510(k) SUMMARY OF SAFETY AND EFFECTIVENESS

IDENTIFICATION INFORMATION

SUBMITTER'S INFORMATION

This summary of 510(k) safety and effectiveness is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.20.

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DATE SUMMARY PREPARED: August 5, 2004

NAME OF DEVICE: ImmunoCard STAT!® RSV

COMMON NAME: Reagent, Respiratory Syncytial Virus antigens

CLASSIFICATION NAME: Antigens, CF, Respiratory Syncytial Virus [83(GQG)]

REGULATION: 866.3480

INTENDED USES

ImmunoCard STAT!® RSV is a rapid, qualitative, lateral-flow immunoassay for the detection of Respiratory Syncytial Virus (RSV) antigens (fusion protein and internal protein) in human Nasal Wash, Nasopharyngeal Aspirate and Nasal and Nasopharyngeal Swab Samples. It is designed to test specimens from symptomatic neonatal and pediatric patients. It is recommended that all negative test results be confirmed by cell culture.

PREDICATE EQUIVALENT DEVICES:

ImmunoCard STAT! RSV is intended to detect the same analyte as other cleared devices including:

- **Binax NOW® RSV** [a rapid lateral-flow immunoassay cleared to market under 510(k) K032166] (Binax, Inc. South Portland, ME)
- **BD Directigen® EZ RSV** [a rapid enzyme immunoassay cleared to market under 510(k) K022133] (Becton Dickinson & Co., Sparks, MD)
- **RSV OIA®** [an optical immunoassay cleared to market under 510(k) K023779] (Thermo-Biostar Inc., Louisville, CO)

BACKGROUND:

Respiratory Syncytial Virus (RSV) is the most important cause of pneumonia and bronchiolitis in infants and small children. Approximately 90,000 children are hospitalized each year due to RSV in the USA alone. Hospitalization due to RSV is more frequently associated with children that have underlying disease or premature birth. Mortality rates are estimated to be between 1 and 3% for children that are hospitalized with RSV.(1) RSV is also being recognized more frequently as a cause of significant

respiratory disease in the elderly. RSV causes a wide range of respiratory symptoms that can be difficult to distinguish clinically from symptoms caused by other respiratory viruses such as influenza. Because of its high infectivity, the potential for prolonged patient shedding and the ability of the virus to survive for hours on environmental surfaces, RSV has emerged as a serious cause of nosocomial infection. RSV can be detected in human respiratory samples by a variety of methods including tissue culture, immunofluorescent assay and enzyme immunoassay. Although tissue culture is still considered the diagnostic test standard, it requires tissue culture facilities and may take a week to complete. Immunofluorescent antibody-based tests are reasonably sensitive, yet highly dependent on specimen quality and preparation. Enzyme and microparticle-based immunoassays have become one the most frequently used methods for the detection of RSV. ImmunoCard STAT! RSV is a lateral flow based immunoassay for the rapid detection of RSV in human respiratory samples. The results from this test are used to support data available from the patient's clinical evaluation and assist the physician in determining a course of action.

Type of test

ImmunoCard STAT! RSV is a rapid, qualitative lateral-flow immunoassay screening test designed for use in clinical and doctor office laboratories.

Specimen type

The following specimens have been found compatible with ImmunoCard STAT! RSV.

1. Nasal wash
2. Nasopharyngeal aspirate
3. Nasal and nasopharyngeal swabs

Conditions for use

ImmunoCard STAT! RSV is designed to be used under the normal environmental conditions existing in hospital and reference laboratories. The assay, which is stored at 2-8 C when not in use, is brought to room temperature prior to use. Normal laboratory lighting, humidity and temperature do not affect the performance of the assay.

Contraindications

There are no contraindications associated with the use of this product.

Special instrument requirements

No instruments are used with this product.

Combination with other medical devices

No other medical devices are used in combination with this device.

DEVICE DESCRIPTION AND TECHNOLOGICAL PRINCIPLES

Reagents

ImmunoCard STAT! RSV is distributed as a test kit that includes the following reagents:

ImmunoCard STAT! RSV Test Device: A chromatography strip housed in a plastic frame and enclosed in a foil pouch with a desiccant. The membrane carries immobilized monoclonal antibodies to RSV fusion and internal proteins at the TEST line and goat anti-mouse antibody at the CONTROL line. The strip also contains colloidal gold conjugated to monoclonal anti-RSV fusion protein and anti-RSV internal protein as the detector antibodies.

