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7. 510(k) Summary

This 510(k) summary of safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

Assigned 510(k) number: K101564

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Device Name
CDC Influenza 2009 A(H1N1)pdm Real-Time RT-PCR Panel

Common or Usual Name
CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel

Classification Name
Reagents for detection of specific novel influenza A viruses (21 CFR 866.3332, Product Code NXD)

Predicate devices
No predicate devices have been determined

Device Description
The CDC Influenza 2009 A(H1N1)pdm Real-time RT-PCR Panel (CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel) is a panel of oligonucleotide primers and dual-labeled hydrolysis (TaqMan®) probes which may be used in real-time RT-PCR (rRT-PCR) assays for the in vitro qualitative detection and characterization of human influenza

viruses (RNA) in respiratory specimens from patients presenting with influenza-like illness (ILI). Detection of viral RNA not only aids in the diagnosis of illness caused by seasonal and novel influenza viruses in patients with ILI, but also provides epidemiologic information on influenza and aids in the presumptive laboratory identification of specific novel influenza A viruses.

The influenza A primer and probe sets are designed for universal detection of type A influenza viruses. Influenza A subtyping primer and probe sets are designed to specifically detect 2009 A (H1N1) influenza virus.

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel is an updated version of the assay distributed by CDC. during the 2009 A(H1N1) pandemic strain to qualified laboratories (CDC rRT-PCR Swine Flu Panel G090072) under Emergency Use Authorization (EUA) from the FDA in that it has different sequences of primers and probes that are more specific to the currently circulating 2009 A(H1N1) influenza virus.

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel includes the following primer and probe sets and positive control:

- **InfA** detects all influenza A strains, but does not detect influenza B strains
- **pdm InfA** is specific for 2009 influenza A
- **pdm H1** is specific for 2009 influenza A, subtype H1
- **RNase P (RP)** detects human RNase P and is used with human clinical specimens to indicate that adequate isolation of nucleic acid resulted from the extraction of the clinical specimen
- **Inactivated Influenza Typing Panel Real-Time RT-PCR Positive Control** is a positive control designed to react with all the primer and probe sets including RNase P

Assay principle

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel assay is based on real-time RT-PCR technology which is used in many molecular diagnostic assays to date. The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel influenza A primer and probe sets are designed for universal detection of type A influenza viruses. The panel also contains influenza A type and subtyping primer and probe sets designed to specifically detect human 2009 A(H1N1) influenza viruses.

One-step real-time RT-PCR assays are one-tube assays that first reverse-transcribe specific RNA templates into complementary deoxyribonucleic acid (cDNA) copies. The cDNA then serves as template for a polymerase chain reaction that utilizes a thermocyclic heating and cooling of the reaction to logarithmically amplify a specific region of DNA. The probe anneals to a specific target sequence located between the forward and reverse primers. During the extension phase of the PCR cycle, the 5' nuclease activity of Taq polymerase degrades the probe, causing the reporter dye to separate from the quencher dye, generating a fluorescent signal. With each cycle,

additional reporter dye molecules are cleaved from their respective probes, increasing the fluorescence intensity. Fluorescence intensity is monitored at each PCR cycle.

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel includes internal positive control materials. The human RNase P (RP) primer and probe set detects human RNase P and is used with human clinical specimens to indicate that adequate isolation of nucleic acid resulted from the extraction process of the clinical specimen. A positive result in the RP assay indicates adequate specimen was present, ensures that common reagents and equipment are functioning properly, and demonstrates the absence of inhibitory substances. A Human Specimen Control (HSC) is a noninfectious cultured human cell material that demonstrates successful recovery of RNA as well as extraction reagent integrity. The Influenza 2009 A(H1N1)pdm Positive Control (pdm PC) consists of influenza viruses representing 2009 A(H1N1) influenza virus and cultured human cells. The pdm PC serves as a rRT-PCR reaction control and demonstrates that the master mix and primer and probe sets for InfA, pdm InfA, pdm H1, and RP are functioning properly. All controls (HSC and pdm PC) are inactivated using beta propiolactone and are noninfectious.

