

Auditable events and tamper-resistance | HealthIT.gov

 healthit.gov/test-method/auditable-events-and-tamper-resistance

Updated on 03-11-2024

Regulation Text

Regulation Text

§170.315 (d)(2) *Auditable events and tamper-resistance*—

1. *Record actions.* Technology must be able to:
 1. Record actions related to electronic health information in accordance with the standard specified in §170.210(e)(1);
 2. Record the audit log status (enabled or disabled) in accordance with the standard specified in §170.210(e)(2) unless it cannot be disabled by any user; and
 3. Record the encryption status (enabled or disabled) of electronic health information locally stored on end-user devices by technology in accordance with the standard specified in §170.210(e)(3) unless the technology prevents electronic health information from being locally stored on end-user devices (see paragraph (d)(7) of this section).
2. *Default setting.* Technology must be set by default to perform the capabilities specified in paragraph (d)(2)(i)(A) of this section and, where applicable, paragraphs (d)(2)(i)(B) and (d)(2)(i)(C) of this section.
3. *When disabling the audit log is permitted.* For each capability specified in paragraphs (d)(2)(i)(A) through (C) of this section that technology permits to be disabled, the ability to do so must be restricted to a limited set of users.
4. *Audit log protection.* Actions and statuses recorded in accordance with paragraph (d)(2)(i) of this section must not be capable of being changed, overwritten, or deleted by the technology.
5. *Detection.* Technology must be able to detect whether the audit log has been altered.

Standard(s) Referenced

Cross Reference Criteria

§ 170.315(d)(7)(ii) Technology is designed to prevent electronic health information from being locally stored on end-user devices after use of the technology on those devices stops.

Paragraph (d)(2)(i)(A)

§ 170.210(e)(1)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.2 and 7.1.6 through 7.1.9 of the standard specified in § 170.210(h) and changes to user privileges when health IT is in use.
2. The date and time must be recorded in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks*. The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content*. [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems](#).

Paragraph (d)(2)(i)(B)

§ 170.210(e)(2)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the audit log status is changed.
2. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks*. The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content*. [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems](#).

Paragraph (d)(2)(i)(C)

§ 170.210(e)(3) The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the encryption status of electronic health information locally stored by electronic health record (EHR) technology on end-user devices is changed. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks*. The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) Audit log content. ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems

Certification Dependencies

Design and performance: Quality management system (QMS) (§ 170.315(g)(4)) and accessibility-centered design (§ 170.315(g)(5)) must be certified as part of the overall scope of the certificate issued to the product.

- Quality management system (§ 170.315(g)(4)): When a single QMS is used, the QMS only needs to be identified once. Otherwise, when different QMS are used, each QMS needs to be separately identified for every capability to which it was applied.
- Accessibility-centered design (§ 170.315(g)(5)): When a single accessibility-centered design standard is used, the standard only needs to be identified once. Otherwise, the accessibility-centered design standards need to be identified for every capability to which they were applied; or, alternatively, the developer must state that no accessibility-centered design was used.

Revision History

Version #	Description of Change	Version Date
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1.0	Initial publication	03-11-2024
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Regulation Text

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§170.315 (d)(2) Auditable events and tamper-resistance—

1. *Record actions.* Technology must be able to:
 1. Record actions related to electronic health information in accordance with the standard specified in §170.210(e)(1);
 2. Record the audit log status (enabled or disabled) in accordance with the standard specified in §170.210(e)(2) unless it cannot be disabled by any user; and
 3. Record the encryption status (enabled or disabled) of electronic health information locally stored on end-user devices by technology in accordance with the standard specified in §170.210(e)(3) unless the technology prevents electronic health information from being locally stored on end-user devices (see paragraph (d)(7) of this section).
2. *Default setting.* Technology must be set by default to perform the capabilities specified in paragraph (d)(2)(i)(A) of this section and, where applicable, paragraphs (d)(2)(i)(B) and (d)(2)(i)(C) of this section.

3. *When disabling the audit log is permitted.* For each capability specified in paragraphs (d)(2)(i)(A) through (C) of this section that technology permits to be disabled, the ability to do so must be restricted to a limited set of users.
4. *Audit log protection.* Actions and statuses recorded in accordance with paragraph (d)(2)(i) of this section must not be capable of being changed, overwritten, or deleted by the technology.
5. *Detection.* Technology must be able to detect whether the audit log has been altered.

