

Newborn Screening Quality Assurance Program

PROFICIENCY TESTING

**Cystic Fibrosis Mutation Detection
Quarterly Report**

Volume 8, No. 1

February 2014

INTRODUCTION

This report is the quarterly summary of all data reported within the specified data-reporting period for the Quarter 1, 2014 program for cystic fibrosis (CF) mutation detection. The attached tables provide the certification profiles for the distributed specimens, the verification of your reported data, the summary of reported genotypes, and the frequency distribution summary for expected interpretations. 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 dried-blood-spot (DBS) specimens was distributed to 33 laboratories in the United States and 34 laboratories in other countries to detect mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene.

PARTICIPANT RESULTS

This panel consisted of five DBS specimens prepared from adult CF patients, carriers or unaffected individuals (specimens 114C1, 114C2, 114C3, 114C4, and 114C5).

The algorithm for evaluating reported data has changed. Evaluations are based on the genotype and clinical assessment of each specimen. Each clinical assessment counts as 10% and each allele counts as 5% of the assessment. Expected genotypes may differ by participant because of the panel of mutations, screening algorithm, or method used. In these cases, an answer of “no mutation detected” is acceptable and participants will receive a 100% Satisfactory assessment.

We processed data from 60 participants. Laboratories were asked to report the method used and the genotype for each

specimen. Methods varied widely with regard to the panel of mutations detected, the algorithm used for testing, and DNA extraction methods used. These methods and the number of laboratories that use them are shown in tables included in this report.

One laboratory reported an incorrect genotype for Specimens 114C3. One laboratory did not report alleles for any of the specimens and received a reduced evaluation for each missing allele.

The Newborn Screening Quality Assurance Program will ship next quarter’s Cystic Fibrosis Mutation Detection PT specimens on April 7, 2014.

One laboratory did not receive an evaluation because they used the wrong data report form. Please note that in order to receive an evaluation, you must use the current data report form. This form can be downloaded from our website at http://www.cdc.gov/labstandards/nsqip_resources.html#QCReportForms

ACKNOWLEDGMENTS

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CDC/APHL

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

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NEWBORN SCREENING QUALITY ASSURANCE PROGRAM

CYSTIC FIBROSIS MUTATION DETECTION SURVEY

QUARTER 1 – FEBRUARY 2014

SPECIMEN CERTIFICATION

Specimen	Allele 1	Allele 2	Expected Clinical Assessment
114C1	F508del (p.Phe508del)	No mutations detected	2
114C2	F508del (p.Phe508del)	R553X (p.Arg553X)	2
114C3	F508del (p.Phe508del)	621+1G ->T (c.489+1G>T)	2
114C4	F508del (p.Phe508del)	F508del (p.Phe508del)	2
114C5	No mutations detected	No mutations detected	1

1 = screen negative (normal)

2 = 1 or 2 mutations detected

Alleles were determined/confirmed by CDC and/or were included with the samples from the provider.

OVERALL FREQUENCY OF CLINICAL ASSESSMENTS

SPECIMEN ID	SCREEN NEGATIVE (Normal)	SCREEN POSITIVE (1 or 2 mutations detected)	NOT ASSESSED	NO DATA SUBMITTED	LATE*	INCORRECT CLINICAL ASSESSMENTS**
114C1	0	60	1	6	0	0
114C2	0	60	1	6	0	0
114C3	0	59	2	6	0	0
114C4	0	60	1	6	0	0
114C5	0	59	2	6	0	0

*Late results are maintained by NSQAP, but not included in evaluation statistics

**Methods vary widely based upon panel of mutations detected, the algorithm used for testing, and DNA extraction methods.

OVERALL FREQUENCY OF REPORTED GENOTYPES

	F508del	R553X	621+1G>T	NO MUTATIONS DETECTED*	NO GENOTYPE REPORTED (Cell left blank)	INCORRECT GENOTYPE (by allele)	INCORRECT CLINICAL ASSESSMENTS**
114C1	Allele 1				1	0	0
	Allele 2			59			
114C2	Allele 1				1	0	0
	Allele 2	54		5			
114C3	Allele 1						
	Allele 2		50	8	2	1	0
114C4	Allele 1						
	Allele 2				1	0	0
114C5	Allele 1				1	0	0
	Allele 2			59			
				59			

*Methods vary widely with regard to the panel of mutations detected, the algorithm used for testing, and DNA extraction methods. These factors are considered in evaluation determination.

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PRIMARY METHODS

	Number of Laboratories
CF1 Hologic CF Inplex Molecular Test - ACMG	5
CF2 Hologic CF Inplex Molecular Test 40+4	17
CF3 Luminex Molecular Diagnostics xTAG CF - ACMG only	1
CF4 Luminex Molecular Diagnostics CFTR IVD 39 v2	7
CF5 Luminex Molecular Diagnostics xTAG CF 60 v2	1
CF6 Luminex Molecular Diagnostics xTAG CF 71 v2	1
CF7 Luminex Platform and Laboratory Developed Test	1
CF8 Hologic Gen-Probe Elucigene CF4v2	1
CF10 Hologic Gen-Probe Elucigene CF30	3
CF12 Abbott Molecular CF Genotyping Assay v3	4
CF15 Innogenetics Inno-LiPA Strips 17+19	3
CF16 Sequenom (MALDI-TOF Mass Spectrometry)	2
CF20 Allele-specific Oligonucleotide PCR	2
CF21 High Resolution Melt Technology	3
CF23 In-house Amplification Refractory Mutation System	1
CF27 Amplification and Restriction Fragment Length Polymorphism Analysis (PCR-RFLP)	2
CF28 Amplification and Polyacrylamide Gel Electrophoresis (PCR-PAGE)	2
CF29 Sequencing	1
CF19 Other	2

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SECONDARY METHODS

	Number of Laboratories
CF1 Hologic CF Inplex Molecular Test - ACMG	1
CF2 Hologic CF Inplex Molecular Test 40+4	6
CF4 Luminex Molecular Diagnostics CFTR IVD 39 v2	5
CF12 Abbott Molecular CF Genotyping Assay v3	3
CF14 Innogenetics Inno-LiPA Strip 19	1
CF15 Innogenetics Inno-LiPA Strips 17+19	1
CF16 Sequenom (MALDI-TOF Mass Spectrometry)	3
CF17 ViennaLab Diagnostics GmbH CF StripAssay	1
CF25 PCR/Heteroduplex Analysis/Gel Electrophoresis	1
CF26 Capillary Electrophoresis	1
CF28 Amplification and Polyacrylamide Gel Electrophoresis (PCR-PAGE)	1
CF29 Sequencing	7
CF99 No response	27
CF19 Other	2

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EXTRACTION METHODS

	Number of Laboratories
X1 Qiagen QIAamp spin columns (manual or robotic)	5
X2 Qiagen magnetic bead kit (EZ1 or BioSprint 96)	1
X3 Qiagen Generation DNA Purification & DNA Elution Solutions	22
X4 Sigma Aldrich Extract-N-Amp	1
X5 in-house alkaline lysis prep	7
X6 in-house MeOH boiling prep	4
X7 in-house lysis boiling prep	2
X18 No response	5
X19 Other	13

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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