Newborn Screening Quality Assurance Program

2015 UDOT

May 2015

INTRODUCTION

The UDOT proficiency testing challenge is a unique component of the Newborn Screening Quality Assurance Program (NSQAP) utilizing a panel of dried blood spot (DBS) specimens that enter the testing scheme in a manner similar to actual newborn screening specimens. All analytes on a laboratory's test panel must be assayed for each specimen.

METHODS

On April 6, 2015, a panel of 25, blind-coded DBS specimens was distributed to all active UDOT participants. Specimens were enriched with predetermined levels of the following analytes: 17 α-hydroxyprogesterone (17-OHP), total galactose (Tgal), immunoreactive trypsinogen (IRT), thyroid-stimulating hormone (TSH), arginine (Arg), citrulline (Cit), leucine (Leu), methionine (Met), phenylalanine (Phe), succinylacetone (SUAC), tyrosine (Tyr), valine (Val), C3, C4, C5, C5DC, C6, C8, C10, C10:1, C10:2, C14, C14:1, C16, C16OH, C18, C18:1,C18OH. Specimens deficient in the following analytes were also included in the panel: galactose-1-phosphate uridyltransferase (GALT), biotinidase (Bio), Thyroxine (T_4), and C0.

Most UDOT pools were prepared from whole blood with the hematocrit adjusted to 50% and were enriched with high-purity analytes. The C0, Bio, and T_4 deficient pools were produced by combining washed, packed red blood cells with heat-treated charcoal stripped serum to achieve a 50% hematocrit. The GALT/Tgal pool was made by adding a 50/50 serum/saline mixture to washed, packed red blood cells until the hematocrit was 50% and then the reconstituted blood was heat-treated to decrease the GALT enzyme activity. The blood pool was then enriched with predetermined levels of Tgal (consisting of galactose and galactose-1-phosphate).

All of the blood pools were spotted in 75 µL aliquots onto lots W112 and W121 of Whatman 903 filter paper, dried, and stored according to standard practices. [1]

Quarterly publications for colleagues and participants of the
Proficiency Testing Program for UDOT in Dried Blood Spots.

Direct inquiries to:
Centers for Disease Control and Prevention (CDC)
4770 Buford Highway, NE, MS/F43
Atlanta, GA 30341-3724

Phone: 770-488-4582
FAX: 770-488-4255
E-mail: NSQAPDMT@cdc.gov

Editor: Sherri D. Zobel

REPORTS and RESULTS

We processed data from 66 participants. Laboratories were asked to report only results that were "outside normal limits".

The 2015 UDOT specimen certification of expected values (EV) and frequency for outside normal limits is summarized in Table 1. The EV for the majority of analytes is the sum of the base pool (endogenous) plus the predetermined enrichment levels. The GALT and IRT expected values are based on the NSQAP assayed values. The NSQAP biotinidase method analysis does not generate quantitative results therefore there is no EV to report. The absence of an EV for biotinidase is noted as n/a on Table 1 and there are no z value charts for biotinidase specimens.

The process to prepare the GALT/Tgal and T_4/TSH specmiens (panel numbers 21509 and 21520 respectively) depletes the biotinidase enzyme. A majority of UDOT participants found reduced biotinidase activity in these specimens. NSQAP deemed specimens educational samples for biotinidase. They are evaluated specimens for T_4, TSH, GALT, and Tgal.

Table 2 contains the summary of participant cutoffs for all 2015 UDOT analytes. Non-certified analytes found by participant laboratories are shown in Table 3.

Individual laboratory results are qualitatively evaluated. The quantitative statistical results are for informational purposes. The quantitative statistical reports include: Summary of Reported Cutoff Values, Overall Statistics, Mean Concentration by Method, and z value charts.

The Summary of Reported Cutoff Values includes all data for the mean, median, minimum value, and maximum value with no outliers removed. In the statistical summary analysis for the Overall Statistics and Mean Concentration by Method reports, data outside two passes of the 99% confidence interval were considered outliers and removed from the reported statistical results.

The z value charts are calculated by using the following calculation:

$$\text{z value} = \frac{\text{Participant Value} - \text{NSQAP Expected Value}}{\text{Overall Participant Standard Deviation}}$$

(Note: z values are coded for each lab. Find your z value code in the Reviewer's Comments box on your laboratory's evaluation page.

NSQAP appreciates your continued participation in our program. Please contact us at NSQAPDMT@cdc.gov with comments and suggestions.

[1] Mei JV, Alexander JR, Adam BW, Hannon WH. Use of Filter Paper for the Collection and Analysis of Human Whole Blood Specimens. Nutr. 2001 May;131(5):1631S-6S.

Newborn Screening Quality Assurance Program
2015 UDOT Proficiency Testing Panel
Table 1. Specimen Certification Frequency of Outside-Normal-Limits Report

Specimen Certification				Labs Reporting ONL *	
Specimen	Analyte	Expected Value	Units		Percent Consensus (%)**
21501	*normal*				
21502	*normal*				
21503	*normal*				
21504	Palmitoylcarnitine (C16)	15.33	µmol/L blood	52 of 53	98.1%
21504	Stearoylcarnitine (C18)	6.15	µmol/L blood	45 of 47	95.7%
21504	Oleoylcarnitine (C18:1)	9.60	µmol/L blood	44 of 50	88.0%
21505	Decadienoylcarnitine (C10:2)	1.02	µmol/L blood	27 of 32	84.4%
21506	Myristoylcarnitine (C14)	1.59	µmol/L blood	48 of 48	100.0%
21506	Tetradecenoylcarnitine (C14:1)	1.61	µmol/L blood	55 of 56	98.2%
21507	Hydroxypalmitoylcarnitine (C16OH)	1.03	µmol/L blood	56 of 56	100.0%
21507	Hydroxystearoylcarnitine (C18OH)	1.28	µmol/L blood	42 of 45	93.3%
21508	Hexanoylcarnitine (C6)	2.27	µmol/L blood	49 of 50	98.0%
21508	Octanoylcarnitine (C8)	2.87	µmol/L blood	56 of 56	100.0%
21508	Decanoylcarnitine (C10)	2.33	µmol/L blood	49 of 51	96.1%
21508	Decenoylcarnitine (C10:1)	2.88	µmol/L blood	46 of 46	100.0%
21509	Total Galactose (Tgal)	25.6	mg/dL blood	27 of 27	100.0%
21509	Galactose-1-Phosphate Uridyltransferase (GALT)	1.5^	U/g Hb	47 of 48	97.9%
21510	Citrulline (Cit)	189.6	µmol/L blood	43 of 43	100.0%
21511	17 α-Hydroxyprogesterone (17-OHP)	127.2	ng/mL serum	49 of 49	100.0%
21512	Tyrosine (Tyr)	891.9	µmol/L blood	53 of 59	89.8%
21512	Succinylacetone (SUAC)	40.4	µmol/L blood	35 of 35	100.0%
21513	Arginine (Arg)	290.9	µmol/L blood	40 of 44	90.9%
21514	Biotinidase (Bio)	n/a		46 of 49	93.9%
21514	Free Carnitine (C0 Low)	2.69	µmol/L blood	55 of 55	100.0%
21515	Glutarylcarnitine (C5DC)	1.32	µmol/L blood	54 of 55	98.2%
21516	Methionine (Met)	162.8	µmol/L blood	52 of 53	98.1%
21517	Phenylalanine (Phe)	268.4	µmol/L blood	62 of 63	98.4%
21518	Isovalerylcarnitine (C5)	1.61	µmol/L blood	56 of 56	100.0%
21519	Immunoreactive Trypsinogen (IRT)	267.1^	ng/mL blood	51 of 51	100.0%
21520	Thyroxine (T4)	0.0	µg/dL serum	25 of 26	96.2%
21520	Thyroid-Stimulating Hormone (TSH)	80.8	µIU/mL serum	49 of 51	96.1%
21521	Propionylcarnitine (C3)	13.93	µmol/L blood	52 of 54	96.3%
21522	Butyrylcarnitine (C4)	2.62	µmol/L blood	47 of 49	95.9%
21523	Leucine (Leu)	856.3	µmol/L blood	51 of 54	94.4%
21523	Valine (Val)	659.0	µmol/L blood	37 of 39	94.9%
21524	*normal*				
21525	*normal*				

Educational Samples

21509	*Biotinidase (Bio)*	*n/a*
21520	*Biotinidase (Bio)*	*n/a*

*Total number of laboratories reporting data per analyte varies.
^ NSQAP assayed value
A gradable specimen must have 80% or more agreement among laboratories.
All certified MS/MS expected values are derivatized.
Expected Value - Sum of endogenous and enrichment values

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Table 2. Summary of Reported Cutoff Values

Analyte	N	Min/Max	Mean	Median	Units
T_4	25	4 - 9.3	6.1	6.0	µg/dL serum
TSH	49	18 - 62	31.2	26	µIU/mL serum
Tgal	27	6 - 600	32.5	10	mg/dL blood
17-OHP	49	7 - 95	36.2	33	ng/ml serum
GALT	21	1.5 - 50.0	5.3	3	U/g Hb
GALT	12	21.4 - 60.0	47.6	50	µmol/L blood
GALT	9	2.5 - 4.4	3.2	4	U/dL blood
IRT	51	30.4 - 118.4	67.2	63	ng/mL blood
Biotinidase	10	8 - 16	11.0	10	ERU*
Biotinidase	7	10 - 36	20.0	15	MRU**
Biotinidase	6	45 - 58	53.0	54	nmol/min/dL
Biotinidase	6	35 - 50	44.7	47	U/dL blood
Arg	40	20 - 125	68.2	58	µmol/L blood
Cit	53	18 - 100	54.9	55	µmol/L blood
Leu	51	175 - 450	285.4	275	µmol/L blood
Met	52	35 - 100	73.5	70	µmol/L blood
Phe	62	99 - 188	142.0	140	µmol/L blood
Tyr	53	88 - 850	350.7	338	µmol/L blood
Val	37	190 - 530	286.7	250	µmol/L blood
SUAC	35	0.5 - 7.0	2.7	2	µmol/L blood
C0(low)	55	5.0 - 33.0	8.80	8.00	µmol/L blood
C3	52	2.82 - 9.00	5.93	6.15	µmol/L blood
C4	47	0.60 - 1.90	1.28	1.30	µmol/L blood
C5	56	0.30 - 1.20	0.67	0.64	µmol/L blood
C5DC	55	0.12 - 0.80	0.35	0.32	µmol/L blood
C6	49	0.16 - 0.95	0.38	0.25	µmol/L blood
C8	56	0.26 - 0.72	0.44	0.40	µmol/L blood
C10	49	0.22 - 0.80	0.44	0.40	µmol/L blood
C10:1	46	0.14 - 0.45	0.29	0.30	µmol/L blood
C10:2	27	0.07 - 0.39	0.15	0.12	µmol/L blood
C14	48	0.26 - 1.20	0.77	0.71	µmol/L blood
C14:1	55	0.21 - 0.80	0.62	0.65	µmol/L blood
C16	52	2.56 - 10.00	7.87	7.80	µmol/L blood
C16OH	56	0.07 - 0.25	0.13	0.12	µmol/L blood
C18	45	1.29 - 3.50	2.41	2.30	µmol/L blood
C18:1	44	2.00 - 7.00	3.16	3.00	µmol/L blood
C18OH	42	0.03 - 0.26	0.10	0.10	µmol/L blood

*ERU - Enzyme Response Units

**MRU - Microplate Response Units

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Table 3. Number of Laboratories Reporting Non-Certified Analytes

Specimen	Certified Analyte	Non-Certified Not Expected Analyte(s)
21501	*normal*	C5OH (5)
21502	*normal*	C5OH (4), C18OH (1)
21503	*normal*	17OHP (1), C4OH (1), C5OH (2)
21504	C16, C18, C18:1	C5OH (2), C16OH (1)
21505	C10:2	Bio (1)
21506	C14, C14:1	
21507	C16OH, C18OH	
21508	C6, C8, C10, C10:1	C5OH (1)
21509	GALT, Tgal	
21510	Cit	Leu (1), TSH (1)
21511	17OHP	C5OH (1)
21512	Tyr, SUAC	C5OH (5)
21513	Arg	Leu (1), C5OH (1), Bio (1)
21514	Bio, C0(low)	GALT (1), IRT (1)
21515	C5DC	
21516	Met	Leu (1), C5OH (1)
21517	Phe	C5OH (3), Cit (1), SUAC (1)
21518	C5	Cit (1)
21519	IRT	C5OH (3), C18:1 (1)
21520	T_4, TSH	C5OH (1)
21521	C3	
21522	C4	
21523	Leu, Val	Met (1), C5OH (1)
21524	*normal*	
21525	*normal*	Leu (2)

The number in parentheses shows how many labs reported the analyte as outside-normal-limits.

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Overall Statistics

Specimen	21504	21504	21504	21505	21506	21506	21507
Analyte	C16	C18	C18:1	C10:2	C14	C14:1	C16OH
N****	52	44	44	25	48	54	54
Outliers	0	1	0	2	0	1	2
Mean	13.48	5.84	7.06	0.64	1.58	1.24	0.62
SD	1.72	0.80	1.12	0.16	0.20	0.24	0.10

Specimen	21507	21508	21508	21508	21508	21509	21509
Analyte	C18OH	C6	C8	C10	C10:1	Tgal	GALT*
N****	39	47	55	47	43	26	20
Outliers	3	2	1	2	3	1	1
Mean	0.80	2.04	2.74	2.22	2.42	26.4	1.1
SD	0.14	0.24	0.32	0.30	0.40	6.0	0.7

Specimen	21509	21509	21509	21509	21509	21509	21510
Analyte	GALT**	GALT***	Bio – 1	Bio – 2	Bio – 3	Bio – 4	Cit
N****	12	9	6	10	6	5	53
Outliers	0	0	0	0	0	0	0
Mean	24.8	1.2	41.3	6.3	18.1	32.0	144.0
SD	12.9	1.2	4.6	0.9	7.2	2.1	30.4

Specimen	21511	21512	21512	21513	21514	21514	21514
Analyte	17 – OHP	Tyr	SUAC	Arg	Bio – 1	Bio – 2	Bio – 3
N****	45	53	32	40	6	10	8
Outliers	3	0	3	0	0	0	0
Mean	94.6	758.7	13.6	185.8	10.2	1.8	2.4
SD	10.0	107.4	7.1	81.6	2.7	1.4	2.4

1 – Biotinidase measured in nmol/min/dL.

2 – Biotinidase measured in ERU.

3 – Biotinidase measured in MRU.

4 – Biotinidase measured in U/dL blood.

**GALT measured in U/g Hb.*

***GALT measured in umol/L blood.*

****GALT measured in U/dL.*

***** Values outside the 99% CI (outliers) were excluded from the calculations.*

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Overall Statistics

Specimen	21514	21514	21515	21516	21517	21518	21519
Analyte	Bio – 4	C0(low)	C5DC	Met	Phe	C5	IRT
N****	6	53	55	50	62	53	48
Outliers	0	2	0	2	0	3	3
Mean	12.3	2.80	1.04	143.4	240.9	1.36	241.0
SD	3.8	0.94	0.36	16.7	29.6	0.16	24.6

Specimen	21520	21520	21520	21520	21520	21520	21521
Analyte	T4	TSH	Bio – 1	Bio – 2	Bio – 3	Bio – 4	C3
N****	24	48	6	11	5	6	50
Outliers	0	1	0	0	0	0	2
Mean	0.5	105.3	28.1	3.1	5.1	14.5	12.50
SD	0.6	10.9	3.8	1.7	2.8	2.8	1.08

Specimen	21522	21523	21523
Analyte	C4	Leu	Val
N****	46	50	37
Outliers	1	1	0
Mean	2.36	762.5	570.4
SD	0.26	75.4	102.7

1 – Biotinidase measured in nmol/min/dL.

2 – Biotinidase measured in ERU.

3 – Biotinidase measured in MRU.