Sample Diluent: A buffered protein solution containing sodium azide (0.095%) as a preservative.

Positive Control: Inactivated RSV in a buffered solution containing sodium azide (0.095%) as a preservative.

Equipment needed to use the device

There is no equipment needed to use this device.

Interfering substances

There are no known interfering substances that affect the performance of this device with the exception of whole blood at contaminating concentrations greater than 5%.

Calibrators

There are no calibrators used with this device.

Controls

The assay includes an internal CONTROL line that is used to demonstrate that sample has been applied, that it has flowed correctly and that the conjugated detector antibody is active at the time of testing. A clear, colorless background around the TEST and CONTROL lines serves as a negative control and indicates that reagents were performing correctly at the time of use.

Positive Control Reagent and Sample Diluent (used for a negative control reagent) are supplied as external controls. These reagents also serve as indicators that the test was performed correctly, that the capture and detector antibodies were active at the time of use, and that the membrane supports proper sample flow.

Failure of the internal and external control to produce the expected results suggests the test was not performed correctly (ie, incorrect volume of reagents added; incorrect incubation temperature or times used or that reagents were not brought to room temperature prior to testing).

Technological principles

ImmunoCard STAT! RSV uses specific monoclonal antibodies directed at the fusion and internal proteins of RSV as the capture and detector antibodies. The antibodies are bound to the membrane of the Test Device at the reaction site marked TEST. Monoclonal anti-RSV fusion and anti-RSV internal protein antibodies are conjugated to colloidal gold and are suspended within the conjugate pad. To perform the test, sample (nasal wash, nasopharyngeal aspirate, nasal and nasopharyngeal swabs) is first diluted with Sample Diluent, then added to the sample port of the Test Device. Antigens in the sample bind the conjugate detector antibodies as the sample migrates through the device. The RSV-gold conjugate complexes will bind to the capture antibodies at the window site marked "Test" producing a visible pink-red line. In the absence of antigen, no pink-red line appears at this point.

Goat anti-mouse antibody is bound at the membrane site marked "Control". A visible pink-red line should appear at this position each time a sample or control reagent is tested. Failure to obtain a visible pink-red control line invalidates the test and is an indication of assay failure.

SUBSTANTIAL EQUIVALENCE TO PREDICATE DEVICES

The performance characteristics of ImmunoCard STAT! RSV were compared to several predicate devices. The comparison is shown in the next two tables.

The predicate devices to which ImmunoCard STAT! RSV was compared are as follows:

Binax NOW® RSV (Binax, Inc.)
BD Directigen® EZ RSV (Becton Dickinson, Inc.)
RSV OIA® (ThermoElectron Corp.)

Characteristics	Meridian ICSRSV	Binax NOW RSV	Directigen EZ RSV	Thermobiostar RSV OIA®
Device Type				
In vitro diagnostic device	Yes	Yes	Yes	Yes
Control	No	No	No	No
Calibrator	No	No	No	No
Intended Use				
Detection RSV in nasal samples	Yes	Yes	Yes	Yes
Screening test	Yes	Yes	Yes	Yes
Diagnostic test	No	No	No	No
Monitoring therapy	No	No	No	No
Acceptable Sample				
Nasal wash	Yes	Yes	Yes	Yes
Nasopharyngeal aspirate	Yes	No	Yes	Yes
Nasal and nasopharyngeal swabs	Yes	No	Yes	No
Nasal wash or swab in transport medium	Yes	No	Yes	Yes

