The information previously contained on these webpages were authorized under the 2009 H1N1 Influenza Emergency Use Authorizations (EUAs). As of June 23, 2010, the EUAs have been terminated and this information is no longer current.

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GeneSTAT™ 2009 A/H1N1 Influenza Test

INTENDED USE

The GeneSTAT™ 2009 A/H1N1 Influenza Test is intended for the *in vitro* qualitative detection of 2009 H1N1 Influenza A viral RNA using RNA extracted with the Roche High Pure RNA Isolation Kit from nasopharyngeal and nasal swabs of patients with signs and symptoms of respiratory infection. This test is to be used in CLIA High Complexity Laboratories with access to the GeneSTAT Analytical Platform.

Testing with the GeneSTAT™ 2009 A/H1N1 Influenza Test should not be performed unless the patient meets clinical and epidemiologic criteria for testing suspect specimens. The identification of 2009 H1N1 influenza virus should be made in conjunction with clinical and epidemiological information.

Negative results from the GeneSTAT™ 2009 A/H1N1 Influenza Test do not preclude influenza virus infection and should not be used as the sole basis for treatment or other patient management decisions.

SUMMARY AND EXPLANATION

Influenza is a highly contagious, acute respiratory illness. Influenza symptoms include but are not limited to, fever, muscle ache and pain, headache, cough, sore throat and nasal inflammation. Seasonal, geographic patterns have historically characterized the illness, but international travel precipitates influenza becoming a year-round disease. Recent significant public health concerns associated with emergence of the novel 2009 H1N1 influenza A virus pandemic, have elevated the need for improved screening tools intended to detect specific seasonal and novel influenza A viruses infecting humans.[1] In that regard, the U.S. Food and Drug Administration has issued a document entitled "Guidance for Industry and FDA Staff - In Vitro Diagnostic 2009 H1N1 Tests for Use in the 2009 H1N1 Emergency" that delineates criteria for Emergency Use Authorization (EUA) requests for in vitro diagnostic devices to be used in detecting 2009 H1N1 Influenza virus[2].

Three major influenza pandemics occurred in the 20th Century, predictions of the imminence of a future pandemic[3] were recently verified by the declaration of the H1N1 influenza pandemic in June, 2009. The GeneSTAT™ 2009 A/H1N1 Influenza Test is an *in vitro* diagnostic test designed to detect influenza A, via an influenza A matrix gene target, and 2009 H1N1 influenza A RNA, via HA1 and NA1 gene targets specific to the 2009 A/H1N1 influenza virus.

The GeneSTAT System can provide valuable information to assist medical professionals in diagnosing 2009 A/H1N1 Influenza virus infection and consequently implementing appropriate therapeutic and control measures.

PRINCIPLE

The test comes as two components, the GeneSTAT Sample Prep Vial and GeneSTAT Test Module. The Test Module can only be analyzed using the GeneSTAT Analytical platform.

The Sample Prep Vial contains a pre-measured amount of buffer. An extracted test specimen (obtained from a nasal or nasopharyngeal swab) is added to the liquid in the Sample Prep Vial, after which, it is attached to the Test Module. The Test Module is then inserted in the GeneSTAT Analyzer. All subsequent procedural steps, from sample preparation to result reporting, are analyzer-controlled and proceed without user intervention.

The Test Module contains all of the necessary PCR chemistry in lyophilized format. There are two reaction wells. One reaction well contains the necessary reagents to individually detect sequences in the H1 hemagglutinin gene and N1 neuraminidase gene specific for the 2009 H1N1 influenza A virus using separate fluorophores. The other well contains reagents to individually detect the presence of the Influenza A matrix gene plus an internal or exogenous control gene, the Caprine Arthritis-Encephalitis Virus (CAEV) core polypeptide p28 gene (which is spiked into each specimen prior to sample processing).

The required testing conditions (e.g., duration and temperature) and specific test/reagent information are encoded on an RFID tag that is attached to the Test Module and recognized automatically by the system. The user is not required to select an assay routine from a menu of assays and is not able or to define testing conditions.

