

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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**December, 2012**

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## 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:

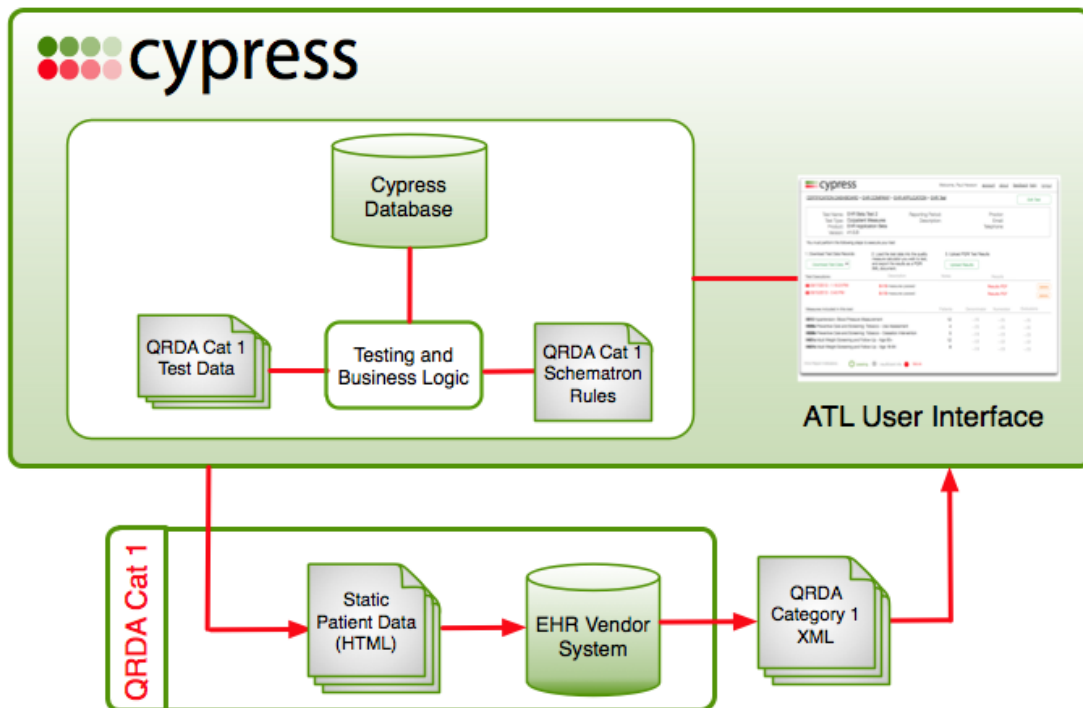
### 1. Capture and Export

**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

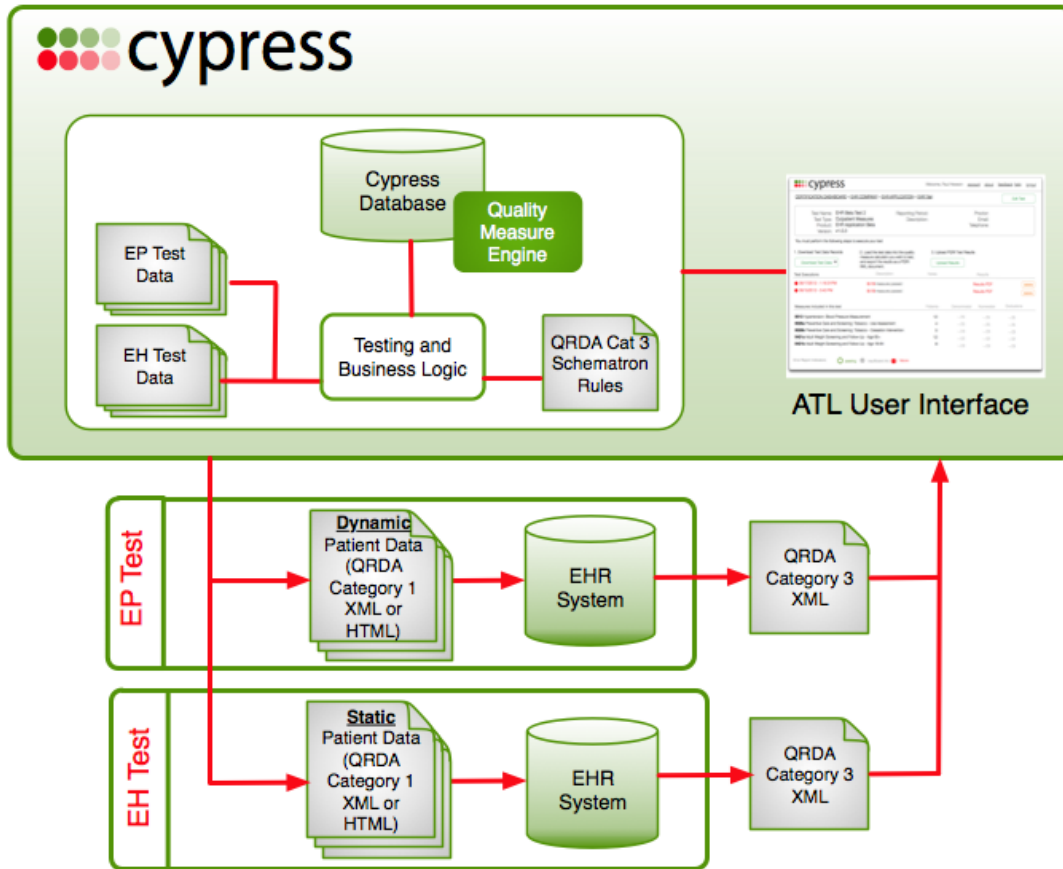
**Electronic Submission** - Enables a user to electronically create a data file in QRDA Category III format for transmission of clinical quality measurement data that can be electronically accepted by Centers for Medicare & Medicaid Services (CMS).

