



Measures Management System  
Information Session

# Introduction to Measure Authoring Development Integrated Environment (MADiE)

Nikki Hunter

MADiE Product Owner

# Welcome to Today's Presentation

## Objectives

- Learn about MADiE and how it is streamlining electronic Clinical Quality Measure (eCQM) authoring and testing.
- Understand how this tool supports Centers for Medicare & Medicaid Services' (CMS) digital measurement priorities.
- Hear how users will transition to MADiE from the Measure Authoring Tool (MAT) and Bonnie, an eCQM testing tool.





# Introduction to MADiE

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Nikki Hunter  
MADiE Product Owner

4/24/2024

# Agenda

1. MAT and Bonnie Overview
2. MADiE Introduction
3. MADiE Transition Plan
4. MADiE Access
5. MADiE Demonstration
6. MADiE Resources
7. Q&A

# MADiE Team

(Part of us anyway)



Nikki Hunter  
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Senior Health Informatics  
Solutions Coordinator

# The Rest of us!



Stan Rankins  
Interoperability Architect



Gail Winters  
Interoperability Architect



Jean Fajen  
Contract Support



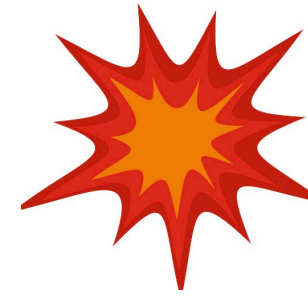
Ben Ohe  
MADiE Security Engineer Lead



Brendan Donohue  
MADiE Dev Ops Engineer Lead



Funky Bunch  
MADiE Dev/QA Team



Legacy Exploders  
MADiE Dev/QA Team

## MADiE CMS Team

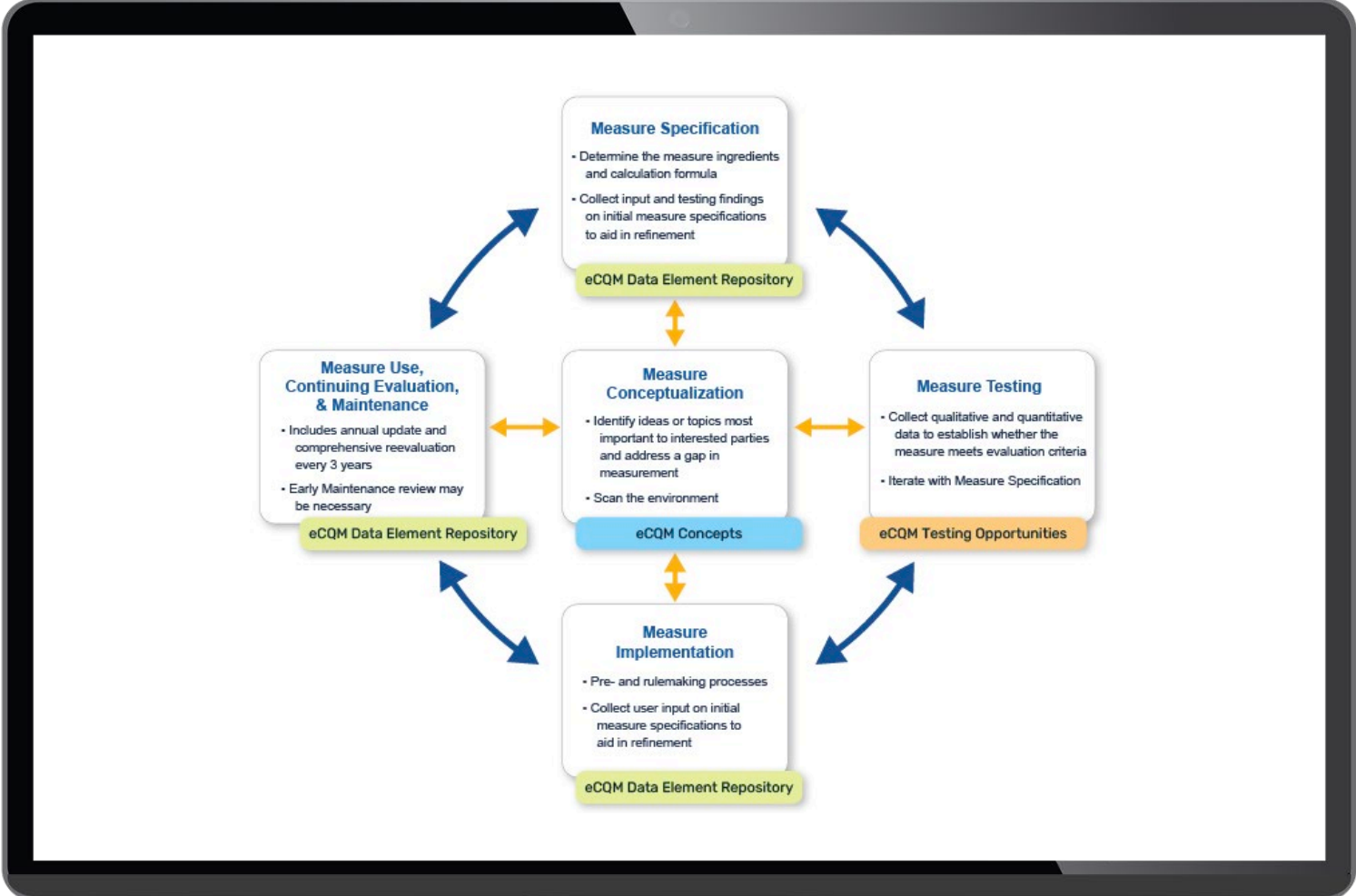


Emmanuel Kalluri  
CMS Contracting Officer's  
