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An Open Source Electronic Clinical Quality Measure Testing and
Certification Tool

Supporting the 2014 ONC Certification Edition with
Cypress v3

Draft

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1. Introduction

Cypress v3.2 is the rigorous open source testing tool of Electronic Health Records (EHR) and EHR modules used in calculating electronic Clinical Quality Measures (eCQM). Cypress v3.2 is the official testing tool for the 2015 EHR Certification program supported by the Office of the National Coordinator for Health Information Technology (ONC). The 2015 Edition final rule, published by the ONC, updates the ONC Health Information Technology (IT) Certification Program and includes certification criteria to support repeatable electronic clinical quality measurement and reporting across the healthcare ecosystem. The 2015 Edition eCQM certification criteria also support the requirements of the Medicare and Medicaid EHR Incentive Programs and other Centers for Medicare & Medicaid Services (CMS) program requirements.

ONC and CMS developed the Cypress v3.2 User Guide for test proctors who test and certify EHR systems at Authorized Testing Labs (ATL). EHR software engineers, quality assurance engineers, and production release engineers may draw on the guide when they use Cypress in a pre-testing mode to understand how their EHR product will perform in an ATL-conducted operational test.

Cypress 2.6.1 is the only version available for use with the 2014 Certification Edition. By design, Cypress 2.6.1 only supports the eCQMs published in 2014 by CMS. Therefore, vendors looking to certify to the 2014 Certification Edition are required to implement eCQMs that are not currently in use. As an alternative, this document describes how Cypress v3 can be configured for testing with the 2014 Certification Edition.

The two most significant differences between the 2014 Certification Edition and the 2015 Certification Edition are:

1. The 2015 Edition requirement to perform patient deduplication
2. The 2015 Edition C2 (import and calculate) requirement for automated QRDA import

It is possible to work around these two differences to achieve a 2014 certification by temporarily changing the administrative settings for the Cypress instance. This document describes the steps required to change the administrative settings in Cypress.

2. Steps to Update Cypress Configuration to Turn Off Patient Duplication

This section presents the required ten steps to change the administrative settings in Cypress.

Step 1: Log in with a User Account with Administrative Privileges

- An administrator account will have a link to the **Admin** page in the banner in Figure 1.
- Click on the **Admin** link to go to the **Admin Page**.

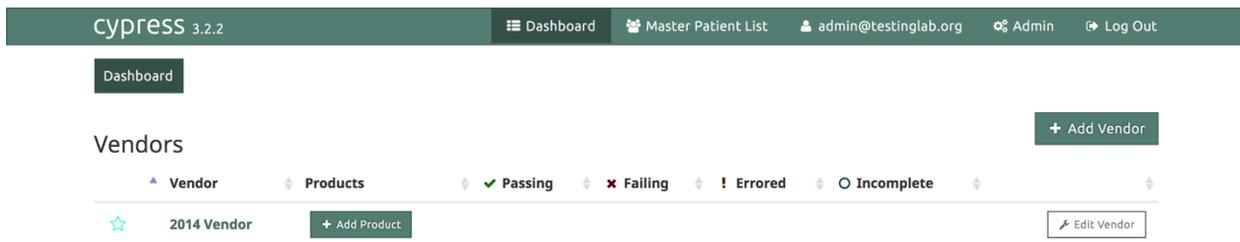


Figure 1. Screenshot of Vendor Dashboard

Step 2: Go to Admin Page

- By default, Cypress will be running in **ATL mode** as shown in Figure 2.
- Select **Edit Application Settings** to modify the Application Mode.