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel components used for testing are similar to the components provided in the CDC rRT-PCR Flu Panel ([IVD] [K080570]), following the same instructions for use on the ABI 7500 Fast Dx Real-Time PCR system.

Intended use

The CDC Influenza 2009 A(H1N1)pdm Real-Time RT-PCR Panel (CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel) is intended for use in real-time RT-PCR assays on an Applied Biosystems (ABI) 7500 Fast Dx Real-Time PCR Instrument in conjunction with clinical and epidemiological information:

- For the qualitative detection of influenza virus type A viral RNA from nasopharyngeal swabs (NPS), nasal swabs (NS), nasal aspirates (NA), nasal washes (NW), dual nasopharyngeal / throat swabs (NPS/TS), broncheoalveolar lavage (BAL), tracheal aspirate (TA), and bronchial wash (BW), collected from the respiratory tract of human patients with signs and symptoms of respiratory infection and/or from viral culture.
- For differentiation of 2009 H1N1 influenza virus RNA from nasopharyngeal swabs (NPS), nasal swabs (NS), nasal aspirates (NA), nasal washes (NW) ,dual nasopharyngeal / throat swabs (NPS/TS), broncheoalveolar lavage (BAL), tracheal aspirate (TA), and bronchial wash (BW) collected from the respiratory tract of human patients with signs and symptoms of respiratory infection and/or from viral culture.
- To provide epidemiologic information for surveillance of the 2009 H1N1 influenza virus.

Performance characteristics for influenza A were established during the 2009-2010 influenza season when 2009 H1N1 influenza virus was the predominant influenza A virus in circulation. Performance characteristics may vary against other emerging influenza A viruses.

A negative test result for the broncheoalveolar lavage (BAL), tracheal aspirate (TA), and bronchial wash (BW) is presumptive and it is recommended these results be confirmed by viral culture.

Negative results do not preclude influenza virus infection and should not be used as the sole basis for treatment or other patient management decisions.

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 department for testing. Viral culture should not be attempted in these cases unless a BSL 3+ facility is available to receive and culture specimens.

All users, analysts, and any person reporting results from use of this device should be trained to perform and interpret the results from this procedure by a competent instructor prior to use. CDC Influenza Division will limit the distribution of this device to only those users who have successfully completed

Substantial Equivalence Comparison:

1. Predicate device name(s): Focus Simplexa™ Influenza A H1N1 (2009) assay and CDC Human Influenza Virus Real-Time RT- PCR Detection and Characterization Panel

2. Predicate 510(k) number(s):_ K0100148 and K080570 respectively

3. Comparison with predicate:

Similarities

Device Characteristics	CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel (New Device)	Simplexa™ Influenza A H1N1 (2009) (K100148)	CDC Human Influenza Virus Real-Time RT- PCR Detection and Characterization Panel (K080570)
Intended Use	The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel is intended for use in real-time RT-PCR assays on the Applied Biosystems (ABI) 7500 Fast Dx Real-Time PCR instrument for the *in vitro* qualitative detection of influenza virus type A and 2009 A(H1N1) viral RNA from nasopharyngeal swabs (NPS), nasal swabs (NS), throat swabs (TS), nasal aspirates (NA), nasal washes (NW), dual nasopharyngeal / throat swabs (NPS/TS) and lower respiratory tract specimens (LRTS) from human patients with signs and symptoms of respiratory infection and/or from viral culture, in conjunction with clinical and epidemiological risk factors.	The Focus Diagnostics Simplexa™ Influenza A H1N1 (2009) assay is intended for use on the 3M Integrated Cycler as part of the Microfluidic Molecular System for the *in vitro* qualitative detection and differentiation of influenza A and 2009 H1N1 influenza viral RNA in nasopharyngeal swabs (NPS), nasal swabs (NS), and nasopharyngeal aspirates (NPA) from human patients with signs and symptoms of respiratory infection in conjunction with clinical and epidemiological risk factors.	The Human Influenza Virus Real-time RT-PCR Detection and Characterization Panel (rRT-PCR Flu Panel) is intended for use in Real-time RT-PCR assays on an ABI 7500 Fast Dx Real-time PCR instrument in conjunction with clinical and epidemiological information: for qualitative detection of influenza virus type A or B in symptomatic patients from viral RNA in nasopharyngeal and/or nasal swab specimens, for determination of the subtype of seasonal human influenza A virus, as seasonal A/HI or A/H3, if present, from viral RNA in nasopharyngeal and/or nasal swab specimens, for presumptive identification of virus in patients who may be infected with influenza A subtype A/H5 (Asian lineage) from viral RNA in human respiratory specimens and viral culture in conjunction with clinical and epidemiological risk factors to provide epidemiologic information for surveillance for influenza viruses.
Identification of Inf A	Yes (Universal A)	Yes	Yes
Assay Results	Qualitative	Qualitative	Qualitative
Nucleic Acid Extraction	Yes	Yes	Yes

