Newborn Screening Quality Assurance Program

2013 UDOT Proficiency Testing Panel

Data Evaluation

Lab XXX

- For a copy of your reported data, print your Excel worksheet.
- For summarized analytical information about the fifth UDOT PT event, go to ***http://www.cdc.gov/labstandards/nsqap_reports.html***
- Under "Quarterly Proficiency Testing Reports," click UDOT. Pages of the 2013 report include:

Pages

UDOT Commentary
Specimen Certification & Frequency of Outside-Normal-Limits Reports
Overall Statistics
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Z scores

NSQAP determines the "Estimate of Laboratory Bias" (ref. ISO 5724-4) where the quantity (**x - X**) is used to establish the **Z score** as a measurement of analytical performance quality:

x = lab value **X** = group mean **SD** = standard deviation

$$\textbf{Z score} = \frac{\text{lab value - group mean}}{\text{group SD}}$$

*Interpretation of **Z Score**:*

$|z| \leq 2$ = satisfactory **$2 < |z| < 3$ = questionable** **$|z| \geq 3$ = unsatisfactory**

Z scores are coded for each lab. Find your **Z score** code in the Reviewer's Comments box.

Reviewer's Comments

Your Z score code is N and can be found as a vertical number on the x-axis for each analyte chart.

Your evaluation is based only on the analytes you selected on your check-list, and on whether or not you were able to identify the certified/enriched analytes in the panel of specimens.

Three analytes, C10:2 (specimen 21303), C3DC+C4OH (specimen 21311) and C18OH (specimen 21321) were not evaluated. Laboratory consensus of 80% was not achieved for these analytes; therefore, they were declared to be educational challenges.

Each participant received a lab-specific evaluation.

Newborn Screening Quality Assurance Program
2013 UDOT Proficiency Testing Panel
Commentary

The UDOT proficiency testing (PT) challenge is a unique component of the Newborn Screening Quality Assurance Program (NSQAP) utilizing a panel of dried blood spot specimens that enter the testing scheme in a manner similar to actual newborn specimens; therefore, all analytes on a laboratory's test menu must be considered as a possibility. Results from the 2013 UDOT PT event highlighted some practices that need discussion for the benefit of all participants.

- Analytes that do not achieve the required 80% consensus for evaluation are classified as not evaluated. Three analytes, C10:2 (specimen 21303), C3DC+C4OH (specimen 21311) and C18OH (specimen 21321) did not meet this 80% consensus requirement.

- Harmonization of domestic cutoffs continues to be an elusive goal that may affect achieving evaluation consensus for various analytes. Table 1 illustrates the participant cutoff ranges for all analytes.

- The introduction of the reporting category C3DC+C4OH resulted in most laboratories achieving the correct assessment for both non-derivatized methods (C3DC+C4OH) and derivatized methods (C4OH) for Specimen 21319. However, the majority of non-derivatized assay users did not report C3DC + C4OH results for Specimen 21311, enriched only with C3DC. This is further evidence of the decreased assay sensitivity for C3DC using non-derivatized methods. As a reminder, C3DC and C4OH cannot be resolved using non-derivatized MS/MS assays.

- Laboratories reported three different units for Biotinidase and for GALT. NSQAP will continue to work to ensure that quantitative data is properly captured for these analytes.

- In order to provide a better comparison of performance by method, three Z-score charts were created for Biotinidase and GALT to cover the various units reported. The units used for biotinidase (nmol/min/dL, MRU, and ERU) are not interchangeable. Additionally, the units used for GALT (U/g Hb, µmol/L blood, and U/dL) are not interchangeable. Some laboratories reported only a qualitative Biotinidase assessment.

NSQAP strives to continuously enhance the scope of its services and to provide immediate consultation and technical assistance that support the newborn screening public health laboratory community. Please contact Sherri Zobel (szobel@cdc.gov) for questions regarding these observations.

Newborn Screening Quality Assurance Program
2013 UDOT Proficiency Testing Panel
Specimen Certification Frequency of Outside-Normal-Limits Report

Specimen Certification				Labs Reporting ONL *	
Specimen	Analyte	Expected Value	Units		Percent (%)**
21301	Citrulline (Cit)	165.16	µmol/L blood	54 of 55	98.2
21302	Arginine (Arg)	358.73	µmol/L blood	36 of 41	87.8
21303	Decadienoylcarnitine (C10:2)	1.02	µmol/L blood	22 of 29	75.9
21304	Methionine (Met)	190.91	µmol/L blood	55 of 55	100.0
21305	Hydroxypalmitoylcarnitine (C16OH)	0.8	µmol/L blood	53 of 57	93.0
21306	Isovalerylcarnitine (C5)	1.35	µmol/L blood	57 of 57	100.0
21307	Free Carnitine (C0 Low)	5.63	µmol/L blood	55 of 55	100.0
21308	Immunoreactive Trypsinogen (IRT)	178.2	ng/mL blood	50 of 51	98.0
21309	Butyrylcarnitine (C4)	2.64	µmol/L blood	47 of 49	95.9
21310	Biotinidase (Bio)			48 of 49	98.0
21311	Malonylcarnitine (C3DC)	1.55	µmol/L blood	26 of 31	83.9
21311	C3DC + C4OH	1.72	***Õmol/L blood	1 of 20	5.0
21312	*normal*				
21313	17 α-Hydroxyprogesterone (17-OHP)	125.9	ng/mL serum	49 of 50	98.0
21314	Tyrosine (Tyr)	741.69	µmol/L blood	49 of 56	87.5
21314	Succinylacetone (SUAC)	15.42	µmol/L blood	25 of 30	83.3
21315	Myristoylcarnitine (C14)	1.66	Õmol/L blood	49 of 50	98.0
21315	Tetradecenoylcarnitine (C14:1)	1.67	µmol/L blood	56 of 58	96.6
21316	Galactose-1-Phosphate Uridyltransferase (GALT)	1.6	U/g Hb	45 of 48	93.8
21317	Thyroid-Stimulating Hormone (TSH)	75.0	µIU/mL serum	52 of 54	96.3
21317	Thyroxine (T_4)	0.2	µg/dL serum	24 of 28	85.7
21318	Glutarylcarnitine (C5DC)	1.05	µmol/L blood	55 of 55	100.0
21319	Hydroxybutyrylcarnitine (C4OH)	1.62	µmol/L blood	23 of 25	92.0
21319	C3DC + C4OH	1.62	***Õmol/L blood	16 of 20	80.0
21320	Leucine (Leu)	891.26	µmol/L blood	55 of 56	98.2
21320	Valine (Val)	592.20	µmol/L blood	40 of 41	97.6
21321	Hydroxystearoylcarnitine (C18OH)	1.02	Õmol/L blood	30 of 40	75.0
21322	Palmitoylcarnitine (C16)	15.31	µmol/L blood	53 of 54	98.1
21322	Stearoylcarnitine (C18)	5.79	µmol/L blood	43 of 45	95.6
21322	Oleoylcarnitine (C18:1)	6.82	µmol/L blood	46 of 50	92.0
21323	Phenylalanine (Phe)	268.41	µmol/L blood	62 of 63	98.4
21324	Tiglylcarnitine (C5:1)	1.03	µmol/L blood	54 of 55	98.2
21324	Hydroxyisovalerylcarnitine (C5OH)	2.95	µmol/L blood	52 of 54	96.3
21325	Propionylcarnitine (C3)	11.32	µmol/L blood	52 of 55	94.5

*Total number of laboratories reporting data per analyte varies.
**A gradable specimen must have 80% or more agreement among laboratories.
***All certified MS/MS expected values are derivatized except C3DC+C4OH

Newborn Screening Quality Assurance Program
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Table 1. Summary of Reported Cutoff Values

Analyte	N	Min/Max	Mean	Median	Units
T4	23	4 - 9.3	6.1	6.0	µg/dL serum
TSH	52	3 - 60	31.6	27.6	µIU/mL serum
17-OHP	48	7 - 65	33.7	33.0	ng/ml serum
GALT (U/g Hb)	16	2 - 5	3.1	3.0	U/g Hb
GALT (µmol/L blood)	14	30-60	48.6	50.0	µmol/L blood
GALT (U/dL)	7	0.4 - 4.4	3.5	3.5	U/dL
IRT	50	34 - 122	67.3	63.5	ng/mL blood
Biotinidase (nmol/min/dL)	8	25 - 60	50.9	52.5	nmol/min/dL
Biotinidase (ERU)	11	8 - 16	10.4	10.0	ERU*
Biotinidase (MRU)	5	10 - 36	22.0	15.0	MRU**
Arg	36	20 - 120	64.49	50	µmol/L blood
Cit	54	18 - 100	54.76	58	µmol/L blood
Leu	55	200 - 450	288.33	272	µmol/L blood
Met	55	34 - 106	75.17	72	µmol/L blood
Phe	62	2.5 - 190	141.10	140	µmol/L blood
Tyr	49	88 - 600	338.68	330	µmol/L blood
Val	40	190 - 420	282.75	272	µmol/L blood
SUAC	25	0.5 - 7.0	2.73	2.00	µmol/L blood
C0(low)	55	3.80 - 27.00	9.01	8.00	µmol/L blood
C3	53	1.10 - 9.00	5.96	6.10	µmol/L blood
C3DC	26	0.14 - 0.45	0.26	0.23	µmol/L blood
C4	47	0.55 - 2.15	1.28	1.30	µmol/L blood
C4OH	24	0.27 - 1.00	0.66	0.70	µmol/L blood
C3DC+C4OH	16	0.30 - 3.03	0.59	0.40	µmol/L blood
C5	58	0.30 - 1.20	0.68	0.67	µmol/L blood
C5:1	54	0.07 - 0.60	0.25	0.19	µmol/L blood
C5DC	55	0.12 - 0.80	0.36	0.32	µmol/L blood
C5OH	52	0.19 - 1.36	0.78	0.80	µmol/L blood
C10:2	22	0.04 - 0.46	0.15	0.12	µmol/L blood
C14	49	0.17 - 1.20	0.78	0.72	µmol/L blood
C14:1	56	0.20 - 0.80	0.63	0.65	µmol/L blood
C16	53	0.41 - 10.00	7.83	7.79	µmol/L blood
C16OH	53	0.08 - 0.25	0.13	0.12	µmol/L blood
C18	42	0.22 - 0.40	2.48	2.26	µmol/L blood
C18:1	46	0.36 - 7.00	3.24	3.00	µmol/L blood
C18OH	30	0.03 - 0.20	0.10	0.10	µmol/L blood

*ERU - Enzyme Response Units
*MRU - Microplate Response Units

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Table 2. Number of Laboratories Reporting Non-Certified Analytes

Specimen	Certified Analyte	Non-Certified Not Expected Analyte(s) (false-positive reports)
21301	Cit	Arg (1), C5OH (1)
21302	Arg	C5OH (5)
21303	C10:2	C5OH (2)
21304	Met	C5:1 (1), C10:1 (1)
21305	C16OH	Bio (1), C5:1 (1), C5OH (1)
21306	C5	C16OH (1)
21307	C0(L)	Bio (13), C16 (1)
21308	IRT	Bio (1), Val (1), C5OH (1),
21309	C4	C5OH (7)
21310	Biotinidase	T_4 (1), C16 (2)
21311	C3DC, C3DC + C4OH	17OHP (1), C5OH (5)
21312	*Normal*	C5OH (1)
21313	17OHP	IRT (1), GALT (1), Tgal (2), Val (1), C5OH (2)
21314	Tyr, SUAC	GALT (1), C5OH (1)
21315	C14, C14:1	T_4 (1), TSH (1), Bio (1)
21316	GALT	T4 (5), Bio (1), C5:1 (1), C10:1 (1)
21317	TSH, T_4	Bio (46), C14:1 (1), C16 (1)
21318	C5DC	C5OH (5), C18:1 (3)
21319	C4OH, C3DC + C4OH	C5OH (1)
21320	Leu, Val	C5DC (1), C5OH (2)
21321	C18OH	
21322	C16, C18, C18:1	C5OH (6), C14 (1), C14:1 (1), C16OH (1)
21323	Phe	C5OH (5)
21324	C5:1, C5OH	C5 (1)
21325	C3	Bio (1)

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

Biotinidase was anticipated in specimen 21307 and 21317.

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM

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Overall Statistics

Specimen	21301	21302	21303	21304	21305	21306	21307
Analyte	Cit	Arg	C10:2	Met	C16OH	C5	C0(low)
N****	54	36	21	55	53	55	54
Outliers	0	0	1	0	0	2	1
Mean	130.78	131.88	0.72	152.38	0.64	1.26	5.10
SD	27.12	52.16	0.12	19.06	0.14	0.14	1.34
UL (95%)	183.96	234.10	0.96	189.74	0.92	1.54	7.72
LL (95%)	77.62	29.66	0.50	115.04	0.36	1.00	2.48

Specimen	21308	21309	21310	21310	21310	21311	21313
Analyte	IRT	C4	Bio ^	Bio ^ ^	Bio ^ ^ ^	C3DC	17 – OHP
N****	49	46	8	11	5	26	46
Outliers	1	1	0	0	0	0	2
Mean	179.1	2.06	14.6	2.2	3.0	1.14	99.5
SD	26.0	0.22	3.1	1.9	1.1	0.60	13.6
UL (95%)	230.1	2.48	20.7	5.9	5.2	2.32	126.3
LL (95%)	128.1	1.64	8.6	0.0	0.8	0.00	72.8

Specimen	21314	21314	21315	21315	21316	21316	21316
Analyte	Tyr	SUAC	C14	C14:1	GALT*	GALT**	GALT***
N****	49	25	47	55	16	14	7
Outliers	0	0	2	1	0	0	0
Mean	643.04	8.40	1.48	1.16	1.6	14.7	1.8
SD	99.22	5.42	0.16	0.22	0.4	5.6	1.3
UL (95%)	837.50	19.02	1.80	1.58	2.4	25.8	4.3
LL (95%)	448.58	0.00	1.18	0.74	0.8	3.7	0.0

^ Biotinidase measured in nmol/min/dL.

^ ^ Biotinidase measured in ERU.

^ ^ ^ Biotinidase measured in MRU.

**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. UL = upper limit LL = lower limit*

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Overall Statistics

Specimen	21317	21317	21318	21319	21319	21320	21320
Analyte	TSH	T4	C5DC	C4OH	C3DC+C4OH	Leu	Val
N****	52	23	55	24	15	52	40
Outliers	0	0	0	0	1	3	0
Mean	69.5	0.6	1.06	2.08	1.42	770.02	518.36
SD	8.1	0.6	0.40	0.40	0.20	64.70	92.98
UL (95%)	85.3	1.9	1.86	2.88	1.82	896.84	700.62
LL (95%)	53.7	0.0	0.28	1.26	1.02	643.18	336.10

Specimen	21321	21322	21322	21322	21323	21324	21324
Analyte	C18OH	C16	C18	C18:1	Phe	C5:1	C5OH
N****	29	51	40	45	61	52	49
Outliers	1	2	3	1	1	2	3
Mean	0.72	13.48	5.22	6.74	236.40	0.94	2.18
SD	0.18	1.12	0.68	0.90	26.54	0.14	0.42
UL (95%)	1.06	15.68	6.54	8.52	288.40	1.22	3.00
LL (95%)	0.38	11.28	3.88	4.96	184.38	0.64	1.34

Specimen	21325
Analyte	C3
N****	52
Outliers	0
Mean	9.72
SD	0.98
UL (95%)	11.64
LL (95%)	7.82

^ *Biotinidase measured in nmol/min/dL.*

^^ *Biotinidase measured in ERU.*

^^^ *Biotinidase measured in MRU.*

**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.* *UL = upper limit* *LL = lower limit*

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Mean Concentration by Method

Specimen No. 21301		Cit		
		Expected Value 165.16 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	107.66	26.10
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	145.10	9.20
38	Non-deriv MS/MS non-kit	2	102.50	---*
60	Non-deriv MS/MS PE NeoBase Kit	19	148.30	14.10

Specimen No. 21302		Arg		
		Expected Value 358.73 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	12	77.94	51.82
35	Deriv-MS/MS PE NeoGram MS2 Kit	9	153.18	17.58
60	Non-deriv MS/MS PE NeoBase Kit	15	162.26	27.16

Specimen No. 21303		C10:2		
		Expected Value 1.02 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	11	0.82	0.08
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	0.68	0.08
60	Non-deriv MS/MS PE NeoBase Kit	3	0.58	---*

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21304		Met		
		Expected Value 190.91 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	150.46	22.12
35	Deriv-MS/MS PE NeoGram MS2 Kit	12	166.88	16.68
38	Non-deriv MS/MS non-kit	2	121.00	---*
60	Non-deriv MS/MS PE NeoBase Kit	20	148.86	10.12

Specimen No. 21305		C16OH		
		Expected Value 0.78 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	0.66	0.16
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	0.74	0.12
60	Non-deriv MS/MS PE NeoBase Kit	19	0.54	0.06

Specimen No. 21306		C5		
		Expected Value 1.35 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	1.28	0.16
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	1.26	0.18
38	Non-deriv MS/MS non-kit	2	1.04	---*
60	Non-deriv MS/MS PE NeoBase Kit	19	1.26	0.08

