Influenza A+B test correctly identified 72% (46/64) type A positive specimens, 73% (29/40) type B positive specimens, and 96% (159/166) negative specimens. These results with nasal swabs are shown in Table 3.

Table 3
QuickVue Influenza A+B Nasal Swab Results versus Culture (All Age Groups)

TYPE A

	Culture +	Culture –
QV Pos	46	7
QV Neg	18	159

Sens = 46/64 = 72% (95% C.I. 60–81%)
Spec = 159/166 = 96% (95% C.I. 91–98%)
Accur = 205/230 = 89% (95% C.I. 84–93%)
PPV = 46/53 = 87%
NPV = 159/177 = 90%

TYPE B

	Culture +	Culture –
QV Pos	29	7
QV Neg	11	159

Sens = 29/40 = 73% (95% C.I. 57–84%)
Spec = 159/166 = 96% (95% C.I. 91–98%)
Accur = 188/206 = 91% (95% C.I. 87–94%)
PPV = 29/36 = 81%
NPV = 159/170 = 94%

Results with Nasopharyngeal Swab Specimens (2005 Clinical Study)

Results for All Age Groups:
Nasopharyngeal swab specimens from one hundred sixteen patients were tested in QuickVue Influenza A+B and in cell culture. The QuickVue Influenza A+B test correctly identified 83% (20/24) culture-positive Influenza A specimens, 62% (8/13) culture-positive Influenza B specimens, and 89% (82/92) culture-negative for Influenza A, and 98% (101/103) culture-negative for Influenza B, with an overall accuracy of 88% (102/116) and 94% (109/116) for Influenza A and B specimens, respectively. These results with nasopharyngeal swabs are shown in Table 4.

Table 4
QuickVue Influenza A+B Nasopharyngeal Swab Results versus Culture (All Age Groups)

TYPE A

	Culture +	Culture –
QV Pos	20	10*
QV Neg	4	82

Sens = 20/24 = 83% (95% C.I. 64–94%)
Spec = 82/92 = 89% (95% C.I. 81–94%)
Accur = 102/116 = 88% (95% C.I. 81–93%)
PPV = 20/30 = 67%
NPV = 82/86 = 95%

TYPE B

	Culture +	Culture –
QV Pos	8	2**
QV Neg	5	101

Sens = 8/13 = 62% (95% C.I. 35–82%)
Spec = 101/103 = 98% (95% C.I. 93–100%)
Accur = 109/116 = 94% (95% C.I. 88–97%)
PPV = 8/10 = 80%
NPV = 101/106 = 95%

* Of the 10 discrepant results, 4 were subsequently found to be positive by the QuickVue test and by an investigational RT-PCR.

** Of the 2 discrepant results, 1 was subsequently found to be positive by the QuickVue test and by an investigational RT-PCR.

Results Stratified by Age Group:

The results obtained with nasopharyngeal swab specimens for each age group are shown in Table 5.

Table 5
QuickVue Influenza A+B Nasopharyngeal Swab Results versus Culture (by Age Groups)

	<5 years of age N=3			5 – <18 years of age N=30			≥18 years of age N=83		
	Sens	Spec	Accur	Sens	Spec	Accur	Sens	Spec	Accur
Type A	100% (1/1)	100% (2/2)	100% (3/3)	82% (9/11)	84% (16/19)	83% (25/30)	83% (10/12)	90% (64/71)	89% (74/83)
Type B	NA (0/0)	67% (2/3)	67% (2/3)	67% (2/3)	96% (26/27)	93% (28/30)	60% (6/10)	100% (73/73)	95% (79/83)

Results with Frozen Nasal Washes (2005 Study)

Results for All Age Groups:

The performance of the QuickVue Influenza A+B test was further evaluated in the year 2005 in a retrospective study with 149 frozen, clinical, nasal wash specimens. All clinical samples were collected from symptomatic patients visiting a physician's office in the Northeastern region of the United States. Fifty-eight percent (58%) of the population tested were <5 years of age, 38% 5 - <18 years of age, 4% ≥18 years of age, and 46% were male.

Nasal Wash specimens from one hundred forty-nine patients were tested in QuickVue Influenza A+B and in cell culture. The QuickVue Influenza A+B test correctly identified 86% (56/65) culture-positive influenza A specimens and 95% (80/84) culture-negative specimens as shown in Table 6. No influenza B samples were evaluated in this study.

