

# Newborn Screening Quality Assurance Program

PROFICIENCY TESTING

Cystic Fibrosis Mutation Detection  
Quarterly Report

Volume 8, No. 2

May 2014

## INTRODUCTION

This report is the quarterly summary of all data reported within the specified data-reporting period for the Quarter 2, 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 April 7, 2014 a panel of five unknown dried blood spot (DBS) specimens was distributed to 32 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 214C1, 214C2, 214C3, 214C4, and 214C5).

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 59 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.

Two laboratories reported an incorrect genotype for specimen 214C2. One laboratory reported an incorrect genotype for specimen 214C4. The 3272-26A>G mutation in specimen 214C5 is included in eight primary methods reported by participants. Based on reported information, 11 participants were able to detect this mutation. For the other participants, this specimen was not evaluated. One laboratory reported an incorrect genotype for specimen 214C5 and another laboratory reported an incorrect genotype and an incorrect clinical assessment for specimen 214C5. The Newborn Screening Quality Assurance Program will ship next quarter's Cystic Fibrosis Mutation Detection PT specimens on July 14, 2014.

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\\_resources.html#QCReportForms](http://www.cdc.gov/labstandards/nsqap_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).

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

Phone: 770-488-7828  
FAX: 770-488-4255  
E-mail: MEarley@cdc.gov

Editor: Marie Earley  
Production: Connie Singleton  
Sarah Brown



NEWBORN SCREENING QUALITY ASSURANCE PROGRAM

CYSTIC FIBROSIS MUTATION DETECTION SURVEY

QUARTER 2 – MAY 2014

SPECIMEN CERTIFICATION

Specimen	Allele 1	Allele 2	Expected Clinical Assessment
214C1	No mutations detected	No mutations detected	1
214C2	F508del (p.Phe508del)	2183AA->G (c.2051_2052delAAinsG)	2
214C3	No mutations detected	No mutations detected	1
214C4	F508del (p.Phe508del)	F508del (p.Phe508del)	2
214C5	F508del (p.Phe508del)	3272-26A->G (c.3140-26A->G)	2

1 = screen negative (normal)

2 = 1 or 2 mutations detected

Alleles were determined or confirmed by CDC.

**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**
214C1	58	0	1	4	2	0
214C2	0	58	0	5	2	0
214C3	58	0	1	4	2	0
214C4	0	58	0	5	2	0
214C5	2	4	52	5	2	1

\*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. These factors are considered in evaluation determination.

**OVERALL FREQUENCY OF REPORTED GENOTYPES**

Specimen ID and Alleles	F508del	2183delAA>G	3272-26A->G	NO MUTATIONS DETECTED*	NO GENOTYPE REPORTED (Cell left blank)	INCORRECT GENOTYPE (by allele)	INCORRECT CLINICAL ASSESSMENTS**
214C1 Allele 1				57	2	0	0
214C1 Allele 2				56	3	0	
214C2 Allele 1	58			0	1	0	0
214C2 Allele 2		47		9	1	2	
214C3 Allele 1				57	2	0	0
214C3 Allele 2				56	3	0	
214C4 Allele 1	58			0	1	0	0
214C4 Allele 2	57			1	1	1	
214C5 Allele 1	52	0	0	6	1	0	1
214C5 Allele 2	5		10	43	1	2	

\*Methods vary widely with regard to the panel of mutations detected, the algorithm used for testing, and DNA extraction methods.

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These factors are considered in evaluation determination.

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CYSTIC FIBROSIS MUTATION DETECTION SURVEY

QUARTER 2 - MAY 2014

PRIMARY METHODS

	Number of Laboratories
CF1 Hologic CF Inplex Molecular Test - ACMG	7
CF2 Hologic CF Inplex Molecular Test 40+4	14
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	2
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	3
CF15 Innogenetics Inno-LiPA Strips 17+19	3
CF16 Sequenom (MALDI-TOF Mass Spectrometry)	4
CF20 Allele-specific Oligonucleotide PCR	2
CF21 High Resolution Melt Technology	3
CF27 Amplification and Restriction Fragment Length Polymorphism Analysis (PCR-RFLP)	1
CF28 Amplification and Polyacrylamide Gel Electrophoresis (PCR-PAGE)	1
CF29 Sequencing	1
CF19 Other	4

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM

CYSTIC FIBROSIS MUTATION DETECTION SURVEY

QUARTER 2 - MAY 2014

SECONDARY METHODS

	Number of Laboratories
CF1 Hologic CF Inplex Molecular Test - ACMG	4
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	2
CF16 Sequenom (MALDI-TOF Mass Spectrometry)	2
CF17 ViennaLab Diagnostics GmbH CF StripAssay	1
CF26 Capillary Electrophoresis	1
CF28 Amplification and Polyacrylamide Gel Electrophoresis (PCR-PAGE)	1
CF29 Sequencing	6
CF19	2

NEWBORN SCREENING QUALITY ASSURANCE PROGRAM

CYSTIC FIBROSIS MUTATION DETECTION SURVEY

QUARTER 2 - MAY 2014

EXTRACTION METHODS

	Number of Laboratories
X1 Qiagen QIAamp spin columns (manual or robotic)	6
X2 Qiagen magnetic bead kit (EZ1 or BioSprint 96)	1
X3 Qiagen Generation DNA Purification & DNA Elution Solutions	21
X4 Sigma Aldrich Extract-N-Amp	1
X5 in-house alkaline lysis prep	7
X6 in-house MeOH boiling prep	3
X7 in-house lysis boiling prep	3
X19 Other	14

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**

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Robin Ikeda, M.D., M.P.H.

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**Division of Laboratory Sciences**

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**Chief**

**Newborn Screening and Molecular Biology Branch**

Carla Cuthbert, Ph.D.



**Contributors:** Barbara W. Adam  
Suzanne Cordovado, Ph.D.  
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.  
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:**

*Marie Earley, 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: MEarley@cdc.gov*