

Newborn Screening Quality Assurance Program

LYSOSOMAL STORAGE DISORDER Quarterly Report

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INTRODUCTION

This report is the Quarterly summary of all data reported within the specified data-reporting period for the Quarter 1, 2014, pilot proficiency testing (PT) program for Lysosomal Storage Disorders (LSD) in dried-blood spots (DBS) to detect Krabbe and/or Pompe disease. 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. We distribute this PT report to all participants, state laboratory directors, and program colleagues by request.

On January 13, 2014, a panel of five unknown DBS specimens was distributed to eight laboratories in the United States to analyze Galactocerebrosidase (GALC) for Krabbe disease and/or Acid Alpha-Glucosidase (GAA) for Pompe disease in whole blood.

PARTICIPANT RESULTS

This panel consisted of five DBS specimens 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 114L1, 114L2, 114L3, 114L4, and 114L5).

We processed data from eight participants. Laboratories were asked to report quantitative results for GALC and/or GAA 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 did not include data that were outside the 99% confidence interval, nor did we include summary data for methods reported by

less than two laboratories.

For GALC, six laboratories reported using flow injection analysis MS/MS (FIA-MS/MS), and one used LC-MS/MS. For GAA, six laboratories reported using FIA-MS/MS, one used LC-MS/MS. One laboratory used digital microfluidic technology and therefore not included in the statistical evaluation below.

The expected GALC and GAA 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-b. Specimen certification information is given in Table 2 and overall statistics for GALC and GAA are given in Tables 3a-b.

The mean cutoff for the GALC methods ($n>2$) was 0.50 with a range of 0.30 to 0.79 $\mu\text{mol/hr/L}$; the mean cutoff for the GAA methods ($n>2$) was 3.23 with a range of 2.10 to 4.46 $\mu\text{mol/hr/L}$.

No false positive and no false negative assessments were reported for Krabbe (GALC) while one false positive and no false negative assessments were reported for Pompe (GAA).

The Newborn Screening Quality Assurance Program will ship next Quarter's pilot PT specimens for Krabbe and/or Pompe disease on April 7, 2014. ❖

ACKNOWLEDGMENTS

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CDC/APHL

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

Phone: 770-488-7945
FAX: 770-488-4255
E-mail: JMei@cdc.gov

Editors: Joanne Mei
Irene Williams



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 LYSOSOMAL STORAGE DISORDERS TO DETECT KRABBE AND/OR POMPE DISEASE
 IN DRIED-BLOOD SPOTS
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Table 1a. Frequency of reported Clinical Assessments: KRABBE DISEASE (GALC)

Specimen Number	No follow-up required (Screen Negative)	Follow-up required
114L1	7	0
114L2	7	0
114L3	7	0
114L4	7	0
114L5	0	7

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

Specimen Number	No follow-up required (Screen Negative)	Follow-up required
114L1	8	0
114L2	0	8
114L3	8	0
114L4	8	0
114L5	7	1

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Table 2. Specimen Certification

Specimen Number	Expected GALC (μmol/hr/L)	KRABBE Assessment Code
114L1	3.32	1
114L2	2.17	1
114L3	5.63	1
114L4	8.17	1
114L5	0.08	2
Specimen Number	Expected GAA (μmol/hr/L)	POMPE Assessment Code
114L1	16.30	1
114L2	0.00	2
114L3	18.92	1
114L4	22.64	1
114L5	34.90	1

1 = No Follow-Up Required (Screen Negative)
 2 = Follow-Up Required

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OVERALL STATISTICS

Table 3a. Screening Results for GALC – Mass Spectrometry Methods‡

Specimen	N	Outliers*	Mean (µmol/hr/L)	UL (95%)	LL (95%)
114L1	6	0	3.19	4.41	1.97
114L2	6	0	2.22	3.03	1.40
114L3	6	0	4.84	6.89	2.79
114L4	6	0	6.66	9.46	3.85
114L5	6	0	0.20	0.42	0.00

‡ Data from methods where N<2 are not included.

* Outliers are not included in N

UL = upper limit LL = lower limit

Table 3b. Screening Results for GAA – Mass Spectrometry Methods‡

Specimen	N	Outliers*	Mean (µmol/hr/L)	UL (95%)	LL (95%)
114L1	6	0	14.81	22.53	7.08
114L2	6	0	0.28	0.71	0.00
114L3	6	0	18.23	25.73	10.73
114L4	6	0	20.80	29.99	11.61
114L5	6	0	32.74	42.60	22.88

‡ Data from methods where N<2 are not included.

* Outliers are not included in N

UL = upper limit LL = lower limit

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.

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Director

Division of Laboratory Sciences

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Chief

Newborn Screening and Molecular Biology Branch

Carla Cuthbert, Ph.D.



Contributors: Barbara W. Adam
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.
Nancy Meredith
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
Connie Singleton

ASSOCIATION OF PUBLIC HEALTH LABORATORIES
SILVER SPRING, MD 20910



President

Christine Bean, Ph.D., M.B.A., MT(ASCP)

Chairman, Newborn Screening and Genetics in Public Health Committee

Susan M. Tanksley, Ph.D.

Chairman, Newborn Screening Quality Assurance Quality Control Subcommittee

Patrick Hopkin, B.S.

INQUIRIES TO:

Irene Williams, 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: IWilliams1@cdc.gov