Standard(s) Referenced

Cross Reference Criteria

§ 170.315(d)(7)(ii) Technology is designed to prevent electronic health information from being locally stored on end-user devices after use of the technology on those devices stops.

Paragraph (d)(2)(i)(A)

§ 170.210(e)(1)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.2 and 7.1.6 through 7.1.9 of the standard specified in § 170.210(h) and changes to user privileges when health IT is in use.
2. The date and time must be recorded in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems.](#)

Paragraph (d)(2)(i)(B)

§ 170.210(e)(2)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the audit log status is changed.
2. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems.](#)

Paragraph (d)(2)(i)(C)

§ 170.210(e)(3) The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the encryption status of electronic health information locally stored by electronic health record (EHR) technology on end-user devices is changed. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems](#)

Certification Dependencies

Design and performance: Quality management system (QMS) (§ 170.315(g)(4)) and accessibility-centered design (§ 170.315(g)(5)) must be certified as part of the overall scope of the certificate issued to the product.

- Quality management system (§ 170.315(g)(4)): When a single QMS is used, the QMS only needs to be identified once. Otherwise, when different QMS are used, each QMS needs to be separately identified for every capability to which it was applied.
- Accessibility-centered design (§ 170.315(g)(5)): When a single accessibility-centered design standard is used, the standard only needs to be identified once. Otherwise, the accessibility-centered design standards need to be identified for every capability to which they were applied; or, alternatively, the developer must state that no accessibility-centered design was used.

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1.0	Initial publication	03-11-2024
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Testing components

Attestation: As of September 21, 2017, the testing approach for this criterion is satisfied by attestation.

The archived version of the Test Procedure is attached below for reference.

System Under Test	ONC-ACB Verification
The health IT developer will attest directly to the ONC-ACB to conformance with the § 170.315 (d)(2) <i>Auditable events and tamper-resistance</i> requirements.	The ONC-ACB verifies the health IT developer attests conformance to the § 170.315 (d)(2) <i>Auditable events and tamper-resistance</i> requirements.

Archived Version:

[§170.315\(d\)\(2\) Test Procedure](#)

Archived Version:

[2015 Edition Archived Test Procedure](#)

Updated on 06-11-2024

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 2. Record the audit log status (enabled or disabled) in accordance with the standard specified in §170.210(e)(2) unless it cannot be disabled by any user; and
 3. Record the encryption status (enabled or disabled) of electronic health information locally stored on end-user devices by technology in accordance with the standard specified in §170.210(e)(3) unless the technology prevents electronic health information from being locally stored on end-user devices (see paragraph (d)(7) of this section).
2. *Default setting.* Technology must be set by default to perform the capabilities specified in paragraph (d)(2)(i)(A) of this section and, where applicable, paragraphs (d)(2)(i)(B) and (d)(2)(i)(C) of this section.
3. *When disabling the audit log is permitted.* For each capability specified in paragraphs (d)(2)(i)(A) through (C) of this section that technology permits to be disabled, the ability to do so must be restricted to a limited set of users.

4. *Audit log protection.* Actions and statuses recorded in accordance with paragraph (d) (2)(i) of this section must not be capable of being changed, overwritten, or deleted by the technology.
5. *Detection.* Technology must be able to detect whether the audit log has been altered.

Standard(s) Referenced

Cross Reference Criteria

§ 170.315(d)(7)(ii) Technology is designed to prevent electronic health information from being locally stored on end-user devices after use of the technology on those devices stops.

Paragraph (d)(2)(i)(A)

§ 170.210(e)(1)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.2 and 7.1.6 through 7.1.9 of the standard specified in § 170.210(h) and changes to user privileges when health IT is in use.
2. The date and time must be recorded in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems.](#)

Paragraph (d)(2)(i)(B)

§ 170.210(e)(2)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the audit log status is changed.
2. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems.](#)

Paragraph (d)(2)(i)(C)

§ 170.210(e)(3) The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the encryption status of electronic health information locally stored by electronic health record (EHR) technology on end-user devices is changed. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* [ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems](#)

Certification Dependencies

Design and performance: Quality management system (QMS) (§ 170.315(g)(4)) and accessibility-centered design (§ 170.315(g)(5)) must be certified as part of the overall scope of the certificate issued to the product.

