CPAL
Central **P**ennsylvania **A**lliance **L**aboratory

Technical Bulletin
No. 154

August 12, 2016

Total Immunoglobulin IgE
- New Assay -

Contact: Steph Frey, 717.812.4768
Operations Manager, Clinical Pathology, CPAL

Dr. Jennifer Thebo, 717.851.3210
Director of Technical Operations and Scientific Affairs, CPAL

Ordering Information and Suggested Codes:

Mnemonic:	**IgE**
Test Name:	Immunoglobulin IgE Total
Test Number:	3000458
Specimen:	Serum, EDTA, or Sodium Heparin Plasma Refrigerated for 72 hours Note: Do not freeze plasma
LOINC Codes	33960-6
CPT Codes	82785

Effective Date: Testing offered beginning on Thursday, September 1, 2016.

Performed: Monday through Saturday, dayshift

Reference Range:

Age	**Previous Range (DxI)**	**New Range (CPAL)**
Adults	1.31 – 165.3 IU/mL	≤ 164 IU/mL
Pediatric	No reference range established	No reference range established

Background:

Measurement of total serum IgE is often used as a tool in the diagnosis and management of atopic diseases such as asthma, hay fever, atopic dermatitis, and urticaria. It has been used to distinguish atopic from non-atopic individuals presenting allergy-like symptoms. In addition, studies have also shown that increased levels of IgE in cord blood and infants may be predictive of future atopic tendencies.

Normal levels of circulating IgE are extremely low in comparison to other immunoglobulins. Levels of IgE at birth are almost undetectable but increase in non-allergic adults. Elevated levels are commonly seen in cases of allergic diseases, parasitic infections, pulmonary aspergillosis, Wiskott-Aldrich Syndrome, and myeloma.

Serum IgE levels may vary as a result of diet, genetic background, geographical location, and other factors. It is therefore recommended that total IgE measurements be used in conjunction with other clinical tests when establishing diagnoses.

Principle of Test:
The Immage IgE assay is intended for quantitative determination of total immunoglobulin E (IgE) concentration in human serum or plasma by rate turbidimetry.

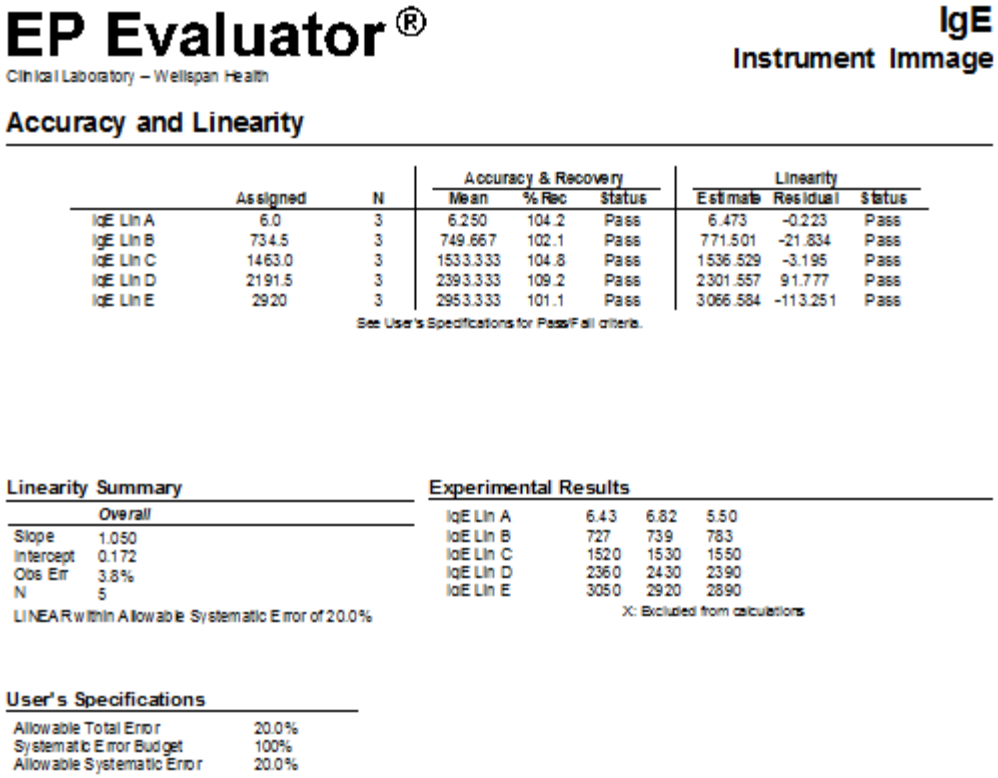
Validation Data:
Precision:
For within run precision, two levels of control were run ten times each, within the same run and on two different days. The %CVs fall within the Manufacturer's claim of <7.0% for within run precision and <7.5% for between run precision. (Table 1)

