

SEP 28 1998

510(k) Summary of Safety and Effectiveness

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

The assigned 510(k) number is: _____

Applicant Information:

Date Prepared: July 21, 1998
Name: Diamedix Corporation
Address: 2140 N. Miami Avenue
Miami, FL 33127

Contact Person: Dr. Lynne Stirling
Phone Number: 305-324-2354
Fax Number: 305-324-2585

Device Information:

Trade Name: Is-VZV IgG Test System
Common Name: VZV EIA Test
Classification Name: Enzyme linked immunosorbent assay, varicella zoster virus

Equivalent Device:

Diamedix VZV Microassay

Device Description: The Is-VZV IgG Test System is an enzyme immunoassay (EIA) for the detection and semi-quantitation of IgG antibodies to VZV antigen in human serum

Intended Use: The assay is intended for use in detecting IgG antibodies to VZV antigen in human serum. The results of the assay can be used to determine a prior exposure to VZV and, when evaluating paired sera, to aid in the determination of acute or convalescent stage of VZV infection.

Principle of the Procedure:

The Is-VZV IgG Test System is an enzyme-linked immunosorbent assay to detect IgG to VZV in human serum. Partially purified VZV antigen is attached to a solid phase microtiter well. Diluted test sera are added to each well. If antibodies which recognize the VZV antigen are present in the patient sample they will bind to the antigen on the well. After incubation, the wells are washed to remove unbound antibody. An enzyme labeled anti-human immunoglobulin (conjugate) is added to each test well. If antibody is present the enzyme-linked antibody will bind to it. After incubation, the wells are washed to remove unbound conjugate. A substrate solution is then added to each well. If enzyme is present from the prior step, the reaction is stopped and the color intensity is measured photometrically producing an indirect measure of the specific antibody present in the patient sample.

Performance Characteristics

A. Comparison Testing

A total of six hundred and fifty-two sera were tested for the presence of VZV IgG antibodies using the Diamedix Is-VZV IgG Test Kit and another commercially available EIA test kit at two independent sites (site #1, Miami, FL and site #2, Salt Lake City, Utah) as well as at Diamedix Corp., Miami FL (site #3). At site #3, testing was performed both manually and using the MAGO Plus Automated EIA processor.

Site #1 tested 200 sera (all frozen). Samples were obtained from the S. Florida area. Thirty-seven of the samples were obtained from males, including 5 children, and ninety-seven from females. Of the 97 samples from females, 46 (47%) were of child-bearing age (18-45 years). No age or gender data was available on the remaining samples. Table 1 compares the results obtained for the Is-VZV IgG Test Kit and their currently used testing method.

Site #2 tested 198 sera (all fresh). Samples were obtained from the Mid-West/West region. Fifty-eight of the samples were obtained from males, including 6 children, and one hundred and twenty-seven from females, including one child. Of the 127 samples from females, 107 (84%) were of child-bearing age (18-45 years). No age or gender data was available on the remaining samples. Table 2 compares the results obtained for the Is-VZV IgG Test Kit and their currently used testing method.

TABLE 1
Is-VZV IgG : Site #1

		Positive	Negative	Equivocal
Other EIA	Positive	171	1	3
	Negative	0	23	2
	Equivocal	0	0	0

*95%CI***

Relative Sensitivity 171/172 = 99.4% 96.8-100.0
 Relative Specificity 23/23 = 100.0% 85.2-100.0
 Overall Agreement* 194/195 = 99.5% 97.2-100.0

TABLE 2
Is-VZV IgG : Site #2

		Positive	Negative	Equivocal
Other EIA	Positive	164	4	6
	Negative	0	19	2
	Equivocal	0	3	0

*95%CI**

Relative Sensitivity 164/168 = 97.6% 94.0-99.3
 Relative Specificity 19/19 = 100.0% 82.4-100.0
 Overall agreement 183/187 = 97.9% 94.6-99.4

*Equivocal results were excluded from calculations

** Calculated by the Exact Method (10).

For site #1, the discordant sample was equivocal when tested by a referee EIA method. For site #2, the discordant sera were not available for further resolution.

