



Data Integrity Group

Agenda Item 8

Digital signature error monitoring

Meeting: 18 December 2018

OFFICIAL

RECOMMENDATIONS

That the Members:

- 1 **NOTE** when the digital signature issue emerged in 2016, its impact was so significant that it was escalated to the Minister for Health and although the issue is being managed it is not completely resolved.
- 2 **NOTE** the My Health Record system has a new monitoring facility which can help identify failed attempts to upload clinical documents to the My Health Record system due to the digital signature issue.

PURPOSE

The purpose of the paper is to inform the Data Integrity Group members about a new monitoring capability recently introduced into the My Health Record system.

SUMMARY OF ISSUES

A clinical document must be digitally signed before it can be uploaded to the My Health Record system. Some clinical information systems cannot reliably create a digital signature and without that they cannot attempt to upload the clinical document to the My Health Record system, potentially resulting in:

1. Missing clinical information in a consumer's My Health Record resulting in incomplete information.
2. Changes to documents in My Health Record including amendments not uploading resulting in out-of-date or incorrect clinical information.
3. Unexplained cases of missing information or incorrect information in a My Health Record where a healthcare provider believed they had fulfilled the correct upload workflow.
4. Healthcare providers failing to obtain their Practice Incentive Payment as Shared Health Summaries they thought they created are not sent to the My Health Record system.

My Health Record Release 9.4.2 deployed 5 November 2018, introduced information monitoring to help the Agency identify any healthcare provider organisations and clinical information systems failing to digitally sign and upload, on average, 62.5% of clinical documents. Previously, the My Health Record system recorded information about transactions between healthcare providers' clinical information systems and the My Health Record system, although no information was recorded about transactions that failed to occur due to this specific issue.

The My Health Record System Management team within the Agency is in the process of analysing the information captured and notifying clinical information system vendors of the issue so it can be resolved.

This is just one example of what is possible to achieve proactive data quality surveillance of the production data.

BACKGROUND

On 8 March 2016, Microsoft released a security patch which caused an unintended impact to the My Health Record system. This update exposed an issue in the way many clinical information systems created digital signatures preventing the clinical information system from uploading clinical documents to the My Health Record system. The issue can also affect the ability of clinical information systems to display clinical documents.

Vendors were then advised of the issue and how to resolve it, however many healthcare providers are still using clinical information systems with the issue rather than the corrected versions created by vendors.

All clinical documents in the My Health Record system are created with a digital signature for security purposes. This signature generally contains an identifier starting with a randomly generated hexadecimal character which is an alphanumeric character that is either numeric or one of the letters A to F. That means the signature identifier commenced with a numeric character 10/16 (62.5%) of the time and commenced with a letter 6/16 (37.5%) of the time. Under international standards, a digital signature identifier is not allowed to start with a numeric character. A digital signature which starts with a numeric character had no impact on the My Health Record System until Microsoft issued the security patch which resulted in these signatures causing a Windows operating system error.

The detectability of this error depended on the clinical information system and the implementation of error reporting. Some clinical information systems did not display an obvious error message. Therefore, some healthcare provider end-users may still be using clinical information software with this issue and not be aware. Since this issue first manifested on 8 March 2016, many but not all clinical information systems were modified to avoid creating a digital signature identifier which starts with a numeric character.

The new My Health Record monitoring facility records the digital signature identifier which can be used to identify any clinical information systems only uploading documents starting with a letter, hence identifying where those starting with a numeric character are failing.

FINANCIAL IMPLICATION

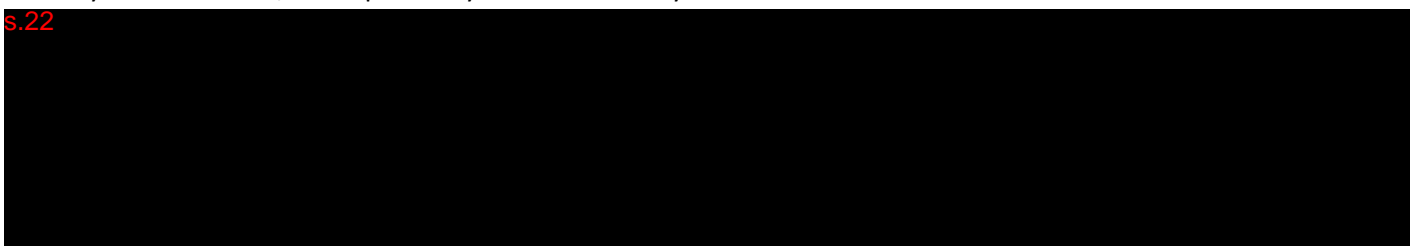
No financial impact identified

LEVEL OF RISK

This new monitoring capability is contributing to the risk mitigation for My Health Record document upload failures.