Differences

Device Characteristics	CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel (New Device)	Simplexa™ Influenza A H1N1 (2009) (New Device)	CDC Human Influenza Virus Real-Time RT- PCR Detection and Characterization Panel (Predicate Device #2)
Sample types	NPS, NS, NPS/TS, NA, NW, BAL, BW, TA, and/or virus culture	NPS, NS, NPA	NPS, NS
Extraction Methods	• QIAamp® Viral RNA Mini Kit, Qiagen Inc. • MagNA Pure Compact -Total Nucleic Acid Kit, Roche Applied Science • MagNA Pure Compact – RNA Isolation Kit, Roche Applied Science • MagNA Pure LC - RNA Isolation Kit II, Roche Applied Science • Qiagen QIAcube with QIAamp® Viral RNA Mini Kit, Qiagen Inc. • NucliSENS® easyMAG®, bioMerieux	• QIAamp® Viral RNA Mini Kit, Qiagen Inc. • MagNA Pure Total Nucleic Acid Isolation Kit (Roche) • MagNA Pure LC Instrument (Roche)	• QIAamp® Viral RNA Mini Kit, Qiagen Inc. • RNeasy® Mini Kit, Qiagen, Inc. • MagNA Pure LC RNA Isolation Kit II, Roche Applied Science • MagNA Pure Total Nucleic Acid Kit, Roche Applied Science
Assay Type	Real-time RT-PCR	Real-time RT-PCR	Real-Time RT-PCR
Identification of 2009 H1N1 Subtype	Yes	Yes	No
Required Instrumentation	Applied Biosystems 7500 Fast Dx Real-Time PCR Instrument	Integrated cycler with Integrated Cycler Studio software v. 2.0	Applied Biosystems 7500 Fast Dx Real- Time PCR Instrument with SDS software version 1.4
Multiplex Capability	No (Modular Use with CDC rRT-PCR Flu Panel (K08570)	Yes	No

Analytical Performance

1. Limit of Detection

Analytical sensitivity was demonstrated by determining the limit of detection (LoD) of each primer and probe set in the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel. Each primer and probe set was tested with two different 2009 A(H1N1) influenza virus

strains. The limit of detection for each primer and probe set was calculated to indicate the range of lowest detectable concentration of influenza virus (EID_{50}/mL) with a 95.0 percent or greater positivity. The lowest concentration of influenza virus detected was determined to be the end-point concentration where the type and subtype primer and probe sets had uniform detection. If the two end-points differ in concentration the higher (or limiting) concentration was used.