- [Quality management system \(§ 170.315\(g\)\(4\)\)](#): When a single QMS is used, the QMS only needs to be identified once. Otherwise, when different QMS are used, each QMS needs to be separately identified for every capability to which it was applied.
- [Accessibility-centered design \(§ 170.315\(g\)\(5\)\)](#): When a single accessibility-centered design standard is used, the standard only needs to be identified once. Otherwise, the accessibility-centered design standards need to be identified for every capability to which they were applied; or, alternatively, the developer must state that no accessibility-centered design was used.

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2. *Default setting.* Technology must be set by default to perform the capabilities specified in paragraph (d)(2)(i)(A) of this section and, where applicable, paragraphs (d)(2)(i)(B) and (d)(2)(i)(C) of this section.
3. *When disabling the audit log is permitted.* For each capability specified in paragraphs (d)(2)(i)(A) through (C) of this section that technology permits to be disabled, the ability to do so must be restricted to a limited set of users.
4. *Audit log protection.* Actions and statuses recorded in accordance with paragraph (d)(2)(i) of this section must not be capable of being changed, overwritten, or deleted by the technology.
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Paragraph (d)(2)(i)(A)

§ 170.210(e)(1)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.2 and 7.1.6 through 7.1.9 of the standard specified in § 170.210(h) and changes to user privileges when health IT is in use.
2. The date and time must be recorded in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems.

Paragraph (d)(2)(i)(B)

§ 170.210(e)(2)

1. The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the audit log status is changed.
2. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems.

Paragraph (d)(2)(i)(C)

§ 170.210(e)(3) The audit log must record the information specified in sections 7.1.1 and 7.1.7 of the standard specified at § 170.210(h) when the encryption status of electronic health information locally stored by electronic health record (EHR) technology on end-user devices is changed. The date and time each action occurs in accordance with the standard specified at § 170.210(g).

§ 170.210(g) *Synchronized clocks.* The date and time recorded utilize a system clock that has been synchronized using any Network Time Protocol (NTP) standard.

Review the [NTP Reference Document](#) for guidance on certifying to this requirement.

§ 170.210(h) *Audit log content.* ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems

Certification Dependencies

Design and performance: Quality management system (QMS) (§ 170.315(g)(4)) and accessibility-centered design (§ 170.315(g)(5)) must be certified as part of the overall scope of the certificate issued to the product.

- Quality management system (§ 170.315(g)(4)): When a single QMS is used, the QMS only needs to be identified once. Otherwise, when different QMS are used, each QMS needs to be separately identified for every capability to which it was applied.

- Accessibility-centered design (§ 170.315(g)(5)): When a single accessibility-centered design standard is used, the standard only needs to be identified once. Otherwise, the accessibility-centered design standards need to be identified for every capability to which they were applied; or, alternatively, the developer must state that no accessibility-centered design was used.

Revision History

Version	#	Description of Change	Version Date
1.0		Initial publication	03-11-2024
1.1		Removed “Additional Resources” accordion. Revised for clarity a clarification for paragraph (d)(2)(v) regarding the use of hashing algorithms to determine whether an audit log has been altered.	06-11-2024

Certification Companion Guide: Auditable events and tamper-resistance

This Certification Companion Guide (CCG) is an informative document designed to assist with health IT product certification. The CCG is not a substitute for the requirements outlined in regulation and related ONC final rules. It extracts key portions of ONC final rules' preambles and includes subsequent clarifying interpretations. To access the full context of regulatory intent please consult the [Certification Regulations page](#) for links to all ONC final rules or consult other regulatory references as noted. The CCG is for public use and should not be sold or redistributed.

The below table outlines whether this criterion has additional Maintenance of Certification dependencies, update requirements and/or eligibility for standards updates via SVAP. Review the Certification Dependencies and Required Update Deadline drop-downs above if this table indicates “yes” for any field.

<u>Base EHR Definition</u>	<u>Real World Testing</u>	<u>Insights Condition</u>	<u>SVAP</u>	<u>Requires Updates</u>
Not Included	No	No	No	No

Certification Requirements

Technical Explanations and Clarifications

Applies to entire criterion

Clarifications:

- The ONC Cures Act Final Rule included the requirement for Health IT Modules to support updates to audit logging and has incorporated by reference the standards, as amended effective June 30, 2020, § 170.299(1) ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems, approved May 1, 2018, IBR approved for §170.210(h).
- For purposes of certification, a Health IT Module should adhere to any Network Time Protocol (NTP) standard for the synchronized clock requirement.
- Actions and information must be captured in a manner that supports the forensic reconstruction of the sequence of changes to a patient's chart. [see also [77 FR 54235](#)]
- Any changes to a user's privileges must be captured to meet this criterion (e.g., user account creation, user switches roles and new privileges are assigned, revoking privileges, account disabling, etc.). [see also [77 FR 54235](#)]
- If the Health IT Module does not include a capability for which an “action” is listed, testing and certification can proceed for the audit log process without the Health IT Module showing that it can record actions related to a non-existent capability.
- Similarly, for example, a developer that is seeking to certify a Health IT Module to § 170.315(h) will not necessarily have end-user device encryption features (see 170.315(d)(7)). As such, certification can proceed for the audit log process without the Health IT Module demonstrating that it can record an encryption status as required by § 170.315(d)(2)(i)(C).
- If third-party software is relied upon to meet the criteria, one of the following approaches applies:
 - Approach 1 requires disclosure of the software that was relied upon to meet the criterion.
 - Approach 2 requires documentation of how the external services that are necessary to meet the requirements of criteria will be deployed and used.
- A user could be a healthcare professional or office staff; or a software program or service that would interact directly with the Certified Health IT Module. [see also [80 FR 62611](#); [77 FR 54168](#)] A “user” is not a patient for the purposes of this criterion. [see also [77 FR 54168](#)]
- For Health Information Service Provider (HISP) software that does not normally store patient data, certification to (d)(2) does not create the obligation to do so. Rather, certification to (d)(2) requires that a user is able to produce a forensic reconstruction of events in the case of a security incident. At a minimum, some type of message ID, date/time, sender, receiver, confirmation of receipt, and other values may be necessary. For example, it may be helpful to consider what types of data a user would need to track misrouted or dropped messages. Additionally, the HISP software being certified may contain error queues, support dashboards, and other tools where messages containing protected health information (PHI) are persisted. Audit records would have to be created when actions are performed on PHI through these tools, per (d)(2).

- For portal products seeking (e)(1) certification, testing the activity history log will involve much of the patient level audit recording, such as patient account login, view, download, and transmit actions. This criterion would not be applicable to the patient user. Rather, it applies to administrative functionality such as creating accounts, revoking privileges, and account disabling. It is not applicable to the activity history log for patient use of the (e)(1) functionality.

Clarifications:

- The ONC Cures Act Final Rule included the requirement for Health IT Modules to support updates to audit logging and has incorporated by reference the standards, as amended effective June 30, 2020, § 170.299(1) ASTM E2147-18 Standard Specification for Audit and Disclosure Logs for Use in Health Information Systems, approved May 1, 2018, IBR approved for §170.210(h).
- For purposes of certification, a Health IT Module should adhere to any Network Time Protocol (NTP) standard for the synchronized clock requirement.
- Actions and information must be captured in a manner that supports the forensic reconstruction of the sequence of changes to a patient's chart. [see also [77 FR 54235](#)]
- Any changes to a user's privileges must be captured to meet this criterion (e.g., user account creation, user switches roles and new privileges are assigned, revoking privileges, account disabling, etc.). [see also [77 FR 54235](#)]
- If the Health IT Module does not include a capability for which an “action” is listed, testing and certification can proceed for the audit log process without the Health IT Module showing that it can record actions related to a non-existent capability.
- Similarly, for example, a developer that is seeking to certify a Health IT Module to § 170.315(h) will not necessarily have end-user device encryption features (see 170.315(d)(7)). As such, certification can proceed for the audit log process without the Health IT Module demonstrating that it can record an encryption status as required by § 170.315(d)(2)(i)(C).
- If third-party software is relied upon to meet the criteria, one of the following approaches applies:
 - Approach 1 requires disclosure of the software that was relied upon to meet the criterion.
 - Approach 2 requires documentation of how the external services that are necessary to meet the requirements of criteria will be deployed and used.
- A user could be a healthcare professional or office staff; or a software program or service that would interact directly with the Certified Health IT Module. [see also [80 FR 62611](#); [77 FR 54168](#)] A “user” is not a patient for the purposes of this criterion. [see also [77 FR 54168](#)]