4 – Biotinidase measured in U/dL blood.

**GALT measured in U/g Hb.*

***GALT measured in umol/L blood.*

****GALT measured in U/dL.*

***** Values outside the 99% CI (outliers) were excluded from the calculations.*

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Mean Concentration by Method

Specimen No. 21504		C16		
		Expected Value 15.33 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	13.72	1.88
35	Deriv-MS/MS PE NeoGram MS2 Kit	7	12.70	2.38
38	Non-deriv MS/MS non-kit	2	14.62	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	13.40	1.26

Specimen No. 21504		C18		
		Expected Value 6.15 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	18	5.68	1.00
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	5.90	1.26
60	Non-deriv MS/MS PE NeoBase Kit	20	6.10	0.56

Specimen No. 21504		C18:1		
		Expected Value 9.60 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	6.66	1.12
35	Deriv-MS/MS PE NeoGram MS2 Kit	7	7.14	1.46
60	Non-deriv MS/MS PE NeoBase Kit	16	7.40	0.76

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21505		C10:2		
		Expected Value 1.02 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	15	0.80	0.26
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	0.68	0.10
60	Non-deriv MS/MS PE NeoBase Kit	5	0.44	0.04

Specimen No. 21506		C14		
		Expected Value 1.59 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	18	1.60	0.24
35	Deriv-MS/MS PE NeoGram MS2 Kit	7	1.58	0.26
38	Non-deriv MS/MS non-kit	2	1.72	---*
60	Non-deriv MS/MS PE NeoBase Kit	21	1.54	0.14

Specimen No. 21506		C14:1		
		Expected Value 1.61 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	22	1.28	0.26
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	1.48	0.28
38	Non-deriv MS/MS non-kit	2	1.38	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	1.10	0.10

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21507		C16OH		
		Expected Value 1.03 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	0.68	0.08
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	0.70	0.12
38	Non-deriv MS/MS non-kit	2	0.62	---*
60	Non-deriv MS/MS PE NeoBase Kit	23	0.54	0.06

Specimen No. 21507		C18OH		
		Expected Value 1.28 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	16	0.94	0.26
35	Deriv-MS/MS PE NeoGram MS2 Kit	7	0.88	0.16
38	Non-deriv MS/MS non-kit	2	0.48	---*
60	Non-deriv MS/MS PE NeoBase Kit	17	0.74	0.08

Specimen No. 21508		C6		
		Expected Value 2.27 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	1.98	0.34
35	Deriv-MS/MS PE NeoGram MS2 Kit	7	2.02	0.36
38	Non-deriv MS/MS non-kit	2	1.90	---*
60	Non-deriv MS/MS PE NeoBase Kit	20	2.12	0.16

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21508		C8		
		Expected Value 2.87 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	22	2.76	0.40
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	2.48	0.42
38	Non-deriv MS/MS non-kit	2	2.90	---*
60	Non-deriv MS/MS PE NeoBase Kit	23	2.78	0.20

Specimen No. 21508		C10		
		Expected Value 2.33 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	19	2.48	0.46
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	1.84	0.16
38	Non-deriv MS/MS non-kit	2	2.26	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	2.18	0.16

Specimen No. 21508		C10:1		
		Expected Value 2.88 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	17	2.90	0.46
35	Deriv-MS/MS PE NeoGram MS2 Kit	7	2.36	0.34
60	Non-deriv MS/MS PE NeoBase Kit	20	2.16	0.18

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21509		Tgal		
		Expected Value 25.6 mg/dL blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	4	21.5	1.0
19	Other	4	363.9	677.8
25	Bio-Rad Quantase	2	37.7	---*
34	Astoria-Pacific 50 Hour Reagen	8	29.0	3.7
47	Fluorometric Manual	5	24.1	4.2
62	PerkinElmer GSP Neonatal	3	21.5	---*

Specimen No. 21509		GALT*		
		Assayed Value 1.5 U/g Hb		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	15	1.2	0.7
64	Astoria-Pacific Neonatal Micro	6	3.8	7.6

Specimen No. 21509		GALT**		
		Expected Value N/A μmol/L blood		
		N	Mean	SD
Method Code	Method Name			
34	Astoria-Pacific 50 Hour Reagen	12	24.8	12.9

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21509		GALT***		
		Expected Value N/A U/dL blood		
		N	Mean	SD
Method Code	Method Name			
62	PerkinElmer GSP Neonatal	9	1.2	1.2

Specimen No. 21509		Bio-1		
		Expected Value N/A nmol/min/dL blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	6	41.3	4.6

Specimen No. 21509		Bio-2		
		Expected Value N/A ERU		
		N	Mean	SD
Method Code	Method Name			
34	Astoria-Pacific 50 Hour Reagen	10	6.3	0.9

Specimen No. 21509		Bio-3		
		Expected Value N/A MRU		
		N	Mean	SD
Method Code	Method Name			
64	Astoria-Pacific Neonatal Micro	6	18.1	7.2

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21509		Bio-4		
		Expected Value N/A U/dL blood		
		N	Mean	SD
Method Code	Method Name			
62	PerkinElmer GSP Neonatal	5	32.0	2.1

Specimen No. 21510		Cit		
		Expected Value 189.6 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	19	119.8	33.0
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	156.8	19.6
38	Non-deriv MS/MS non-kit	2	119.7	---*
60	Non-deriv MS/MS PE NeoBase Kit	23	161.2	14.7

Specimen No. 21511		17-OHP		
		Expected Value 127.2 ng/mL serum		
		N	Mean	SD
Method Code	Method Name			
19	Other	7	97.6	8.6
21	AutoDelfia	8	106.1	12.1
58	AutoDelfia Neonatal 17-OHP (B0	14	87.9	18.8
62	PerkinElmer GSP Neonatal	18	92.4	7.2

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21512		Tyr		
		Expected Value 891.9 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	22	736.8	115.2
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	764.7	123.2
38	Non-deriv MS/MS non-kit	3	602.8	---*
60	Non-deriv MS/MS PE NeoBase Kit	17	809.4	57.9

Specimen No. 21512		SUAC		
		Expected Value 40.4 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	13	24.2	12.0
38	Non-deriv MS/MS non-kit	2	32.2	---*
60	Non-deriv MS/MS PE NeoBase Kit	20	9.6	1.5

Specimen No. 21513		Arg		
		Expected Value 290.9 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	17	121.3	87.3
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	216.0	34.2
60	Non-deriv MS/MS PE NeoBase Kit	17	239.6	19.9

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21514		Bio-1		
		Expected Value N/A nmol/min/dL blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	6	10.2	2.7

Specimen No. 21514		Bio-2		
		Expected Value N/A ERU		
		N	Mean	SD
Method Code	Method Name			
34	Astoria-Pacific 50 Hour Reagen	10	1.8	1.4

Specimen No. 21514		Bio-3		
		Expected Value N/A MRU		
		N	Mean	SD
Method Code	Method Name			
64	Astoria-Pacific Neonatal Micro	8	2.4	2.4

Specimen No. 21514		Bio-4		
		Expected Value N/A U/dL blood		
		N	Mean	SD
Method Code	Method Name			
62	PerkinElmer GSP Neonatal	6	12.3	3.8

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21514		C0(low)		
		Expected Value 2.69 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	2.88	0.90
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	4.14	0.60
38	Non-deriv MS/MS non-kit	2	2.28	---*
60	Non-deriv MS/MS PE NeoBase Kit	21	2.22	0.26

Specimen No. 21515		C5DC		
		Expected Value 1.32 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	22	0.66	0.22
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	1.28	0.14
38	Non-deriv MS/MS non-kit	2	0.86	---*
60	Non-deriv MS/MS PE NeoBase Kit	21	1.32	0.10

Specimen No. 21516		Met		
		Expected Value 162.8 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	144.6	27.0
35	Deriv-MS/MS PE NeoGram MS2 Kit	8	141.3	23.1
38	Non-deriv MS/MS non-kit	2	136.4	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	143.8	11.6

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21517		Phe		
		Expected Value 268.4 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	2	228.0	---*
22	Deriv-MS/MS non-kit	24	244.6	34.6
35	Deriv-MS/MS PE NeoGram MS2 Kit	8	230.3	42.5
38	Non-deriv MS/MS non-kit	3	243.1	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	243.4	18.2

Specimen No. 21518		C5		
		Expected Value 1.61 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	1.42	0.20
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	1.30	0.16
38	Non-deriv MS/MS non-kit	2	1.40	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	1.36	0.12

Specimen No. 21519		IRT		
		Assayed Value 267.1 ng/mL blood		
		N	Mean	SD
Method Code	Method Name			
21	AutoDelfia	31	230.8	22.4
62	PerkinElmer GSP Neonatal	17	259.6	16.3

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21520		T4		
		Expected Value 0.0µg/dL serum		
		N	Mean	SD
Method Code	Method Name			
21	AutoDelfia	8	0.3	0.3
62	PerkinElmer GSP Neonatal	15	0.7	0.7

Specimen No. 21520		TSH		
		Expected Value 80.8µIU/mL serum		
		N	Mean	SD
Method Code	Method Name			
21	AutoDelfia	28	104.7	12.8
62	PerkinElmer GSP Neonatal	19	105.8	7.8

Specimen No. 21520		Bio-1		
		Expected Value N/A nmol/min/dL blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	6	28.1	3.8

Specimen No. 21520		Bio-2		
		Expected Value N/A ERU		
		N	Mean	SD
Method Code	Method Name			
34	Astoria-Pacific 50 Hour Reagen	11	3.1	1.7

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21520		Bio-3		
		Expected Value N/A MRU		
		N	Mean	SD
Method Code	Method Name			
64	Astoria-Pacific Neonatal Micro	5	5.1	2.8

Specimen No. 21520		Bio-4		
		Expected Value N/A U/dL blood		
		N	Mean	SD
Method Code	Method Name			
62	PerkinElmer GSP Neonatal	6	14.5	0.6

Specimen No. 21521		C3		
		Expected Value 13.93 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	18	13.16	0.78
35	Deriv-MS/MS PE NeoGram MS2 Kit	8	11.78	0.98
38	Non-deriv MS/MS non-kit	2	13.92	---*
60	Non-deriv MS/MS PE NeoBase Kit	22	12.10	0.96

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21522		C4		
		Expected Value 2.62 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	18	2.50	0.30
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	2.20	0.26
60	Non-deriv MS/MS PE NeoBase Kit	21	2.26	0.18

Specimen No. 21523		Leu		
		Expected Value 856.3 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	19	755.3	92.4
35	Deriv-MS/MS PE NeoGram MS2 Kit	8	772.5	65.7
38	Non-deriv MS/MS non-kit	2	597.5	---*
60	Non-deriv MS/MS PE NeoBase Kit	21	780.9	39.1

Specimen No. 21523		Val		
		Expected Value 659.0 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	15	568.4	119.8
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	527.8	78.4
60	Non-deriv MS/MS PE NeoBase Kit	15	605.3	66.3

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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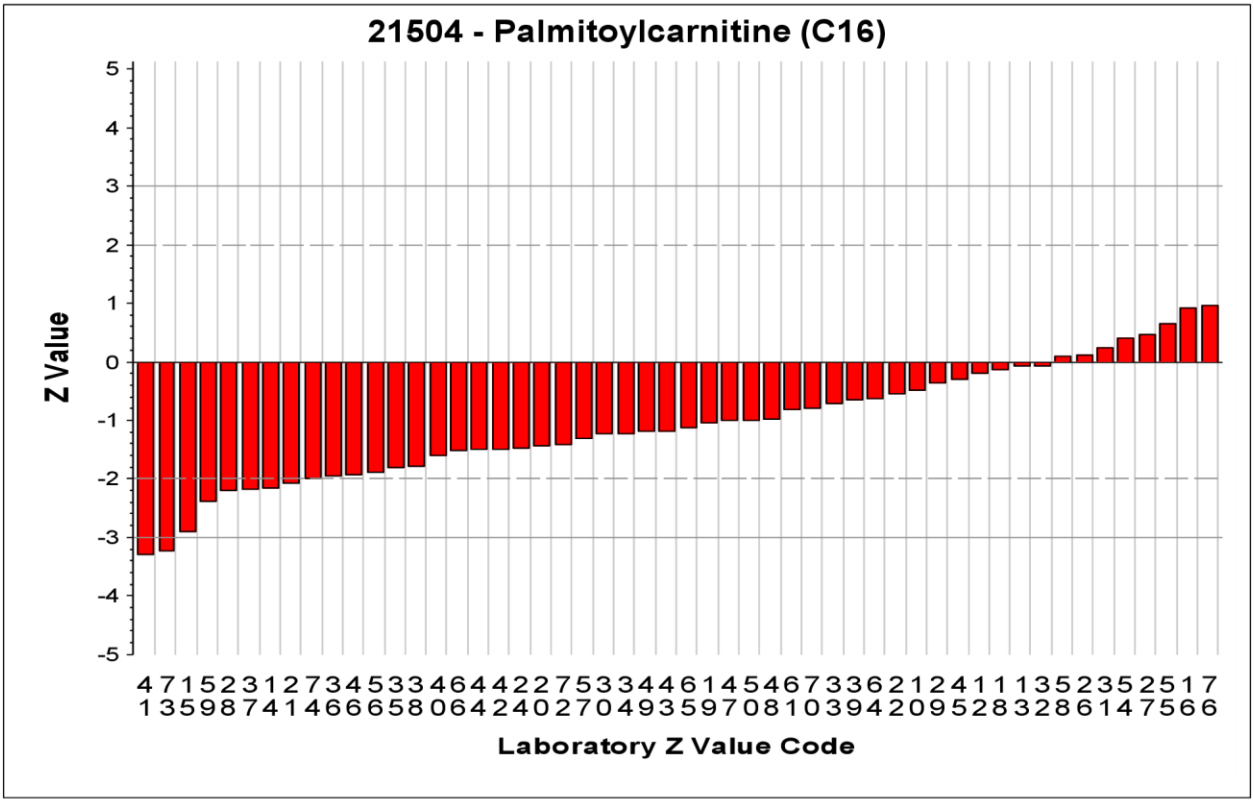