	Limit of Detection (EID_{50}/mL)			
2009 H1N1 Virus	**InfA**	**pdm InfA**	**pdm H1**	**Final LoD**
A/California/07/2009	$10^{1.6}$	$10^{1.6}$	$10^{1.6}$	$10^{1.6}$
A/New York/18/2009	$10^{1.3}$	$10^{0.6}$	$10^{1.3}$	$10^{1.3}$

2. Inclusivity of 2009 A(H1N1) Influenza Viruses

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel analytical specificity was demonstrated by inclusivity testing. To demonstrate the specificity of the primer and probe sets to detect a diverse population of 2009 A(H1N1) influenza viruses, ten 2009 A(H1N1) influenza viruses were tested at low concentrations using the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel. The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel analytical specificity inclusivity data indicated 100% concordance with all primer and probe sets included in the device. These data indicate that the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel is highly specific for detecting 2009 A(H1N1) influenza viruses.

2009 A/H1N1 Virus	ID_{50}/mL Tested	Average InfA Ct Value (N=3)	Average pdm InfA Ct Value (N=3)	Average pdm H1 Ct Value (N=3)
A/MEXICO/4108/2009	$10^{2.5}$	33.46	36.20	32.86
A/CALIFORNIA/8/2009	$10^{2.2}$	29.75	31.57	28.80
A/CALIFORNIA/7/2009	$10^{2.4}$	34.16	35.28	33.78
A/CALIFORNIA/04/2009	$10^{1.9}$	32.26	33.54	32.13
A/TEXAS/48/2009	$10^{2.0}$	32.20	33.14	32.06
A/WASHINGTON/29/2009	$10^{2.5}$	30.58	32.35	30.10
A/SOUTH CAROLINA/18/2009	$10^{2.6}$	25.44	24.55	26.90
A/NEW YORK/18/2009	$10^{2.7}$	27.95	26.42	28.23
A/ENGLAND/195/2009	$10^{2.0}$	26.92	27.03	29.36

A/NORTH CAROLINA/39/2009	$10^{2.7}$	27.23	26.47	27.96

3. Exclusivity of Seasonal Influenza Viruses and Influenza Viruses with Pandemic Potential

Characterized seasonal influenza viruses representing various geographical locations (A/H1, A/H3, Influenza B) were tested with the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel to demonstrate the specificity of the primer and probe sets. To demonstrate the ability of the influenza A primer and probe sets to detect influenza A/H5 viruses with pandemic potential, the reactivity of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel was tested with ten avian A/H5 influenza viruses that have been shown to infect humans. The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel demonstrates the ability to detect influenza type A viruses other than 2009 A(H1N1) viruses without a subtype as expected.

Type	Virus	Titer (log $TCID_{50}$/mL)	InfA	pdm InfA	pdm H1
H1N1	A/JIANGXI/160/2005	5.6	+	-	-
	A/SOLOMON ISLANDS/03/2006	6.2	+	-	-
	A/TAIWAN/42/2006	4.7	+	-	-
	A/FUKUSHIMA/141/2006	5.7	+	-	-
	A/MEXICO/1744/2007	5.3	+	-	-
	A/MEXICO/1729/2007	4.8	+	-	-
	A/MEXICO/1677/2007	5.7	+	-	-
	A/MEXICO/949/2007	5.1	+	-	-
	A/BANGLADESH/7286/2007	6.1	+	-	-
	A/MEXICO/2010/2007	5.1	+	-	-
	A/BRISBANE/59/2007	8.4 (EID_{50}/mL)	+	-	-
	A/PARAGUAY/61/2009	7.2	+	-	-
H3N2	A/HAWAII/08/2006	7.8	+	-	-
	A/WISCONSIN/03/2007	8.2	+	-	-
	A/HENAN/JINSHUI/147/2007	8.1	+	-	-
	A/BRISBANE/10/2007	6.8	+	-	-
	A/MEXICO/922/2007	7.8	+	-	-
	A/AFGHANISTAN/2903/2008	5.0	+	-	-
	A/MEXICO/1938/2007	5.1	+	-	-
	A/MEXICO/1995/2007	4.3	+	-	-
	A/ANHUI/1239/2005	8.1	+	-	-
	A/MEXICO/1842/2007	6.1	+	-	-
	A/PERTH/16/2009	8.2 (EID_{50}/mL)	+	-	-
	A/WISCONSIN/15/2009	8.1 (EID_{50}/mL)	+	-	-
Inf B	B/FLORIDA/04/2006	5.7	-	-	-
	B/CHONGQING/YONGCHUAN18/2007	7.7	-	-	-
	B/FLORIDA/02/2006	6.0	-	-	-
	B/PENNSYLVANIA/05/2007	6.6	-	-	-
	B/BANGLADESH/5972/2007	4.7	-	-	-
	B/BANGLADESH/3461/2007	3.7	-	-	-

