DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
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Quidel Corporation
Ronald H. Lollar, Senior Director Clinical and Quality Affairs
Diagnostic Hybrids, Inc. (Wholly Owned Subsidiary of Quidel)
2005 East State Street, Suite 100
Athens, OH 45701

October 9, 2014

Re: K141931
Trade/Device Name: Lyra™ Adenovirus Assay
Regulation Number: 21 CFR 866.3980
Regulation Name: Respiratory viral panel multiplex nucleic acid assay
Regulatory Class: II
Product Code: OCC
Dated: July 15, 2014
Received: July 16, 2014

Dear Mr. Lollar:

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. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

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 Parts 801 and 809); 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 regulations (21 CFR Parts 801 and 809), please contact the Division of Industry and Consumer Education 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. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 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 Industry and Consumer Education 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,

Tamara V. Feldblyum -S for

Sally Hojvat, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of In Vitro Diagnostics
and Radiological Health
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: January 31, 2017
See PRA Statement below.

510(k) Number *(if known)*
K141931

Device Name
Lyra™ Adenovirus Assay

Indications for Use *(Describe)*
The Lyra™ Adenovirus Assay is a real-time polymerase chain reaction (PCR) in vitro diagnostic test for the qualitative detection of human adenovirus (HAdV) viral DNA isolated from nasal and nasopharyngeal swab specimens obtained from individuals exhibiting signs and symptoms of acute respiratory infections. The intended use of this test is to aid in the diagnosis of HAdV in conjunction with other clinical and laboratory findings.

The test detects, but does not differentiate, HAdV species (A, B, C, D, E, and F) or serotypes (HAdV 1-52).

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

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

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Section 05, 510(k) Summary

Applicant:

Quidel Corporation
12544 High Bluff Drive, Suite 200
San Diego, California 92130
Telephone: 858-552-7910
Fax: 858-646-8045

Contact Information:

Ronald H. Lollar, Senior Director Clinical and Regulatory Affairs
2005 East State Street
Suite 100
Athens, Ohio 45701
740-589-3300 – Corporate number
740-589-3373 – Desk phone
740-593-8437 – Fax
lollar@dhiusa.com

Date of preparation of 510(k) summary:

July 15, 2014

Device Name:

Trade name – Lyra™ Adenovirus Assay
Classification name – Respiratory viral panel multiplex nucleic acid assay
Product Code – OCC
Regulation Section – 21CFR 866.3980

Substantial Equivalency

The Lyra™ Adenovirus Assay used an FDA-cleared composite method of direct fluorescent antibody (DFA) staining of viral culture followed by DFA staining of the specimen as the reference comparator. The predicate device for the assay is the Adenovirus R-gene® US. The characteristics of the Lyra™ Adenovirus Assay ("Subject Device") and the legally marketed device are described in the Table below:

Section 05, 510(k) Summary

Item	**Subject Device** Lyra™ Adenovirus Assay	**Predicate Device (K121942)** **Adenovirus R-gene US Assay**
Intended Use	The Lyra™ Adenovirus Assay is a real-time polymerase chain reaction (PCR) *in vitro* diagnostic test for the qualitative detection of human adenovirus (HAdV) viral DNA isolated from nasal and nasopharyngeal swab specimens obtained from individuals exhibiting signs and symptoms of acute respiratory infection. The intended use of this test is to aid in the diagnosis of HAdV in conjunction with other clinical and laboratory findings. The test detects, but does not differentiate, HAdV species (A, B, C, D, E, and F) or serotypes (HAdV 1-52). Negative results do not preclude HAdV infection and should not be used as the sole basis for treatment or other patient management decisions.	Adenovirus R-gene US is a Real Time PCR *in vitro* diagnostic test for the rapid and qualitative detection of Adenovirus viral DNA isolated and purified from nasopharyngeal specimens (swab or wash/aspirate) obtained from individuals exhibiting signs and symptoms of acute respiratory infection. The intended use for this test is to aid in the diagnosis of Adenovirus infections in humans. Negative results do not preclude Adenovirus infection and should not be used as the sole basis for treatment or other management decisions.
DNA Amplification Technology	Real-time polymerase chain reaction (PCR)	Same