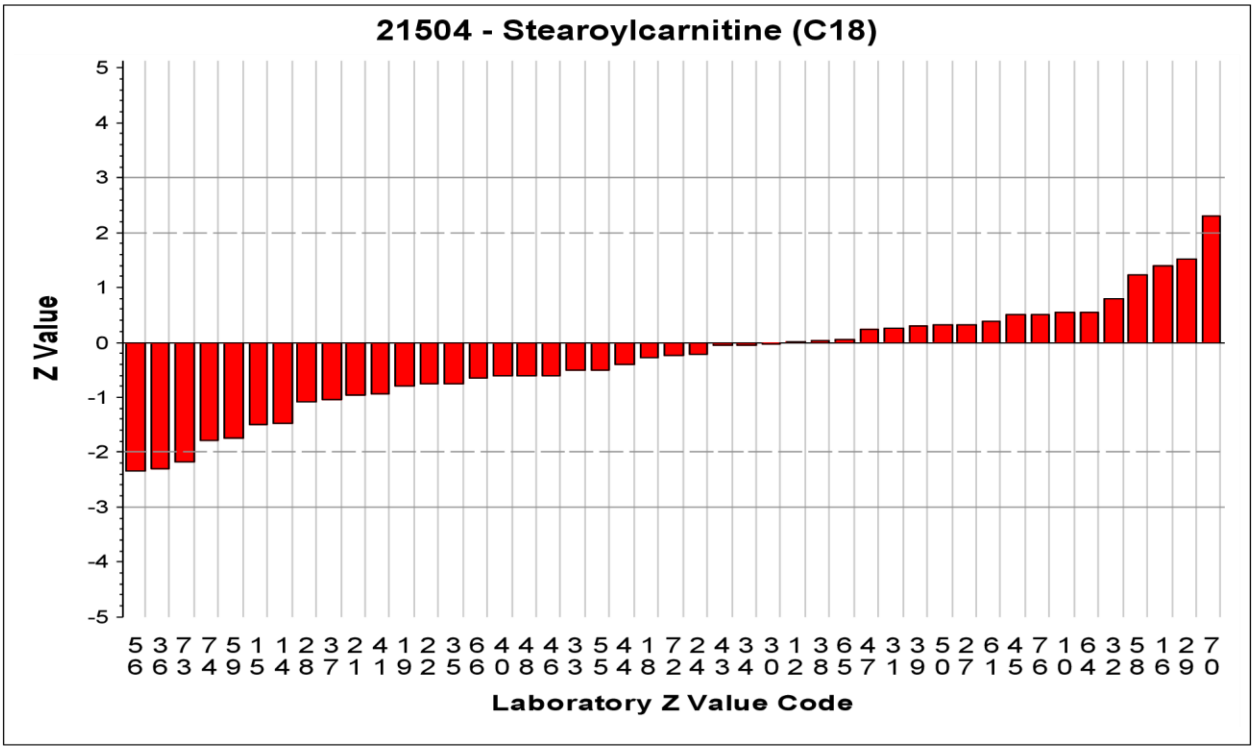

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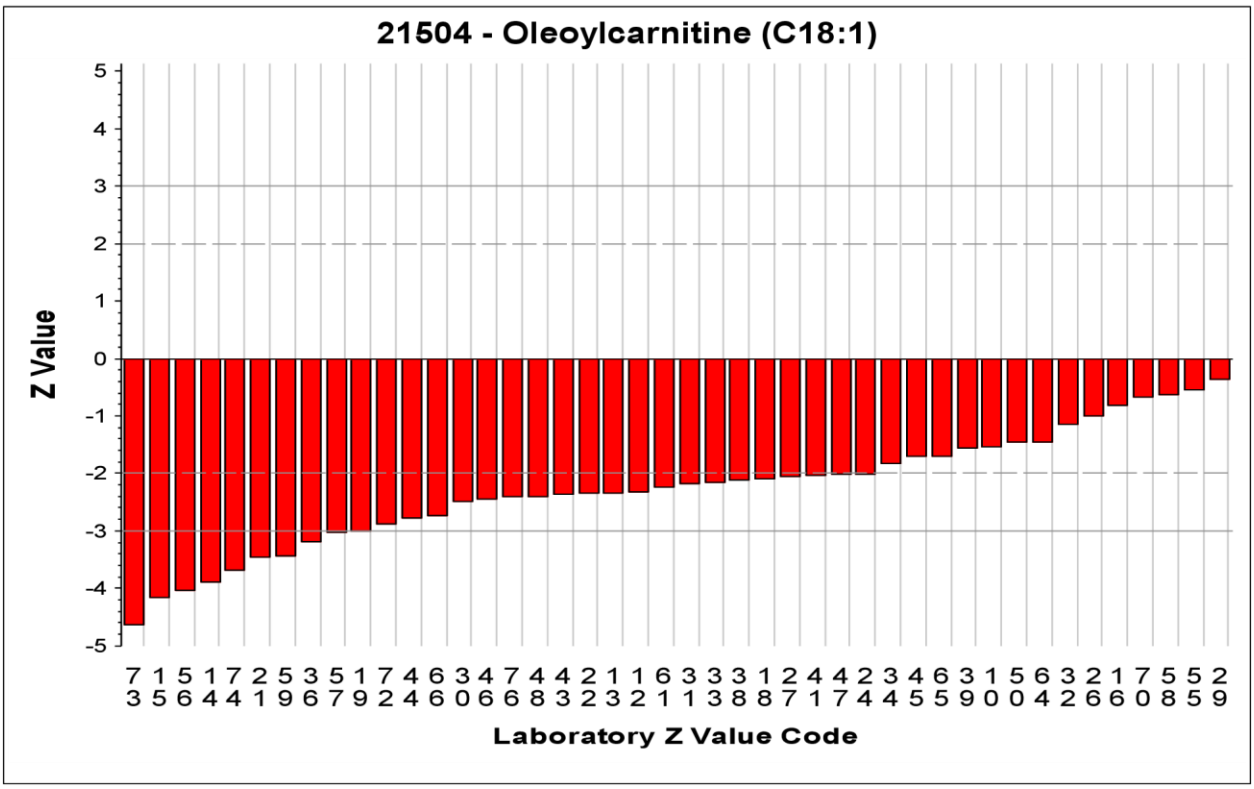

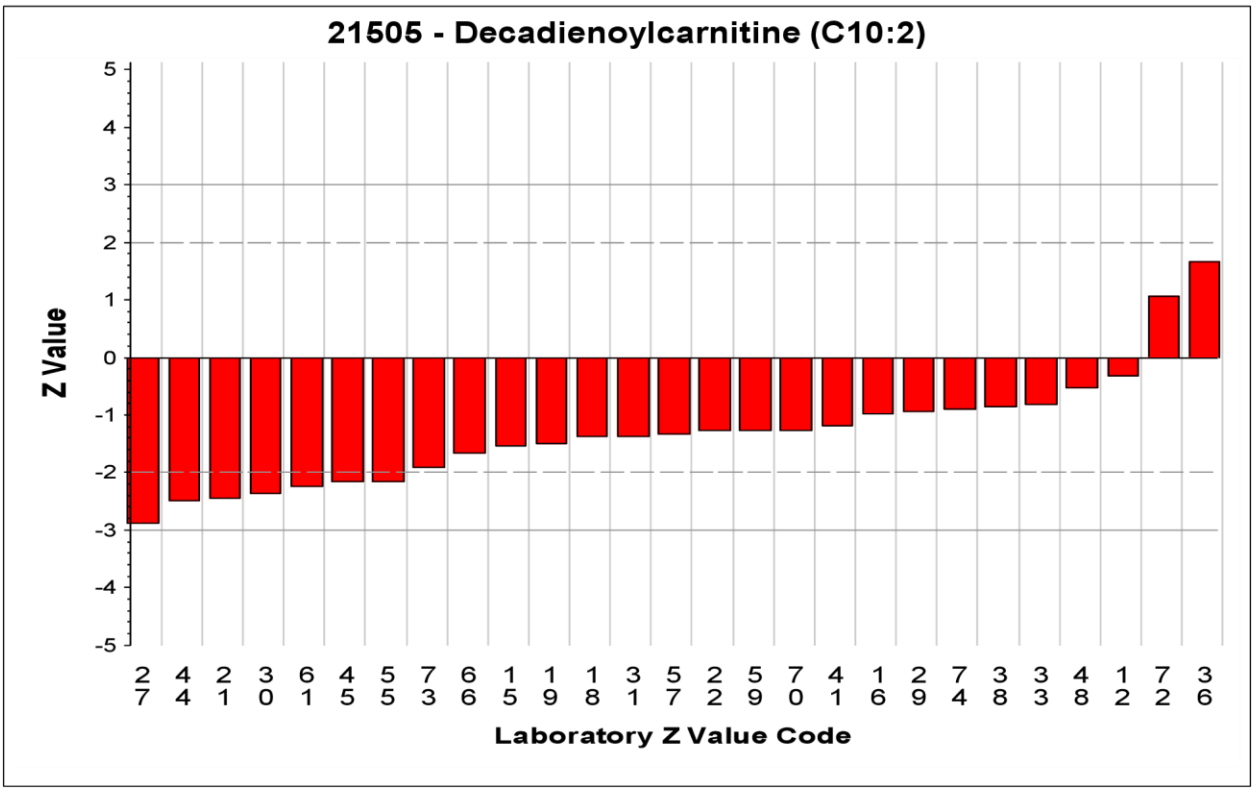

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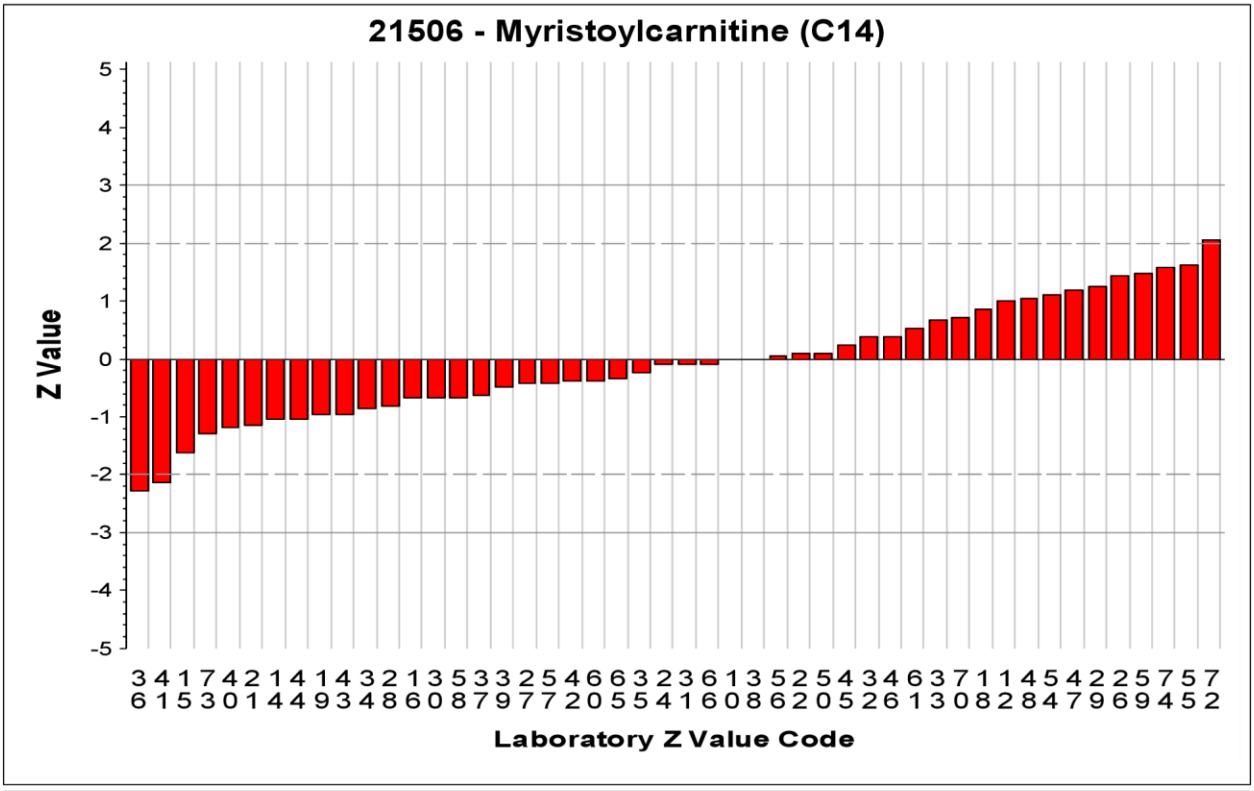

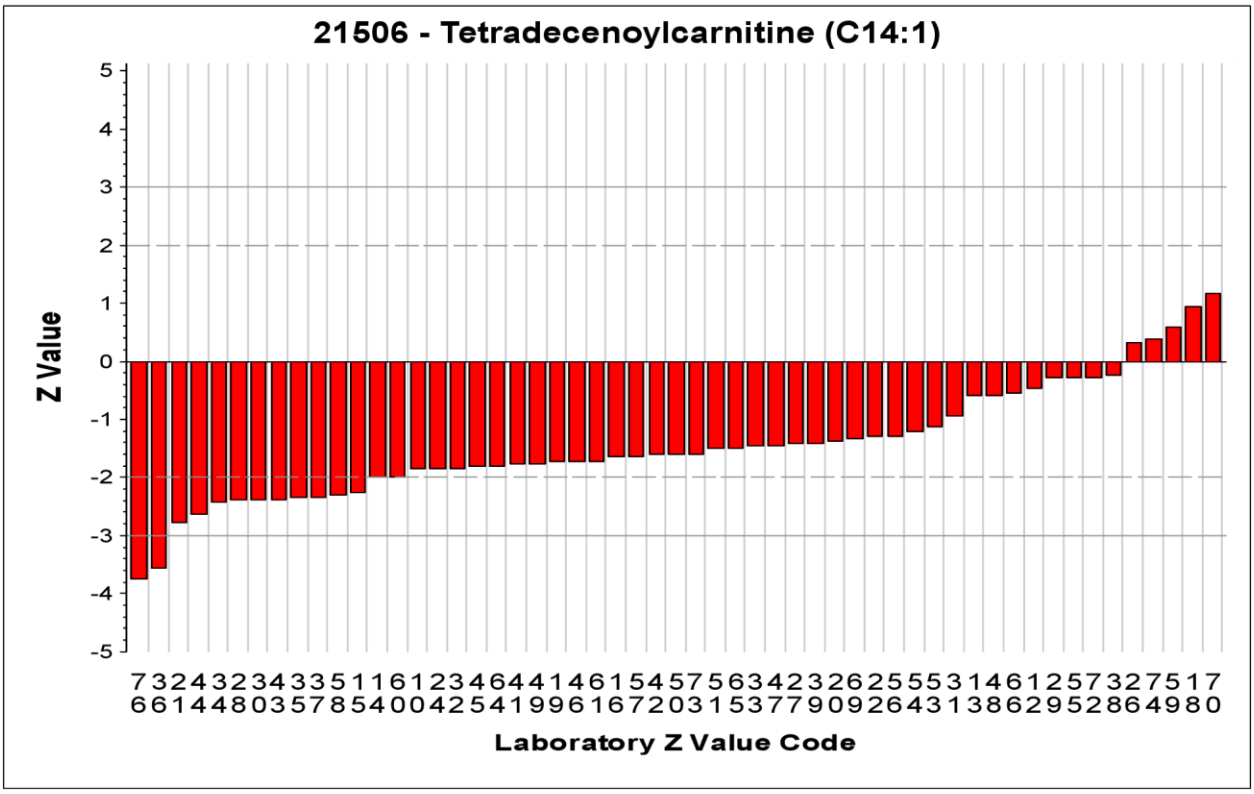

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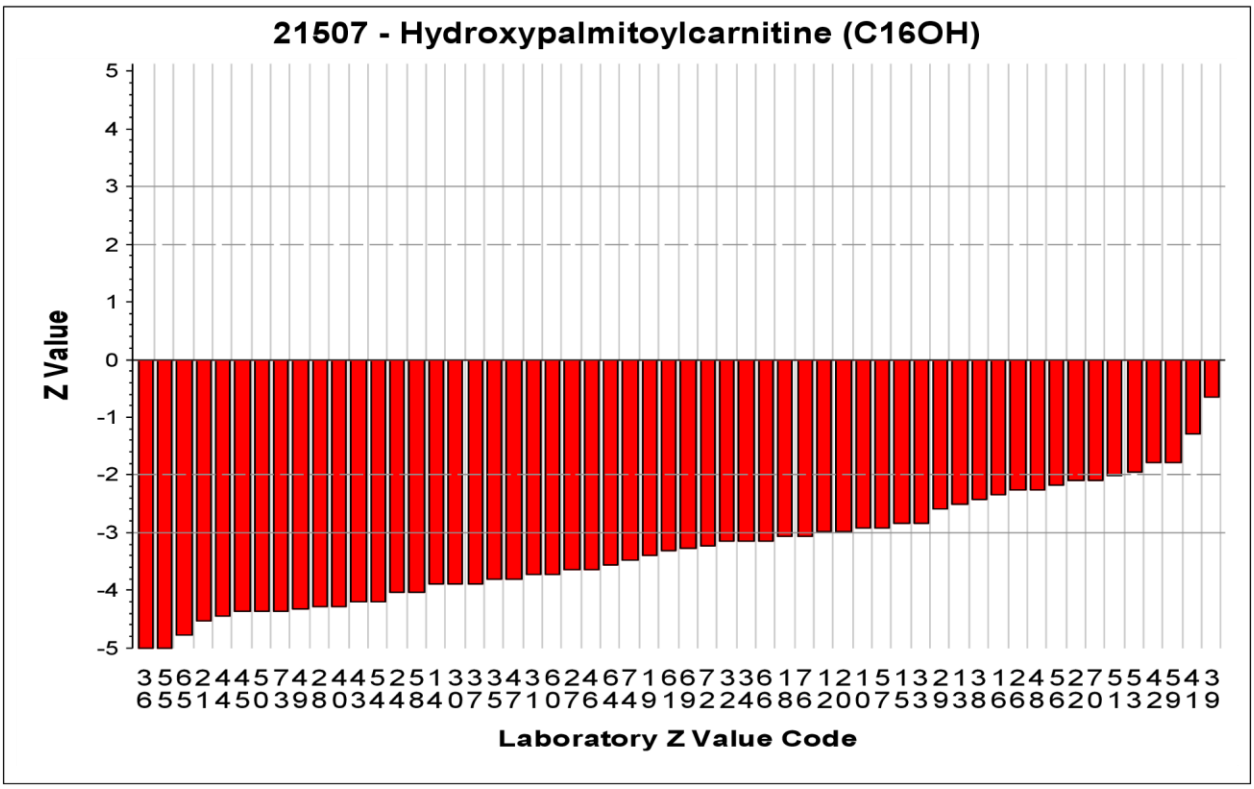

