SPECIAL 510(K): DEVICE MODIFICATION
OIR DECISION SUMMARY

510(k) Number: _K180288___

This 510(k) submission contains information/data on modifications made to the applicant's own class II device requiring 510(k). The following items are present and acceptable:

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1. The name and 510(k) number of the applicant's previously cleared device.

510(k) Number	Device Name	Clearance Date	Primary Reason for 510(k) Submission
K031899	QuickVue Influenza A+B Test	9/11/2003	Initial 510(k) – the data used for this submission was primarily from the clinical and analytical QuickVue Influenza (A/B) test studies (reference K991633). The primary difference between the two assays is that QuickVue Influenza A+B Test provides separate results for influenza A and influenza B. Whereas, QuickVue Influenza (A/B) test only provides one positive result which could be influenza A or B. Specimen types: nasal swab, nasal wash, nasal aspirate.
K053146	QuickVue Influenza A+B Test	12/14/2005	This 510(k) included a clinical study performed with QuickVue Influenza A+B Test. Clinical data for nasal swab, nasopharyngeal swab, and frozen nasal wash specimens was submitted.
K092698	QuickVue Influenza A+B Test	9/15/2009	Provided analytical reactivity data for A/California/04/2009 (A 2009 H1N1 Virus)
K131619	QuickVue Influenza A+B Test	6/28/2013	Provided analytical reactivity data for the A/Anhui/1/2013 (H7N9 Virus)

2. Applicant's statement that the **INDICATION/INTENDED USE** of the modified device as described in its labeling **HAS NOT CHANGED** along with the proposed instructions for use.

3. A description of the device **MODIFICATION(S)** in sufficient detail to demonstrate that the **FUNDAMENTAL SCIENTIFIC TECHNOLOGY** of the modified device **has not changed**.

    1) QuickVue Influenza A+B Test was originally developed and manufactured using standard manual lateral flow techniques. This manual manufacturing process can result in quality lateral flow immunoassays, but can yield product with a high degree of variability due to the process parameters not being under tight control.

    Quidel embarked on improving product consistency and performance by focusing on improving the way components were processed through automation, using a proprietary process called Web manufacturing. Web manufacturing is a continuous process that holds critical processing steps in tight control. The Web system ensures that every foot of product on the reel is exposed to conditions within specification limits. Any product that fails to meet product specifications are marked and removed from the lot prior to further processing. The better control of the manufacturing process parameters via the

implementation of the Web system led to significant improvements in product performance.

2) The product instructions for use (package insert) was updated to add the new clinical performance data generated using the modified QuickVue Influenza A+B Test (see Section 6 below) and to remove the old clinical performance data generated using the QuickVue Influenza A+B Test as previously FDA-cleared in K031899 and K053146.

3) The product instructions for use (package insert) was updated to remove nasal aspirate and nasal wash specimens from the list of claimed upper respiratory specimen types, and to add the relevant up to date FDA recommended warning and limitation statements

4. **Comparison Information** (similarities and differences) to applicant's legally marketed predicate device.

Item	**Previously Cleared Device**	**Modified Device**	**Predicate Device**
Features	QuickVue Influenza A+B Test (K031899, K053146)	QuickVue Influenza A+B Test (K180288)	Sofia Influenza A+B FIA (K162438)