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.

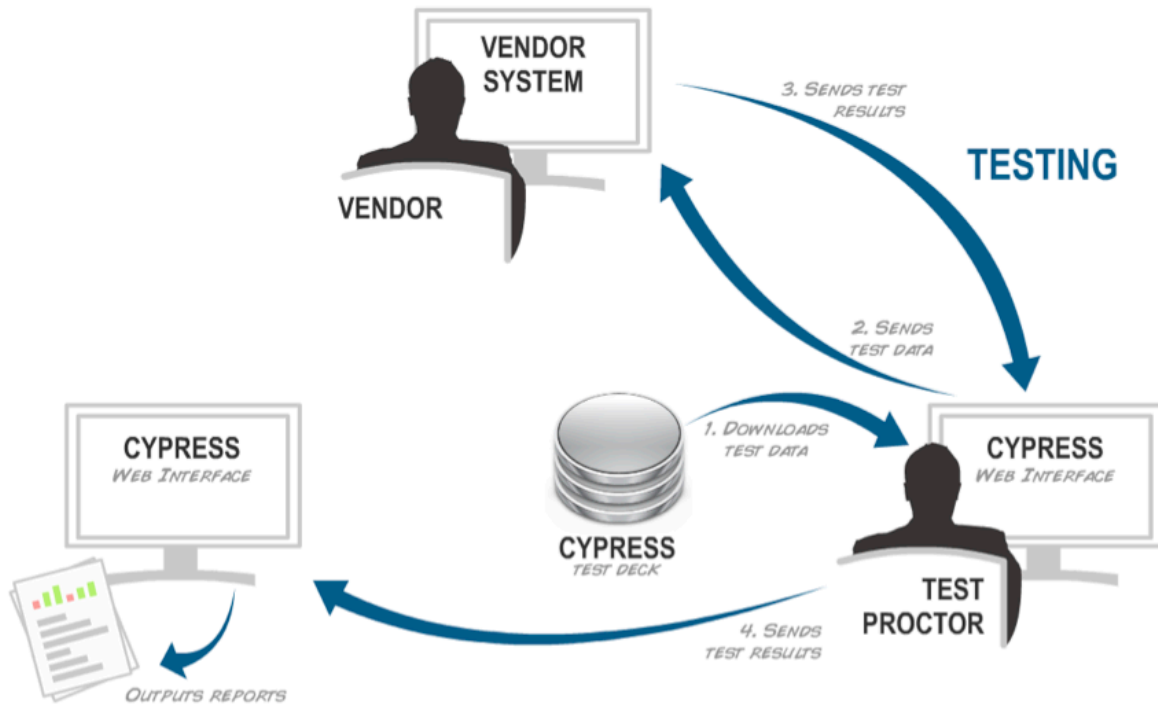


**Figure 2: Import, Calculate and Electronic Submission**



## 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>.

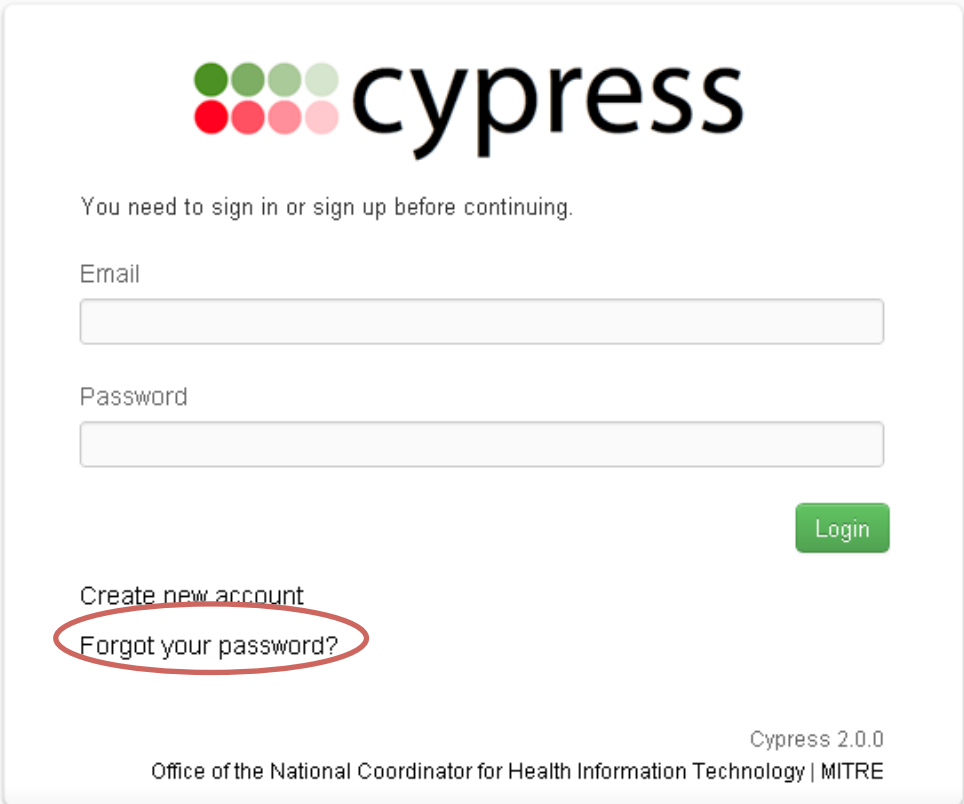
# User Guide Detailed Description

## 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.

**cypress**

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?](#)

