

Title

Liver function tests ALT/AST data

Reference Number: RDF2290-24

Date of Response: 21/02/2024

Further to your Freedom of Information Act request, please find the Trust's response(s) below:

Please be aware that the Royal Devon University Healthcare NHS Foundation Trust (Royal Devon) has existed since 1st April 2022 following the integration of the Northern Devon Healthcare NHS Trust (known as Northern Services) and the Royal Devon and Exeter NHS Foundation Trust (known as Eastern Services).

I am writing to request information under the Freedom of Information Act. This information should be readily available through your clinical biochemistry or pathology department.

I would be grateful if you could provide me with the following:

- The normal range (adults and children) for the following liver enzymes: alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase and gamma GT.*

Ranges for ALT

Female	Ref. Range	Abnormal
0 up to 1 Days	0-31 IU/L	<0 or >31 IU/L
1 Days up to 5 Days	0-52 IU/L	<0 or >52 IU/L
5 Days up to 7 Months	0-60 IU/L	<0 or >60 IU/L
7 Months up to 1 Years	0-57 IU/L	<0 or >57 IU/L
1 Years up to 13 Years	0-39 IU/L	<0 or >39 IU/L
13 Years up to 17 Years	0-23 IU/L	<0 or >23 IU/L
17 Years up to Unspecified	0-33 IU/L	<0 or >33 IU/L
Male	Ref. Range	Abnormal
0 up to 1 Days	0-31 IU/L	<0 or >31 IU/L
1 Days up to 5 Days	0-52 IU/L	<0 or >52 IU/L
5 Days up to 7 Months	0-60 IU/L	<0 or >60 IU/L

7 Months up to 1 Years	0-57 IU/L	<0 or >57 IU/L
1 Years up to 13 Years	0-39 IU/L	<0 or >39 IU/L
13 Years up to 17 Years	0-26 IU/L	<0 or >26 IU/L
17 Years up to Unspecified	0-41 IU/L	<0 or >41 IU/L
Unspecified	Ref. Range	Abnormality - Critical
Unspecified	<=600 IU/L	>600 IU/L

>=5 IU/L

Ranges for AST

Female	Ref. Range	Abnormal
0 up to 15 Days	0-155 IU/L	<0 or >155 IU/L
15 Days up to 1 Years	0-63 IU/L	<0 or >63 IU/L
1 Years up to 7 Years	0-41 IU/L	<0 or >41 IU/L
7 Years up to 12 Years	0-33 IU/L	<0 or >33 IU/L
12 Years up to 17 Years	0-23 IU/L	<0 or >23 IU/L
17 Years up to Unspecified	0-32 IU/L	<0 or >32 IU/L
Male	Ref. Range	Abnormal
0 up to 15 Days	0-155 IU/L	<0 or >155 IU/L
15 Days up to 1 Years	0-63 IU/L	<0 or >63 IU/L
1 Years up to 7 Years	0-41 IU/L	<0 or >41 IU/L
7 Years up to 12 Years	0-33 IU/L	<0 or >33 IU/L
12 Years up to 17 Years	0-32 IU/L	<0 or >32 IU/L
17 Years up to Unspecified	0-40 IU/L	<0 or >40 IU/L
Unspecified	Ref. Range	Abnormality - Critical
Unspecified	<=600 IU/L	>600 IU/L

Ranges for Alkaline Phosphatase

Unspecified	Ref. Range	Abnormal
0 up to 29 Days	70-380 IU/L	<70 or >380 IU/L
29 Days up to 16 Years	60-425 IU/L	<60 or >425 IU/L

16 Years up to Unspecified	30-130 IU/L	30-130 IU/L
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>=5 IU/L

Ranges for GGT

Female	Ref. Range	Abnormal	Critical
0 up to 15 Days	17-175 IU/L	<17 or >175 IU/L	>175 IU/L
15 Days up to 1 Years	5-101 IU/L	<5 or >101 IU/L	>150 IU/L
1 Years up to 11 Years	4-12 IU/L	<4 or >12 IU/L	>150 IU/L
11 Years up to 19 Years	4-16 IU/L	<4 or >16 IU/L	>150 IU/L
19 Years up to Unspecified	0-40 IU/L	<0 or >40 IU/L	>150 IU/L
Male	Ref. Range	Abnormal	
0 up to 15 Days	17-175 IU/L	<17 or >175 IU/L	>175 IU/L
15 Days up to 1 Years	5-101 IU/L	<5 or >101 IU/L	>150 IU/L
1 Years up to 11 Years	4-12 IU/L	<4 or >12 IU/L	>150 IU/L
11 Years up to 19 Years	4-16 IU/L	<4 or >16 IU/L	>150 IU/L
19 Years up to Unspecified	0-60 IU/L	<0 or >60 IU/L	>150 IU/L

2. *The method and machine used with reference so it can be identified.*

- ALT: Roche Cobas 8000. ALT catalyses the reaction between L-alanine and 2-oxoglutarate.
- The pyruvate formed is reduced by NADH in a reaction catalysed by lactate dehydrogenase (LDH) to form L-lactate and NAD
- AST: Roche Cobas 8000. AST in the sample catalyzes the transfer of an amino group between L-aspartate and 2-oxoglutarate to form oxaloacetate and L-glutamate. The oxaloacetate then reacts with NADH, in the presence of malate dehydrogenase (MDH), to form NAD+
- GGTP Roche: L-γ-glutamyl-3-carboxy-4-nitroanilide + glycylglycine catalyzed by GGTP to 5-amino-2-nitrobenzoate. The amount of 5-amino-2-nitrobenzoate liberated is proportional to the GGT activity in the sample.

3. *How was your local normal range determined?*
- a. *From the reference range specified by the manufacturer: YES.*
 - b. *By the lab of a large group of normal volunteers*
 - c. *From historical data*
 - d. *Other – please describe.*
4. *Do your liver function tests automatically include measurement of AST? NO.*
5. *How many sets of liver function tests, which include measurement of ALT and alkaline phosphatase, does your hospital or laboratory complete each year? How many patients does this represent?.*
482,204 tests, 203,128 patients.
6. *How many requests for measurement of AST does your hospital or laboratory complete each year? How many patients does this represent?*
9915 tests, 6936 Patients.
7. *How many values exceed the upper limit of normal for each liver function test?*
160,830 were Abnormal?.