Item	Previously Cleared Device	Modified Device	Predicate Device
Features	QuickVue Influenza A+B Test (K031899, K053146)	QuickVue Influenza A+B Test (K180288)	Sofia Influenza A+B FIA (K162438)
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.	The QuickVue Influenza A+B Test allows for the rapid, qualitative detection of influenza type A and type B antigens directly in nasal swab and nasopharyngeal swab specimens from symptomatic patients. 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. A negative test is presumptive, and it is recommended these results be confirmed by viral culture or an FDA-cleared influenza A and B molecular assay. Negative results do not preclude influenza virus infections and should not be used as the sole basis for treatment or other patient management decisions. The test is intended for professional and laboratory use. Performance characteristics for influenza A were established during the 2017/2018 influenza seasons when influenza A/H3N2 and A/H1N1 pandemic were the predominant influenza A viruses in circulation. When other influenza A viruses are emerging, performance characteristics may vary. 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.	The Sofia Influenza A+B FIA employs immunofluorescence to detect influenza A and influenza B viral nucleoprotein antigens in direct nasal swab, nasopharyngeal swab, and nasopharyngeal aspirate/wash specimens and nasopharyngeal swab and nasopharyngeal aspirate/wash specimens in transport media from symptomatic patients. This qualitative test is intended for use as an aid in the rapid differential diagnosis of acute influenza A and influenza B viral infections. The test is not intended to detect influenza C antigens. A negative test is presumptive and it is recommended these results be confirmed by viral culture or an FDA-cleared influenza A and B molecular assay. Negative results do not preclude influenza virus infections and should not be used as the sole basis for treatment or other patient management decisions. This test is intended for professional and laboratory use. The Sofia Influenza A+B FIA may be used with Sofia or Sofia 2. Performance characteristics for influenza A and B were established during February through March 2011 when influenza viruses A/California/7/2009 (2009 H1N1), A/Perth/16/2009 (H3N2), and B/Brisbane/60/2008 (Victoria-Like) were the predominant influenza viruses in circulation according to the Morbidity and Mortality Weekly Report from the CDC entitled "Update: Influenza Activity--United States, 2010-2011 Season, and Composition of the 2011-2012 Influenza Vaccine." Performance characteristics may vary against other emerging influenza viruses. If infection with a novel influenza virus is suspected based on current clinical and epidemiological screening criteria recommended by public health authorities, samples 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 samples.

Item	Previously Cleared Device	Modified Device	Predicate Device
Features	QuickVue Influenza A+B Test (K031899, K053146)	QuickVue Influenza A+B Test (K180288)	Sofia Influenza A+B FIA (K162438)
Read Results	Visual	Visual	Reader
Specimen Types	Nasal swab, nasopharyngeal swab, nasal aspirate, and nasal wash	Nasal swab, nasopharyngeal swab	Direct nasal swab, nasopharyngeal swab, and nasopharyngeal aspirate/wash specimens and nasopharyngeal swab and nasopharyngeal aspirate/wash specimens in transport media
Read Result Time	10 minutes	10 minutes	15 minutes
External Controls	Test kit contains Positive and Negative Control swabs	Test kit contains Positive and Negative Control swabs	Test kit contains Positive and Negative Control swabs
Manufacturing Method	Manual Process	Automated Web Process	Automated Web Process

5. A **Design Control Activities Summary** which includes:

   a) Identification of Risk Analysis method(s) used to assess the impact of the modification on the device and its components, and the results of the analysis.

   The Risk Assessment process used was based on an internal Quidel Risk Management Procedure (QIN002), which follows the requirements in ISO 14971.
   Using this procedure, the primary failures/risks associated with transferring QuickVue Influenza A+B to the Web manufacturing process, as well as the process controls were analyzed.

   b) Based on the Risk Analysis, an identification of the verification and/or validation activities required, including methods or tests used and acceptance criteria to be applied.

   Based on the Risk Analysis, Quidel followed its established internal procedures when developing, validating, and transferring QuickVue Influenza A+B to the Web manufacturing process . Several component level validations were completed. The primary validation encompassed testing multiple lots of components to demonstrate that the process controls were effective and that the entire product when manufactured on Web equipment met the manufacturing specifications.

   In addition to this validation, a Stability Study was conducted that gathered both real-time and accelerated data.

   Furthermore, Quidel conducted a new prospective clinical study using the modified devices to demonstrate that the performance of the modified QuickVue Influenza A+B Test meets the Class II performance special control specified in 21 CFR 866.3328. (See Section 6 below).

6. **Clinical Performance**

The clinical performance of the modified device was evaluated in a prospective multi-center field clinical study during two distinct influenza seasons in the United States, February through May 2017 and October 2017 through January 2018. Performance for influenza A was established when influenza A/H3 and A/H1pdm09 were the predominant influenza A viruses in circulation in the United States.