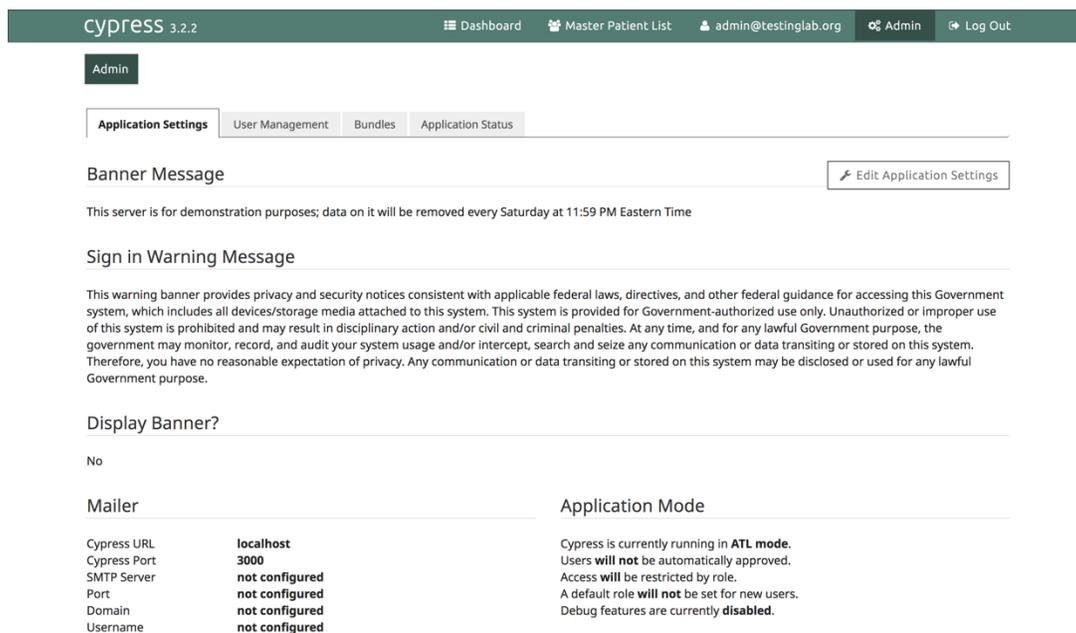


Figure 2. Screenshot of Admin Page

Step 3: Edit Application Settings

- By default, Cypress will be running in **ATL mode** as shown in Figure 3.
- Select **Custom** to change the default settings.

The screenshot shows the 'Edit Settings' page in the Cypress 3.2.2 application. The page is divided into several sections:

- Banner:** A text area containing the message: "This server is for demonstration purposes; data on it will be removed every Saturday at 11:59 PM Eastern Time".
- Sign in Warning:** A text area containing a privacy and security notice. Below it is a checkbox labeled "Display banner/warning?".
- Email Settings:** A section with several input fields:
 - Cypress Instance URL:** A text field containing "localhost".
 - Instance Port:** A text field containing "3000".
 - SMTP Server:** An empty text field.
 - Port:** An empty text field.
 - Mailer Domain:** An empty text field.
 - Mailer Username:** An empty text field.
 - Mailer Password:** An empty text field.
- Application Mode:** A section with four radio button options:
 - Internal
 - Demo
 - ATL
 - Custom

At the bottom of the form, there are two buttons: "Edit Settings" (highlighted in green) and "Cancel".

Figure 3. Screenshot of Edit Settings (Original Settings)

Step 4: Select Custom Options

- When first selected, the **Custom** settings will be the same as the original **ATL settings**.
 - **Auto Approve, Ignore Roles, and Debug Features** will all be set to **Disable** as shown in Figure 4.

The screenshot shows the 'Edit Settings' page in the Cypress 3.2.2 application. The page is divided into several sections:

- Banner:** A text area containing the message: "This server is for demonstration purposes; data on it will be removed every Saturday at 11:59 PM Eastern Time".
- Sign in Warning:** A text area containing the message: "This warning banner provides privacy and security notices consistent with applicable federal laws, directives, and other federal guidance for accessing this Government system, which includes all devices/storage media attached to this system. This system is provided for Government-authorized use only." Below this is a checkbox labeled "Display banner/warning?" which is currently unchecked.
- Email Settings:** A section with several input fields:
 - Cypress Instance URL:** A text input field containing "localhost".
 - Instance Port:** A text input field containing "3000".
 - SMTP Server:** An empty text input field.
 - Port:** An empty text input field.
 - Mailer Domain:** An empty text input field.
 - Mailer Username:** An empty text input field.
 - Mailer Password:** An empty text input field.
- Application Mode:** A section with four radio buttons:
 - Internal
 - Demo
 - ATL
 - Custom
- Custom Mode Options:** A section with three checkboxes and one dropdown menu:
 - Auto Approve:** Enable, Disable
 - Ignore Roles:** Enable, Disable
 - Debug Features:** Enable, Disable
 - Default role:** A dropdown menu with "None" selected.

At the bottom of the page, there are two buttons: "Edit Settings" (highlighted in green) and "Cancel".

Figure 4. Default Settings

Step 5: Enable Debug Features

- Clicking **Enable** for **Debug Features** enables turning off patient duplication when creating a new Product.
- Click **Edit Settings** to save the changes as shown in Figure 5.