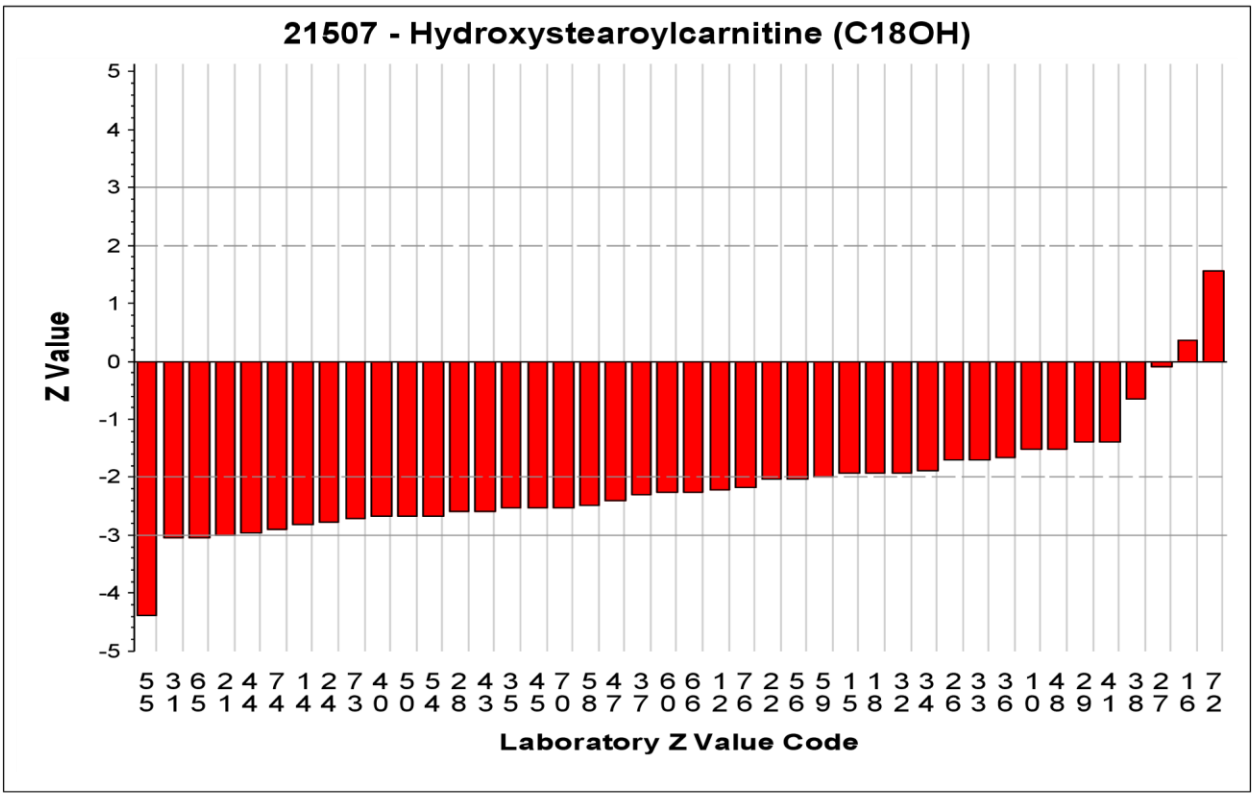

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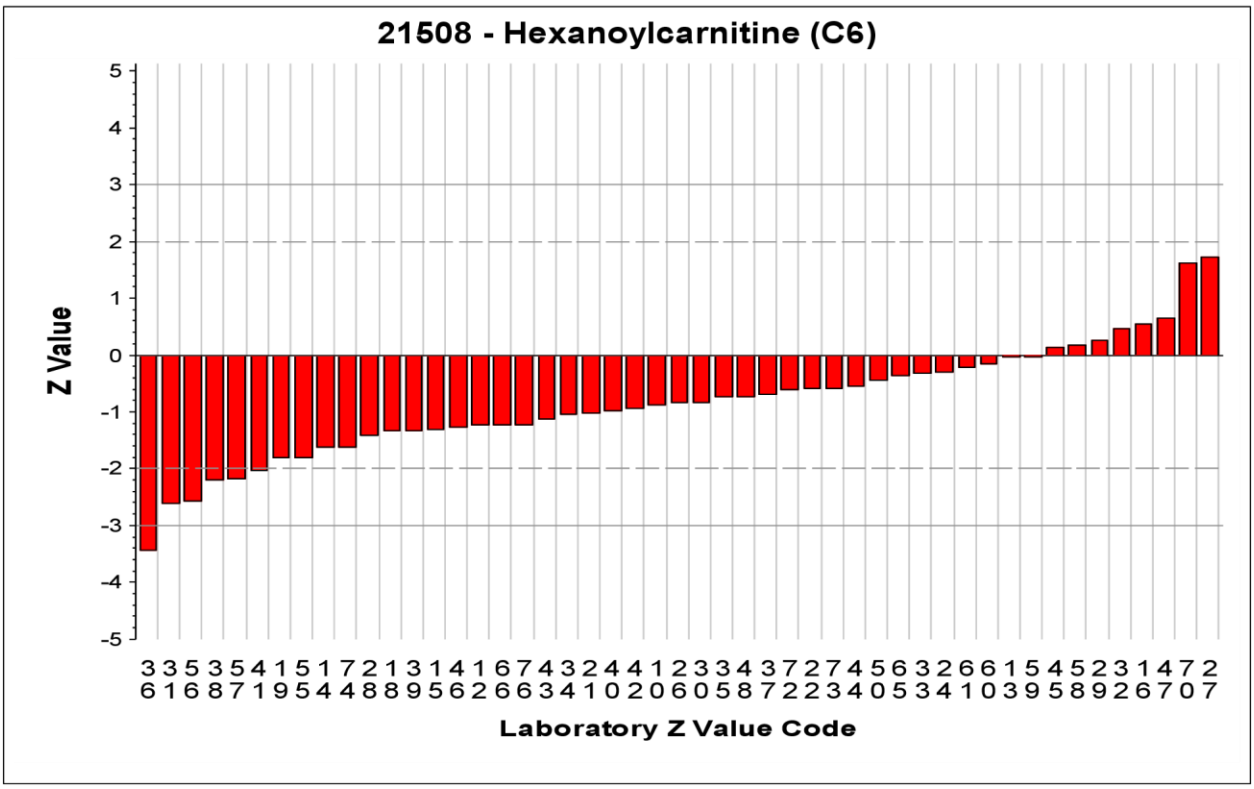

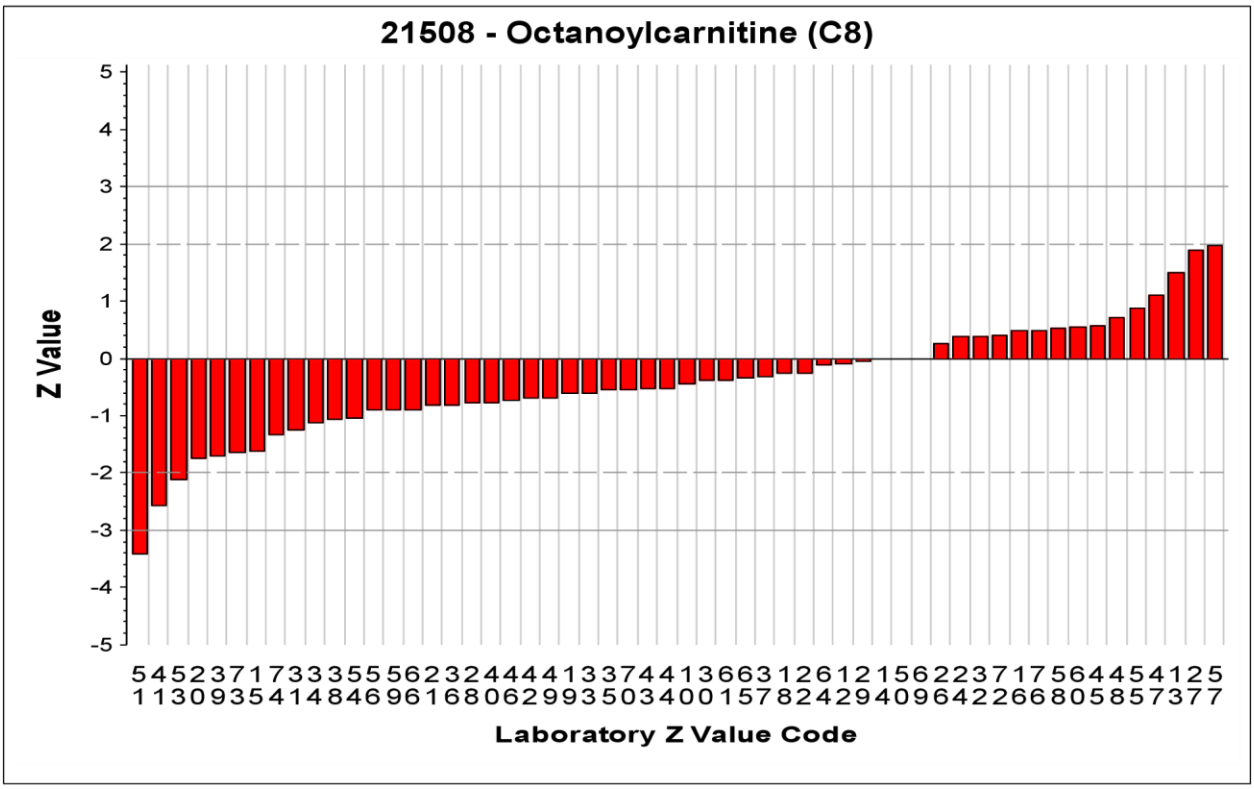

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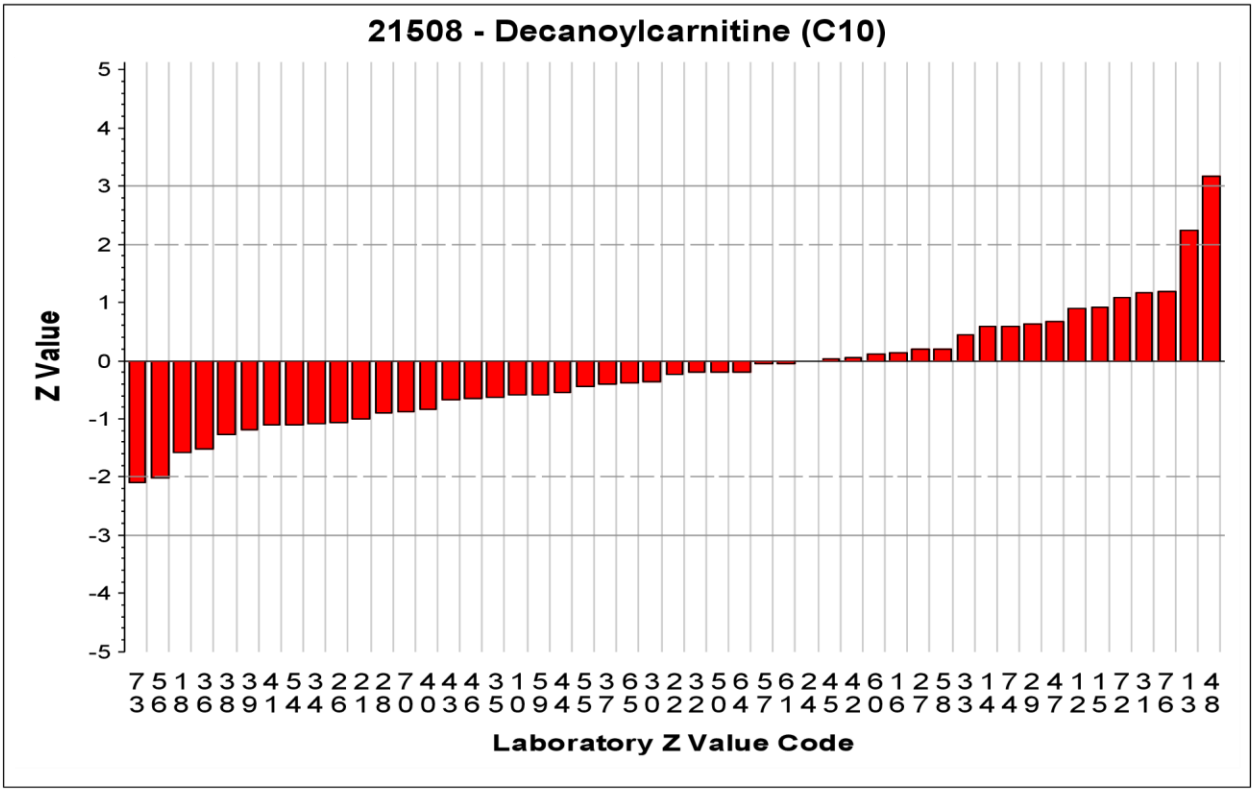