	B/BANGLADESH/7110/2007	4.2	-	-	-
	A/MEXICO/1819/2007	5.1	-	-	-
	B/TEXAS/17/2007	5.7	-	-	-
	B/TEXAS/03/2007	5.6	-	-	-
	B/BRISBANE/60/2008	8.5 (EID_{50}/mL)	-	-	-
	B/TEXAS/26/2008	8.2 (EID_{50}/mL)	-	-	-

Type	Virus	Clade	Titer (log EID_{50}/mL)	InfA	pdm InfA	pdm H1
H5N1	A/Japanese white eye/Hong Kong/1038/2006	2.3.4	9.2	+ (3/3)	-	-
	A/Duck/Hunan/795/2002	2.1	9.9	+ (3/3)	-	-
	A/Chicken/Yunnan/1251/2003	1	9.3	+ (3/3)	-	-
	A/Common magpie/Hong Kong/645/2006	2.3.2	9.2	+ (3/3)	-	-
	A/Vietnam/1194/2004	1	9.3	+ (3/3)	-	-
	A/Egypt/321/2007	2.2	9.2	+ (3/3)	-	-
	A/Anhui/1/2005	2.3.4	9.3	+ (3/3)	-	-
	A/Chicken/India/NIV3487/2006	2.2	9.3	+ (3/3)	-	-
	A/Chicken/Vietnam/NCVD-016/2008	7	9.1	+ (3/3)	-	-
	A/Cambodia/R040505/2007	1	8.5	+ (3/3)	-	-

To demonstrate the ability of the influenza A primer and probe sets to detect potential pandemic influenza A viruses, the reactivity of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel was also tested with 15 non-human influenza viruses that have been shown to infect humans. These data demonstrate 100% concordance with expected results and strongly supports the intended use claims of the device and demonstrates the performance specificity of the device.

4. Reactivity of Non-Influenza Respiratory Viral and Bacterial Pathogens

The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel analytical specificity was further demonstrated by testing 34 non-influenza organisms (respiratory pathogens or flora) commonly present in the nasopharynx region of the human respiratory tract. The CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel analytical specificity reactivity study showed 100% concordance with the expected results for all primer and probe sets included in the device. These data indicate that the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel primer and probe sets do not cross react with biological organisms that may be present in the human nasopharynx.

Markers Tested	Commensal Bacteria and Yeast Detection	Non-Influenza Respiratory Virus Detection	Detection Expected	Concordance
Inf A	0/19	0/15	No	100 %
pdm InfA	0/19	0/15	No	100 %
pdm H1	0/19	0/15	No	100 %

5. Reproducibility

The reproducibility and precision of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel were evaluated at six separate laboratory sites. Each testing site assessed a panel of four simulated samples at relative moderate, low (near the assay lower limit of detection range), and "high negative" viral RNA concentration, and a negative sample. The panels and assay controls were tested at each site by two operators on 5 different days within a 10-day period. Each site tested one of the six extraction methods associated with this device. Simulated samples in the qualification panel used in the reproducibility evaluation were:

Sample #1 Influenza 2009 A/H1N1 moderate viral RNA titer range
Sample #2 Influenza 2009 A/H1N1 low viral RNA titer range
Sample #3 Influenza 2009 A/H1N1 "high negative" RNA titer range
Sample #4 Influenza Negative (uninfected A549 cells)

