

## Test Procedure for §170.314(a)(4) Vital signs, body mass index, and growth charts

This document describes the test procedure for evaluating conformance of complete EHRs or EHR modules 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 document<sup>1</sup> is organized by test procedure and derived test requirements with traceability to the normative certification criteria as described in the Overview document located at [available when final]. The test procedures may be updated to reflect on-going feedback received during the certification activities.

The HHS/Office of the National Coordinator for Health Information Technology (ONC) has defined the standards, implementation guides and certification criteria used in this test 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 HIT Certification Program<sup>2</sup>, is carried out by National Voluntary Laboratory Accreditation Program-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.*)

Questions or concerns regarding the ONC HIT Certification Program should be directed to ONC at [ONC.Certification@hhs.gov](mailto:ONC.Certification@hhs.gov).

### CERTIFICATION CRITERION

This Certification Criterion is from 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 issued by the Department of Health and Human Services (HHS) on September 4, 2012.

#### §170.314(a)(4) Vital signs, body mass index, and growth charts.

- (i) Vital signs. Enable a user to electronically record, change, and access, at a minimum, a patient's height/length, weight, and blood pressure. Height/length, weight, and blood pressure must be recorded in numerical values only.
- (ii) Calculate body mass index. Automatically calculate and electronically display body mass index based on a patient's height and weight.

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<sup>1</sup> Disclaimer: Certain commercial products may be identified in this document. Such identification does not imply recommendation or endorsement by ONC.

<sup>2</sup> 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

(iii) Optional – Plot and display growth charts. Plot and electronically display, upon request, growth charts for patients.

Per Section III.A of the preamble 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 2014 Edition of this Certification Criterion is classified as revised from the 2011 Edition. This Certification Criterion meets at least one of the three factors of revised certification criteria: (1) the certification criterion includes changes to capabilities that were specified in the previously adopted certification criterion, (2) the certification criterion has a new mandatory capability that was not included in the previously adopted certification criterion, or (3) the certification criterion was previously adopted as “optional” for a particular setting and is subsequently adopted as “mandatory” for that setting.

Per Section III.A of the preamble 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 where the vital signs, body mass index, and growth charts certification criterion is discussed:

- Vital signs
  - “We decline to revise this certification criterion in response to the comment that recommended we require EHR technology to natively record vital signs data in specific vocabularies... We do intend, however, to require as part of the next edition of EHR certification criteria that EHR technology would need to be able to record all vital signs according to standardized terminologies. Further, we emphasize to EHR technology developers that nothing precludes you from taking this step for certification to the 2014 Edition EHR certification criteria.”
  - “... we have revised this certification criterion to explicitly state that the data recorded by EHR technology for height/length, weight, and blood pressure must be in numeric values only (i.e., alphabetic characters such as “lbs,” “kg,” or “cm” would not be permitted to include as part of the value recorded). This restriction has significant clinical and patient safety benefits because it prevents the inappropriate recording of text in fields that should be constrained to numeric values. Additional attributes that may be used to document (e.g., which arm a blood pressure is taken from, whether the patient is sitting or standing, or a reason that the value could not be obtained) should be recorded in a supplemental field rather than the field for the value itself.”
- Growth charts
  - “We do not believe that the capability to plot and electronically display growth charts should be a required capability because, as we noted in the Proposed Rule, not all EP, EHs, and CAHs will necessarily need this capability.”
  - “For certification to this certification criterion, we clarify that EHR technology is not required to demonstrate the capability to provide growth charts based on subsets of age ranges within the 0-20 age range required by the MU objective. However, we encourage

- EHR technology developers to include the specificity that best addresses their customers' needs.”
- “We do not expect growth charts to be transmitted in a transition of care/referral summary formatted in accordance with the Consolidated CDA.”
  - “...we expect that certifications issued to EHR technology certified to this certification criterion will indicate whether the EHR technology is capable of plotting and electronically displaying growth charts and that such information would be accessible on the CHPL.”

Per Section III.D of the preamble of the Health Information Technology: Initial Set of Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, Final Rule where the vital signs certification criterion is discussed:

- Vital signs and body mass index
  - “We expect that Complete EHR and EHR Module developers will include the units of measure that their customers believe are necessary to meet their needs, which in many cases will include those that patients routinely request.”
- Growth charts
  - “...we do not preclude Complete EHR and EHR Module developers from designing more specific displays of laboratory results that may need to be displayed in a more complex fashion.”
  - “While the regulation text does not specifically require comparison to national norms, we understand that this type of information is typically provided along with the growth chart itself to provide greater relevance and meaning for the growth charts. We encourage Complete EHR and EHR Module developers to include this feature.”

