

Prepared for:

**The Office of the National Coordinator for Health
Information Technology**



An Open Source Meaningful Use Stage 2 Clinical Quality Measure Testing and Certification Tool

V2.0 User Guide

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Table of Contents

Target Audience	5
Cypress Testing Capabilities	5
1. Capture and Export	5
Figure 1: Capture and Export	7
2. Import and Calculate	7
3. Electronic Submission	7
Figure 2: Import, Calculate and Electronic Submission	8
Testing Procedure Overview	9
Figure 2: Authorized Testing Lab Workflow Illustration	9
User Guide Detailed Description	10
Accessing Cypress	10
Figure 4: Cypress Login in	10
Figure 5: Cypress Account and Terms and Conditions	11
Figure 6: Cypress Account Creation	12
Cypress Administrative Functions.....	13
Figure 7: Certification Dashboard No Vendors Added.....	13
Figure 8: Account Password Update.....	14
Figure 9: Cypress Feedback Mechanisms	15
Figure 10: Cypress v2.0 Logout.....	15
Figure 11: Master Patient List of Test Patients.....	16
Figure 12: Patient Test Record Data Requirements and CQM Qualifiers	17
Figure 13: Downloaded Patient Data Zip File	17
Prepare for Cypress v2.0 Testing	18
Figure 14: Certification Dashboard Select Add Vendor	18
Figure 15: Vendor and Contact Form	19
Figure 16: Vendor Certification Dashboard with no products added.....	19
Figure 17: EHR Product form	20
Figure 18: Certification Dashboard showing a vendor with one product added.....	20
Figure 19: Dashboard showing Product and No Tests Added	21
Figure 20: Create New Test - Step 1 Basic Information	21
Figure 21: Create New Test - Step 2 CQM selection	22
Figure 22: New Test Created	22
Figure 23: Dashboard with no Test Executions	23
Test Execution.....	23
Figure 24: Download Patient Data for Import	24

Figure 25: Listing of Zip file HTML Patient Test Data for selected CQMs to be tested	25
Figure 26: HTML for one Patient Record	26
Figure 27: Upload test execution results	27
Figure 28: Test execution with validation errors	28
Figure 29: Details of test execution with errors	29
Figure 30: Test execution with no errors calculated results against expected results	30
Submit.....	32
Verify	33
Acronyms	34

Target Audience

Cypress v2.0 is the rigorous and repeatable testing tool of Electronic Health Records (EHRs) and EHR modules in calculating Meaningful Use (MU) Stage 2 Clinical Quality Measures (CQMs). Cypress v2 serves as the official testing tool for the 2014 EHR Certification program supported by the Office of the National Coordinator for Health IT (ONC).

The Cypress v2.0 User Guide has been developed for use by test proctors supporting the Meaningful Use Stage 2 program to test and certify Electronic Health Record (EHR) systems at Authorized Testing Labs (ATLs). The Cypress v2.0 User Guide may also be used by EHR software engineers, quality assurance engineers, and production release engineers who wish to use Cypress in a pre-testing mode to understand how their EHR product will perform when an ATL performs an operational test with their respective EHR product.

The Cypress v2.0 User Guide provides instructions on how to use the Cypress Testing Tool Software. This Cypress v2.0 User Guide assumes you have downloaded the Cypress v2.0 open source software and discusses the requirements and steps for testing Electronic Health Record (EHR) technology for the calculation and reporting of Clinical Quality Measures (CQM).

The Cypress tool is open source and freely available for use or adoption by the health IT community including EHR vendors and testing labs. Information detailing the setup and configuration of Cypress v2.0 open source software is available via the open source project website <http://projectcypress.org>.

Cypress Testing Capabilities

The Cypress v2.0 software verifies three required clinical quality measure (CQM) capabilities for EHR certification. These include:

1. Capture and Export

Capture - EHR technology seeking certification must be able to electronically record all of the data identified in the specified procedure, §170.314(c), that would be necessary to calculate each CQM. Data required for CQM exclusions or exceptions must be codified entries, which may include specific terms as defined by each CQM, or may include codified expressions of “patient reason,” “system reason,” or “medical reason.”

Export- EHR technology must be able to electronically export a data file formatted in accordance with the Quality Reporting Document Architecture (QRDA) Category I standard that includes all of the data captured for each and every CQM to which EHR technology is being certified.

The basic concept for Capture and Export is shown below in Figure 1. The primary purpose of this step is the verification of the EHR technology's ability to export data in the proper QRDA Category 1 format, and with the proper Quality Data Model (QDM) data elements.

To verify this, Cypress produces static patient data for each of the CQMs that are to be tested, and exports the relevant patients. This data is then entered into the EHR. The EHR is then commanded to export the patient test data as a set of QRDA Category I files containing the proper elements from the QDM that are required to calculate the CQMs that are being tested. These QRDA files are loaded back into Cypress where they are tested for validity (valid QRDA Category I Extensible Markup Language (XML) documents) and correctness (contain only the elements required to calculate the CQMs, and no more).

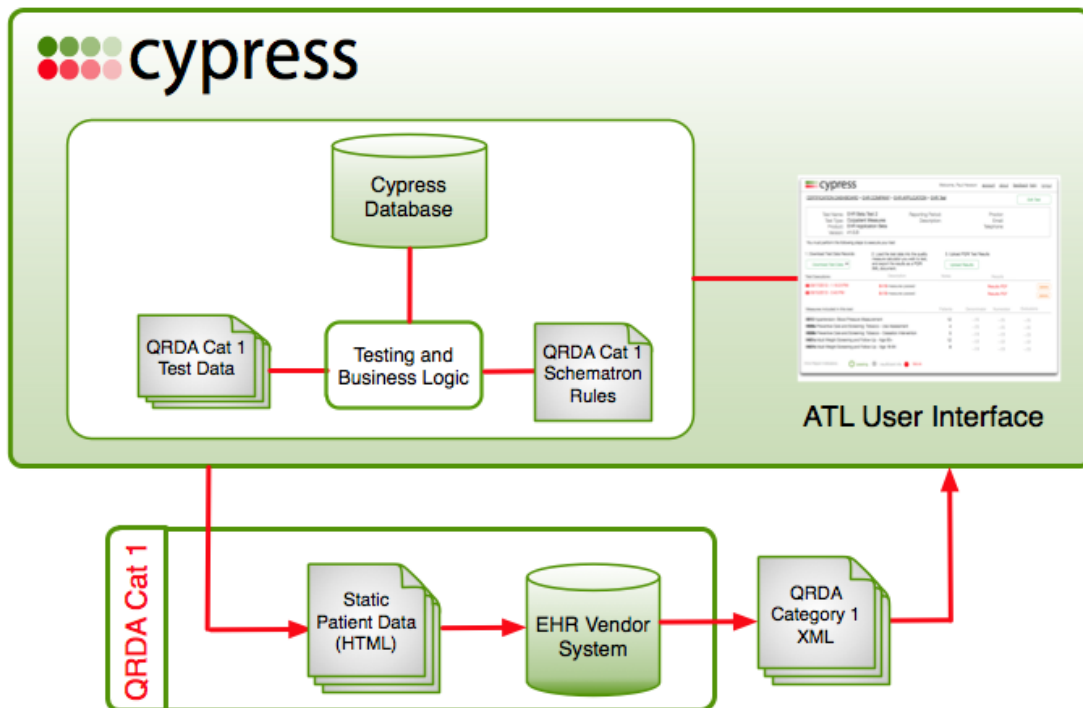


Figure 1: Capture and Export

2. Import and Calculate

Import - EHR technology must be able to electronically import a data file formatted in the QRDA Category I format.

Calculate - EHR technology must be able to electronically calculate each and every clinical quality measure for which it is presented for certification.

3. Electronic Submission

Electronic Submission - Enables a user to electronically create a data file in QRDA Category III format for transmission of clinical quality measurement data that can be electronically accepted by Centers for Medicare & Medicaid Services (CMS).

The basic concept for Import, Calculate and Electronic Submission is shown below in Figure 2.

2. The purpose of these steps, is for the automated verification that an EHR system can:

- Import and calculate the CQM results for the quality measures being certified based on the synthetic patient data that Cypress presents to the EHR system under test.

- Generate a properly formatted summary CQM report that could be electronically submitted using QRDA Category III format.