Summary of Reproducibility Study for the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel

N=10 tests		bioMerieux NucliSENS easyMAG			Roche MagNA Pure LC TNA			Roche MagNA Pure Compact NA			Qiagen QIAcube Viral RNA			Qiagen Manual Viral RNA			Roche MagNA Pure Compact RNA			
		Agreement with expected result	Avg. Ct	% CV	Agreement with expected result	Avg. Ct	% CV	Agreement with expected result	Avg. Ct	% CV	Agreement with expected result	Avg. Ct	% CV	Agreement with expected result	Avg. Ct	% CV	Agreement with expected result	Avg. Ct	% CV	Total Agreement
No Template Control		10/10	NA	NA	10/10	NA	NA	10/10	NA	NA	10/10	NA	NA	10/10	NA	NA	10/10	NA	NA	**60/60**
Sample 1 moderate	**InfA**	10/10	28.52	2.59	10/10	30.53	2.55	10/10	31.99	4.23	10/10	27.92	2.06	10/10	28.85	2.00	10/10	30.54	2.12	**60/60**
	pdm InfA	10/10	27.49	2.10	10/10	29.98	2.69	10/10	30.63	3.10	10/10	27.68	2.25	10/10	28.72	1.59	10/10	29.81	2.57	**60/60**
	pdm H1	10/10	30.21	2.12	10/10	32.23	3.17	10/10	32.98	2.31	10/10	30.63	1.48	10/10	31.09	1.69	10/10	32.38	2.57	**60/60**
	RP	10/10	28.78	1.33	10/10	30.79	2.65	10/10	32.27	2.51	10/10	27.55	2.43	10/10	27.82	2.45	10/10	29.43	1.77	**60/60**
Sample 2 low	**InfA**	10/10	33.10	3.26	8/10	31.75	35.61	8/10	36.12	4.11	10/10	32.95	1.04	10/10	33.49	3.14	10/10	34.48	2.88	**58/60**
	pdm InfA	10/10	32.50	2.48	9/10	30.42	35.27	9/10	31.50	35.27	10/10	32.91	3.32	10/10	33.89	3.27	10/10	34.48	2.92	**58/60**
	pdm H1	10/10	35.19	3.10	7/10	28.85	52.94	7/10	29.34	52.77	10/10	34.66	1.27	10/10	36.12	2.18	10/10	36.57	3.70	**54/60**
	RP	10/10	28.44	1.34	10/10	30.33	2.78	10/10	31.44	3.27	10/10	27.41	1.95	10/10	28.34	1.55	10/10	28.57	5.11	**60/60**
Sample 3 "high negative"	**InfA**	8/10	NA	NA	10/10	NA	NA	9/10	NA	NA	10/10	NA	NA	7/10	NA	NA	10/10	NA	NA	**54/60**
	pdm InfA	10/10	NA	NA	10/10	NA	NA	10/10	NA	NA	9/10	NA	NA	8/10	NA	NA	10/10	NA	NA	**57/60**
	pdm H1	10/10	NA	NA	9/10	NA	NA	10/10	NA	NA	9/10	NA	NA	10/10	NA	NA	10/10	NA	NA	**58/60**
	RP	10/10	28.04	2.13	10/10	30.08	4.92	10/10	31.12	2.60	10/10	26.89	2.09	10/10	28.33	1.41	10/10	28.45	3.31	**60/60**
Sample 4 A549 cells	**RP**	10/10	28.68	2.75	10/10	30.20	5.68	10/10	32.10	1.74	10/10	27.06	2.65	10/10	28.60	2.29	10/10	29.33	4.00	**60/60**
HSC	**RP**	10/10	28.51	2.30	10/10	29.80	4.48	10/10	29.55	3.11	10/10	25.89	2.04	10/10	27.30	1.61	10/10	27.35	4.98	**60/60**
Influenza 2009 A(H1N1) pdm Positive Control	**InfA**	10/10	23.71	2.10	10/10	21.95	2.97	10/10	23.54	4.10	10/10	21.62	1.39	10/10	23.66	2.63	10/10	24.95	2.21	**60/60**
	pdm InfA	10/10	22.81	2.68	10/10	22.27	1.91	10/10	23.79	2.78	10/10	21.82	2.62	10/10	23.63	1.57	10/10	24.93	2.03	**60/60**
	pdm H1	10/10	25.76	1.55	10/10	24.35	4.78	10/10	26.36	2.42	10/10	25.31	1.19	10/10	25.89	2.13	10/10	27.52	2.53	**60/60**
	RP	10/10	28.84	1.66	10/10	27.44	3.23	10/10	29.03	4.03	10/10	27.35	1.84	10/10	28.59	2.35	10/10	28.82	3.26	**60/60**

