

Newborn Screening Quality Assurance Program

PROFICIENCY TESTING

Lysosomal Storage Disorder
Quarterly Report

Volume 4, No. 4

November 2015

INTRODUCTION

This report is the Quarterly summary of all data reported within the specified data-reporting period for the Quarter 4, 2015, proficiency testing (PT) program for Lysosomal Storage Disorders (LSD) in dried blood spots (DBS) to detect Krabbe disease, Pompe disease, and for the first time, Mucopolysaccharidosis Type I (MPS-I). The attached tables provide the certification profiles for the distributed specimens, the verification of your reported data, and the summary of reported analytical and categorical results.

On October 5, 2015, a panel of six unknown DBS specimens was distributed to eight laboratories in the United States to analyze Galactocerebrosidase (GALC) for Krabbe disease, Acid Alpha-Glucosidase (GAA) for Pompe disease, and alpha-L-iduronidase (IDUA) for MPS-I in whole blood.

PARTICIPANT RESULTS

This panel of DBS specimens were 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 415L1, 415L2, 415L3, 415L4, 415L5, and 415L6).

We processed data from seven participants. Laboratories were asked to report quantitative results for GALC, GAA, and IDUA in $\mu\text{mol/hr/L}$ units and qualitative results as “No follow-up required (Screen Negative)” or “Follow-up required”. In the statistical summary analysis, we included summary data for all methods.

For GALC five laboratories reported using flow injection analysis MS/MS (FIA-MS/MS), non-kit; one used LC-MS/MS; and one used a fluorometric method. For GAA and IDUA, five laboratories reported using FIA-MS/MS, non-kit; one used LC-MS/MS and one reported using digital microfluidics.

The GALC, GAA, and IDUA expected values were based on CDC assayed values by FIA-MS/MS. The frequency distribution of participants’ interpretations for categorical results is shown in Tables 1a–c. Specimen certification information is given in Table 2 and overall method statistics for GALC, GAA, and IDUA are given in Tables 3a–c.

The all-method mean cutoff for GALC was 0.43, with a range of 0.1 to 0.80 $\mu\text{mol/hr/L}$; the all-method mean cutoff for GAA was 3.27 with a range of 0.92 to 8.0 $\mu\text{mol/hr/L}$; and the all-method mean cutoff for IDUA was 1.82 with a range of 1.1 to 3.2 $\mu\text{mol/hr/L}$.

No false negatives were reported for Krabbe (GALC), Pompe (GAA), or MPS-I (IDUA). One false positive assessment was reported for MPS-I for specimen 415L4. False-positive assessments should be monitored and kept as low as possible.

The Newborn Screening Quality Assurance Program will ship next Quarter’s pilot PT specimens for Krabbe and/or Pompe disease on January 11, 2016.

ACKNOWLEDGMENTS

We would like to thank Barbara Waters-Pick (Duke University Medical Center) for the supply of umbilical cord blood units.

CDC/APHL

This program is cosponsored by the Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories (APHL).

Direct inquiries to:
Centers for Disease Control and Prevention (CDC)
4770 Buford Highway, NE, MS/F19
Atlanta, GA 30341-3724

Phone: 770-488-7945
FAX: 770-488-7459
E-mail: JMei@cdc.gov

Editor: Joanne Mei
Irene Williams



NEWBORN SCREENING QUALITY ASSURANCE PROGRAM
 LYSOSOMAL STORAGE DISORDERS TO DETECT KRABBE DISEASE, POMPE DISEASE,
 AND MUCOPOLYSACCHARIDOSIS TYPE I
 IN DRIED BLOOD SPOTS

Table 1a. Frequency of reported Clinical Assessments: KRABBE DISEASE (GALC)

Specimen Number	No follow-up required (Screen Negative)	Follow-up required
415L1	7	0
415L2	7	0
415L3	7	0
415L4	0	7
415L5	7	0
415L6	7	0

Table 1b. Frequency of Reported Clinical Assessments: POMPE DISEASE (GAA)

Specimen Number	No follow-up required (Screen Negative)	Follow-up required
415L1	7	0
415L2	0	7
415L3	7	0
415L4	7	0
415L5	7	0
415L6	7	0

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM
LYSOSOMAL STORAGE DISORDERS TO DETECT KRABBE DISEASE, POMPE DISEASE,
AND MUCOPOLYSACCHARIDOSIS TYPE I
IN DRIED BLOOD SPOTS

Table 1c. Frequency of Reported Clinical Assessments: MUCOPOLYSACCHARIDOSIS
TYPE I (IDUA)