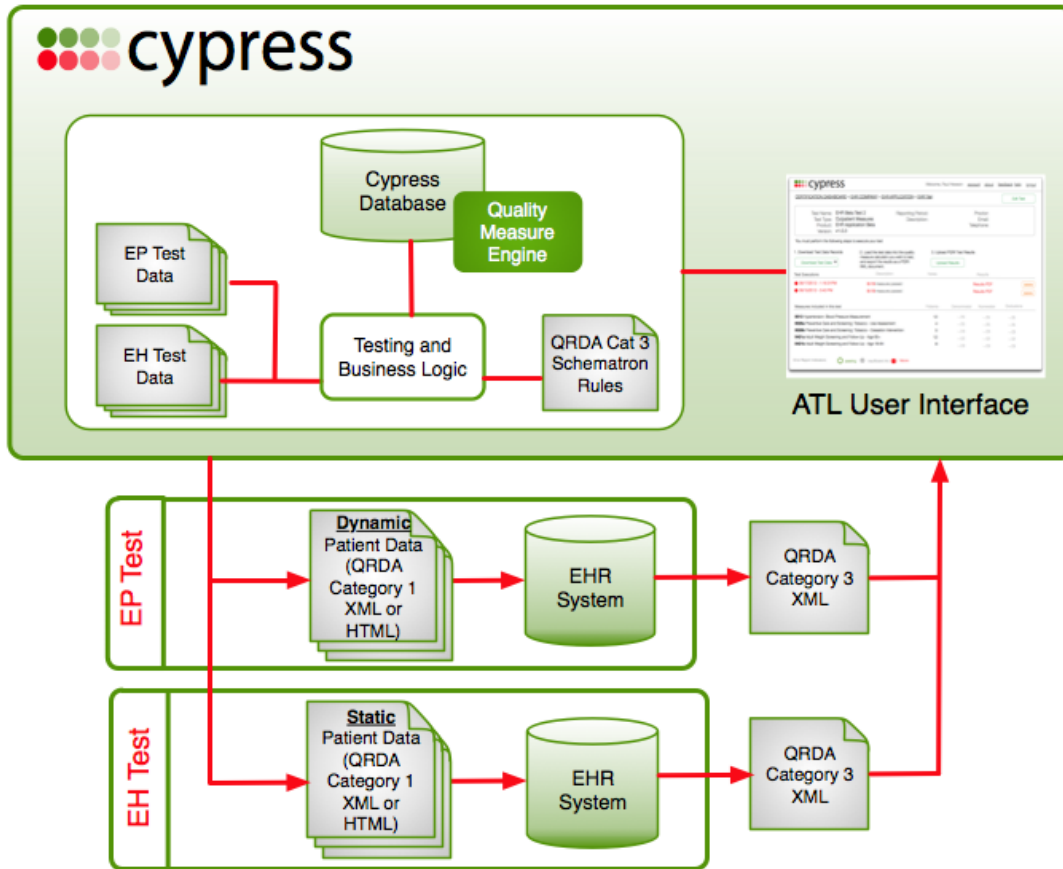


Figure 2: Import, Calculate and Electronic Submission

Testing Procedure Overview

The Figure 3 graphic below provides a general workflow of a test performed with Cypress and description of how the test procedure is organized and conducted. This test procedure is based on the ONC approved and the National Institute of Standards and Technology (NIST) published procedure augmented to include Cypress as a software tool for testing the accurate calculation, submission and degree of correctness of the CQMs.

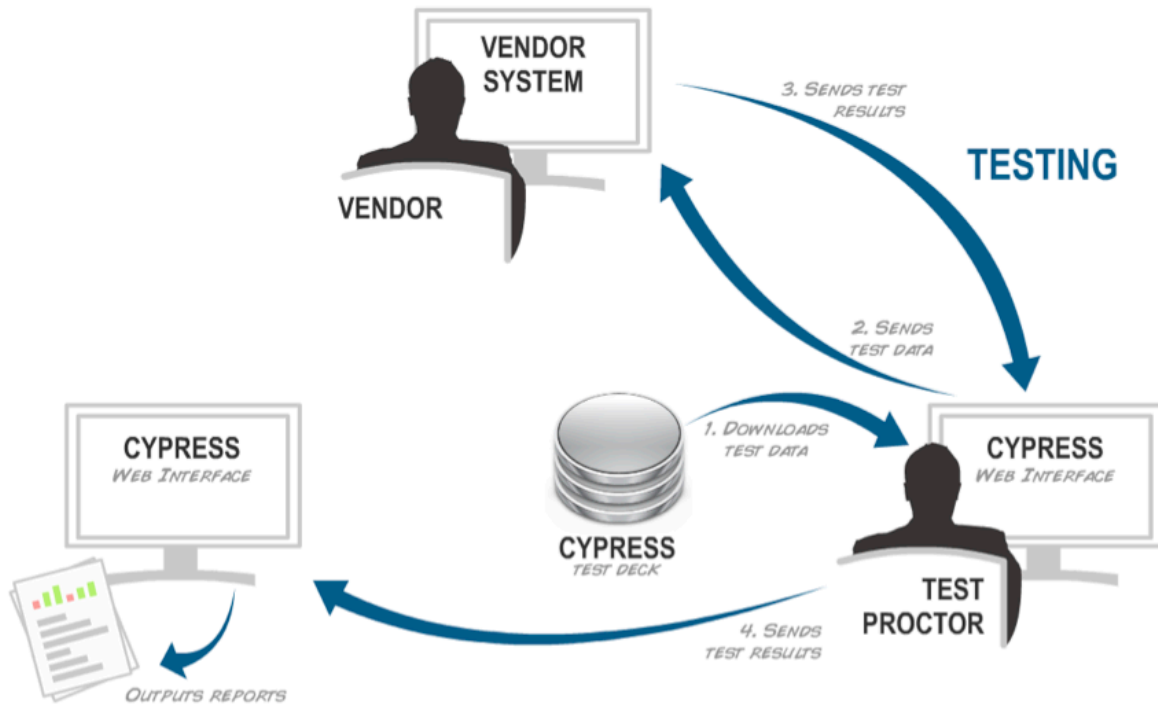


Figure 2: Authorized Testing Lab Workflow Illustration

This test procedure is centered on the open source software tool, Cypress. Cypress is capable of performing the following types of tests in support of CQM certification:

1. XML Data conformance testing of the Quality Reporting Document Architecture (QRDA) Category 1 standard for individual patient-level data used for CQM calculation
2. XML Data conformance testing of the Quality Reporting Document Architecture (QRDA) Category III standard for aggregate reporting of CQM calculation
3. Accuracy calculation testing of the Meaningful Use Stage 2 Eligible Professional (EP) CQMs
4. Accuracy calculation testing of the Meaningful Use Stage 2 Eligible Hospital (EH) CQMs

A complete description of the Cypress Testing Procedure can be found via the Cypress website at <http://projectcypress.org/resources.html>.

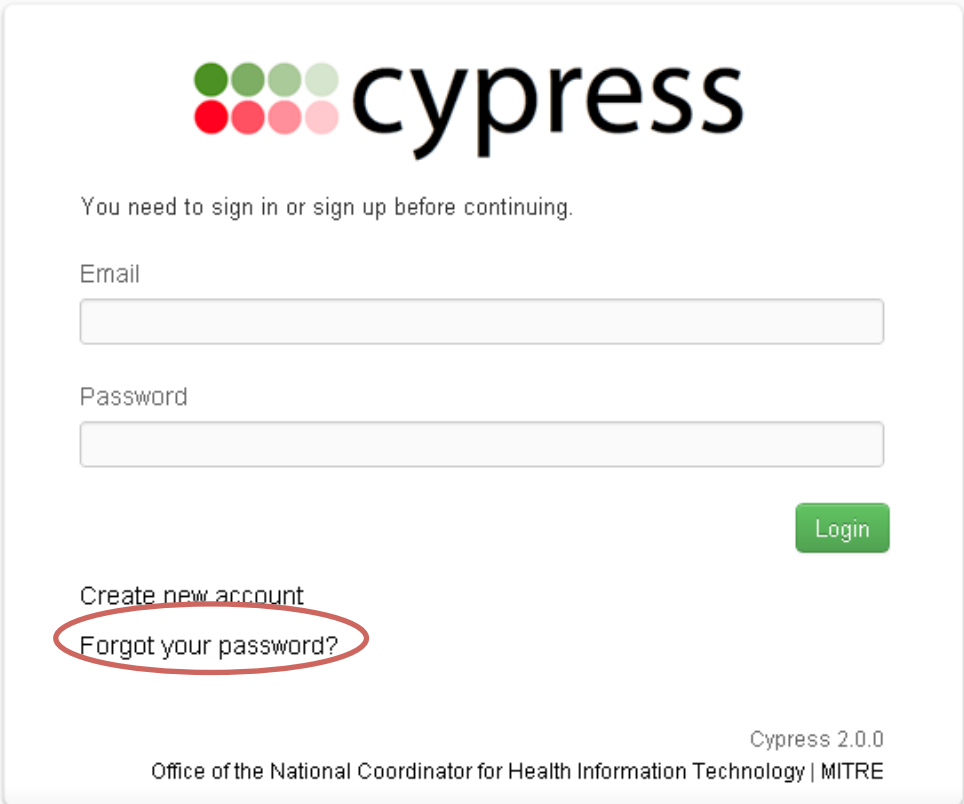
User Guide Detailed Description

Accessing Cypress

- To access and download the Cypress Software go to <http://projectcypress.org>
- There are several options and detailed instructions there for downloading and installing the Cypress software. This document is not meant to provide instructions for downloading the Cypress software, so if you need to install the software, please follow the Cypress Download Instructions.