- For Health Information Service Provider (HISP) software that does not normally store patient data, certification to (d)(2) does not create the obligation to do so. Rather, certification to (d)(2) requires that a user is able to produce a forensic reconstruction of events in the case of a security incident. At a minimum, some type of message ID, date/time, sender, receiver, confirmation of receipt, and other values may be necessary. For example, it may be helpful to consider what types of data a user would need to track misrouted or dropped messages. Additionally, the HISP software being certified may contain error queues, support dashboards, and other tools where messages containing protected health information (PHI) are persisted. Audit records would have to be created when actions are performed on PHI through these tools, per (d)(2).
- For portal products seeking (e)(1) certification, testing the activity history log will involve much of the patient level audit recording, such as patient account login, view, download, and transmit actions. This criterion would not be applicable to the patient user. Rather, it applies to administrative functionality such as creating accounts, revoking privileges, and account disabling. It is not applicable to the activity history log for patient use of the (e)(1) functionality.

Paragraph (d)(2)(i)(A) Record actions

Technical outcome – The health IT records actions pertaining to electronic health information in accordance with sections 7.1.1, 7.1.2 and 7.1.6, through 7.1.9 of the ASTM E2147-18 standard when health IT is in use; changes to user privileges when health IT is in use; and records the date and time in accordance with any Network Time Protocol (NTP) standard.

Clarifications:

- Only those sections specified from section 7 of ASTM E2147-18 are the minimum required for certification. [see also [45 CFR 170.210\(e\)](#)]
- Regarding the granularity of the information ONC expects to be recorded, this should be consistent with the guidance in Section 7.1.9 of ASTM E2147-18, which states the “granularity should be specific enough to clearly determine if data designated by federal or state law as requiring special confidentiality protection has been accessed.” And, more to the point, Section 7.1.9 goes on to state that “[s]pecific category of data content, such as demographics, pharmacy data, test results, and transcribed notes type, should be identified.” For example, the ability of the audit log to record that the user accessed a patient’s medication list would be sufficient for certification, and the audit log would not need to also record the specific medication. [see also [77 FR 54234](#)]
- “Copy” can encompass a variety of actions, including extracting data from the health IT.

- For "Query" actions, some of the fields listed in ASTM E2147-18 may not apply, such as patient ID. To enable a forensic reconstruction of the query, the health IT should capture information about the query, such as the search the user performed, so that a security professional could identify nefarious user behavior. For example, a user performing multiple searches looking for famous individuals who may be patients in the system.
- The certification criterion requires actions initiated by the user from within the health IT interface to be tracked in the audit log. The copy and paste functions of Microsoft Windows originate outside of the health IT environment and are thus outside the scope of certification. Copy actions originating from within the health IT interface (e.g., exporting or downloading a copy of electronic health information from the Health IT Module) are required to be tracked in the audit log.
- Demonstration of the ability to use National Institute of Standards and Technology (NIST) time servers is required for certification, however vendors are not required to use NIST servers post certification.
- A "pointer to original data state" is a means of identifying original information that has been changed by a user. Similarly, a "pointer to deleted information" is a means of identifying information prior to deletion. A description of a change or deletion is acceptable as long as the type of action is specified and both the original and modified data states are able to be identified. For example, an audit log could include a link to an original document and provide a description of the modified state. Conversely, it could include a description of the original data state and provide a link to the modified document. The certification criterion is not prescriptive of how the requirement should be achieved. Demonstrating the ability to view the original document prior to a change or deletion is an acceptable method of meeting the certification requirement, however it is not required during testing.
- Information related to the required actions (e.g., additions, deletions, changes, queries, print, and copy) must be recorded in the audit log, however the certification criterion is not prescriptive to the method by which this is achieved and does not place limitations on the format in which this information is presented in the audit log. Namely, the audit log should record actions in a way that assists the user in reconstructing events that occurred effecting health information. For example, a "change" action may be listed in the audit log as an "edit" event if that is the labeling the user is accustomed to using in the Health IT Module for those kinds of actions.
- "Changes to user privilege" are considered a type of "change." The Health IT Module may separately record this auditable event or may reflect an approach that records user privilege changes as a subtype or reason (description) for the change.
- If the audit log reflects the privilege modification to each individual user account that was part of the group, the privilege modification may be applied as a group change.
- The elements "Patient identification" and "Identification of the patient data that are accessed" are not applicable when capturing a "user privilege change" action.

- The exact point in time when an action is logged may depend on the architecture/design of the Health IT Module or the workflow.
- For the purposes of certification, a Health IT Module may create a single audit log file with all of the specified auditable data, or it may use multiple audit log files. However, if this latter approach is used, when all of the audit log files are considered together the total content they include must represent all of the required auditable data (which would be equivalent to the single audit log file approach).