Performance Characteristics (rounded) in Direct Comparison to Clinical Status or Condition	Meridian ICSRSV	Binax NOW RSV	Directigen EZ RSV	Thermobiostar RSV OIA®
Sensitivity (wash/aspirate)	23/28 (82%)	88%	76.9-87.2%	86.8%
Sensitivity (swab)	32/37 (87%)	93%	66.7-71.8%	66.7%
Specificity (wash/aspirate)	15/20 (75%)	98%	85.5-91.6%	83.2%
Specificity (swab)	86/89 (97%)	93%	95.0-91.6%	96.4%
Predictive Value of a Positive Test (wash/aspirate)	23/28 (82%)	ND	ND	ND
Predicate Value of a Positive Test (swab)	32/35% (91%)	ND	ND	ND
Predictive Value of a Negative Test (wash/aspirate)	15/20 (75%)	ND	ND	ND
Predicate Value of a Negative Test (swab)	86/91 (95%)	ND	ND	ND
Agreement (wash/aspirate)	38/48 (79%)	93-96%	ND	ND
Agreement (swab)	118/126 (94%)	ND	ND	ND
Laboratory Equivalence with (Predicate Device) combined totals	(culture)	(culture)	(culture)	(culture)
Concordance of positive tests with culture (wash/aspirate)	23/28 (82%)	45/51 (88%)	ND	ND
Concordance of positive tests with culture (swab)	32/37 (86%)	ND	ND	ND
Discordance of positive tests with culture (wash/aspirate)	5/28 (18%)	6/51 (12%)	ND	ND
Discordance of positive tests with culture (swab)	5/37 (14%)	ND	ND	ND
Concordance of negative tests with culture (wash/aspirate)	15/20 (75%)	196/199 (98%)	ND	ND
Concordance of negative tests with culture (swab)	86/89 (97%)	ND	ND	ND
Discordance of negative tests with culture (wash/aspirate)	5/20 (25%)	3/199 (2%)	ND	ND
Discordance of negative tests with culture (swab)	3/89 (3%)	ND	ND	ND
Performance characteristics				
Precision/Reproducibility (intra-assay)	94-100%	100%	99.1%	95%
Precision/Reproducibility (inter-assay)	100%	100%	99.1%	95%
Linearity/reportable range	N/A	N/A	N/A	N/a
Limit of detection	10-10,000 v/mL	$1.56 \times 10^4 - 5 \times 10^4$ $TCID_{50}$	400-790 $TCID_{50}$	$1 \times 10^5 - 1 \times 10^{1095\%}$ $TCID_{50}$
Assay cutoff	N/A	N/A	N/A	N/a

Comparison of Assay Methods

Characteristic	ICSRSV	Binax NOW RSV	BD Directogen EZ RSV	
Intended use	Qualitative detection of RSV in specimens from neonatal and pediatric patients	Qualitative detection of RSV in specimens from pediatric patients	Qualitative detection of RSV in specimens from pediatric patients	Q in pa
Specimen Required	1. Nasal wash 2. Nasopharyngeal aspirate 3. Nasal and nasopharyngeal swabs	1. Nasal wash	1. Nasal wash 2. Nasal swab 3. Nasopharyngeal aspirate 4. Nasopharyngeal swab 5. sputum 6. Tracheal aspirates 7. Other swabs	1. 2.
Technology	Lateral flow, colloidal gold-based immunoassay	Lateral flow, colloidal gold-based immunoassay	Lateral flow, colloidal gold-based immunoassay	O in
Level of skill required	Complexity: Moderate	CLIA waived	Moderate complexity	M
Assay steps	1. Add 4 drops sample diluent to a tube 2. Add 150 uL sample and vortex to mix 3. Add 150 uL diluted specimen to Test Device. 4. Incubate 15 min., 20-26 C. 5. Read at end of incubation	1. Add 100uL diluted specimen to Test Device. 4. Incubate 15 min., 20-26 C. 5. Read at end of incubation	1. Add 3 drops sample diluent to a tube 2. Add 250 uL sample and vortex to mix 3. Add 3 drops diluted specimen to Test Device. 4. Incubate 15 min., 20-26 C. 5. Read at end of incubation	1. Re mi 2. mi 3. th 4. 5. 6. in 7.
End point	Visible pink-red line	Visible purple-pink line	Visible reddish purple	V
Interpretation of test result	Positive = appearance of pink-red test and control lines (indicated presence of RSV antigens) Negative = no test line color with pink-red control line (indicates absence of RSV antigen	Positive = appearance of purple-pink test and control lines (indicated presence of RSV antigens) Negative = no test line color with purple--pink control line (indicates absence of RSV antigen	Positive = appearance of red-purple test and control lines (indicated presence of RSV antigens) Negative = no test line color with red-purple control line (indicates absence of RSV antigen	Po te an pu Ne (in

DEMONSTRATION OF EQUIVALENCE

Clinical trials

Two independent laboratories and Meridian's Development Laboratory performed testing on archival (retrospective) or fresh (prospective) samples collected from symptomatic patients and that had been submitted because of a respiratory syndrome. Each laboratory tested the samples by its own reference method (if applicable), the predicate device Binax NOW RSV and ImmunoCard STAT! RSV.

Investigators were required to record the age and sex of the patient, and the type and age of each specimen at the time of testing, if available. Samples were tested fresh (stored at 2-8 C for no more than 72 hours) or after frozen storage at ≤ -20 C.