Cypress 2.0.0  
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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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[Sign in](#)  
[Forgot your password?](#)

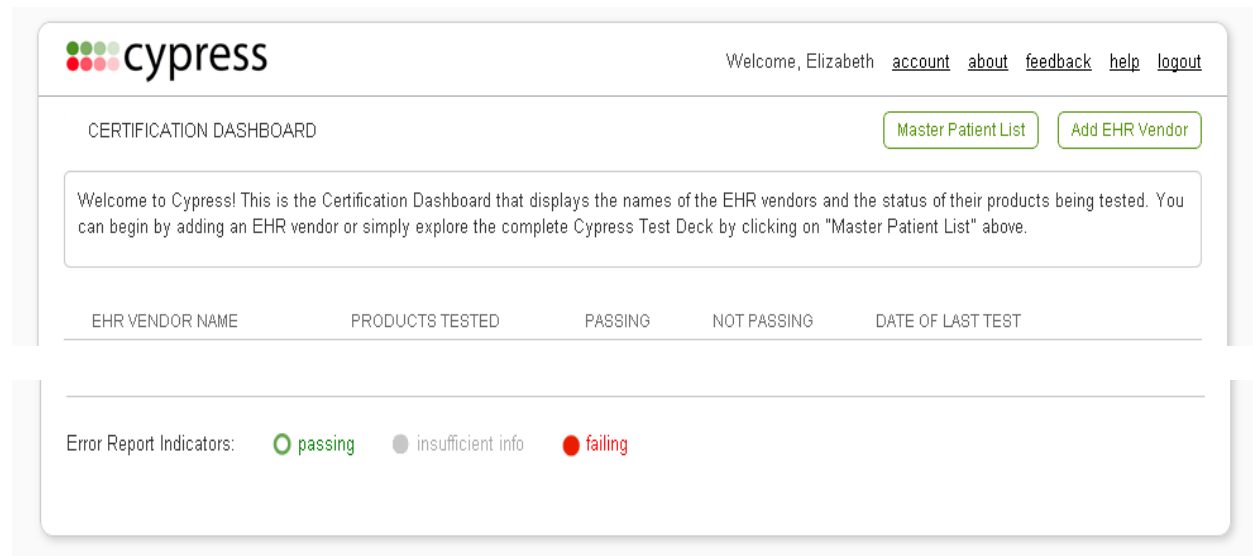
Cypress 2.0.0  
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**Figure 6: Cypress Account Creation**

## Cypress Administrative Functions

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

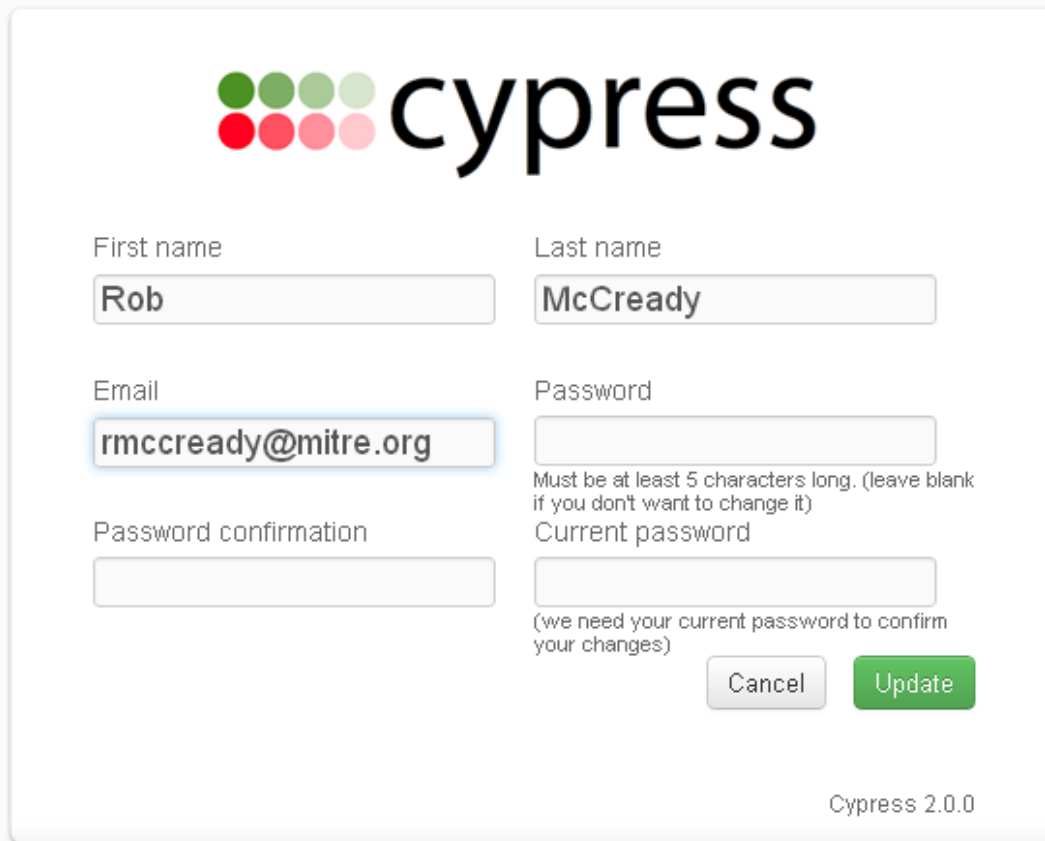
*Welcome to Cypress! This is the Certification Dashboard that displays the names of the EHR vendors and the status of their products being tested. You can begin by **adding an EHR vendor** or simply **explore the complete Cypress Test Deck** by clicking on "Master Patient List" above.*