Site #3 (Diamedix Corp.) tested 254 samples (all frozen) by the manual method and 253 of these samples (one being QNS) by the MAGO Plus method. No age or gender data was available for these samples. Of the samples tested 74 were specifically selected either because they were negative or had values close to the cut-off by other EIA methods. The remainder of the samples were obtained from the normal S. Florida blood donor population. Tables 3 and 4 compare the results obtained by manual and MAGO Plus testing for the Is-VZV IgG Test Kit and another marketed EIA method.

TABLE 3
Is-VZV IgG : Site #3 (manual)

		Positive	Negative	Equivocal
Other EIA	Positive	169	3	6
	Negative	2	68	6
	Equivocal	0	0	0

*95%CI***

Relative Sensitivity 169/172 = 98.3% 95.0-99.6
 Relative Specificity 68/70 = 97.1% 90.1-99.7
 Overall Agreement* 237/242 = 97.9% 95.2-99.3

*Equivocal results were excluded from calculations

TABLE 4
Is-VZV IgG : Site #3 (MAGO Plus)

		Positive	Negative	Equivocal
Other EIA	Positive	173	1	3
	Negative	5	67	4
	Equivocal	0	0	0

*95%CI***

Relative Sensitivity 173/174 = 99.4% 96.8-100.0
 Relative Specificity 67/72 = 93.1% 84.5-97.7
 Overall Agreement* 240/246 = 97.6% 94.8-99.1

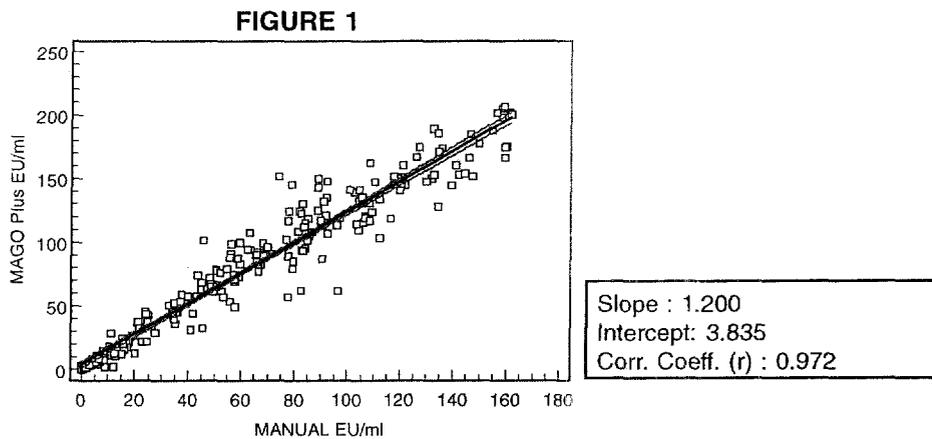
** Calculated by the Exact Method (10).

For site #3 (manual testing), the two samples that were positive by the Is-VZV IgG and negative by the other EIA were negative by a referee EIA method. For the three samples that were negative in the Is-VZV IgG Test Kit and positive by the other EIA one was negative, one was equivocal and one was positive in the referee method. For MAGO Plus testing the five samples that were positive in the Is-VZV IgG and negative by the other EIA were negative in the referee EIA method. The sample that was negative in the Is-VZV IgG Test Kit and positive by the other EIA was negative in the referee EIA method.

NOTE: Please be advised that 'relative' refers to the comparison of the assay's results to that of a similar assay. There was not an attempt to correlate the assay's results with disease presence or absence. No judgment can be made on the comparison assay's accuracy to predict disease.