Patient characteristics (patient age, sex) and sample type

Patient characteristics and sample characteristics are shown in the following tables. The age of the patients included in the clinical trial ranged from <1 to 71 years, and as expected, the majority of tests were performed on samples from patients less than 6 years of age. Males and female patients were equally represented. Table 6-1 shows there were no significant differences in test results attributable to patient age or sample storage. Table 6-2shows patient sex had no affect on test results. Tables 6-3

and 6-4 show there was no significant affect of sample source (or type), sample storage parameters or patient gender on test outcomes.

Table 6-1. Patient age, sample storage statistics and mean positive reaction strengths

Patient Age and Sample Storage	<1 Yr.	1-5 Yrs	6-15 Yrs	> 15 Yrs	Not defined
Clinical site 1					
Total tested Fresh	36	12	1	5	0
Mean positive reaction strength	3.0	4.0	No pos	No pos	N/A
Positive reaction range	1-6	4	N/A	N/A	N/A
Total tested Frozen	20	3	0	0	0
Mean positive reaction strength	3.6	1.0	N/A	N/A	N/A
Positive reaction range	1-7	1	N/A	N/A	N/A
Clinical site 2					
Total tested Fresh	29	5	0	0	0
Mean positive reaction strength	Not Recorded*	Not Recorded	N/A	N/A	N/A
Positive reaction range	Not Recorded	Not Recorded	N/A	N/A	N/A
Total tested Frozen	0	0	0	0	0
Mean positive reaction strength	N/A	N/A	N/A	N/A	N/A
Positive reaction range	N/A	N/A	N/A	N/A	N/A
Clinical site 3					
Total tested Fresh	0	0	0	0	0
Mean positive reaction strength	N/A	N/A	N/A	N/A	N/A
Positive reaction range	N/A	N/A	N/A	N/A	N/A
Total tested Frozen	0	0	0	0	68
Mean positive reaction strength	N/A	N/A	N/A	N/A	4.2
Positive reaction range	N/A	N/A	N/A	N/A	0.5-9
Clinical site Totals					
Total tested Fresh	65	17	1	5	0
Mean positive reaction strength	3	4	No pos	No pos	N/A
Positive reaction range	1-6	4	N/A	N/A	N/A
Total tested Frozen	20	3	0	0	68
Mean positive reaction strength	3.6	1	N/A	N/A	4.2
Positive reaction range	1-7	1	N/A	N/A	0.5-9
Patient Age and Sample Storage	<1 Yr.	1-5 Yrs	6-15 Yrs	> 15 Yrs	Not defined

* Site protocol did not require grading of reaction strengths.

Table 6-2. Patient gender statistics and mean positive reaction strengths

	Male	Female	Not defined
Clinical site 1			
Total tested	47	30	0
Mean positive reaction strength	3.3	3.4	N/A
Positive reaction range	1-6	1-7	N/A
Clinical site 2			
Total tested	24	10	0
Mean positive reaction strength	Not Recorded	Not Recorded	N/A
Positive reaction range	Not Recorded	Not Recorded	N/A
Clinical site 3			
Total tested	0	0	68
Mean positive reaction strength	N/A	N/A	4.2
Positive reaction range	N/A	N/A	0.5-9
Clinical site Totals			
Total tested	71	40	68
Mean positive reaction strength	3.3	3.4	4.2
Positive reaction range	1-6	1-7	0.5-9

Table 6-3. Specimen sample type and mean positive reaction strengths

	Specimen Type			
	Swab	Wash	NPA	Not defined
Total tested -- Clinical Site 1				
Total tested	76	1	0	0
Mean positive reaction strength	3.4	2	N/A	N/A
Positive reaction range	1-7	2	N/A	N/A
Total tested -- Clinical Site 2				
Total tested	0	34	0	0
Mean positive reaction strength	N/A	Not Recorded	N/A	N/A
Positive reaction range	N/A	Not Recorded	N/A	N/A
Total tested -- Clinical Site 3				
Total tested	50	0	18	0
Mean positive reaction strength	2.2	N/A	5	N/A
Positive reaction range	0.5-5	N/A	2-9	N/A
Total tested – All Sites				
Total tested	126	35	18	0
Mean positive reaction strength	3.2	2	5	N/A
Positive reaction range	0.5-7	2	2-9	N/A

Legend: NPA = nasopharyngeal aspirate

Table 6-4. Specimen sample storage parameters and mean positive reaction strengths