**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



The image shows a web form for updating a Cypress account. At the top is the Cypress logo, which consists of eight colored dots (four green, four red) followed by the word "cypress" in a lowercase, sans-serif font. Below the logo are four input fields arranged in a 2x2 grid. The first row contains "First name" with the value "Rob" and "Last name" with the value "McCready". The second row contains "Email" with the value "rmccready@mitre.org" and "Password" which is currently empty. Below the "Password" field is a note: "Must be at least 5 characters long. (leave blank if you don't want to change it)". Below the "Email" field is a "Password confirmation" field, also empty. Below the "Current password" field is another note: "(we need your current password to confirm your changes)". At the bottom right of the form are two buttons: a grey "Cancel" button and a green "Update" button. In the bottom right corner of the form's container, the text "Cypress 2.0.0" is displayed.

**cypress**

First name:

Last name:

Email:

Password:

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

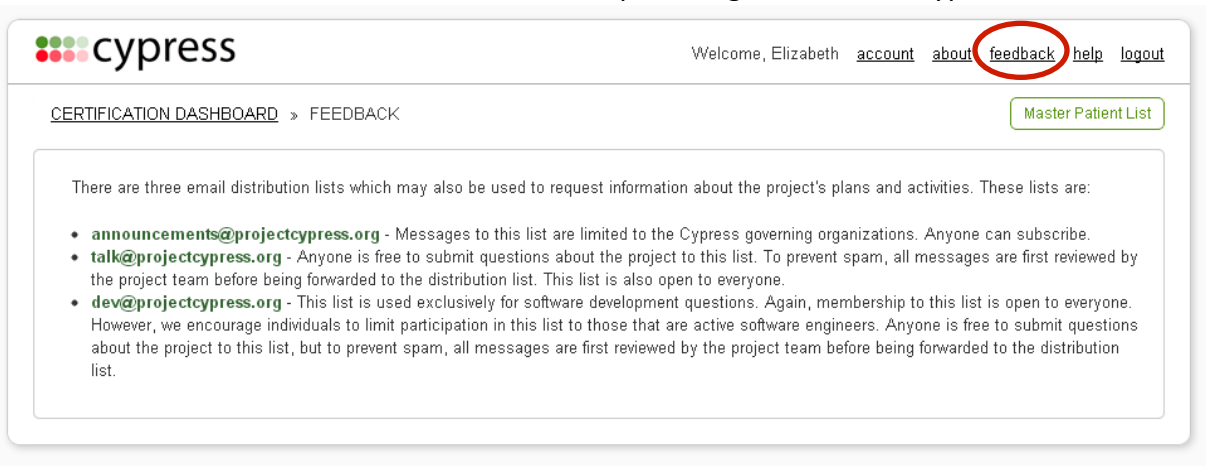
Current password:

(we need your current password to confirm your changes)