Clinical Performance

Performance characteristics of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel were established during a prospective study at 8 U.S. public health laboratories and a Department of Defense (DoD) laboratory during the 2009-2010 respiratory virus season (February-April). Samples used for this study were collected for routine influenza testing at each site from individuals who were symptomatic with influenza-like illness (ILI) and included both upper and lower respiratory specimen types. Because of the low prevalence of influenza, retrospective specimens were used to supplement prospectively collected specimens.

The reference methods utilized in this study were virus culture with Immunofluorescent Antibody (IFA) or Direct Fluorescent Antibody (DFA) for screening and identification of influenza type and bi-directional sequencing for confirmation of 2009 influenza A (H1N1) subtype. InfA analyte results from the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel were compared to virus culture results in the analysis. Sequencing was performed only with specimens that were first identified as positive for influenza A by virus culture. Pdm InfA and pdm H1 analyte results from the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel were compared to bi-directional sequencing results in the analysis.

There were 1901 total patient specimens evaluated at the nine clinical testing sites: 1191 nasopharyngeal swabs (NPS) and nasal swabs (NS), 50 throat swabs, 519 nasal washes and nasal aspirates, 99 dual NPS/TS, and 42 lower respiratory specimens.

The overall performance call rate for the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel in the clinical evaluation at nine different sites was greater than 99%.

The clinical sensitivity of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel for all markers tested using upper respiratory specimens was greater than 96% and the clinical specificity for all markers was greater than 96%. The positive percent agreement was greater than 96% for all markers tested.

The clinical sensitivity and specificity of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel was also evaluated with lower respiratory specimens. The clinical sensitivity and specificity for all markers in the panel were greater than 83% when compared to culture. The positive percent agreement of the CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel was 100%.

The clinical performance of the CDC Influenza 2009 A(H1N1)pdm Real-Time RT-PCR Panel supports the intended use of this device, demonstrates a clinical utility, and meets labeling claims.

The CDC 2009 A(H1N1)pdm rRT-PCR Panel Clinical Sensitivity, Specificity, and Percent Agreement Summary

	InfA			2009 H1N1		
Specimen Type	**Sensitivity** % (95% CI)	**Specificity** % (95% CI)	**Positive Percent Agreement Retrospective**	**Sensitivity** % (95% CI)	**Specificity** % (95% CI)	**Positive Percent Agreement Retrospective**
NPS/NS	**96.8** (89.1-99.1)	**96.2** (94.6-97.3)	**99.4 (97.7-99.8)**	**100** (93.7-100)	**96.7** (95.3-97.7)	**99.7 (98.1-99.9)**
NA/NW	**100** (83.2-100)	**99.3** (97.5-99.8)	**97.7 (94.6-99.0)**	**100** (80.6-100)	**98.6** (96.5-99.5)	**99.0 (96.5-99.7)**
NPS/TS	**100** (61.0-100)	**100** (93.9-100)	**100 (89.0-100)**	**100** (56.6-100)	**98.3** (91.1-99.7)	**100 (88.3-100)**
BAL, TA, BW	**83.3** (43.6-97.0)	**83.3** (64.1-93.3)	**100 (72.3-100)**	**100** (56.6-100)	**84.0** (65.3-93.6)	**100 (72.3-100)**