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21307		C0(low)		
		Expected Value 5.63 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	4.82	0.76
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	6.92	0.90
38	Non-deriv MS/MS non-kit	2	4.92	---*
60	Non-deriv MS/MS PE NeoBase Kit	18	4.04	0.52

Specimen No. 21308		IRT		
		Expected Value 178.2 ng/mL blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	3	177.9	---*
21	AutoDelfia	33	170.3	22.4
62	PerkinElmer GSP Neonatal	11	203.6	12.3

Specimen No. 21309		C4		
		Expected Value 2.64 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	18	2.14	0.28
35	Deriv-MS/MS PE NeoGram MS2 Kit	10	2.10	0.28
38	Non-deriv MS/MS non-kit	2	1.92	---*
60	Non-deriv MS/MS PE NeoBase Kit	17	2.02	0.14

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21310		Bio		
		Expected Value N/A nmol/min/dL		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	8	14.6	3.1

Specimen No. 21310		Bio		
		Expected Value N/A ERU		
		N	Mean	SD
Method Code	Method Name			
34	Astoria-Pacific 50 Hour Reagent Kit	11	2.2	1.9

Specimen No. 21310		Bio		
		Expected Value N/A MRU		
		N	Mean	SD
Method Code	Method Name			
64	Astoria-Pacific Neonatal Microplate Reagent Kit	5	3.0	1.1

Specimen No. 21311		C3DC		
		Expected Value 1.55 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	15	0.72	0.18
35	Deriv-MS/MS PE NeoGram MS2 Kit	10	1.84	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. 21313		17-OHP		
		Expected Value 125.9 ng/mL serum		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	2	117.9	---*
21	AutoDelfia	10	100.0	16.5
58	AutoDelfia Neonatal 17-OHP (B024)	23	98.7	14.6
62	PerkinElmer GSP Neonatal	11	99.8	9.8

Specimen No. 21314		Tyr		
		Expected Value 741.69 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	22	618.44	115.76
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	637.42	74.06
38	Non-deriv MS/MS non-kit	2	548.50	---*
60	Non-deriv MS/MS PE NeoBase Kit	12	709.98	59.56

Specimen No. 21314		SUAC		
		Expected Value 15.42 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	12	11.48	6.46
60	Non-deriv MS/MS PE NeoBase Kit	12	5.22	0.74

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21315		C14		
		Expected Value 1.66 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	18	1.48	0.20
35	Deriv-MS/MS PE NeoGram MS2 Kit	11	1.48	0.18
38	Non-deriv MS/MS non-kit	2	1.40	---*
60	Non-deriv MS/MS PE NeoBase Kit	17	1.54	0.14

Specimen No. 21315		C14:1		
		Expected Value 1.67 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	1.14	0.20
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	1.38	0.20
38	Non-deriv MS/MS non-kit	2	1.20	---*
60	Non-deriv MS/MS PE NeoBase Kit	19	1.02	0.08

Specimen No. 21316		GALT		
		Expected Value 1.60 U/g Hb		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	13	1.7	0.3
64	Astoria-Pacific Neonatal Microplate Reagent Kit	3	1.1	---*

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21316		GALT		
		Expected Value N/A µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
34	Astoria-Pacific 50 Hour Reagent Kit	14	14.7	5.6

Specimen No. 21316		GALT		
		Expected Value N/A U/dL blood		
		N	Mean	SD
Method Code	Method Name			
62	PerkinElmer GSP Neonatal	7	1.8	1.3

Specimen No. 21317		TSH		
		Expected Value 75.0µIU/mL serum		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	3	76.7	---*
10	Delfia	2	63.6	---*
21	AutoDelfia	34	71.4	7.5
62	PerkinElmer GSP Neonatal	11	65.4	5.7

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM

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Mean Concentration by Method

Specimen No. 21317		T4		
		Expected Value 0.2 µg/dL serum		
		N	Mean	SD
Method Code	Method Name			
21	AutoDelfia	14	0.7	0.7
62	PerkinElmer GSP Neonatal	8	0.6	0.6

Specimen No. 21318		C5DC		
		Expected Value 1.05 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	22	0.64	0.18
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	1.30	0.10
38	Non-deriv MS/MS non-kit	2	0.94	---*
60	Non-deriv MS/MS PE NeoBase Kit	18	1.44	0.14

Specimen No. 21319		C4OH		
		Expected Value 1.62 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	17	1.96	0.42
35	Deriv-MS/MS PE NeoGram MS2 Kit	6	2.34	0.24

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21319		C3DC+C4OH		
		Expected Value 1.62 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
60	Non-deriv MS/MS PE NeoBase Kit	15	1.42	0.20

Specimen No. 21320		Leu		
		Expected Value 891.26 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	760.06	95.66
35	Deriv-MS/MS PE NeoGram MS2 Kit	12	791.32	26.74
38	Non-deriv MS/MS non-kit	2	649.50	---*
60	Non-deriv MS/MS PE NeoBase Kit	19	759.40	77.86

Specimen No. 21320		Val		
		Expected Value 592.20 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	16	491.84	72.36
35	Deriv-MS/MS PE NeoGram MS2 Kit	12	566.52	83.48
38	Non-deriv MS/MS non-kit	2	347.50	---*
60	Non-deriv MS/MS PE NeoBase Kit	10	537.12	93.64

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21321		C18OH		
		Expected Value 1.02 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	12	0.80	0.32
35	Deriv-MS/MS PE NeoGram MS2 Kit	8	0.88	0.10
60	Non-deriv MS/MS PE NeoBase Kit	10	0.60	0.08

Specimen No. 21322		C16		
		Expected Value 15.31 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	21	13.50	0.96
35	Deriv-MS/MS PE NeoGram MS2 Kit	11	13.86	0.96
38	Non-deriv MS/MS non-kit	2	11.04	---*
60	Non-deriv MS/MS PE NeoBase Kit	19	13.40	1.56

Specimen No. 21322		C18		
		Expected Value 5.79 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	14	4.74	1.10
35	Deriv-MS/MS PE NeoGram MS2 Kit	10	5.54	0.74
38	Non-deriv MS/MS non-kit	2	4.16	---*
60	Non-deriv MS/MS PE NeoBase Kit	17	5.10	0.58

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21322		C18:1		
		Expected Value 6.82 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	19	6.36	0.80
35	Deriv-MS/MS PE NeoGram MS2 Kit	11	7.08	0.92
60	Non-deriv MS/MS PE NeoBase Kit	15	7.00	0.90

Specimen No. 21323		Phe		
		Expected Value 268.41 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
09	PerkinElmer Neonatal Kit	2	214.98	---*
22	Deriv-MS/MS non-kit	23	236.86	31.82
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	246.26	20.18
38	Non-deriv MS/MS non-kit	2	242.50	---*
60	Non-deriv MS/MS PE NeoBase Kit	19	231.16	19.94

Specimen No. 21324		C5:1		
		Expected Value 1.03 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	20	1.02	0.18
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	0.94	0.12
38	Non-deriv MS/MS non-kit	2	0.84	---*
60	Non-deriv MS/MS PE NeoBase Kit	18	0.88	0.12

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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Mean Concentration by Method

Specimen No. 21324		C5OH		
		Expected Value 2.95 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	19	2.40	0.44
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	2.36	0.38
60	Non-deriv MS/MS PE NeoBase Kit	17	1.84	0.30

Specimen No. 21325		C3		
		Expected Value 11.32 µmol/L blood		
		N	Mean	SD
Method Code	Method Name			
22	Deriv-MS/MS non-kit	19	10.00	1.14
35	Deriv-MS/MS PE NeoGram MS2 Kit	13	9.48	0.76
38	Non-deriv MS/MS non-kit	2	8.50	---*
60	Non-deriv MS/MS PE NeoBase Kit	18	9.74	0.86

Methods with N = 1 are not identified.

* SD was not included for N ≤ 3.

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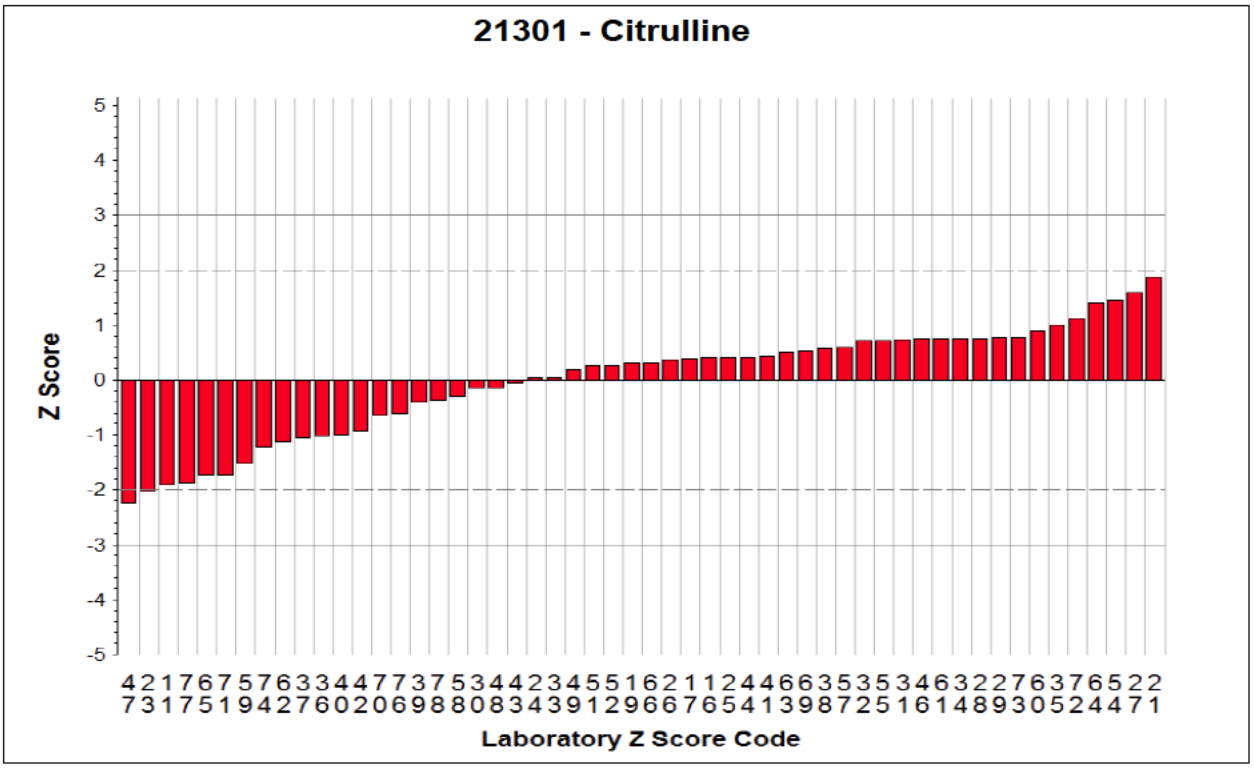

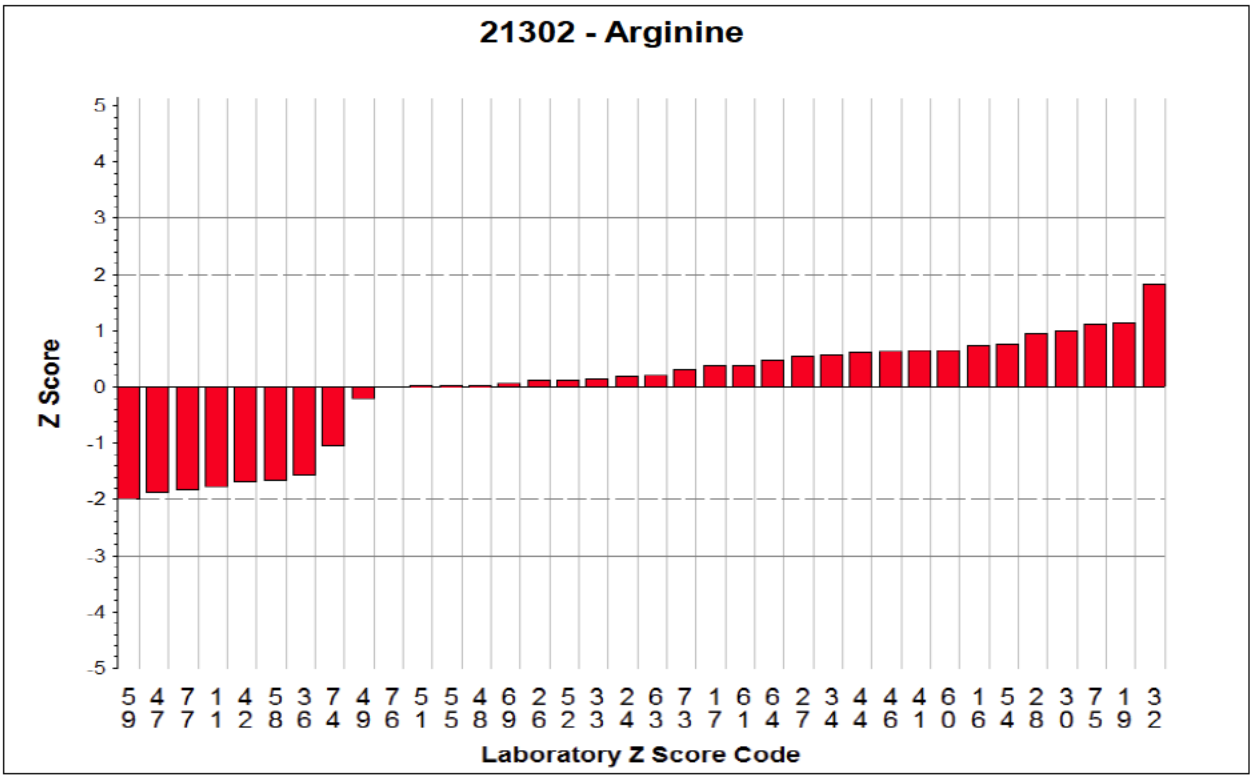

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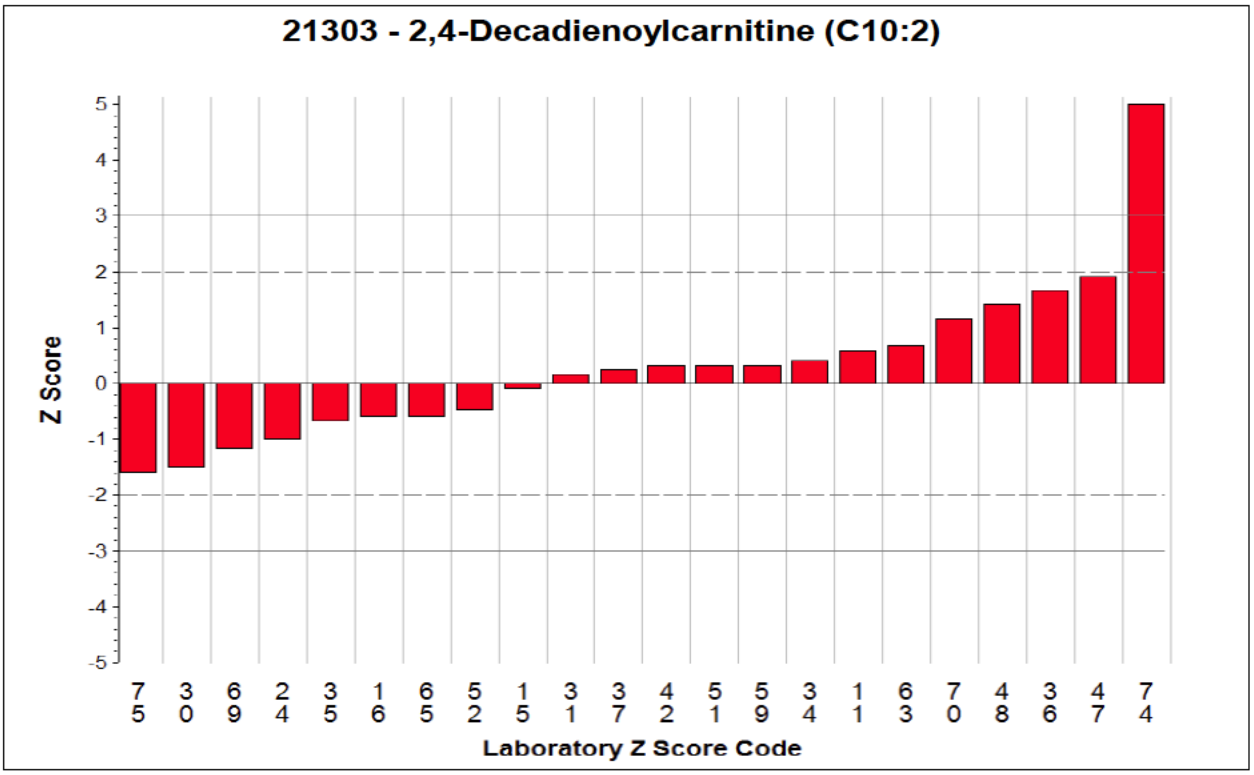