Cypress 2.0.0

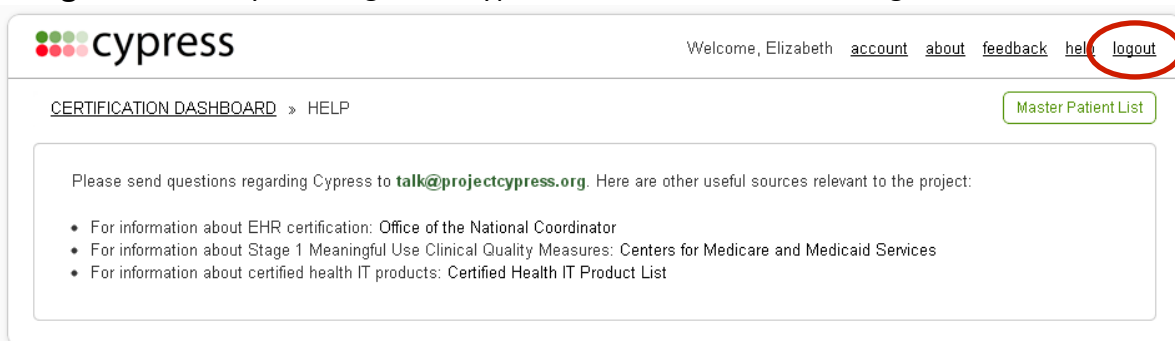
**Figure 8: Account Password Update**

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	<input type="radio"/> 0002_0024_0033_0036_0041_0069_0418	11_06_12_GP_Peds_DEN	01/01/1993	F
	0163	<input checked="" type="radio"/> 0002_0024_0033_0036_0041_0069_0418	11_06_12_GP_Peds_NUM	01/01/1993	F
	0164	<input type="radio"/> 0002_0024_0033_0036_0069_0108	10_11_12_GP_Peds_EXCL	01/01/2000	F
	0639	<input type="radio"/> 0018_0068_0070_0081_0083_0075_HTN_FSACbf	11_06_12_Heart_Adult_DEN	01/01/1940	M
Asthma	0338	<input type="radio"/> 0018_0068_0070_0081_0083_0075_HTN_FSACbf	11_06_12_Heart_Adult_NUM	01/01/1940	M
		<input type="radio"/> 0022_0043_0101_0034_Dementia_FSAHip_FSAKnee	10_11_12_GP_Geriatric_DEN	01/02/1943	M
		<input type="radio"/> 0022_0043_0101_0034_Dementia_FSAHip_FSAKnee	10_11_12_GP_Geriatric_NUM	01/03/1943	M
		<input type="radio"/> 0028_0031_0032_0052_0419_0421_BPScreen_Ref_Chol	11_06_12_GP_Adult_DEN	01/01/1965	F
Behavioral Health Adult	0004	<input type="radio"/> 0028_0031_0032_0052_0419_0421_BPScreen_Ref_Chol	11_06_12_GP_Adult_NUM	01/01/1965	F
	Treatment	<input type="radio"/> 0038	10_11_12_GP_Peds_Immunizations_DEN	06/18/2008	M
	0004	<input type="radio"/> 0038	10_11_12_GP_Peds_Immunizations_NUM	06/18/2008	M
	Treatment w/ AOD	<input type="radio"/> 0052_0418_0419_0028	10_11_12_Heart_Adult_EXCL	01/01/1970	M
	0004	<input type="radio"/> 0055_0056_0059_0062_0064	11_06_12_Diabetes_Adult_DEN	01/01/1980	F
	Treatment, RS1: 13-17	<input type="radio"/> 0055_0056_0059_0062_0064	11_06_12_Diabetes_Adult_NUM	01/01/1980	F
	0004	<input type="radio"/> 0060	11_06_12_Diabetes_Peds_DEN	01/01/2000	F
	Treatment, RS2: >=18	<input type="radio"/> 0060	11_06_12_Diabetes_Peds_NUM	01/01/2000	F
	0004	<input type="radio"/> 0086_0088_0089_0564_0565	11_06_12_Eye_Adult_DEN	01/01/1939	M
	Treatment w/ AOD, RS1: 13-17	<input type="radio"/> 0086_0088_0089_0564_0565	11_06_12_Eye_Adult_NUM	01/01/1939	M
	0004	<input type="radio"/> 0385_0389_0384	11_06_12_Cancer_Adult_Male_DEN	08/01/1985	M
	Treatment w AOD, RS2: >=18	<input type="radio"/> 0385_0389_0384	11_06_12_Cancer_Adult_Male_NUM	08/01/1985	M
	0104	<input type="radio"/> 0387	11_06_12_Cancer_Adult_Female_DEN	09/01/1960	F
	0105	<input type="radio"/> 0387	11_06_12_Cancer_Adult_Female_NUM	09/01/1960	F
	84 days	<input type="radio"/> 0403_0405_0407	11_06_12_HIV_Peds_DEN	11/01/1995	F
	0105	<input type="radio"/> 0403_0405_0407	11_06_12_HIV_Peds_NUM	11/01/1995	F
	180 days	<input type="radio"/> 0608	10_11_12_Pregnancy_Adult_DEN	12/01/1986	F
	0110	<input type="radio"/> 0608	10_11_12_Pregnancy_Adult_NUM	12/01/1986	F
	0710	<input type="radio"/> 0710_0105	10_11_12_BH_Adult_2_DEN	01/01/1989	M
		<input type="radio"/> 0710_0105	10_11_12_BH_Adult_2_NUM	01/01/1989	M
		<input type="radio"/> 0712_0104_0004_0110	10_30_12_BH_Adult_1_DEN	01/01/1989	M
		<input type="radio"/> 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							
NQF						0002_0024_0033_0036_0041_0069_0418, 11_06_12_GP_Peds_DEN	
#	POP	GM	MM	WOL	OCOP	Gender	F
=SAKnee	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	DOB	01/01/1993
=SAHip	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Race	American Indian Or Alaska Native
=hypertensionImprovement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ethnicity	Not Hispanic or Latino
=SACHF	<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"/>		
J008	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ALLERGIES	
J034	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
J043	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CARE GOALS	
J086	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
J083	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	VITAL SIGNS	
=PrimaryCariesPrevention	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	LOINC: 10524-7	Laboratory Test, Order: Pap Test (Code List: 2.16.840.1.113883.3.464.1003.108.12.1017) ?
ChildDentalDecay	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	LABORATORY TESTS	
I365	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
I401	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ENCOUNTERS	
J101	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HCPCS: G0438	Encounter, Performed: Encounter-Influenza (Code List: 2.16.840.1.113883.3.526.3.1252) ?
J028	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99420 SNOMED-CT: 4525004	
J088	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99201	Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
J089	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
J022a	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99201	Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
J022b	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		