Results are generated from typical RT-PCR amplification curves that exhibit sufficient amplification and typical characteristics. Test results are scored as positive, meaning that specific nucleic acid sequences of the target analyte (H1, N1, and Matrix) were "Detected"; or as negative, meaning that such specific sequences were "Not Detected."

As with all diagnostic procedures exhibiting a limit of detection, a negative result does not preclude the possibility of the specific target being present at concentrations below the assay's detection limit.

Negative test results should be followed up by additional diagnostic testing. Cell culture requires a Biosafety Level 2 or higher designated facility.

As with other PCR tests, negative results do not preclude influenza virus infection and should not be used as the sole basis for treatment or other management decisions.

STORAGE

Optimally, the product should be stored refrigerated (2-8°C), but may be kept at temperatures ranging from 2°C to 25°C until the expiration date printed on the box. Do not freeze or overheat.

PRECAUTIONS

- For *In Vitro* Diagnostic Use Only.
- This is a "closed test system" (except for the extraction procedure) that employs a unique test module. The test module is designed to only run on a GeneSTAT PCR Analyzer.
- Directions and user manual must be read and followed carefully.
- Do not use tests or components beyond printed expiration date.
- Do not use cotton swabs or swabs with wooden shafts to collect nasal or nasopharyngeal specimens. These can introduce chemistry that may compromise and confound PCR amplification.
- Follow the established safety procedures when working with patient specimens.
- Opening of the cartridge and removal of specimen after initial specimen insertion is not recommended and may invalidate the test. Biological hazards and/or amplicon contamination might compromise subsequent test results.
- Suspected novel virulent specimens should be collected with infection control precautions and sent to state or local health departments for further testing.
- Used test modules should be disposed of using standard biohazard material handling protocols (autoclaving or 10% bleach).

SPECIMEN COLLECTION AND TRANSPORT

Acceptable specimens for use with the GeneSTAT 2009 A/H1N1 Influenza Test are nasal and nasopharyngeal swabs. All collected specimens should be obtained as early as possible after onset of symptoms. Ideally, the swab should be inserted immediately into a tube containing 1-ml viral transport media and stored at 2-4 C for less than 4 days or otherwise at -70°C to prevent contamination or degradation of the sample.

Inadequate or inappropriate specimen collection and storage may yield false results. No analytical system can compensate for an inadequate test specimen. Multiple references describe in detail how to properly obtain adequate nasal and nasopharyngeal swab samples[4].

The sample should be processed, placed in a test module and then inserted into the GeneSTAT Analyzer as soon as possible for the best results. If a positive result for 2009 H1N1 influenza is indicated, reporting should be forwarded to the CDC as per current reportable disease guidelines.

SAMPLE TRANSPORT OR STORAGE MEDIA

The GeneSTAT 2009 A/H1N1 Influenza Test has been successfully validated using Brain Heart Infusion Transport Medium and *Chlamydia*, Viruses and *Mycoplasma* Transport Medium from Hardy Laboratories. Performance of the test using other virus transport and storage media has not been established.

Testing on the GeneSTAT can be done at or near the specimen collection site if the appropriate equipment and personnel capabilities are in place. However, if a sample must be sent to a testing site, transport should be arranged in accordance with international, federal and/or state requirements and local laboratory protocols. DxNA recommends following the protocols outlined by Centers for Disease Control and Prevention or the World Health Organization for transport of suspected Human and Animal specimens suspected of containing 2009 A/H1N1 Influenza virus infection.[5]

NUCLEIC ACID EXTRACTION

Performance of RT-PCR amplification-based assays in the GeneSTAT System using nucleic acid extracted samples depends on the amount and quality of sample template RNA. DxNA routinely uses the Roche High Pure RNA Isolation Kit (Roche Diagnostics, Germany; Cat. No. 11 828 665 001) for extraction of purified RNA for the GeneSTAT System. The manufacturer's 1X protocol should be followed with 200-µL samples used for extraction. Nucleic acid is eluted into a final volume of 200 µL and either used immediately or stored at -70°C.

Note:

Extraction of a 200-µL sample aliquot typically comprises about 20% of the total volume of a sample contained in sample transport or storage medium.

