

Newborn Screening Quality Assurance Program

PROFICIENCY TESTING

**Cystic Fibrosis Mutation Detection
Quarterly Report**

Volume 7, No. 3

August 2013

INTRODUCTION

This report is the quarterly summary of all data reported within the specified data-reporting period for the Quarter 3, 2013 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 July 8, 2013 a panel of five unknown dried-blood-spot (DBS) specimens was distributed to 33 laboratories in the United States and 33 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 313C1, 313C2, 313C3, 313C4, and 313C5).

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 58 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 incorrect genotype was reported for specimen 313C3. The Newborn Screening Quality Assurance Program will ship next quarter's Cystic Fibrosis Mutation Detection PT specimens on October 7, 2013.

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/nsqap.html>.

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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CYSTIC FIBROSIS MUTATION DETECTION SURVEY

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SPECIMEN CERTIFICATION

Specimen	Allele 1	Allele 2	Expected Clinical Assessment
313C1	F508del (p.Phe508del)	F508del (p.Phe508del)	2
313C2	No mutations detected	No mutations detected	1
313C3	F508del (p.Phe508del)	1717-1G->A (c.1585-1G->A)	2
313C4	No mutations detected	No mutations detected	1
313C5	1717-1G->A (c.1585-1G->A)	1154insTC (c.1022_1023insTC)	2

1 = screen negative (normal)

2 = 1 or 2 mutations detected

Alleles were determined and/or confirmed by CDC.

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FREQUENCY OF REPORTED CLINICAL ASSESSMENTS

Specimen	Screen Negative (Normal)	Screen Positive (1 or 2 mutations detected)
313C1	0	58
313C2	58	0
313C3	0	58
313C4	58	0
315C5	8	50

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INCORRECT ASSESSMENTS AND GENOTYPES

Specimen	Incorrect Genotype	Incorrect Clinical Assessment
313C1	0	0
313C2	0	0
313C3	1	0
313C4	0	0
313C5	0	0

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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	16
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	4
CF16 Sequenom (MALDI-TOF Mass Spectrometry)	1
CF17 ViennaLab Diagnostics GmbH CF StripAssay	1
CF20 Allele-specific Oligonucleotide PCR	1
CF21 High Resolution Melt Technology	2
CF22 Real-time PCR Allelic Discrimination Assay (ie TaqMan)	2
CF23 In-house Amplification Refractory Mutation System	1
CF25 PCR/Heteroduplex Analysis/Gel Electrophoresis	1
CF27 Amplification and Restriction Fragment Length Polymorphism Analysis (PCR-RFLP)	3
CF28 Amplification and Polyacrylamide Gel Electrophoresis (PCR-PAGE)	1
CF29 Sequencing	1

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SECONDARY METHODS

	Number of Laboratories
CF1 Hologic CF Inplex Molecular Test - ACMG	2
CF2 Hologic CF Inplex Molecular Test 40+4	4
CF4 Luminex Molecular Diagnostics CFTR IVD 39 v2	5
CF12 Abbott Molecular CF Genotyping Assay v3	2
CF14 Innogenetics Inno-LiPA Strip 19	1
CF15 Innogenetics Inno-LiPA Strips 17+19	1
CF16 Sequenom (MALDI-TOF Mass Spectrometry)	1
CF21 High Resolution Melt Technology	1
CF22 Real-time PCR Allelic Discrimination Assay (ie TaqMan)	1
CF25 PCR/Heteroduplex Analysis/Gel Electrophoresis	1
CF27 Amplification and Restriction Fragment Length Polymorphism Analysis (PCR-RFLP)	1
CF28 Amplification and Polyacrylamide Gel Electrophoresis (PCR-PAGE)	1
CF29 Sequencing	6

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EXTRACTION METHODS

	Number of Laboratories
X1 Qiagen QIAamp spin columns (manual or robotic)	3
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	4
X6 in-house MeOH boiling prep	3
X7 in-house lysis boiling prep	6
X18 No response	10
X19 Other	8

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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