PRIORITY AREA OR STRATEGIC INITIATIVE

My Health Record, Interoperability and Data Quality



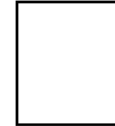
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Briefing Paper

New My Health Record logging facility



Date prepared: 4 December 2018

Prepared by: s.22 [Redacted]

Prepared for: Data Governance Board

Briefing point

The My Health Record system is now able to help identify uploads which failed to occur due to a digital signature issue after introducing a new logging facility.

Overview

A clinical document must be digitally signed before it can be uploaded to the My Health Record system. Some clinical information systems cannot reliably create a digital signature and without that they cannot attempt to upload the clinical document to the My Health Record system, potentially resulting in:

- Missing clinical information in a consumer's My Health Record resulting in incomplete information.
- Changes to documents in My Health Record including amendments not uploading resulting in out-of-date or incorrect clinical information.
- Unexplained cases of missing information or incorrect information in a My Health Record where a healthcare provider believed they had fulfilled the correct upload workflow.
- Healthcare providers failing to obtain their Practice Incentive Payment as Shared Health Summaries they thought they created are not sent to the My Health Record system.

My Health Record Release 9.4.2 deployed 5 November 2018, introduced information logging to help the Agency identify any healthcare provider organisations and clinical information systems failing to digitally sign and upload, on average, 62.5% of clinical documents. Previously, the My Health Record system logged information about transactions between healthcare providers' clinical information systems and the My Health Record system, although no information was recorded about transactions that failed to occur due to this specific issue.

The My Health Record System Management team within the Agency is in the process of analysing the logged information and notifying clinical information system vendors of the issue so it can be resolved.

Detailed Information

On 8 March 2016, Microsoft released a security patch which caused an unintended impact to the My Health Record system. This update exposed an issue in the way many clinical information systems created digital signatures preventing the clinical information system from uploading clinical documents to the My Health

Record system. The issue can also affect the ability of clinical information systems to display clinical documents.

Vendors were then advised of the issue and how to resolve it, however many healthcare providers are still using clinical information systems with the issue rather than the corrected versions created by vendors.

All clinical documents in the My Health Record system are created with a digital signature for security purposes. This signature generally contains an identifier starting with a randomly generated hexadecimal character which is an alphanumeric character that is either numeric or one of the letters A to F. That means the signature identifier commenced with a numeric character 10/16 (62.5%) of the time and commenced with a letter 6/16 (37.5%) of the time. Under international standards¹, a digital signature identifier is not allowed to start with a numeric character. A digital signature which starts with a numeric character had no impact on the My Health Record System until Microsoft issued the security patch which resulted in these signatures causing a Windows operating system error.

The detectability of this error depended on the clinical information system and the implementation of error reporting. Some clinical information systems did not display an obvious error message. Therefore, some healthcare provider end-users may still be using clinical information software with this issue and not be aware. Since this issue first manifested on 8 March 2016, many but not all clinical information systems were modified to avoid creating a digital signature identifier which starts with a numeric character.

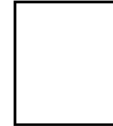
The new My Health Record logging facility records the digital signature identifier which can be used to identify any clinical information systems only uploading documents starting with an alpha character, hence identifying where those starting with a numeric character are failing.

¹ XML Signature Syntax and Processing



Briefing Paper

New My Health Record logging facility



Date prepared: 3 December 2018

Prepared by:

s.22

Prepared for: Data Governance Board

Briefing point

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Briefing Paper

Clinical document upload failures

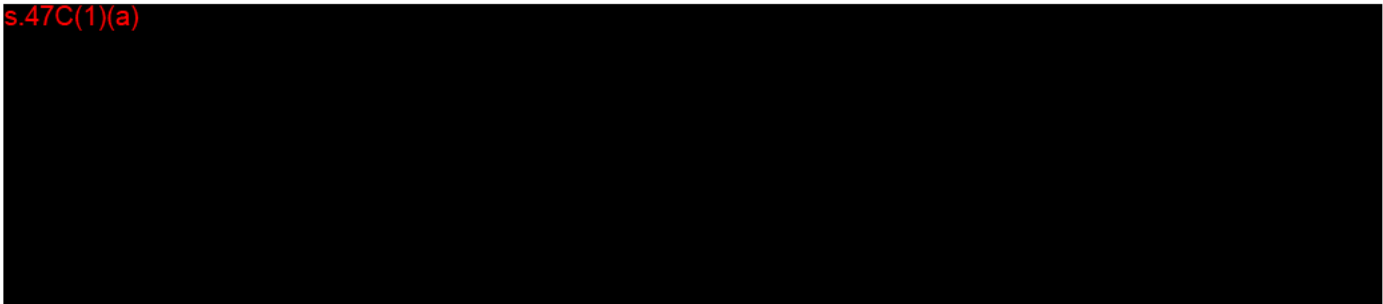
Date prepared	7 February 2018
Prepared by	s.22
Prepared for	Digital Health Safety and Quality Management Committee
Protective marking	UNCLASSIFIED

Briefing point

Clinical information is recorded in clinical documents. It may be intentionally created by a healthcare provider for uploading to the My Health Record system (e.g. by creating a shared health summary or event summary); or it may be automatically uploaded as a by-product of standard health practice (e.g. prescription and dispense records and discharge summaries may be automatically copied to the My Health Record system).

One dimension of data quality is the completeness of information in My Health Records, albeit a My Health Record is only intended to be a summary of a consumer's health information.

s.47C(1)(a)



Relevant background information


Note: Technical terms in this briefing paper are italicised and explained towards the end of the paper.

The following steps are taken by a clinical information system to upload clinical information about a healthcare consumer.

1. Manage consent
2. Create a *clinical document*

3. Create a *digital signature*
4. Upload a clinical document
5. Re-upload a clinical document (if the upload failed)

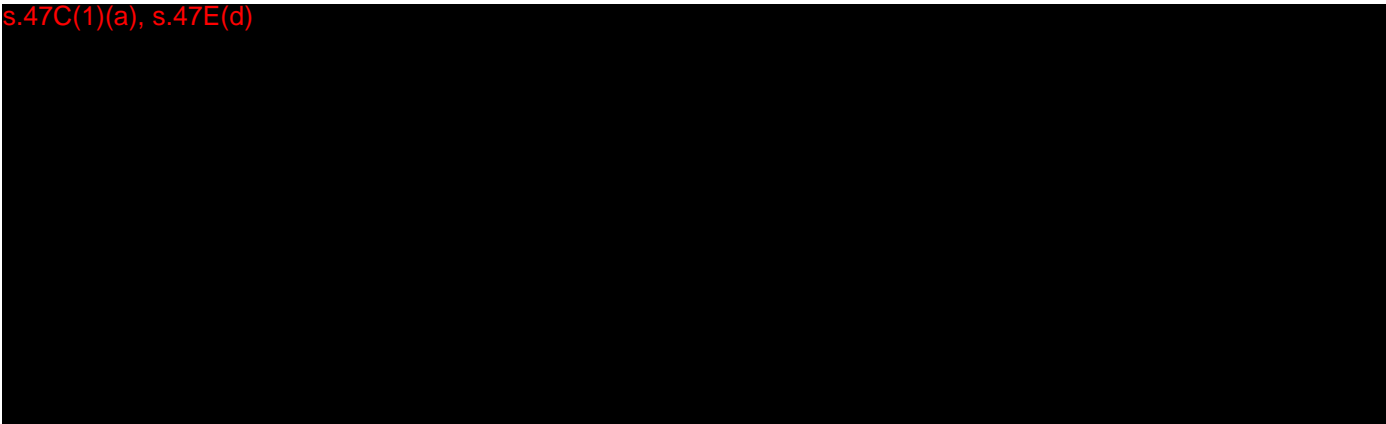
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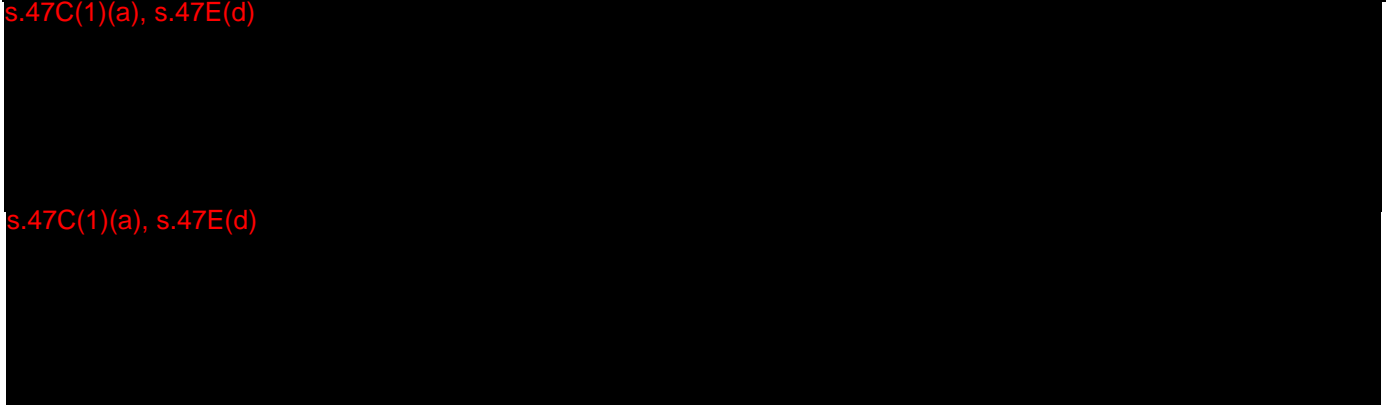
Manage consent

