Test Scenario Procedure for Encounter: Care Ordering

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.

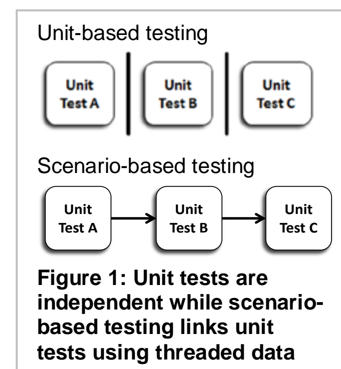

Figure 1: Unit tests are independent while scenario-based testing links unit tests using threaded data

[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.

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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).

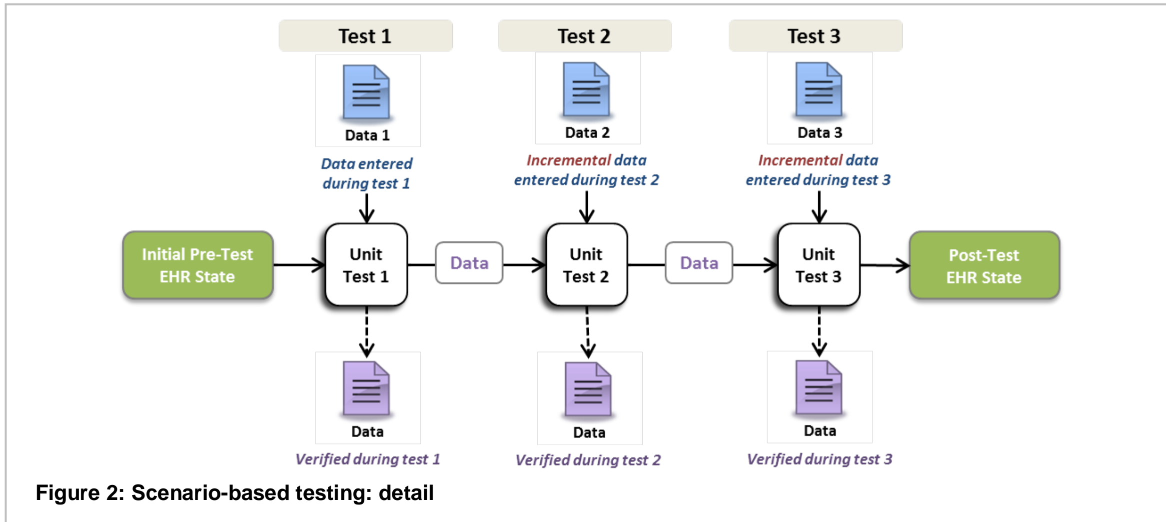

Figure 2: Scenario-based testing: detail

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

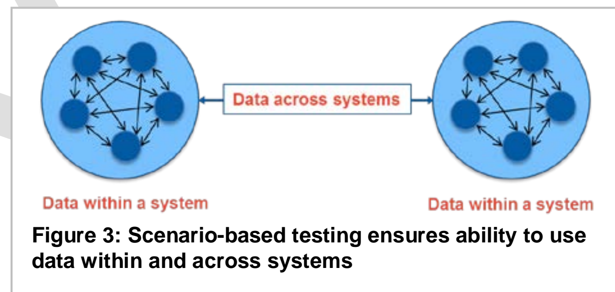

Figure 3: Scenario-based testing ensures ability to use data within and across systems

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.

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TEST SCENARIO NARRATIVE: ENCOUNTER: CARE ORDERING

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 and problem, medication and medication allergy lists for the Patient are recorded, changed, and accessed in the Provider's EHR. The Provider performs clinical information reconciliation between the problem, medication and medication allergy lists stored in the EHR and the medication and medication allergy lists from the Hospital admission. Upon completion of the clinical information reconciliation, the reconciled problem, medication and medication allergy lists are stored 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(b)(4) Clinical information reconciliation

The Provider records, changes, and accesses medication, laboratory, and radiology/imaging orders for the Patient during the visit, and the EHR automatically indicates drug-drug, drug-allergy contraindication interventions based on the medication orders and information from the Patient's medication and medication allergy lists. This portion of the scenario tests:

- §170.314(a)(1) Computerized provider order entry
- §170.314(a)(2) Drug-drug, drug-allergy interaction checks

The Provider uses the EHR to generate prescriptions for electronic transmission, and the EHR automatically checks whether a drug formulary exists for the Patient and given medication. This portion of the scenario tests:

- §170.314(b)(3) Electronic prescribing
- §170.314(a)(10) Drug-formulary checks

Inpatient

Patient is admitted to Hospital after a visit with an ambulatory Provider. During this hospitalization, demographics and problem, medication and medication allergy lists for the Patient are recorded, changed, and accessed in the Hospital's EHR. A member of the Patient's care team performs clinical information reconciliation between the problem, medication and medication allergy lists stored in the Hospital's EHR and the medication and medication allergy lists from the ambulatory visit. Upon completion of the clinical information reconciliation, the reconciled problem, medication and medication allergy lists are stored in the Hospital's EHR. This portion of the scenario tests:

- §170.314(a)(3) Demographics

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- §170.314(a)(5) Problem list
- §170.314(a)(6) Medication list
- §170.314(a)(7) Medication allergy list
- §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, and the EHR automatically indicates drug-drug, drug-allergy contraindication interventions based on the medication orders and information from the Patient's medication and medication allergy lists. This portion of the scenario tests:

- §170.314(a)(1) Computerized provider order entry
- §170.314(a)(2) Drug-drug, drug-allergy interaction checks

A member of the care team uses the Hospital's EHR to generate prescriptions for electronic transmission, and the Hospital's EHR automatically checks whether a drug formulary exists for the Patient and given medication. A member of the care team administers medication and documents the medication administration in the Patient's record in the Hospital's EHR. This portion of the scenario tests:

- §170.314(b)(3) Electronic prescribing
- §170.314(a)(10) Drug-formulary checks
- §170.314(a)(16) Inpatient setting only – electronic medication administration record

Informative Test Scenario Description: Encounter: Care Ordering

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.

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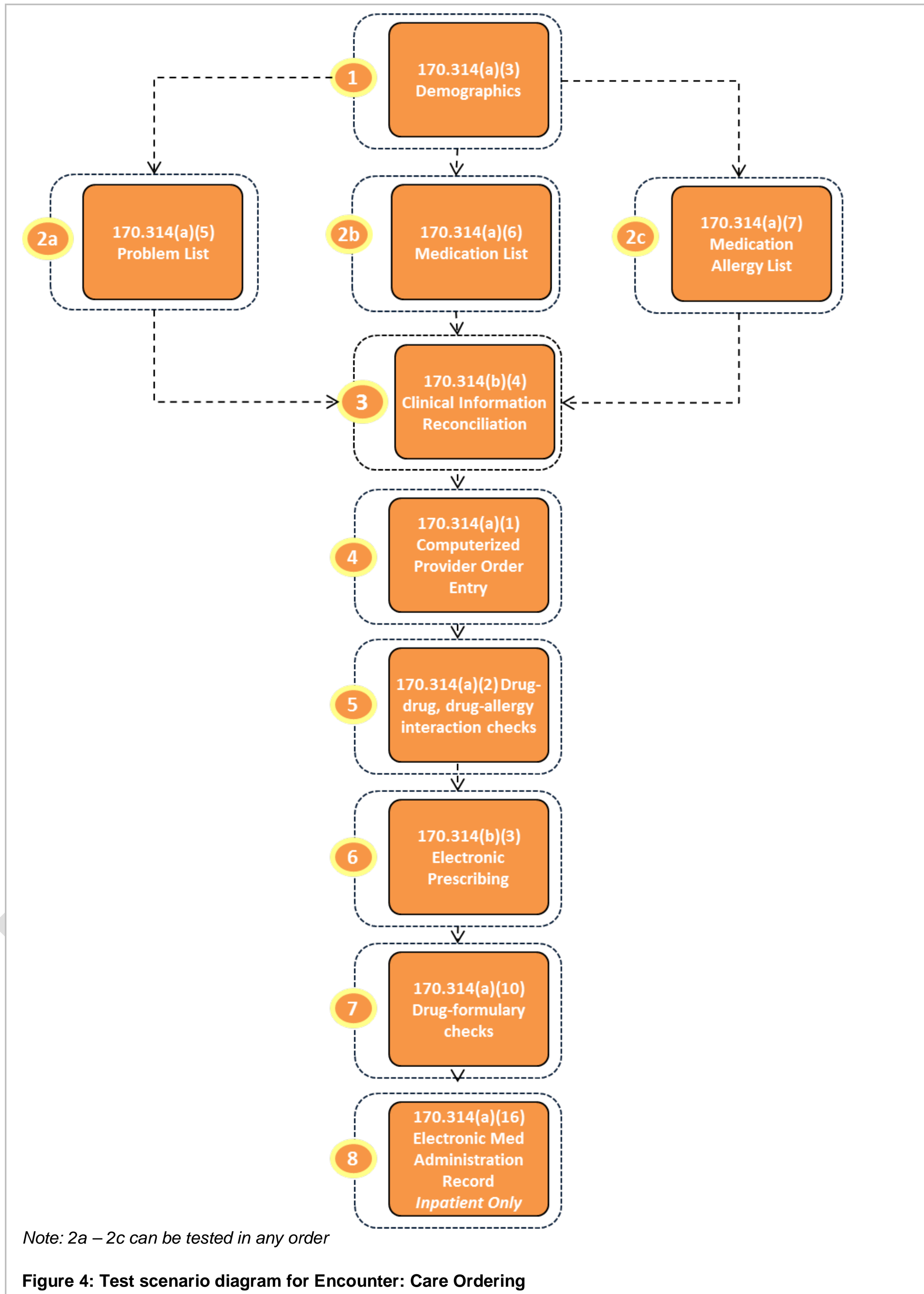

