Test Scenario Procedure for Encounter: Care Results

This document describes the test scenario procedure for evaluating conformance of electronic health record (EHR) technology to the certification criteria defined in 45 CFR Part 170 Subpart C of the Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition; Revisions to the Permanent Certification Program for Health Information Technology, Final Rule. The test scenario procedure evaluates conformance to these certification criteria in a clinically plausible workflow. The document[1] references test procedures and derived test requirements with traceability to the normative certification criteria as described in the Test Scenario Procedure Overview document located at http://www.healthit.gov/certification (navigation: 2014 Edition Testing and Certification > 2014 Edition Test Method > 2014 Edition Test Scenarios > 2014 Edition Draft Test Scenarios). The test scenario procedures may be updated to reflect on-going feedback received during the certification activities.

The Department of Health and Human Services (HHS)/Office of the National Coordinator for Health Information Technology (ONC) has defined the standards, implementation guides and certification criteria used in the test procedures within the test scenario procedure. Applicability and interpretation of the standards, implementation guides and certification criteria to EHR technology is determined by ONC. Testing of EHR technology in the Permanent Certification Program, henceforth referred to as the ONC Health Information Technology (HIT) Certification Program[2], is carried out by National Voluntary Laboratory Accreditation Program (NVLAP)-Accredited Testing Laboratories (ATLs) as set forth in the final rule establishing the Permanent Certification Program (*Establishment of the Permanent Certification Program for Health Information Technology, 45 CFR Part 170; February 7, 2011*).

Under the ONC HIT Certification Program, scenario-based testing is an alternative method for testing and certification to the 2014 Edition EHR Certification Criteria. Questions or concerns regarding the ONC HIT Certification Program should be directed to ONC at ONC.Certification@hhs.gov.

Test Scenario Overview

Unit-based testing is a minimum requirement for testing and certification to the 2011 and 2014 Edition EHR Certification Criteria. Scenario-based testing is an alternative method for testing and certification to the 2014 Edition EHR Certification Criteria. As shown in Figure 1, unit-based testing consists of independent tests with individual test data (input) and results (output), while scenario-based testing links unit tests using threaded test data.

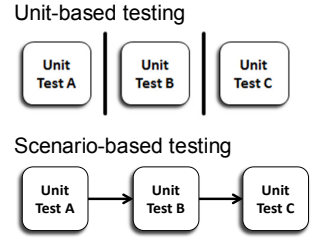


Figure 1: Unit tests are independent while scenario-based testing links unit tests using threaded data

[1] Disclaimer: Certain commercial products may be identified in this document. Such identification does not imply recommendation or endorsement by ONC.

[2] Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition; Revisions to the Permanent Certification Program for Health Information Technology, Final Rule.

As discussed above, scenario-based testing is an alternative to unit-based testing which links unit tests with dependent inputs and outputs, as shown in Figure 2. The tests, test data, and test results are all dependent; the data output from one test is the test data input for a subsequent test(s).

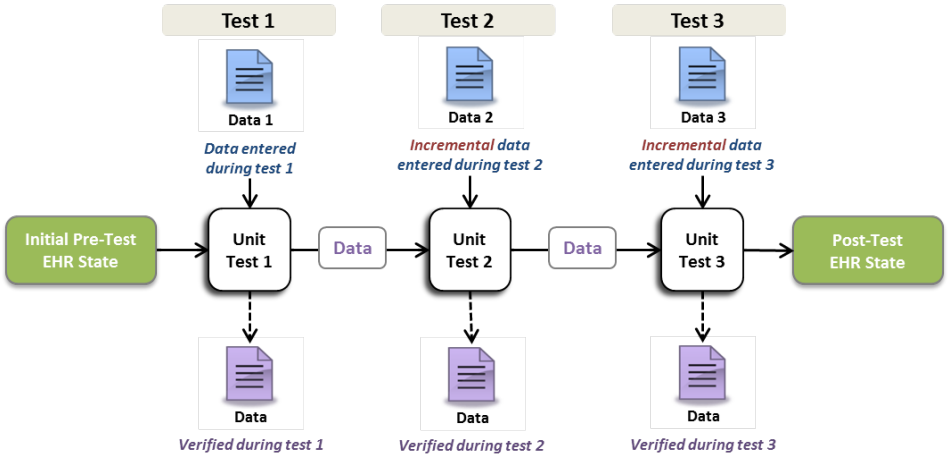


Figure 2: Scenario-based testing: detail

Within a scenario, unit tests can be added, removed, or rearranged for various reasons, depending on the scenario. For example, a scenario can be made setting-specific (ambulatory or inpatient) by adding or removing unit tests.