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Item	**Subject Device** Lyra™ Adenovirus Assay	**Predicate Device (K121942) Adenovirus R-gene US Assay**
Assay Results	Qualitative	Same
Viral Target Sequence	Penton base gene	Hexon gene
Sample Types	Nasal and Nasopharyngeal swabs	Nasopharyngeal swabs and Nasopharyngeal aspirates/washes
Amplification	Self-contained and automated	Same
Detection Techniques	Self-contained and automated	Same
Nucleic Acid Extraction Method	bioMérieux NucliSENS easyMAG System	Same
Collection and Transport Media	Universal Transport Medium (Copan/DHI), MicroTest M4, M4-RT, M5, or M6 Transport Medium (Remel)	Universal Transport Medium (DHI) MicroTest M4RT Transport (Remel)
Instrument/Assay Platform	Applied Biosystems (ABI) 7500 Fast Dx Real-Time PCR Instrument	Cepheid SmartCycler II
Controls Included with Assay	Internal process control (MS2 Bacteriophage; Zeptometrix)	Positive control (Plasmid DNA) Negative Control (molecular grade water) Internal control (IC2) phage particle

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Intended Use

The Lyra™ Adenovirus Assay is a real-time polymerase chain reaction (PCR) *in vitro* diagnostic test for the qualitative detection of human adenovirus (HAdV) viral DNA isolated from nasal and nasopharyngeal swab specimens obtained from individuals exhibiting signs and symptoms of acute respiratory infections. The intended use of this test is to aid in the diagnosis of HAdV in conjunction with other clinical and laboratory findings.

The test detects, but does not differentiate, HAdV species (A, B, C, D, E, and F) or serotypes (HAdV 1-52).

Negative results do not preclude HAdV infection and should not be used as the sole basis for diagnosis, treatment or other patient management decisions

Methodology

The assay detects viral nucleic acids that have been extracted from a patient sample. A real-time PCR reaction is carried out using the ABI 7500 Fast Dx Real-Time PCR Instrument ("ABI Fast Dx Instrument") under optimized conditions in a single tube generating amplicons for adenovirus and the Process Control (PRC). Identification of human adenovirus (HAdV) and the PRC occurs by the use of target-specific primers and fluorescent-labeled probes that hybridize to conserved regions in the genomes of adenovirus and the PRC.

Table 1. Lyra™ Probe Labels

Target	Dye
HAdV	FAM
PRC	Cy5

Performance Data

Precision/Reproducibility

Precision

The Precision/Within Laboratory Repeatability study was assessed using a panel of four (4) simulated samples that include moderate positive and low positive, high negative and negative. The four (4) member panel consisting of HAdV and negative samples were tested by two (2) operators, in triplicate for twelve (12) days.

Table 2. Results Summary – Cts and Positivity

Platform	Target	Ct Values					
		Pos. Control	5X LoD	2X LoD	0.5X LoD	Neg. Matrix	Neg. Control
ABI 7500 Fast Dx	Operator 1 Avg Ct	20.8	25.5	26.6	29.7	NEG	NEG
	Operator 2 Avg Ct	20.4	25.4	26.7	29.3	NEG	NEG

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Table 2. Results Summary – Cts and Positivity							
Platform	Target	Ct Values					
		Pos. Control	5X LoD	2X LoD	0.5X LoD	Neg. Matrix	Neg. Control
	Positivity	100%	100%	100%	100%	0%	0%

The Lyra™ Adenovirus Assay produces results that are highly reproducible.