Specimen Number	No follow-up required (Screen Negative)	Follow-up required
415L1	7	0
415L2	7	0
415L3	7	0
415L4	6	1
415L5	7	0
415L6	0	7

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM
 LYSOSOMAL STORAGE DISORDERS TO DETECT KRABBE DISEASE, POMPE DISEASE,
 AND MUCOPOLYSACCHARIDOSIS TYPE I
 IN DRIED BLOOD SPOTS

Table 2. Specimen Certification

Specimen Number	Expected GALC ($\mu\text{mol/hr/L}$)	KRABBE Assessment Code
415L1	7.54	1
415L2	3.18	1
415L3	9.62	1
415L4	0.35	2
415L5	4.51	1
415L6	3.90	1
Specimen Number	Expected GAA ($\mu\text{mol/hr/L}$)	POMPE Assessment Code
415L1	14.82	1
415L2	0.19	2
415L3	44.97	1
415L4	33.58	1
415L5	19.23	1
415L6	39.51	1

1 = No follow-up required (Screen Negative)

2 = Follow-up required

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM
 LYSOSOMAL STORAGE DISORDERS TO DETECT KRABBE DISEASE, POMPE DISEASE,
 AND MUCOPOLYSACCHARIDOSIS TYPE I
 IN DRIED BLOOD SPOTS

Table 2. Specimen Certification, cont.

Specimen Number	Expected IDUA ($\mu\text{mol/hr/L}$)	MPS-I Assessment Code
415L1	16.72	1
415L2	5.26	1
415L3	33.82	1
415L4	2.18	1
415L5	15.62	1
415L6	0.65	2

1 = No follow-up required (Screen Negative) 2 = Follow-up required

OVERALL STATISTICS

Table 3a. Screening Results for GALC – ALL Methods

Specimen	N	Mean ($\mu\text{mol/hr/L}$)	SD	%CV
415L1	7	6.7	3.4	51.4
415L2	7	2.8	1.2	45.4
415L3	7	8.5	3.6	41.9
415L4	7	0.2	0.1	49.3
415L5	7	4.2	1.8	43.7
415L6	7	3.2	1.9	57.7

Table 3b. Screening Results for GAA – ALL Methods

Specimen	N	Mean ($\mu\text{mol/hr/L}$)	SD	%CV
415L1	7	11.1	5.8	51.9
415L2	7	0.6	0.9	156.6
415L3	7	35.9	22.7	63.1
415L4	7	28.6	14.9	52.2
415L5	7	14.3	8.5	59.0
415L6	7	40.5	25.4	62.7

Table 3c. Screening Results for IDUA - ALL Methods

Specimen	N	Mean ($\mu\text{mol/hr/L}$)	SD	%CV
415L1	7	13.1	5.2	40.1
415L2	7	5.0	0.9	17.1
415L3	7	27.4	13.5	49.2
415L4	7	2.1	0.5	24.3
415L5	7	12.4	6.5	52.6
415L6	7	0.6	0.6	93.0

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**.

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 Breyse, 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:

Carter Asef
Paul Dantonio
Victor R. De Jesus, Ph.D.
Marie C. Earley, Ph.D.
Sharon Flores
Stephanie Foster
Elizabeth M. Hall
Christopher Haynes, Ph.D.
Kameron Khaksarfard
Francis Lee, Ph.D.
Lixia Li, Ph.D.
Timothy Lim, Ph.D.
Daniel Mandel, Ph.D.
Joanne Mei, Ph.D.
Gyliann Peña
Kelsey Sheard
Robert Vogt, Ph.D.
Irene Williams
Golriz Yazdanpanah
Hui Zhou, Ph.D.
Sherri Zobel

Production:

Sarah Brown
Kimberly Coulter
Chinh Nguyen
LoNeka Shockley

ASSOCIATION OF PUBLIC HEALTH LABORATORIES
SILVER SPRING, MD 20910



President

Judith C. Lovchik, Ph.D., D(ABMM)

Chairman, Newborn Screening and Genetics in Public Health Committee

Susan M. Tanksley, Ph.D.

Chairman, Newborn Screening Quality Assurance Quality Control Subcommittee

Patricia R. Hunt, B.A. and Joseph Orsini, Ph.D.

INQUIRIES TO:

Irene Williams, Editor • Centers for Disease Control and Prevention (CDC)
Newborn Screening Quality Assurance Program • Mailstop F-24
4770 Buford Highway, N.E. • Atlanta, GA 30341-3724
Phone (770) 488-4582 • FAX (770) 488-4255 • E-mail: IWilliams1@cdc.gov