



Newborn Screening Quality Assurance Program

PROFICIENCY TESTING

Cystic Fibrosis Mutation Detection Quarterly Report

Volume 6, No. 1

February 2012

INTRODUCTION

This report is the quarterly summary of all data reported within the specified data-reporting period for the Quarter 1, 2012, 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 distributions summary for expected interpretations. We distribute this PT report to all participants, state laboratory directors, and program colleagues by request.

On April 2, 2012, a panel of five unknown dried-blood-spot (DBS) specimens was distributed to 30 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 112C1, 112C2, 112C3, 112C4, and 112C5).

Evaluations are based on the clinical assessment of each specimen. Expected genotypes may differ by participant because of the panel of mutations tested. In these cases, an answer of “no mutation detected” is acceptable. A specimen is considered not evaluated when both of the expected mutations are not detected by the laboratory’s method or if the specimen cannot be assayed (sample failure).

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 and the algorithm used for testing. The specific methods and the number of laboratories that use them are shown in the Laboratory Methods Table. Some laboratories screen specimens for a limited number of mutations and if a mutation was present, continue testing with an expanded panel. Laboratories were not asked to report the maximum number of mutations that could be detected.

No incorrect clinical assessments were reported. Sample failure was reported for specimens 112C1 and 112C5, and one laboratory did not report any clinical assessments. The Newborn Screening Quality Assurance Program will ship next quarter’s Cystic Fibrosis Mutation Detection PT specimens on April 2, 2012. ❖

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 2012

LAB XXX

DATA VERIFICATION

| Specimen Number | Allele 1 | Allele 2 | Clinical Assessment |
|------------------------|-----------------|-----------------|----------------------------|
| 112C1 | | | |
| 112C2 | | | |
| 112C3 | | | |
| 112C4 | | | |
| 112C5 | | | |

| |
|---------------------|
| Reviewer's Comments |
| EVALUATION: |

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FREQUENCY OF REPORTED CLINICAL ASSESSMENTS

| Specimen | Screen Negative (Normal) | Screen Positive (1 or 2 mutations detected) | Sample Failure | Clinical Assessment Not Reported |
|----------|--------------------------|---|----------------|----------------------------------|
| 112C1 | 55 | 0 | 3 | 1 |
| 112C2 | 0 | 58 | 0 | 1 |
| 112C3 | 0 | 58 | 0 | 1 |
| 112C4 | 0 | 58 | 0 | 1 |
| 112C5 | 54 | 0 | 4 | 1 |

INCORRECT ASSESSMENTS AND SPECIMENS NOT EVALUATED

| Specimen | Incorrect Assessment | Not Evaluated* |
|----------|----------------------|----------------|
| 112C1 | 0 | 4 |
| 112C2 | 0 | 1 |
| 112C3 | 0 | 1 |
| 112C4 | 0 | 1 |
| 112C5 | 0 | 5 |

*Includes sample failures, no reported clinical assessments, and when both mutations are not part of the laboratory's mutation panel.

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LABORATORY METHODS

| Method | Number of Laboratories |
|---|------------------------|
| Hologic (Third Wave Technologies) Invader Assay | 20 |
| Luminex Molecular Diagnostics X-Tag Cystic Fibrosis kit | 9 |
| Innogenetics Inno-LIPA | 7* |
| Abbott Laboratories | 6 |
| Gen-Probe Elucigene Assay (CF-29, CF-30, CF-4, or CF-EU) | 5* |
| Allelic discrimination assay (i.e. TaqMan assay) | 3 |
| Amplification / gel electrophoresis | 3* |
| PCR/Restriction fragment length polymorphism analysis | 2* |
| Sequencing | 2* |
| High Resolution Melt Technology | 1 |
| Allele-specific oligonucleotide PCR | 1 |
| In-house single nucleotide primer extension assay (SNUPe) | 1 |
| Capillary electrophoresis visualization | 1* |
| In-house assay | 1* |
| Autogenomics INFINITI® CFTR-15 Assay | 1 |
| Not reported | 1 |

*Assays used in addition to another method listed.

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SPECIMEN CERTIFICATION

| Specimen | Allele 1 (Colloquial name) | Allele 2 (Colloquial name) | Allele 1 (Standard name) | Allele 2 (Standard name) | Expected Clinical Assessment |
|----------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|------------------------------|
| 112C1 | Wild Type | Wild Type | Wild Type | Wild Type | 1 |
| 112C2 | 1898+1G>A | F508del | c.1766+1G->A | p.Phe508del | 2 |
| 112C3 | F508del | F508del | p.Phe508del | p.Phe508del | 2 |
| 112C4 | R347P | F508del | p.Arg347Pro | p.Phe508del | 2 |
| 112C5 | Wild Type | Wild Type | Wild Type | Wild Type | 1 |

1 = screen negative (normal) 2 = One or two mutations detected, presumptive CF carrier or case

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

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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