Once you have downloaded and installed the Cypress Software, you should be able to access Cypress system via a URL, bookmark or icon you have created.

- Once you access your installed instance of Cypress, enter your Email and Password and choose **Create a new account**.

The image shows the Cypress login interface. At the top is the Cypress logo, which consists of eight colored circles (green, red, and pink) followed by the word "cypress" in a lowercase, sans-serif font. Below the logo, the text "You need to sign in or sign up before continuing." is displayed. There are two input fields: "Email" and "Password". To the right of the "Password" field is a green "Login" button. Below the "Login" button, the text "Create new account" and "Forgot your password?" are displayed. The "Forgot your password?" text is circled in red. At the bottom right, the text "Cypress 2.0.0" is displayed. At the bottom center, the text "Office of the National Coordinator for Health Information Technology | MITRE" is displayed.

You need to sign in or sign up before continuing.

Email

Password

Login

Create new account

Forgot your password?

Cypress 2.0.0

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Figure 4: Cypress Login in

- If you have previously set up an account, enter your email and password and select Login.
- If you have previously created an account and forgotten your password, enter your email and select 'Forgot your Password?' And you will be sent a link to reset your password.
- Create New Account will bring you to the Account Creation and Terms and Conditions

cypress

* First name * Last name

* Email Telephone

* Password * Password confirmation

Must be at least 6 characters long.

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[Sign in](#) [Forgot your password?](#)

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Page.

Figure 5: Cypress Account and Terms and Conditions

- To create an account, enter your First and Last Name, Email, Telephone and enter a Password and confirm your Password
- Read the Terms and conditions and check 'Agree' and select "Create" to create your Cypress Account

 **cypress**

* First name * Last name

* Email Telephone

* Password * Password confirmation

Must be at least 6 characters long.

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☒ I agree to the above terms and conditions of use

Sign in
 Forgot your password?

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Figure 6: Cypress Account Creation

Cypress Administrative Functions

- The first page displayed after your account is created is the **Certification Dashboard** and the following message is displayed:

*Welcome to Cypress! This is the Certification Dashboard that displays the names of the EHR vendors and the status of their products being tested. You can begin by **adding an EHR vendor** or simply **explore the complete Cypress Test Deck** by clicking on "Master Patient List" above.*

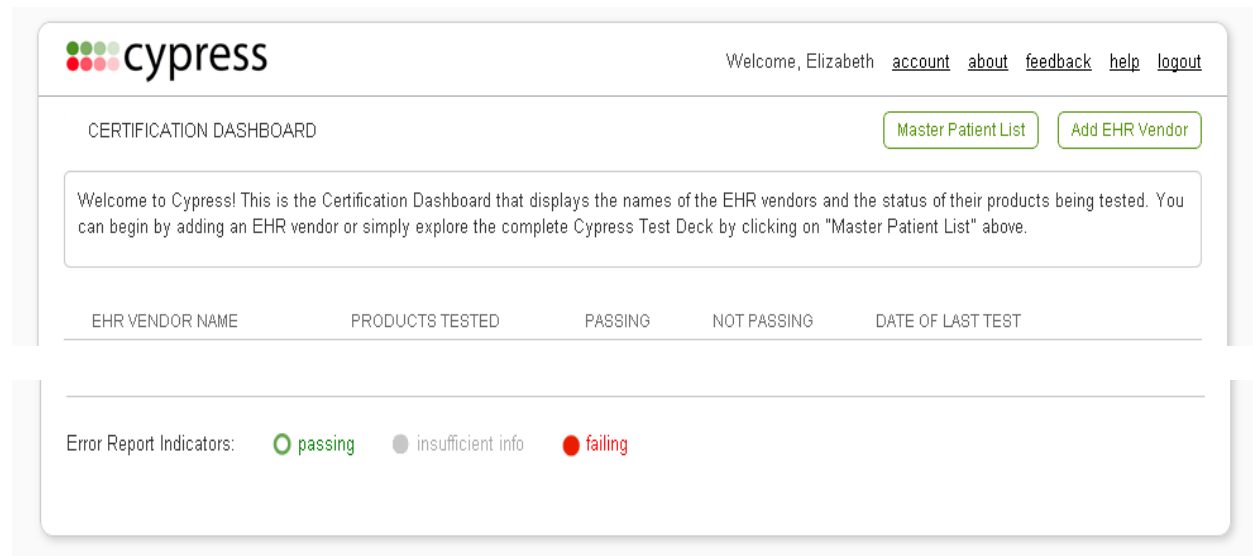
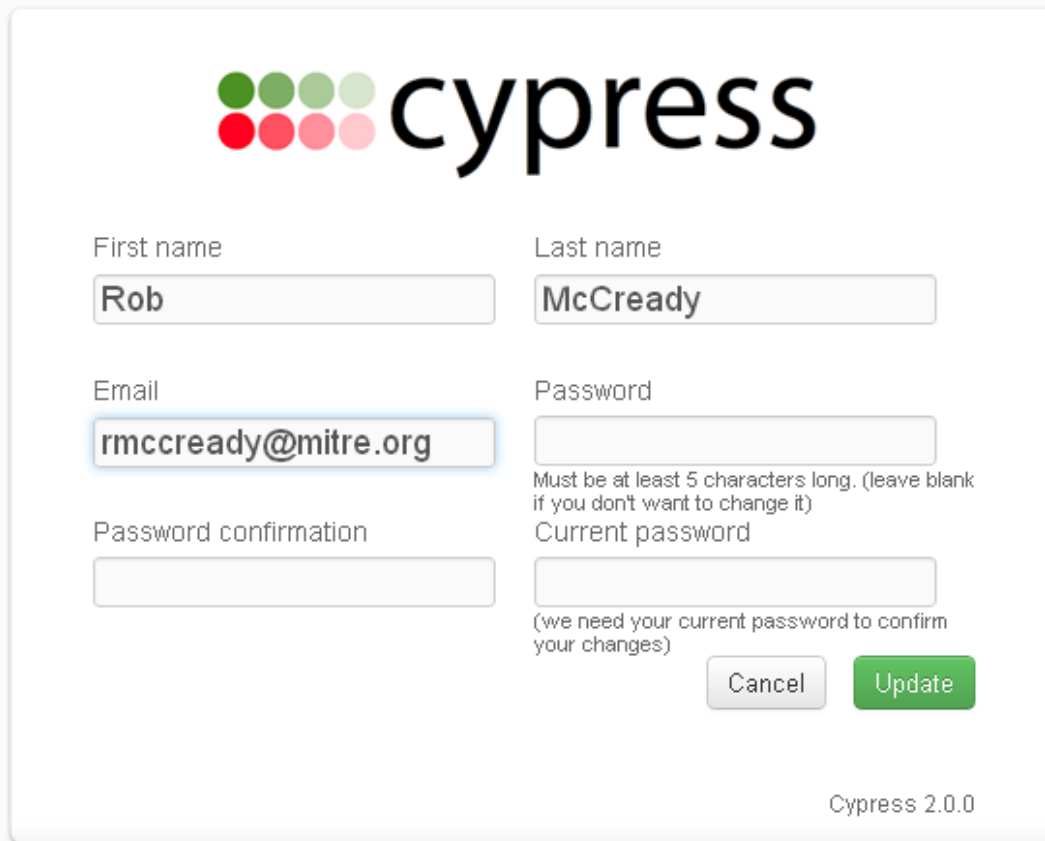


Figure 7: Certification Dashboard No Vendors Added

- There are five Cypress Administrative Functions found on the Certification Dashboard:
 1. Account- Update a Cypress Account Password
 2. About- Learn more about Cypress and review FAQs
 3. Feedback- Provide Feedback to the Cypress Team
 4. Help- Locate a Help email address, Copy of this User Guide and other resources
 5. Logout- Log out of the Cypress Application
 6. Master Patient List