Table 1: Precision

Test	Within Run Precision				Between Run Precision				Accept?
	Mean Lev 1	CV	Mean Lev 3	CV	Mean Lev 1	CV	Mean Lev 3	CV	
IgE	45.68	2.55%	165.00	3.77%	46.50	2.70%	165.70	2.78%	Yes

Linearity:
To verify the linearity and analytical measurement range of the assay, a high patient sample was diluted with a low patient sample to cover the reportable range of 5.0 IU/mL to 3000.0 IU/mL. The dilutions were run in triplicate. (Figure 1) The calculated slope is 1.050 with an intercept of 0.172 and an error of 3.8%. The assay is linear within Allowable Systematic Error 20.0%. The linearity validation is acceptable.

Figure 1: Linearity



EP Evaluator®
Clinical Laboratory – Wellspan Health

IgE
Instrument Immage

Accuracy and Linearity

	Assigned	N	Accuracy & Recovery Mean	% Rec	Status	Linearity Estimate	Residual	Status
IgE Lin A	6.0	3	6.250	104.2	Pass	6.473	-0.223	Pass
IgE Lin B	734.5	3	749.667	102.1	Pass	771.501	-21.834	Pass
IgE Lin C	1463.0	3	1533.333	104.8	Pass	1536.529	-3.195	Pass
IgE Lin D	2191.5	3	2393.333	109.2	Pass	2301.557	91.777	Pass
IgE Lin E	2920	3	2953.333	101.1	Pass	3066.584	-113.251	Pass

See User's Specifications for Pass/Fail criteria.

Linearity Summary

	Overall
Slope	1.050
Intercept	0.172
Obs Err	3.8%
N	5

LINEAR within Allowable Systematic Error of 20.0%

Experimental Results

IgE Lin A	6.43	6.82	5.50
IgE Lin B	727	739	783
IgE Lin C	1520	1530	1550
IgE Lin D	2360	2430	2390
IgE Lin E	3050	2920	2890