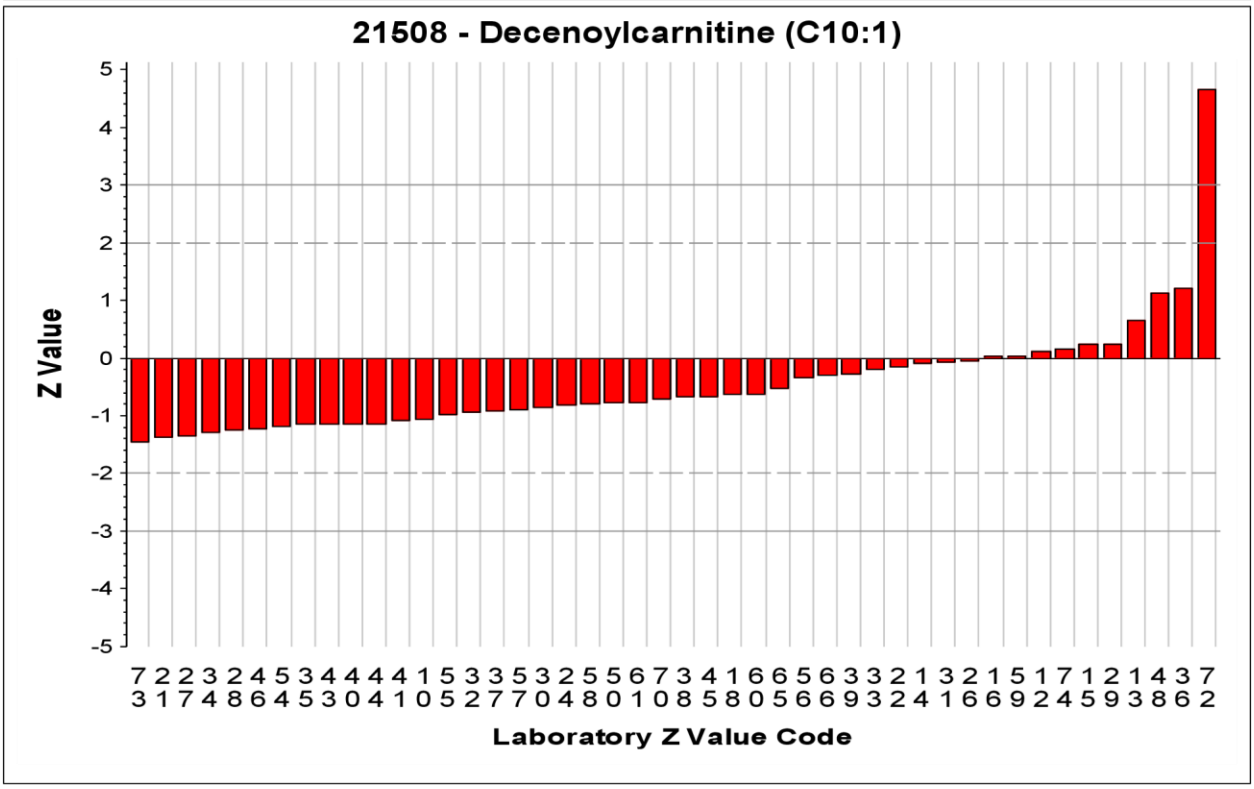

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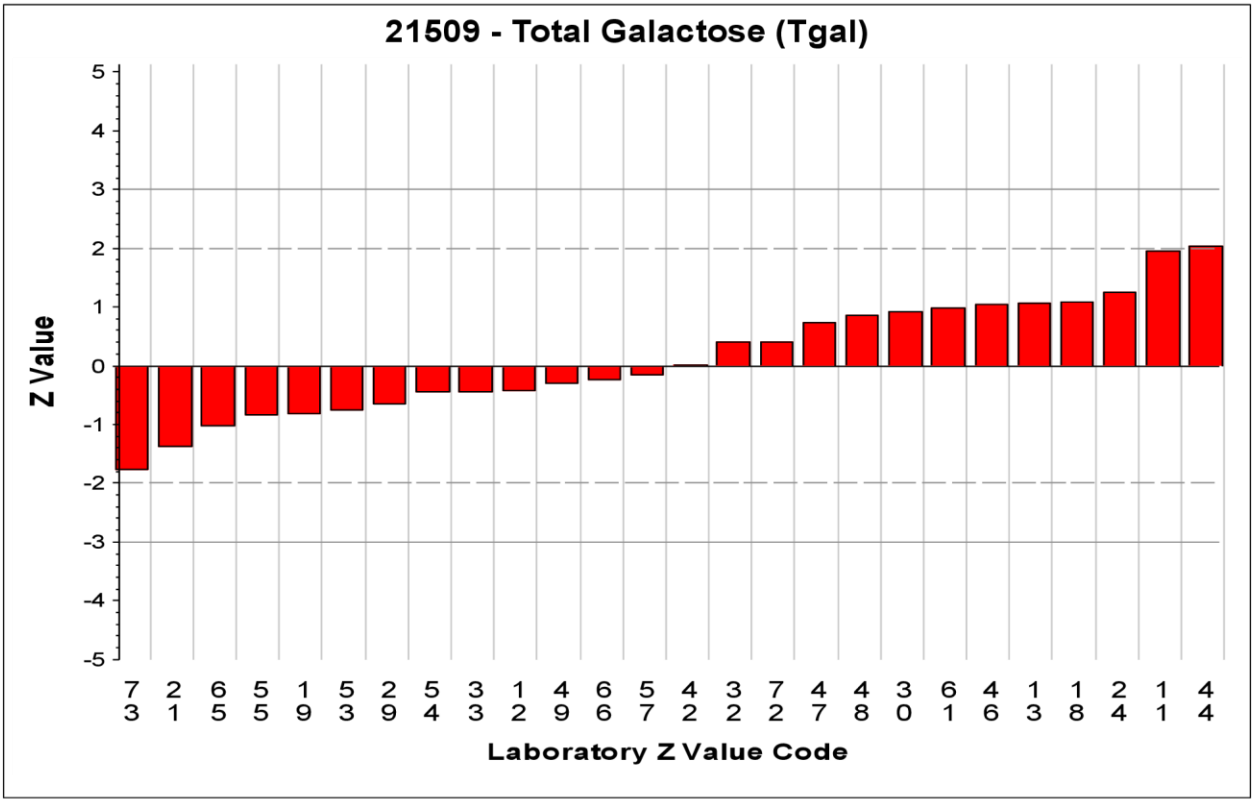

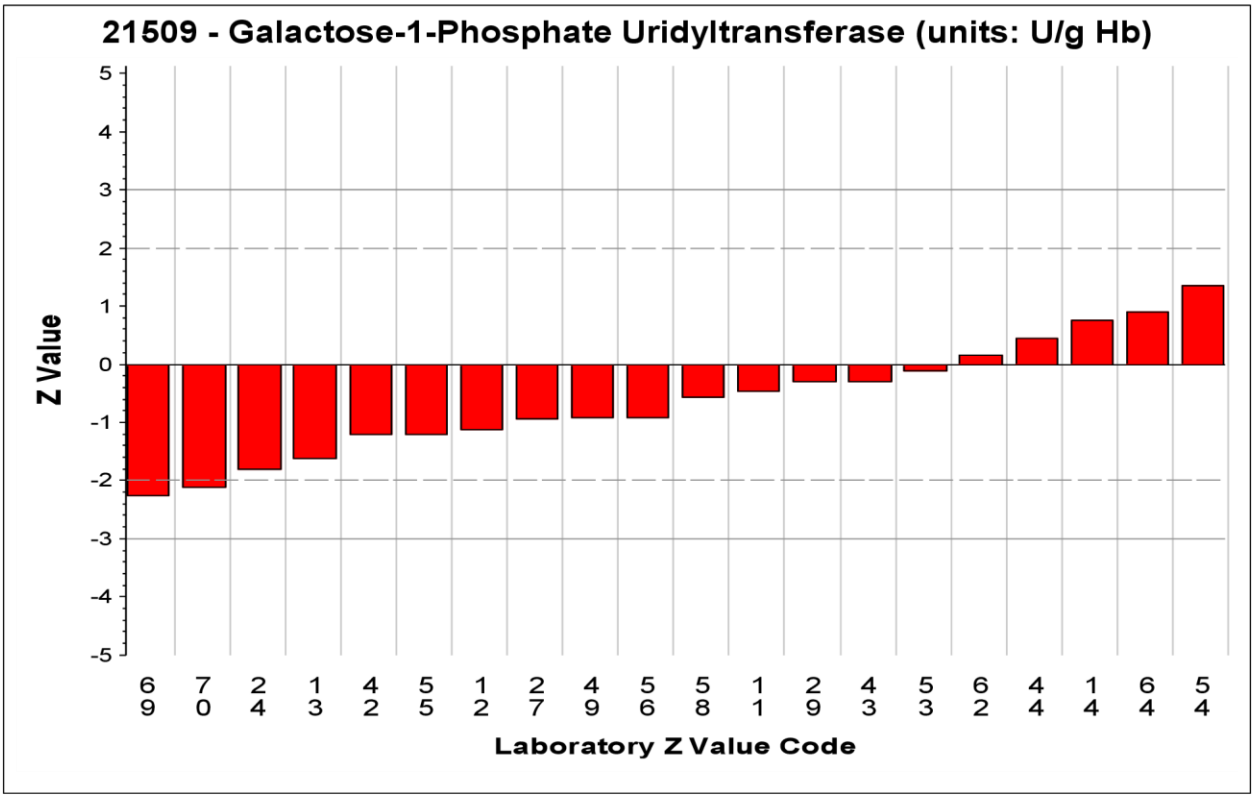

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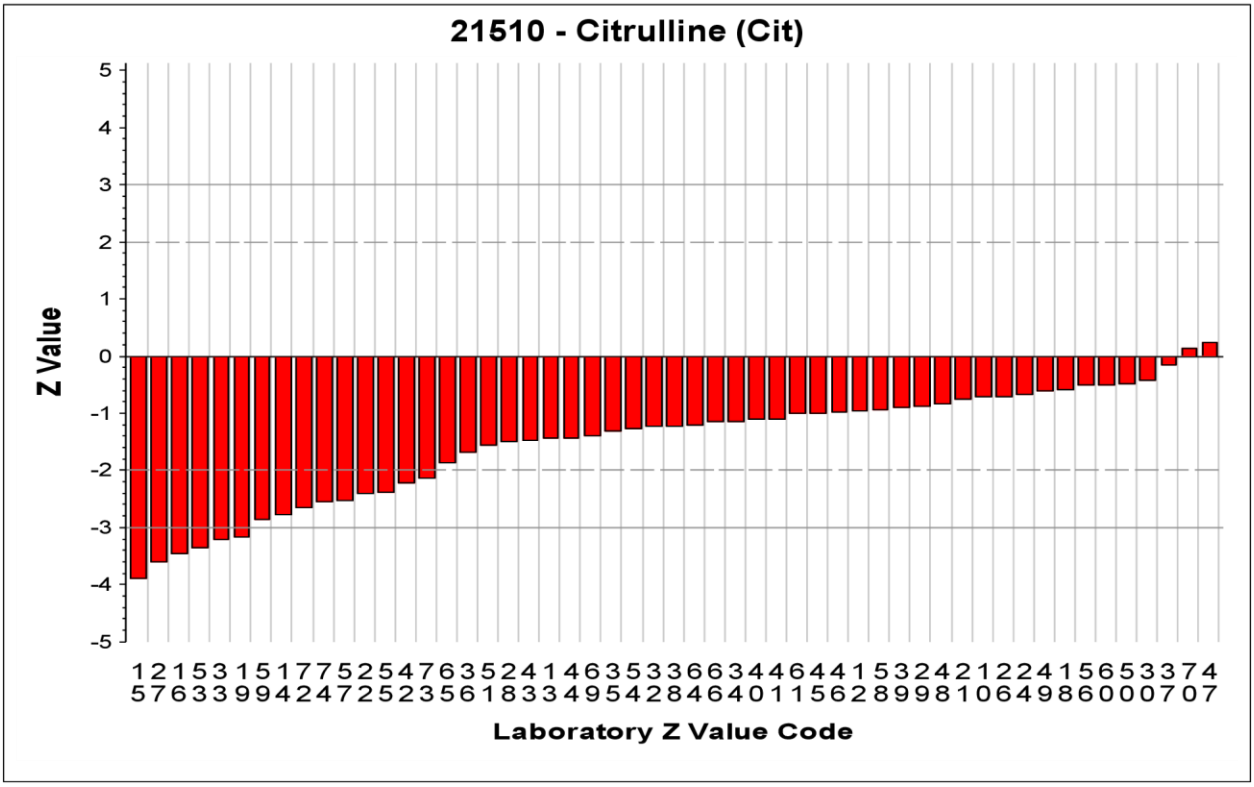

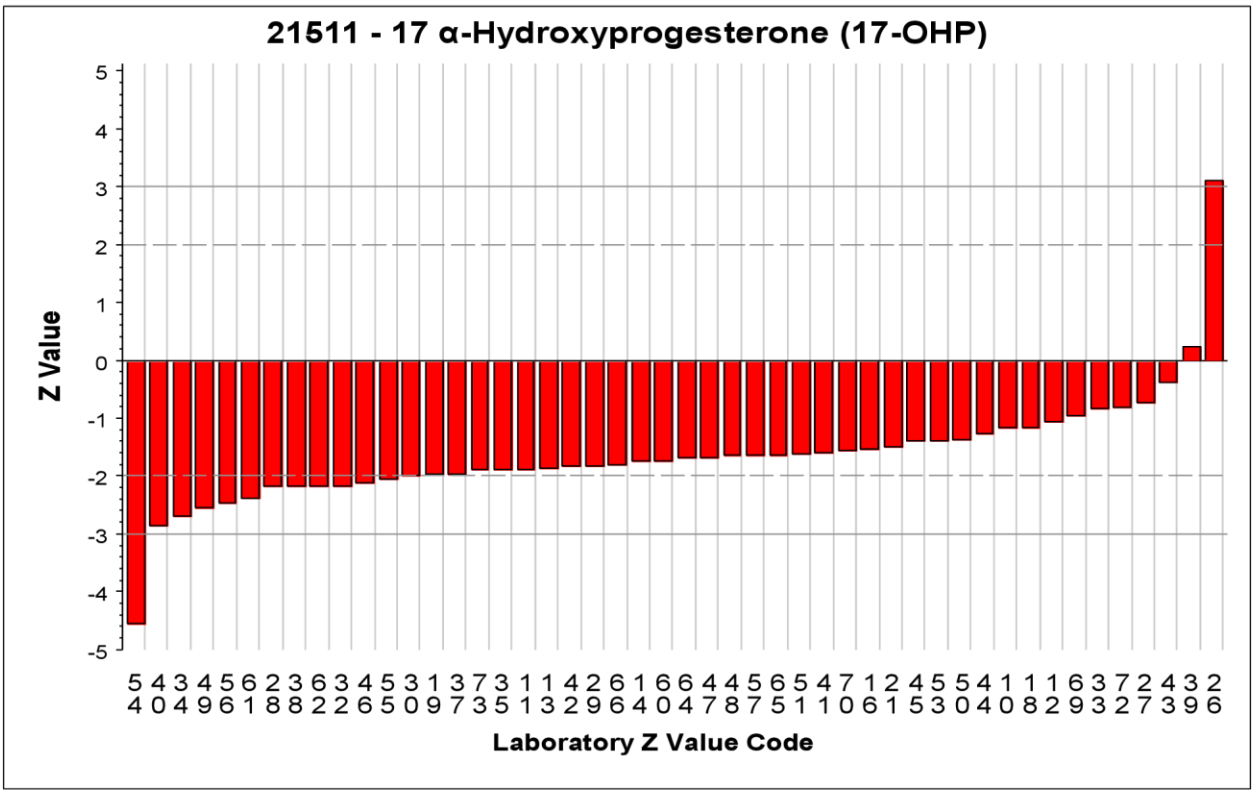

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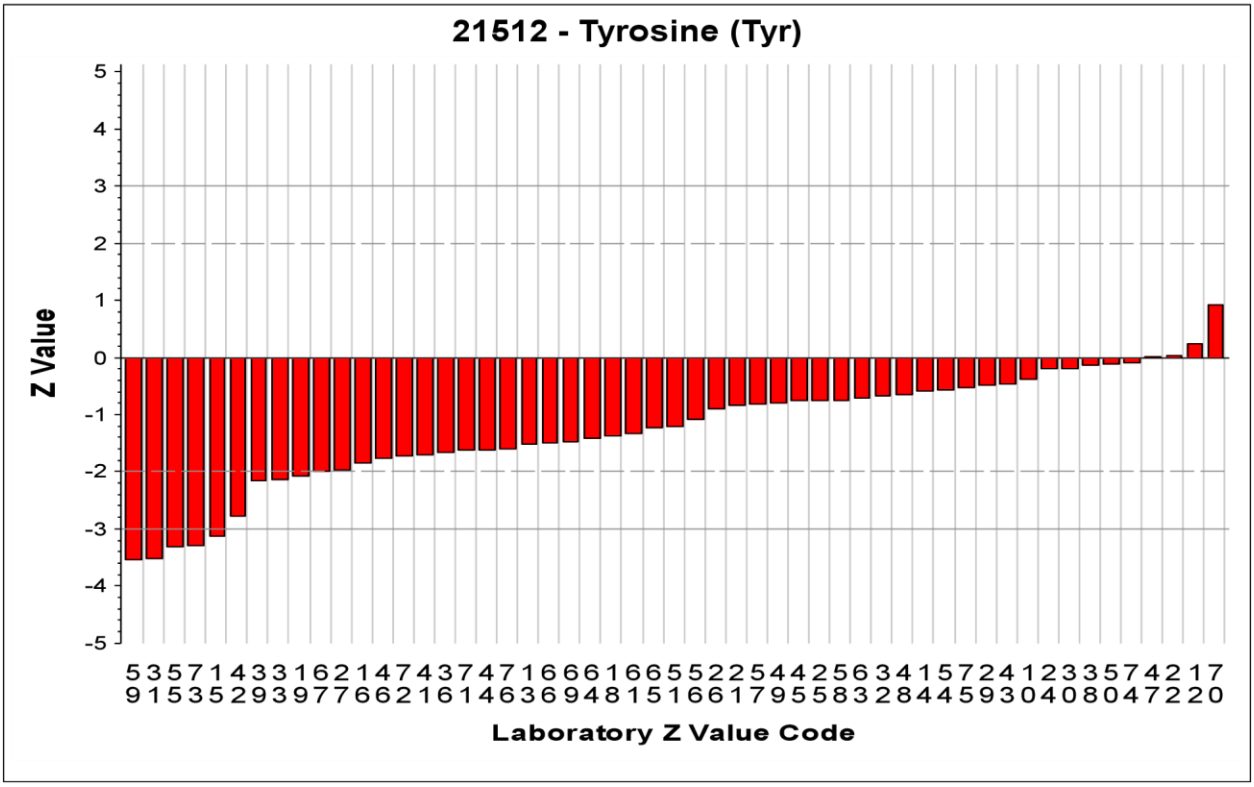