1. Account– If you have previously set up an account, this page will allow you to change your Password



First name

Last name

Email

Password

Must be at least 5 characters long. (leave blank if you don't want to change it)

Password confirmation

Current password

(we need your current password to confirm your changes)

Cypress 2.0.0

Figure 8: Account Password Update

2. About - Learn more about Cypress via the publicly available project website
3. Feedback - Provides several mechanisms for providing feedback on Cypress

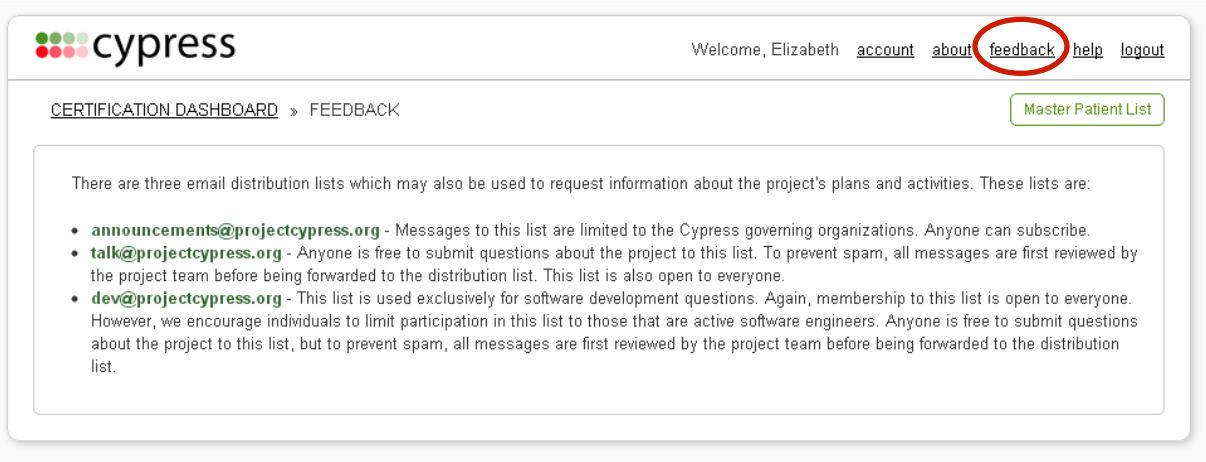


Figure 9: Cypress Feedback Mechanisms

4. Help - Provides help contact and additional reference information via the Cypress v2.0 Frequently Asked Questions (FAQ) page
5. Logout - Allows you to logout of Cypress and return to Account Sign in

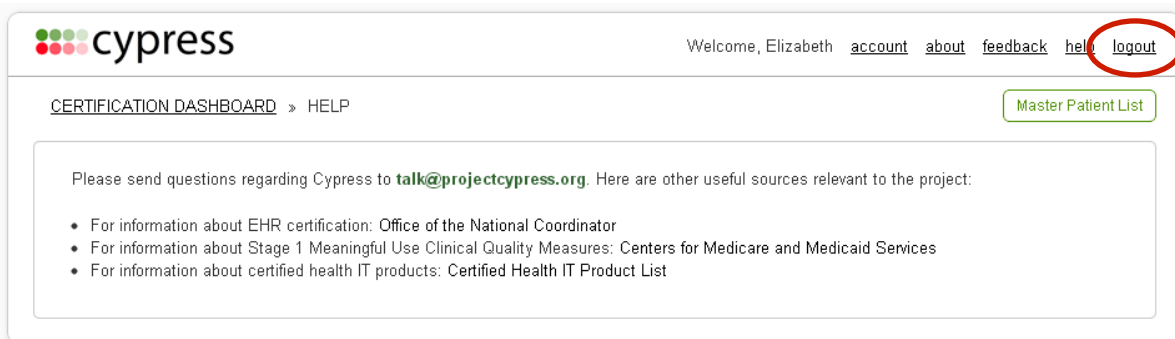


Figure 10: Cypress v2.0 Logout

6. Master Patient List- Provide a list of all test data for CQMs
 - You can select and download individual or all the patient data records
 - You can select a record and Cypress v2.0 will display the patient test record applicable data requirements and CQM qualifiers

Master Patient List

NOF #		LAST NAME	FIRST NAME	DOB	GENDER
Acute Myocardial Infarction					
0142		0002_0024_0033_0036_0041_0069_0418	11_06_12_GP_Peds_DEN	01/01/1993	F
0163		0002_0024_0033_0036_0041_0069_0418	11_06_12_GP_Peds_NUM	01/01/1993	F
0164		0002_0024_0033_0036_0069_0108	10_11_12_GP_Peds_EXCL	01/01/2000	F
0639		0018_0068_0070_0081_0083_0075_HTN_FSACbf	11_06_12_Heart_Adult_DEN	01/01/1940	M
		0018_0068_0070_0081_0083_0075_HTN_FSACbf	11_06_12_Heart_Adult_NUM	01/01/1940	M
Asthma					
0338		0022_0043_0101_0034_Dementia_FSAHip_FSAKnee	10_11_12_GP_Geriatric_DEN	01/02/1943	M
		0022_0043_0101_0034_Dementia_FSAHip_FSAKnee	10_11_12_GP_Geriatric_NUM	01/03/1943	M
Behavioral Health Adult					
0004		0028_0031_0032_0052_0419_0421_BPScreen_Ref_Chol	11_06_12_GP_Adult_DEN	01/01/1965	F
Treatment		0028_0031_0032_0052_0419_0421_BPScreen_Ref_Chol	11_06_12_GP_Adult_NUM	01/01/1965	F
0004		0038	10_11_12_GP_Peds_Immunizations_DEN	06/18/2008	M
Treatment w/ AOD		0038	10_11_12_GP_Peds_Immunizations_NUM	06/18/2008	M
0004		0052_0418_0419_0028	10_11_12_Heart_Adult_EXCL	01/01/1970	M
Treatment, RS1: 13-17		0055_0056_0059_0062_0064	11_06_12_Diabetes_Adult_DEN	01/01/1980	F
0004		0055_0056_0059_0062_0064	11_06_12_Diabetes_Adult_NUM	01/01/1980	F
Treatment, RS2: >=18		0060	11_06_12_Diabetes_Peds_DEN	01/01/2000	F
0004		0060	11_06_12_Diabetes_Peds_NUM	01/01/2000	F
Treatment w/ AOD, RS1: 13-17		0086_0088_0089_0564_0565	11_06_12_Eye_Adult_DEN	01/01/1939	M
0004		0086_0088_0089_0564_0565	11_06_12_Eye_Adult_NUM	01/01/1939	M
Treatment w AOD, RS2: >=18		0385_0389_0384	11_06_12_Cancer_Adult_Male_DEN	08/01/1985	M
0104		0385_0389_0384	11_06_12_Cancer_Adult_Male_NUM	08/01/1985	M
0105		0387	11_06_12_Cancer_Adult_Female_DEN	09/01/1960	F
84 days		0387	11_06_12_Cancer_Adult_Female_NUM	09/01/1960	F
0105		0403_0405_0407	11_06_12_HIV_Peds_DEN	11/01/1995	F
180 days		0403_0405_0407	11_06_12_HIV_Peds_NUM	11/01/1995	F
0110		0608	10_11_12_Pregnancy_Adult_DEN	12/01/1986	F
		0608	10_11_12_Pregnancy_Adult_NUM	12/01/1986	F
		0710_0105	10_11_12_BH_Adult_2_DEN	01/01/1989	M
		0710_0105	10_11_12_BH_Adult_2_NUM	01/01/1989	M
		0712_0104_0004_0110	10_30_12_BH_Adult_1_DEN	01/01/1989	M
		0712_0104_0004_0110	10_30_12_BH_Adult_1_NUM	01/01/1989	M