X: Excluded from calculations

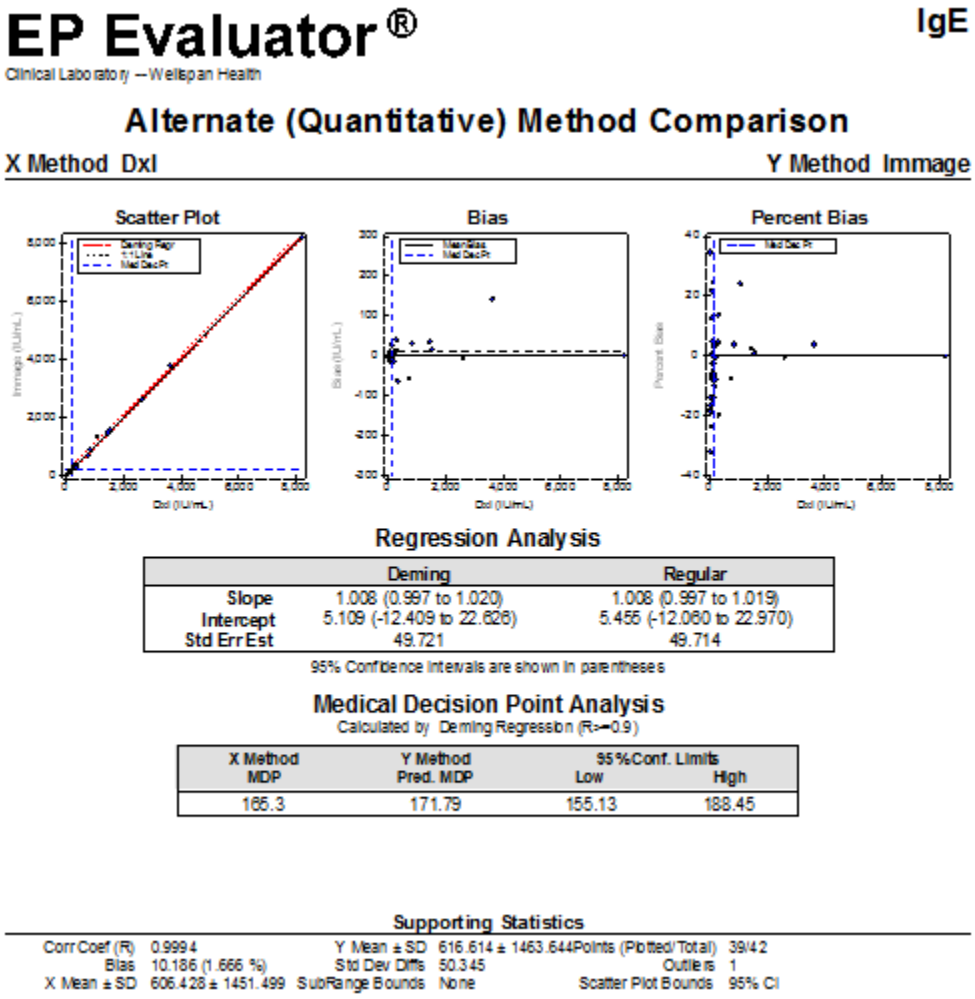
User's Specifications

Allowable Total Error	20.0%
Systematic Error Budget	100%
Allowable Systematic Error	20.0%

Method Comparison:

Forty-two specimens were split and processed utilizing the Beckman Coulter Immage 800 versus results from the Beckman Coulter DxI 800. (Figure 2). The manufacturer's suggested reference range of <165 IU/mL for adults was verified by medical decision point analysis.

Figure 2: Method Comparison



Limitations:

1. Patients with high levels of rheumatoid factor or anti-human IgE autoantibodies may falsely elevate IgE results.
2. The following substances were tested in serum for interference with this methodology at the initial dilution:

SUBSTANCE	SOURCE	LEVEL TESTED	OBSERVED EFFECT
Bilirubin	Porcine	5 – 60 mg/dL	None
Lipid	Human Triglyceride	180 – 1,600 mg/dL	None[a]
Hemoglobin	Human	100 – 750 mg/dL	None
Rheumatoid Factor	Human	65 – 660 IU/mL	None

3. Quantitation of IgE by turbidimetry may not be possible in lipemic sera or may produce inaccurate results due to the extreme light scattering properties of the sample.
4. Dust particles or other particulate matter in the reaction solution may result in extraneous light scattering signals, resulting in variable sample analysis.

5. For assays employing mouse antibodies, the possibility exists for interference by human anti-mouse antibodies (HAMA) in the sample. Human anti-mouse antibodies may be present in samples from patients who have received immunotherapy or diagnostic procedures utilizing monoclonal antibodies or in individuals who have been regularly exposed to animals. Additionally, other heterophile antibodies, such as human anti-goat antibodies may be present in patient samples. Interpretation of results should be done in the context of the overall clinical presentation of the patient, including symptoms, clinical history, data from additional tests, and other appropriate information.
6. Pediatric reference intervals for this assay have not been determined. Studies in the U.S. show that newborn levels of IgE are near the limit of detection of current assays and may not be detected. In general, levels of IgE in a healthy pediatric population rise during the first 3-4 years of life to approximately adult levels. IgE continues to rise through age 9-12 years, returning to adult levels by 18 years of age.

References:

1. Beckman Coulter Immage Total Immunoglobulin IgE Information Sheet, April 2015.
2. Martins TB, Bandhauer ME, Bunker AM, Roberts, WL, Hill HR. *New childhood and adult reference intervals for total IgE.* J Allergy Clin Immunol 2014:133(2);589–591.
3. Soldin OP, Dahlin JR, Gresham EG, et al. *IMMULITE 2000 age and sex-specific reference intervals for alpha feto protein, homocysteine, insulin, insulin-like growth factor-1, insulin-like growth factor binding protein-3, C-peptide, immunoglobulin E and intact parathyroid hormone.* Clin Biochem 2008:41;937-42.