The purpose of scenario-based testing is to:

- Make testing clinically plausible
- Ensure ability to use data within and across systems, as shown in Figure 3
- Increase the value of testing
- Improve the efficiency of testing
- Reduce setup of testing
- Make testing consistent and replicable

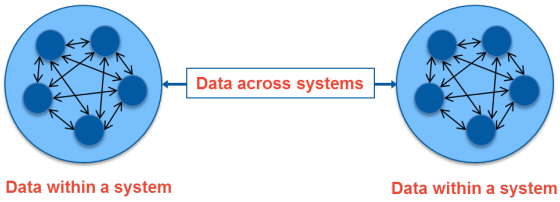


Figure 3: Scenario-based testing ensures ability to use data within and across systems

A scenario represents one possible clinical workflow that could link unit tests. It does not represent the only way that unit tests could be linked in a clinical workflow nor does it imply any requirements about how eligible providers should use EHR technology to attest to meaningful use.

Scenarios will test all of the capabilities of the certification criteria included in the scenario. For guidelines on modifying a scenario, please see the Referenced 2014 Edition Test Procedures section.

TEST SCENARIO NARRATIVE: ENCOUNTER: CARE RESULTS

This test scenario represents the following clinically plausible scenarios:

Ambulatory

Patient is seen by Provider following a recent hospital admission. During this ambulatory visit, demographics, medication, medication allergy, and problem lists, immunization information and vital signs for the Patient are recorded, changed, and accessed in the Provider's EHR. This portion of the scenario tests:

- §170.314(a)(3) Demographics
- §170.314(a)(5) Problem list
- §170.314(a)(6) Medication list
- §170.314(a)(7) Medication allergy list
- §170.314(f)(1) Immunization information
- §170.314(a)(4) Vital signs, BMI, and growth charts

The Provider receives a C-CDA formatted transition of care / referral summary for the Patient's recent Hospital admission. The C-CDA formatted transition of care / referral summary for the Patient is received, displayed, and incorporated in the Provider's EHR. During incorporation of the referral summary (C-CDA), clinical information reconciliation is performed between the problem, medication and medication allergy lists stored in the EHR and those contained in the C-CDA. Upon completion of the clinical information reconciliation, the reconciled medication, medication allergy, and problem list are stored in the Provider's EHR. This portion of the scenario tests:

- §170.314(b)(1) Transitions of care – receive, display, and incorporate transition of care/referral summaries
- §170.314(b)(4) Clinical information reconciliation

The Provider records, changes, and accesses medication, laboratory, and radiology/imaging orders for the Patient during the visit. This portion of the scenario tests:

- §170.314(a)(1) Computerized provider order entry

During a subsequent visit, the Provider's EHR indicates that image results for the Patient are available, and the Provider accesses the Patient's images and narrative interpretations. The Provider's EHR electronically receives and incorporates the Patient's clinical laboratory tests and values/results, and the Provider accesses the clinical laboratory test report information linked with the Patient's record. The Provider's EHR electronically identifies diagnostic and therapeutic reference information for the Provider as well as patient-specific education resources. This portion of the scenario tests:

- §170.314(a)(12) Image results
- §170.314(b)(5) Incorporate laboratory tests and values/results
- §170.314(a)(8) Clinical decision support
- §170.314(a)(15) Patient-specific education resources

The Provider records, changes, accesses and searches electronic notes for the Patient in the EHR, and creates a clinical summary for the Patient. This portion of the scenario tests:

- §170.314(a)(9) Electronic notes
- §170.314(e)(2) Ambulatory setting only - clinical summary

Inpatient

Patient is admitted to Hospital after a visit with an ambulatory Provider. During this hospitalization, demographics, medication, medication allergy, and problem lists, immunization information and vital signs for the Patient are recorded, changed, and accessed in the Hospital's EHR. This portion of the scenario tests:

- §170.314(a)(3) Demographics
- §170.314(a)(5) Problem list
- §170.314(a)(6) Medication list
- §170.314(a)(7) Medication allergy list
- §170.314(f)(1) Immunization information
- §170.314(a)(4) Vital signs, BMI, and growth charts