Representative (COR)



Crystal Kellam  
CMS SME

# Measure Lifecycle



The Measure Lifecycle is expansive and complex. Pre work is done to research the concepts, conceptualize the measures, and specify the measure. Currently, measures are created in the Measure Authoring Tool (MAT) and then tested in Bonnie. Each year, specific measures go through an annual update cycle (AU) where they are evaluated, updated, and maintained to ensure clinical relevancy and accuracy.



# MAT, Bonnie FHIR, Bonnie QDM and Bonnie Prior Overview

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The legacy tools measure developers have been using to author and test measures for over a decade are the MAT and Bonnie, which includes Bonnie Prior, Quality Data Model (QDM), and Fast Healthcare Interoperability Resources (FHIR).

## **MAT**

The MAT is a web application that allows measure developers to author electronic Clinical Quality Measures (eCQMs) using Clinical Quality Language (CQL) and QDM or FHIR.

The MAT expresses complex measure logic and exports measures in several formats: a human-readable document that can be viewed in a web browser and a CQL file containing the CQL library in its entirety. For integration into electronic health records (EHRs), the MAT provides an eCQM HQMF XML document, an Expression Logical Model (ELM) XML document, and a JavaScript Object Notation (JSON) file for QDM / CQL measures. For FHIR / CQL measures, it provides JSON or XML bundles.