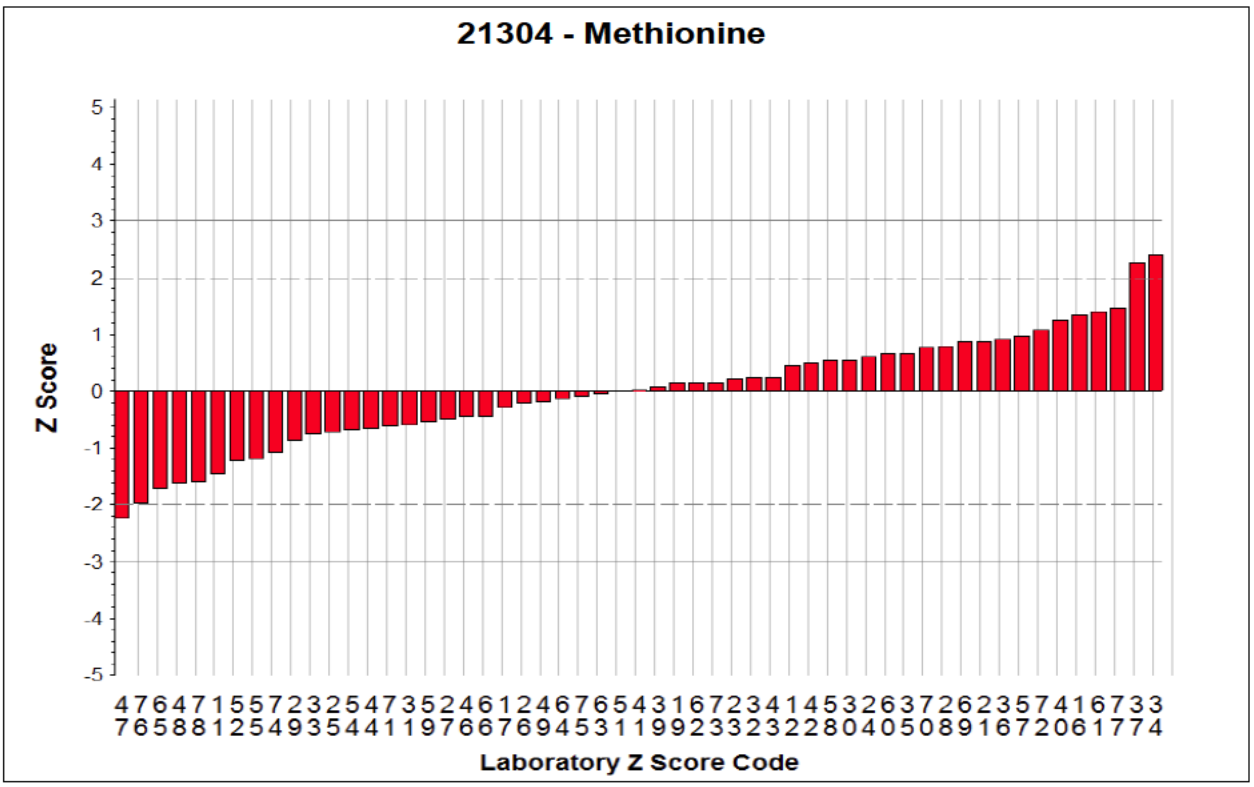

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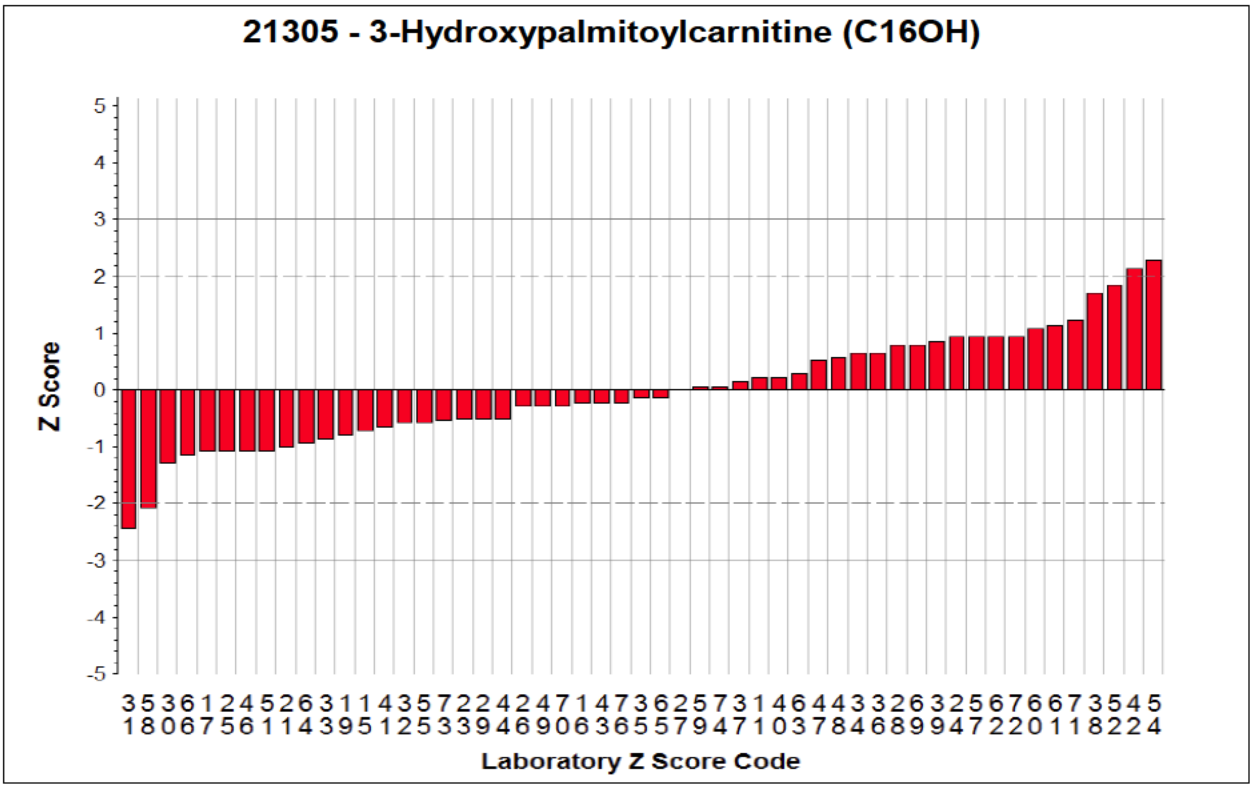

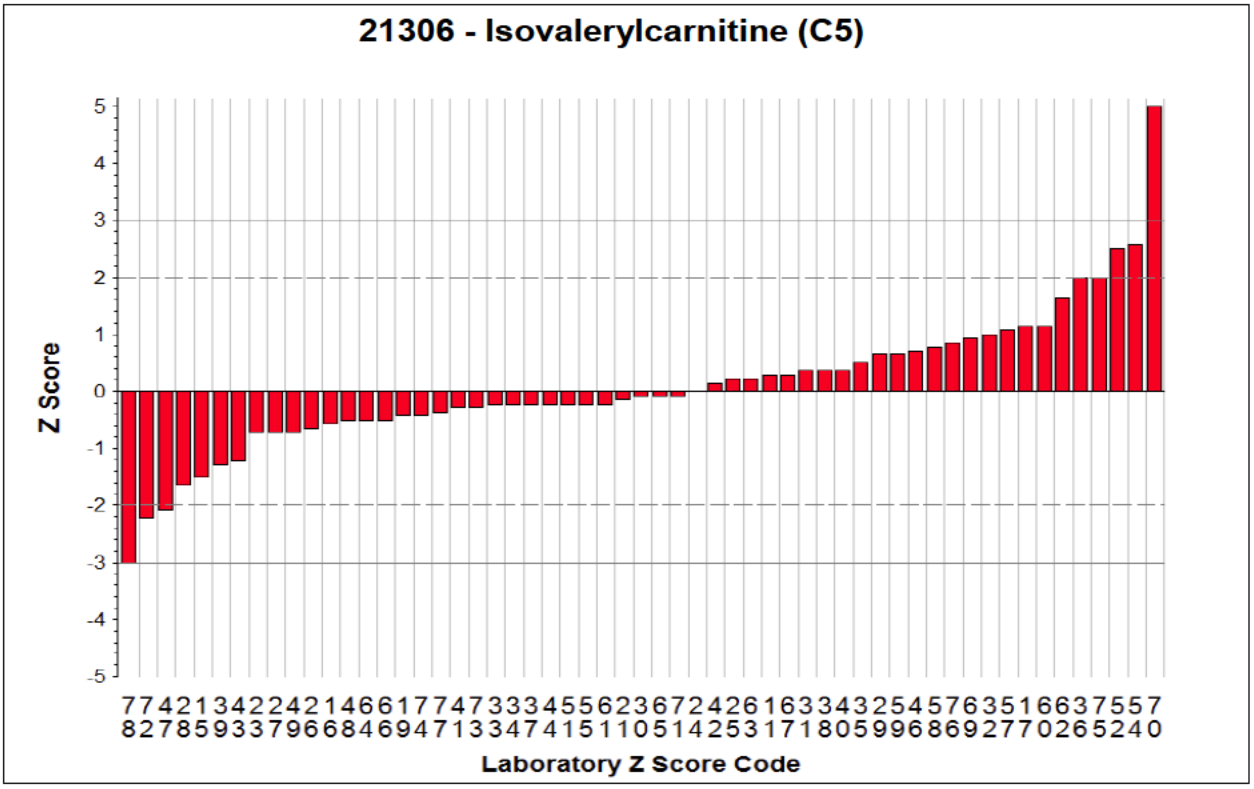

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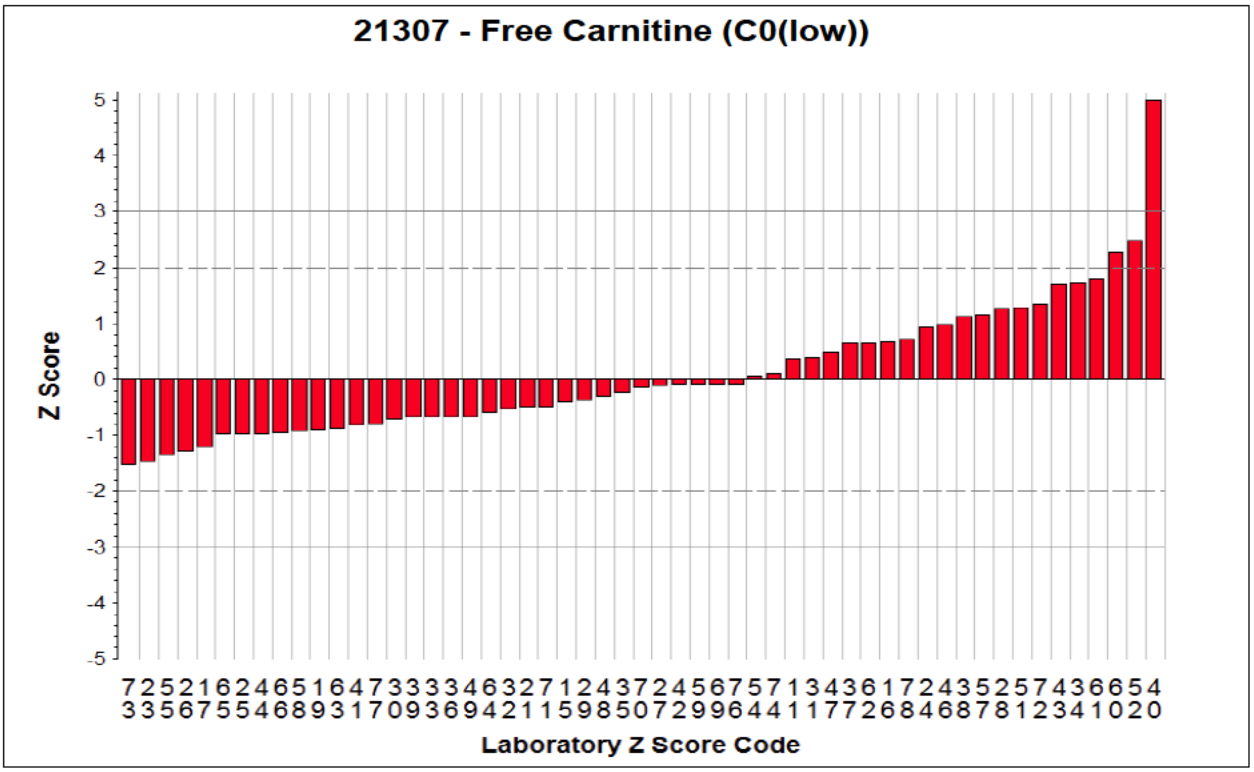

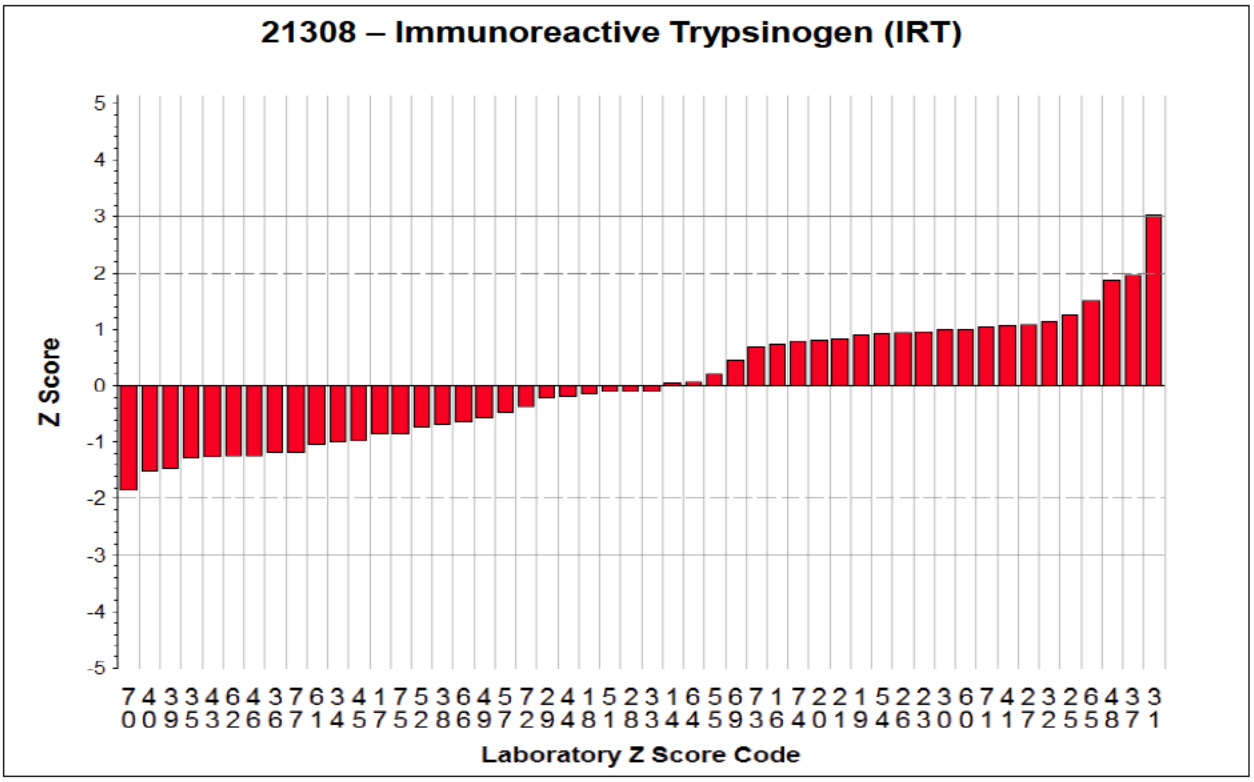

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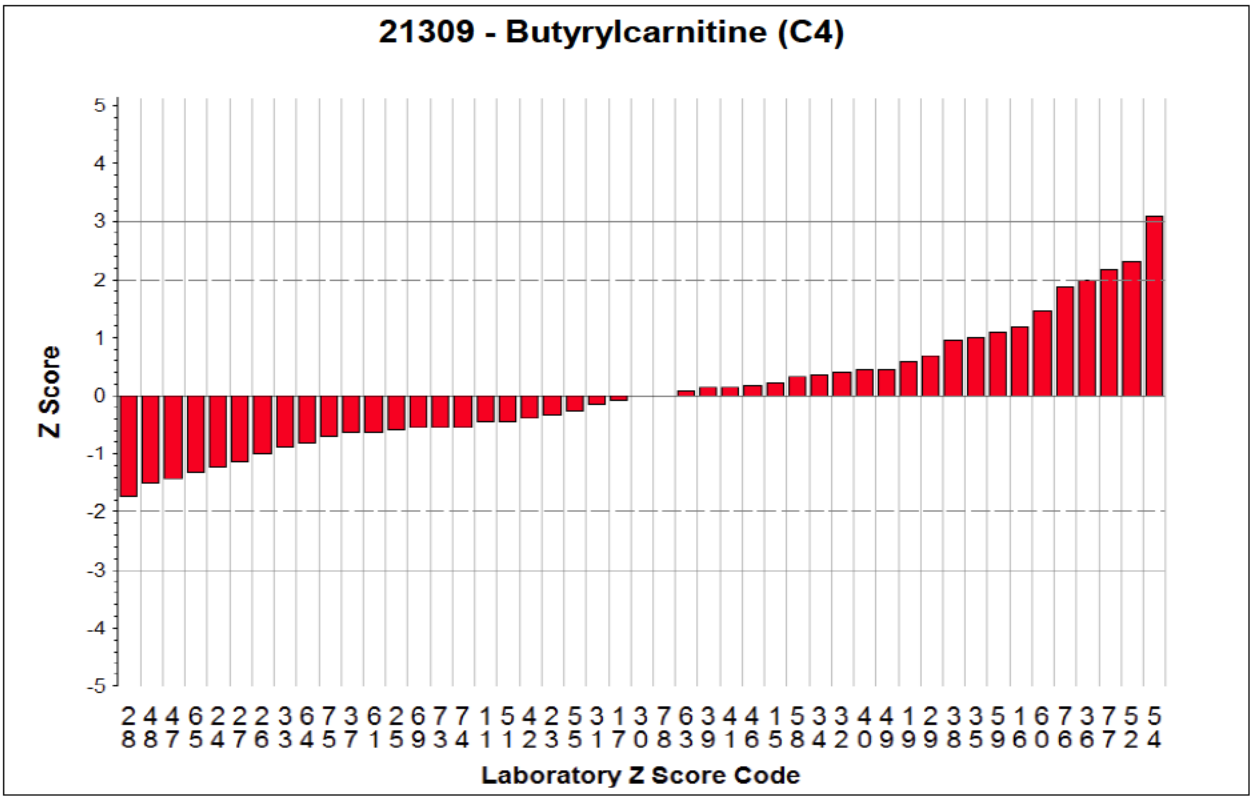