In this prospective clinical study, the performance of the modified QuickVue Influenza A+B Test was compared to an FDA-cleared influenza A and B molecular assay. This study was conducted at five (5) clinical sites in the USA which represent CLIA waived testing environments comprised of Urgent Care, Pediatric, and General Practice offices. A total of forty-eight (48) operators from the five intended user sites participated in the study.

Two (2) nasal or two (2) nasopharyngeal swab specimens were collected from each of the 1183 patients enrolled in the study. All clinical samples were collected from symptomatic patients meeting the inclusion and exclusion criteria. Thirty-nine percent (39%) of the patients tested were <5 years of age, forty-one percent (41%) 5-<18 years of age, and twenty percent (20%) ≥18 years of age. Forty-eight percent (48%) were male and fifty-two percent (52%) were female.

On-site testing of one nasal swab or nasopharyngeal swab specimen in the QuickVue Influenza A+B Test was performed by CLIA waived test operators within one (1) hour of specimen collection. This swab specimen was incubated for one (1) minute with the Extraction Reagent Solution before addition of the dipstick. The other swab specimen was placed in viral transport media and stored at 2°C to 8°C prior to testing with the FDA-cleared influenza molecular assay.

Out of the 1183 nasal or nasopharyngeal swab specimens tested, there were no invalid QuickVue Influenza A+B Test results, but there were five (5) invalid comparator test results; therefore, 1178 evaluable specimens, including 924 nasopharyngeal swab specimen and 254 nasal swab specimens, were included in the performance analysis below.

Table 1: QuickVue Influenza A+B Test Nasal Swab and Nasopharyngeal Swab Positive Persent Agreement (PPA) and Negative Percent Agreement (NPA) versus the FDA-cleared Influenza A and B Molecular Assay (Comparator) (All Age Groups)

	Comparator Results			
QuickVue Influenza A+B Test	Flu A Positive	Flu A Negative	Total	Performance
Flu A Positive	190	21	211	PPA: 81.5% 95% CI: 76.1%-86.0%
Flu A Negative	43	924	967	NPA: 97.8% 95% CI: 96.6%-98.5%
Total	233	945	1178	

	Comparator Results			
QuickVue Influenza A+B Test	Flu B Positive	Flu B Negative	Total	Performance
Flu B Positive	89	10	99	PPA: 80.9% 95% CI: 72.6%-87.2%
Flu B Negative	21	1058	1079	NPA: 99.1% 95% CI: 98.3%-99.5%
Total	110	1068	1178	

Table 2: QuickVue Influenza A+B Nasal Sawb and Nasopharyngeal Swab Positive Persent Agreement (PPA) and Negative Percent Agreement (NPA) versus the FDA-cleared Influenza A and B Molecular Assay (Comparator) (by Age Group)

	<5 years of age N=458		5-<18 years of age N=480		≥18 years of age N=240	
	PPA and 95% CI	NPA and 95% CI	PPA and 95% CI	NPA and 95% CI	PPA and 95% CI	NPA and 95% CI
Flu A	90.0% (63/70) 80.8%-95.1%	98.2% (381/388) 96.3%-99.1%	80.4% (90/112) 72.0%-86.7%	97.8% (360/368) 95.8%-98.9%	72.5% (37/51) 59.1%-82.9%	96.8% (183/189) 93.2%-98.5%
Flu B	84.2% (16/19) 62.4%-94.5%	99.3% (436/439) 98.0%-99.8%	80.3% (61/76) 70.0%-87.7%	98.8% (399/404) 97.1%-99.5%	80.0% (12/15) 54.8%-93.0%	99.1% (223/225) 96.8%-99.8%

7. **Conclusion**

The labeling for this modified subject device has been reviewed to verify that the indication/intended use for the device is unaffected by the modification. In addition, the applicant's description of the particular modification(s) and the comparative information between the modified and unmodified devices demonstrate that the fundamental scientific technology has not changed. The applicant has provided the design control information as specified in The New 510(k) Paradigm and on this basis, I recommend the device be determined substantially equivalent to the predicate device.