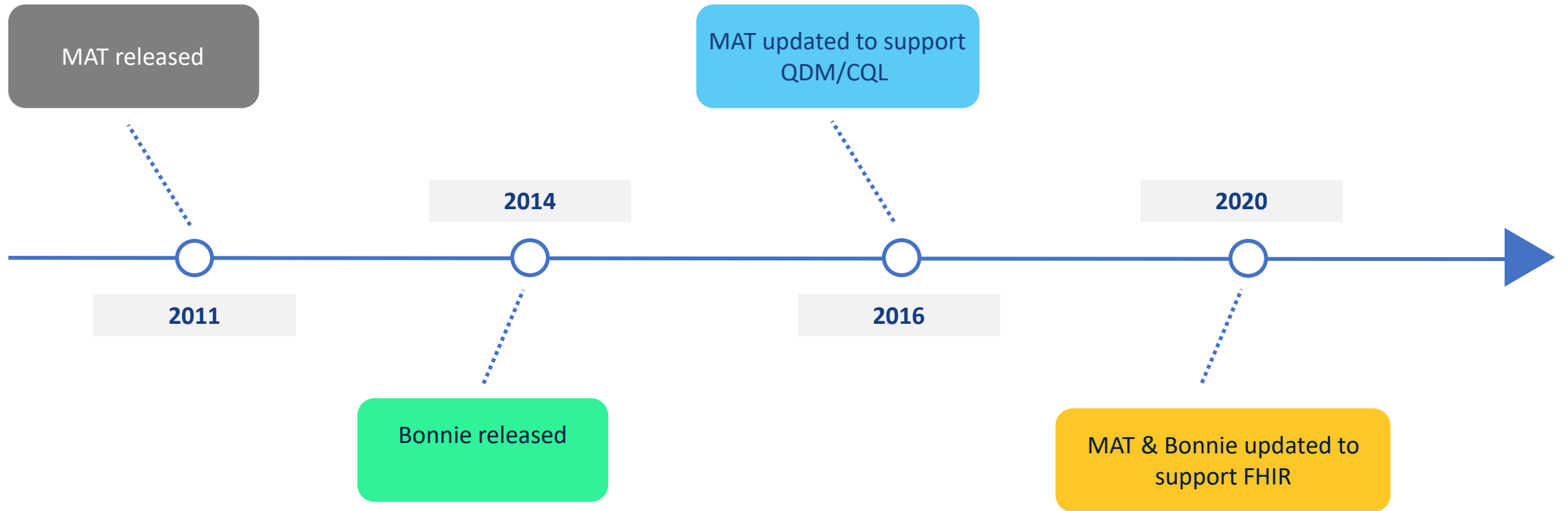
## **Bonnie**

Bonnie is a software tool that allows eCQM developers to test and verify the behavior of their eCQM logic. Bonnie enables measure developers to independently load measures they have constructed using the MAT. It helps measure developers execute the measure logic against the constructed patient test deck and evaluate whether the logic aligns with the intent of the measure.

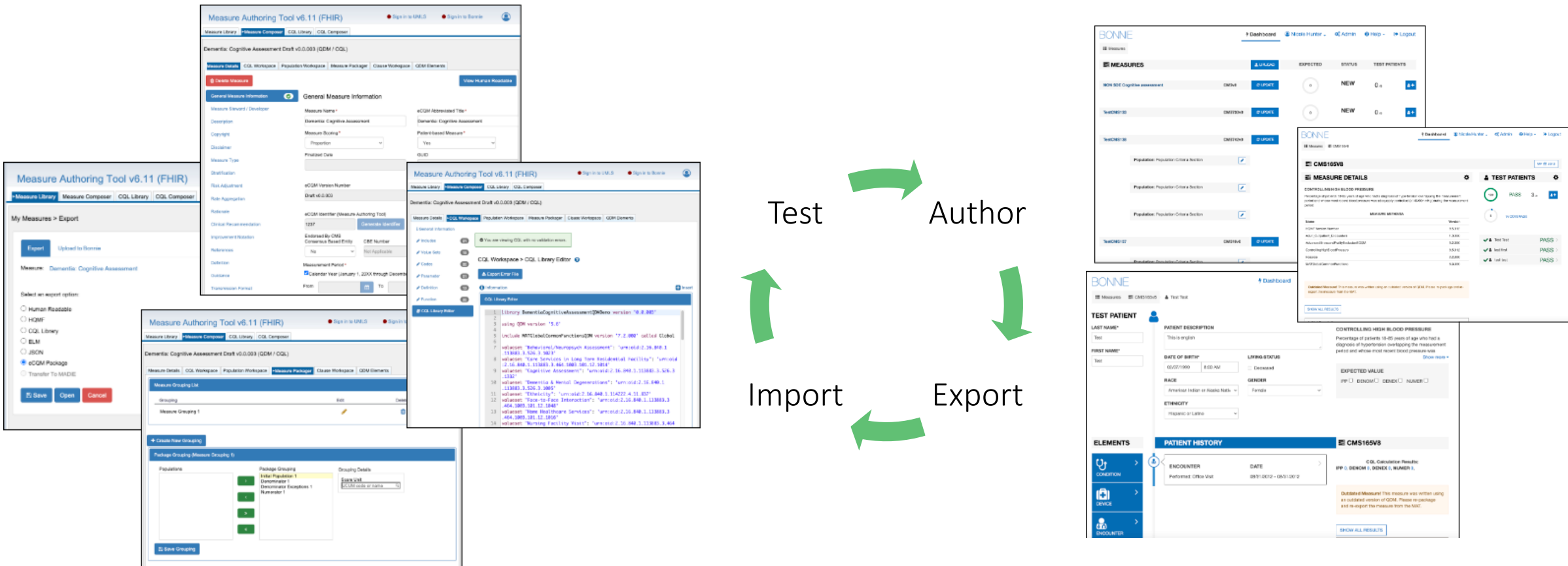
Bonnie was designed to integrate with the nationally recognized data standards CMS quality reporting programs use for expressing eCQM logic for machine-to-machine interoperability.