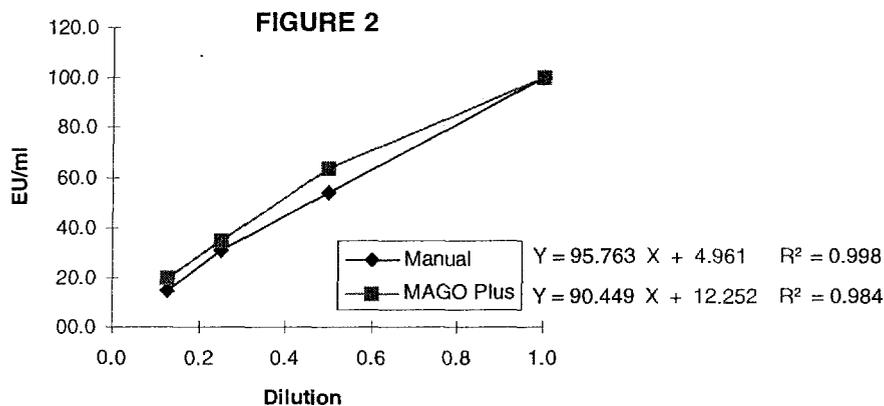
B. Correlation of Manual and MAGO Plus Results

The Diamedix Is-VZV IgG Test System has been developed for use both manually and using the MAGO Plus Automated EIA Processor. To further demonstrate the equivalence of the manual and MAGO Plus procedures, the results of the 253 serum samples tested by both methods were plotted. A scattergram and regression line of the results obtained with 95% confidence intervals is shown in Figure 1 and demonstrates good correlation.



C. Linearity

Several strongly positive serum specimens as well as the in-house standard were diluted (2-fold) and separate dilutions were assayed in the Is-VZV IgG Test Kit both manually and using the MAGO Plus Automated Processor. R^2 values for the samples ranged from 0.972 to 0.999. The titration curve of the in-house standard, manually and by MAGO Plus, is shown in Figure 2. The results demonstrate a high degree of linearity throughout the reportable range of the assay.



The linearity/dynamic range of the assay was determined to be 20-100 EU/ml

D. Semi-Quantitative Data

Serum pairs were obtained by preparing multiple serial 2-fold dilutions of several strongly positive sera. Ratios for dilutions representing a four-fold and two fold difference in antibody level were evaluated as a serum pair both manually and using the MAGO Plus. The overall mean ratio obtained for 4-fold dilutions was 3.13 (SD 0.35) and the overall mean ratio obtained for 2-fold dilutions was 1.77 (SD 0.15). Overall, it was estimated a ratio of 2.8-fold or greater (mean ratio minus 1 SD) increase in Is-VZV IgG EU/ml values corresponded to a four-fold increase in VZV IgG antibody levels. A ratio in the range of 1.8 to 2.8 was considered equivocal for significant increase determination.

E. Cross Reactivity

Sera containing IgG antibodies to viruses potentially cross-reactive to VZV have been tested in the Is-VZV IgG Test Kit. Thirteen sera negative for antibodies to VZV in the Is-VZV IgG Test Kit as well as in another marketed test were positive for antibodies to one or more viruses. The data in the following table indicate that no cross-reactivity should be expected with the Is-VZV IgG Test Kit from these analytes.

TABLE 5

Analyte	VZV IgG	HSV IgG	Measles IgG	CMV IgG	Rubella IgG
# of Pos. Samples	0	12	12	9	12

F. Precision

Six serum samples as well as the Is-VZV IgG Test Kit Calibrator, Positive Control and Negative Control, were assayed, in triplicate in three separate runs for site #1 and site #2 and in six separate runs for site #3. The precision studies were performed manually at the two outside testing sites (site #1 and site #2) and at site #3 (Diamedix Corp.) both manually and using the MAGO Plus Automated EIA processor. The results obtained are shown in Tables 6-10.