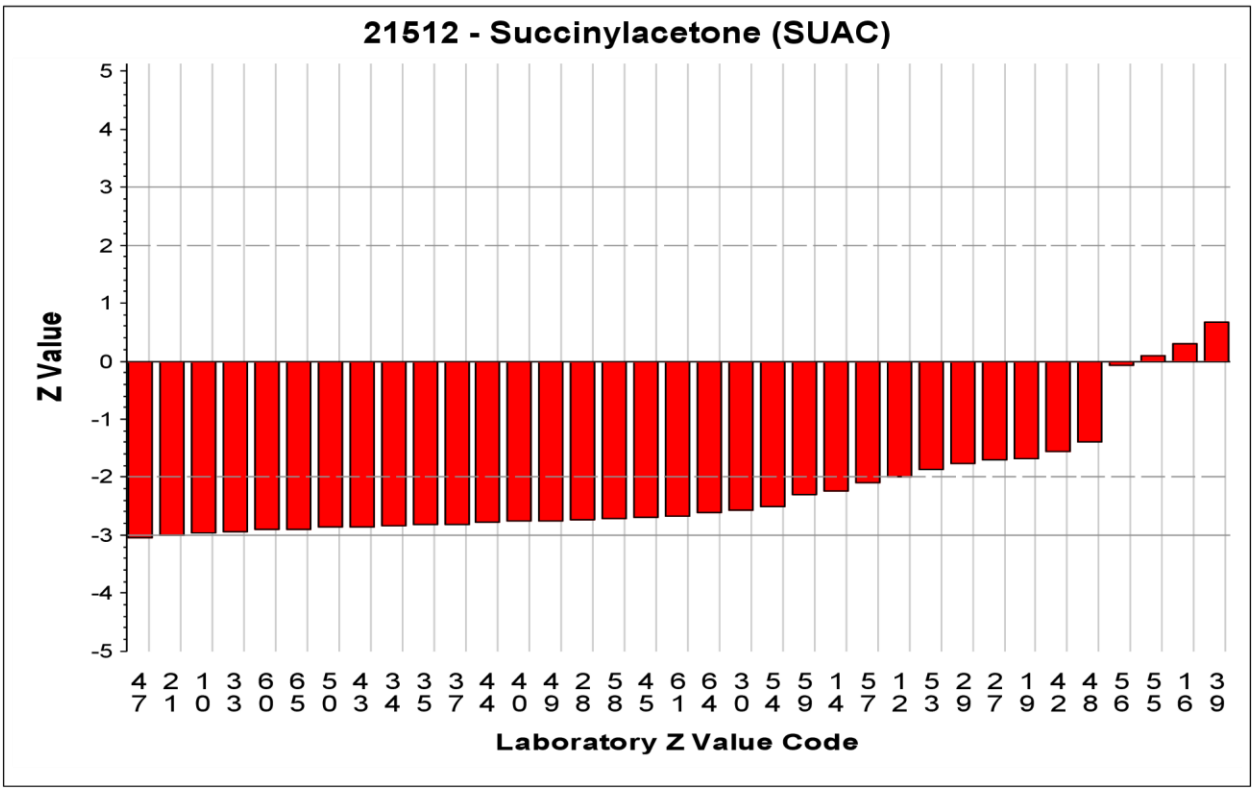

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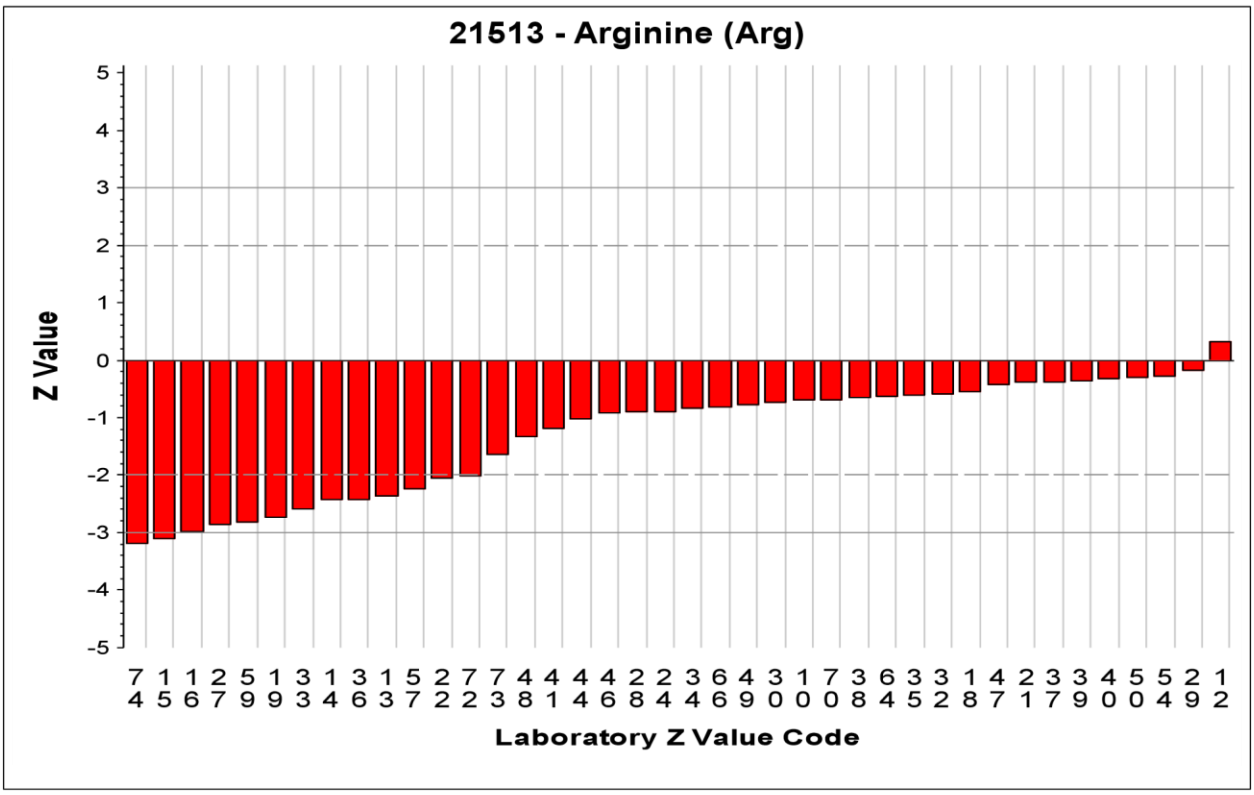

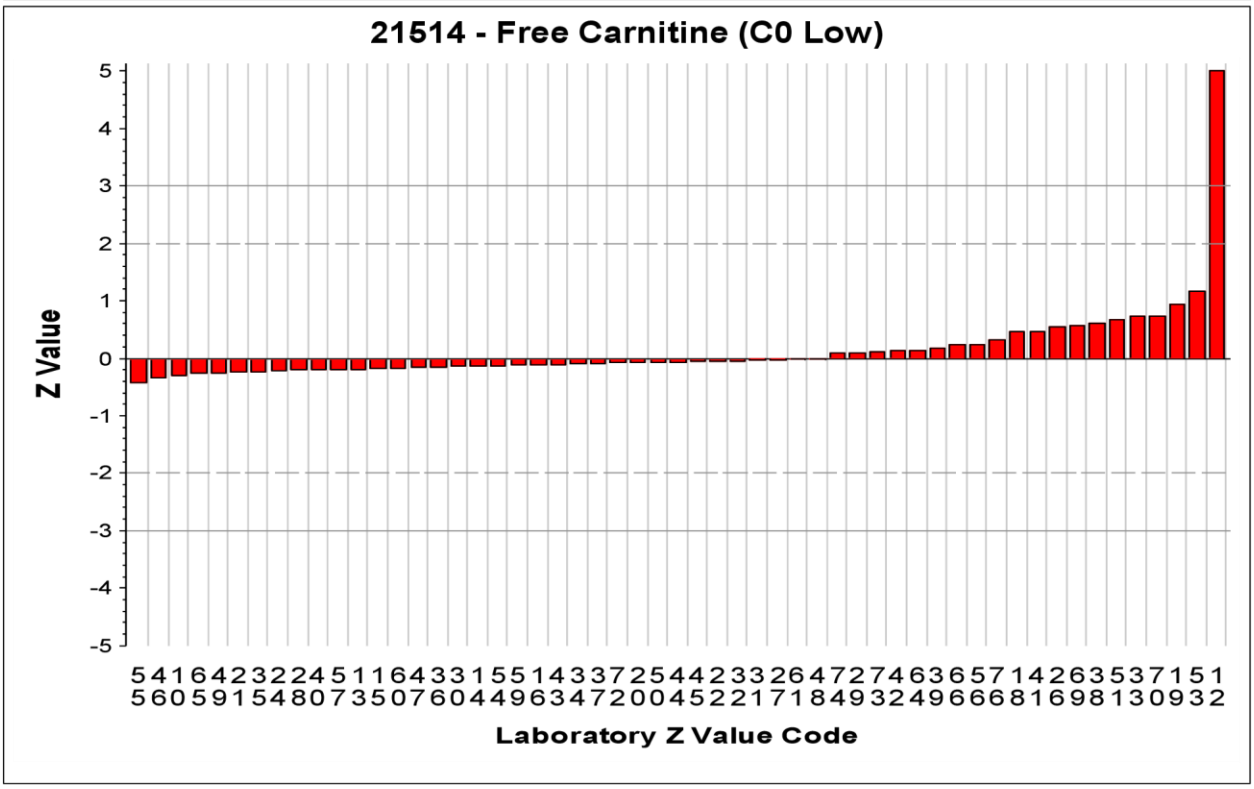

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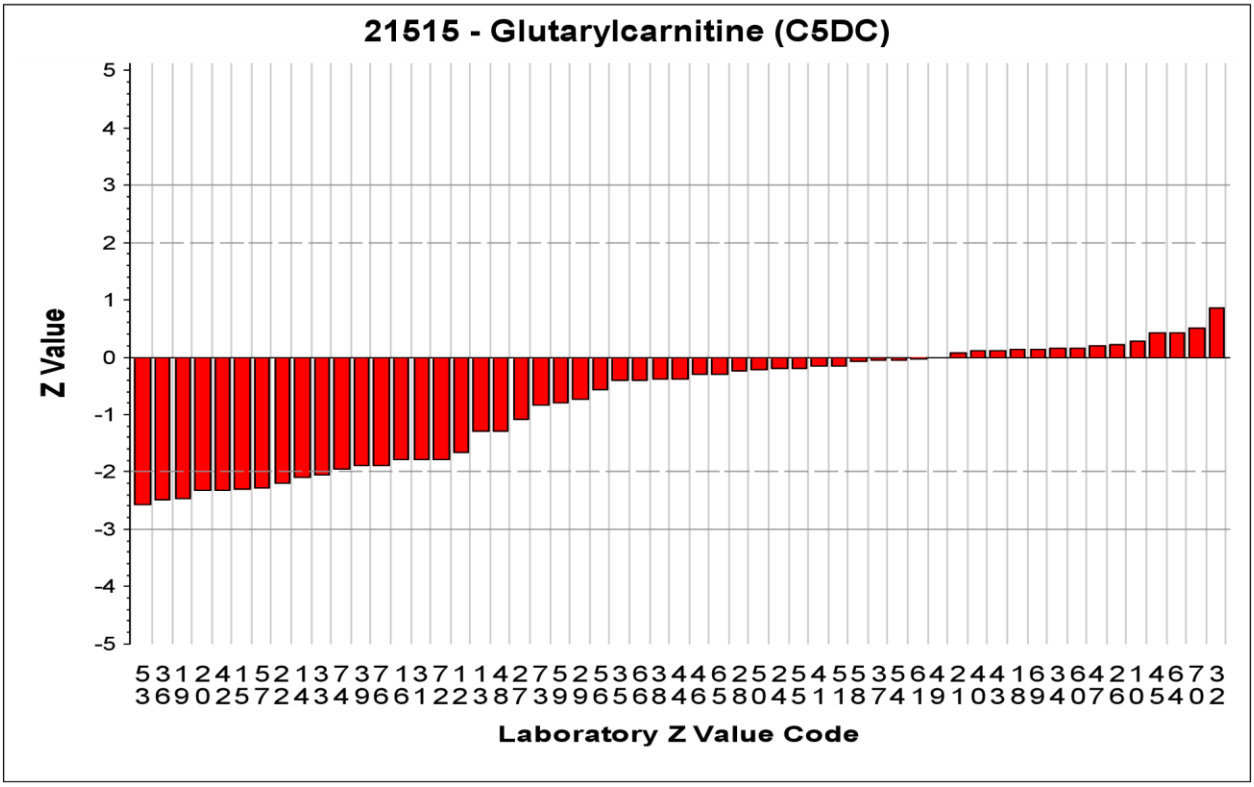