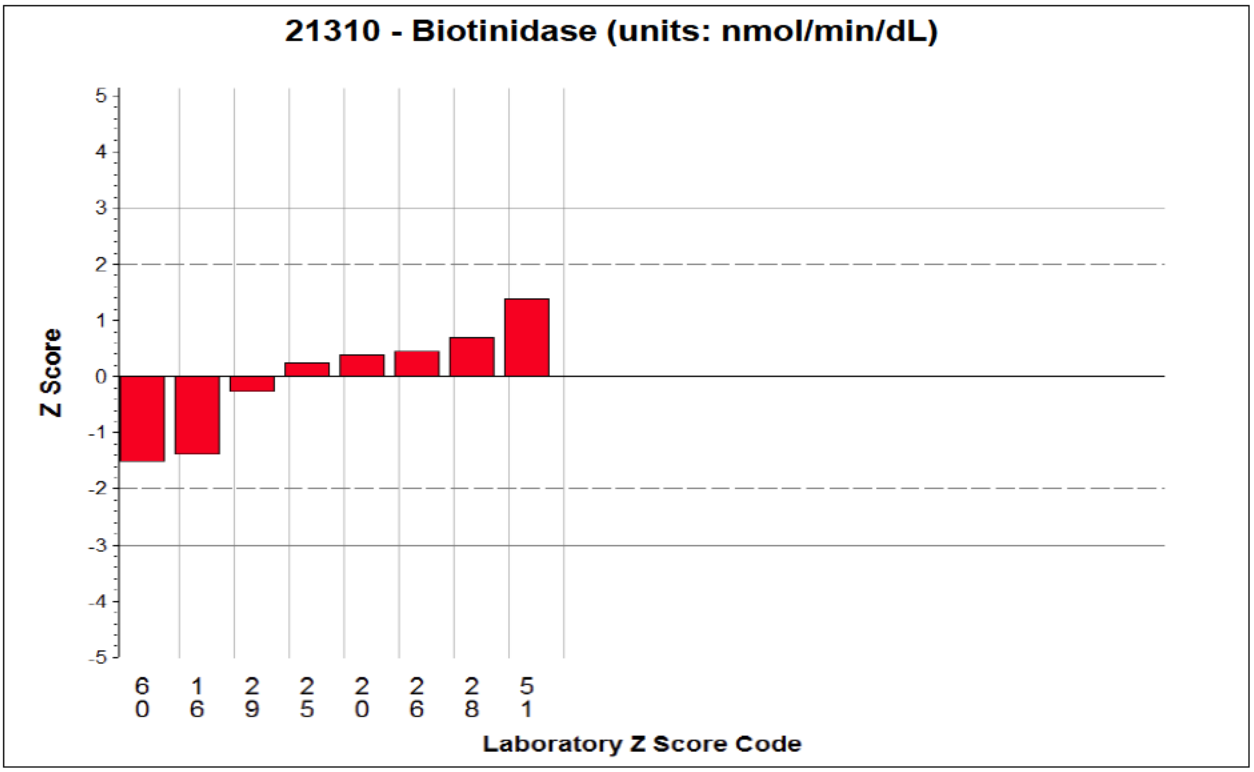

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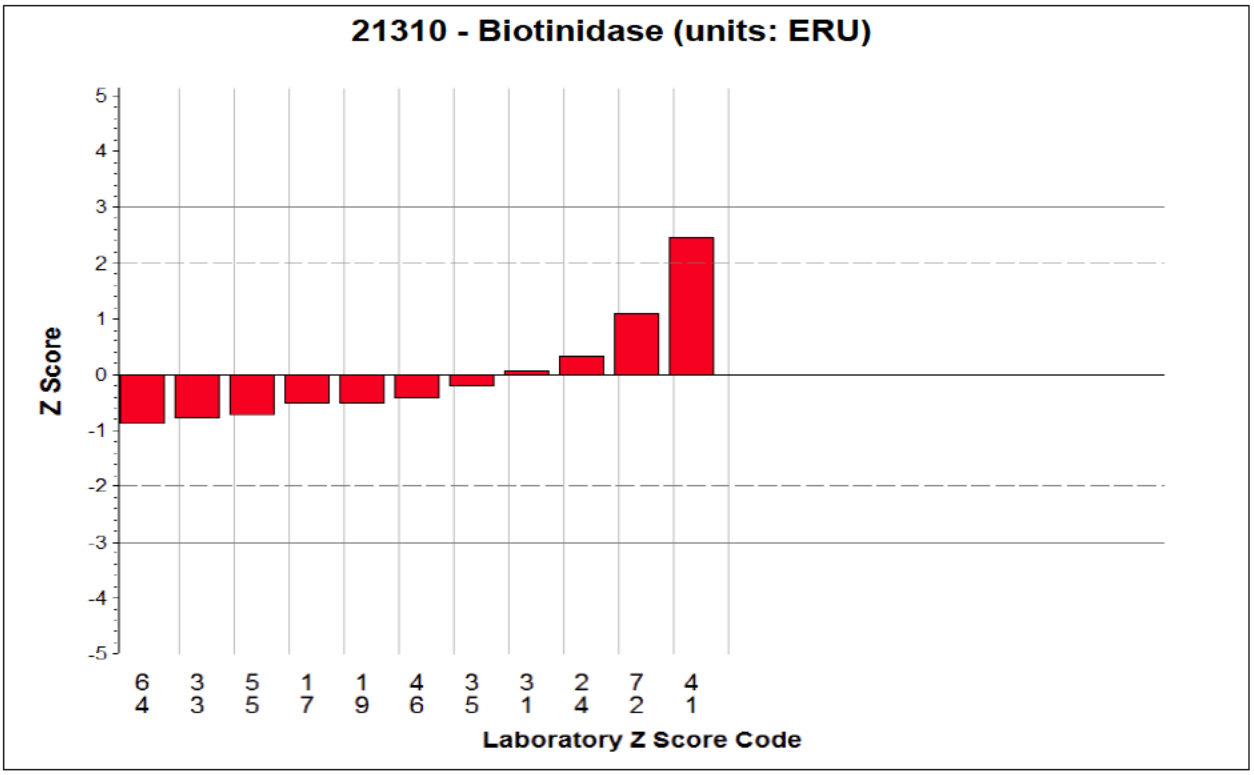

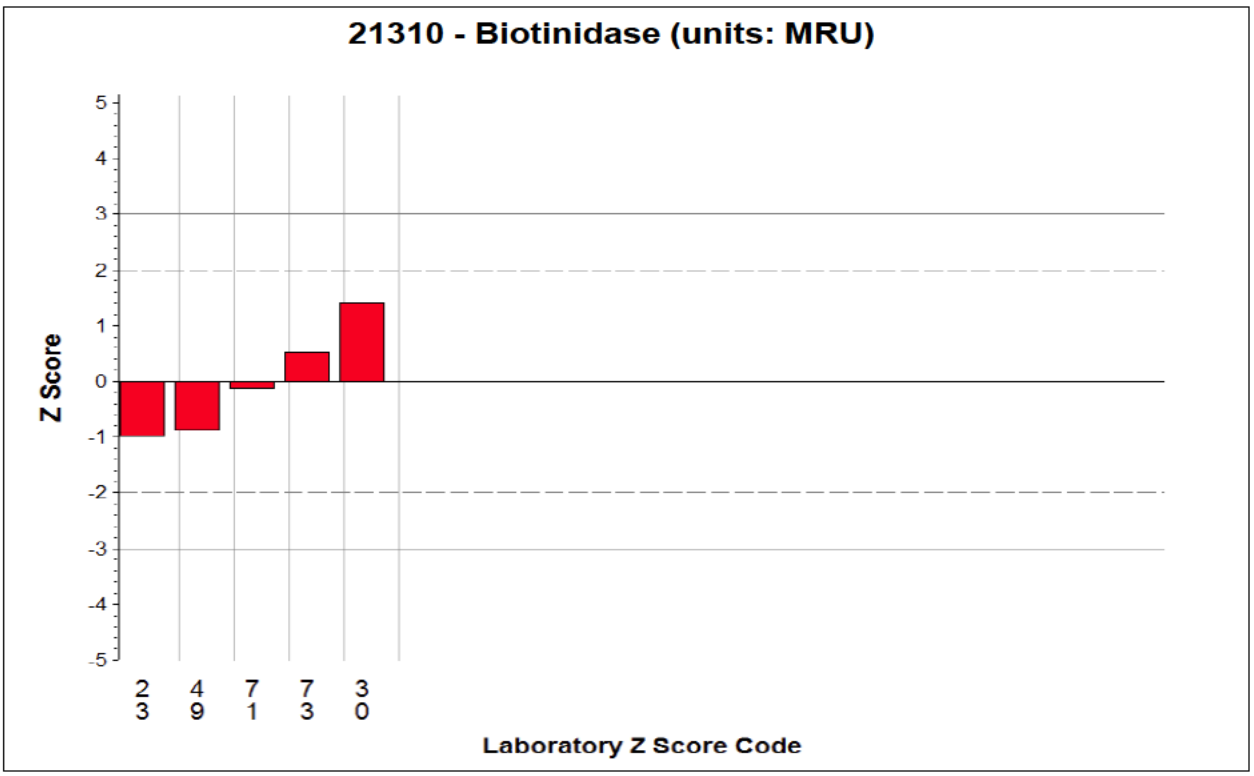

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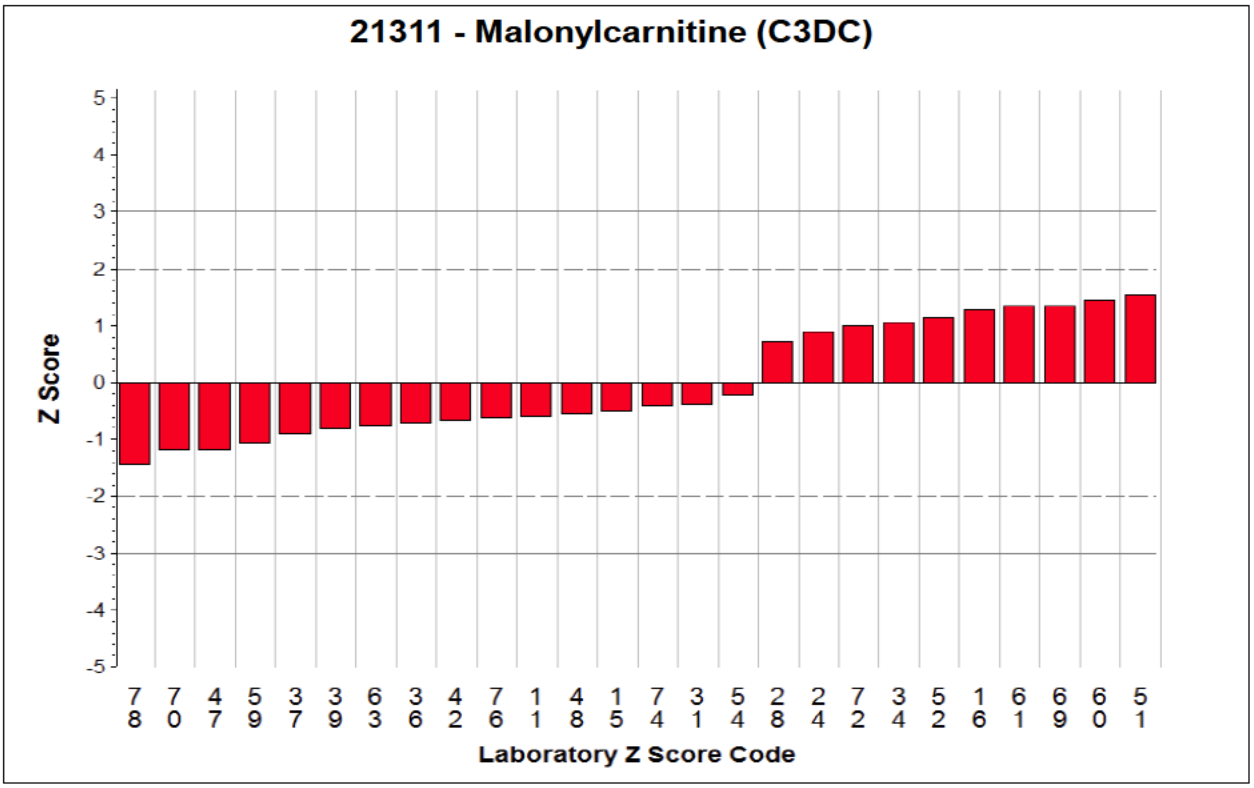