	Specimen Type		
	Fresh	Frozen	Not recorded
Total tested -- Clinical Site 1			
Total tested	54	23	0
Mean positive reaction strength	3.2	3.5	N/A
Positive reaction range	1-6	1-7	N/A
Total tested -- Clinical Site 2			
Total tested	34	0	0
Mean positive reaction strength	Not Recorded	N/A	N/A
Positive reaction range	Not Recorded	N/A	N/A
Total tested -- Clinical Site 3			
Total tested	0	68	0
Mean positive reaction strength	N/A	4.2	N/A
Positive reaction range	N/A	0.5-9	N/A
Total tested -- All Sites			
Total tested	88	91	0
Mean positive reaction strength	3.2	3.9	N/A
Positive reaction range	1-6	0.5-9	N/A

Clinical trial data summarized

The compiled results from clinical trials are summarized as follows:

Table 6-5. Results of clinical evaluations

6-5A

Clinical site 1	**ICS RSV**			**Binax Now RSV**		
	Pos	**Neg**	**Total**	**Pos**	**Neg**	**Total**
Tissue Culture Pos	30	4	34	27	6	33
Tissue Culture Neg	0	43	43	0	43	43
Total	30	47	77	27	49	76
Concordant rate (%)						
Positive	30/34 (88%)			27/33 (82%)		
Negative	43/43 (100%)			43/43 (100%)		
Discordant rate (%)						
Positive	4/34 (12%)			6/33 (18%)		
Negative	0/43 (0%)			0/43 (0%)		
		95% CI				
Agreement	73/77 (94.8%)	90.1% - 99.9%		70/76 (92.1%)		
Sensitivity	30/34 (88.2 %)	77.0% - 99.0%		27/33 (81.8 %)		
Specificity	43/43 (100 %)	N/A		43/43 (100 %)		
Predictive value positive test	30/30 (100 %)	N/A		27/27 (100 %)		
Predictive value negative test	43/47 (91.5 %)	82.8% - 99.2%		43/49 (87.8 %)		

6-5B

Clinical site 2	ICS RSV			Binax Now RSV		
	Pos	Neg	Total	Pos	Neg	Total
Tissue Culture Pos	7	2	9	7	2	9
Tissue Culture Neg	5	15	20	5	15	20
Total	12	17	29	12	17	29
Concordant rate (%)						
Positive	7/9 (78%)			7/9 (78%)		
Negative	15/20 (75%)			15/20 (75%)		
Discordant rate (%)						
Positive	2/9 (22%)			2/9 (22%)		
Negative	5/20 (25%)			5/20 (25%)		
		95% CI				
Agreement	22/29 (75.9%)	60.5% - 91.5%		22/29 (75.9%)		
Sensitivity	7/9 (77.8%)	51.0% - 100%		7/9 (77.8%)		
Specificity	15/20 (75.0%)	56.0% - 94.0%		15/20 (75.0%)		
Predictive value positive test	7/12 (58.3%)	30.2% - 85.8%		7/12 (58.3%)		
Predictive value negative test	15/17 (88.2%)	72.5% - 100%		15/17 88.2%%)		

Clinical Site 2 performed PCR analysis on specimens that exhibited overgrowth in tissue culture or discrepant results between ImmunoCard STAT! RSV and culture. In many cases, PCR analysis indicated that culture results were falsely negative. Test results are recalculated based on the PCR data and given in table immediately below. The PCR results are matched to individual samples in Table 6-6.

6-5C

Clinical site 2 data AFTER correction to PCR results	ICS RSV			Binax Now RSV		
	Pos	Neg	Total	Pos	Neg	Total
Tissue Culture Pos	13	2	15	13	2	15
Tissue Culture Neg	1	17	18	1	17	18
Total	14	19	33	14	19	33
Concordant rate (%)						
Positive	13/15 (87%)			13/15 (87%)		
Negative	17/18 (94%)			17/18 (94%)		
Discordant rate (%)						
Positive	2/15 (13%)			2/15 (13%)		
Negative	1/18 (6%)			1/18 (6%)		
		95% CI				
Agreement	30/33 (90.9%)	81.2% - 100%		30/33 (90.9%)		
Sensitivity	13/15 (86.7%)	70.0% - 100%		13/15 (86.7%)		
Specificity	17/18 (94.4%)	83.0% - 100%		17/18 (94.4%)		
Predictive value positive test	13/14 (92.9 %)	79.7% - 100%		13/14 (92.9 %)		
Predictive value negative test	17/19 (89.5%)	74.9% - 100%		17/19 (89.5%)		