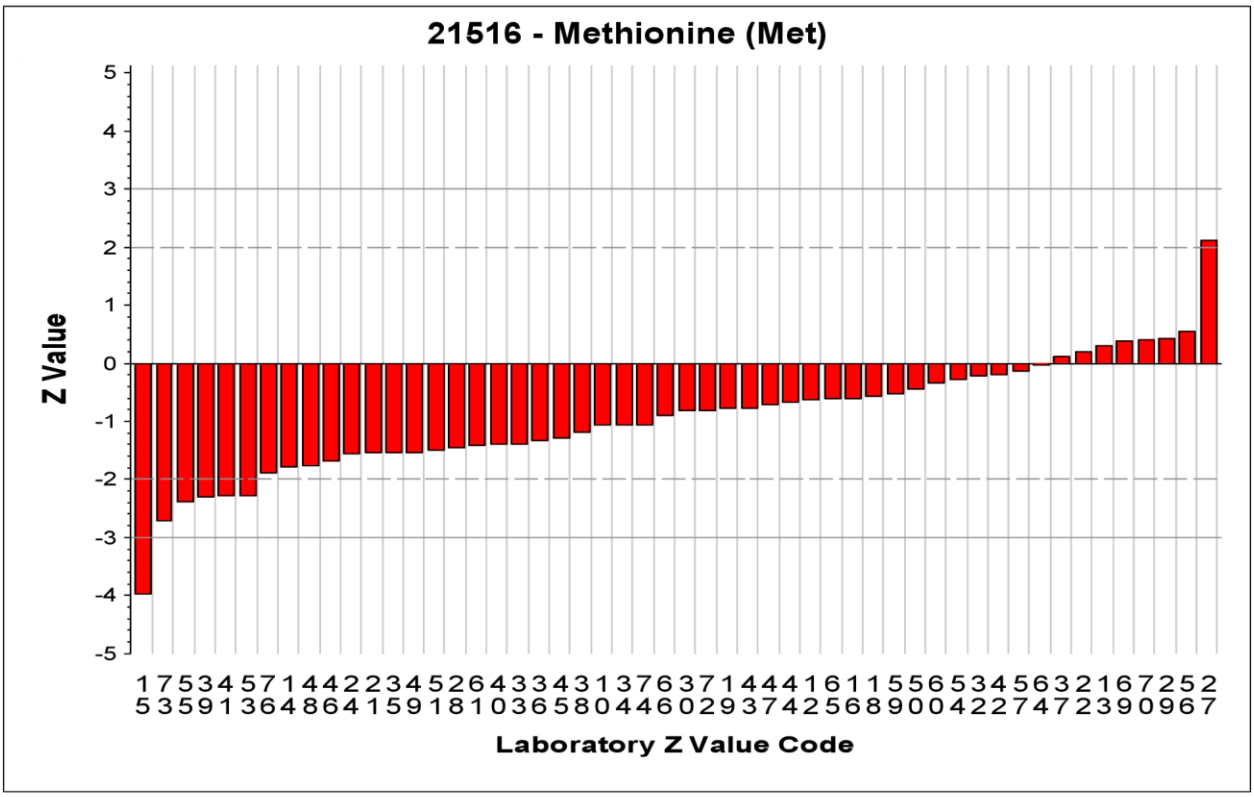

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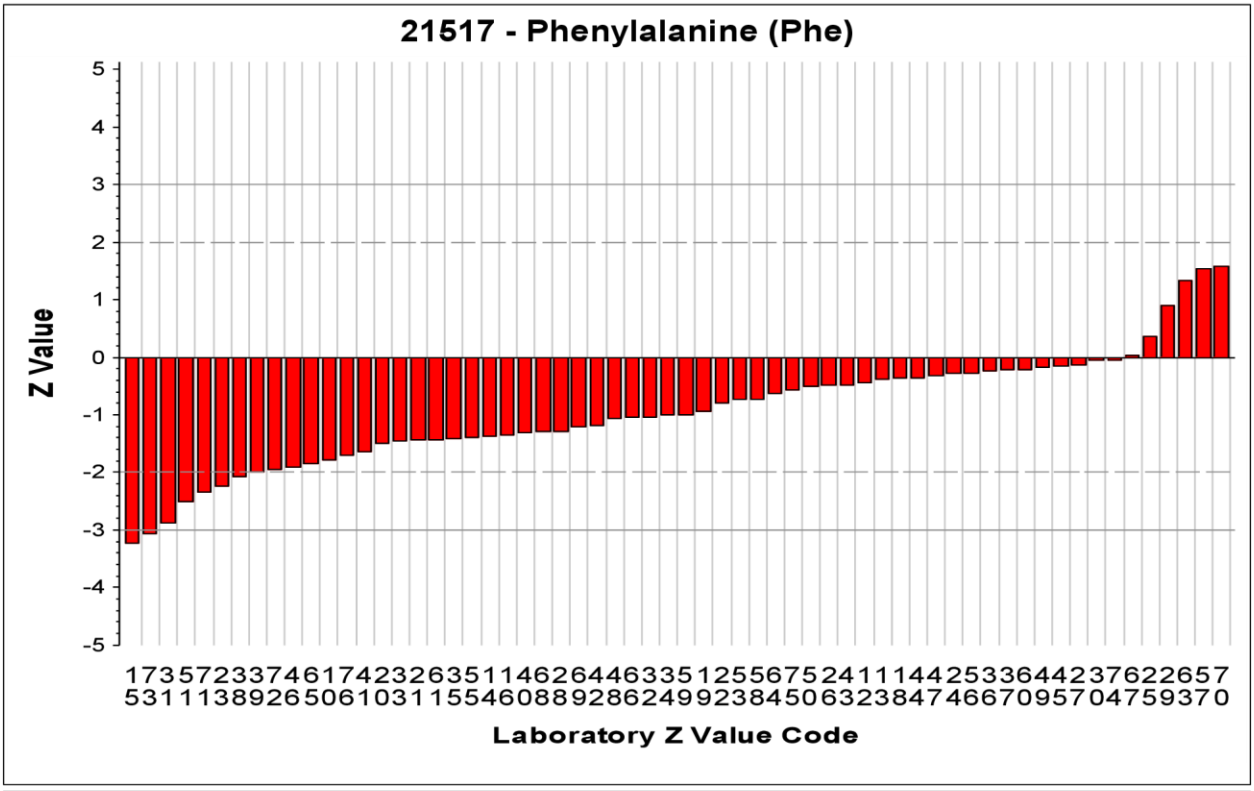

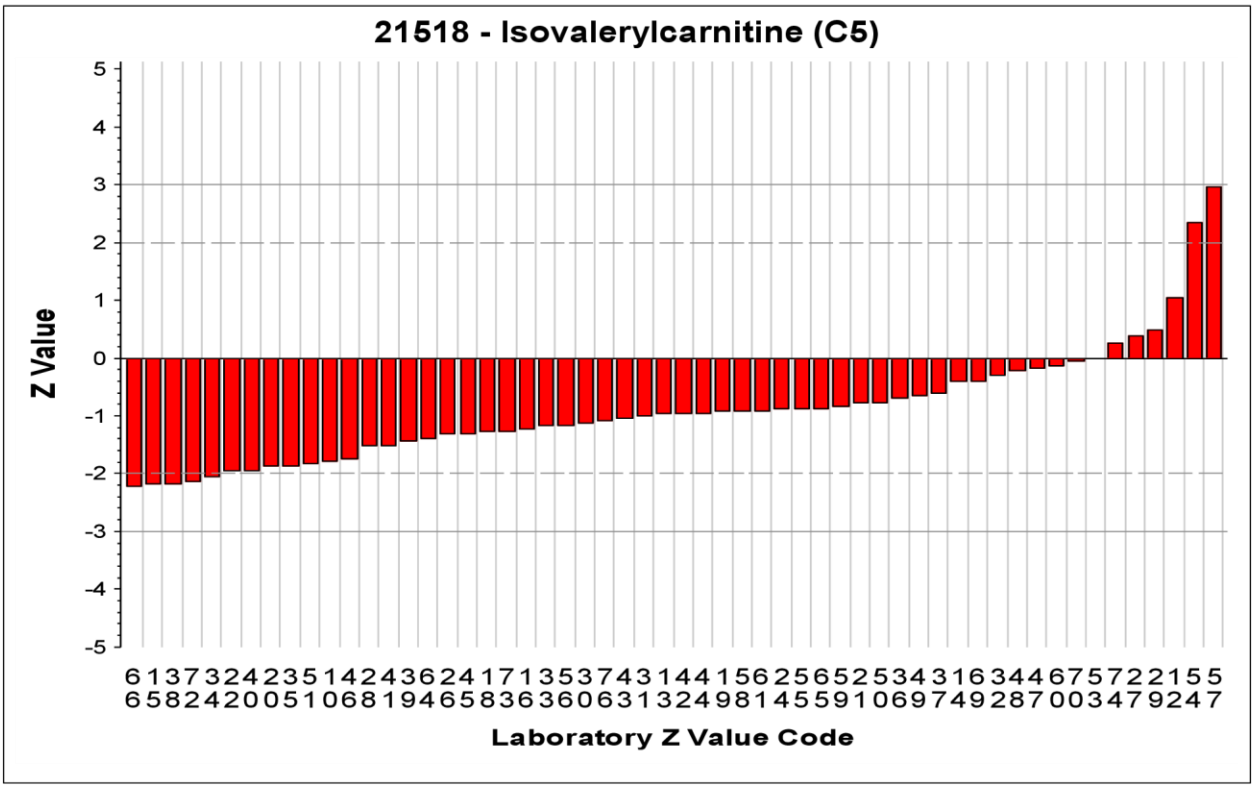

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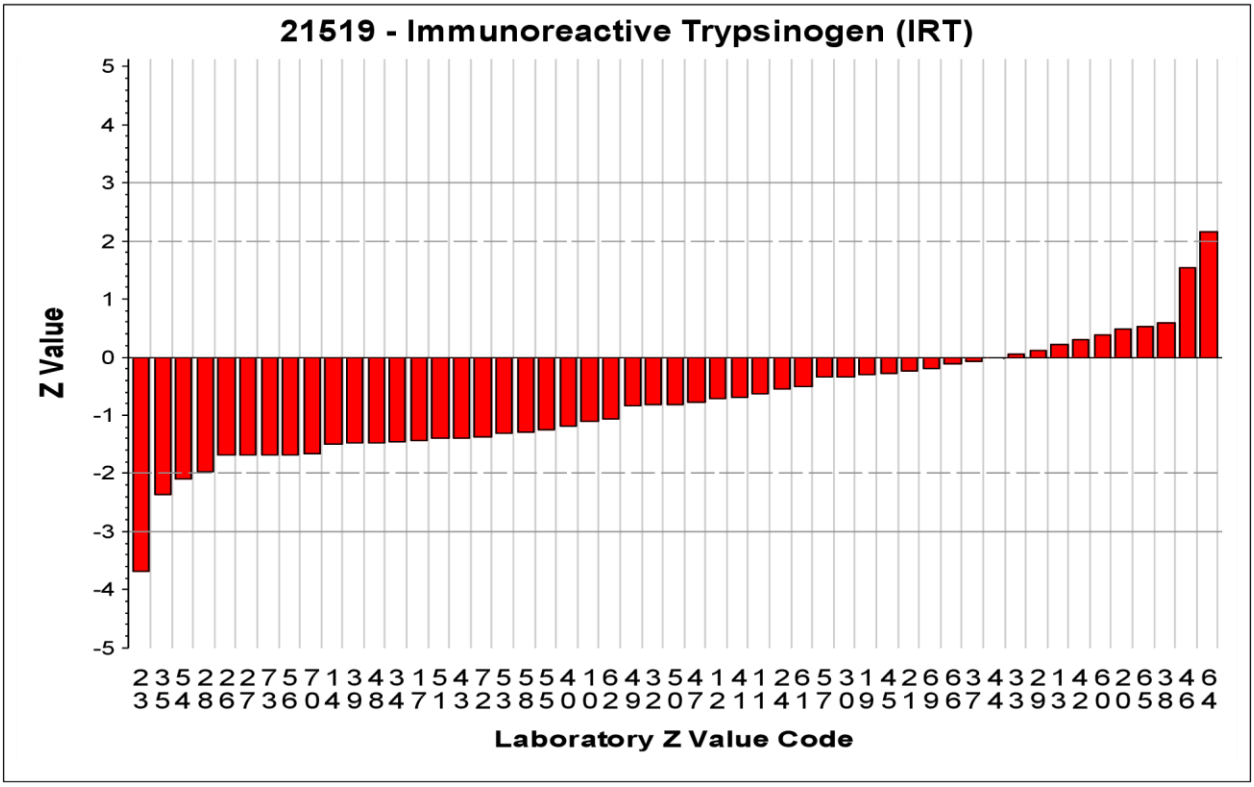

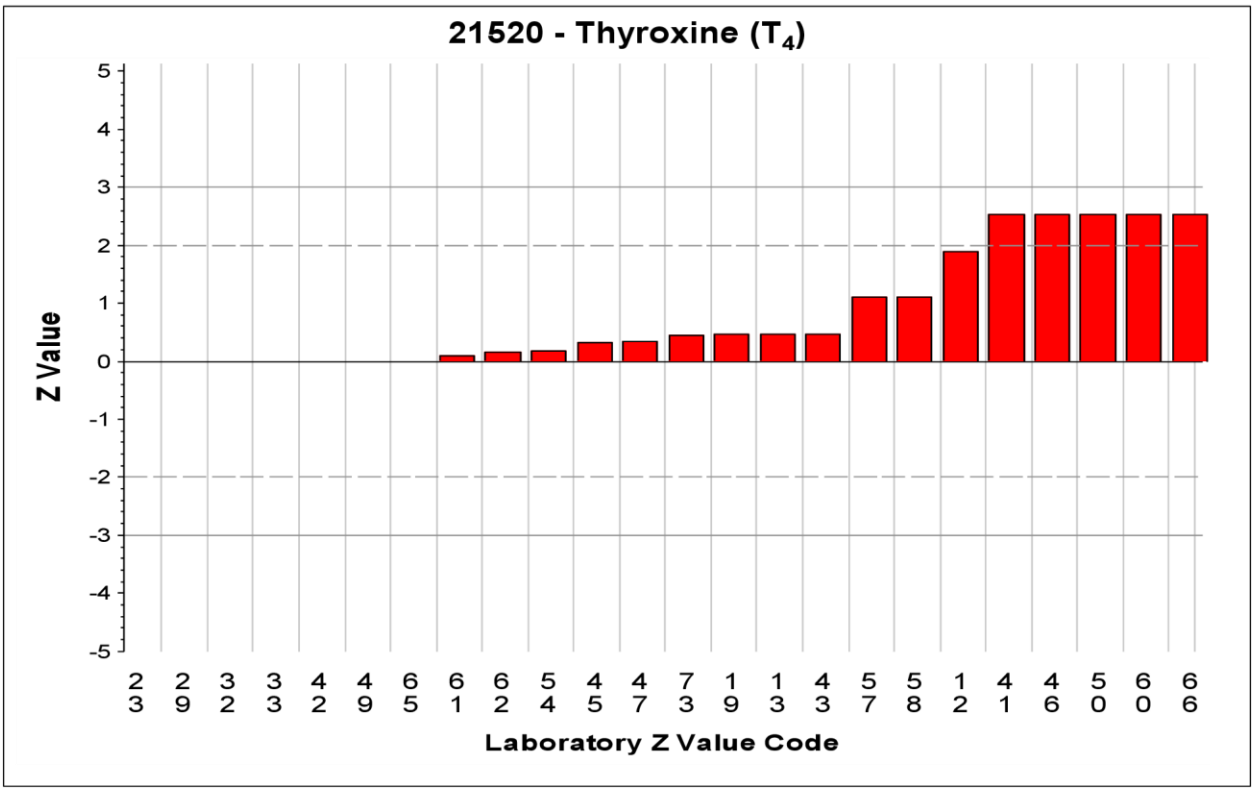

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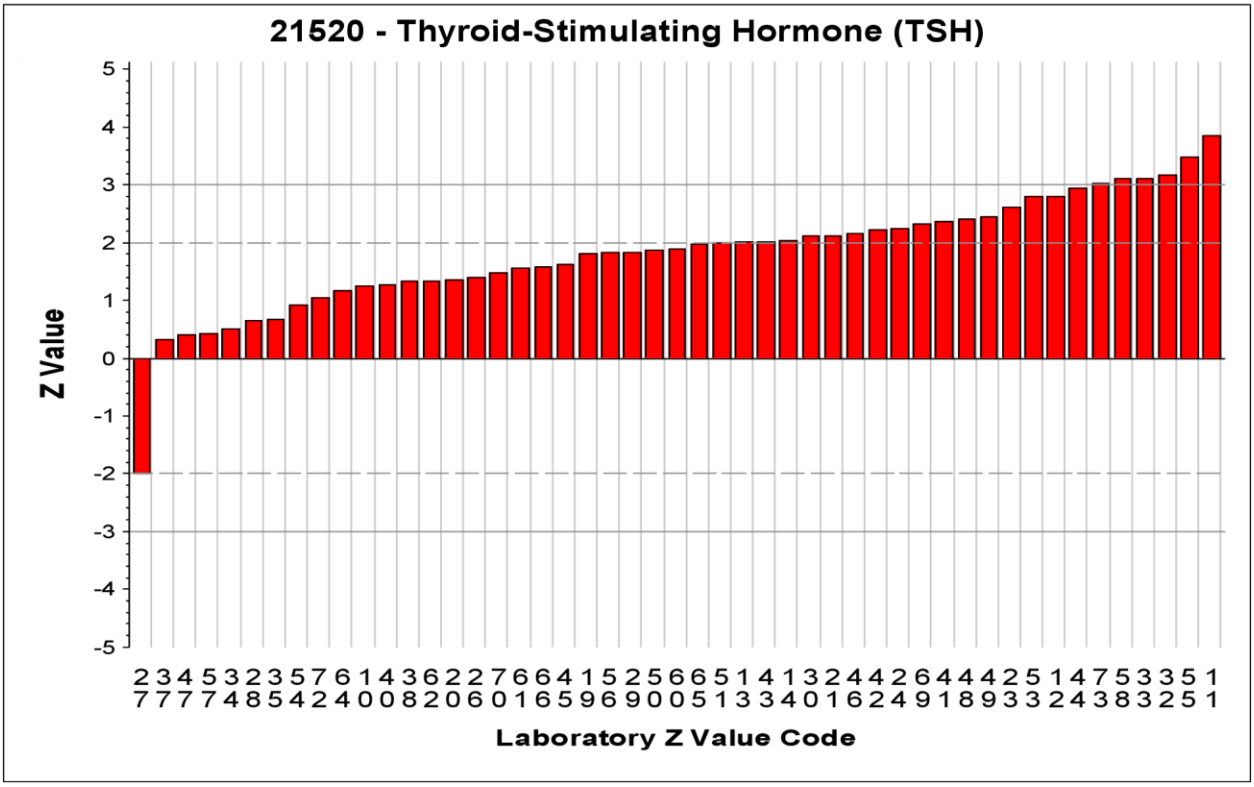