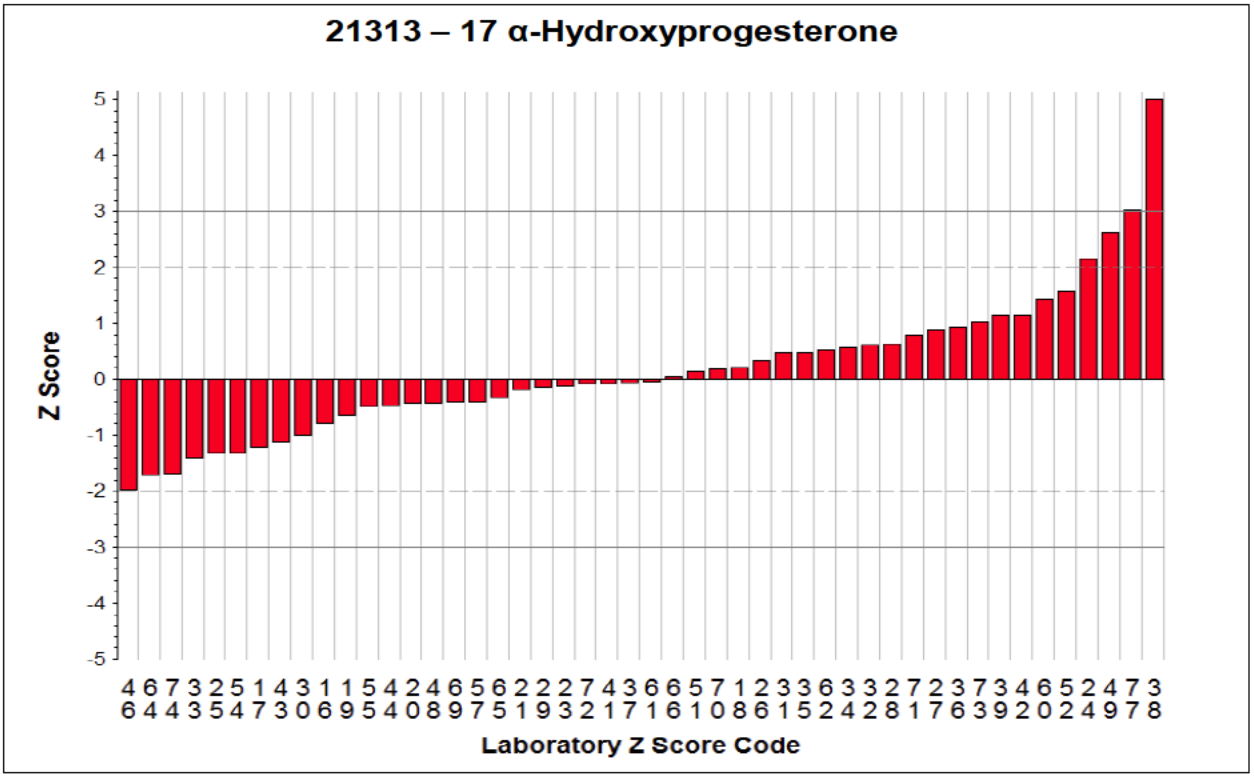

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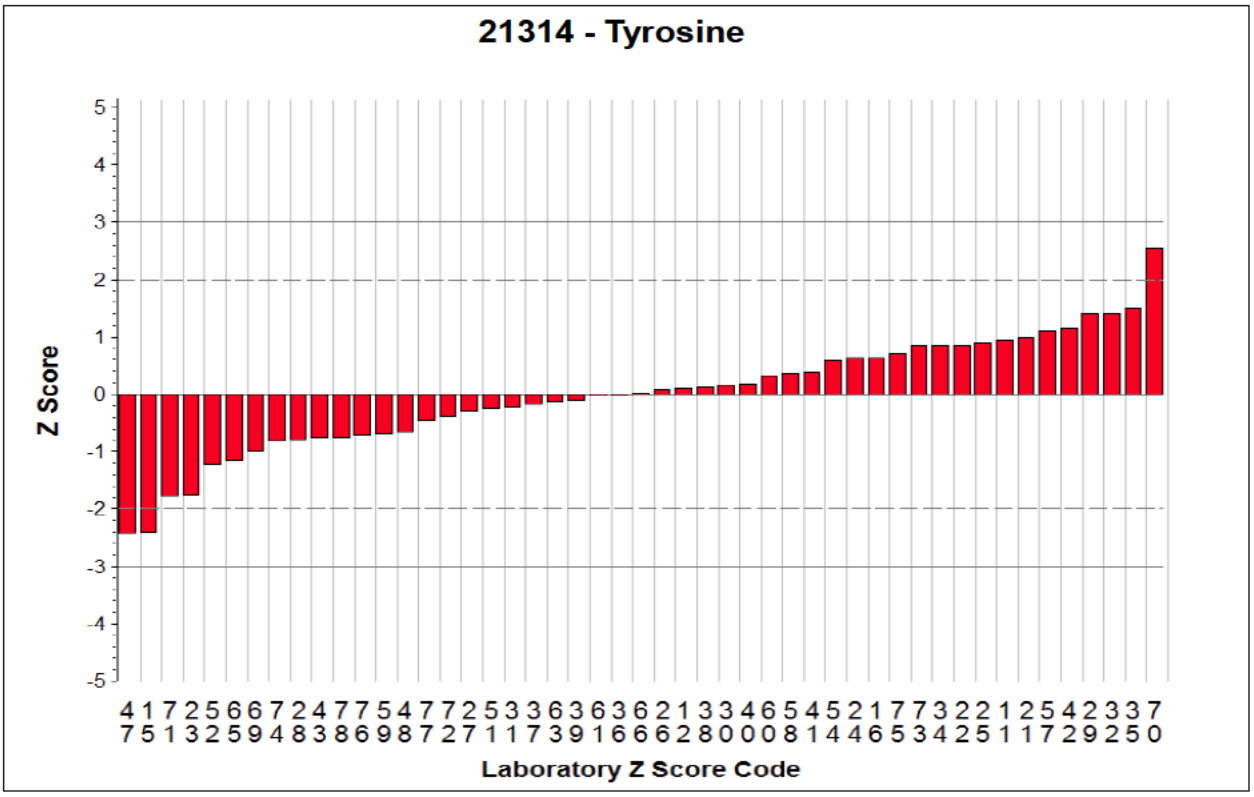

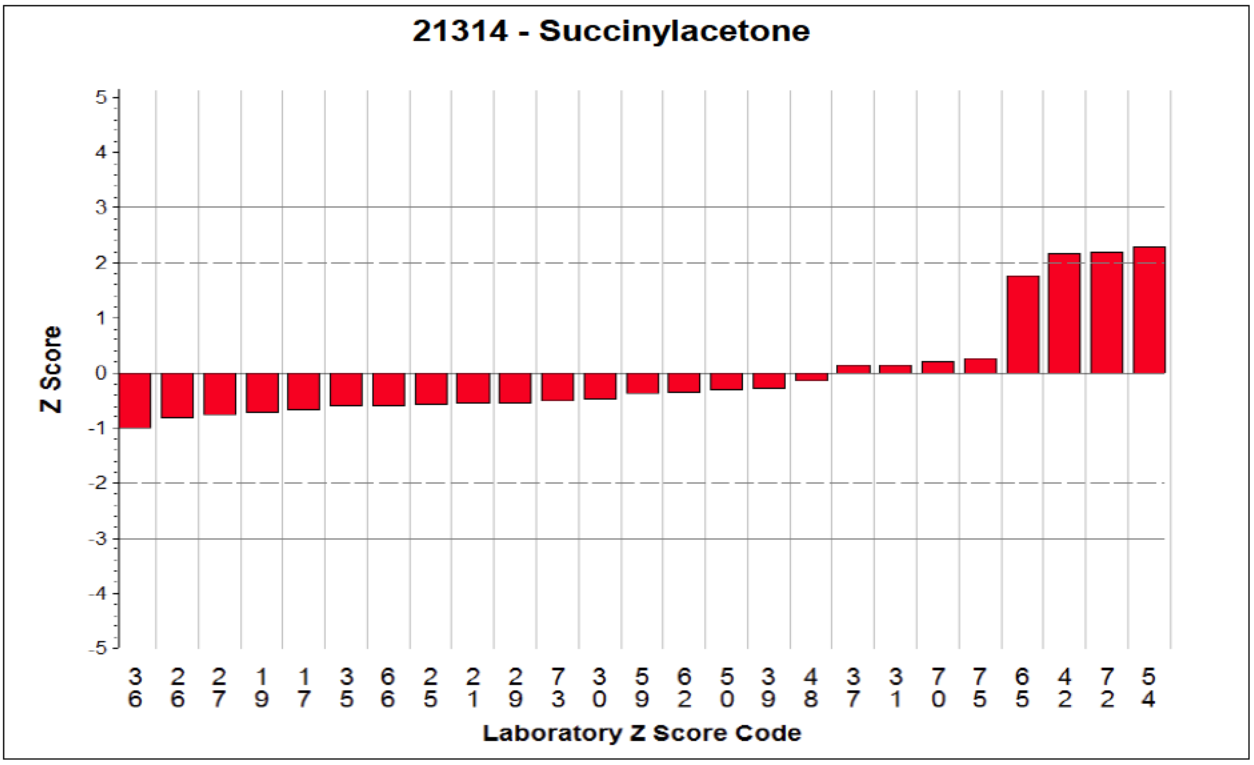

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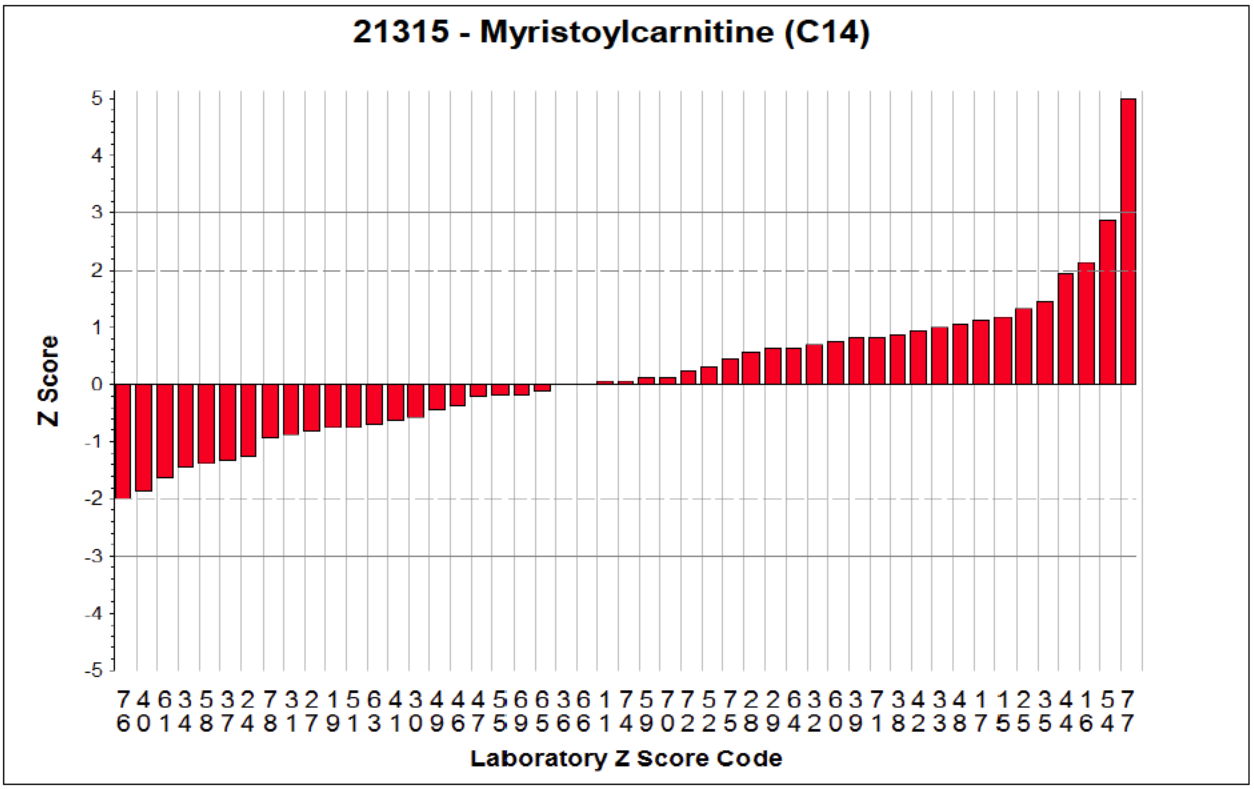

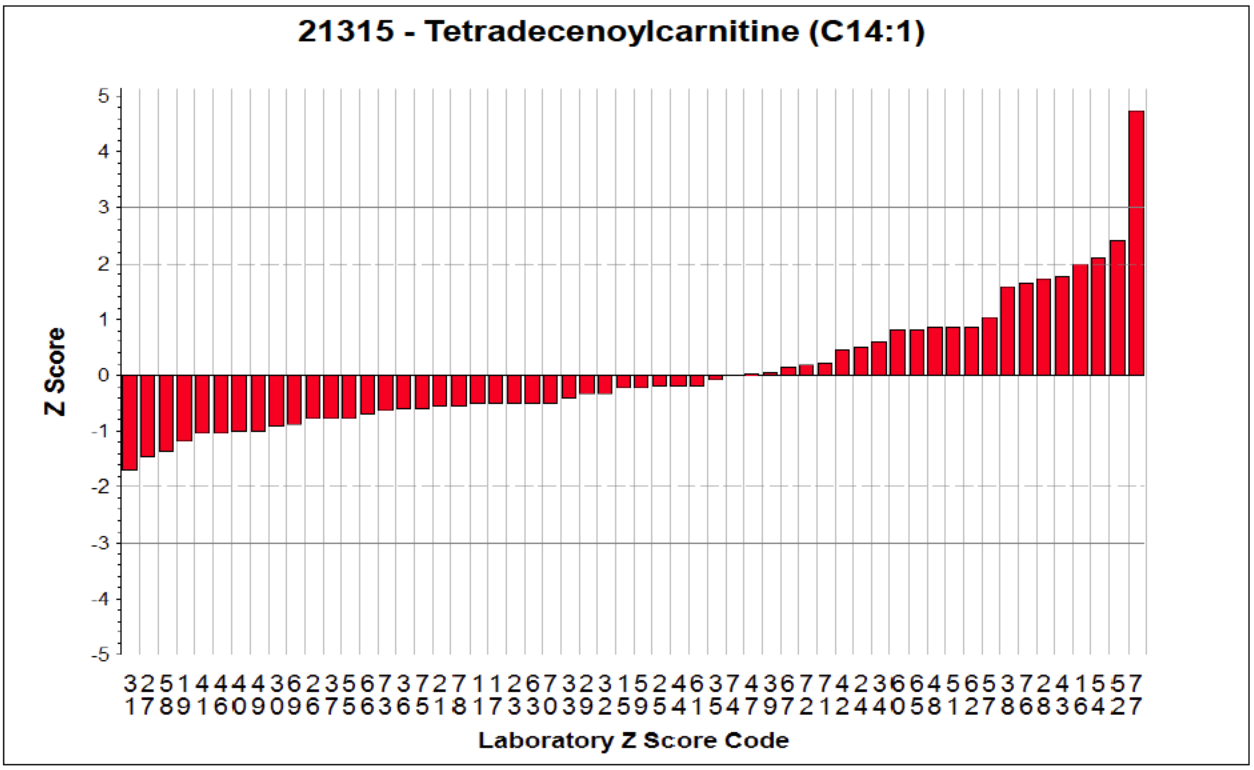

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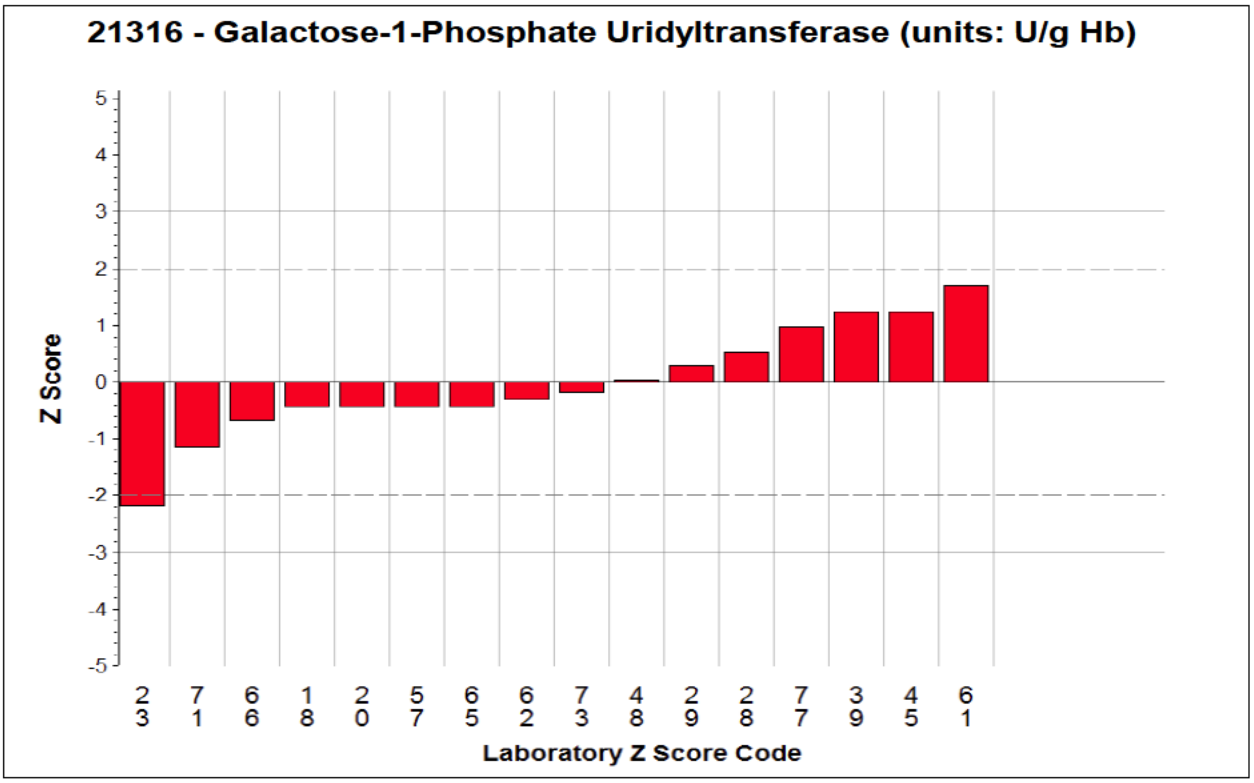