6-5D

Clinical site 3	ICS RSV			Binax Now RSV		
	Pos	Neg	Total	Pos	Neg	Total
Tissue Culture Pos	18	4	22	17	4	21
Tissue Culture Neg	3	43	46	0	46	46
Total	21	47	68	17	50	67
Concordant rate (%)						
Positive	18/22 (82%)			17/21 (81%)		
Negative	43/46 (93%)			46/46 (100%)		
Discordant rate (%)						
Positive	4/22 (18%)			4/21 (19%)		
Negative	3/46 (7%)			0/46 (0%)		
		95% CI				
Agreement	61/68 (89.7%)	82.9% - 97.1%		63/67 (94.0%)		
Sensitivity	18/22 (81.8%)	65.9% - 98.1%		17/21 (81.0%)		
Specificity	43/46 (93.5%)	85.6% - 100%		46/46 (100%)		
Predictive value positive test	18/21 (85.7%)	71.1% - 100%		17/17 (100%)		
Predictive value negative test	43/47 (91.5%)	82.8% - 99.2%		46/50 (92.0%)		

6-5E

Total Sites Combined Data – Comparison to Standard	ICS RSV		
	Pos	Neg	Total
Tissue Culture Pos	55	10	65
Tissue Culture Neg	8	101	109
Total	63	111	174
Concordant rate (%)			
Positive	55/65 (85%)		
Negative	101/109 (93%)		
Discordant rate (%)			
Positive	10/65 (15%)		
Negative	8/109 (7%)		
			95% CI
Agreement	156/174 (89.7%)		88.1% - 94.5%
Sensitivity	55/65 (84.6%)		76.4% - 93.6%
Specificity	101/109 (92.7%)		88.3% - 97.7%
Predictive value positive test	55/63 (87.3%)		78.8% - 95.2%
Predictive value negative test	101/111 (91.0%)		85.7% - 96.3%

6-5F

Total Sites Combined Data – Comparison to Standard resolved against PCR data at Site 2.	ICS RSV		
	Pos	Neg	Total
Tissue Culture Pos	61	10	71
Tissue Culture Neg	4	103	107
Total	65	113	178
Concordant rate (%)			
Positive	61/71 (86%)		
Negative	103/107 (96%)		
Discordant rate (%)			
Positive	10/71 (14%)		
Negative	4/107 (4%)		
			95% CI
Agreement	164/178 (92.1%)		88.1% - 95.9%
Sensitivity	61/71 (85.9%)		78.0% - 94.0%
Specificity	103/107 (96.3%)		92.3% - 99.7%
Predictive value positive test	61/65 (93.8%)		88.3 % - 99.7%
Predictive value negative test	103/113 (91.2%)		85.7% - 96.3%

Characterization of samples producing discordant results

The data collected during clinical trials is shown in the spreadsheets provided at the end of these sections. The results can be summarized as follows:

Table 6-6. Samples producing discrepant results.

Sample Number	ICS RSV Results	Culture Results		Comments PCR Results
1-4	Neg	RSV	FN	No repeat testing performed
1-56	Neg	RSV	FN	No repeat testing performed
1-57	Neg	RSV	FN	No repeat testing performed
1-61	Neg	RSV	FN	No repeat testing performed
2-21	Neg	Overgrown	Overgrown	Neg
2-27	Pos	Overgrown	Overgrown	Pos RSV A
2-41	Neg	RSV	FN	Neg
2-42	Pos	Neg	FP	Pos RSV A
2-44	Pos	Overgrown	Overgrown	Pos RSV A
2-45	Pos	Neg	FP	Pos RSV A& B
2-46	Pos	Neg	FP	Pos RSV A
2-59	Neg	RSV	FN	No repeat testing performed
2-69	Neg	Overgrown	Overgrown	Pos RSV A
2-70	Pos	Overgrown	Overgrown	Equivocal
2-72	Pos	Neg	FP	Neg
2-73	Pos	Neg	FP	Pos RSV A
3-7	Neg	RSV	FN	No repeat testing performed
3-18	Pos 0/1	Para 3	FP	Neg
3-32	Pos 1	Neg	FP	Neg
3-39	Pos 1	Neg	FP	Neg
3-62	Neg	RSV	FN	No repeat testing performed
3-64	Neg	RSV	FN	No repeat testing performed
3-67	Neg	RSV	FN	No repeat testing performed

Legend: ICS RSV = ImmunoCard STAT! RSV, FN = false negative, FP = false positive

The following data sets given in Table 6-7 provide analysis of clinical data by sample type (wash/aspirate vs swab). The data in these tables show there is no significant differences in outcomes of tests performed with wash, aspirate or swab samples.