TABLE 6 : Site #1 Intra- and Interassay Precision

SERUM	INTRA-ASSAY DAY 1			INTRA-ASSAY DAY 2			INTRA-ASSAY DAY 3			INTERASSAY		
	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%
A	1.5	0.10	6.67	1.5	0.25	16.67	1.5	0.17	11.33	1.5	0.16	10.67
B	3.9	0.25	6.41	4.1	0.23	5.61	4.1	0.26	6.34	4.0	0.23	5.75
C	16.9	1.45	8.58	16.8	1.56	9.29	17.4	0.83	4.77	17.0	1.18	6.94
D	49.5	3.43	6.93	49.1	3.44	7.01	48.0	3.20	6.67	48.9	2.99	6.11
E	81.9	5.58	6.81	81.2	5.14	6.33	84.3	1.84	2.18	82.4	4.16	5.05
F	102.4	2.67	2.61	101.6	2.68	2.64	101.9	2.32	2.28	102.0	2.24	2.20
CAL	93.4	2.76	2.96	93.0	3.10	3.33	92.4	3.55	3.84	93.0	2.76	2.97
POS	44.3	1.10	2.48	44.1	1.18	2.68	42.1	0.91	2.16	43.5	1.38	3.17
NEG	1.3	0.06	4.62	1.3	0.00	0.00	1.1	0.15	13.64	1.2	0.15	12.50

TABLE 7 : Site #2 Intra- and Interassay Precision

SERUM	INTRA-ASSAY DAY 1			INTRA-ASSAY DAY 2			INTRA-ASSAY DAY 3			INTERASSAY		
	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%
A	1.4	0.38	27.14	2.1	0.15	7.14	1.5	0.23	15.33	1.7	0.38	22.35
B	4.9	1.59	32.45	6.2	0.35	5.65	5.7	0.76	13.33	5.6	1.07	19.11
C	15.3	4.38	28.63	20.2	1.46	7.23	18.7	1.55	8.29	18.1	3.27	18.07
D	34.8	3.91	11.24	45.7	0.50	1.09	41.3	1.37	3.32	40.6	5.19	12.78
E	77.4	14.11	18.23	83.6	4.12	4.93	77.9	3.65	4.69	79.6	8.14	10.23
F	75.3	2.76	3.67	105.4	1.65	1.57	103.1	8.95	8.68	94.6	15.26	16.13
CAL	96.5	4.87	5.05	102.4	3.22	3.14	94.3	5.18	5.49	97.7	5.32	5.45
POS	45.8	2.41	5.26	55.2	3.35	6.07	51.0	2.75	5.39	50.7	4.78	9.43
NEG	1.6	0.03	18.75	1.8	0.51	28.33	2.0	0.76	38.00	1.82	0.52	28.89

TABLE 8 : Site #3 Intra- and Interassay Precision (Manual)

SERUM	INTRA-ASSAY DAY 1			INTRA-ASSAY DAY 2			INTRA-ASSAY DAY 3			INTERASSAY		
	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%
A	1.7	0.08	4.90	1.9	0.10	5.26	1.8	0.10	5.56	1.8	0.14	7.78
B	4.4	0.45	10.17	4.7	0.53	11.26	4.3	0.35	8.06	4.4	0.37	8.41
C	18.2	0.81	4.43	17.7	1.03	5.79	17.1	0.58	3.37	17.5	0.89	5.09
D	46.7	1.64	3.51	46.3	1.47	3.19	45.3	1.15	2.54	45.5	2.63	5.78
E	71.7	2.78	3.88	71.6	4.12	5.76	68.3	1.70	2.49	70.3	3.09	4.40
F	99.3	5.12	5.16	99.9	4.03	4.03	95.2	6.53	6.86	97.9	5.38	5.50
CAL	97.8	7.15	7.31	98.6	7.35	7.46	98.3	5.26	5.36	97.1	6.25	6.44
POS	48.8	1.38	2.83	47.6	2.54	5.33	47.6	2.48	5.29	47.5	2.09	4.40
NEG	1.8	0.26	14.62	1.8	0.15	8.65	1.6	0.15	9.35	1.7	0.21	12.35