The Hospital receives a C-CDA formatted transition of care / referral summary for the Patient's recent visit with an ambulatory provider. The C-CDA formatted transition of care / referral summary for the Patient is received, displayed, and incorporated in the Hospital's EHR. During incorporation of the referral summary (C-CDA), clinical information reconciliation is performed between the problem, medication and medication allergy lists stored in the EHR and those contained in the C-CDA. Upon completion of the clinical information reconciliation, the reconciled medication, medication allergy, and problem list are stored in the Hospital's EHR. This portion of the scenario tests:

- §170.314(b)(1) Transitions of care – receive, display, and incorporate transition of care/referral summaries
- §170.314(b)(4) Clinical information reconciliation

A member of the care team records, changes, and accesses medication, laboratory, and radiology/imaging orders for the Patient during the admission. The Hospital's EHR indicates that image results for the Patient are available, and a member of the care team accesses the Patient's images and narrative interpretations. The Hospital's EHR electronically receives and incorporates the Patient's clinical laboratory tests and values/results, and a member of the care team accesses the clinical laboratory test report information linked with the Patient's record. The Hospital's EHR electronically identifies diagnostic and therapeutic reference information for a member of the care team as well as patient-specific education resources. This portion of the scenario tests:

- §170.314(a)(1) Computerized provider order entry
- §170.314(a)(12) Image results
- §170.314(b)(5) Incorporate laboratory tests and values/results

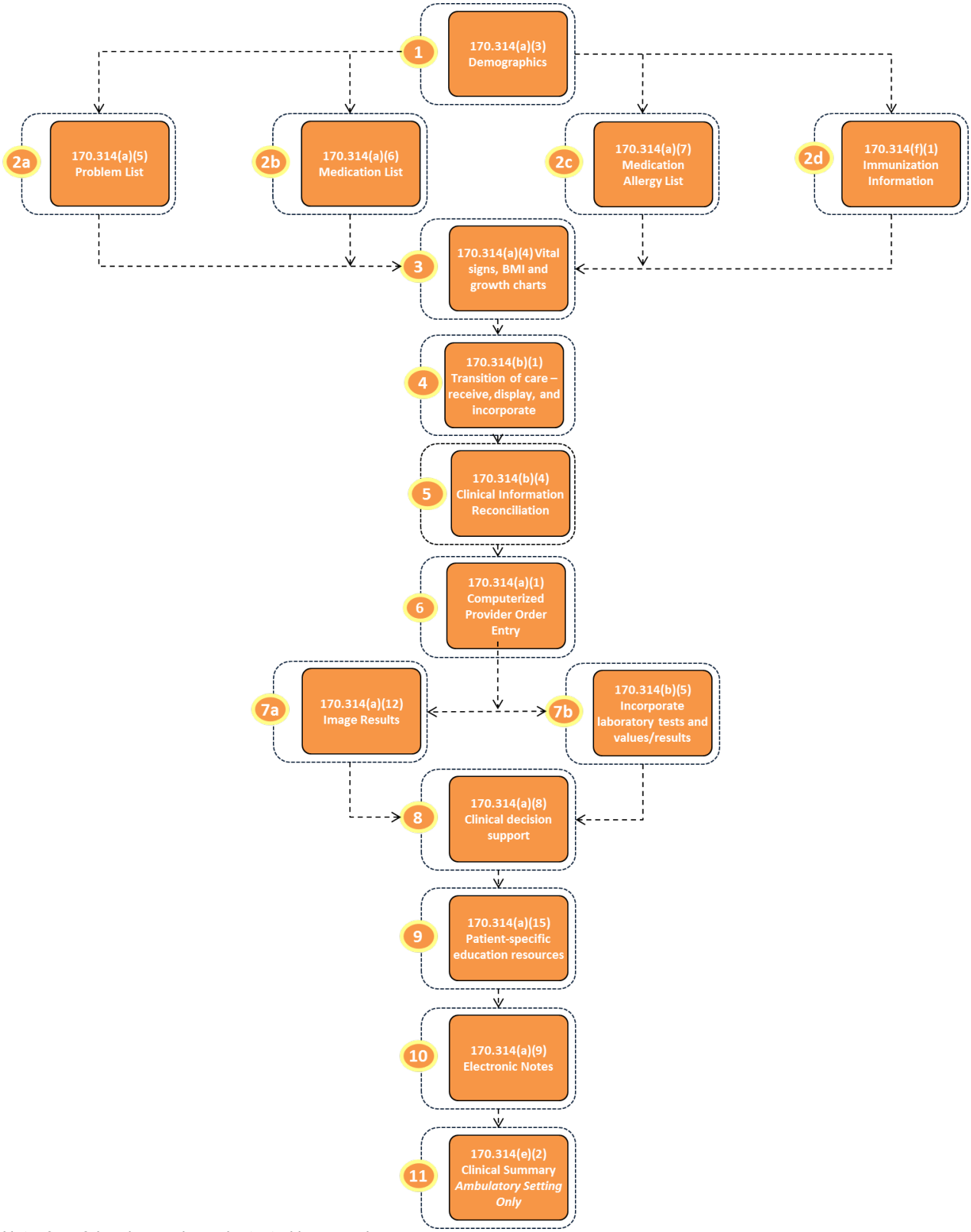
- §170.314(a)(8) Clinical decision support
- §170.314(a)(15) Patient-specific education resources