Reproducibility

The reproducibility of the Lyra™ Adenovirus Assay was evaluated at three (3) laboratory sites (two external, one in-house). Reproducibility was assessed using a panel of four (4) simulated samples that include moderate positive and low positive, high negative and negative adenovirus samples. The panels and controls were processed and tested on the ABI 7500 Fast Dx Instrument. Panels and controls were tested at each site by 2 operators for 5 non-consecutive days (triplicate testing x 2 operators x 3 replicates x 5 days x 3 sites = 90 results per level for each virus). The LoD values were based on the values obtained in the LoD study.

Table 3. Reproducibility Results

Panel Member ID	Site 1			Site 2			Site 3			Combined Site Data		
	Rate of Detection	AVE Ct	% CV	Rate of Detection	AVE Ct	% CV	Rate of Detection	AVE Ct	% CV	Rate of Detection	AVE Ct	%CV
HAdV High Negative (0.5x LoD)	30/30	29.0	4.9	30/30	28.9	4.2	26/29*	27.8	8.8	86/89*	28.6	6.2
HAdV Low Positive (2x LoD)	30/30	26.7	2.3	30/30	26.2	3.0	30/30	26.1	9.3	90/90	26.4	5.9
HAdV Moderate Positive (5x LoD)	30/30	25.2	1.7	30/30	24.8	3.0	30/30	24.1	6.8	90/90	24.8	4.8
HAdV Negative Nasal Matrix	0/30	N/A	N/A	0/30	N/A	N/A	0/30	N/A	N/A	0/90	N/A	N/A
HAdV Positive Control	30/30	20.5	2.5	30/30	18.2	3.9	30/30	17.1	3.7	90/90	18.6	8.5
HAdV Negative Control	0/30	N/A	N/A	0/30	N/A	N/A	0/30	N/A	N/A	0/90	N/A	N/A

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* One aliquot was removed from the analysis because it had an invalid PRC result. Three aliquots (from the same replicate) tested negative.

The data from the combined sites indicates that the Lyra™ Adenovirus Assay, on the ABI 7500 Fast Dx Instrument, generates reproducible results for the detection of adenovirus and the internal control.

Limit of Detection (LoD)

The analytical sensitivity (limit of detection or LoD) of the Lyra™ Adenovirus Assay was determined using quantified ($TCID_{50}$/mL) stocks of representatives of the six (6) species of adenovirus diluted in a negative matrix. Testing was performed with three manufactured device lots. Analytical sensitivity (LoD) is defined as the lowest concentration at which 95% of all replicates tested positive.

Table 4. Summary of LoD Study

Species/ Serotype	LoD ($TCID_{50}$/mL)	Avg. Ct Value
A/31	8.00×10^{-2}	28.5
B/3	8.00×10^{-2}	28.3
C/1	8.00×10^{-2}	28.1
D/19	1.61×10^{1}	28.6
E/4	1.00×10^{0}	27.7
F/41	3.20×10^{-2}	28.9

Analytical Reactivity (Inclusivity)

To verify the Lyra™ Adenovirus Assay detects the fifty-two (52) known serotypes of HAdV, 49 serotypes were initially tested at or near the species LoD (see above). Higher concentrations were tested if the organism was not detected at the LoD. Each of the 49 serotypes tested was detected by the Lyra Adenovirus Assay. Three (3) of the serotypes (38, 42, and 52) were unavailable for testing with the device. These serotypes were evaluated using *in silico* analysis.