TABLE 9 : Site #3 Intra- and Interassay Precision (MAGO Plus)

SERUM	INTRA-ASSAY DAY 1			INTRA-ASSAY DAY 2			INTRA-ASSAY DAY 3			INTERASSAY		
	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%	MEAN	SD	CV%
A	2.7	1.07	40.23	2.4	0.71	29.95	3.0	0.29	9.48	2.7	0.77	28.52
B	4.4	0.77	17.58	4.6	0.92	19.95	5.4	0.50	9.14	4.8	0.84	17.50
C	19.9	1.97	9.92	21.1	1.11	5.27	21.4	1.31	6.13	20.8	1.56	7.50
D	51.3	1.75	3.41	52.2	3.60	6.90	58.1	4.02	6.91	53.9	4.39	8.14
E	91.2	10.07	11.04	96.3	10.26	10.65	98.5	15.09	15.32	95.3	11.73	12.31
F	108.0	6.47	5.99	117.1	6.48	5.53	117.7	8.03	6.82	114.3	8.03	7.03
CAL	112.8	10.45	9.26	119.0	8.80	7.39	128.5	13.17	10.25	120.1	12.23	10.18
POS	49.8	4.16	8.35	53.5	3.17	5.93	55.6	4.65	8.37	52.9	4.52	8.54
NEG	1.6	0.45	27.56	2.9	1.00	34.62	3.6	1.27	35.21	2.7	1.24	45.93

TABLE 10 : Inter-Site precision (manual)

SERUM	Site #1	Site #2	Site #3	INTER-SITE		
	MEAN EU/ml	MEAN EU/ml	MEAN EU/ml	MEAN EU/ml	SD	CV%
A	1.5	1.7	1.8	1.7	0.15	8.82
B	4.0	5.6	4.4	4.7	0.83	17.66
C	17.0	18.1	17.5	17.5	0.55	3.14
D	48.9	40.6	45.0	45.0	4.17	9.27
E	82.4	79.6	70.3	77.4	6.33	8.18
F	102.0	94.6	97.9	98.2	3.71	3.78
CAL	93.0	97.7	97.1	95.9	2.56	2.67
POS	43.5	50.7	47.5	47.2	3.61	7.65
NEG	1.2	1.8	1.6	1.6	0.32	20.00

Expected Values

The prevalence of VZV antibodies can vary depending on age, geographical location, socio-economic status, race and vaccine usage. The prevalence of VZV antibodies generally varies from about 15% positive in 2 year olds to about 95% in persons over 40 years of age. Sera from 100 healthy South Florida blood donors (52 female and 48 male) were evaluated in the Is-VZV IgG Test Kit. Of the 100 samples, 92 were found to be reactive (positive), 6 were found to be non-reactive (negative) and 2 sera were equivocal. Age distribution, geographic location and prevalence is provided in Table 11. Histograms demonstrating the distribution of EU/ml values are shown in Figures 3 and 4.

TABLE 11

	Number of donors	Prevalence
Total Number	100	92.0%
Geographic location : South Eastern US	100	92.0%
Age		
10-19	13	92.3%
20-29	23	91.3%
30-39	40	87.5%
40-49	13	100.0%
50-59	5	100.0%
60-69	6	100.0%