Technical outcome – The health IT records actions pertaining to electronic health information in accordance with sections 7.1.1, 7.1.2 and 7.1.6, through 7.1.9 of the ASTM E2147-18 standard when health IT is in use; changes to user privileges when health IT is in use; and records the date and time in accordance with any Network Time Protocol (NTP) standard.

Clarifications:

- Only those sections specified from section 7 of ASTM E2147-18 are the minimum required for certification. [see also [45 CFR 170.210\(e\)](#)]
- Regarding the granularity of the information ONC expects to be recorded, this should be consistent with the guidance in Section 7.1.9 of ASTM E2147-18, which states the “granularity should be specific enough to clearly determine if data designated by federal or state law as requiring special confidentiality protection has been accessed.” And, more to the point, Section 7.1.9 goes on to state that “[s]pecific category of data content, such as demographics, pharmacy data, test results, and transcribed notes type, should be identified.” For example, the ability of the audit log to record that the user accessed a patient’s medication list would be sufficient for certification, and the audit log would not need to also record the specific medication. [see also [77 FR 54234](#)]
- “Copy” can encompass a variety of actions, including extracting data from the health IT.
- For “Query” actions, some of the fields listed in ASTM E2147-18 may not apply, such as patient ID. To enable a forensic reconstruction of the query, the health IT should capture information about the query, such as the search the user performed, so that a security professional could identify nefarious user behavior. For example, a user performing multiple searches looking for famous individuals who may be patients in the system.
- The certification criterion requires actions initiated by the user from within the health IT interface to be tracked in the audit log. The copy and paste functions of Microsoft Windows originate outside of the health IT environment and are thus outside the scope of certification. Copy actions originating from within the health IT interface (e.g., exporting or downloading a copy of electronic health information from the Health IT Module) are required to be tracked in the audit log.
- Demonstration of the ability to use National Institute of Standards and Technology (NIST) time servers is required for certification, however vendors are not required to use NIST servers post certification.

- A "pointer to original data state" is a means of identifying original information that has been changed by a user. Similarly, a "pointer to deleted information" is a means of identifying information prior to deletion. A description of a change or deletion is acceptable as long as the type of action is specified and both the original and modified data states are able to be identified. For example, an audit log could include a link to an original document and provide a description of the modified state. Conversely, it could include a description of the original data state and provide a link to the modified document. The certification criterion is not prescriptive of how the requirement should be achieved. Demonstrating the ability to view the original document prior to a change or deletion is an acceptable method of meeting the certification requirement, however it is not required during testing.
- Information related to the required actions (e.g., additions, deletions, changes, queries, print, and copy) must be recorded in the audit log, however the certification criterion is not prescriptive to the method by which this is achieved and does not place limitations on the format in which this information is presented in the audit log. Namely, the audit log should record actions in a way that assists the user in reconstructing events that occurred effecting health information. For example, a "change" action may be listed in the audit log as an "edit" event if that is the labeling the user is accustomed to using in the Health IT Module for those kinds of actions.
- "Changes to user privilege" are considered a type of "change." The Health IT Module may separately record this auditable event or may reflect an approach that records user privilege changes as a subtype or reason (description) for the change.
- If the audit log reflects the privilege modification to each individual user account that was part of the group, the privilege modification may be applied as a group change.
- The elements "Patient identification" and "Identification of the patient data that are accessed" are not applicable when capturing a "user privilege change" action.
- The exact point in time when an action is logged may depend on the architecture/design of the Health IT Module or the workflow.
- For the purposes of certification, a Health IT Module may create a single audit log file with all of the specified auditable data, or it may use multiple audit log files. However, if this latter approach is used, when all of the audit log files are considered together the total content they include must represent all of the required auditable data (which would be equivalent to the single audit log file approach).

Paragraph (d)(2)(i)(B) Record actions

Technical outcome – The health IT records the audit log status in accordance with sections 7.1.1 and 7.1.7 of the ASTM E2147-18 standard when the audit log status is changed and records the date and time each action occurs in accordance with any Network Time Protocol (NTP) standard.

Clarifications:

- The ONC Cures Act Final Rule inadvertently omitted updates to the correct references in this section. To meet this requirement, Health IT Modules must record the audit log status in accordance with sections 7.1.1 and 7.1.7 of ASTM E2147-18.