Table 5. HAdV Serotypes Reactivity Summary

Species	Serotype	Concentration Tested ($TCID_{50}$/mL)	Multiple of LoD Detected
A	HAdV-12	1.60×10^{-1}	2x LoD
	HAdV-18	1.60×10^{-1}	2x LoD
B	HAdV-7	1.60×10^{-1}	2x LoD

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Table 5. HAdV Serotypes Reactivity Summary

Species	Serotype	Concentration Tested ($TCID_{50}$/mL)	Multiple of LoD Detected
	HAdV-11	1.60×10^{-1}	2x LoD
	HAdV-14	1.60×10^{-1}	2x LoD
	HAdV-16	1.60×10^{-1}	2x LoD
	HAdV-21	2.00×10^{1}	250x LoD[a]
	HAdV-34	1.60×10^{-1}	2x LoD
	HAdV-35	1.60×10^{-1}	2x LoD
	HAdV-50	1.60×10^{-1}	2x LoD
C	HAdV-2	1.60×10^{-1}	2x LoD
	HAdV-5	1.60×10^{-1}	2x LoD
	HAdV-6	1.60×10^{-1}	2x LoD
F	HAdV-40	6.40×10^{-2}	2x LoD
D	HAdV-8	3.22×10^{-1}	2x LoD
	HAdV-9	3.22×10^{-1}	2x LoD
	HAdV-10	3.22×10^{-1}	2x LoD
	HAdV-13	3.22×10^{-1}	2x LoD
	HAdV-15	9.66×10^{1}	6x LoD[b]
	HAdV-17	9.66×10^{1}	6x LoD[c]
	HAdV-20	3.22×10^{-1}	2x LoD
	HAdV-22	3.22×10^{-1}	2x LoD
	HAdV-23	3.22×10^{-1}	2x LoD
	HAdV-24	3.22×10^{-1}	2x LoD
	HAdV-25	3.22×10^{-1}	2x LoD
	HAdV-26	3.22×10^{-1}	2x LoD
	HAdV-27	3.22×10^{-1}	2x LoD
	HAdV-28	3.22×10^{-1}	2x LoD
	HAdV-29	3.22×10^{-1}	2x LoD
	HAdV-30	3.22×10^{-1}	2x LoD
	HAdV-32	3.22×10^{-1}	2x LoD
	HAdV-33	3.22×10^{-1}	2x LoD
	HAdV-36	3.22×10^{-1}	2x LoD
	HAdV-37	3.22×10^{-1}	2x LoD
	HAdV-39	3.22×10^{-1}	2x LoD

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Table 5. HAdV Serotypes Reactivity Summary

Species	Serotype	Concentration Tested ($TCID_{50}$/mL)	Multiple of LoD Detected
	HAdV-43	3.22×10^{-1}	2x LoD
	HAdV-44	3.22×10^{-1}	2x LoD
	HAdV-45	3.22×10^{-1}	2x LoD
	HAdV-46	3.22×10^{-1}	2x LoD
	HAdV-47	3.22×10^{-1}	2x LoD
	HAdV-48	3.22×10^{-1}	2x LoD
	HAdV-49	3.22×10^{-1}	2x LoD
	HAdV-51	3.22×10^{-1}	2x LoD

[a] HAdV-21 required repeat testing and was ultimately found to be detected at 250X LoD.
[b] HAdV-15 required repeat testing and was ultimately found to be detected at 6X LoD.
[c] HAdV-17 required repeat testing and was ultimately found to be detected at 6X LoD.

HAdV Species D serotypes 38 and 42 and Species G serotype 52 (often associated with conjunctivitis and gastroenteritis) were not evaluated for inclusivity as the sponsor could not obtain these strains. Instead, the manufacturer conducted an *in silico* analysis where they aligned their probe and primers with the target regions from a single sequence (obtained from GenBank) for each of these adenovirus types. The alignments showed a 100% agreement of the forward primer with types 38, 42, and 52. For the reverse primer, there were 3 mismatches detected on the sequences for types 38 and 42 (84% homology) and 2 mismatches with the sequence for type 52 (89.5% homology). For the probe, there was 100% agreement with types 38 and 42, while three mismatches were observed with the sequence for type 52 (85% homology).