DEPARTMENT OF HEALTH & HUMAN SERVICES

Food and Drug Administration
10903 New Hampshire Avenue
Document Mail Center – WO66-0609
Silver Spring, MD 20993-0002

Dr. Hye-Joo Kim
Associate Director,
Regulatory Affairs
Centers for Disease Control and Prevention
1600 Clifton Rd, N.E., Mail Stop C-12
Atlanta, Georgia 30333

JUN 22 2010

Re: K101564

Trade/Device Name:	CDC Influenza 2009 A (H1N1)pdm Real-time RT-PCR Panel
Regulation Number:	21 CFR §866.3332
Regulation Name:	Reagents for detection of specific novel influenza A viruses
Regulatory Class:	Class II
Product Code:	OQW
Dated:	June 02, 2010
Received:	June 04, 2010

Dear Dr. Kim:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please go to http://www.fda.gov/AboutFDA/CentersOffices/CDRH/CDRHOffices/ucm115809.htm for the Center for Devices and Radiological Health's (CDRH's) Office of Compliance. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Sally A. Hojvat, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of *In Vitro* Diagnostic Device Evaluation and Safety
Center for Devices and Radiological Health

Enclosure

3. **Indications for Use Statement**

510(k) Number: **K101564**

Device Name: CDC Influenza 2009 A(H1N1)pdm Real-Time RT-PCR Panel

Intended use
The CDC Influenza 2009 A(H1N1)pdm Real-Time RT-PCR Panel (CDC rRT-PCR 2009 A(H1N1)pdm Flu Panel) is intended for use in real-time RT-PCR assays on an Applied Biosystems (ABI) 7500 Fast Dx Real-Time PCR Instrument in conjunction with clinical and epidemiological information:

- For the qualitative detection of influenza virus type A viral RNA from nasopharyngeal swabs (NPS), nasal swabs (NS), nasal aspirates (NA), nasal washes (NW), dual nasopharyngeal / throat swabs (NPS/TS), broncheoalveolar lavage (BAL), tracheal aspirate (TA), and bronchial wash (BW), collected from the respiratory tract of human patients with signs and symptoms of respiratory infection and/or from viral culture.
- For differentiation of 2009 H1N1 influenza virus RNA from nasopharyngeal swabs (NPS), nasal swabs (NS), nasal aspirates (NA), nasal washes (NW) ,dual nasopharyngeal / throat swabs (NPS/TS), broncheoalveolar lavage (BAL), tracheal aspirate (TA), and bronchial wash (BW) collected from the respiratory tract of human patients with signs and symptoms of respiratory infection and/or from viral culture.
- To provide epidemiologic information for surveillance of the 2009 H1N1 influenza virus.

Performance characteristics for influenza A were established during the 2009-2010 influenza season when 2009 H1N1 influenza virus was the predominant influenza A virus in circulation. Performance characteristics may vary against other emerging influenza A viruses.

A negative test result for the broncheoalveolar lavage (BAL), tracheal aspirate (TA), and bronchial wash (BW) is presumptive and it is recommended these results be confirmed by viral culture.

Negative results do not preclude influenza virus infection and should not be used as the sole basis for treatment or other patient management decisions.

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 department for testing. Viral culture should not be attempted in these cases unless a BSL 3+ facility is available to receive and culture specimens.

All users, analysts, and any person reporting results from use of this device should be trained to perform and interpret the results from this procedure by a competent instructor prior to use. CDC Influenza Division will limit the distribution of this device to only those users who have successfully completed

Prescription Use X
(Part 21 CFR 801 Subpart D)

AND/OR

Over-The-Counter Use _____
(21 CFR 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE-CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostic Device Evaluation and Safety

Division Sign-Off

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) k101564