Figure 11: Master Patient List of Test Patients

- Patient test record 0002_0024_0033_0036_0041_0069_0418, 11_06_12_GP_Peds_DEN applicable data requirements and CQM qualifiers is displayed
- You can download the individual files

effective date: 01/01/2011			
NOF		0002_0024_0033_0036_0041_0069_0418, 11_06_12_GP_Peds_DEN	
#		Gender F	
=SAKnee	PO	DOB	01/01/1993
=SAHip	DM	Race	American Indian Or Alaska Native
=SACHF	MM	Ethnicity	Not Hispanic or Latino
=SACHF	ENCL		
ClosingReferralLoop	GRCP		
J608	OUT		
J034		ALLERGIES	
J043			
J086		CARE GOALS	
J083			
PrimaryCariesPrevention		VITAL SIGNS	
ChildDentalDecay		LOINC: 10524-7	Laboratory Test, Order: Pap Test (Code List: 2.16.840.1.113883.3.464.1003.108.12.1017) ?
I365		LABORATORY TESTS	
I401			
I101		ENCOUNTERS	
J028		HCPCS: G0438	Encounter, Performed: Encounter-Influenza (Code List: 2.16.840.1.113883.3.526.3.1252) ?
J088		CPT: 99420 SNOMED-CT: 4525004	
J089		CPT: 99201	Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
J022a		CPT: 99201	Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
J022b			

Figure 12: Patient Test Record Data Requirements and CQM Qualifiers

- Patient Records are downloaded to a Zip file

CERTIFICATION DASHBOARD > **MASTER PATIENT LIST**

effective date: 01/01/2011

0002_0024_0033_0036_0041_0069_0418, 11_06_12_GP_Peds_DEN
 Gender F
 DOB 01/01/1993
 Race American Indian Or Alaska Native
 Ethnicity Not Hispanic or Latino

	Pap	DBP	MIM	EXCL	ENCP	OUT
FSAKnee	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
FSAHip	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HypertensionImprovement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
FSACHF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ClosingReferralLoop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0608	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0034	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0043	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0086	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0083	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PrimaryCariesPrevention	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
ChildDentalDecay	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
1365	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
1401	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0101	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0028	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0088	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0069	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0022a	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0022b	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0384	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
DementiaCognitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0002	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
0085	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

ALLERGIES

CARE GOALS

VITAL SIGNS

LABORATORY TESTS

ENCOUNTERS

CONDITIONS

Figure 13: Downloaded Patient Data Zip File

Prepare for Cypress v2.0 Testing

- Once you have created an Account, the next step is to add a Vendor and Contact Information
- Select Add Vendor from the Certification Dashboard

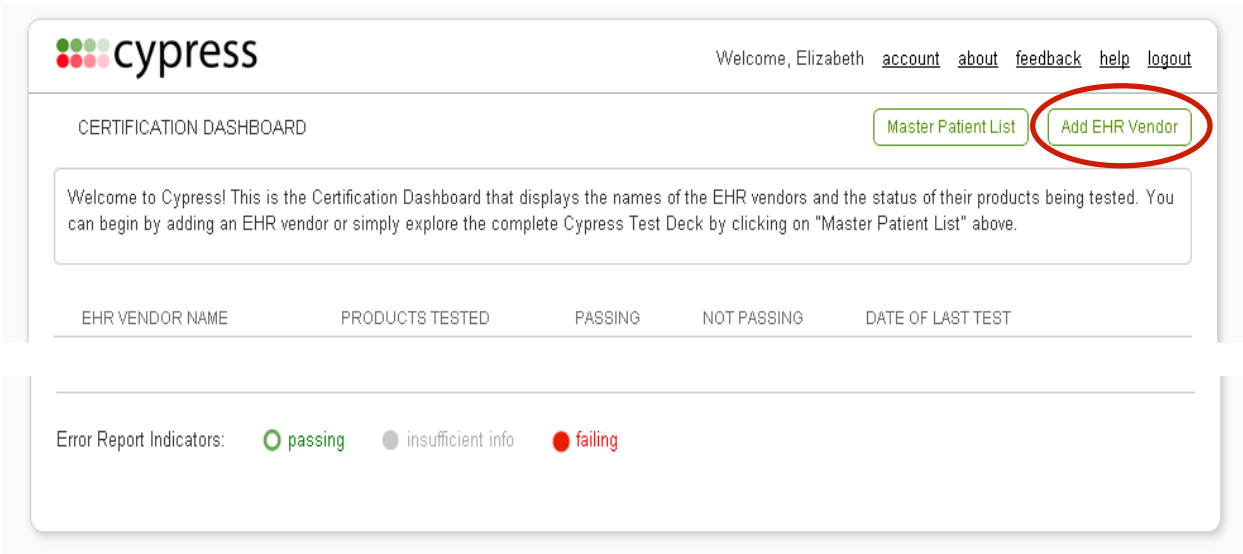


Figure 14: Certification Dashboard Select Add Vendor

- The Vendor Information and Contact Form will be displayed
- Complete the Vendor Information and Contact Form and select Create

Cypress: An Open Source EHR Quality Measure Testing Framework

Welcome, Rob [account](#) [about](#) [feedback](#) [help](#) [logout](#)

CERTIFICATION DASHBOARD • CREATE NEW VENDOR

Vendor Information

Vendor Name: EHR POC:
 Vendor ID: Email:
 URL: Phone:
 Address: Fax:
 State:
 ZIP:

alternate POCs

Main EHR POC: Technical POC:
 Email: Email:
 Phone: Phone:
 Press POC:
 Email:
 Phone:

Figure 15: Vendor and Contact Form

- Once the Vendor Account is created, the Vendor name will be displayed on the Certification Dashboard

Cypress

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CERTIFICATION DASHBOARD [Master Patient List](#) [Add EHR Vendor](#)

Welcome to Cypress! This is the Certification Dashboard that displays the names of the EHR vendors and the status of their products being tested. You can begin by adding an EHR vendor or simply explore the complete Cypress Test Deck by clicking on "Master Patient List" above.

EHR VENDOR NAME	PRODUCTS TESTED	PASSING	NOT PASSING	DATE OF LAST TEST
EHR Vendor Company	0 / 0 products	0 products	0 products	delete

Error Report Indicators: ○ passing ● insufficient info ● failing

Figure 16: Vendor Certification Dashboard with no products added

- The next step is to enter Product information (Product Name, Description and Version). Examples would be: product version number, the name and version of any optional modules installed in the product at the time of the test, and the operating system.
- Once the Product information is entered, select Create

Figure 3: EHR Product form

- The Vendor, EHR Point of Contact and Product will now display on the Certification Dashboard

Figure 4: Certification Dashboard showing a vendor with one product added

- Select the Pending Product and Certification Dashboard with no tests will be displayed

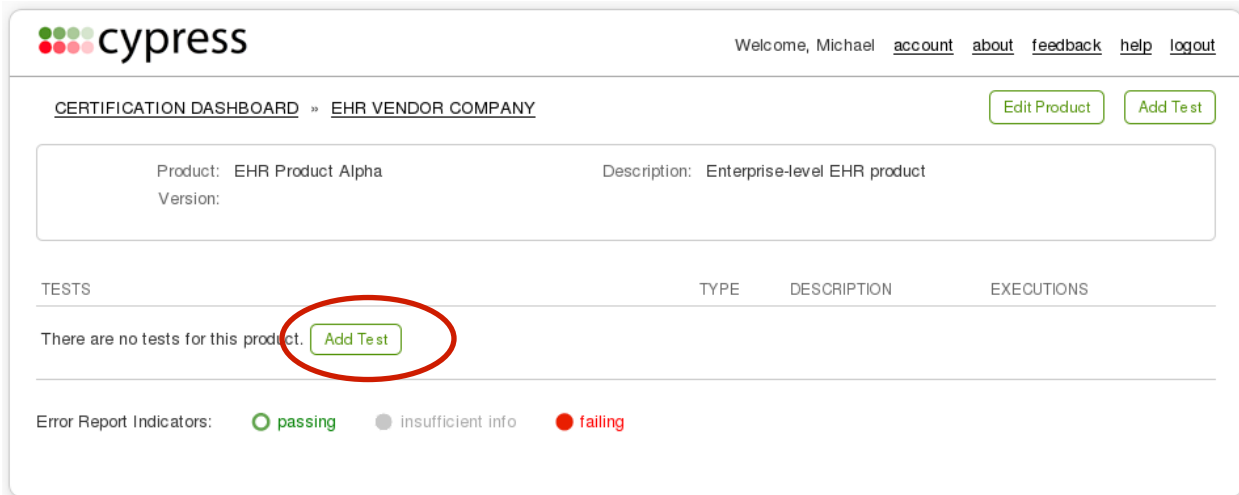


Figure 5: Dashboard showing Product and No Tests Added

- Select 'Add Test' and 'Create New Test' Page is displayed
- Add a Test Name, Brief Description and choose Test Type (EP, EH, QRDA1)

