Newborn Screening Quality Assurance Program
Lysosomal Storage Disorders
Proficiency Testing Program (LSDPT)

In co-sponsorship with Association of Public Health Laboratories (APHL)
Provided by the Newborn Screening and Molecular Biology Branch
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Quarterly Report
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Report Authorization

This report has been reviewed and authorized by Dr. Joanne Mei, Laboratory Chief, Newborn Screening Quality Assurance Program.

Confidentiality Statement

NSQAP participant information and evaluations are strictly confidential and shared only with individual participants, unless written authorization for release is received.

Introduction

*****AMENDED REPORT****** This amended report replaces The Lysosomal Storage Disorders Proficiency Testing Report, Volume 7, No. 3. This report corrects the expected values for GALC, GAA and IDUA in Table 1. Expected Values – GALC, GAA and IDUA (µmol/hr/L).

This report summarizes data collected within the specified period for the Quarter 4, 2018, proficiency testing (PT) program for Lysosomal Storage Disorders (LSD) in dried blood spots (DBS) to detect Krabbe disease, Pompe disease and Mucopolysaccharidosis Type I (MPS-1). Reports are distributed to all participants, state laboratory directors, and program colleagues by request. The tables within this report provide certification profiles for the distributed specimens and a summary of submitted analytical and categorical results. An evaluation of your laboratory's data is attached to this summary.

Certification of PT Specimens

This panel of DBS specimens was prepared from human blood, including cord blood from unaffected individuals and leuko-depleted adult blood restored with lymphoblast cells derived from patients with LSD (specimens 418L1, 418L2, 418L3, 418L4, and 418L5). Table 1 shows the expected specimen values and clinical assessments for Galactocerebrosidase (GALC) for Krabbe disease, Acid Alpha-Glucosidase (GAA) for Pompe disease, and alpha-L-iduronidase (IDUA) for Mucopolysaccharidosis Type I in whole blood. The expected values were based on NSQAP assayed values by FIA-MS/MS.

Table 1. Expected Values – GALC, GAA and IDUA (µmol/hr/L)

Specimen	Expected Value GALC	Krabbe Assessment Code*	Expected Value GAA	Pompe Assessment Code*	Expected Value IDUA	MPS-1 Assessment Code*
418L1	0.37	2	10.96	1	19.68	1
418L2	6.70	1	6.17	1	6.83	1
418L3	14.18	1	6.09	1	6.72	1
418L4	5.94	1	6.53	1	7.88	1
418L5	7.14	1	24.39	1	0.13	2

*1 = No follow-up required (Screen Negative)
2 = Follow-up required (Screen Positive)
3 = Borderline

Distribution of PT Specimens

On September 25, 2018, a PT panel of five unknown DBS specimens was distributed to 21 domestic laboratories.

Participant Results

Quantitative Data

We processed data from 17 participants. Laboratories were asked to report quantitative results for GALC, GAA, and IDUA in µmol/hr/L. For GALC, two laboratories reported using LC-MS/MS, eight used an FIA-MS/MS non-kit multiplexed enzyme reaction, and one used a fluorometric method. For GAA, two laboratories reported using LC-MS/MS, 11 used an FIA-MS/MS non-kit multiplexed enzyme reaction, 3 reported using digital microfluidics, and 1 used a fluorometric method. For IDUA, two laboratories reported using LC-MS/MS, nine reported using FIA-MS/MS non-kit multiplexed enzyme reaction, three reported using digital microfluidics, and one used a fluorometric method. The statistical summary analysis and cutoff information for all methods is provided in Tables 2a-c.

Table 2a. Screening Results for GALC — All methods

Mean Reported Cutoff: 0.68
Range of Reported Cutoffs: <0.18 – 1.5

Specimen	N	Mean (µmol/hr/L)	SD
418L1	11	0.42	0.23
418L2	11	5.10	2.03
418L3	11	11.53	4.87
418L4	11	4.90	1.80
418L5	11	5.51	1.76

Table 2b. Screening Results for GAA – All methods

Mean Reported Cutoff: 3.73
Range of Reported Cutoffs: <0.85 – 8.54

Specimen	N	Mean (µmol/hr/L)	SD
418L1	17	14.40	8.12
418L2	17	9.51	6.25
418L3	17	9.01	5.76
418L4	17	10.96	7.99
418L5	17	29.21	17.29

Table 2c. Screening Results for IDUA – All methods

Mean Reported Cutoff: 2.48
Range of Reported Cutoffs: 0.66 – 4.89

Specimen	N	Mean (µmol/hr/L)	SD
418L1	15	29.48	17.18
418L2	15	10.59	7.39
418L3	15	11.01	8.02
418L4	15	13.00	9.75
418L5	15	1.36	2.11

Clinical Assessments

Laboratories were asked to report qualitative results as “No follow-up required (Screen Negative)” or “Follow-up required (Screen Positive)”. A “Borderline” assessment category is included to more accurately assess those labs that identify milder disease forms, carriers, or pseudo deficiencies. The frequency distribution of participants’ clinical assessments is shown in Tables 3a-c.

Table 3a. Frequency Distribution of Reported Clinical Assessments - GALC

Specimen	No follow-up required (Screen Negative)	Follow-up required (Screen Positive)
418L1	1	10
418L2	11	0
418L3	11	0
418L4	11	0
418L5	11	0

Table 3b. Frequency Distribution of Reported Clinical Assessments - GAA

Specimen	No follow-up required (Screen Negative)	Follow-up required (Screen Positive)
418L1	17	0
418L2	17	0
418L3	17	0
418L4	17	0
418L5	17	0

Table 3c. Frequency Distribution of Reported Clinical Assessments - IDUA

Specimen	No follow-up required (Screen Negative)	Follow-up required (Screen Positive)	Borderline
418L1	15	0	0
418L2	15	0	0
418L3	15	0	0
418L4	15	0	0
418L5	0	13	2

Evaluations

Participants reported one False-negative and no False-positives for Krabbe; no False-negatives and no False-positives for Pompe; and no False-positives or False-negatives for MPS-1.

Future Shipments

The Newborn Screening Quality Assurance Program will ship next quarter's LSDPT specimens on January 15, 2019.

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The content of this report may also be located on our website at:
https://www.cdc.gov/labstandards/nsqap_reports.html

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