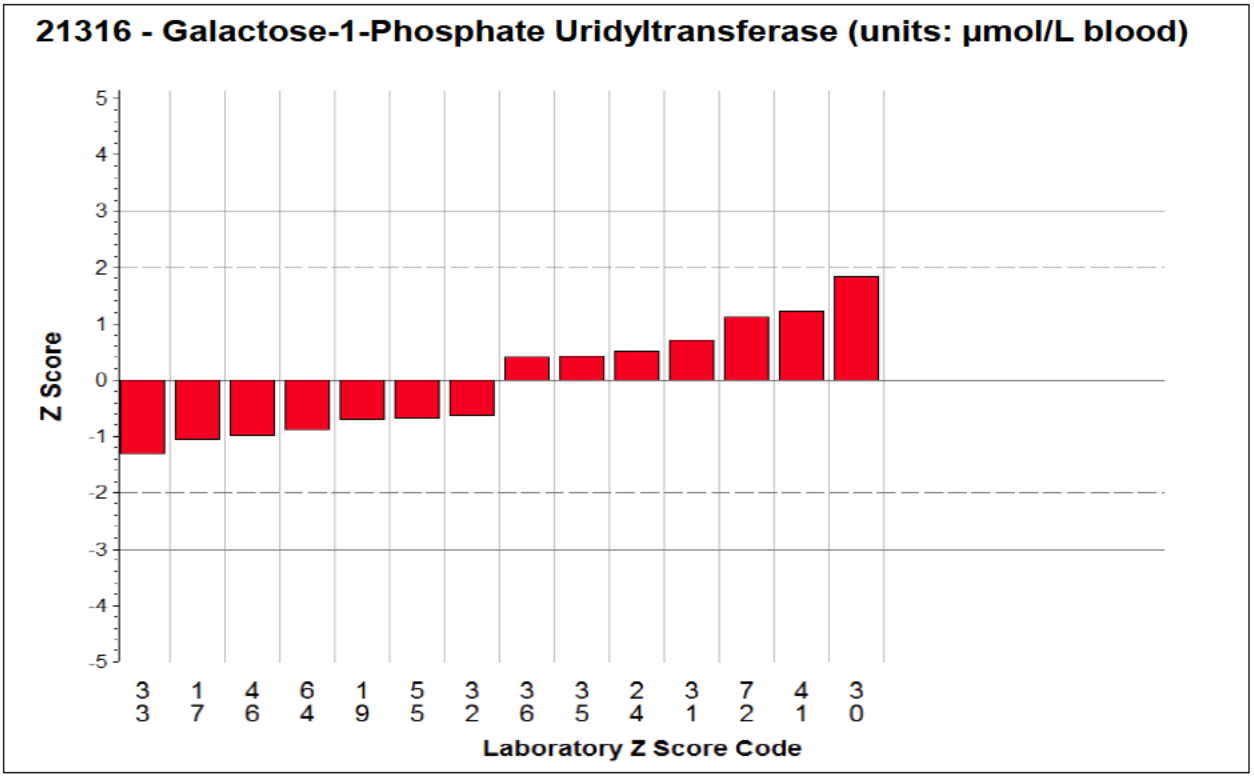

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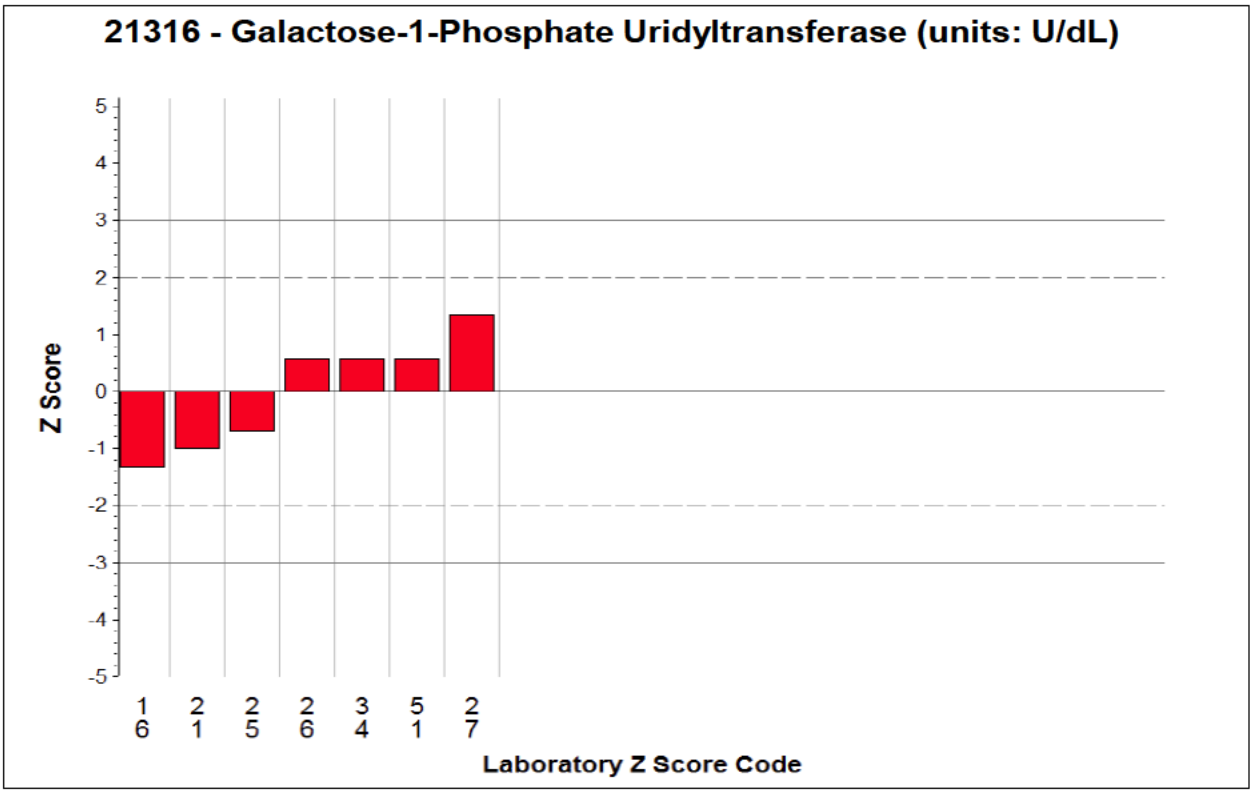

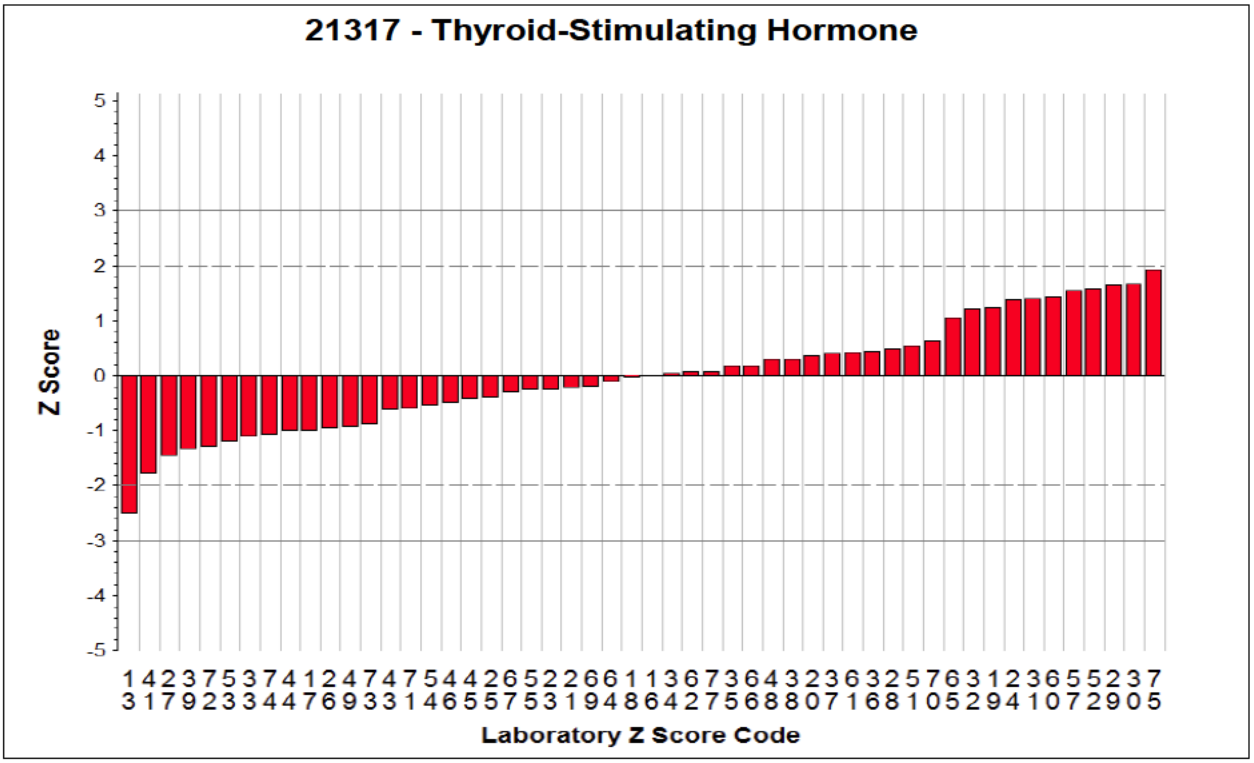

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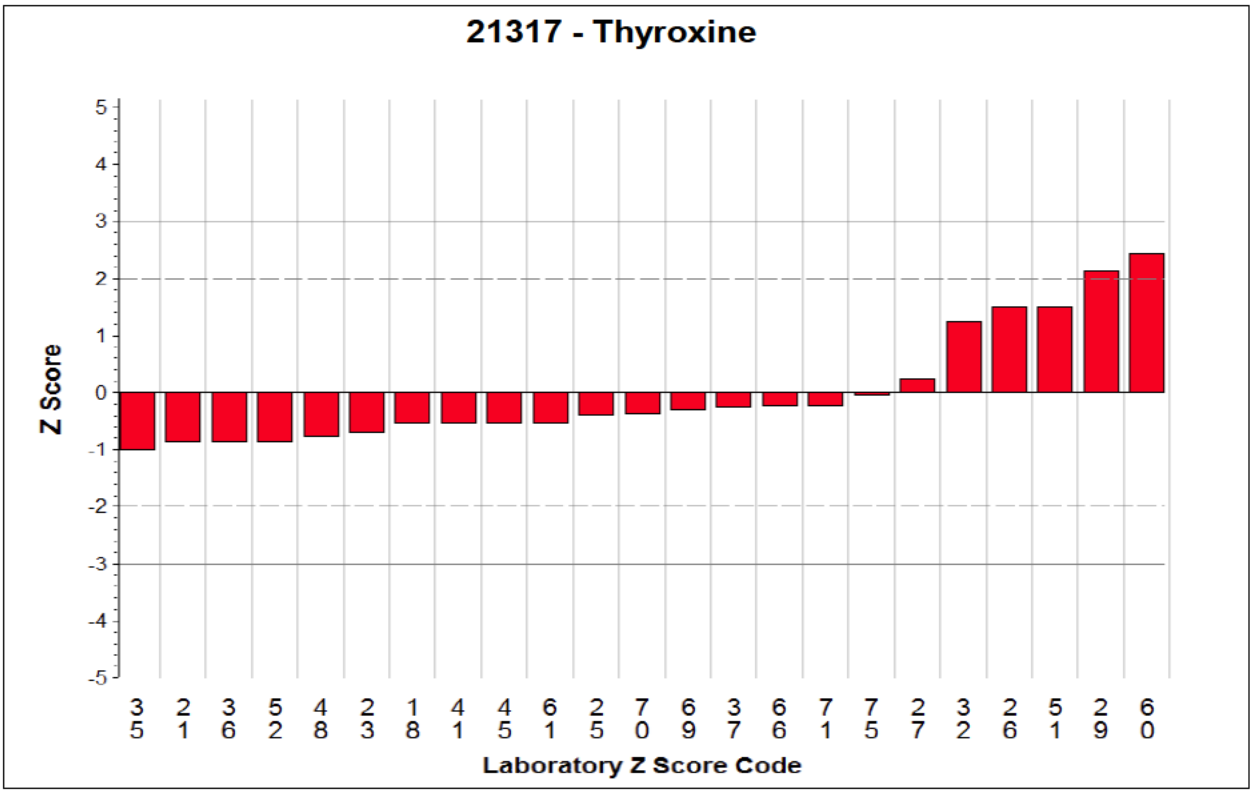

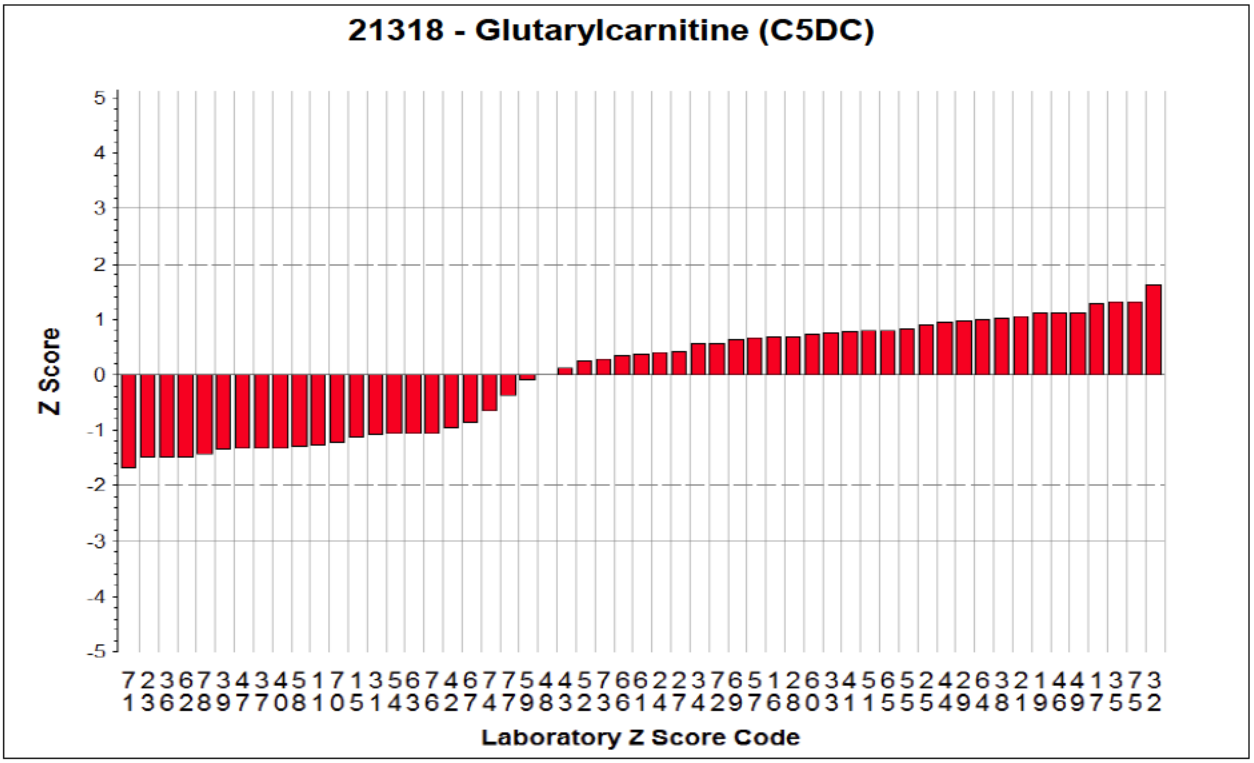

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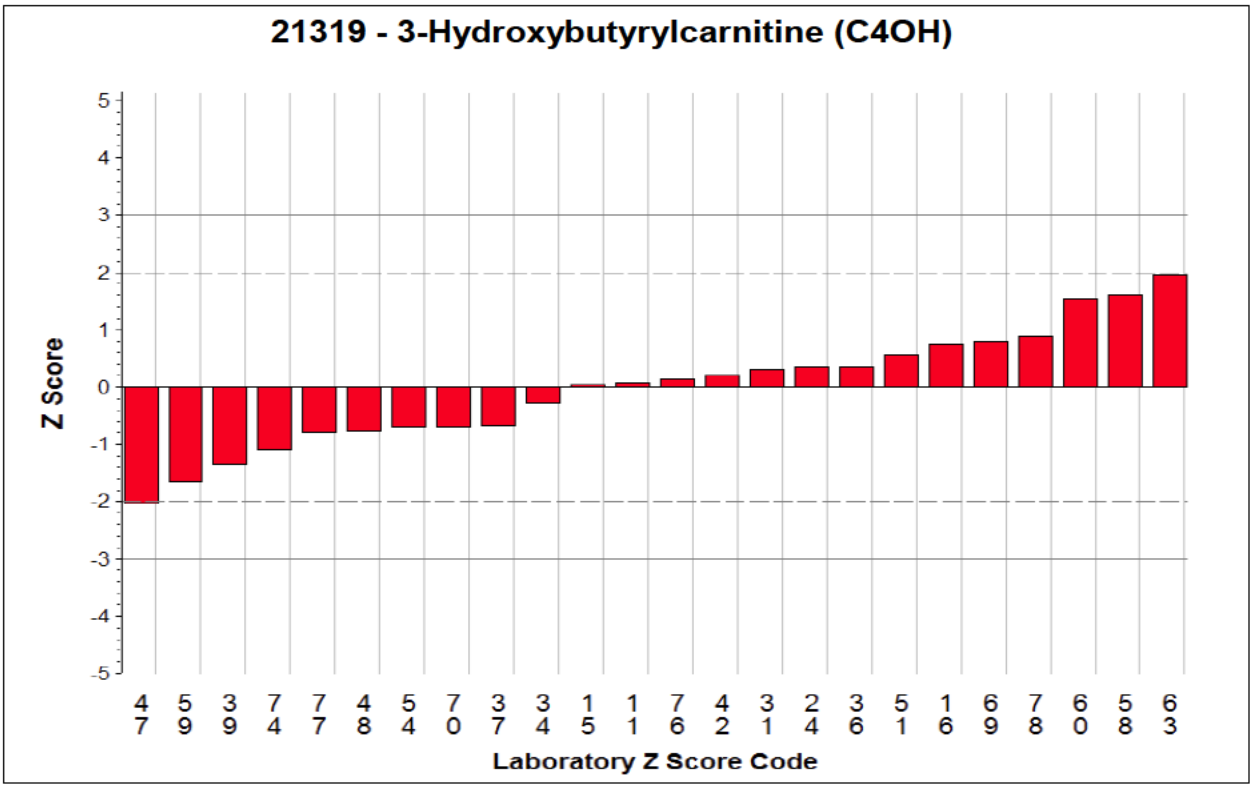