Table 6-7. Results of comparison to predicate device

6-7A

Wash/Aspirate Specimens Not resolved	ICS RSV			Binax Now RSV		
	Pos	Neg	Total	Pos	Neg	Total
Tissue Culture Pos	23	5	28	22	5	27
Tissue Culture Neg	5	15	20	5	15	20
Total	28	20	48	27	20	47
Concordant rate (%)						
Positive	23/28 (82%)			22/27 (81%)		
Negative	15/20 (75%)			15/20 (75%)		
Discordant rate (%)						
Positive	5/28 (18%)			5/27 (19%)		
Negative	5/20 (25%)			5/20 (25%)		
Agreement	38/48 (79.2%)		67.2% - 90.8%	37/47 (78.7%)		
Sensitivity	23/28 (82.1%)		68.3% - 95.7%	22/27 (81.5%)		
Specificity	15/20 (75.0%)		55.4% - 94.6%	15/20 (75.0%)		
Predictive value positive test	23/28 (82.1%)		68.3% - 95.7%	22/27 (81.5%)		
Predictive value negative test	15/20 (75.0%)		55.4% - 94.6%	15/20 (75.0%)		

Note to table above: 5 overgrown specimens not included, 1 QNS to run on Binax

6-7B

Wash/Aspirate Specimens Resolved	ICS RSV			Binax Now RSV		
	Pos	Neg	Total	Pos	Neg	Total
Tissue Culture Pos	29	5	34	28	5	33
Tissue Culture Neg	1	17	18	1	17	18
Total	30	22	52	29	22	51
Concordant rate (%)						
Positive	29/34 (85%)			28/33 (85%)		
Negative	17/18 (94%)			17/18 (94%)		
Discordant rate (%)						
Positive	5/34 (15%)			5/33 (15%)		
Negative	1/18 (6%)			1/18 (6%)		
Agreement	46/52 (88.5%)		78.2% – 97.8%	45/51 (88.2%)		
Sensitivity	29/34 (85.3%)		73.2% - 96.8%	28/33 (84.8%)		
Specificity	17/18 (94.4%)		82.2% - 100%	17/18 (94.4%)		
Predictive value positive test	29/30 (96.7%)		91.1% - 100%	28/29 (96.6%)		
Predictive value negative test	17/22 (77.3%)		59.4% - 94.6%	17/22 (77.3%)		

Note to table above: 1 QNS to run on Binax, 1 Equivocal Specimen after PCR

6-7C

Swab Specimens	ICS RSV			Binax Now RSV		
	Pos	Neg	Total	Pos	Neg	Total
Tissue Culture Pos	32	5	37	29	7	36
Tissue Culture Neg	3	86	89	0	89	89
Total	35	91	126	29	96	125
Concordant rate (%)						
Positive	32/37 (86%)			29/36 (81%)		
Negative	86/89 (97%)			89/89 (100%)		
Discordant rate (%)						
Positive	5/37 (14%)			7/36 (19%)		
Negative	3/89 (3%)			0/89 (0%)		
Agreement	118/126 (93.7%)		90.1% - 97.9%	118/125 (94.4%)		
Sensitivity	32/37 (86.5%)		74.2% - 97.8%	29/36 (80.6%)		
Specificity	86/89 (96.6%)		93.1% - 100%	89/89 (100%)		
Predictive value positive test	32/35 (91.4%)		81.2% - 100%	29/29 (100%)		
Predictive value negative test	86/91 (94.5%)		90.1% - 97.9%	89/96 (92.7%)		

Note to table above: 1 Binax Invalid Result, No resolved data. PCR was negative for the 3 false positive samples

Reproducibility

Two reproducibility panels, each consisting of eight coded specimens, were sent to the three clinical sites. Five of these samples in each set were classified by the predicate device Binax NOW RSV as positive. One additional sample was at the limit of detect of ImmunoCard STAT! RSV. The samples were expected to produce a positive or negative result. Even though the trial sites were instructed to grade reactions, there were no criteria regarding the strength of a positive reaction that was expected. Tables 6-8 and 6-9 show that all samples in Panel 1 and 7/8 samples in Panel 2 demonstrated intra- and inter-assay reproducibility of 100%. One sample (Panel 2) gave a reproducible rate of 94%.