For other RNA-based detection assays, commercially available procedures including QIAamp® viral RNA Mini Kit, or RNeasy® Mini Kit (Qiagen), Roche MagNA Pure Compact RNA Isolation Kit, MagNA Pure LC RNA Isolation Kit II and Roche MagNA Pure Total Nucleic Acid Kit have been shown to generate highly purified RNA appropriate for analysis when following manufacturer's recommended procedures. Performance of the GeneSTAT 2009 A/H1N1 Influenza Test using any RNA extraction procedure other than the Roche High Pure RNA Isolation Kit has not been established.

REAGENTS AND MATERIALS SUPPLIED

1. GeneSTAT H1N1 Test Module. Each GeneSTAT Test Module contains within it all of the measured reagents and materials necessary to do RT-PCR. No additional measuring or manipulation of reagents is necessary.

2. GeneSTAT Sample Prep Vial. The Sample Prep Vial for use with extracted RNA contains a pre-measured volume (900 µL) of distilled water.

3. Influenza A Matrix - Positive Control Swab

4. H1 Positive Control Swab (2009 H1N1 specific).

MATERIALS REQUIRED OR RECOMMENDED BUT NOT SUPPLIED

1. Disposable, powder-free gloves

2. Laboratory coat

3. Pipette and pipette tips capable of handling 200-µL volumes

4. 10% Bleach Solution

PROCEDURE

It is recommended that a lab coat and powder-free disposable gloves (not previously used) be worn when running assays. Change gloves between samples and whenever you suspect that these may be contaminated. Also, remember to keep samples capped or covered as much as possible prior to use. Work surfaces, pipettes and the GeneSTAT Analyzer should be cleaned and decontaminated with cleaning products like 5% bleach, UltraClean™ Lab Cleaner, DNAzap™ or RNase AWAY® to minimize the risk of nucleic acid contamination.

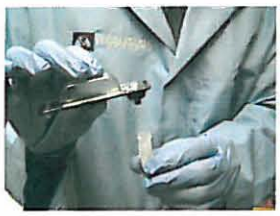
1. Have ready a 200-µL aliquot of an extracted RNA sample. If more than 5 minutes will transpire before adding it to a GeneSTAT Sample Prep vial, keep the samples on ice or refrigerated at 4-8°C until used.

2. Open the foil pouch containing the Test Module but do not remove it from the pouch at this time.

3. Remove the Sample Prep Vial from its pouch and remove the cap.

4. With a pipette, dispense the 200-µL aliquot of an extracted RNA sample into the liquid contained in the Sample Prep Vial. Remove the pipette tip from the liquid and discard it in 10% bleach.

5. Remove the Test Module from its pouch and screw on the Sample Prep Vial as shown below. It will lock in place which will be obviated by an ability to screw on no further. The fully-assembled Test Module is self-contained and does not vent to the external environment.




6. Open the lid of the analyzer and position the Test Module as shown below.

7. Close the lid and push the Start Button (●) on the analyzer.

8. The assay will proceed without any further user input. Results will be displayed after the run is completed. The following screens indicate assay progress (i.e., what is happening to the sample): (a) Lysing [which will actually be turned off when used with extracted RNA samples], (b) RT [= Reverse Transcriptase], (c) Pre-Denature, (d) Cycles to go: # [Progress of DNA Amplification], Test Results

9. Read and record the test results from the display screen on the analyzer.

Notes:

1. See the GeneSTAT Operator's Manual to set the local date and time.

2. The lot number and expiration date of the Test Module will be read from the Radio Frequency ID (RFID) tag on the Test Module. Test names and cycling conditions (e.g., duration and temperature.) are also read from the RFID memory and cannot be altered by the operator.

3. Error screens will indicate the problem and give instruction as 'what to do' if necessary.

INTERPRETATION AND REPORTING OF RESULTS

All of the three targets (N1 neuraminidase, H1 hemagglutinin, and Influenza A matrix) must be positive to determine that 2009 A/H1N1 Influenza RNA has been detected in a sample. In case of an indeterminate result (i.e., when one or more of the three aforementioned targets is not detected), retesting and/or other diagnostic follow up is recommended.