Table 6
QuickVue Influenza A+B Frozen Nasal Wash Results versus Culture (All Age Groups)

TYPE A

	Culture +	Culture −
QV Pos	56	4*
QV Neg	9**	80

Sens = 56/65 = 86% (95% C.I. 76–93%)
Spec = 80/84 = 95% (95% C.I. 88–99%)
Accur = 136/149 = 91% (95% C.I. 86–95%)
PPV = 56/60 = 93%
NPV = 80/89 = 90%

* Of the 4 discrepant results, 1 was subsequently found to be positive by the QuickVue test and by an investigational RT-PCR. There was too little volume in 1 sample to be analyzed by RT-PCR.

** Of the 9 discrepant results, 2 of 5 samples were subsequently found to be negative by the QuickVue test and by an investigational RT-PCR. There was too little volume in 4 samples to be analyzed by RT-PCR.

Results Stratified by Age Group:

The results obtained with frozen nasal wash specimens for each age group are shown in Table 7.

Table 7
QuickVue Influenza A+B Frozen Nasal Wash Results versus Culture (by Age Groups)

	<5 years of age N=87			5 – <18 years of age N=56			≥18 years of age N=6		
	Sens	Spec	Accur	Sens	Spec	Accur	Sens	Spec	Accur
Type A	90% (35/39)	96% (46/48)	93% (81/87)	87% (20/23)	94% (31/33)	91% (51/56)	33% (1/3)	100% (3/3)	67% (4/6)

Results with Fresh Nasal Wash/Aspirate Specimens (1998/1999 Clinical Study)
Compared to culture and confirmed for Influenza A or B by DFA, the QuickVue Influenza A+B test correctly identified 77% (10/13) type A positive specimens, 82% (9/11) type B positive specimens, and 99% (68/69) negative specimens. These samples were tested within one hour of collection and had not been frozen. These results with nasal wash/aspirate specimens are shown in Table 8.

Table 8
QuickVue Influenza A+B Fresh Nasal Wash/Aspirate Results versus Culture (All Age Groups)

TYPE A

	Culture +	Culture −
QV Pos	10	1
QV Neg	3	68

Sens = 10/13 = 77% (95% C.I. 49–93%)
Spec = 68/69 = 99% (95% C.I. 91–100%)
Accur = 78/82 = 95% (95% C.I. 88–98%)
PPV = 10/11 = 91%
NPV = 68/71 = 96%

TYPE B

	Culture +	Culture −
QV Pos	9	1
QV Neg	2	68

Sens = 9/11 = 82% (95% C.I. 51–96%)
Spec = 68/69 = 99% (95% C.I. 91–100%)
Accur = 77/80 = 96% (95% C.I. 89–99%)
PPV= 9/10 = 90%
NPV= 68/70 = 97%

ANALYTICAL SPECIFICITY AND CROSS-REACTIVITY

The QuickVue Influenza A+B test was evaluated with a total of 62 bacterial and viral isolates. Bacterial isolates were evaluated at a concentration between 10^7 and 10^9 org/mL. Viral isolates were evaluated at a concentration of at least 10^4–10^6 TCID50/mL. Adenovirus 18 and Parainfluenza virus 3 were tested at 10^2 TCID50/mL. None of the organisms or viruses listed below in Table 9 gave a positive result in the QuickVue Influenza A+B test.

Table 9
Analytical Specificity and Cross-Reactivity

Bacterial Panel:

Acinetobacter calcoaceticus
Bacteroides fragilis
Bordetella pertussis
Branhamella catarrhalis
Candida albicans
Corynebacterium diphtheriae
Enterococcus faecalis
Escherichia coli
Gardnerella vaginalis
Haemophilus influenzae
Klebsiella pneumoniae
Lactobacillus casei
Lactobacillus plantarum
Legionella pneumophila
Mycoplasma pneumoniae
Neisseria gonorrhoeae
Neisseria meningitidis
Neisseria sicca
Neisseria subflava
Proteus vulgaris
Pseudomonas aeruginosa
Serratia marcescens
Staphylococcus aureus
Staphylococcus epidermidis
Streptococcus mutans
Streptococcus pneumoniae
Streptococcus pyogenes
Streptococcus sanguis

Bacterial Panel:

Listeria monocytogenes
Mycobacterium avium
Mycobacterium intracellulare
Mycobacterium tuberculosis
Mycoplasma orale
Streptococcus sp. Gp. B
Streptococcus sp. Gp. C
Streptococcus sp. Gp. F
Streptococcus sp. Gp. G

Viral Panel:

Adenovirus 5 (Ad. 75)
Adenovirus 7 (Gomen)
Adenovirus 10 (J.J.)
Adenovirus 18 (D.C.)
Coronavirus OC43
Coxsackievirus A9 (Bozek)
Coxsackievirus B5 (Faulkner)
Cytomegalovirus (Towne)
Echovirus 2 (Cornells)
Echovirus 3 (Morrisey)
Echovirus 6 (D'Amori)
Herpes simplex virus 1
Herpes simplex virus 2
Human Rhinovirus 2 (HGP)
Human Rhinovirus 14 (1059)
Human Rhinovirus 16 (11757)
Measles (Edmonston)
Mumps (Enders)
Parainfluenza virus 1 (Sendai)
Parainfluenza virus 2 (CA/Greer)
Parainfluenza virus 3 (C243)
Respiratory Syncytial virus (A-2)
Respiratory Syncytial virus
(Subgroup A, Long chain)
Rubella (RA 27/3)
Varicella-Zoster (Ellen)

ANALYTICAL SENSITIVITY

Analytical sensitivity was demonstrated using a total of forty-seven (47) strains of human influenza viruses: thirty-four (34) Influenza A and thirteen (13) Influenza B (Table 10).

Table 10
Analytical Sensitivity with Human Isolates of Influenza A and B

Viral Strain	Viral Type	Sub-Type	Minimum Detectable Level
			TCID50/mL
New Caledonia/20/99	A	H1N1	1.63×10^{2}
California/04/09*	A	H1N1	4.4×10^{2}
			pfu/mL**
Hong Kong	A	H3N2	6.60×10^{-1}
Beijing/32/92	A	H3N2	3.30×10^{0}
Shanghai/11	A	H3N2	6.70×10^{0}
Shanghai/16	A	H3N2	1.00×10^{1}
Victoria	A	H3N2	3.30×10^{1}
Singapore/1/57	A	H2N2	6.70×10^{1}
Port Chalmers	A	H3N2	1.24×10^{2}
USSR	A	H1N1	2.00×10^{2}
Puerto Rico/8/34	A	H1N1	2.60×10^{2}
New Jersey	A	H1N1	2.70×10^{2}
Taiwan	A	H1N1	3.30×10^{2}
Tokyo/3/67	A	H2N2	3.40×10^{2}
Bayern	A	H1N1	6.60×10^{2}
Sichuan	A	H3N2	6.60×10^{2}
Beijing/352/89	A	H3N2	7.70×10^{2}
NWS/33	A	H1N1	1.00×10^{3}
Fort Warren/1/50	A	H1N1	1.70×10^{3}
Mississippi	A	H3N2	1.70×10^{3}
Texas/77	A	H1N1	3.30×10^{3}
Fort Monmouth/1/47	A	H1N1	6.70×10^{3}
Aichi	A	H3N2	3.20×10^{3}

Viral Strain	Viral Type	Sub-Type	Minimum Detectable Level
			pfu/mL**
Shangdong	A	H3N2	8.40×10^{3}
Maryland/91	A	H1N1	1.00×10^{4}
Japan/305/57	A	H2N2	1.30×10^{4}
Johannesburg/94	A	H3N2	1.44×10^{4}
Brazil	A	H1N1	1.70×10^{4}
Sydney	A	H3N2	2.00×10^{4}
Bangkok	A	H3N2	3.30×10^{4}
Wuhan	A	H3N2	3.30×10^{4}
Beijing/353/89	A	H3N2	3.30×10^{5}
Singapore/86	A	H1N1	6.60×10^{5}
Texas/91	A	H1N1	1.60×10^{7}
Victoria	B		1.40×10^{4}
Taiwan	B		1.10×10^{5}
Panama	B		1.00×10^{6}
Ann Arbor	B		3.30×10^{2}
Singapore	B		3.30×10^{2}
Lee	B		6.60×10^{2}
Hong Kong	B		7.00×10^{2}
Beijing/184/93	B		1.66×10^{3}
California	B		3.30×10^{3}
Maryland	B		6.60×10^{3}
Yamagata/16/88	B		6.70×10^{3}
Harbin	B		1.40×10^{4}
Stockholm	B		3.30×10^{5}

TCID50/mL = 50% tissue culture infectious dose; pfu/mL = plaque-forming unit per milliliter

* Although this test has been shown to detect the 2009 H1N1 virus cultured from a positive human respiratory specimen, the performance characteristics of this device with clinical specimens that are positive for the 2009 H1N1 influenza virus have not been established. The QuickVue Influenza A+B test can distinguish between influenza A and B viruses, but it cannot differentiate influenza subtypes.

** These viral strains were obtained from American Type Culture Collection (ATCC) with titer information, and the titers were not verified by Quidel. The performance characteristics for influenza A virus subtypes emerging as human pathogens have not been established.

Analytical sensitivity was further evaluated using a total of twenty-four (24) Influenza A viruses isolated from birds and mammals. The QuickVue Influenza A+B test detected all of the strains examined (Table 11).