Microbial Cross-Reactivity and Interference

The analytical specificity of the Lyra Adenovirus Assay was evaluated by testing a panel consisting of 30 viral, 26 bacterial, and 1 yeast strain representing respiratory pathogens or flora commonly present in the nasopharynx. The organisms were tested in the presence and absence of 2X LoD HAdV to determine if there was interference or cross-reactivity, respectively. Samples were extracted using the NucliSENS easyMAG instrument and tested in triplicate. All HAdV positive samples remained positive and all HAdV negative samples remained negative, indicating that there was no interference or cross-reactivity in the presence of the organisms tested. Each microorganism was tested three times, once in the presence of HAdV type 4, once in the presence of HAdV type 31, and once in the presence of negative nasal matrix.

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Table 6. Organisms used for the study were the following:

Organism	Concentration tested (TCID50/mL or CFU/mL)	Lyra Adenovirus Assay Result	
		Interference (+ HAdV)	Cross-reactivity (- HAdV)
Bordetella pertussis	9.08E+08	Positive	Negative
Bordetella bronchiseptica	5.40E+08	Positive	Negative
Chlamydophila pneumonia	0.11 ng/ µL	Positive	Negative
Chlamydia trachomatis	2.10E+06	Positive	Negative
Legionella pneumophila	1.42E+09	Positive	Negative
Mycobacterium intracellualre	1.53E+09	Positive	Negative
Mycobacterium tuberculosis	9.30E+06	Positive	Negative
Mycobacterium avium	3.18E+09	Positive	Negative
Mycoplasma pneumoniae	3.16E+06	Positive	Negative
Haemophilus influenzae	4.00E+08	Positive	Negative
Pseudomonas aeruginosa	1.32E+09	Positive	Negative
Proteus vulgaris	6.53E+08	Positive	Negative
Proteus mirabilis	1.19E+09	Positive	Negative
Neisseria gonorrhoeae	1.40E+09	Positive	Negative
Neisseria meningitidis	1.29E+08	Positive	Negative
Neisseria mucosa	1.61E+08	Positive	Negative
Klebsiella pneumoniae	9.75E+08	Positive	Negative
Escherichia coli	1.13E+09	Positive	Negative
Moraxella catarrhalis	1.26E+09	Positive	Negative
Corynebacterium diptheriae	3.44E+08	Positive	Negative
Lactobacillus plantarum	3.18E+08	Positive	Negative
Streptococcus pneumoniae	1.43E+08	Positive	Negative
Streptococcus pyogenes	6.38E+08	Positive	Negative
Streptococcus salivarius	5.40E+08	Positive	Negative
Staphylococcus epidermidis	9.23E+08	Positive	Negative
Staphylococcus aureus	6.08E+08	Positive	Negative
Candida albican	9.70E+07	Positive	Negative
Coronavirus 229E	2.46E+07	Positive	Negative
Coronavirus NL63	1.41E+04	Positive	Negative
Coronavirus OC43	2.42E+07	Positive	Negative
Coxsackievirus B4	2.00E+07	Positive	Negative
Coxsackievirus B5/10/2006	3.62E+05	Positive	Negative
Cytomegalovirus	2.14E+06	Positive	Negative