The My Health Record consent model is based on *standing consent* in order to maximise the flow of clinical information from clinical information systems to the My Health Record system. A consumer and their healthcare provider are allowed to decide to not upload clinical documents despite standing consent.

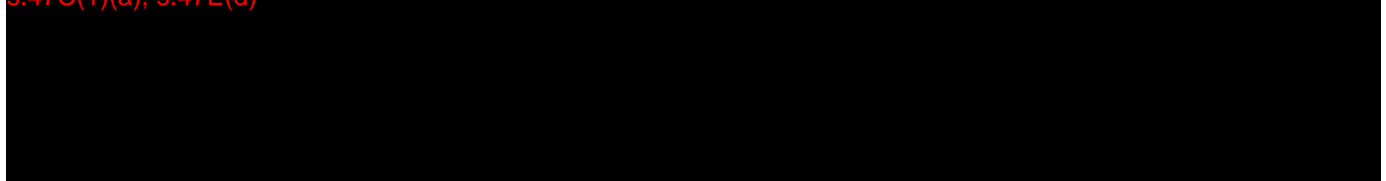
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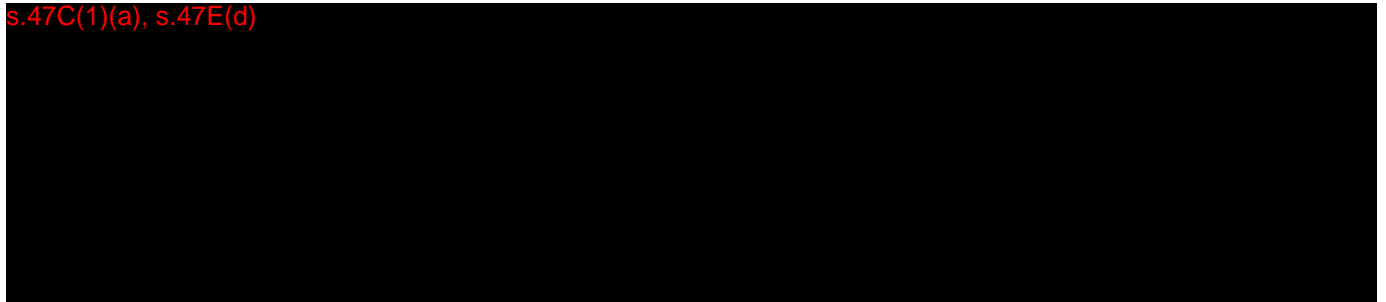
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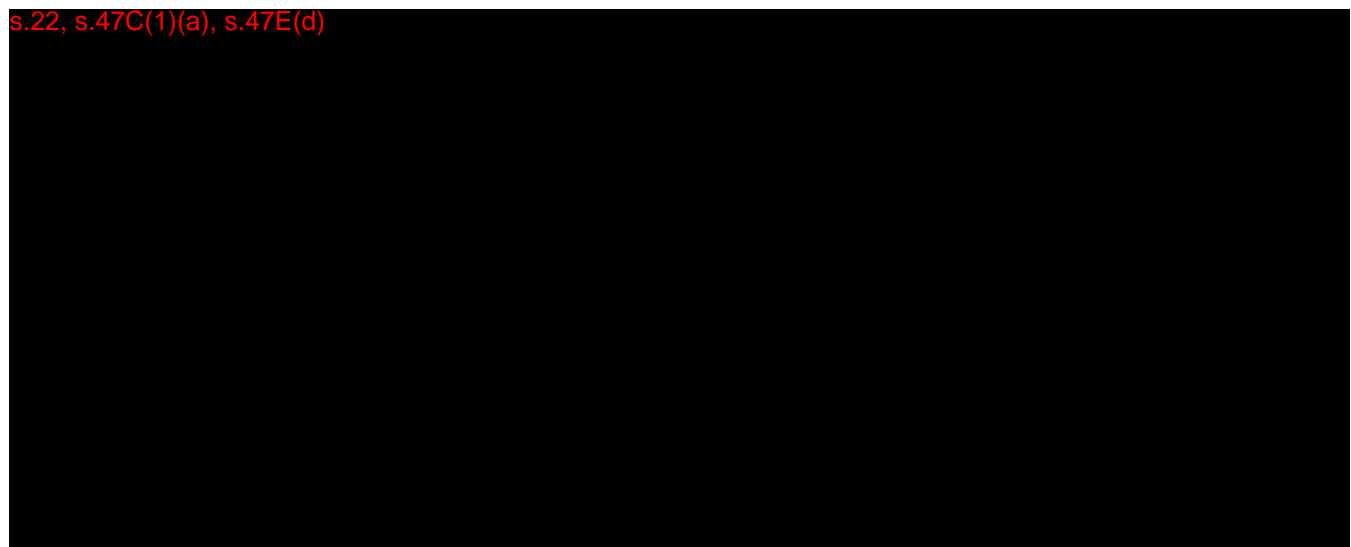
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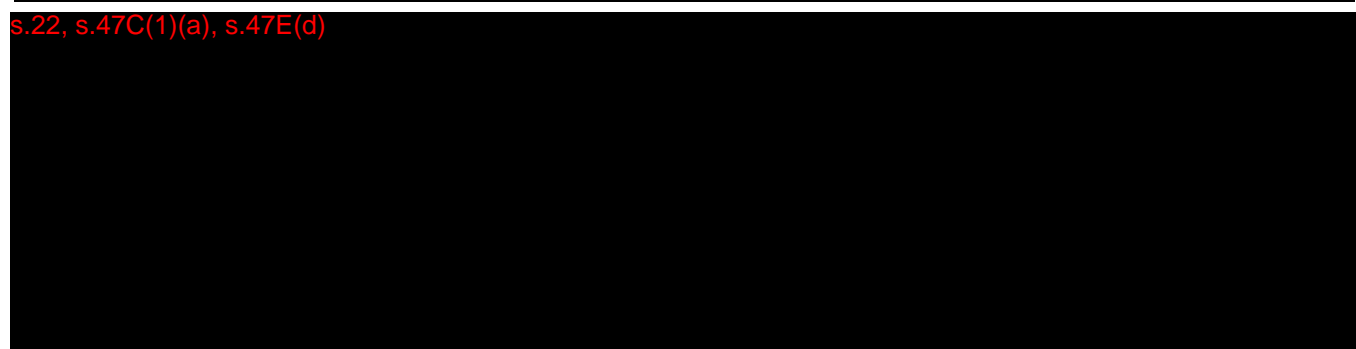