- Only those sections specified from section 7 of ASTM E2147-18 are the minimum required for certification. [see also [45 CFR 170.210\(e\)](#)]
- This provision only applies when the technology allows the audit log to be disabled.

Technical outcome – The health IT records the audit log status in accordance with sections 7.1.1 and 7.1.7 of the ASTM E2147-18 standard when the audit log status is changed and records the date and time each action occurs in accordance with any Network Time Protocol (NTP) standard.

Clarifications:

- The ONC Cures Act Final Rule inadvertently omitted updates to the correct references in this section. To meet this requirement, Health IT Modules must record the audit log status in accordance with sections 7.1.1 and 7.1.7 of ASTM E2147-18.
- Only those sections specified from section 7 of ASTM E2147-18 are the minimum required for certification. [see also [45 CFR 170.210\(e\)](#)]
- This provision only applies when the technology allows the audit log to be disabled.

Paragraph (d)(2)(i)(C) Record actions

Technical outcome – The health IT records the information specified in sections 7.1.1 and 7.1.7, of the ASTM E2147-18 standard when the encryption status of locally stored electronic health information on end-user devices is changed and records the date and time each action occurs in accordance with any Network Time Protocol (NTP) standard.

Clarifications:

- To meet this requirement, Health IT Modules must record the audit log status in accordance with sections 7.1.1 and 7.1.7 of ASTM E2147-18. Only those sections specified from section 7 of ASTM E2147-18 are the minimum required for certification. [see also [45 CFR 170.210\(e\)](#)]
- This provision does not apply when the technology prevents electronic health information from being locally stored on end-user devices.
- Paragraph 170.315(d)(2)(i)(C) is not applicable for the privacy and security testing and certification of a Health IT Module required by § 170.550(h)(3)(iii), (v), (vii), and (viii). This specific requirement was intended to be exempted. It would only apply if § 170.315(d)(7) was also required for privacy and security testing and certification, which it is not under the aforementioned paragraphs.

Technical outcome – The health IT records the information specified in sections 7.1.1 and 7.1.7, of the ASTM E2147-18 standard when the encryption status of locally stored electronic health information on end-user devices is changed and records the date and time each action occurs in accordance with any Network Time Protocol (NTP) standard.

Clarifications:

- To meet this requirement, Health IT Modules must record the audit log status in accordance with sections 7.1.1 and 7.1.7 of ASTM E2147-18. Only those sections specified from section 7 of ASTM E2147-18 are the minimum required for certification. [see also [45 CFR 170.210\(e\)](#)]
- This provision does not apply when the technology prevents electronic health information from being locally stored on end-user devices.
- Paragraph 170.315(d)(2)(i)(C) is not applicable for the privacy and security testing and certification of a Health IT Module required by § 170.550(h)(3)(iii), (v), (vii), and (viii). This specific requirement was intended to be exempted. It would only apply if § 170.315(d)(7) was also required for privacy and security testing and certification, which it is not under the aforementioned paragraphs.

Paragraph (d)(2)(ii) Default setting

Technical outcome – The health IT is set by default to record actions related to electronic health information (per provision (d)(2)(i)(A)), (where applicable) record the audit log status (per provision (d)(2)(i)(B)), and (where applicable) record the encryption status of locally stored electronic health information on end-user devices (per provision (d)(2)(i)(C)).

Clarifications:

- To meet this provision for certification, the health IT must be set by default to record the actions and information specified. This is to ensure that at the point of installation or upgrade, the health IT will be set by default for a provider to record the actions and information specified. [see also [77 FR 54233](#)]
- The default setting requirement is only applicable for recording the audit log status if the technology permits the audit log be disabled.

The default setting requirement is only applicable for recording the encryption status of electronic health information when the information is locally stored on end-user devices. [see also [77 FR 54233](#)]

- The developer must demonstrate that the audit log is capable of recording the details (date, time, and user identification at a minimum) related to enabling and disabling of the encryption status. However, if the health IT is designed in such a way that no users are able to enable or disable the encryption status, the vendor is permitted to submit supporting documentation to demonstrate this. Requirements related to the specific process of encrypting electronic health information locally stored on end-user devices by health IT are outside the scope of this certification criterion, but are addressed in the § 170.315(d)(7) End-user device encryption certification criterion.

Technical outcome – The health IT is set by default to record actions related to electronic health information (per provision (d)(2)(i)(A)), (where applicable) record the audit log status (per provision (d)(2)(i)(B)), and (where applicable) record the encryption status of locally stored electronic health information on end-user devices (per provision (d)(2)(i)(C)).

