

# Newborn Screening Quality Assurance Program

PROFICIENCY TESTING

Second Tier LC-MS/MS CAHPT  
Quarterly Report

Volume 6, No. 3

August 2016

## INTRODUCTION

This report is the quarterly summary of all data submitted within the specified data-reporting period for Quarter 3, 2016. The attached tables provide the certification profiles for the distributed specimens, the verification of your reported data, the statistical analysis of the quantitative data, and the frequency distribution summaries for expected interpretations. We distribute this proficiency testing (PT) report to all participants, and program colleagues by request.

On July 11, 2016 a panel of five unknown dried blood spot (DBS) specimens prepared with different enrichments of five biomarkers for congenital adrenal hyperplasia (CAH) was distributed to six domestic laboratories and fifteen international laboratories. DBS specimens were prepared at 50% hematocrit.

We processed data from 20 participants. Laboratories were asked to report concentrations of 17-Hydroxyprogesterone (17OHP), 4-Androstenedione (4AD), Cortisol (CORT), 11-Deoxycortisol (11D) and 21-Deoxycortisol (21D) results in ng/mL serum. For the statistical summary analysis, we did not include data that were outside the 99% confidence interval.

Twenty laboratories reported results using tandem mass spectrometry (LC-MS/MS). Thirteen of these labs also reported enzyme immunoassay (EIA) results. The expected analyte concentration values were based on CDC expected values. Overall statistics from EIA (Table 1) and LC-MS/MS (Table 2) methods were combined so as to not identify an individual laboratory.

The frequency distribution of participants' interpretations for screening results is shown in Table 3; your laboratory's interpretations are shown on the Specimen Certification page.

Most programs use a clinical ratio to determine if samples are normal or abnormal. NSQAP uses the formula:  $\text{clinical ratio} = ([17\text{OHP}] + [4\text{AD}])/[\text{CORT}]$ . Samples with a calculated ratio less than the clinical ratio are considered "normal"; those samples with a calculated ratio greater than the clinical ratio are evaluated as "abnormal." Observations on participant reported LC-MS/MS cutoff values are shown in Table 4.

Expected interpretations (qualitative assessments) may differ by participant because of specific assessment practices. When the reported clinical assessment differs from our expected clinical assessment, the grading algorithm is used to evaluate test performance. An explanation of the grading algorithm can be found on the NSQAP data reporting web site or in the annual summary report. Overall, participants reported five False-positive and no False-negative results.

All data are presented in units of ng/mL serum. Participants whose methods yield data in nM whole blood units were asked to multiply by the following factors for conversion to serum concentration: 0.66 (17OHP), 0.57 (4AD), 0.72 (CORT), and 0.69 (11D and 21D). In order to expedite the issuance of this report, data that are not submitted in the requested units (ng/mL serum) will not be accepted. Conversion factors are provided on the CAHPT Data Report Form.

NSQAP will ship the next CAHPT specimens on October 3, 2016. If you have any comments or questions about CAHPT quality assurance issues, contact Dr. Joanne V. Mei at 770-488-7945, or by e-mail at [jvm0@cdc.gov](mailto:jvm0@cdc.gov). ❖

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](mailto:JMei@cdc.gov)

Editor: Joanne Mei  
Irene Williams



CONGENITAL ADRENAL HYPERPLASIA  
SECOND TIER PT PROGRAM FOR LC-MS/MS  
Quarter 3 - August 2016

Table 1. Overall Statistics for 17-Hydroxyprogesterone by EIA.

**OVERALL STATISTICS - 17OHP (ng/mL Serum)**

**EIA SCREENING RESULTS**

Specimen	N	Mean	SD	%CV
316A1	11	0.2	0.3	158.8
316A2	13	10.9	2.9	26.6
316A3	13	48.6	8.7	17.9
316A4	13	97.0	16.5	17.1
316A5	12	10.1	3.3	33.0

Table 2. Overall Statistics for 17-Hydroxyprogesterone, 4-Androstenedione, Cortisol, 11-Deoxycortisol and 21-Deoxycortisol by LC-MS/MS.