A member of the care team records, changes, accesses and searches electronic notes for the Patient in the Hospital's EHR. This portion of the scenario tests:

- §170.314(a)(9) Electronic notes

INFORMATIVE TEST SCENARIO DESCRIPTION: ENCOUNTER: CARE RESULTS

This section provides an informative description of how the test procedure is organized and conducted. It is not intended to provide normative statements of the certification requirements. The testing workflow for this scenario is shown in Figure 4.



Note: 2a – 2d and 7a – 7b can be tested in any order

Figure 4: Test scenario diagram for Encounter: Care Results

This test scenario is organized into fifteen sections:

- Demographics – evaluates the capability to record, change, and access a patient's demographic information
    - The Tester records, changes, and accesses the ONC-supplied patient demographic information

- Problem list – evaluates the capability to record, change, and access a patient's active problem list
    - The Tester records, changes, and accesses the ONC-supplied patient active problems

- Medication list – evaluates the capability to record, change, and access a patient's active medication list as well as medication history
    - The Tester records, changes, and accesses the ONC-supplied patient active medications as well as medication history

- Medication allergy list – evaluates the capability to record, change, and access a patient's active medication allergy list as well as medication allergy history
    - The Tester records, changes, and accesses the ONC-supplied patient active medication allergies as well as medication allergy history

- Immunization information – evaluates the capability to record, change, and access immunization information
    - The Tester records, changes, and accesses the ONC-supplied patient immunization information

- Vital signs, body mass index, and growth charts – evaluates the capability to record, change, and access a patient's height/length, weight, and blood pressure, calculate and display body mass index, and (optional) plot and display growth charts
    - The Tester records, changes, and accesses the ONC-supplied patient vital signs
    - The Tester enters the ONC-supplied patient height and weight data and verifies that the BMI is calculated and displayed correctly
    - The Tester enters the ONC-supplied patient height and weight, and verifies that they are plotted and displayed accurately on age and gender-appropriate growth charts

- Transitions of care – receive, display and incorporate transition of care/referral summaries – evaluates the capability to receive, display and incorporate transition of care/referral summary
    - The Tester receives, displays and incorporates the ONC-supplied transition of care/referral summary

- Clinical information reconciliation – evaluates the capability to reconcile data that represent a patient's active problem, medication, and medication allergy lists

- The Tester electronically and simultaneously displays the patient's active problem, medication, and medication allergy lists recorded in the EHR and received in the transition of care/referral summary
- The Tester creates, reviews, validates, confirms and submits single reconciled lists of problems, medications and medication allergies

- Computerized provider order entry – evaluates the capability to record, change, and access a patient's medication, laboratory, and radiology/imaging orders
  - The Tester records, changes, and accesses the ONC-supplied medication, laboratory, and radiology/imaging orders

- Image results – evaluates the capability for the EHR to electronically indicate the availability of a patient's images and associated narrative interpretations, and the capability for a user to access and display the images and narrative interpretations.
  - The Tester validates that the availability of the patient's images and associated narrative interpretations is indicated by the EHR to the user electronically
  - The Tester access and displays the patient's images and narrative interpretations and validates that they are accurate and complete, and accessed without requiring additional patient lookup

- Incorporate laboratory tests and values/results – evaluates the capability to receive, incorporate (*ambulatory setting only*), and display laboratory tests and values/results and link laboratory tests and values/results with the appropriate patient record
  - The Tester sends the laboratory tests and values/results to the EHR
  - The Tester verifies that the laboratory tests and values/results were received and incorporated (*ambulatory setting only)* by the EHR and displays the test report information
  - The Tester verifies that the laboratory tests and values/results are associated with the appropriate lab order or correct patient record