### Figure 12: Patient Test Record Data Requirements and CQM Qualifiers

- Patient Records are downloaded to a Zip file

CERTIFICATION DASHBOARD > MASTER PATIENT LIST
[Download](#)

effective date: 01/01/2011

NPI #	PAP	DBI	HUM	EXCL	ENCP	OUT	
FSAKnee	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>0002_0024_0033_0036_0041_0069_0418, 11_06_12_GP_Peds_DEN</b> Gender F  DOB 01/01/1993  Race American Indian Or Alaska Native  Ethnicity Not Hispanic or Latino
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"/>	ALLERGIES
0034	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CARE GOALS
0043	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	VITAL SIGNS
0086	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	LABORATORY TESTS
0003	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	ENCOUNTERS
PrimaryCariesPrevention	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	LOINC: 10524-7 Laboratory Test, Order: Pap Test (Code List: 2.16.840.1.113883.3.464.1003.108.12.1017) ?
ChildDentalDecay	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Laboratory Tests
1365	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	CONDITIONS
1401	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPCPS: G0438 Encounter, Performed: Encounter-Influenza (Code List: 2.16.840.1.113883.3.526.3.1252) ?
0101	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99420 SNOMED-CT: 4525004
0028	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99201 Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
0088	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99201 Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
0089	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CPT: 99201 Encounter, Performed: Office Visit (Code List: 2.16.840.1.113883.3.464.1003.101.12.1001) ?
0022a	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	CONDITIONS
0022b	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ICD-9-CM: 460 Diagnosis, Active: Upper Respiratory Infection (Code List: 2.16.840.1.113883.3.464.1003.102.12.1022)
0384	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ICD-10-CM: J00 SNOMED-CT: 541570009
DementiaCognitive	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	ICD-10-CM: J00 SNOMED-CT: 541570009
0002	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	ICD-10-CM: J00 SNOMED-CT: 541570009
0003	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	ICD-10-CM: J00 SNOMED-CT: 541570009

no.projectcypress.org/patients/50a559f0f664f...d46254b0002da/download.html

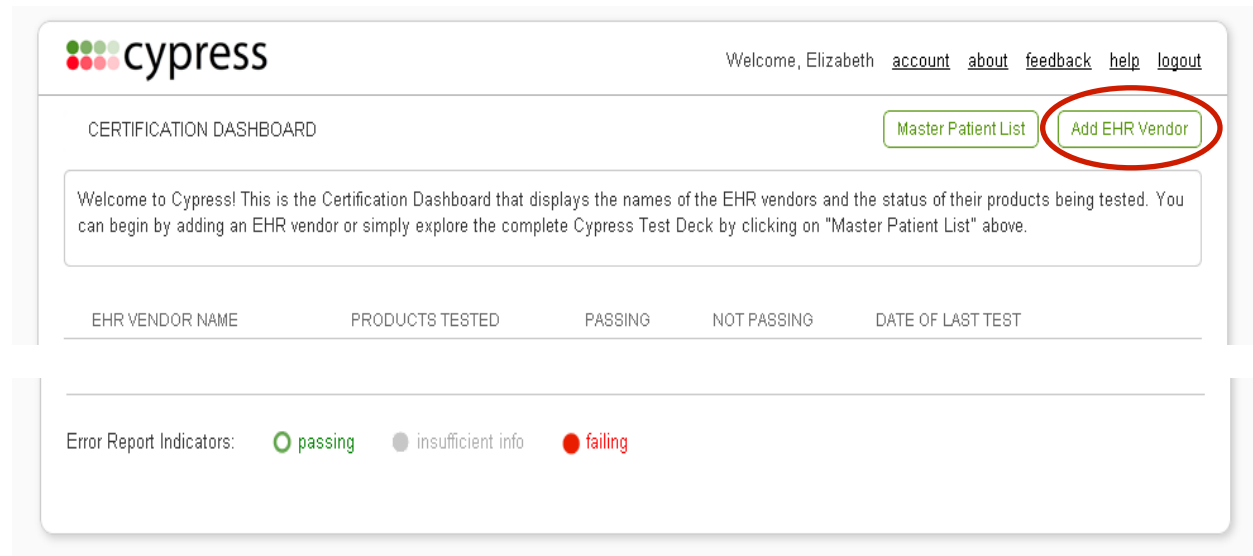
patient\_50a559f0f664f....zip

Show all downloads.

### 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

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### 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

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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
<b>EHR Vendor Company</b>	0 / 0 products	0 products	0 products	<a href="#">delete</a>

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

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**Product Information**

Product Name:  Description:

Version:

**Figure 3: EHR Product form**

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

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CERTIFICATION DASHBOARD

Candidate EHR: EHR Vendor Company  
Vendor ID: 123-456  
URL: www.ehr\_vendor.com