# MAT & Bonnie - History

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# MAT & Bonnie - Workflow



Measure developers author measures in the MAT. This also involves creation of CQL Libraries. After the measure construction is complete, the measure will be packaged and exported. If measure testing is needed, the measure developer will import the exported measure package into Bonnie and synthetic text cases are created. Measure developers may then execute the measure logic against the test cases to evaluate whether the logic aligns with the intent of the measure. Should updates be needed in the measure, they must go back to the MAT, update, package, export, re-import to Bonnie, and re-test the updates.

# Introducing!

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Measure

Authoring

Development

Integrated

Environment

MADiE is a software tool that redefines eCQM development and testing by making it a self-contained experience that includes dynamic authoring and testing within a single application.

- Provides measure authors with an intuitive, inclusive and easy-to-use interface
- Uses current technologies to provide a secure and efficient user experience
- Leverages modern human-centered design (HCD) processes:
  - Continuously incorporate user feedback and iterative design to inform present and future development
  - 100% 508 compliance to ensure accessibility

## → Why Update?

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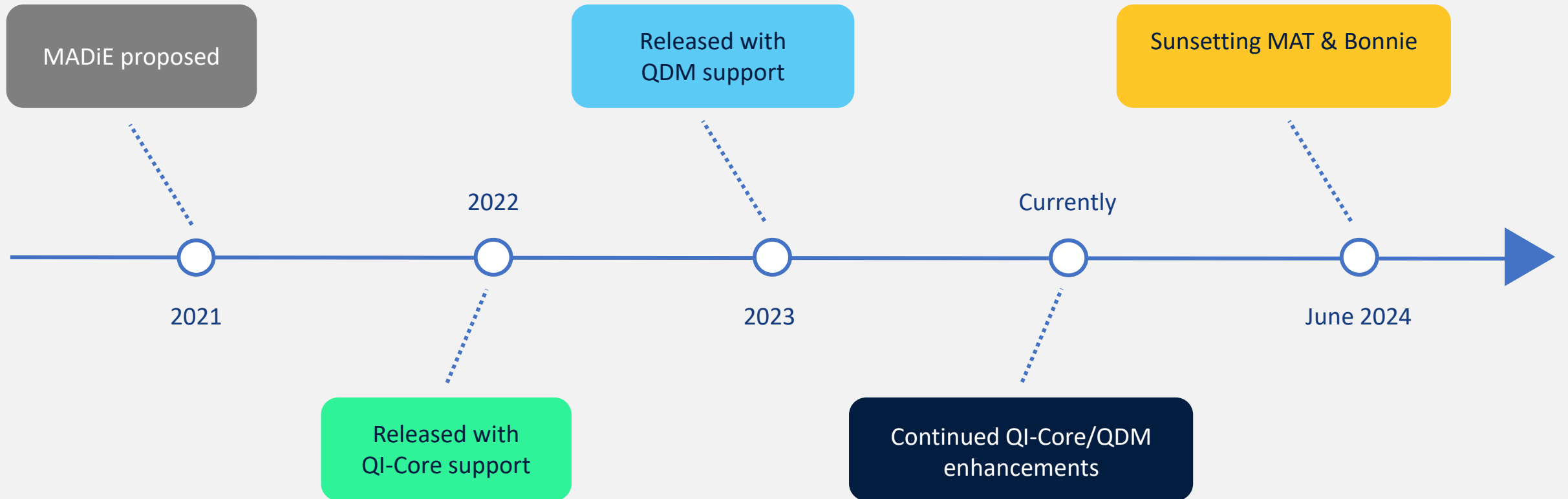
It was time!