The cut-off Ct value for a GeneSTAT assay was set at 38 in order to maximize detection of any and all influenza A subtypes. This cut-off value was validated during the clinical evaluation of the assay. Clinical samples should present reaction curves that cross the threshold line at or before 38 cycles. It is possible that certain samples will fail to yield positive reactions due to low cell numbers in the original clinical samples. Below are the acceptance criteria for the interpretation of the results.

1. If N1 & H1 have a Ct ≤38 and Matrix has a Ct ≤38, then 2009 A/H1N1 Influenza RNA is reported as **Detected.**

2. If N1 & H1 have a Ct ≤38 and Matrix is not detected within 38 cycles, then 2009 A/H1N1 Influenza RNA is reported as **Indeterminate**. Repeat testing is required.

3. If N1 or H1 (i.e., only one not both targets) has a Ct ≤38 and Matrix is detected within 38 cycles, then 2009 A/H1N1 Influenza RNA is reported as **Indeterminate.** Repeat testing is required.

4. If N1 or H1 (only one of them) has a Ct ≤38 and Matrix is not detected within 38 cycles, then an "Indeterminate Test Result" is obtained. Repeat testing is required.

5. If N1 and H1 are not detected within 38 cycles and Matrix has a Ct ≤38, then 2009 A/H1N1 Influenza RNA is reported as **Not Detected**; Influenza-A RNA is considered **Detected.**

6. If N1 and H1 are not detected within 38 cycles and Matrix is not detected within 38 cycles, then 2009 A/H1N1 Influenza RNA is reported as **Not Detected**; Influenza-A RNA is considered **Not Detected.**

Quality Control:

1. If Matrix is not detected within 38 cycles and p28 is also not detected within 38 cycles, the test is Invalid. Repeat testing is required.

2. If Matrix is detected within 38 cycles, the test is valid regardless of p28 status.

3. At least once per day that specimens are to be tested, a known sample (2009 H1N1 positive or influenza A positive specimen) should be tested as a positive control for RNA extraction and subsequent protocol steps. If the positive control fails, any specimen result obtained since the last positive control result needs to be retested.

4. LIMITATIONS

1. Individuals performing analyses should be trained and familiar with testing procedures and interpretation of results prior to doing a GeneSTAT assay.

2. Results from this test must be interpreted in conjunction with the clinical history, epidemiological data, clinical signs and symptoms, and other data available to the clinician evaluating the patient.

3. The prevalence of infection will affect the test's predictive value.

4. Performance characteristics may vary due to emerging influenza A viruses.

5. As with other tests, negative results do not rule out Influenza A or 2009 H1N1 influenza infection, and should not be used as the sole basis for patient clinical management decisions.

6. Analyte targets (viral nucleic acid) may persist *in vivo*, independent of virus viability. Detection of analyte target(s) does not imply that the corresponding virus(es) are infectious, or are the causative agents of the clinical symptoms.

7. A false negative result may outfall when inadequate amounts of viral RNA are present in samples due to low viral loads, improper collection, transportation, poor storage conditions and other deficiencies in handling.

8. False negative results may occur when the infecting organism has genomic mutations, insertions, deletions, or rearrangements or when performed late in the course of illness.

9. There is a risk of false positive values resulting from cross-contamination by target organisms or their nucleic acid.

10. The performance of this test has not been established for screening of blood or blood products for the presence of Influenza A or 2009 H1N1 influenza.

11. This test cannot rule out diseases caused by other bacterial or viral pathogens.

ANALYTICAL PERFORMANCE CHARACTERISTICS

ANALYTICAL SENSITIVITY/LIMIT OF DETECTION (LOD)

The Limit of Detection was determined with samples of virus cultured in chicken eggs: a 2009 H1N1 influenza virus strain (A/California/04/2009) and a seasonal strain of H1N1 (A/Memphis/37/2009), both obtained from the WHO Collaborating Center for Studies on the Ecology of Influenza in Animals Virology (Department of Infectious Disease, St. Jude Children's Research Hospital, Memphis, TN).