## CHANGES FROM 2011 TO 2014 EDITION

Per Section III.A of the preamble 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 where the vital signs, body mass index, and growth charts certification criterion is discussed:

- Vital signs
  - “We proposed to replace the terms “modify” and “retrieve” with “change” and “access,” respectively.”
  - “We also proposed to add the alternative term “length” to go with “height” as it is the clinically appropriate term for newborns and assisted in clarifying the intent of the “vital signs” capability.”
  - “...we have revised this certification criterion to explicitly state that the data recorded by the EHR technology for height/length, weight, and blood pressure must be in numeric values only...”
- Growth charts

- “The only other refinements that we proposed were for the plot and display growth charts capability. First, we proposed that this capability be designated “optional” within this certification criterion because some EPs, EHs, and CAHs would not (or would never) use such a capability due to scope of practice or other reasons... Second, we proposed to remove the age range reference (2-20 years old) from this capability.”

## Test Procedure for Vital Signs

### INFORMATIVE TEST DESCRIPTION

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.

This test evaluates the capability for a Complete EHR or EHR Module to enable a user to electronically record, change, and access, at a minimum, a patient’s height/length, weight, and blood pressure in numerical values only.

The test procedure is not prescriptive about the method used to change vital signs. For example, changing vital signs does not require changing an existing instance of vital signs. Changes may be accomplished through inactivating or deleting existing vital signs in the patient’s EHR and entering a new instance of vital signs.

This test procedure is organized into three sections:

- Record - evaluates the capability to enter vital signs data into the EHR system in numerical values only
  - The Tester enters non-numerical height/length, weight, and blood pressure data and verifies that the data was not recorded
  - The Tester enters the numerical ONC-supplied height/length, weight, and blood pressure data and verifies that the data was recorded
- Change – evaluates the capability to change vital signs data that have been entered previously into the EHR
  - The Tester displays the height/length, weight, and blood pressure data entered during the Record Patient Vital Signs test
  - The Tester changes the previously entered vital signs data using ONC-supplied height/length, weight, and blood pressure data
- Access – evaluates the capability to display the vital signs data that have been entered previously into the EHR
  - The Tester displays the height/length, weight, and blood pressure data entered during the test
  - The Tester verifies that the displayed vital signs data are accurate and complete

## REFERENCED STANDARDS

None

## NORMATIVE TEST PROCEDURES

### Derived Test Requirements

DTR170.314.a.4.i – 1: Electronically Record Patient Vital Signs

DTR170.314.a.4.i – 2: Electronically Change Patient Vital Signs

DTR170.314.a.4.i – 3: Electronically Access Patient Vital Signs

### **DTR170.314.a.4.i – 1: Electronically Record Patient Vital Signs**

#### Required Vendor Information

VE170.314.a.4.i – 1.01: Vendor shall identify a patient with an existing record in the EHR to be used for this test

VE170.314.a.4.i – 1.02: Vendor shall identify the EHR function(s) that are available to: 1) select the patient, 2) verify that height/length, weight, and blood pressure can only be recorded in numerical values 3) enter the patient's height/length, weight, and blood pressure, 4) change these vital signs data, and 5) access these vital signs data

#### Required Test Procedure:

TE170.314.a.4.i – 1.01: Tester shall select vital signs test data from ONC-supplied test data set in TD170.314.a.4.i – 1

TE170.314.a.4.i – 1.02: Using the EHR function(s) identified by the Vendor, the Tester shall select the patient's existing record and enter non-numerical vital signs for

- the patient's height/length
- the patient's weight
- the patient's blood pressure

TE170.314.a.4.i – 1.03: The Tester shall verify that the non-numerical vital signs were not recorded

TE170.314.a.4.i – 1.04: The Tester shall select the patient's existing record and enter numerical vital signs from the selected test data set in TD170.314.a.4.i – 1 for

- the patient's height/length
- the patient's weight
- the patient's blood pressure

TE170.314.a.4.i – 1.05: The Tester shall verify that the numerical vital signs were recorded

TE170.314.a.4.i – 1.03: Using the Inspection Test Guide (below), the Tester shall verify that the vital signs test data have been entered correctly and without omission

Inspection Test Guide

IN170.314.a.4.i – 1.01: Using the data in the selected ONC-supplied test data set in TD170.314.a.4.i – 1, Tester shall verify that the vital signs test data are entered correctly and without omission

IN170.314.a.4.i – 1.02: Tester shall verify that the units of measure appropriate for the height/length and weight display or are selected at the time each vital sign is entered

IN170.314.a.4.i – 1.03: Tester shall verify that the vital signs test data are stored in the patient's record, including