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- Unsupported tooling
  - MAT – Google Web Toolkit
  - Bonnie – Ruby on Rails version
- Security risks
- Two separate tools and workflows
- Different look and feel between tools
- Bonnie functionality spread across 3 different environments



# MADiE - History



# MADiE - Workflow

Author

Test

Status	Group	Title	Description	Action
Pass	IPFail	NoDementia test		Select
Fail	DenomFail	Invalid Encounter	the encounter selected isn't valid for the measure	Select
Fail	denomex	allergy		Select
Fail	IPPass	ValidEnc		Select

Population Criteria	Description
Population Criteria 1	
Population Criteria 2	

```
define "Initial Population":
  exists "Dementia Encounter During Measurement Period"
  and ( Count("Qualifying Encounter During Measurement Period") >= 2 )
```

Measure CQL (View Only)	Highlighting	Expected / Actual
IP	define "Initial Population":	
DENOM	exists "Dementia Encounter During Measurement Period"	
DENEX	and ( Count("Qualifying Encounter During Measurement Period") >= 2 )	
DENEXCPT	Results	
	true	

Measure developers author the measures in one tab of MADiE. After the measure construction is complete, the measure developer can switch to the “Test Case” tab to generate synthetic text cases. Measure developers may then execute the measure logic against the test cases to evaluate whether the logic aligns with the intent of the measure. Should updates be needed, the measure developer can switch back to the measure tabs.



**MAT/Bonnie → MADiE Transition**



# Transitioning to MADiE



MAT and Bonnie will be sunsetted\* on

**June 28, 2024**

\* Sunsetting means that MAT and Bonnie data and websites will no longer be accessible after this date.

# MAT and Bonnie Migration to MADiE

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The legacy tools MAT and Bonnie – which includes Bonnie Prior, QDM, and FHIR – **will not be accessible after June 28, 2024**. Below are key dates in the migration timeline.

- **April 2024:** MADiE continues to release key features to support QDM measure development, as well as enhancements based on prioritization discussions.
- **May 2024:** Measure developers need to begin migrating measures, libraries, and test cases to MADiE if that process has not begun already.
- **June 28, 2024:** MAT, Bonnie FHIR, Bonnie QDM, and Bonnie Prior shutdown. These tools will no longer be accessible by any measure developers.

The measures and test cases currently contained within MAT and Bonnie will not be accessible to users after June 28.

Users can transfer their QDM and FHIR measures and import test cases directly to MADiE. (**Note:** Test cases in Bonnie Prior cannot be imported into MADiE).

# Measure Transferring



Transfer measures from MAT **directly** to MADiE

Steps to transfer measure

1. Log into MADiE
2. Select the measure to transfer
3. Click “Export” in the actions menu
4. Select “Transfer to MADiE”
5. Click “Save” or “Open”
6. Log in to MADiE. Your measure will now display in My Measures within MADiE

A success or failure email will be sent to the email associated with your HARP ID.

There are limitations to the transfer, such as only the MAT measure owner can transfer the measure. Please reference the MADiE User Guide for complete details.

# Test Case Transferring – QDM Test Cases



Bonnie allows for bulk **export** and **re-import** into MADiE for **QDM** test cases

Steps to export test cases

1. Log into Bonnie QDM
2. Click the measure name of the measure containing the test cases to export
3. Click the gear icon and select “EXPORT”
4. A test cases zip file will be saved to your downloads folder
5. Test cases will need to be unzipped to be uploaded to MADiE

Steps to import test cases

1. Unzip test cases exported from Bonnie QDM
2. Log into MADiE
3. Select the measure to import the test cases
4. Open the measure and navigate to the “Test Cases” tab
5. Select “Import Test Cases”
6. Click “Select File” and select the JSON file unzipped in Step 1
7. Click “Import”
8. If import is possible\*, the test cases will be imported

\*There are limitations to the import, specifically around when expected values are set. Please reference the MADiE User Guide for complete details.

