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**Lab Dept:** Chemistry

**Test Name:** ALKALINE PHOSPHATASE ISOENZYMES

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***General Information***

**Lab Order Codes:** ALFR

**Synonyms:** ALK Isoenzymes, serum; Alkaline Phosphatase Fractionation; ALP Isoenzymes; Regan Isoenzymes

**CPT Codes:** 84080 – Alkaline phosphatase; isoenzymes  
84075 – Alkaline phosphatase; total

**Test Includes:** Alkaline phosphatase, total; Alkaline phosphatase, isoenzymes (bone, liver and other fraction) reported in U/L and IU/L.

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***Logistics***

**Test Indications:** Useful for determining the tissue source of elevated total alkaline phosphatase activity in serum. Differentiating between a liver and bone source of ALP. Diagnosis and treatment of liver, bone, intestinal, and parathyroid diseases.

**Lab Testing Sections:** Chemistry - Sendouts

**Referred to:** Mayo Medical Laboratories (MML Test: 89503/ALKI)

**Phone Numbers:** MIN Lab: 612-813-6280

STP Lab: 651-220-6550

**Test Availability:** Daily, 24 hours

**Turnaround Time:** 2 – 4 days, Monday - Friday

**Special Instructions:** None

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***Specimen***

**Specimen Type:** Blood

**Container:** Red top tube

**Draw Volume:** 3 mL (Minimum: 1.5. mL) blood

**Processed Volume:** 1 mL (Minimum: 0.5 mL) serum

**Collection:** Routine venipuncture

**Special Processing:** Lab Staff: Centrifuge specimen, remove serum aliquots and place into TWO screw-capped round bottom plastic vials (Recommended: 0.5 mL into each vial - Minimum: 0.25 mL into each vial). Store and ship at frozen temperatures. Forward promptly.

**Patient Preparation:** None

**Sample Rejection:** Hemolysis; warm specimens; mislabeled or unlabeled specimens

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***Interpretive***

**Reference Range:**

**Total Alkaline Phosphatase (U/L)**

<b>Age:</b>	<b>Male:</b>	<b>Female:</b>
<4 years	Not established	Not established
4 years	149 - 369 U/L	169 - 372 U/L
5 years	179 - 416 U/L	162 - 355 U/L
6 years	179 - 417 U/L	169 - 370 U/L
7 years	172 - 405 U/L	183 - 402 U/L
8 years	169 - 401 U/L	199 - 440 U/L
9 years	175 - 411 U/L	212 - 468 U/L
10 years	191 - 435 U/L	215 - 476 U/L
11 years	185 - 507 U/L	178 - 526 U/L
12 years	185 - 562 U/L	133 - 485 U/L
13 years	182 - 587 U/L	120 - 449 U/L
14 years	166 - 571 U/L	153 - 362 U/L
15 years	138 - 511 U/L	75 - 274 U/L
16 years	102 - 417 U/L	61 - 264 U/L
17 years	69 - 311 U/L	
18 years	52 - 222 U/L	
≥19 years	45 - 115 U/L	
17 - 23 years		52 - 144 U/L
24 - 45 years		37 - 98 U/L
46 - 50 years		39 - 100 U/L
51 - 55 years		41 - 108 U/L
56 - 60 years		46 - 118 U/L

61 - 65 years		50 - 130 U/L
≥66 years		55 - 142 U/L
<b>Isoenzymes:</b>		
<b>Age</b>	<b>Liver Fraction 1 (%)</b>	<b>Liver Fraction 1 (IU/L)</b>
0 - 6 years	5.1 - 49%	7.0 - 112.7 IU/L
7 - 9 years	3.0 - 45.0%	7.4 - 109.1 IU/L
10 - 13 years	2.9 - 46.3%	7.8 - 87.6 IU/L
14 - 15 years	7.8 - 48.9%	10.3 - 75.6 IU/L
16 - 18 years	14.9 - 50.5%	13.7 - 78.5 IU/L
≥19 years	27.8 - 76.3%	16.2 - 70.2 IU/L
<b>Age</b>	<b>Live Fraction 2 (%)</b>	<b>Liver Fraction 2 (IU/L)</b>
0 - 6 years	2.9 - 13.7%	3.0 - 41.5 IU/L
7 - 9 years	3.7 - 12.5%	4.0 - 35.6 IU/L
10 - 13 years	2.9 - 22.3%	3.3 - 37.8 IU/L
14 - 15 years	2.2 - 19.8%	2.2 - 32.1 IU/L
16 - 18 years	1.9 - 12.5%	1.4 - 19.7 IU/L
≥19 years	0.0 - 8.0%	0.0 - 5.8 IU/L
<b>Age</b>	<b>Bone Fraction (%)</b>	<b>Bone Fraction (IU/L)</b>
0 - 6 years	41.5 - 82.7%	43.5 - 208.1 IU/L
7 - 9 years	39.9 - 85.8%	41.0 - 258.3 IU/L
10 - 13 years	31.8 - 91.1%	39.4 - 346.1 IU/L
14 - 15 years	30.6 - 85.4%	36.4 - 320.5 IU/L
16 - 18 years	38.9 - 72.6%	32.7 - 214.6 IU/L

≥19 years	19.1 - 67.7%	12.1 - 42.7 IU/L
<b>Age</b>	<b>Intestine Fraction (%)</b>	<b>Intestine Fraction (IU/L)</b>
0 - 6 years	0.0 - 18.4 %	0.0 - 37.7 IU/L
7 - 9 years	0.0 - 18.3 %	0.0 - 45.6 IU/L
10 - 13 years	0.0 - 11.8%	0.0 - 40.0 IU/L
14 - 15 years	0.0 - 8.2%	0.0 - 26.4 IU/L
16 - 18 years	0.0 - 8.7%	0.0 - 12.7 IU/L
≥19 years	0.0 - 20.6%	0.0 - 11.0 IU/L
<b>Placental Fraction (all ages)</b>		
Not present		

**Critical Values:**

N/A

**Limitations:**

None

**Methodology:**

Total Alkaline Phosphatase: Photometric, p-Nitrophenol Phosphatase  
Isoenzymes: Electrophoreses

**References:**

[Mayo Medical Laboratories Web Page](#) October 2014

**Updates:**

9/26/2007: Test now forwarded to ARUP laboratories. Previously performed at Mayo Medical Laboratories. Note changes in isoenzymes and reference ranges.  
12/7/2008: Test done internally at Mayo. New reference ranges.  
4/19/2011: Added comment, no ranges established for <4 year on ALP Total.