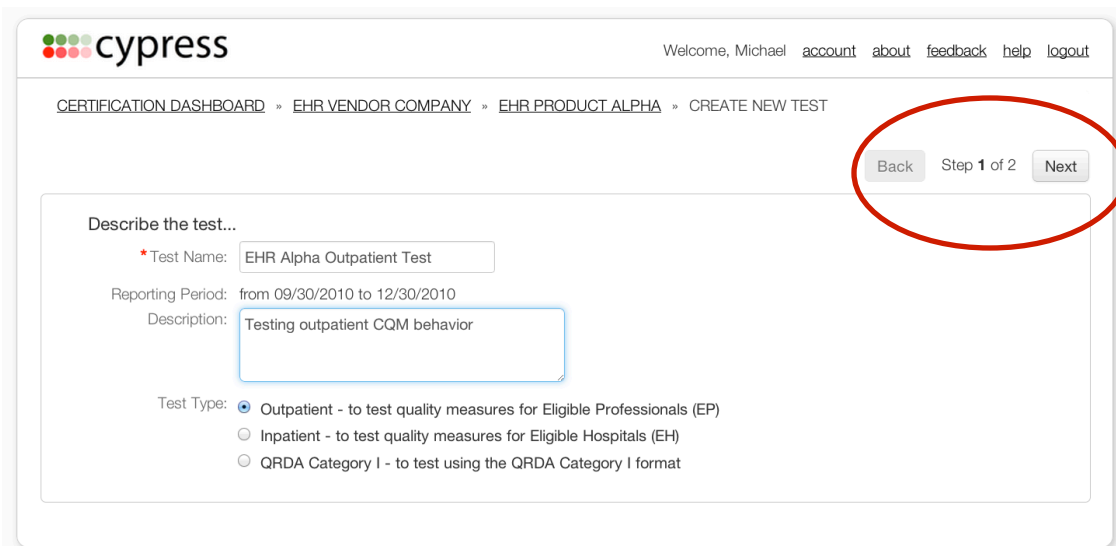


Figure 20: Create New Test - Step 1 Basic Information

- Specify the measures that will be tested, the format and the method to use for loading the test patients

Figure 21: Create New Test - Step 2 CQM selection

Figure 22: New Test Created

The screenshot shows the Cypress v2.0 Certification Dashboard. At the top, the Cypress logo is on the left, and a welcome message 'Welcome, Michael' with links for 'account', 'about', 'feedback', 'help', and 'logout' is on the right. Below the header, the breadcrumb navigation reads 'CERTIFICATION DASHBOARD » EHR VENDOR COMPANY » EHR PRODUCT ALPHA', with an 'Edit Test' button on the right. A central box contains test details: Test Name (EHR Alpha Test), Test Type (QRDA Cat 1), Product (EHR Product Alpha), Version (v1.0), Reporting Period (09/30/2010 - 12/30/2010), Description (Testing EHR Product Alpha with latest code updates), Proctor (Michael Nosal), Email (mnosal@mitre.org), and Telephone. Below this, instructions state: 'You must perform the following steps to execute your test: 1. Download Test Data, 2. Load Test Data into your quality measure calculator, 3. Upload Results'. Each step has a corresponding button: 'Test Data', 'Upload Results', and 'add note'. A 'Notes' section with a text input and an 'add note' button is also present. A table titled 'TEST EXECUTIONS' (highlighted with a red circle) has columns for 'DESCRIPTION' and 'RESULTS'. The table body shows 'There are no test executions'. At the bottom, 'Error Report Indicators' are shown: a green circle for 'passing', a grey circle for 'insufficient info', and a red circle for 'failing'.

Figure 23: Dashboard with no Test Executions

Test Execution

- This process evaluates the capability of the EHR system under test (SUT) to electronically generate the proper CQM artifacts for the CQMs being certified.
- The Test Proctor provides the Cypress v2.0 Test Data for the clinical quality measures for which the EHR system will be tested in the format selected to the EHR vendor via the Download Test Data.
- Depending on the test, the Vendor manually inputs or electronically downloads the patient test data into their EHR system.
 - Capture and Export: manual test data input (using html)
 - Import and Calculate: QRDA Category 1 electronic input
- The Test Proctor examines the CQMs implemented in the EHR.

cypress

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CERTIFICATION DASHBOARD » EHR VENDOR COMPANY » EHR PRODUCT ALPHA

Edit Test

Test Name: EHR Alpha Test

Reporting Period: 09/30/2010 - 12/30/2010

Proctor: Michael Nosal

Test Type: QRDA Cat 1

Description: Testing EHR Product Alpha with latest code updates.

Email: mnosal@mitre.org

Product: EHR Product Alpha

Version: v1.0

Telephone:

You must perform the following steps to execute your test:

1. Download Test Data

2. Load Test Data into your quality measure calculator

3. Upload Results

Test Data

Upload Results

Notes:

add note

TEST EXECUTIONS

DESCRIPTION

RESULTS

There are no test executions

Error Report Indicators:

passing

insufficient info

failing

Figure 24: Download Patient Data for Import

- A list of the patient records required for testing the selected CQMs is downloaded

Name	Date Modified	Size	Kind
0_10_11_12_Eye_Adult_NUM_0086_0088_0089_0564_0565.html	Today 5:21 PM	25 KB	HTM
1_10_11_12_Cancer_Adult_Male_DEN_0385_0389_0384.html	Today 5:21 PM	26 KB	HTM
2_10_11_12_Diabetes_Adult_N...5_0056_0059_0062_0064.html	Today 5:21 PM	17 KB	HTM
3_10_11_12_GP_Adult_DEN_00...0421_BPScreen_Ref_Chol.html	Today 5:21 PM	27 KB	HTM
4_10_11_12_GP_Peds_DEN_000...3_0036_0041_0069_0418.html	Today 5:21 PM	27 KB	HTM
5_10_11_12_Diabetes_Peds_NUM_0060.html	Today 5:21 PM	15 KB	HTM
6_10_11_12_BH_Infant_DEN_1401.html	Today 5:21 PM	8 KB	HTM
7_10_11_12_GP_Geriatric_DEN...ementia_FSAHip_FSAKnee.html	Today 5:21 PM	20 KB	HTM
8_10_11_12_Dental_Peds_DEN.html	Today 5:21 PM	8 KB	HTM
9_10_11_12_Heart_Adult_DEN...0083_0075_HTN_FSAChf.html	Today 5:21 PM	31 KB	HTM
10_10_11_12_Pregnancy_Adult_DEN_0608.html	Today 5:21 PM	8 KB	HTM
11_10_11_12_BH_Peds_DEN_1365_0108.html	Today 5:21 PM	15 KB	HTM
12_10_11_12_GP_Peds_Immunizations_DEN_0038.html	Today 5:21 PM	8 KB	HTM
13_10_11_12_Cancer_Adult_Female_DEN_0387.html	Today 5:21 PM	16 KB	HTM
14_10_11_12_HIV_Peds_DEN_0403_0405_0407.html	Today 5:21 PM	14 KB	HTM
15_10_11_12_Eye_Adult_DEN_0086_0088_0089_0564_0565.html	Today 5:21 PM	18 KB	HTM
16_10_11_12_Diabetes_Peds_DEN_0060.html	Today 5:21 PM	12 KB	HTM
17_10_11_12_GP_Peds_Immunizations_NUM_0038.html	Today 5:21 PM	74 KB	HTM
18_10_11_12_BH_Infant_NUM_1401.html	Today 5:21 PM	10 KB	HTM
19_10_11_12_Dental_Peds_NUM.html	Today 5:21 PM	13 KB	HTM
20_10_11_12_Pregnancy_Adult_NUM_0608.html	Today 5:21 PM	16 KB	HTM
21_10_11_12_GP_Geriatric_NU...Dementia_FSAHip_FSAKnee.html	Today 5:21 PM	36 KB	HTM
22_10_11_12_BH_Peds_NUM_1365_0108.html	Today 5:21 PM	23 KB	HTM
23_10_11_12_Cancer_Adult_Male_NUM_0385_0389_0384.html	Today 5:21 PM	28 KB	HTM
24_10_11_12_HIV_Peds_NUM_0403_0405_0407.html	Today 5:21 PM	18 KB	HTM
25_10_11_12_Cancer_Adult_Female_NUM_0387.html	Today 5:21 PM	24 KB	HTM
26_10_11_12_Diabetes_Adult...55_0056_0059_0062_0064.html	Today 5:21 PM	11 KB	HTM
27_10_11_12_BH_Adult_1_DEN_0712_0104_0004_0110.html	Today 5:21 PM	21 KB	HTM
28_10_11_12_GP_Adult_NUM_0...0421_BPScreen_Ref_Chol.html	Today 5:21 PM	45 KB	HTM
29_10_11_12_Heart_Adult_NU...1_0083_0075_HTN_FSAChf.html	Today 5:21 PM	40 KB	HTM
30_10_11_12_GP_Peds_NUM_0...3_0036_0041_0069_0418.html	Today 5:21 PM	42 KB	HTM
31_10_11_12_BH_Adult_1_NUM_0712_0104_0004_0110.html	Today 5:21 PM	29 KB	HTM
32_10_11_12_BH_Adult_2_DEN_0710_0105.html	Today 5:21 PM	17 KB	HTM
33_10_11_12_BH_Adult_2_NUM_0710_0105.html	Today 5:21 PM	21 KB	HTM
34_10_11_12_GP_Peds_EXCL_0...4_0033_0036_0069_0108.html	Today 5:21 PM	40 KB	HTM
35_10_11_12_GP_Adult_EXCL_18_FSAHF.html	Today 5:21 PM	17 KB	HTM
36_10_11_12_Heart_Adult_EXCL_0052_0418_0419_0028.html	Today 5:21 PM	18 KB	HTM