Note: 2a – 2c can be tested in any order

Figure 4: Test scenario diagram for Encounter: Care Ordering

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This test scenario is organized into ten 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
- 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 the additional problem, medication, and medication allergy lists
  - 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
- Drug-drug, drug-allergy interaction checks – evaluates the capability to indicate drug-drug and drug-drug allergy contraindications and for a limited set of users to make adjustments to the severity level of interventions provided
  - The Tester triggers at least one drug-drug intervention and one drug-allergy intervention using the Vendor-supplied medication order
  - The Tester adjusts intervention severity levels and verifies that users without severity level adjustment capability cannot access the capability

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- Electronic prescribing - evaluates the capability to generate conformant prescriptions and prescription related information for electronic transmission
  - The Tester enters the ONC-supplied prescription information and causes the EHR to generate the prescription information message

- Drug-formulary checks – evaluates the capability to check whether a drug formulary (or preferred drug list) exists for a given patient and medication
  - The Tester enters the ONC-supplied medications and the EHR automatically and electronically checks whether each medication is in the Vendor-identified formulary

- Inpatient setting only – electronic medication administration record – evaluates the capability to verify the "5 Rights" of medication administration and record the right documentation when medication is administered
  - The Vendor enters the ONC-supplied patient medication orders and the Tester verifies that the "5 Rights" are correct and that the EHR technology alerts users about any wrongs
  - The Tester verifies that the EHR technology enables users to automatically record the right documentation when medication is administered

Referenced 2014 Edition Test Procedures: Encounter: Care Ordering

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)(2) Drug-drug, drug-allergy interaction checks
- §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(a)(10) Drug-formulary checks
- §170.314(a)(16) Inpatient setting only – electronic medication administration record
- §170.314(b)(3) Electronic prescribing
- §170.314(b)(4) Clinical information reconciliation

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

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- 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
Drug-drug, drug-allergy interaction checks	ONC and Vendor
Demographics	ONC
Problem list	ONC
Medication list	ONC
Medication allergy list	ONC and Vendor
Drug-formulary checks	ONC
Electronic medication administration record	ONC
Electronic prescribing	ONC
Clinical information reconciliation	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

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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.

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Document History

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

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