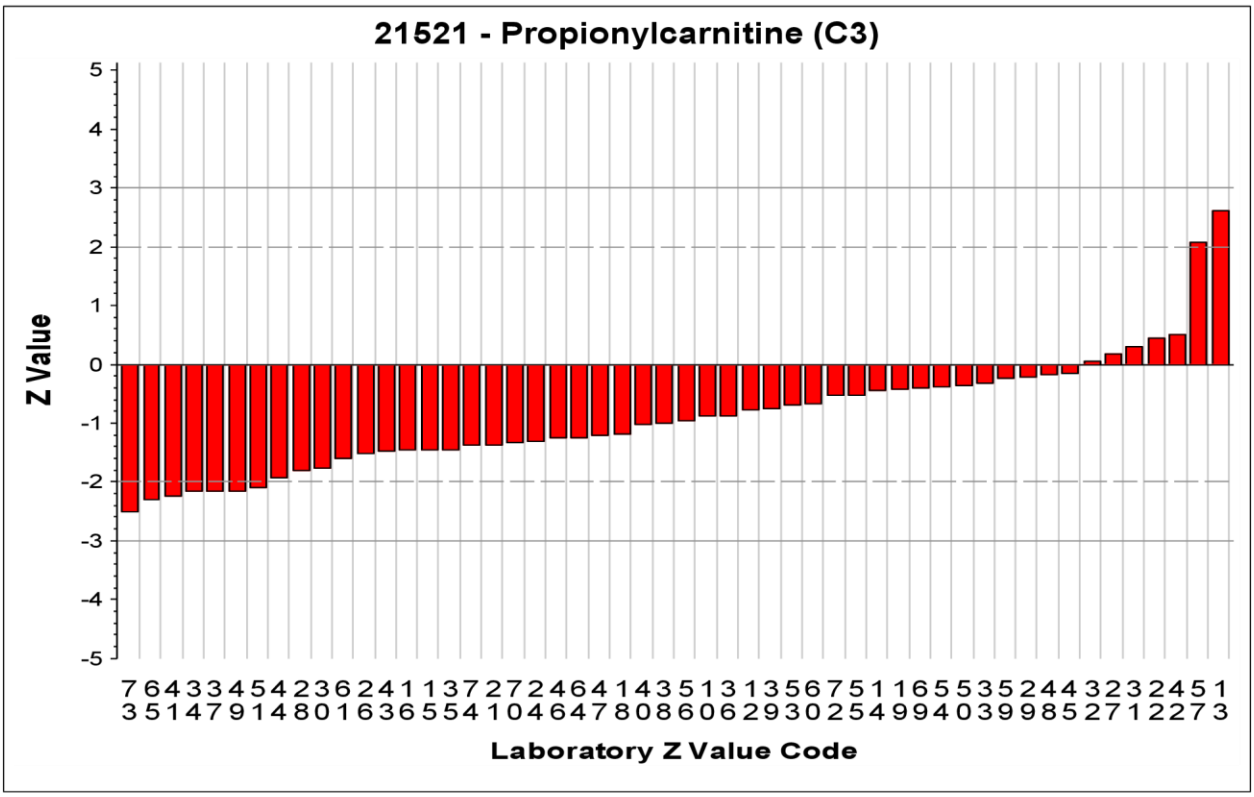

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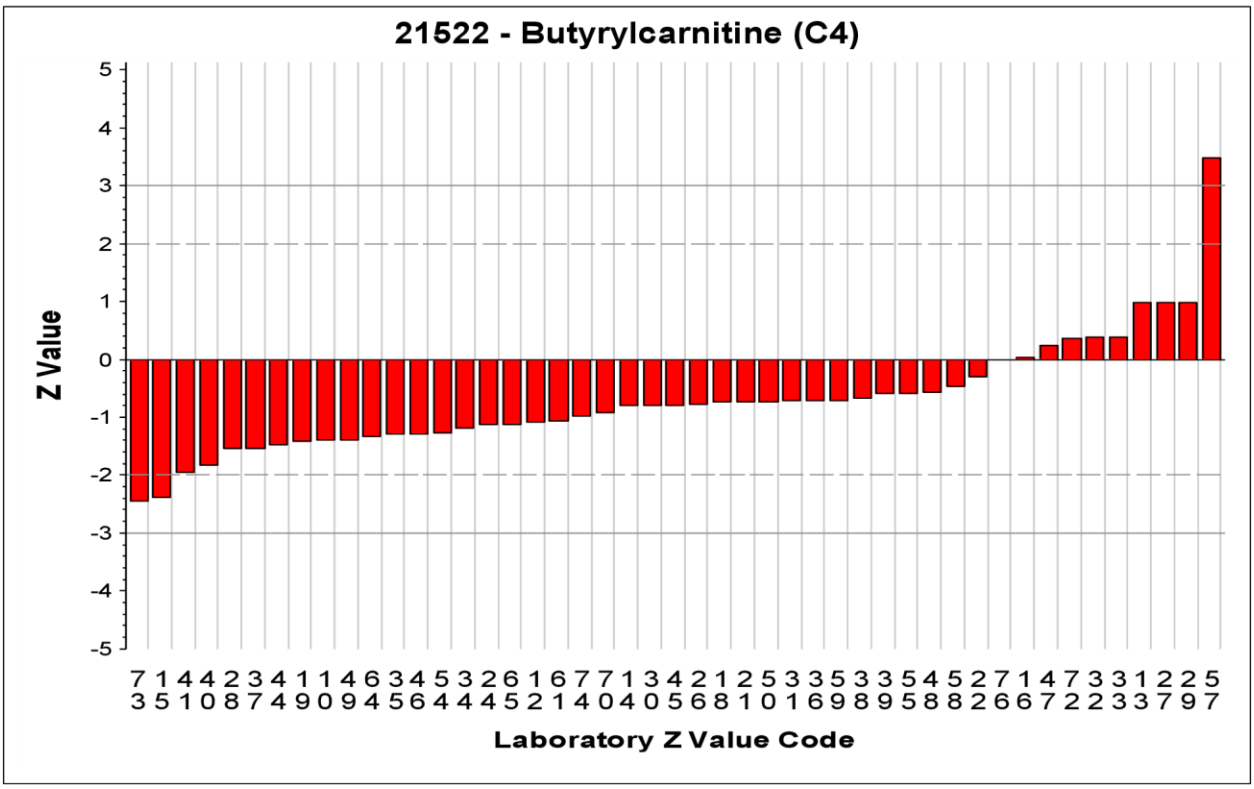

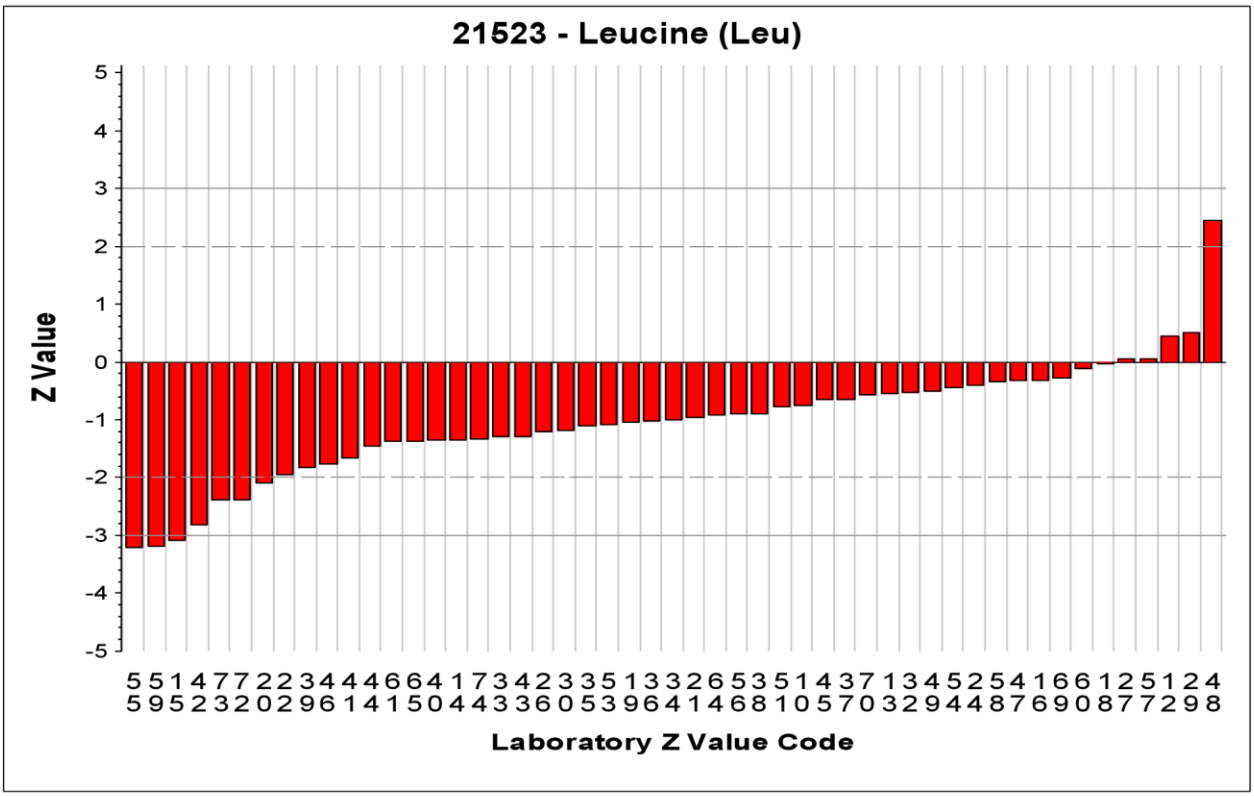

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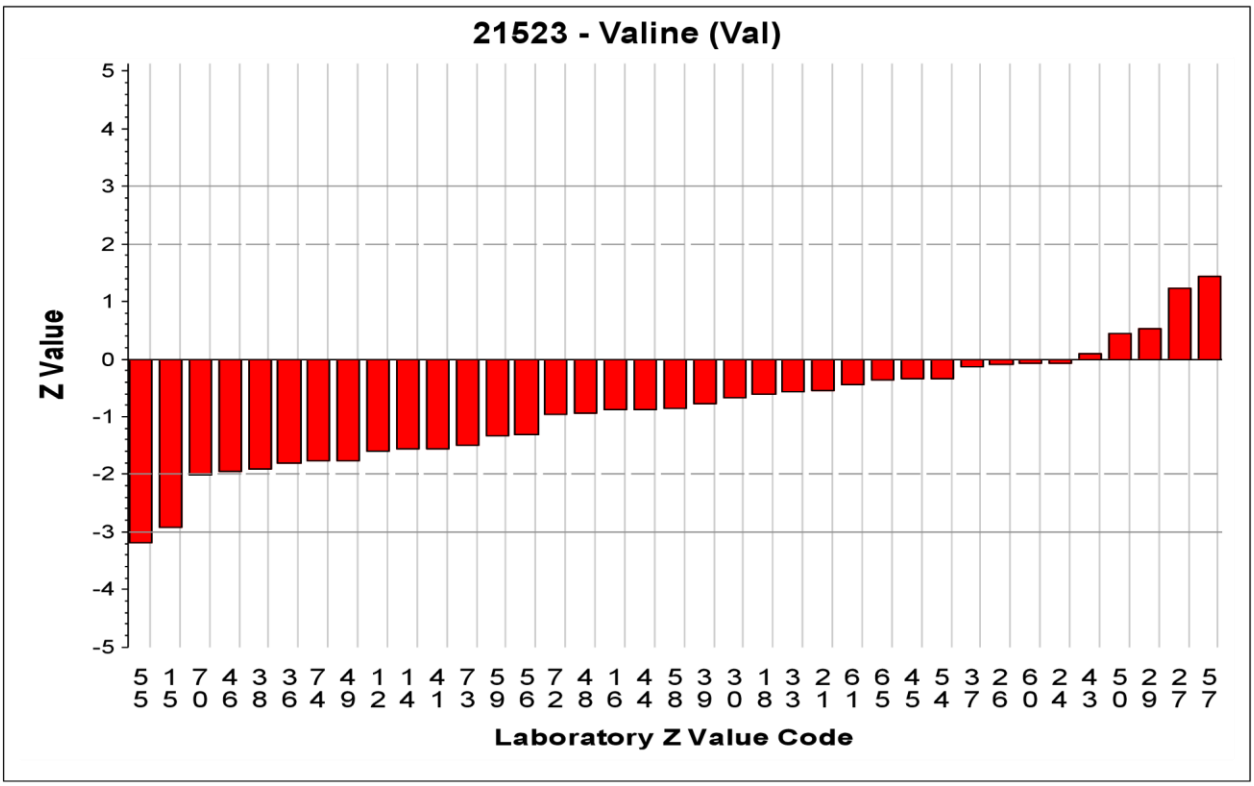

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CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)
ATLANTA, GA 30341

Director
Thomas R. Frieden, M.D., M.P.H.
Director
National Center for Environmental Health
Patrick Breysse, Ph.D.
Director
Division of Laboratory Sciences
James L. Pirkle, M.D., Ph.D.
Chief
Newborn Screening and Molecular Biology Branch
Carla Cuthbert, Ph.D.

Contributors:
Paul Dantonio
Victor R. De Jesus, Ph.D.
Marie C. Earley, Ph.D.
Sharon Flores
David Foreman
Stephanie Foster
Elizabeth M. Hall
Christopher Haynes, Ph.D.
Sarah Klass
Francis Lee, Ph.D.
Lixia Li, Ph.D.
Timothy Lim, Ph.D.
Daniel Mandel, Ph.D.
Joanne Mei, Ph.D.
Patrick Pickens
Kelsey Sheard
Jennifer Taylor, Ph.D.
Robert Vogt, Ph.D.
Irene Williams
Golriz Yazdanpanah
Hui Zhou, Ph.D.
Sherri Zobel

Production:
Sarah Brown
Felicia Manning
LoNeka Shockley

ASSOCIATION OF PUBLIC HEALTH LABORATORIES
SILVER SPRING, MD 20910

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INQUIRIES TO:

Sherri Zobel, Editor • Centers for Disease Control and Prevention (CDC)
Newborn Screening Quality Assurance Program • Mailstop F-43
4770 Buford Highway, N.E. • Atlanta, GA 30341-3724
Phone (770) 488-4582 • FAX (770) 488-4255 • E-mail: SZobel@cdc.gov