**2a. OVERALL STATISTICS - 17OHP (ng/mL Serum)**

Specimen	N	Mean	SD	%CV
316A1	12	0.45	0.38	84.30
316A2	17	14.32	9.17	64.06
316A3	20	49.69	15.93	32.06
316A4	20	100.81	15.71	15.58
316A5	17	13.99	6.63	47.36

**2b. OVERALL STATISTICS - 4AD (ng/mL Serum)**

Specimen	N	Mean	SD	%CV
316A1	11	0.57	1.04	183.55
316A2	17	8.97	3.54	39.50
316A3	20	10.10	4.16	41.16
316A4	20	43.32	13.31	30.73
316A5	17	9.14	3.64	39.86

**2c. OVERALL STATISTICS - CORT (ng/mL Serum)**

<b>Specimen</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>%CV</b>
<b>316A1</b>	12	1.11	1.32	119.13
<b>316A2</b>	17	49.25	13.63	27.67
<b>316A3</b>	20	105.49	21.43	20.31
<b>316A4</b>	20	21.64	6.56	30.31
<b>316A5</b>	17	52.57	9.08	17.27

**2d. OVERALL STATISTICS - 11D (ng/mL Serum)**

<b>Specimen</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>%CV</b>
<b>316A1</b>	8	2.04	5.08	248.43
<b>316A2</b>	12	5.51	1.58	28.69
<b>316A3</b>	13	6.55	2.63	40.25
<b>316A4</b>	13	17.84	4.91	27.53
<b>316A5</b>	12	5.85	1.65	28.12

**2e. OVERALL STATISTICS - 21D (ng/mL Serum)**

<b>Specimen</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>%CV</b>
<b>316A1</b>	8	0.27	0.30	111.43
<b>316A2</b>	9	0.33	0.47	143.92
<b>316A3</b>	10	0.28	0.46	164.31
<b>316A4</b>	12	10.10	4.67	46.19
<b>316A5</b>	9	0.74	0.78	105.04

CONGENITAL ADRENAL HYPERPLASIA  
 SECOND TIER PT PROGRAM FOR LC-MS/MS  
 Quarter 3 - August 2016

Table 3. Frequency Distribution of Participant's Final Interpretations  
 LC-MS/MS METHOD

<b>Specimen</b>	<b>Within Normal Limits (WNL)</b>	<b>Outside Normal Limits (ONL)</b>	<b>Not Reported (NR)</b>
<b>316A1</b>	15	0	5
<b>316A2</b>	15	2	3
<b>316A3</b>	18	2	0
<b>316A4</b>	0	20	0
<b>316A5</b>	16	1	3

Table 4. Frequency of LC-MS/MS Clinical Ratio Cutoff Values

	<b>All Laboratories</b>	<b>Domestic</b>	<b>International</b>
<b>MEAN</b>	1.8	1.6	1.9
<b>MODE</b>	2.5	1.0	2.5
<b>MIN</b>	0.1	1.0	0.1
<b>MAX</b>	5.9	2.5	5.9

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	Lixia Li, Ph.D.
Quan Bui	Timothy Lim, Ph.D.
Paul Dantonio	Daniel Mandel, Ph.D.
Victor R. De Jesus, Ph.D.	Joanne Mei, Ph.D.
Sharon Flores	Gyliann Peña
Elizabeth M. Hall	Sean Scott
Christopher Haynes, Ph.D.	Robert Vogt, Ph.D.
Jessica Hendricks	Irene Williams
Brandon Kenwood	Golriz Yazdanpanah
Francis Lee, Ph.D.	Sherri Zobel

**Production:**

Sarah Brown	LoNeka Shockley
Kimberly Coulter	Kizzy Stewart

**ASSOCIATION OF PUBLIC HEALTH LABORATORIES SILVER SPRING, MD 20910**

**President**

A. Christian Whelen, PhD, D(ABMM)

**Chairman, Newborn Screening and Genetics in Public Health Committee**

Susan Tanksley, Ph.D. and Michele Caggana, Sc.D., FACMG

**Chairman, Newborn Screening Quality Assurance Quality Control Subcommittee**

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

**Chairman, Newborn Screening Molecular Subcommittee**

Rachel Lee, 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 • NSQAPDMT@cdc.gov  
E-mail: IWilliams1@cdc.gov