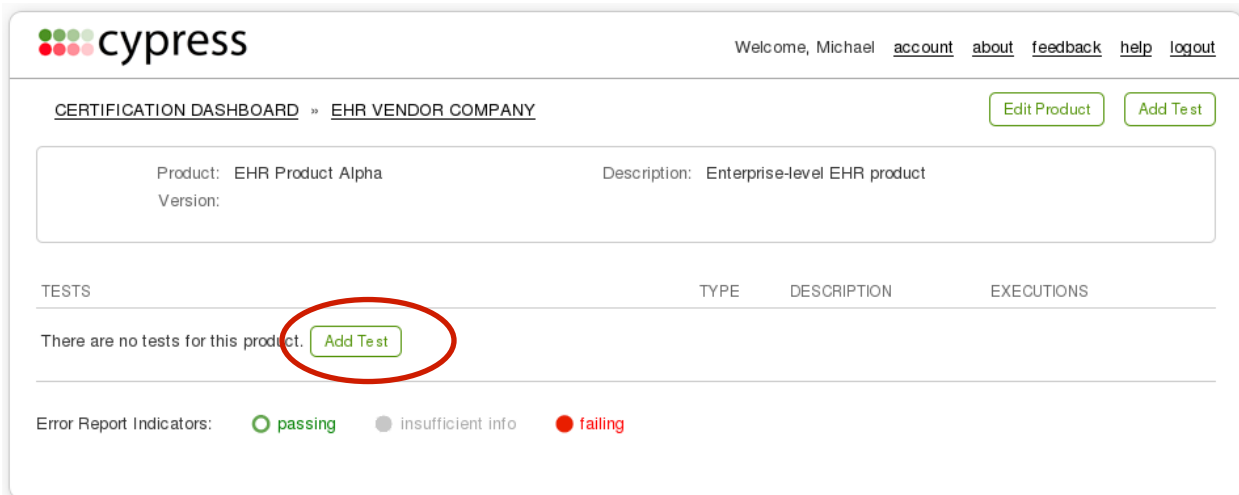
EHR POC:  
Email:  
Phone:

PENDING PRODUCTS	DESCRIPTION	TESTS	
● EHR Product Alpha	Enterprise-level EHR product	0 / 0	<input type="button" value="Delete"/>

Error Report Indicators: ● passing ● insufficient info ● failing

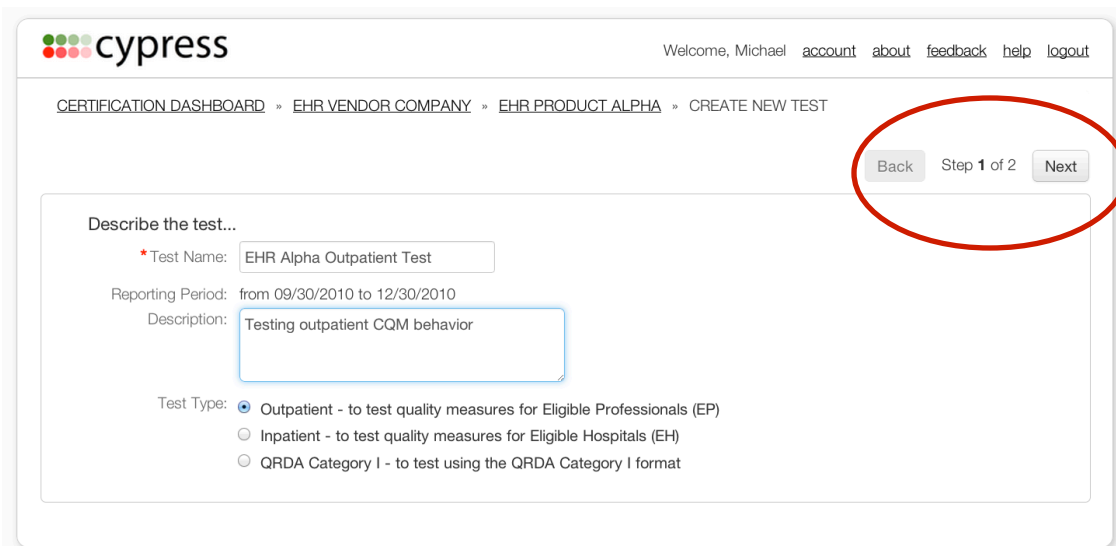
**Figure 4: Certification Dashboard showing a vendor with one product added**

- 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

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[CERTIFICATION DASHBOARD](#) » [EHR VENDOR COMPANY](#) » [EHR PRODUCT ALPHA](#) » CREATE NEW TEST

[Back](#) Step 2 of 2 [Done](#)

Identify **at least one** quality measure to test from the list of available measures for this product...

☐ all quality measures

ADE	<input checked="" type="checkbox"/> all Cancer measures
ADHD	<input checked="" type="checkbox"/> 0389 - Prostate Cancer: Avoidance of Overuse of Bone Scan for Staging Low Risk Prostate Cancer Patients
Alcohol and Drug	<input checked="" type="checkbox"/> 0387 - Breast Cancer: Hormonal Therapy for Stage IC-IIIC Estrogen Receptor/Progesterone Receptor (ER/PR) Positive Breast Cancer
Asthma	<input checked="" type="checkbox"/> 0031 - Breast Cancer Screening
Back Pain	<input checked="" type="checkbox"/> 0032 - Cervical Cancer Screening
Blood Pressure	<input checked="" type="checkbox"/> 0385 - Colon Cancer: Chemotherapy for AJCC Stage III Colon Cancer Patients
CAD	<input checked="" type="checkbox"/> 0034 - Colorectal Cancer Screening
Cancer	6
Cataracts	

Figure 21: Create New Test - Step 2 CQM selection

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Product: EHR Product Alpha Description: Enterprise-level EHR product  
Version: v1.0

INCOMPLETE TESTS	TYPE	DESCRIPTION	EXECUTIONS
EHR Alpha Test	QRDA Cat I	Testing EHR Product Alpha with latest code updates.	0 <a href="#">Delete</a>

Error Report Indicators: ○ passing ● insufficient info ● failing

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 present. Below the notes is a table with the header 'TEST EXECUTIONS' (circled in red), '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.