# Test Case Transferring – FHIR Test Cases



Bonnie Allows for bulk **export** and **re-creation** in MADiE for **FHIR** test cases

Steps to export test cases

1. Log into Bonnie FHIR
2. Click the measure name of the measure containing the test cases to export
3. Click the gear icon and select “EXPORT”
4. A test cases zip file will be saved to your downloads folder

Steps to re create test cases

1. Unzip test cases exported from Bonnie FHIR
2. Log into MADiE
3. Select the measure to import the test cases
4. Open the measure and navigate to the “Test Cases” tab
5. Select “New Test Case”
6. Fill out the title, description, and group based off the information in Bonnie, and test case will be created
7. Open the test case for editing
8. Open the JSON file correlated to the test
9. Select the entire JSON, copy JSON, paste into test case editor
10. Save the test case
11. Repeat Steps 3-10 for all test cases in file

Please reference the MADiE User Guide for complete details.



**MADiE Access**

# MADiE Access Instructions

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## Pre-requisites

- HCQIS Access Roles and Profile (HARP) ID
  - Existing MAT/Bonnie users have one
  - Visit <https://harp.cms.gov> to create one
- Set up HARP two-factor authentication



## Request MADiE Access

- Request MADiE-User role in HARP
- Allow 1 business day for MADiE Security Officer to approve your role
  - An auto-generated email will be sent after approval.
- Log into MADiE
  - For instructions, see the “Logging into MADiE” section of the access guide.
  - Accounts that are not logged into at least once every 60 days will be deactivated.
  - After an account has been deactivated, the user will need to re-request the MADiE-User role in HARP.



# MADiE Demonstration





**MADiE Resources**

# MADiE Resources – MAT Public Website

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The MAT public website contains a [MADiE MVP tab](#) with the following resources:

- [Login](#) button to MADiE
- MADiE Access Guide – how to request a MADiE account
- User Guide – provides details regarding tool functionality
- JSON Test Case Guide – steps for using the JSON test case editor for FHIR test cases
- Known Issues – updated regularly
- Release Notes – posted with each MADiE release
- MADiE Measure and Library Sharing Request Form v2.0 – to request measures and test cases be shared – submitted by the owner to [semanticbits-madie-help@icf.com](mailto:semanticbits-madie-help@icf.com)
- MADiE Measure or Library Ownership Transfer Request Form is now available. This form should be submitted by the owner by emailing [semanticbits-madie-help@icf.com](mailto:semanticbits-madie-help@icf.com).

# MADiE Resources – QI-Core Profile Examples

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- The MADiE team has created a measure in MADiE with an included test case JSON bundle that contains entries for many QI-Core (v4.1.1) profiles.
- The purpose of this test case JSON bundle is to provide users the framework for commonly used QI-Core v4.1.1 profiles that can be leveraged with their own test case development.
- The measure (**QI-Corev4.1.1 Test Case Template**) is a blank measure (no CQL and no population criteria) with one test case (**QI-Corev4.1.1 Example Bundle version 2**).
- The QI-Core profiles examples in the JSON bundle are for guidance and are not intended to fulfill any measure or testing requirement. Update to reflect the specific details of your test case.
- Measure developers may copy any of the profiles from the QI-Corev4.1.1 Example Bundle version 2 test case directly to your test case(s) or use a source code editor (e.g., Notepad++ and Visual Studio Code) and make any updates needed to meet your testing needs.
- The MADiE Test Case JSON Guide, available on the [MADiE MVP tab](#) of the MAT public website, has been updated with detailed information regarding the **QI-Corev4.1.1 Example Bundle version** test case in MADiE and provides additional guidance for using this resource.

# Next Steps

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- **Sign up** for a MADiE Account.
- **Familiarize** yourself with the resources on the [MADiE website](#).
- **Transfer** your MAT measures and Bonnie test cases into MADiE.
- **Complete** work in MAT and Bonnie and ensure your measures and test cases are transferred before June 28, 2024.
- [Register to attend](#) the MAT/Bonnie/MADiE User Group to join a community of measure authors and testers!



Questions?

# Announcements

## CMS Measures Under Consideration Entry / Review Information Tool (MERIT) Closing May 10

CMS MERIT closes for measure submissions at **8 p.m. (ET) Friday, May 10**. Check out the following CMS MERIT resources to learn more about tool and the pre-rulemaking process:

- [Quick Start Guide for Submitters](#)
- [2023 Guidance for Measure Submitters](#)
- [Pre-Rulemaking Frequently Asked Questions](#)
- [Pre-Rulemaking Overview](#)

Please contact [MMSsupport@battelle.org](mailto:MMSsupport@battelle.org) with any questions.



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