Clarifications:

- To meet this provision for certification, the health IT must be set by default to record the actions and information specified. This is to ensure that at the point of installation or upgrade, the health IT will be set by default for a provider to record the actions and information specified. [see also [77 FR 54233](#)]
- The default setting requirement is only applicable for recording the audit log status if the technology permits the audit log be disabled.
The default setting requirement is only applicable for recording the encryption status of electronic health information when the information is locally stored on end-user devices. [see also [77 FR 54233](#)]
- The developer must demonstrate that the audit log is capable of recording the details (date, time, and user identification at a minimum) related to enabling and disabling of the encryption status. However, if the health IT is designed in such a way that no users are able to enable or disable the encryption status, the vendor is permitted to submit supporting documentation to demonstrate this. Requirements related to the specific process of encrypting electronic health information locally stored on end-user devices by health IT are outside the scope of this certification criterion, but are addressed in the § 170.315(d)(7) End-user device encryption certification criterion.

Paragraph (d)(2)(iii) When disabling the audit log is permitted

Technical outcome – The health IT will restrict the ability for auditing to be disabled to a limited set of users if the technology permits auditing to be disabled.

Clarifications:

Health IT does not have to interpret the meaning of “limited.” To meet this provision, health IT would need to include a capability that allows only a limited set of users to have the privileges necessary to change when auditing is enabled or disabled. Generally, ONC would expect any general health IT user could perform such actions. [see also [77 FR 54233](#)]

Technical outcome – The health IT will restrict the ability for auditing to be disabled to a limited set of users if the technology permits auditing to be disabled.

Clarifications:

Health IT does not have to interpret the meaning of “limited.” To meet this provision, health IT would need to include a capability that allows only a limited set of users to have the privileges necessary to change when auditing is enabled or disabled. Generally, ONC would expect any general health IT user could perform such actions. [see also [77 FR 54233](#)]

Paragraph (d)(2)(iv) Audit log protection

Technical outcome – The health IT will not allow actions and status recorded related to electronic health information per provision (d)(2)(i)(A), (B), and (C) to be changed, overwritten, or deleted by the technology.

Clarifications:

This provision would not prohibit an organization from making a policy decision to delete or purge audit logs after a legal retention period. Rather it focuses only on the prohibition of health IT to delete an audit log as a condition of certification. [see also [77 FR 54235](#)]

Technical outcome – The health IT will not allow actions and status recorded related to electronic health information per provision (d)(2)(i)(A), (B), and (C) to be changed, overwritten, or deleted by the technology.

Clarifications:

This provision would not prohibit an organization from making a policy decision to delete or purge audit logs after a legal retention period. Rather it focuses only on the prohibition of health IT to delete an audit log as a condition of certification. [see also [77 FR 54235](#)]

Paragraph (d)(2)(v) Detection

Technical outcome – The health IT must be able to detect whether the audit log has been altered.

Clarifications:

- This provision requires health IT to be able to determine whether activity outside of its control has in some way altered the audit log (e.g., that the operating system was exploited to modify the health IT's database). [see also [77 FR 54235](#)]
- Hashing is one method to detect whether an audit log has been altered. To determine whether an audit log has been altered, ONC encourages the use of hashing algorithms consistent with the standards adopted for hashing of electronic health information at § 170.210(c), including a hashing algorithm with security strength equal to or greater than SHA-2 as specified by NIST in [Federal Information Processing Standards \(FIPS\) Publication 180-4, Secure Hash Standard, 180-4 \(August 2015\)](#). [see also [77 FR 54235](#)]

Technical outcome – The health IT must be able to detect whether the audit log has been altered.

Clarifications:

- This provision requires health IT to be able to determine whether activity outside of its control has in some way altered the audit log (e.g., that the operating system was exploited to modify the health IT's database). [see also [77 FR 54235](#)]
- Hashing is one method to detect whether an audit log has been altered. To determine whether an audit log has been altered, ONC encourages the use of hashing algorithms consistent with the standards adopted for hashing of electronic health information at § 170.210(c), including a hashing algorithm with security strength equal to or greater than SHA-2 as specified by NIST in [Federal Information Processing Standards \(FIPS\) Publication 180-4, Secure Hash Standard, 180-4 \(August 2015\)](#). [see also [77 FR 54235](#)]

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