These primary or minimally-passed viral stocks were titered (both initially testing at 10^8 EID_{50}/mL), serially diluted, and then extracted in 5 replicates of each dilution to determine a tentative LoD EID_{50}/mL dilution yielding positive

values 95% of the time (Table 1). A final dilution confirming a 95% LoD of 2 X 10^2 EID_{50}/mL or $10^{2.3}$ EID_{50}/mL was run in 20 replicates (Table 2).

Table 1. Serial Dilutions of 2009 A/H1N1 Influenza and Seasonal Influenza A/H1N1 Viruses Assayed in the DxNA GeneSTAT System. Values are expressed as Ct values. Primary virus cultures were obtained from the WHO Collaborating Center for Studies on the Ecology of Influenza in Animals Virology (Department of Infectious Disease, St. Jude Children's Research Hospital, Memphis, TN). Five aliquots of each virus dilution were assessed as log_{10} serial dilutions and RNA was extracted for assay processing.

CONC. refers to the concentration of extracted viral RNA present in a GeneSTAT rRT-PCR reaction expressed as EID_{50}/mL. N1 = N1 neuraminidase for 2009 A/H1N1 Influenza; H1 = H1 hemagglutinin for 2009 A/H1N1 Influenza; MA = Influenza A matrix; p28 = P28 Caprine Arthritis-Encephalitis Virus (Exogenous Reaction Control); ND = Not Detected

2009 A/H1N1 Influenza, A/California/04/2009 -- Concentration of Undiluted Virus Culture = 10^8 EID_{50}/mL

CONC.	N1-1	N1-2	N1-3	N1-4	N1-5	H1-1	H1-2	H1-3	H1-4	H1-5	MA-1	MA-2	MA-3	MA-4	MA-5	p28-1	p28-2	p28-3	p28-4	p28-5
10^5	24	26	23	25	23	28	23	25	26	26	25	31	26	28	27	34	36	33	34	33
10^4	27	28	27	27	29	27	28	27	28	28	27	32	30	30	28	31	37	34	30	35
10^3	29	31	28	30	29	28	31	33	30	30	30	35	33	31	33	32	32	31	34	34
10^2	36	37	ND	36	ND	ND	38	35	36	36	ND	38	37	ND	35	30	31	30	33	35
10^1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33	30	32	30	31

Averages

CONC.	N1	H1	MA	p28
10^5	24.2	25.6	27.4	34.0
10^4	27.6	27.6	29.4	33.4
10^3	29.4	30.4	32.4	32.6
10^2	36.3	36.3	36.7	31.2

Seasonal A/H1N1 Influenza, A/Memphis/37/2009 -- Concentration of Undiluted Virus Culture = 10^8 EID_{50}/mL

CONC.	N1-1	N1-2	N1-3	N1-4	N1-5	H1-1	H1-2	H1-3	H1-4	H1-5	MA-1	MA-2	MA-3	MA-4	MA-5	p28-1	p28-2	p28-3	p28-4	p28-5
10^5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22	24	27	23	25	35	34	33	35	32
10^4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27	27	31	27	28	31	30	35	34	36
10^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30	29	33	29	32	34	38	29	34	31
10^2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	32	34	ND	32	ND	32	30	31	36	29
10^1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	34	32	32	30	31

Averages

CONC.	N1	H1	MA	p28
10^5	ND	ND	24.2	33.8
10^4	ND	ND	28.0	33.2
10^3	ND	ND	30.6	33.2
10^2	ND	ND	32.7	31.9

Table 2. Limit of Detection Replicates (n = 20) for 2009 A/H1N1 Influenza and Seasonal Influenza A/H1N1 Viruses Assayed in the DxNA GeneSTAT System. Shown herein are Ct values of the lowest virus concentration that still yielded positive detection of at least 19 out of 20 replicates for each influenza virus. **The Limit of Detection was 2 X 10^2 EID_{50}/mL or $10^{2.3}$ EID_{50}/mL.**