- the patient's height/length
- the patient's weight
- the patient's blood pressure

**DTR170.314.a.4.i – 2: Electronically Change Patient Vital Signs**

Required Vendor Information

- As defined in DTR170.314.a.4.i – 1, no additional information is required

Required Test Procedure:

TE170.314.a.4.i – 2.01: Tester shall select vital signs test data from ONC-supplied test data set in TD170.314.a.4.i – 2 that corresponds to the data set selected for DTR170.314.a.4.i – 1: Electronically Record Patient Vital Signs

TE170.314.a.4.i – 2.02: Using the EHR function(s) identified by the Vendor, the Tester shall select the patient's existing record, shall display each of the vital signs entered during the DTR170.314.a.4.i – 1: Electronically Record Patient Vital Signs test, and shall change each of the previously entered vital signs, including

- the patient's height/length
- the patient's weight
- the patient's blood pressure

TE170.314.a.4.i – 2.03: Using the Inspection Test Guide (below), the Tester shall verify that the patient vital signs data entered in TE170.314.a.4.i – 2.02 have been entered correctly and without omission

Inspection Test Guide:

IN170.314.a.4.i – 2.01: Using the data in the selected ONC-supplied Test Data set in TD170.314.a.4.i – 2, Tester shall verify that the vital signs test data entered during the DTR170.314.a.4.i – 1: Electronically Record Patient Vital Signs test are accessed and changed correctly and without omission

IN170.314.a.4.i – 2.02: Tester shall verify that the units of measure appropriate for the height/length and weight display or are selected at the time each vital sign is changed

IN170.314.a.4.i – 2.03: Tester shall verify that the changed vital signs data are stored in the patient's record, including

- the patient's height/length
- the patient's weight
- the patient's blood pressure

### **DTR170.314.a.4.i – 3: Electronically Access Patient Vital Signs**

#### Required Vendor Information

- As defined in DTR170.314.a.4.i – 1, no additional information is required

#### Required Test Procedure:

TE170.314.a.4.i – 3.01: Using the EHR function(s) identified by the Vendor, the Tester shall select the patient's existing record and shall display the data the Tester entered during the DTR170.314.a.4.i – 2: Electronically Change Patient Vital Signs test for

- the patient's height/length
- the patient's weight
- the patient's blood pressure

TE170.314.a.4.i – 3.02: Using the Inspection Test Guide (below), the Tester shall verify that the vital signs test data display correctly and without omission

#### Inspection Test Guide

IN170.314.a.4.i – 3.01: Using the data in the ONC-supplied test data set in TD170.314.a.4.i – 3 that corresponds to the data set selected for DTR170.314.a.4.i – 1: Electronically Record Patient Vital Signs, Tester shall verify that the vital signs data entered during the DTR170.314.a.4.i – 2: Electronically Change Patient Vital Signs test display correctly and without omission, including

- the patient's height/length
- the patient's weight
- the patient's blood pressure

IN170.314.a.4.i – 3.02: Tester shall verify that the units of measure appropriate for the height/length and weight display or are selected for the height/length and weight

## CONFORMANCE TEST TOOLS

None

## Test Procedure Body Mass Index

### INFORMATIVE TEST DESCRIPTION

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.

This test evaluates the capability of a Complete EHR or EHR Module to automatically calculate and electronically display a patient's body mass index (BMI) using a patient's height and weight.

This test procedure consists of one section:

- Calculate and electronically display - evaluates the capability to calculate and electronically display BMI based on a patient's height and weight
  - The Tester enters the ONC-supplied height and weight data
  - The Tester verifies that the BMI is calculated and electronically displayed correctly from the entered height and weight

### REFERENCED STANDARDS

None

### NORMATIVE TEST PROCEDURES

#### Derived Test Requirement(s)

DTR170.314.a.4.ii - 1: Calculate and electronically display body mass index

#### Required Vendor Information

VE170.314.a.4.ii - 1.01: Vendor shall identify a patient with an existing record in the EHR to be used for this test

VE170.314.a.4.ii - 1.02: Vendor shall identify the EHR function(s) that are available to select the patient, enter the patient's height and weight, and calculate and electronically display BMI

VE170.314.a.4.ii - 1.03: Vendor shall identify the system of measurement (e.g., English or Metric) and the units of measure (e.g., feet/inches, inches, centimeters, pounds, kilograms) to be used for this test

#### Required Test Procedure

TE170.314.a.4.ii - 1.01: Tester shall select height and weight test data from ONC-supplied test data set in TD170.314.a.4.ii – 1

TE170.314.a.4.ii - 1.02: Using the EHR function(s) identified by the Vendor, the Tester shall select the patient's existing record and enter the patient's height and weight



