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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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

This report summarizes data collected within the specified period for the Quarter 1, 2019, 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 119L1, 119L2, 119L3, 119L4, and 119L5). Table 1a 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 1b shows the expected specimen values for GAA and IDUA based on NSQAP assayed values by Digital Microfluidics (DMF).

Table 1a. Expected Values – GALC, GAA and IDUA (µmol/hr/L) by FIA-MS/MS

Specimen	Expected Value GALC	Krabbe Assessment Code*	Expected Value GAA	Pompe Assessment Code*	Expected Value IDUA	MPS-1 Assessment Code*
119L1	12.49	1	14.84	1	18.90	1
119L2	3.69	1	5.32	1	14.77	1
119L3	2.58	1	0.29	2	3.93	1
119L4	5.57	1	21.90	1	0.12	2
119L5	3.82	1	10.06	1	8.22	1

Table 1b. Expected Values – GAA and IDUA (µmol/hr/L) by DMF

Specimen	Expected Value GAA	Pompe Assessment Code*	Expected Value IDUA	MPS-1 Assessment Code*
119L1	65.37	1	66.06	1
119L2	24.48	1	51.71	1
119L3	3.07	2	13.79	1
119L4	74.53	1	4.00	2
119L5	37.77	1	28.02	1

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

Distribution of PT Specimens

On January 15, 2019, a PT panel of five unknown DBS specimens was distributed to 22 domestic laboratories.

Participant Results

Quantitative Data

We processed data from 18 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, six 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, seven used an FIA-MS/MS non-kit multiplexed enzyme reaction, four reported using digital microfluidics, and one used a fluorometric method. For IDUA, one laboratory reported using LC-MS/MS, five reported using FIA-MS/MS non-kit multiplexed enzyme reaction, one reported using FIA-MS/MS individual enzyme reaction, four 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: 0.71
Range of Reported Cutoffs: 0.22 – 1.50

Specimen	N	Mean (µmol/hr/L)	SD
119L1	10	10.78	4.56
119L2	10	3.02	1.34
119L3	10	2.26	0.79
119L4	10	5.43	1.99
119L5	10	3.37	1.39

Table 2b. Screening Results for GAA – All methods

Mean Reported Cutoff: 4.00
Range of Reported Cutoffs: 1.00 – 10.00

Specimen	N	Mean (µmol/hr/L)	SD
119L1	18	27.65	19.90
119L2	18	9.79	7.24
119L3	18	0.74	0.88
119L4	18	32.86	18.19
119L5	18	16.69	11.67

Table 2c. Screening Results for IDUA – All methods

Mean Reported Cutoff: 2.63
Range of Reported Cutoffs: 0.51 – 7.00

Specimen	N	Mean (µmol/hr/L)	SD
119L1	17	28.91	18.63
119L2	17	23.43	15.75
119L3	17	5.56	3.82
119L4	17	1.01	1.66
119L5	17	13.42	9.77

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)	Borderline
119L1	10	0	0
119L2	9	1	0
119L3	10	0	0
119L4	10	0	0
119L5	9	0	1

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

Specimen	No follow-up required (Screen Negative)	Follow-up required (Screen Positive)
119L1	18	0
119L2	18	0
119L3	0	18
119L4	18	0
119L5	18	0

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

Specimen	No follow-up required (Screen Negative)	Follow-up required (Screen Positive)	Borderline
119L1	17	0	0
119L2	17	0	0
119L3	16	1	0
119L4	0	15	2
119L5	17	0	0

Evaluations

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

Future Shipments

The Newborn Screening Quality Assurance Program will ship next quarter's LSDPT specimens on June 25, 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

This *NEWBORN SCREENING QUALITY ASSURANCE PROGRAM* report is an internal publication distributed to program participants and selected program colleagues. The laboratory quality assurance program is a project cosponsored by the Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories.

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