N1 = N1 neuraminidase for 2009 A/H1N1 Influenza; H1 = H1 hemagglutinin for 2009 A/H1N1 Influenza; MA = Influenza A matrix; p28 = P28 Caprine Arthritis-Encephalitis Virus (Exogenous Reaction Control); ND = Not Detected

2009 A/H1N1 Influenza – A/California/04/2009

	REPLICATE																			
TARGET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
N1	30	31	29	29	31	30	30	30	32	29	33	31	32	31	32	30	31	30	33	29
H1	29	33	30	31	32	31	30	31	ND	30	35	31	36	33	32	31	32	32	35	29
MA	29	30	30	30	31	31	32	ND	36	34	33	33	33	34	30	30	31	30	31	29
P28	30	30	30	31	30	31	31	29	29	33	33	28	28	28	28	30	31	30	30	38

	N1	H1	MA	p28
Target Not Detected	0	1	1	0
Total	20	20	20	20
% Reproducibility at LOD	100	95	95	100

Seasonal A/H1N1 Influenza – A/Memphis/37/2009

	REPLICATE																			
TARGET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MA	27	27	29	29	32	30	32	33	30	ND	32	31	31	35	32	34	33	30	32	31
P28	34	30	35	28	28	28	29	36	29	36	29	29	33	30	30	28	30	29	28	28

	MA	p28
Target Not Detected	1	0
Total	20	20
% Reproducibility at LOD	95	100

ANALYTICAL REACTIVITY/INCLUSIVITY

The analytical reactivity of the GeneSTAT 2009 A/H1N1 Influenza Test was evaluated using nucleic acid extracted (following the GeneSTAT protocol) from multiple strains of influenza A virus and tested near the limit of detection. The reactivity panel included four seasonal influenza A subtype H1N1 strains, two seasonal influenza A subtype H3N2 strains, two avian influenza A/H5N1 recombinant viruses, and one 2009 H1N1 influenza A isolate.

All tested positive for the Influenza A matrix gene but remained negative for the H1 hemagglutinin and N1 neuraminidase genes elucidated for the 2009 A/H1N1 Influenza virus.

Viral Strain	Target	Culture Titer	2009 H1N1	Flu A (M)
Seasonal A/H1N1 Salt Lake City, Utah - 2008/2009	Seasonal H1	10^6 $TCID_{50}$/mL	-	+
Seasonal A/H1N1 Salt Lake City, Utah - 2007/2008	Seasonal H1	10^5 $TCID_{50}$/mL	-	+
Seasonal A/H3N2 A/Salt Lake City, Utah - 2008/2009	Seasonal H3	10^4 $TCID_{50}$/mL	-	+
Seasonal A/H3N2 A/Salt Lake City, Utah - 2007/2008	Seasonal H3	10^5 $TCID_{50}$/mL	-	+
2009 H1N1 A/California/04/2009	2009 H1N1	10^2 EID_{50}/mL	+	+

ANALYTICAL SPECIFICITY/CROSS-REACTIVITY

Nucleic acid from a panel of 14 cultures (9 non-Influenza A viral, 3 bacterial (3) and 2 yeast strains) representing pathogens commonly found in respiratory samples were extracted and tested for cross-reactivity using the GeneSTAT 2009 A/H1N1 Influenza Test. Samples had concentrations ranging from 10^4 to 10^8 $TCID_{50}$/mL or EID_{50}/mL for viruses, 10^8 CFU/mL for bacteria and 10^6 CFU/mL for yeast. Each sample was examined as analytical triplicates.

No cross-reactivity was observed between the non-Influenza A viruses, bacteria or fungi and the 2009 H1 or N1 or the Influenza A Matrix targets of the GeneSTAT 2009 A/H1N1 Influenza Test.