- Clinical decision support - evaluates the capability to enable clinical decision support interventions to be electronically triggered, to occur automatically and electronically, to electronically identify for a user diagnostic and therapeutic reference information, and to be configured based on a user's clinical role.
  - The Tester activates available interventions identified by the Vendor and verifies that interventions occur automatically and electronically
  - The Tester accesses diagnostic and therapeutic reference information
  - The Tester configures the clinical decision support interventions and diagnostic and therapeutic reference resources that will be triggered
  - The Tester reviews the attributes of clinical decision support interventions and diagnostic and therapeutic reference resources and verifies that they contain the appropriate information

- Patient-specific education resources – evaluates the capability to electronically identify for a user patient-specific education resources
    - The Tester electronically identifies patient-specific education resources

- Electronic notes – evaluates the capability to record electronic notes into the EHR and change, access, and search electronic notes that have been entered previously and stored in the EHR
    - The Tester records, changes, and accesses electronic notes in the EHR, and verifies that they are accurate and complete
    - The Tester searches a selected note for a single word and a group of words

- Ambulatory setting only – clinical summary – evaluates the capability to electronically generate a clinical summary for a patient and customize the data included in the clinical summary
    - The Tester causes the EHR to electronically generate a clinical summary and verifies that the data rendered in the summary are complete and accurate
    - The Tester customizes the data included in the clinical summary, and verifies that the data rendered in the summary are complete and accurate

REFERENCED 2014 EDITION TEST PROCEDURES: ENCOUNTER: CARE RESULTS

The Tester shall use the 2014 Edition Test Procedures available at http://www.healthit.gov/certification (navigation: 2014 Edition Testing and Certification > 2014 Edition Test Method) to execute the test scenario. Along with the test scenario data, as described in the Test Scenario Data section, the Tester shall use the following 2014 Edition Test Procedures, in the sequence outlined in Figure 4, to complete the test scenario:

- §170.314(a)(1) Computerized provider order entry
- §170.314(a)(3) Demographics
- §170.314(a)(4) Vital signs, BMI, and growth charts
- §170.314(a)(5) Problem list
- §170.314(a)(6) Medication list
- §170.314(a)(7) Medication allergy list
- §170.314(a)(8) Clinical decision support
- §170.314(a)(9) Electronic notes
- §170.314(a)(12) Image results
- §170.314(a)(15) Patient-specific education resources
- §170.314(b)(1) Transition of care – receive, display and incorporate transition of care / referral summaries
- §170.314(b)(4) Clinical information reconciliation
- §170.314(b)(5) Incorporate laboratory tests and values/results
- §170.314(e)(2) Ambulatory setting only - clinical summary
- §170.314(f)(1) Immunization information

The Tester shall use and apply the most current versions of the referenced 2014 Edition Test Procedures, as outlined in Figure 4, during the test. Testers shall use all of the referenced 2014 Edition Test Procedures included in the test scenario without exception, unless one of the following conditions exists:

- Certification is not sought for a criterion included in the test scenario
- A test scenario is made setting-specific for one setting by omitting a criterion included in the scenario which is specific to another setting
- Gap certification will be sought or has been obtained for one of the criteria included in the scenario
- The Vendor wishes to omit optional criteria

Having made the determination that some modification to the provided test scenario is necessary, the Tester shall record the modifications made as part of the test documentation. Following the guidelines for test scenario data provided below, the Tester shall ensure that the test scenario data used for each test input reflects the intended test scenario data output from all of the tests included upstream in the test scenario, including any omitted as a result of one of the conditions outlined above.

TEST SCENARIO DATA

Test scenario data is either ONC or Vendor supplied for each section of the test scenario. The following indicates who supplies the test scenario data for each section of the test scenario:

Criteria	Test Scenario Data Supplier
Computerized provider order entry	ONC
Demographics	ONC
Vital signs, BMI, and growth charts	ONC
Problem list	ONC and Vendor
Medication list	ONC
Medication allergy list	ONC and Vendor
Clinical decision support	Vendor
Electronic notes	ONC
Image results	Vendor
Patient-specific education resources	Vendor
Transition of care – receive, display and incorporate transition of care / referral summaries	ONC
Clinical information reconciliation	ONC
Incorporate laboratory tests and values/results	ONC and Vendor
Clinical summary	ONC
Immunization information	ONC

Where test scenario data are ONC supplied:

Test scenario data is available at http://www.healthit.gov/certification (navigation: 2014 Edition Testing and Certification > 2014 Edition Test Method > 2014 Edition Test Scenarios > 2014 Edition Draft Test Scenarios).

