Newborn Screening Quality Assurance Program

Quarterly Report
Volume 7, No.2

Second-tier Congenital Adrenal Hyperplasia (CAH) Proficiency Testing Program (PT)

2017 Quarter 3 August

Introduction

This report is the Quarterly summary of CAHPT data reported within the specified data-reporting period for Quarter 3, 2017. Reports are distributed to all participants, state laboratory directors, and program colleagues by request. The tables within this report provide certification information for the PT specimen panel, statistical analysis of reported quantitative data, and the frequency distribution summaries for expected interpretations. An evaluation of your reported data is attached to this summary.

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Certification of PT Specimens

The dried blood spot (DBS) specimens were prepared at 50% hematocrit, with different enrichments of five biomarkers for congenital adrenal hyperplasia (CAH); 17 α-hydroxyprogesterone (17OHP), 4-androstenedione (4AD), cortisol (Cort), 11-deoxycortisol (11D), 21-deoxycortisol (21D). Expected values (sum of endogenous and enrichment values) were determined by EIA (17OHP only) and LC-MS/MS. For determination of the Clinical Assessment (CA) NSQAP applies the formula: clinical ratio = ([17OHP] + [4AD])/[CORT]. A cutoff of 1.0 is used to assess whether the specimen is Within Normal Limits (1) or Outside Normal Limits (2).

Table 1. Expected Values (ng/mL serum) and Expected Clinical Assessments (CA)

Specimen	EIA		LC-MS/MS						
	17OHP	CA	17OHP	4AD	Cort	11D	21D	Clinical Ratio	CA
317A1	71.3	2	70.4	43.5	22.3	17.6	11.9	5.1	2
317A2	39.6	2	40.0	27.8	102.6	7.9	1.9	0.7	1
317A3	8.0	1	8.7	22.6	42.2	53.1	11.7	0.7	1
317A4	60.2	2	63.9	26.5	122.1	8.2	1.6	0.7	1
317A5	7.2	1	9.1	22.5	42.4	7.3	1.8	0.7	1

1 = Within Normal Limits 2 = Outside Normal Limits NE = Not Evaluated

Distribution of PT Specimens

On July 10, 2017, a PT panel of DBS specimens was distributed to 5 domestic laboratories and 28 international laboratories.

Participant Results

- Quantitative Data

We received data from 21 participants by the data reporting deadline. Laboratories were asked to report concentrations of 17OHP, 4AD, Cort, 11D and 21D analyzed by Second-tier LC-MS/MS and EIA (optional). For the statistical summary analysis, we did not include data that were outside the 99% confidence interval.

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). Data that are not submitted in the requested units (ng/mL serum) are not accepted. Conversion factors are provided on the CAHPT Data Report Form.

Twenty-one laboratories reported results using tandem mass spectrometry (LC-MS/MS). Sixteen 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 2) and LC-MS/MS (Table 3) methods were combined so as to not identify an individual laboratory.

Table 2. Overall statistics—17OHP (ng/mL serum) by EIA

Specimen	N	Mean	SD
317A1	15	67.5	6.9
317A2	16	39.1	5.9
317A3	16	7.3	1.3
317A4	16	57.6	7.7
317A5	16	7.4	1.5

Table 3. Overall statistics — 17OHP, 4AD, Cort, 11D, 21D (ng/mL serum) by LC-MS/MS

Specimen	17OHP			4AD			Cort			11D			21D		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
317A1	21	71.59	18.2	21	41.74	11.3	21	18.40	4.4	13	16.61	3.6	13	11.19	2.8
317A2	21	41.63	10.6	21	26.86	6.4	21	115.45	20.4	13	7.34	2.6	11	0.71	0.7
317A3	17	9.28	2.2	17	24.50	12.0	17	44.91	7.2	12	55.66	12.5	12	10.36	2.6
317A4	21	67.59	25.9	21	28.55	7.7	21	134.68	22.1	13	6.39	2.4	11	1.76	3.1
317A5	17	8.53	2.0	17	24.39	9.4	17	45.51	8.1	12	6.99	2.5	10	0.77	0.7

♦ Qualitative Clinical Assessments

Qualitative assessments may differ by participant because of specific assessment practices. The frequency distribution of participants' Clinical Assessments for screening results is shown in Table 4.

Most programs use a clinical ratio to determine if samples are normal or abnormal. Samples with a calculated ratio less than the cutoff are considered "normal"; those samples with a calculated ratio greater than the cutoff are evaluated as "abnormal." Observations on participant reported LC-MS/MS cutoff values are summarized in Table 5.

Table 4. Frequency Distribution of Participants' Clinical Assessments (LC-MS/MS)

Specimen	Within Normal Limits (WNL)	Outside Normal Limits (ONL)	Not Reported (NR)
317A1	0	21	0
317A2	19	2	0
317A3*	14	5	2
317A4	17	4	0
317A5	18	1	2

*Specimen 317A3 was not evaluated due to <80% consensus of participating laboratories.

Table 5. Frequency of LC-MS/MS Clinical Ratio Cutoff Values

Specimen	All Laboratories	Domestic	International
MEAN	1.94	1.38	2.13
MODE	1.00	1.00	2.50
MIN	0.10	1.00	0.10
MAX	9.00	2.50	9.00

Evaluations

Participants reported seven False-positive and no False-negative results based on the LC-MS/MS final Clinical Assessment.

Future Shipments

The Newborn Screening Quality Assurance Program will ship next quarter's PT specimens for CAHPT on October 2, 2017.

Direct Inquiries

If you have any comments or questions about CAHPT MS/MS analysis, contact Dr. Joanne V. Mei at 770-488-7945 or by e-mail at jvm0@cdc.gov

For data reporting questions, contact Irene Williams at nsqapdmt@cdc.gov

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

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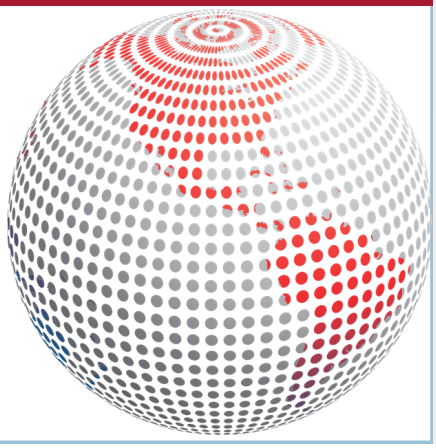

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