	Concentration	2009 H1N1	Flu A (Matrix)
Viruses			
Adenovirus 1	10^6 $TCID_{50}$/mL	-	-
Epstein-Barr Virus (EBV)	10^5 $TCID_{50}$/mL	-	-
Herpes Simplex Virus Type 1 (HSV1)	10^6 $TCID_{50}$/mL	-	-
Human Cytomegalovirus (CMV)	10^8 $TCID_{50}$/mL	-	-

Influenza B (B/Lee/40)	10^8 EID_{50}/mL	-	-
Parainfluenza Virus 1	10^5 $TCID_{50}$/mL	-	-
Primate Polyoma Virus SV40	10^6 $TCID_{50}$/mL	-	-
Respiratory Syncytial Virus Serotype A	10^5 $TCID_{50}$/mL	-	-
Varicella Zoster Virus	10^4 $TCID_{50}$/mL	-	-
Bacteria			
Group B *Streptococcus*	10^8 CFU/mL	-	-
Bacillus subtilis	10^8 CFU/mL	-	-
Escherichia coli	10^8 CFU/mL	-	-
		-	-
Yeast			
Aspergillus flavus	10^6 CFU/mL	-	-
Candida albicans	10^6 CFU/mL	-	-

CLINICAL PERFORMANCE CHARACTERISTICS

A total of 79 samples were assessed. Samples from patients presenting with apparent symptoms of 2009 A/H1N1 Influenza virus infection were received from clinics affiliated with the Saint Mark's Hospital (Salt Lake City, UT; obtained under Institutional Review Board approval). Other samples were received from the Utah State Department of Health and the WHO Collaborating Center for Studies on the Ecology of Influenza in Animals Virology (Department of Infectious Disease, St. Jude Children's Research Hospital, Memphis, TN). All samples were randomized and run blindly in the GeneSTAT and FDA-authorized CDC rRT-PCR Tests for the 2009 A/H1N1 Influenza virus.

These samples encompassed 23 samples positive for the 2009 A/H1N1 Influenza virus (as ascertained by the CDC FDA-authorized test) and 55 samples that were negative with the same authorized reference test. The negative samples include 26 influenza A specimens, 22 of which are seasonal A/H1N1 and 4 seasonal A/H3N2 specimens, all confirmed positive by both, CDC reference test and GeneSTAT test (matrix genes), 19 of the remaining negative samples were no influenza-virus specimens; 3 were influenza B positive cultures; 3 blank swabs, and 3 were streptococcus culture swab specimens.

Results of comparison of the GeneSTAT Test and the CDC reference rRT-PCR Test for 2009 A/H1N1 Influenza are presented in Table 3.

Table 3. 2X2 contingency table comparing results of the GeneSTAT 2009 A/H1N1 Influenza Test **and the CDC FDA-authorized rRT-PCR Test for 2009 H1N1 Influenza A RNA.**

		CDC rRT-PCR 2009 H1N1			
		Positive	Indeterminate[a]	Negative	Totals
GeneSTAT	Positive	22	1	0	23
	Indeterminate[a]	1[b]	1		
	Negative	0	0	55	55
	Totals	23	1	55	79

	Result	95% Confidence Interval
Positive Percent Agreement	95.7% (22/23)	78.0% - 99.9%
Negative Percent Agreement	98.2% (55/56)	90.4% - 100%

[a] All discrepant indeterminate results (total of 2) from both GeneSTAT and reference method are tallied against the performance of the GeneSTAT test.
[b] This sample was actually positive for H1 and N1, but negative for matrix gene in the GeneSTAT 2009 A/H1N1 Influenza Test.

REFERENCES

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2. http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm189298.htm

3. Utah Pandemic Influenza Response Plan, November 2, 2005

4. Reference examples:

- http://cdc.gov/nchs/data/nhanes/nhanes_01_02/specimen_collection_year_3.pdf
- http://www.nyc.gov/html/doh/downloads/pdf/cd/asophar-specimen-guide.pdf
- http://www.phac-aspc.gc.ca/cpip-pclcpi/
- http://www.cdph.ca.gov/HealthInfo/discond/Documents/Nasopharyngeal_Swab_Collection.pdf
- http://www.dhh.state.la.us/offices/miscdocs/docs-249/Manual/Nasopharyngeal%20Swab%20Collection.pdf
- http://www.who.int/csr/disease/avian_influenza/guidelines/humanspecimens/en/

5. www.cdc.gov/h1n1/specimencollection.htm

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