Figure 25: Listing of Zip file HTML Patient Test Data for selected CQMs to be tested

- Select a single patient record and open the html

Cypress Certification Patient Test Record: 10_11_12_GP_Geriatric_DEN 0022_0043_0101_0034_Dementia_FSAHip_FSAKnee

Cypress Certification Patient Test Record: 10_11_12_GP_Geriatric_DEN 0022_0043_0101_0034_Dementia_FSAHip_FSAKnee

Patient	10_11_12_GP_Geriatric_DEN 0022_0043_0101_0034_Dementia_FSAHip_FSAKnee		
Date of birth	January 2nd, 1943 19:30	Sex	Male
Contact info	Primary Home: 202 Burlington Rd. Bedford, MA 01730 Tel: +1-781-271-3000	Patient IDs	5089a9153054cf1a120003ae Cypress
Document Id	5089a9153054cf1a120003ae 2.16.840.1.113883.3.72		
Document Created:	October 25th, 2012 21:21		
Author	Auto Generated		
Contact info	Tel: +1-781-271-3000		
Document maintained by	Cypress		
Contact info	202 Burlington Rd. Bedford, MA 01730 Tel: +1-781-271-3000		

View By Encounter

Diagnoses

Description	Codes	Time	Status	Results	Fields
Diagnosis, Active: Dementia & Mental Degenerations (Code List: 2.16.840.1.113883.3.526.3.1005)	ICD-9-CM: 094.1 ICD-10-CM: A52.17 SNOMED-CT: 281004	January 29th, 2010 05:00 - January 29th, 2010 05:00	active		causeOfDeath: () free_text: () name: () ordinality: () ordinality_code: () priority: () severity: () specifics: () type: ()

Encounters

Description	Codes	Time	Status	Results	Fields
Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001)	CPT: 99201	August 1st, 2009 04:00 - August 1st, 2009 04:00	performed		admitType: () admit_time: () dischargeDisposition: () discharge_time: () free_text: () performer_id: () specifics: ()
Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001)	CPT: 99201	October 1st, 2009 04:00 - October 1st, 2009 04:00	performed		admitType: () admit_time: () dischargeDisposition: () discharge_time: () free_text: () performer_id: () specifics: ()
Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001)	CPT: 99201	January 29th,	performed		admitType: ()

Fri: 63°F Sat: 63°F Sun: 54°F Mon: 51°F

Figure 26: HTML for one Patient Record

- Calculated Test Results in the QRDA Category III format are uploaded from the Certification Dashboard

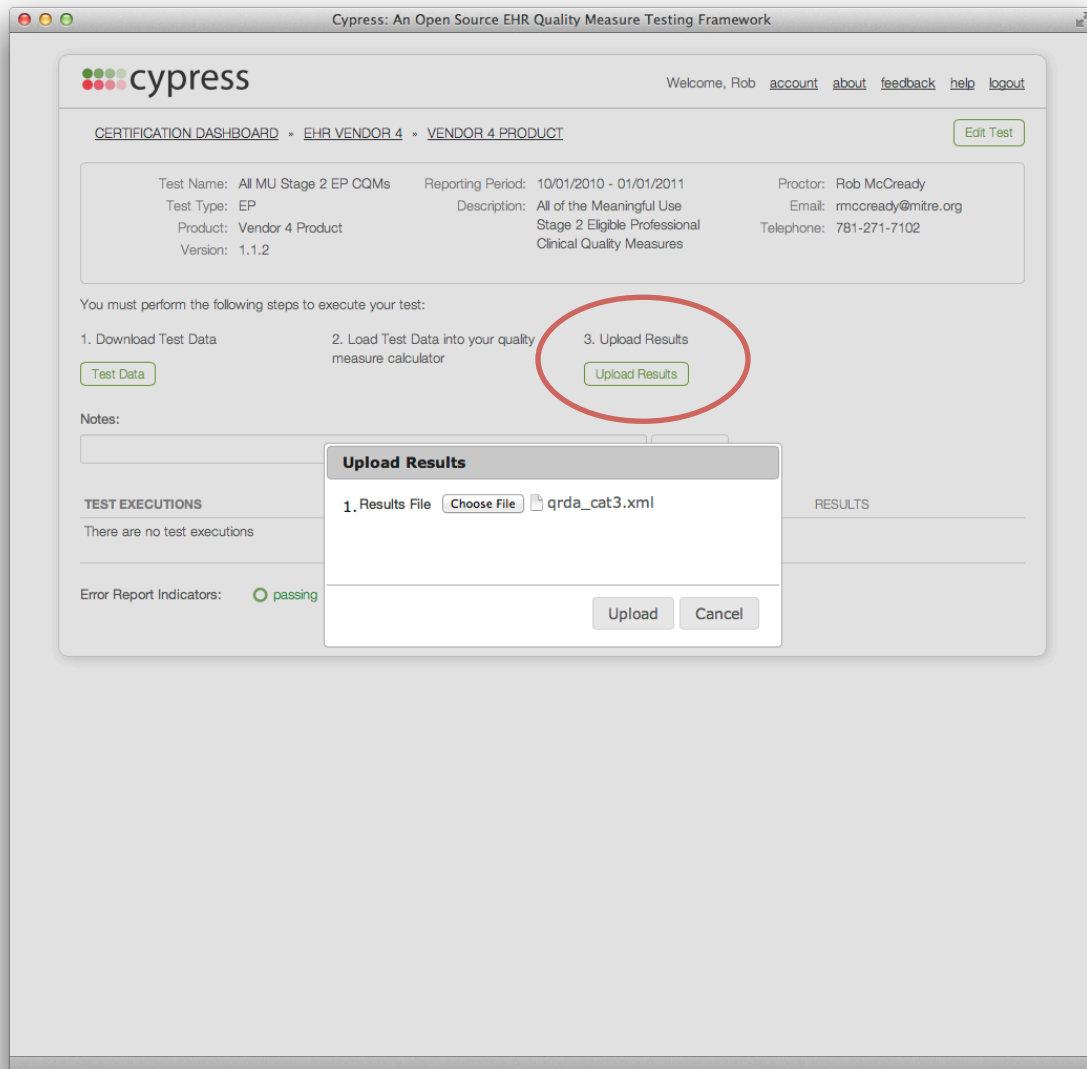



Figure 6: Upload test execution results

- The Test Proctor validates that the proper CQM artifacts in QRDA Category III file format for the test being performed are electronically generated by the EHR SUT.


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[CERTIFICATION DASHBOARD](#) » [EHR VENDOR COMPANY](#) » [EHR PRODUCT ALPHA](#)
[Edit Test](#)

Test Name: EHR Alpha Test
Test Type: QRDA Cat 1
Product: EHR Product Alpha
Version: v1.0

Reporting Period: 09/30/2010 - 12/30/2010
Description: Testing EHR Product Alpha with latest code updates.

Proctor: Michael Nosal
Email: mnosal@mitre.org
Telephone:

You must perform the following steps to execute your test:

1. Download Test Data
[Test Data](#)

2. Load Test Data into your quality measure calculator

3. Upload Results
[Upload Results](#)

Notes:

[add note](#)

TEST EXECUTIONS	DESCRIPTION	RESULTS
2012-10-11 02:51:53 UTC		Results

TEST RESULTS


[Summary](#)
[XML Errors](#)
[XML Warnings](#)
[Content Inspection](#)

Test Date: 2012-10-11 02:51:53 UTC
Inspection ID: EHR Vendor Company
Document Type: ** document type **
Version: ** document version **

XML Validation Errors: **49**
XML Validation Warnings: **48**
Content Inspection Errors: ** content inspection errors **

Figure 7: Test execution with validation errors

- Further detail of the validations errors available and noted in Figure 31


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[CERTIFICATION DASHBOARD](#) » [EHR VENDOR COMPANY](#) » [EHR PRODUCT ALPHA](#)
[Edit Test](#)

Test Name: EHR Alpha Test
Test Type: QRDA Cat 1
Product: EHR Product Alpha
Version: v1.0

Reporting Period: 09/30/2010 - 12/30/2010
Description: Testing EHR Product Alpha with latest code updates.