Table 11
Analytical Sensitivity with Bird and Mammal Isolates of Influenza A

Viral Strain*	Viral Type	Viral Subtype
Duck/Tottori/723/80	A	H1N1
Duck/Alberta	A	H1N1
Duck/Hokkaido/17/01	A	H2N2
Duck/Mongolia/4/03	A	H3N8
Duck/Ukraine/1/63	A	H3N8
Equine/Miami/1/63	A	H3N8
Duck/Czech/56	A	H4N6
Hong Kong/483/97	A	H5N1
Hong Kong/156/97	A	H5N1
Chicken/Yamaguchi/7/04	A	H5N1
A/Chicken/Vietnam/33/04	A	H5N1
A/Vietnam/3028/04	A	H5N1
A/Thailand/MK2/04	A	H5N1
Duck/Pennsylvania/10128/84	A	H5N2
Turkey/Massachusetts/3740/65	A	H6N2
Seal/Massachusetts/1/80	A	H7N7
Turkey/Ontario/67	A	H8N4
Turkey/Wisconsin/66	A	H9N2
Chicken/Germany/N/49	A	H10N7
Duck/England/56	A	H11N6
Duck/Alberta/60/76	A	H12N5
Gull/Maryland/704/77	A	H13N6
Mallard/Astrakhan/263/82	A	H14N5
Duck/Australia/341/83	A	H15N8

* Performance characteristics for detecting influenza A virus from human specimens when these or other influenza A virus subtypes are emerging as human pathogens have not been established.

INTERFERING SUBSTANCES

Whole blood, and several over-the-counter (OTC) products and common chemicals were evaluated and did not interfere with the QuickVue Influenza A+B test at the levels tested: whole blood (2%); three OTC mouthwashes (25%); three OTC throat drops (25%); three OTC nasal sprays (10%); 4-Acetamidophenol (10 mg/mL); Acetylsalicylic Acid (20 mg/mL); Chlorpheniramine (5 mg/mL); Dextromethorphan (10 mg/mL); Diphenhydramine (5 mg/mL); Ephedrine (20 mg/mL); Guaiacol glyceryl ether (20 mg/mL); Oxymetazoline (10 mg/mL); Phenylephrine (100 mg/mL); and Phenylpropanolamine (20 mg/mL).

PRECISION STUDIES

The total, within-run, and between-run performance of the QuickVue Influenza A+B test was evaluated for precision. A panel consisting of two different levels of Influenza A antigen (Johanneburg/82/96; weak positive and strong positive) and two different levels of Influenza B antigen (Harbin/7/94; weak positive and strong positive) were repeated five times with a single lot of QuickVue Influenza A+B test on three different days. One hundred percent (100%) accuracy was obtained for all specimens tested.

PHYSICIAN OFFICE LABORATORY (POL) STUDIES

An evaluation of the QuickVue Influenza A+B test was conducted at three Physicians' Offices using a panel of 180 coded specimens. Testing was performed by physician office personnel with diverse educational backgrounds and work experiences at three different locations. The proficiency panel contained negative, low positive and moderate positive specimens. Each specimen level was tested at each site in replicates of at least six over a period of three days.

The results obtained at each site agreed >99% with the expected results. No significant differences were observed within run (six replicates), between runs (three different days) or between sites (three POL sites).

ASSISTANCE

If you have any questions regarding the use of this product, please call Quidel's Technical Support Number (800) 874-1517 (toll-free in the U.S.A.) or (858) 552-1100, Monday through Friday, between 7:00 a.m. and 5:00 p.m., Pacific Time, U.S.A. If outside the United States contact your local distributor or technicalsupport@quidel.com.

FOR INFORMATIONAL USE ONLY ■ FOR INFORMATIONAL USE ONLY

Not to be used for performing assay. Refer to most current package insert accompanying your test kit.

REFERENCES

1. Murphy B.R. and Webster R.G., 1996, Orthomyxoviruses, pp. 1397–1445. In: Fields Virology, 3rd edition, B.N. Fields, D.M. Knipe, P.M. Howley, et al. (eds.), Lippincott-Raven, Philadelphia.
2. Biosafety in Microbiological and Biomedical Laboratories, 5th Edition. U.S. Department of Health and Human Services, CDC, NIH, Washington, DC (2007).
3. Henretig F.M. MD, King C. MD, Textbook of Pediatric Procedures, Chapter 123 – Obtaining Biologic Specimens Williams and Williams (April 1997).
4. The Clinical Virology Laboratory, Department of Laboratory Medicine at Yale: http://info.med.yale.edu/labmed/virology/booklet.html.

REF 20183 – QuickVue Influenza A+B 25 Test Kit

IVD

CE

EC REP

MDSS GmbH
Schiffgraben 41
30175 Hannover,
Germany

CLIA '88 WAIVED CLIA '88