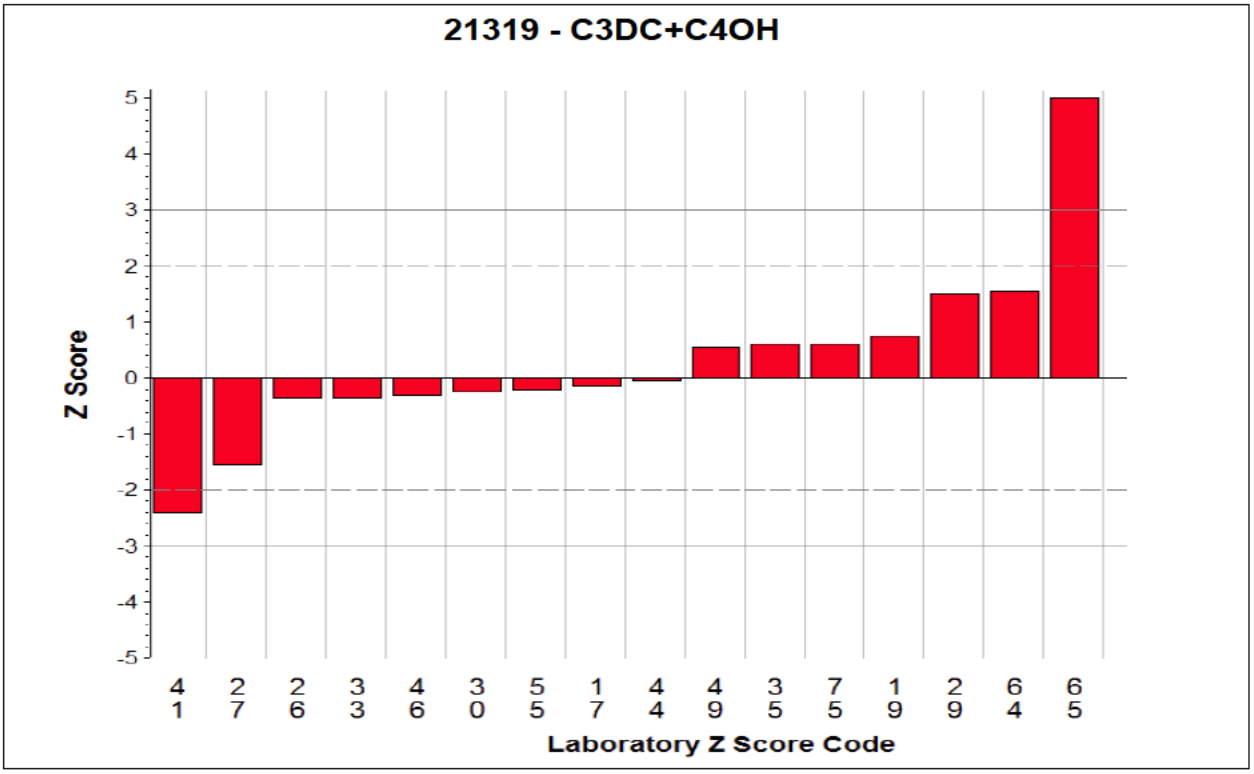

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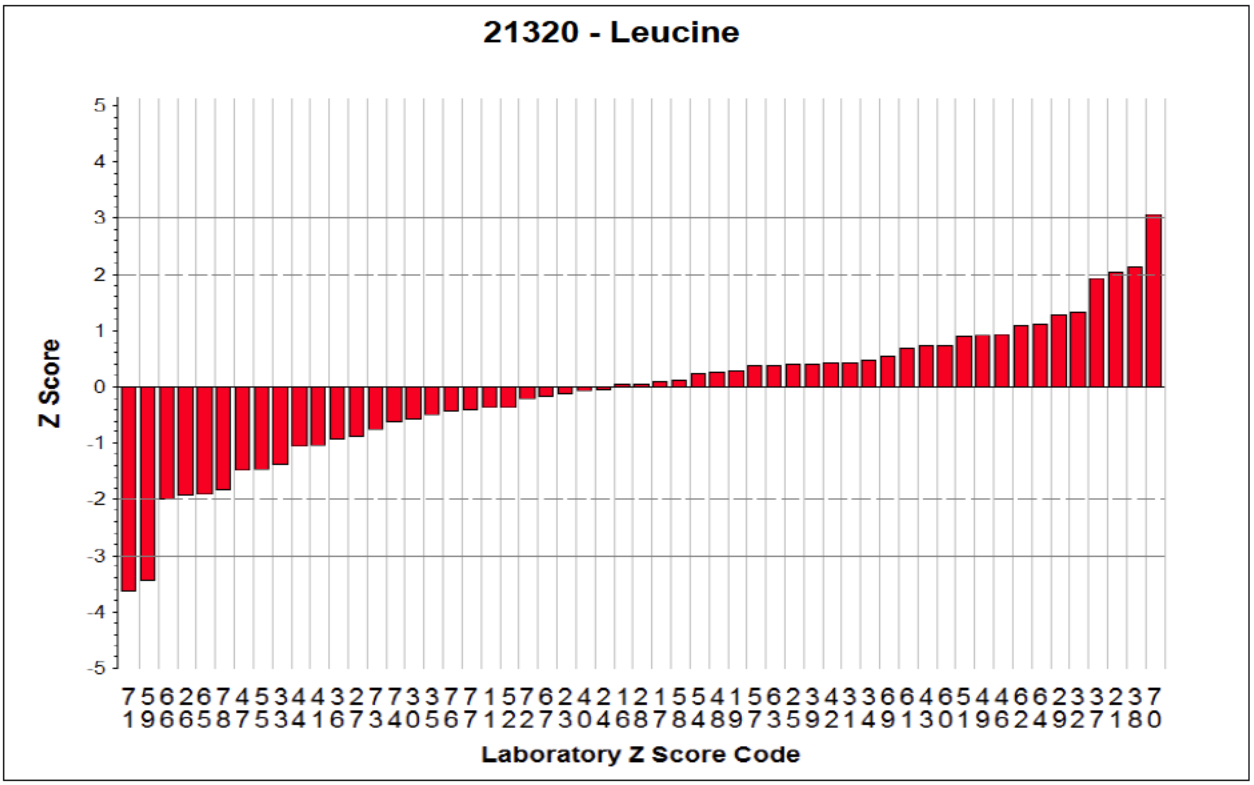

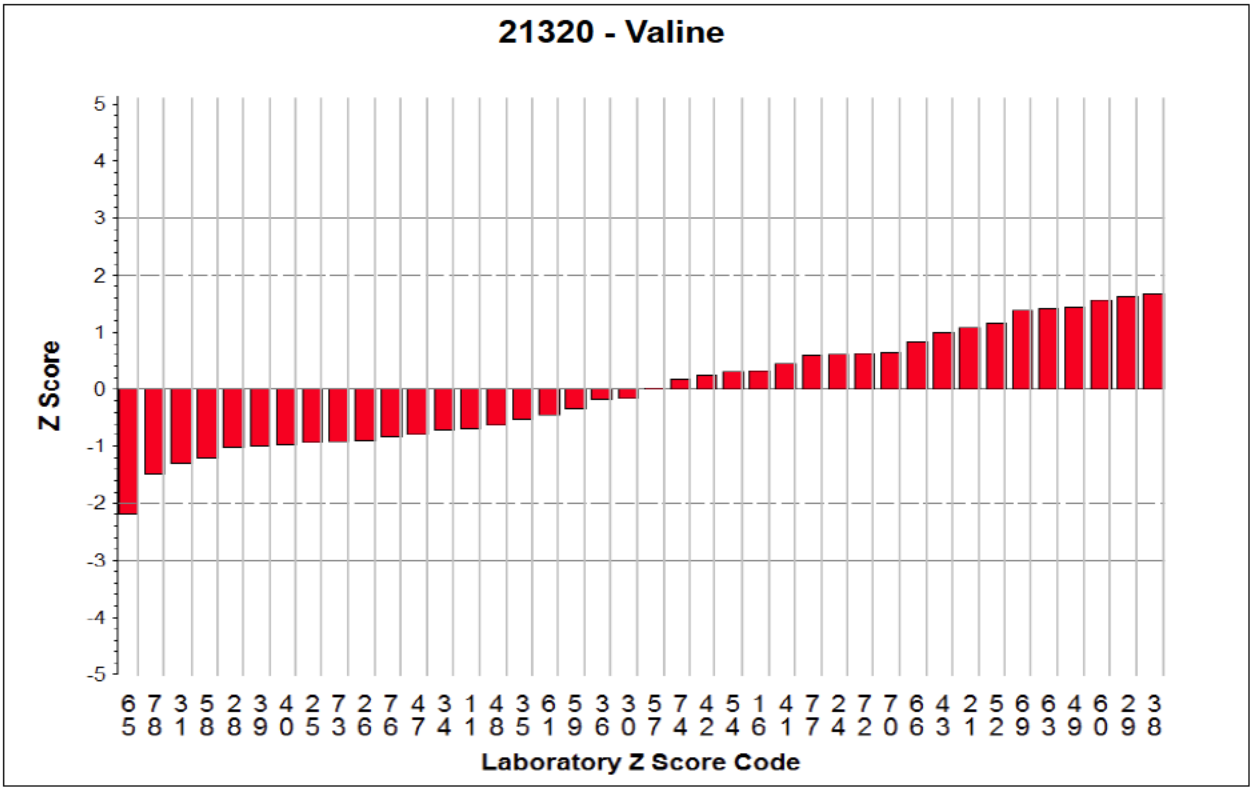

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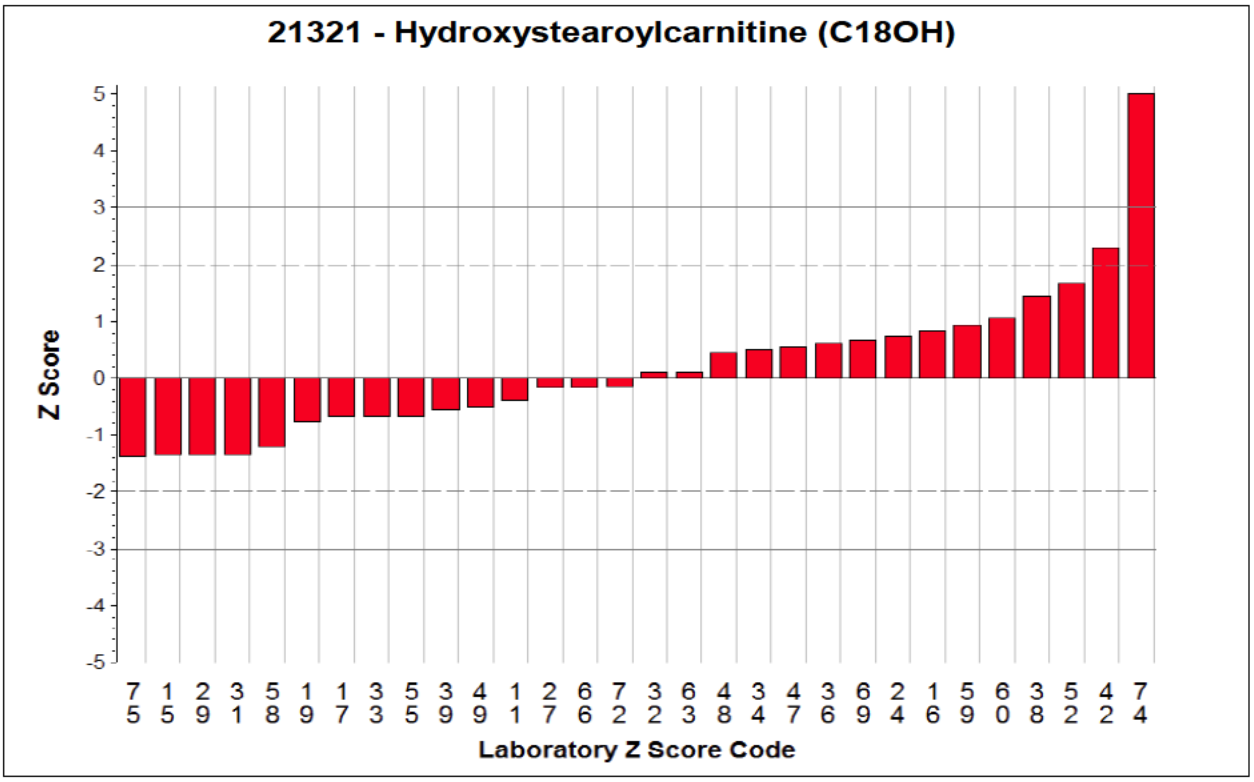

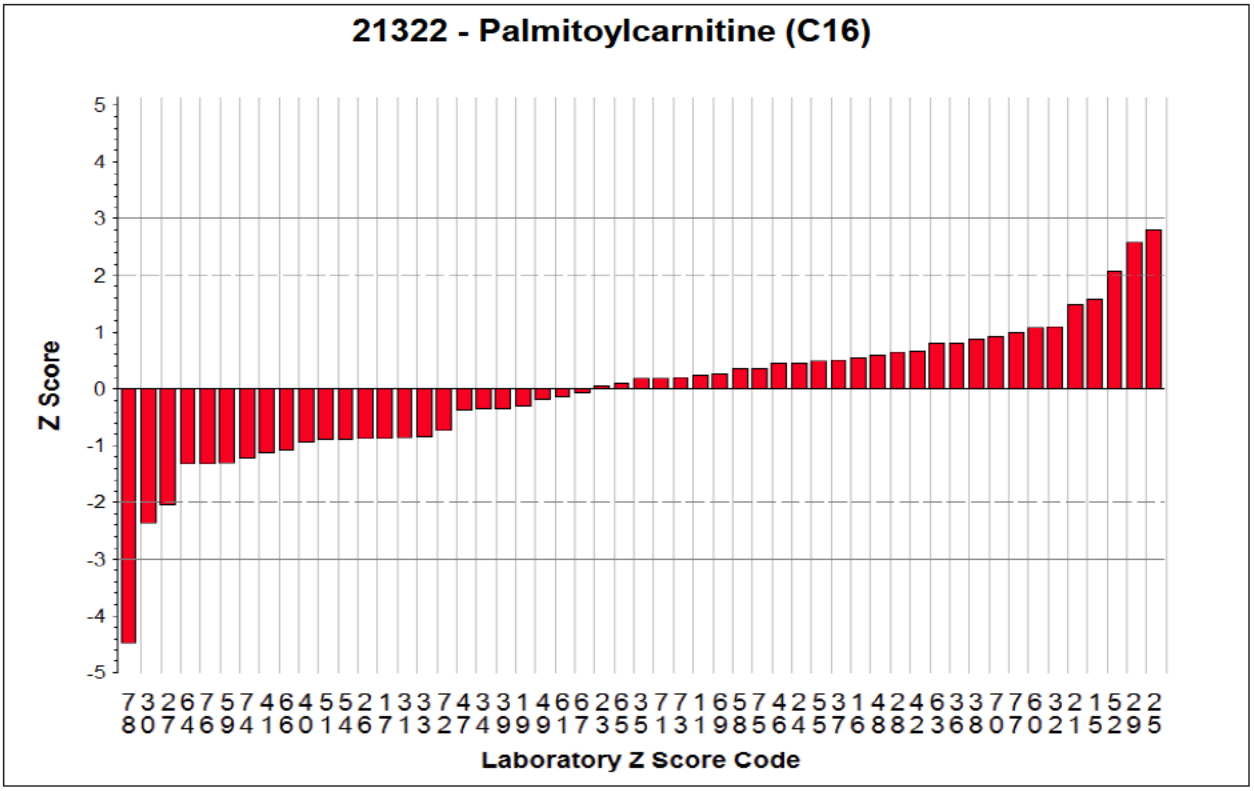

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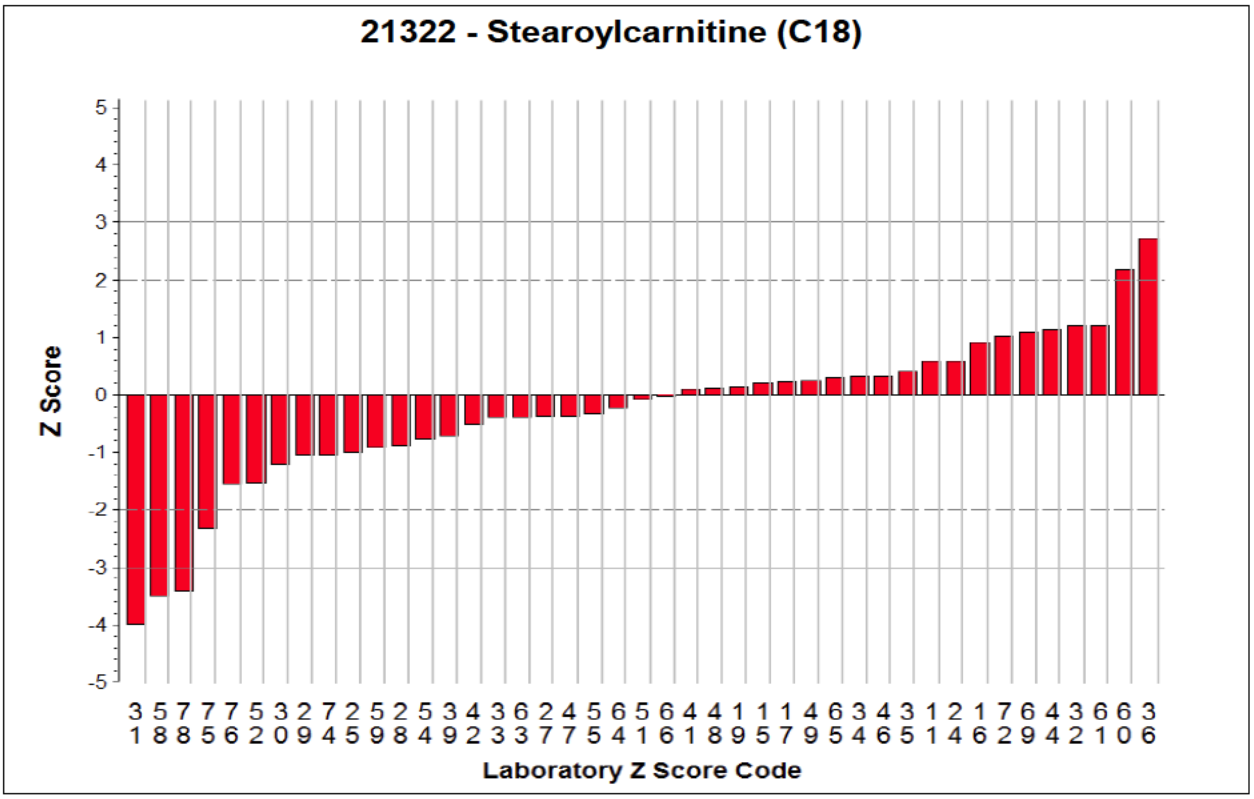

