K963318

Summary of Safety and Effectiveness Information
Legionella pneumophila IgG/IgM ELISA Test Kit

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II. Description of Device

The *Legionella pneumophila* IgG/IgM ELISA kit is an Enzyme-Linked Immunosorbent Assay (ELISA) for the qualitative detection of total antibodies (IgG and IgM) to *Legionella pneumophila* serogroups 1-6 in serum from patients with clinical suspicion of Legionella Disease.

The *Legionella pneumophila* IgG/IgM ELISA test is an enzyme linked immunosorbent assay to detect IgG/IgM antibodies to Legionella. Purified *Legionella pneumopilla* antigen (serogroups 1, 2, 3, 4, 5, 6) is attached to a solid phase microtiter well. Diluted test sera is added to each well. If the antibodies are present that recognize the antigen, they will bind to the antigen in the well. After incubation the wells are washed to remove unbound antibody. An enzyme labeled anti-human IgG/IgM is added to each well. If antibody is present it will bind to the antibody attached to the antigen on the well. After incubation the wells are washed to remove unbound conjugate. A substrate solution is added to each well. If enzyme is present the substrate will undergo a color change. After an incubation period the reaction is stopped and the color intensity is measured photometrically, producing an indirect measurement of specific antibody in the patient specimen.

III. Predicate Device

The *Legionella pneumophila* IgG/IgM ELISA test is substantially equivalent to BioWhitttaker's Legionella STAT test. Equivalence is demonstrated by the following comparative results:

Performance Characteristics

1. **Relative sensitivity and specificity.** The *Legionella pneumophila* IgG/ IgM ELISA was evaluated relative to Legionella Stat at two different sites. The first site was a commercial R&D lab located in Maryland. Thirty three single IFA positive sera from an outbreak and samples routinely submitted for Legionella testing were tested. The results of the study are summarized in Table 3.

Table 3

Comparison of *Legionella pneumophila* IgG/IgM ELISA and Legionella IFA

		Wampole *Legionella pneumophila* IgG/IgM ELISA			
		+	eq	-	Total
IFA	+ ≥256	27	3	3	33
	- >256	0	0	0	0
	Total	27	3	3	33

Relative Sensitivity = 27/30 = 90.00% 95% Confidence interval = 79.0% - 100%
Relative Specificity = NA 95% Confidence interval = NA

Equivocals were not included in the above calculations.
The 95% confidence intervals were calculated using the normal method.

Please be advised that 'relative' refers to the comparison of this assay's results to that of 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.

The second site was a clinical laboratory located in Pennsylvania. Seventy two prospective serum for Legionella testing were tested. The results of the study are summarized in Table 4.

Table 4

Comparison of *Legionella pneumophila* IgG/IgM ELISA and Legionella IFA

		Wampole *Legionella pneumophila* IgG/IgM ELISA			
		+	eq	-	Total
IFA	+ ≥256	2	0	0	2
	- <256	1	2	67	70
	Total	3	2	67	72

Relative Specificity = 67/68 = 98.53% 95% Confidence interval = 95.6% - 100%
Relative Agreement = 69/70 = 98.57% 95% Confidence interval = 95.7% - 100%

Equivocals were not included in the above calculations.
The 95% confidence intervals were calculated using the normal method.

2. Precision. Seven different sera were assayed at two different sites to determine the precision of the assay. An additional three sera were tested at site 1. Each sera was tested ten times each, on three different days at each of the two study sites. The intra and inter assay precision for each site is presented in Tables 5 and 6. The inter-site coefficient of variation (CV) for each serum is presented in table 7.

Table 5
Legionella pneumophila IgG/IgM ELISA Intra and Inter Assay Precision
Study 1