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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

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

file:///Users/rmccready/Downloads/Test\_5089a9143054cf1a12000357/7\_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

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

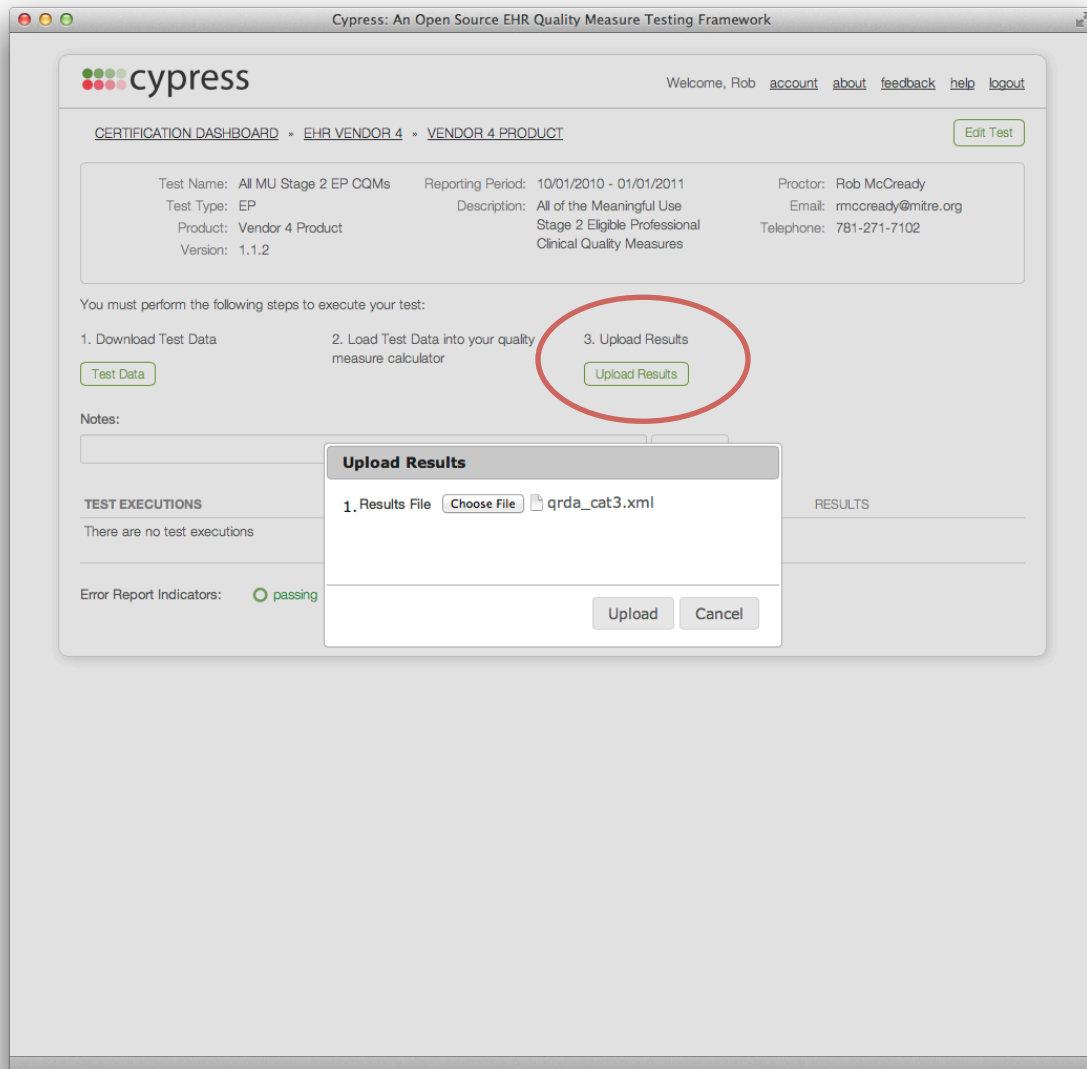
**Encounters**

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.

The screenshot shows the Cypress Certification Dashboard for a test named "EHR Alpha Test". The dashboard includes a header with the Cypress logo and user navigation links. The main content area displays test details, execution steps, and results. A red circle highlights the "XML Validation Errors: 49", "XML Validation Warnings: 48", and "Content Inspection Errors: \*\* content inspection errors \*\*" section.

**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
- Telephone:

**Execution Steps:**

1. Download Test Data (Test Data button)
2. Load Test Data into your quality measure calculator
3. Upload Results (Upload Results button)

**Notes:**

Notes:  add note

**TEST EXECUTIONS**

TEST EXECUTIONS	DESCRIPTION	RESULTS
2012-10-11 02:51:53 UTC		<button>Results</button>

**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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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		<span>Results</span>

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

Robert  
Delete

- 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' for 'VENDOR 4 PRODUCT'. It lists test details: '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 section titled 'You must perform the following steps to execute your test:' lists three steps: '1. Download Test Data', '2. Load Test Data into your quality measure calculator', and '3. Upload Results'. A 'Test Data' button is under step 1, and an 'Upload Results' button is under step 3. A 'Notes' section with an 'add note' button is also present. The 'TEST EXECUTIONS' table shows a single entry for '2012-10-25 21:24:52 UTC' with a 'Results' button circled in red. Below this, the 'TEST RESULTS' section shows a 'PASSING MEASURES' status circled in red. A table lists various measures with their 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

Robert  
Delete

## 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

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