TE170.314.a.4.ii - 1.03: Using the Inspection Test Guide (below), the Tester shall verify that the test data has been entered correctly and without omission and that the BMI has been calculated correctly according to the ONC-supplied data set TD170.314.a.4.ii – 1

#### Inspection Test Guide

IN170.314.a.4.ii – 1.01: Using the data in the ONC-supplied test data set TD170.314.a.4.ii – 1, Tester shall verify that the height and weight test data are entered correctly and without omission

IN170.314.a.4.ii – 1.02: Tester shall verify that the units of measure appropriate for the height and weight display or are selected at the time these data are entered

IN170.314.a.4.ii – 1.03: Using the data in the ONC-supplied data set TD170.314.a.4.ii – 1, the Tester shall verify that the BMI is calculated correctly from the entered height and weight and is electronically displayed without omission and without error.

#### CONFORMANCE TEST TOOLS

None

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## Test Procedure for Growth Charts

### INFORMATIVE TEST DESCRIPTION

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.

This test evaluates the capability for a Complete EHR or EHR Module to plot and electronically display, upon request, growth charts for patients.

The test procedure consists of one section:

- Plot and Display - evaluates the capability to plot and electronically display, upon request, growth charts for patients
  - The Tester enters the ONC-supplied height and weight for 2 patients (1 male and 1 female)
  - The Tester displays the heights and weights entered during the test
  - The Tester verifies that the heights and weights are plotted and electronically displayed accurately on the age and gender-appropriate growth charts

### REFERENCED STANDARDS

None

### NORMATIVE TEST PROCEDURES

#### Derived Test Requirement(s)

DTR170.314.a.4.iii - 1: Plot and electronically display growth charts

#### Required Vendor Information

VE170.314.a.4.iii - 1.01: Vendor shall identify six patients with an existing record in the EHR to be used for this test

- Three male patients with ages that conform to the age data provided for males in the test data set TD170.314.a.4.iii – 1 for this test
- Three female patients with ages that conform to the age data provided for females in the test data set TD170.314.a.4.iii – 1 for this test

VE170.314.a.4.iii - 1.02: Vendor shall identify the EHR function(s) that are available to: 1) select these patients, 2) enter the height and weight data for these patients, and 3) plot and electronically display growth charts for these patients

### Required Test Procedure

- TE170.314.a.4.iii - 1.01: Tester shall select from the ONC-supplied test data set TD170.314.a.4.iii – 1 the height and weight data appropriate for the ages of one male patient and one female patient out of the six patients identified by the Vendor
- TE170.314.a.4.iii - 1.02: Using the EHR function(s) identified by the Vendor, the Tester shall select each of these patient's existing EHR records and enter their height and weight data
- TE170.314.a.4.iii - 1.03: Using the Inspection Test Guide (below), the Tester shall verify that the test data have been entered correctly and without omission
- TE170.314.a.4.iii - 1.04: Using the EHR function(s) identified by the Vendor, the Tester shall verify that the height and weight for each patient is plotted and electronically displayed on the appropriate growth chart (male or female, age)

### Inspection Test Guide

- IN170.314.a.4.iii - 1.01: Using the data in the ONC-supplied Test Data set TD170.314.a.4.iii – 1, Tester shall verify that the height and weight test data are entered correctly and without omission in each patient's record
- IN170.314.a.4.iii - 1.02: Tester shall verify that the units of measure appropriate for the height and weight display or are selected at the time these data are entered
- IN170.314.a.4.iii - 1.03: Tester shall verify that the height and weight are stored in each patient's record
- IN170.314.a.4.iii - 1.04: Tester shall verify that the gender and age of each patient are displayed
- IN170.314.a.4.iii - 1.05: Tester shall verify that the appropriate growth charts (male and female, age) electronically display
- IN170.314.a.4.iii - 1.06: Tester shall verify that the indicator for the point where the height and age meet on the growth chart for the male patient is plotted accurately
- IN170.314.a.4.iii - 1.07: Tester shall verify that the indicator for the point where the weight and age meet on the growth chart for the male patient is plotted accurately
- IN170.314.a.4.iii - 1.08: Tester shall verify that the indicator for the point where the height and age meet on the growth chart for the female patient is plotted accurately
- IN170.314.a.4.iii - 1.09: Tester shall verify that the indicator for the point where the weight and age meet on the growth chart for the female patient is plotted accurately

### CONFORMANCE TEST TOOLS

None

## Document History

| Version Number | Description                 | Date              |
|----------------|-----------------------------|-------------------|
| 1.0            | Released for public comment | September 7, 2012 |

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