	Assay 1 (n=10)			Assay 2 (n=10)			Assay 3 (n=10)			Inter-Assay(n=30)		
Sera#	X	SD	CV	X	SD	CV	X	SD	CV	X	SD	CV
1	3.17	0.138	4.35%	3.55	0.235	6.62%	3.41	0.349	10.2%	3.42	0.305	8.92%
2	2.44	0.244	10.0%	2.66	0.267	10.0%	2.41	0.127	5.27%	2.50	0.247	9.88%
3	2.49	0.322	12.9%	2.78	0.240	8.63%	2.81	0.332	11.8%	2.70	0.327	12.1%
4	1.22	0.180	14.8%	1.36	0.131	9.63%	1.16	0.125	10.8%	1.25	0.164	13.1%
5	0.50	0.051	10.2%	0.56	0.042	7.50%	0.53	0.041	7.74%	0.53	0.050	9.43%
6	0.18	0.025	13.9%	0.21	0.023	11.0%	0.20	0.031	15.5%	0.20	0.030	15.0%
7	0.28	0.039	13.9%	0.34	0.046	13.5%	0.33	0.048	14.6%	0.32	0.051	15.9%
8	1.02	0.051	5.00%	1.13	0.039	3.45%	1.19	0.044	3.70%	1.11	0.084	7.57%
9	0.85	0.053	6.24%	0.92	0.025	2.72%	0.99	0.043	4.34%	0.92	0.069	7.50%
10	0.96	0.067	6.98%	1.05	0.056	5.33%	1.11	0.094	8.47%	1.03	0.122	11.20%
HPC*										3.64	.0402	11.05%
CAL**										1.44	0.122	8.44%
LPC*										1.49	0.195	13.11%
NC*										0.18	0.052	28.97%

* n = 17
** n = 51

Table 6
Legionella pneumophila IgG/IgM ELISA Intra and Inter Assay Precision
Study 2

	Assay 1 (n=10)			Assay 2 (n=10)			Assay 3 (n=10)			Inter-Assay(n=30)		
Sera#	X	SD	CV	X	SD	CV	X	SD	CV	X	SD	CV
1	2.80	0.246	8.79%	2.66	0.165	6.20%	3.08	0.245	7.95%	2.85	0.272	9.54%
2	3.10	0.343	11.1%	3.05	0.276	9.05%	3.14	0.259	8.25%	3.10	0.293	9.45%
3	3.31	0.392	11.8%	3.17	0.220	6.94%	3.38	0.214	6.33%	3.31	0.289	8.73%
4	1.10	0.135	12.3%	1.15	0.131	11.4%	1.18	0.142	12.0%	1.16	0.138	11.9%
5	0.56	0.060	10.7%	0.58	0.053	9.14%	0.59	0.036	6.10%	0.58	0.050	8.62%
6	0.28	0.016	5.71%	0.26	0.013	5.00%	0.29	0.020	6.90%	0.28	0.020	7.14%
7	0.29	0.018	6.21%	0.28	0.020	7.14%	0.31	0.023	7.42%	0.29	0.023	7.93%
HPC*										3.16	0.092	2.91%
CAL**										1.45	0.060	4.11%
LPC*										1.68	0.190	11.29%
NC*										0.35	0.121	34.44%

* n = 5
** n = 15

Table 7 *Legionella pneumophila* IgG/IgM ELISA Inter Site Precision Study

	Inter Site (n=60)					
Sera #	**X**	**SD**	**CV**	**# positive**	**#equ**	**#negative**
1.	3.13	0.406	13.0%	60	0	0
2.	2.80	0.403	14.4%	60	0	0
3.	3.00	0.431	14.4%	60	0	0
4.	1.21	0.158	13.1%	43	16	1
5.	0.56	0.055	9.82%	0	0	60
6.	0.24	0.046	19.2%	0	0	60
7.	0.30	0.040	13.3%	0	0	60
8.*	1.11	0.084	7.57%	19	11	0
9.*	0.92	0.069	7.50%	0	20	10
10.*	1.03	0.122	11.20%	8	20	2
HPC**	3.42	0.401	11.75%	9	0	0
CAL***	1.45	0.069	4.77%	27	0	0
LPC**	1.56	0.240	15.46%	9	0	0
NC**	0.27	0.124	45.68%	0	0	9

* n = 30
** n = 9
*** n = 27

X = Mean
SD = standard deviation
CV = coefficient of variation = SD/X x 100

The methods in NCCLS EP5 were utilized for precision parameters.

4. IFA Paired Serum Analysis (CDC Panel).

The following information is from a serum panel tested at the CDC by IFA and confirmed to be serologically positive for an increase in titer from <1:256 to >1:256. The sera were submitted to CDC for titer conformation. The results are presented as a means to convey further information on the performance of this assay with a masked serum panel. This does not imply an endorsement of the assay by the CDC.

The panel consists of 31 serum pairs showing a greater than 4 fold increase in IFA titer. Each serum pair was evaluated on the *Legionella pneumophila* IgG/IgM ELISA assay to determine an seroconversion in antibody. Twenty nine pairs had a seroconversion thus giving a sensitivity of 29/31 = 93.5% in detecting seroconversions.