FIGURE 3

Is-VZV IgG Reactive (Positive) Population

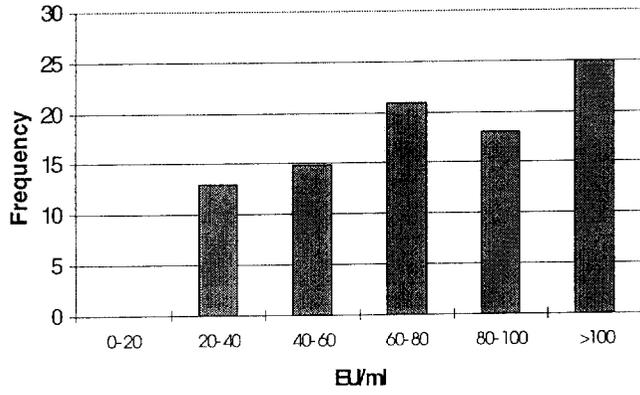
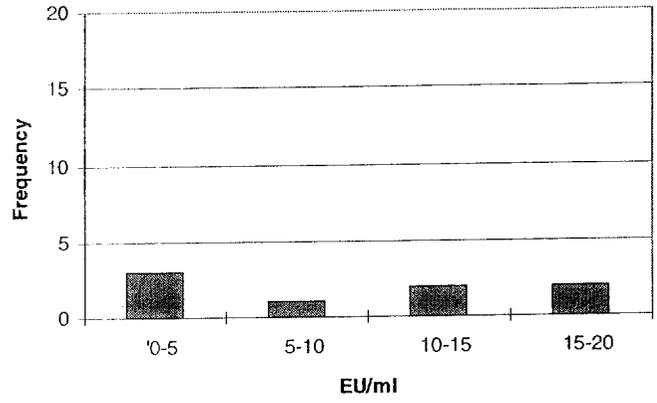


FIGURE 4

Is-VZV IgG Non-Reactive (Negative) Population





SEP 28 1998

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

Lynne Stirling, Ph.D.
Vice President, Regulatory Affairs
Diamedix Corporation
2140 N. Miami Ave.
Miami, FL 33127

Re: K981867
Trade Name: Is-VZV IgG Test System
Regulatory Class: II
Product Code: LFY
Dated: July 23, 1998
Received: July 24, 1998

Dear Dr. Stirling:

We have reviewed your Section 510(k) notification of intent to market the device referenced above and we 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). 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 (Pre-market Approval), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 895. A substantially equivalent determination assumes compliance with the Current Good Manufacturing Practice requirements, as set forth in the Quality System Regulation (QS) for Medical Devices: General regulation (21 CFR Part 820) and that, through periodic QS inspections, the Food and Drug Administration (FDA) will verify such assumptions. Failure to comply with the GMP regulation may result in regulatory action. In addition, FDA may publish further announcements concerning your device in the Federal Register. Please note: this response to your premarket notification submission does not affect any obligation you might have under sections 531 through 542 of the Act for devices under the Electronic Product Radiation Control provisions, or other Federal laws or regulations.

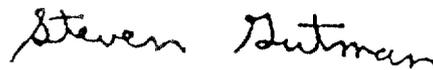
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Under the Clinical Laboratory Improvement Amendments of 1988 (CLIA-88), this device may require a CLIA complexity categorization. To determine if it does, you should contact the Centers for Disease Control and Prevention (CDC) at (770)488-7655.

This letter will allow you to begin marketing your device as described in your 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 advice for your device on our labeling regulation (21 CFR Part 801 and additionally 809.10 for in vitro diagnostic devices), please contact the Office of Compliance at (301) 594-4588. Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers Assistance at its toll free number (800) 638-2041 or at (301) 443-6597 or at its internet address "<http://www.fda.gov/cdrh/dsmamain.html>"

Sincerely yours,



Steven I. Gutman, M.D., M.B.A.
Director
Division of Clinical Laboratory Devices
Office of Device Evaluation
Center for Devices and Radiological Health

Enclosure

Appendix G. Rev. Indications for Use Statement

INDICATIONS FOR USE STATEMENT

510(K) NUMBER : K 98 1867

DEVICE NAME : Is-VZV IgG Test System

Indications for Use : For the qualitative and semi-quantitative detection of IgG antibodies to Varicella-Zoster Virus (VZV) in human serum by indirect immunoassay to determine a prior exposure to VZV and, when evaluating paired sera, to aid in the determination of acute or convalescent stage of VZV infection. These reagents can be used either manually or in conjunction with the MAGO® Plus Automated EIA Processor.

Woody Dubois

(Division Sign Off)

Division of Clinical Laboratory Devices

510(k) Number K981867