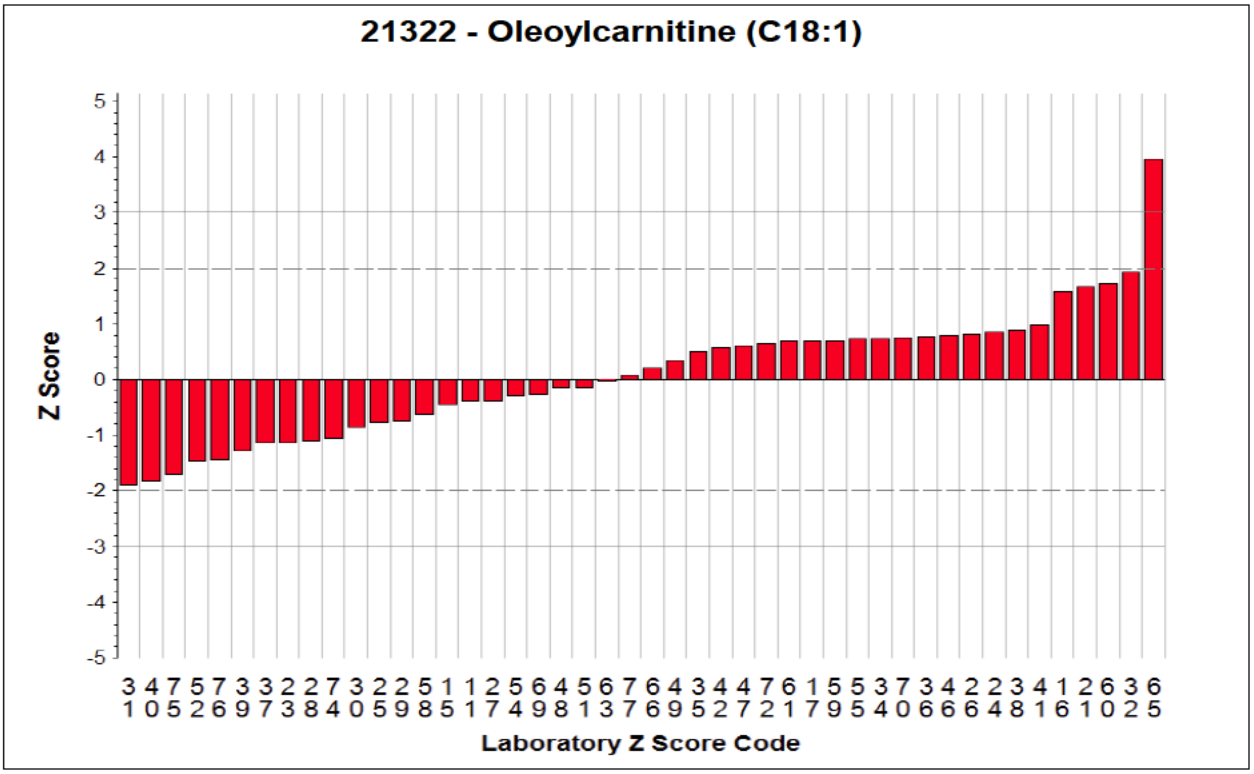

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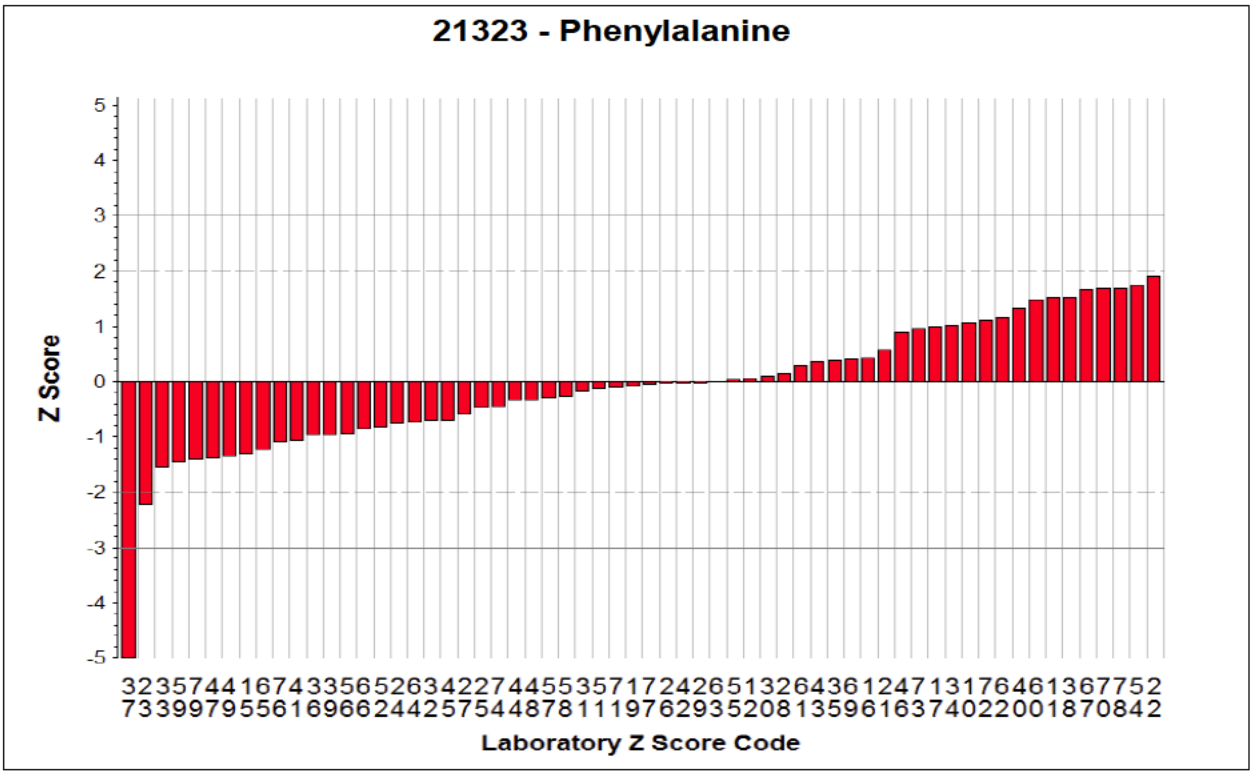

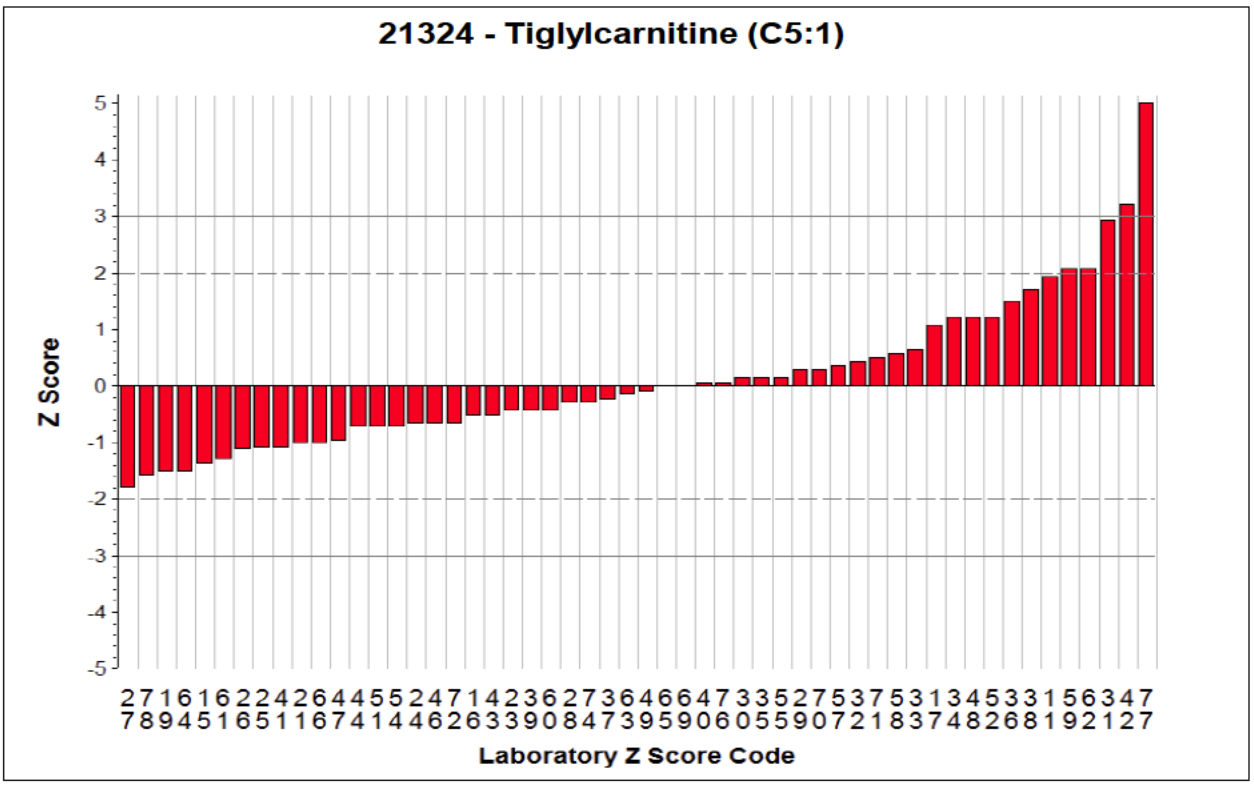

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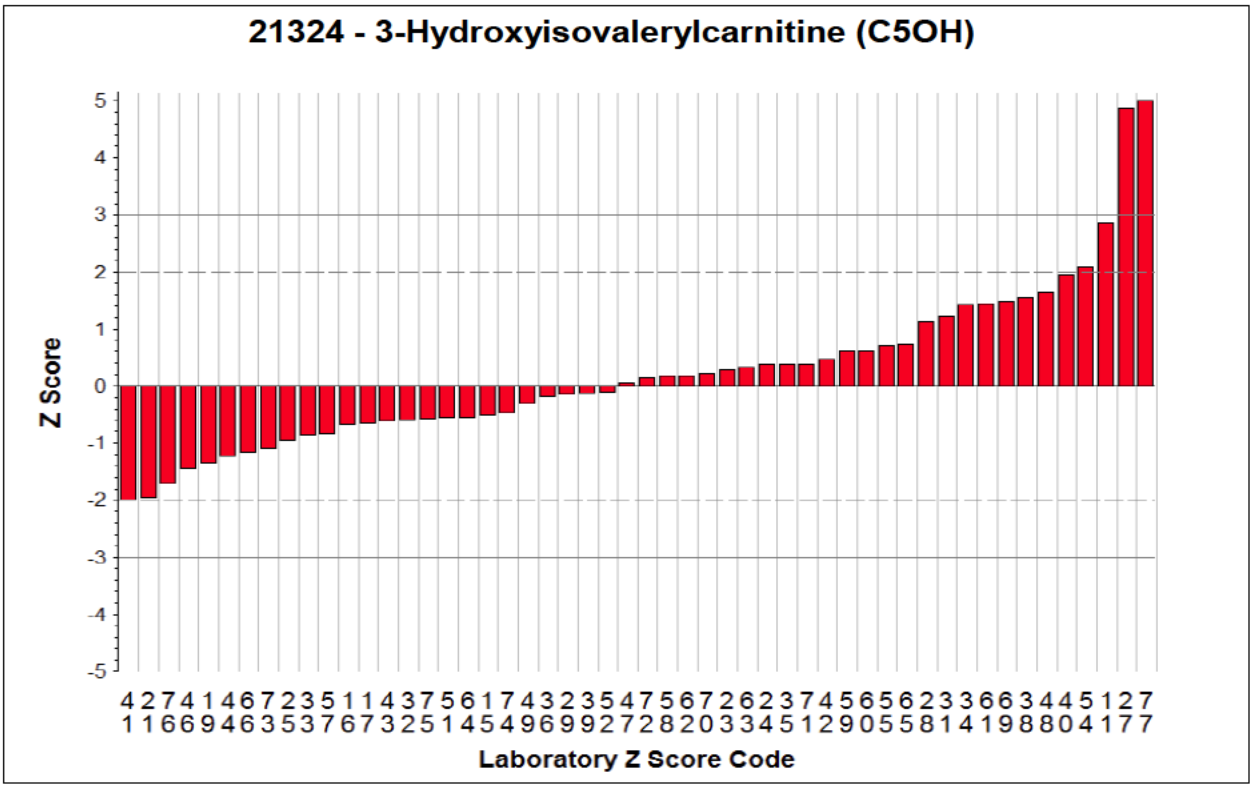

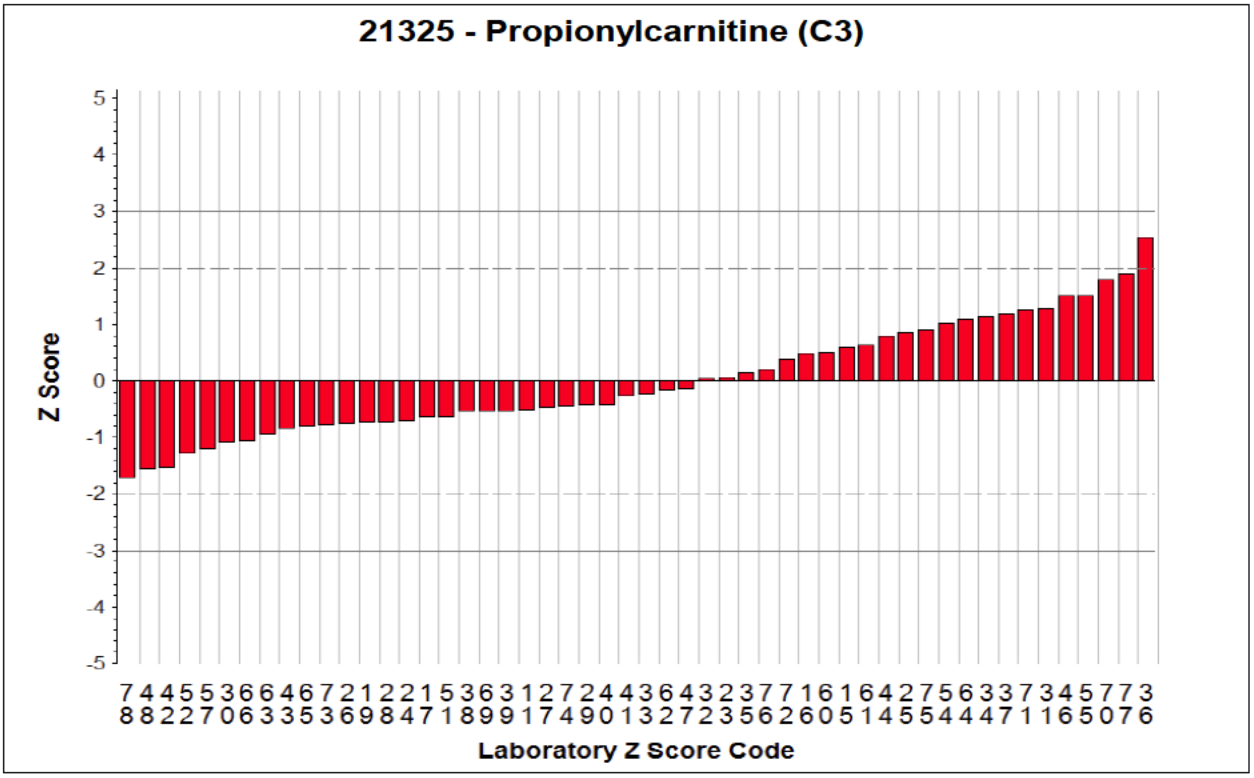

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