The screenshot shows the Cypress 3.2.2 Admin interface. The top navigation bar includes 'Dashboard', 'Master Patient List', 'admin@testinglab.org', 'Admin', and 'Log Out'. The 'Admin' menu is open, showing 'Admin' and 'Edit Settings'. The 'Edit Settings' page is displayed, with the following sections:

- Banner:** A text area containing the message: "This server is for demonstration purposes; data on it will be removed every Saturday at 11:59 PM Eastern Time".
- Sign in Warning:** A text area containing the message: "This warning banner provides privacy and security notices consistent with applicable federal laws, directives, and other federal guidance for accessing this Government system, which includes all devices/storage media attached to this system. This system is provided for Government-authorized use only." Below this is a checkbox labeled "Display banner/warning?" which is currently unchecked.
- Email Settings:** Fields for "Cypress Instance URL" (localhost), "Instance Port" (3000), "SMTP Server", "Port", "Mailer Domain", "Mailer Username", and "Mailer Password".
- Application Mode:** Radio buttons for "Internal", "Demo", "ATL", and "Custom" (selected).
- Custom Mode Options:** A section with the following options:
 - Auto Approve: Enable, Disable
 - Ignore Roles: Enable, Disable
 - Debug Features: Enable, Disable
 - Default role: A dropdown menu currently set to "None".

At the bottom of the form are two buttons: "Edit Settings" and "Cancel".

Figure 5. Enable Debug Features

Step 6: Add a New Vendor and Product

- Once the settings have been saved, a new product can be created with patient duplication turned off.
- Add a product to an existing (or new) vendor by clicking the **Add Product** button as shown in Figure 6.

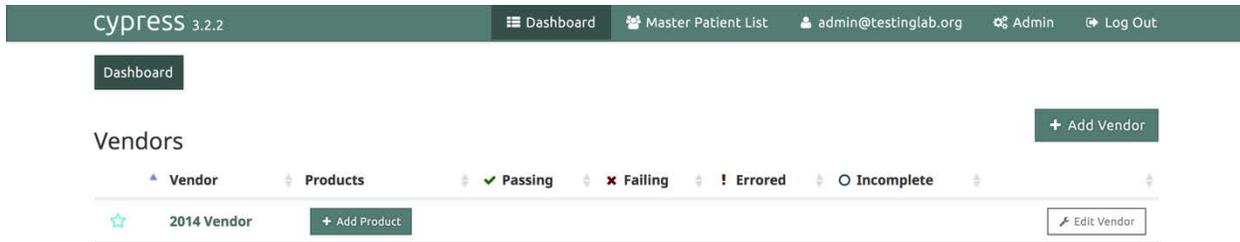


Figure 6. Add Product to a Vendor

Step 7: Take Note of Default Options

- By default, **Duplicate Records** will still be enabled, as shown in Figure 7.

Figure 7. Create Product (Default Options)

Step 8: Deselect Duplicate Records

- Patient duplication can be turned off by deselecting **Duplicate Records**.
- Please note that “C4” is still a certification option in Figure Seven though C4 is not applicable to the 2014 ONC Certification.

- Cypress v3 can only be used with the 2015, 2016, and 2017 measure bundles. These bundles require newer standards than the one specified in the 2014 Certification Edition.

Figure 8. Create Product without Patient Duplication

Step 9: Each Individual Test Exposes 'Get Known Good Result'

- One of the ramifications to enabling **Debug Features** is that the **Get Known Good Results** feature will be available for each test.
- **IMPORTANT!!** If your Cypress version is accessible to vendors, then the vendors will also be able to **Get Known Good Results**. When this is the case, immediately switch the **Application Mode** back to **ATL** after creating the product.

The screenshot shows the Cypress 3.2.2 interface. The top navigation bar includes 'Dashboard', 'Master Patient List', 'admin@testinglab.org', 'Admin', and 'Log Out'. The breadcrumb trail is 'Dashboard > Vendor: 2014 Vendor > Product: Test without duplicate records > Test: Maternal Depression Screening'. Below this, there are tabs for 'C1', 'C2', and 'C3'. A search box shows 'Previous Test: CMS82v5' and another shows 'Next Test: CMS82v5'. The main content area is divided into three sections: 'Measure Test Information', 'C1 and C3', and 'C2 and C3'. The 'Measure Test Information' section lists: Measure: Maternal Depression Screening, HQMF ID: 40280382-5ABD-FA46-015B-49B2128438CB, CMS ID: CMS82v5, Provider Name: Bennett, Timothy, Provider NPI: 1866439551, Provider TIN: 433448034, and Provider CCN: 465752. The 'C1 and C3' and 'C2 and C3' sections show error reports for QRDA Errors, Reporting Errors, Submission Errors, Warnings, and Execution Date. Below these sections are two buttons: '1 Download Test Deck' and '2 Upload Files'. The 'Download Test Deck' button has a sub-button 'Download QRDA Category I (.zip)'. The 'Upload Files' button has a sub-button 'Select file'.