ONC supplied test scenario data are provided with the test scenario procedure to ensure that the applicable requirements identified in the criteria can be adequately evaluated for conformance, as well as to provide consistency in the testing process across multiple National Voluntary Laboratory Accreditation Program (NVLAP)-Accredited Testing Labs (ATLs). The provided test scenario data focus on evaluating the basic capabilities of required EHR technology, rather than exercising the full breadth/depth of capability that installed EHR technology might be expected to support. The test scenario data are formatted for readability of use within the testing process. The format is not prescribing a particular end-user view or rendering. No additional requirements should be drawn from the format.

The Tester shall use and apply the provided test scenario data during the test, without exception, unless one of the following conditions exists:

- The Tester determines that the Vendor product is sufficiently specialized that the provided test scenario data needs to be modified in order to conduct an adequate test. The Tester shall ensure that the applicable requirements identified in the criterion can be adequately evaluated for conformance and that the test scenario data provides a comparable level of robustness to the test scenario data supplied by ONC. Having made the determination that some modification to the provided test scenario data is necessary, the Tester shall record the modifications made as part of the test documentation.
- The Tester determines that changes to the test scenario data will improve the efficiency of the testing process, primarily through using consistent demographic data throughout the testing workflow. The Tester shall ensure that the applicable requirements identified in the criterion can be adequately evaluated for conformance and that the test scenario data provides a comparable level of robustness to the test scenario data supplied by ONC. Having made the determination that some modification to the provided test scenario data is necessary, the Tester shall record the modifications made as part of the test documentation.
- Tester shall ensure that the test scenario data input for each test reflects the test scenario data output from each of the prior tests included in the scenario as outlined, and the intended test scenario data output from prior tests included in scenarios upstream as necessary, if scenarios are performed out of sequence or tests are omitted from a scenario.

Any departure from the provided test scenario data shall strictly focus on meeting the basic capabilities required of EHR technology relative to the certification criterion rather than exercising the full breadth/depth of capability that installed EHR technology might be expected to support.

The test procedures require that the Tester enter the applicable test scenario data into the EHR technology being evaluated for conformance. The intent is that the Tester fully controls the process of

entering the test scenario data in order to ensure that the data are correctly entered as specified in the test procedure. If a situation arises where it is impractical for a Tester to directly enter the test scenario data, the Tester, at the Tester's discretion, may instruct the Vendor to enter the test scenario data, so long as the Tester remains in full control of the testing process, directly observes the test scenario data being entered by the Vendor, and validates that the test scenario data are entered correctly as specified in the test procedure.

Where test scenario data are Vendor supplied:

Vendor supplied test scenario data shall focus on meeting the basic capabilities required of EHR technology relative to the certification criterion rather than exercising the full breadth/depth of capability that installed EHR technology might be expected to support.

The test scenario procedures require that the Tester enter the applicable test scenario data into the EHR technology being evaluated for conformance. The intent is that the Tester fully controls the process of entering the test scenario data in order to ensure that the data are correctly entered as specified in the test scenario procedure. If a situation arises where it is impractical for a Tester to directly enter the test scenario data, the Tester, at the Tester's discretion, may instruct the Vendor to enter the test scenario data, so long as the Tester remains in full control of the testing process, directly observes the test scenario data being entered by the Vendor, and validates that the test scenario data are entered correctly as specified in the test procedure.

For Vendor supplied test scenario data, the Tester shall address the following:

- Vendor-supplied test scenario data shall ensure that the requirements identified in the criterion can be adequately evaluated for conformance.
- Vendor-supplied test scenario data shall strictly focus on meeting the basic capabilities required of an EHR relative to the certification criterion rather than exercising the full breadth/depth of capability that an installed EHR might be expected to support.
- Tester shall record as part of the test documentation the specific Vendor-supplied test scenario data that was utilized for testing.
- Tester shall ensure that the test scenario data input for each test reflects the test scenario data output from each of the prior tests included in the scenario as outlined, and the intended test scenario data output from prior tests included in scenarios upstream as necessary, if scenarios are performed out of sequence or tests are omitted from a scenario.

Document History

Version Number	Description of Change	Date
1.0	Posted for Feedback	September 11, 2013