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Table 6. Organisms used for the study were the following:			
Organism	Concentration tested (TCID50/mL or CFU/mL)	Lyra Adenovirus Assay Result	
		Interference (+ HAdV)	Cross-reactivity (- HAdV)
Echovirus 6	7.60E+08	Positive	Negative
Echovirus 7	4.45E+06	Positive	Negative
Echovirus 9	2.17E+07	Positive	Negative
Echovirus 11	2.17E+05	Positive	Negative
Enterovirus 70	2.41E+06	Positive	Negative
Enterovirus 71	2.03E+05	Positive	Negative
Epstein Barr Virus	9.27E+07	Positive	Negative
HSV Type 1 MacIntyre Strain	5.89E+06	Positive	Negative
HSV Type 2 Strain G	1.96E+06	Positive	Negative
Human Metapneumovirus (A1)	3.66E+05	Positive	Negative
Human Rhinovirus 45	2.94E+04	Positive	Negative
Human Rhinovirus 52	2.63E+04	Positive	Negative
Influenza A/Mexico/4108/2009	4.08E+05	Positive	Negative
Influenza A/Port Chalmers	3.55E+08	Positive	Negative
Influenza B/Florida/04/2006	1.54E+06	Positive	Negative
Measles	1.95E+06	Positive	Negative
Mumps Virus	2.75E+08	Positive	Negative
Parainfluenza Type 1	3.97E+06	Positive	Negative
Parainfluenza Type 2	3.15E+08	Positive	Negative
Parainfluenza Type 3	2.36E+07	Positive	Negative
Parainfluenza Type 4A	1.04E+05	Positive	Negative
RSV A (Long)	4.36E+04	Positive	Negative
RSV B (Wash/18537/62)	3.43E+05	Positive	Negative
Varicella Zoster Virus	1.11E+04	Positive	Negative

Interfering Substances

A study was performed on the ABI 7500 Fast Dx Instrument to evaluate the performance of the Lyra™ Adenovirus Assay in the presence of eleven (11) of potentially interfering/cross-reactive substances, at clinically relevant levels, that might be present in specimens. Each substance was tested in the presence of 2X LoD HAdV and with negative matrix.

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Table 7. Interfering/Cross-reactive Substances Summary

Substance Name	HAdV						Inhibition (yes/no)
	Species E Serotype 4		Species A Serotype 31		No Analyte		
	Ct Avg.	SD	Ct Avg.	SD	Ct Avg.	SD	
Controls	26.0	0.6	27.6	0.9	NEG	N/A	N/A
Mucin (Bovine Submaxillary Gland, type I-S)	26.7	0.8	27.1	0.2	NEG	N/A	No
Blood (human), EDTA anticoagulated	28.0	1.2	27.6	0.6	NEG	N/A	No
Neo-Synephrine	27.2	1.0	26.9	0.2	NEG	N/A	No
Afrin Nasal Spray	26.2	0.8	26.7	0.1	NEG	N/A	No
Zicam Homeopathic Non-Drowsy Allergy Relief No Drip Liquid Nasal Gel	25.6	0.3	26.9	0.3	NEG	N/A	No
Saline Nasal Spray	25.8	0.5	28.2	1.3	NEG	N/A	No
OTC Throat Lozenges: Ricola Action Cherry	26.0	0.3	26.3	1.3	NEG	N/A	No
Zanamivir	25.8	0.8	26.5	0.3	NEG	N/A	No
Tobramycin	26.6	0.2	26.8	0.1	NEG	N/A	No
Mupirocin	26.4	0.4	27.7	0.8	NEG	N/A	No
Oseltamivir phosphate	26.0	0.0	27.2	0.2	NEG	N/A	No

None of the eleven (11) of substances tested cross-reacts with the Lyra™ Adenovirus Assay.

Carry-Over and Cross-Contamination

Studies were performed on the ABI 7500 Fast Dx Instrument using a 96-sample panel consisting of 48 high positive (1.0×10^5 $TCID_{50}$/mL HAdV type 4) and 48 negative specimens (negative nasal matrix). The high positive samples were extracted and added to the plate in a checkerboard pattern that alternated with the negative samples. This testing was repeated over a 5-day period.

Over the course of 5 days, cross-contamination and amplicon carry-over did not occur with the Lyra™ Adenovirus Assay when extracted using the NucliSens easyMAG automated nucleic acid extraction instrument and analyzed on the ABI 7500 Fast Dx Instrument.