Proctor: Michael Nosal
Email: mnosal@mitre.org
Telephone:

You must perform the following steps to execute your test:

1. Download Test Data
[Test Data](#)

2. Load Test Data into your quality measure calculator

3. Upload Results
[Upload Results](#)

Notes:

[add note](#)

TEST EXECUTIONS	DESCRIPTION	RESULTS
2012-10-11 02:51:53 UTC		Results

TEST RESULTS

Summary

XML Errors

XML Warnings

Content Inspection

Test Date: 2012-10-11 02:51:53 UTC
Inspection ID: EHR Vendor Company
Document Type: ** document type **
Version: ** document version **

XML Validation Errors: 49
XML Validation Warnings: 48
Content Inspection Errors: ** content inspection errors **

Validation Notes:
Content discrepancies between patient record assigned to test and C32 under validation will be flagged as warnings. Patient summary content will be validated by visual inspection of the xml and using a stylesheet. UMLS validation errors will be visually inspected and verified. Neither content inspection warnings nor UMLS validation errors automatically determine PASS/FAIL status.

Vendor Generated XML

```

<?xml version="" encoding="" ?>
<?xml-stylesheet type="text/xsl" href="cda.xsl"?>
<!-- Disclaimer: The QRDA samples generated by the system are designed to provide a general idea about the content, structure and parts of QRDA using hypothetical patient data; however, in this phase of the project, the content of the QRDA sample documents may not have "clinically" consistent data. Additionally, in this first phase of the project, some QRDA documents may not have all of the required Quality Data Elements and/or may not be completely error-free (i.e. there may be QRDA schema conformance issues). -->

```

Figure 8: Details of test execution with errors

- Further Testing can occur until all CQMs pass the validation test

The screenshot displays the Cypress web application interface. At the top, the header includes the Cypress logo and navigation links. The main content area shows the 'CERTIFICATION DASHBOARD' with a breadcrumb trail: 'EHR VENDOR 4' > 'VENDOR 4 PRODUCT'. A 'Test Name' section provides details about the test: 'All MU Stage 2 EP CQMs', 'Reporting Period: 10/01/2010 - 01/01/2011', 'Proctor: Rob McCready', 'Test Type: EP', 'Description: All of the Meaningful Use Stage 2 Eligible Professional Clinical Quality Measures', 'Product: Vendor 4 Product', and 'Version: 1.1.2'. Below this, a 'Notes' section is present. The 'TEST EXECUTIONS' section shows a single execution for '2012-10-25 21:24:52 UTC' with a 'Results' button circled in red. The 'TEST RESULTS' section shows a 'PASSING MEASURES' status, also circled in red. A table lists various measures with their respective patient counts, denominators, exclusions, numerators, and exceptions.

MEASURES INCLUDED IN THIS TEST	PATIENTS	DENOMINATOR	DEN. EXCLUSIONS	NUMERATOR	NUM. EXCLUSIONS	EXCEPTIONS
HypertensionImprovement - Hypertension: Improvement in Blood Pressure	0/0	0 / 0	0 / 0	0 / 0	- / -	- / -
FSACHF - Functional Status Assessment for Complex Chronic Conditions	3/3	33 / 2	0 / 1	1 / 1	- / -	- / -
ClosingReferralLoop - Closing the referral loop: receipt of specialist report	2/2	2 / 2	- / -	1 / 1	- / -	- / -
0608 - Pregnant women that had HBsAg testing	2/2	2 / 2	- / -	1 / 1	- / -	- / -
0043 - Pneumonia Vaccination Status for Older Adults	5/5	5 / 5	- / -	1 / 1	- / -	- / -
0086 - Primary Open Angle Glaucoma (POAG): Optic Nerve Evaluation	2/2	43 / 2	- / -	1 / 1	- / -	- / -
0083 - Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD)	3/3	2 / 2	- / -	1 / 1	- / -	- / -
PrimaryCariesPrevention - Primary Caries Prevention Intervention as Offered by Primary Care Providers, including Dentists	15/15	15 / 15	- / -	1 / 1	- / -	- / -
ChildDentalDecay - Children Who Have Dental Decay or Cavities	15/15	15 / 15	- / -	1 / 1	- / -	- / -
1365 - Child and Adolescent Major Depressive Disorder (MDD): Suicide Risk Assessment	3/3	3 / 3	- / -	1 / 1	- / -	- / -
1401 - Maternal Depression Screening	2/2	2 / 2	- / -	0 / 0	- / -	- / -
0101 - Falls: Screening for Future Fall Risk	5/5	5 / 5	- / -	1 / 1	- / -	- / -
0088 - Diabetic Retinopathy: Documentation of Presence or Absence of Macular Edema and Level of Severity of Retinopathy	2/2	2 / 2	- / -	1 / 1	- / -	- / -

Figure 90: Test execution with no errors calculated results against expected results

Test Execution Notes

The criteria used to determine a successful test outcome depends on whether the EHR product is being certified against the EP CQMs or the EH CQMs.

For EP CQMs, a successful test outcome is one in which the following conditions are true:

1. There were no XML validation errors in neither the QRDA Category I submitted data nor the QRDA Category III submitted data.
2. All of the CQM results calculated and submitted by the EHR SUT exactly match the values that Cypress v2.0 was expecting.

For EH CQMs, a successful test outcome is one in which the following conditions are true:

1. There were no XML validation errors in neither the QRDA Category I submitted data nor the QRDA Category III submitted data.
2. All of the CQM results calculated and submitted by the EHR SUT for discrete measures exactly match the values that Cypress v2.0 was expecting.
3. The CQM results calculated and submitted by the EHR SUT for continuous variable tests are within a defined delta of the value that Cypress v2.0 was expecting.

For both types of EHR technologies, it is acceptable for there to be XML validation *warnings* that are generated by Cypress' validation process. These warnings will not constitute a test failure. However, the Test Proctor should review the warnings generated and record any relevant observations that they can make about the reasons for the warnings in the **Notes** field on the Product Test details page.

Submit

Electronically submit generated CQM artifacts

Evaluates the capability to electronically submit a) calculated quality measures in accordance with the standard and implementation specifications; and b) exported patient data sufficient to allow external calculation.

- The Test Proctor commands the EHR SUT to generate and electronically submit the patient-level export in the QRDA Category I format for the clinical quality measures being tested.
- The Test Proctor commands the EHR SUT to generate and electronically submit an aggregate report in the QRDA Category III format of the clinical quality measures calculated in the Execute test.
- The Test Proctor validates that the calculated clinical quality measures are submitted in accordance with the QRDA Category III standard and implementation specifications by uploading the QRDA Category III XML via the Cypress v2.0 User Interface and the Cypress-supplied XML Schema validation.
- The Test Proctor validates that the exported patient-level CQM data are submitted in accordance with the QRDA Category I standard and implementation specifications by uploading the QRDA Category I XML via the Cypress v2.0 User Interface and the Cypress-supplied XML Schema validation.

Verify

Verify electronic and accurate generation of clinical quality measure artifacts

Evaluates the capability to electronically and accurately generate CQM artifacts appropriate for each phase of the test procedure.

- After the Test Proctor validates the submission of the QRDA Category III, the Test Proctor evaluates and displays the accuracy of the submitted clinical quality measure results via the Cypress v2.0 User Interface.
- The Test Proctor generates a test artifact bundle containing all test data used for this test execution, all products generated and submitted by the EHR SUT, and any other additional notes or information that the Test Proctor deems relevant into a single archive file that is cryptographically signed.

Acronyms

ATL	Authorized Testing Lab
CMS	Centers for Medicare & Medicaid Services
CQM	Clinical Quality Measure
EH	Eligible Hospital
EHR	Electronic Health Record
EP	Eligible Professional
HTML	Hypertext Markup Language
NIST	National Institute of Standards and Technology
ONC	Office of the National Coordinator for Health Information Technology
QDM	Quality Data Model
QRDA	Quality Reporting Document Architecture
SUT	System Under Test
XML	Extensible Markup Language