Table 6-8. Results with reproducibility test panel #1

	Clinical Site 3			Clinical Site 1			Clinical Site 2		
Sample ID	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
1 LP	5	2	1	1	2	1	2	2	2
2 LP	3	4.5	5	2	2	3	3	1	2
3 MP	6	5	5.5	3	4	2	3	3	4
4 MP	1	1	2	2	2	2	1	1	1
5 HP	7	6	8	4	6	6	5	6	5
6 N	0	0	0	0	0	0	0	0	0
7 N	0	0	0	0	0	0	0	0	0
8 Limit of detect	0	0	0	0	0	0	0	0	0
Total positive score	22	18.5	21.5	12	16	14	14	13	14
Average positive score	4.4	3.7	4.3	2.4	3.2	2.8	2.8	2.6	2.8
Percent correlation	100	100	100	100	100	100	100	100	100

Legend: LP = low positive, MP = moderate positive, HP = high positive, N = negative,

Table 6-9. Results with reproducibility test panel #2

	Clinical Site 1			Clinical Site 2			Clinical Site 3		
Sample ID	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
1 LP	1	4	1	0	1	1	1.5	2	1
2 LP	4	6	4	3	4	4	1	4	4
3 MP	4	4	4	5	6	3	6.5	5	7
4 MP	5	6	5	5	6	4	7	7	6.5
5 HP	5	1	1	3	7	6	8	9	7
6 N	0	0	0	0	0	0	0	0	0
7 N	0	0	0	0	0	0	0	0	0
8 Limit of detect	0	0	0	1	0	0	1.5	1	8
Total positive score	19	21	15	16	24	18	24	27	25.5
Average positive score	3.8	4.2	3.0	3.2	4.8	3.6	4.8	5.4	5.1
Percent correlation	100	100	100	87.5	100	100	100	100	100

Legend: LP = low positive, MP = moderate positive, HP = high positive, N = negative,

High dose hook effect

There was no high dose hook effect observed in verification or clinical testing performed with this assay.

CONCLUSIONS

ImmunoCard STAT! RSV:

1. Can be used reliably for the rapid detection of RSV antigens in human respiratory samples.
2. Performs similarly to the predicate device Binax NOW RSV.

	ICS RSV			NOW RSV		
	Pos	Neg	Total	Pos	Neg	Total
Culture Pos	55	10	65	51	12	63
Culture Neg	8	101	109	5	104	109
Total	63	111	174	56	116	172
Concordance rate (% to culture)						
Positive	55/65 (85%)			51/63 (81%)		
Negative	101/109 (93%)			104/109 (95%)		

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

AUG 1 3 2004

Ms. Susan Rolih
Vice President, Regulatory Affairs/Quality Assurance
Meridian Bioscience, Inc.
3471 River Hills Drive
Cincinnati, OH 45244

Re: k041445
Trade/Device Name: Immuno *Card* STAT! RSV
Regulation Number: 21 CFR 866.3480
Regulation Name: Respiratory Syncytial Virus Serological Reagents
Regulatory Class: Class I
Product Code: GQG
Dated: May 28, 2004
Received: June 10, 2004

Dear Ms. Rolih:

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.

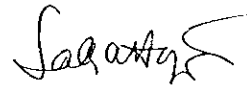
If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish 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); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820).

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific information about the application of labeling requirements to your device, or questions on the promotion and advertising of your device, please contact the Office of *In Vitro* Diagnostic Device Evaluation and Safety at (301) 594-3084. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). 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) 443-6597 or at its Internet address http://www.fda.gov/cdrh/dsma/dsmamain.html.

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

INDICATIONS FOR USE STATEMENT
Immuno*Card* STAT! RSV

510(K) Number: K041445

Immuno*Card* STAT! RSV is a rapid, qualitative, lateral-flow immunoassay for the detection of Respiratory Syncytial Virus (RSV) antigens (fusion protein or internal protein) in human nasal wash, nasopharyngeal aspirate and nasal and nasopharyngeal swab samples. It is designed to test specimens from symptomatic neonatal and pediatric patients. It is recommended that all negative test results be confirmed by cell culture.

Prescription Use ___X___ (Part 21 CFR 801 Subpart D) AND/OR Over-The-Counter Use _____ (21 CFR 807 Subpart C)

Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Division Sign-Off

Office of In Vitro Diagnostic
Device Evaluation and Safety

510(k) K041445