Figure 9. Get Known Good Results on a Test Page

Step 10: Return Settings to ATL Mode

- The **Application Mode** can be switched back to **ATL** mode by going to the **Admin** Page, clicking on **Edit Application Setting** (as shown in Figure 3) and selecting **ATL** as the **Application Mode**.

3. Supporting Manual Entry in Cypress v3

The decision to create measure-specific test decks (instead of a single test deck for each measure) derives from the 2015 Edition C2 (import and calculate) requirement for automated QRDA import and the desire to increase the measure logic coverage in Cypress. When an ATL uses the **Download Full Test Deck** button (as shown in Figure 10), the generated zip file will only contain the QRDA files for the test patients. To support users who do not have the ability to import QRDA files, the test proctor can provide HTML versions of the test patients. Unfortunately, there is no single button available for this action. Instead, a test proctor must go to each individual test and download the HTML files from the View Patients page. The following two steps describe how to download the HTML patient files.

Step 1: Go to Individual Test

- Each C1, C2, C3, and C4 test page has a link to **View Patients** as shown in Figure 10.

The screenshot shows the Cypress 3.2.2 interface. At the top, there is a navigation bar with 'Dashboard', 'Master Patient List', 'admin@testinglab.org', 'Admin', and 'Log Out'. Below this, a breadcrumb trail reads 'Dashboard > Vendor: 2014 Vendor > Product: Tests without duplicate records > Test: Maternal Depression Screening'. There are three tabs labeled 'C1', 'C2', and 'C3'. Below the tabs, there are two input fields: 'Previous Test: CMS137v6' and 'Next Test: CMS128v6'. The main content area is divided into three columns. The left column is titled 'Measure Test Information' and contains details for 'Maternal Depression Screening', including HQMF ID, CMS ID, and provider information for Veronica Rodriguez. The middle column is titled 'C1 and C3' and lists error types like QRDA Errors, Reporting Errors, Submission Errors, Warnings, and Execution Date. The right column is titled 'C2 and C3' and also lists error types, with a 'start' button below. At the bottom, there are two main sections: '1 Download Test Deck' with a 'Download QRDA Category I (.zip)' button, and '2 Upload Files' with a 'Select file' button.

Figure 10. View Patients for Individual Test

Step 2: Download HTML Records Using View Patients

- The **View Patients** page shows a listing of the patients in the Cypress test deck (Figure 11).
- The **Download HTML Patients** button will download a zip file including an HTML representation of all patients in the measure specific test deck.

The screenshot shows the Cypress 3.2.2 interface with the breadcrumb trail 'Dashboard > Vendor: 2014 Vendor > Product: Tests without duplicate records > Test: Maternal Depression Screening > Patient List'. The main heading is 'Patient List' with a 'Download HTML Patients' button. Below this is the title 'CMS82v5 Maternal Depression Screening Patients' and a table of patient data.

Patient Name	Template Name	DOB	Gender	IPOP	DENOM	NUMER
Allan Nguyen	Z3 N Eye	February 11, 1966	Male	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carole Shaw	1 AMI	December 13, 1948	Female	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Connie Meyer	A BH Infant	November 1, 2015	Female	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Henry Poole	Z15 N GP Adult	February 16, 1968	Male	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kathleen Obrien	Z15 GP Peds	June 5, 2014	Female	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lonnie Wagner	1 BH Infant	May 16, 2016	Male	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Nathan Price	Z10 GP Peds	August 13, 2014	Male	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ruby Fields	B BH Infant	November 1, 2015	Female	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

Figure 11. View Patients with Download HTML

Acronyms

ATL	Authorized Testing Lab
CMS	Centers for Medicare & Medicaid Services
CQM	Clinical Quality Measure
eCQM	Electronic Clinical Quality Measure
EHR	Electronic Health Record
HTML	Hypertext Markup Language
ONC	Office of the National Coordinator for Health Information Technology
QRDA	Quality Reporting Document Architecture