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Method Comparison

Prospective Study

The evaluation of the Lyra™ Adenovirus Assay occurred in two separate studies: a prospective multi-center study using one thousand two hundred and forty-one (1241) fresh specimens from the upper respiratory tract; and a retrospective study using one hundred five (105) frozen specimens from the upper respiratory tract. In both studies the specimens were processed the bioMérieux NucliSENS® easyMag® at all sites for the extraction of nucleic acids from the clinical specimens. The ABI 7500 Fast Dx Instrument was used with the Quidel Lyra™ Adenovirus Assay for the amplification and detection of the target nucleic acids. The prospective specimens were also processed and tested with viral culture with an FDA-cleared composite method of direct fluorescent antibody staining (CDFA) followed by direct fluorescent antibody staining of the specimen (SDFA). A specimen was called positive if either the CDFA or the SDFA were positive. For a specimen to be called negative, it must be negative for both CDFA and SDFA. The retrospective specimens were extracted and tested with an additional FDA-cleared molecular assay.

Expected Values for the Winter of 2013 and 2014 (Combined)

Age	# Tested	Lyra Adenovirus Assay Positive	Expected Value	Total Positive by Reference Method	Observed Prevalence
< 1	73	8	11.0%	1	1.4%
1 to 5	452	60	13.3%	24	5.3%
6 to 10	157	10	6.4%	4	2.5%
11 to 15	67	4	6.0%	2	3.0%
16 to 21	55	3	5.5%	1	1.8%
> 21	437	4	0.9%	3	0.7%
Total	1241	89	7.2%	35	2.8%

One thousand two hundred forty-one (1241) fresh specimens were collected and transported to each laboratory for testing with the Lyra™ Adenovirus Assay. Two (2) specimens were invalid when initially tested with the Lyra™ Adenovirus Assay. The specimens were re-tested according to the instructions for use and were invalid upon repeat testing. The specimens have been removed from the data presented below. The specimens shipped daily with cold packs for CDFA and SDFA to the central location and were tested within 72-hours of collection. The table below details the HAdV results for the remaining one thousand two hundred thirty-nine (1239) specimens.

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Combined Site Data			
Lyra™ Adenovirus Assay	**Comparator: CDFA with SDFA**		
	Positive	Negative	Total
Positive	35	54*	89
Negative	0	1150	1150
Total	35	1204	1239
			95% CI
Sensitivity	35/35	100%	90.1% to 100%
Specificity	1150/1204	95.5%	94.2 % to 96.5%

* Forty-five (45) of the fifty-four (54) positives were positive by an additional PCR assay. Four (4) of the fifty-four (54) positives were negative by an additional PCR assay. Two (2) of the fifty-four (54) positives were invalid by an additional PCR assay. Three (3) of the fifty-four (54) positives had insufficient volume for testing by an additional PCR assay.

Retrospective Study

Due to the low prevalence of HAdV at the clinical sites during the study period, a retrospective study was conducted at Site 1 with specimens obtained from a pediatric hospital in the Southwest United States. One hundred five (105) frozen specimens from the upper respiratory tract were tested concurrently with the Lyra™ Adenovirus Assay and an additional FDA-cleared molecular device.

Adenovirus			
Lyra™ Adenovirus Assay	**Comparator: FDA-Cleared PCR Assay**		
	Positive	Negative	Total
Positive	27	1*	28
Negative	0	77	77
Total	27	78	105
			95% CI
Positive Percent Agreement	27/27	100%	87.5% to 100%
Negative Percent Agreement	77/78	98.7%	93.1% to 99.8%

* One (1) of one (1) positive was positive by a third FDA-cleared PCR assay.

Statement of Safety and Effectiveness

In prospectively collected clinical specimens, when performed on the ABI 7500 Fast Dx Instrument, the Lyra™ Adenovirus Assay yielded good sensitivity and specificity when compared to the composite reference method of direct specimen fluorescent antibody (SDFA) and viral culture with DFA (CDFA).

Section 05, 510(k) Summary

In retrospectively collected clinical specimens, when performed on the ABI 7500 Fast Dx Instrument, the Lyra™ Adenovirus Assay yielded good positive and negative percent agreement when compared to a FDA-cleared molecular device.