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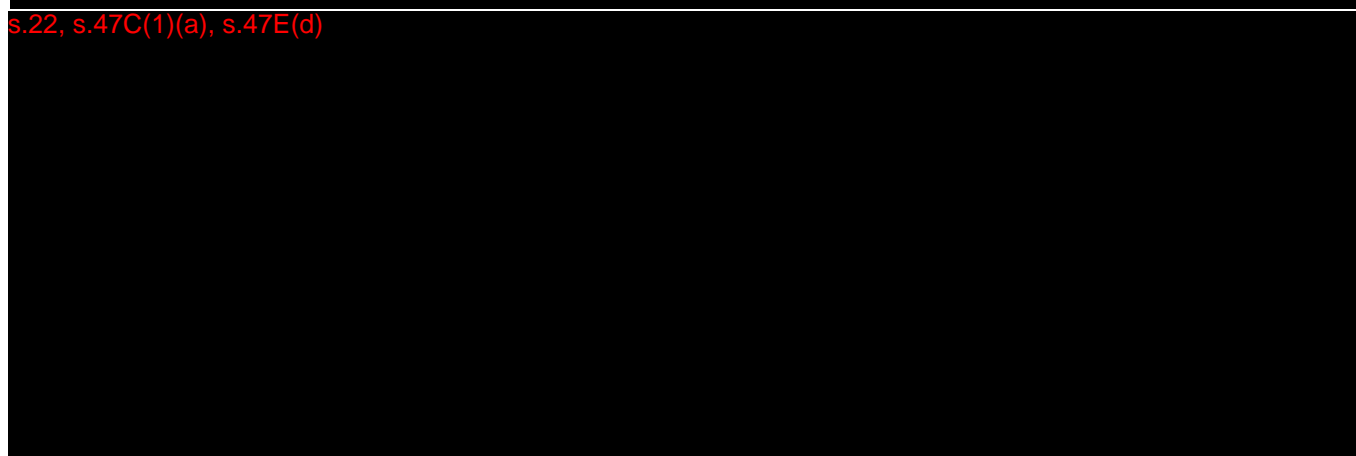
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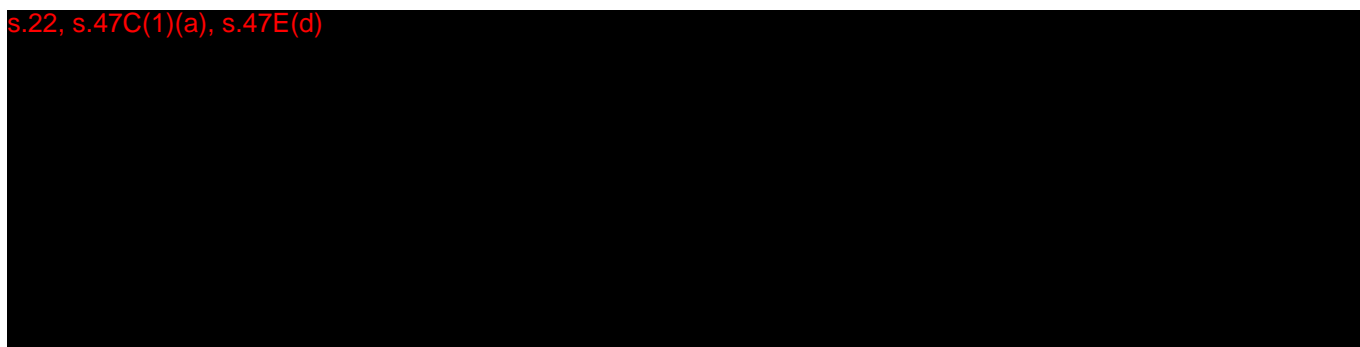
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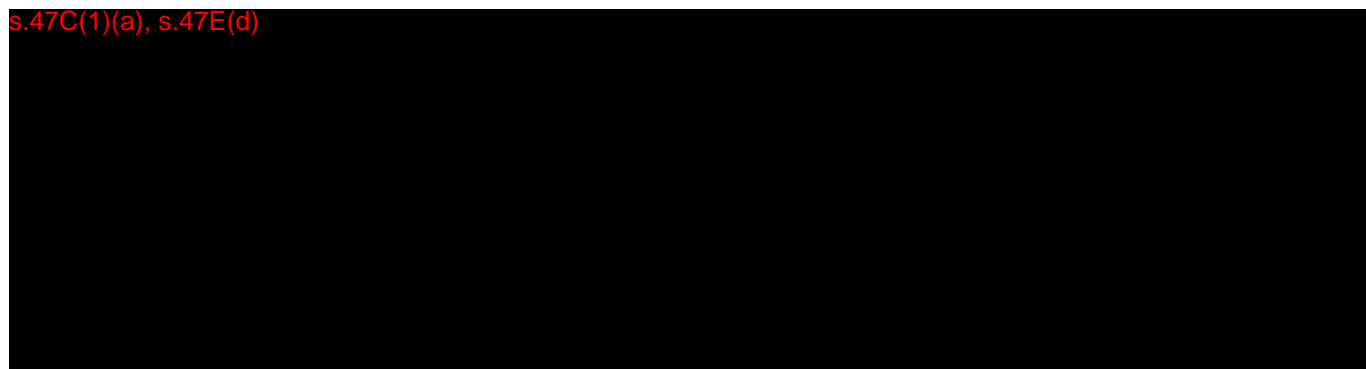
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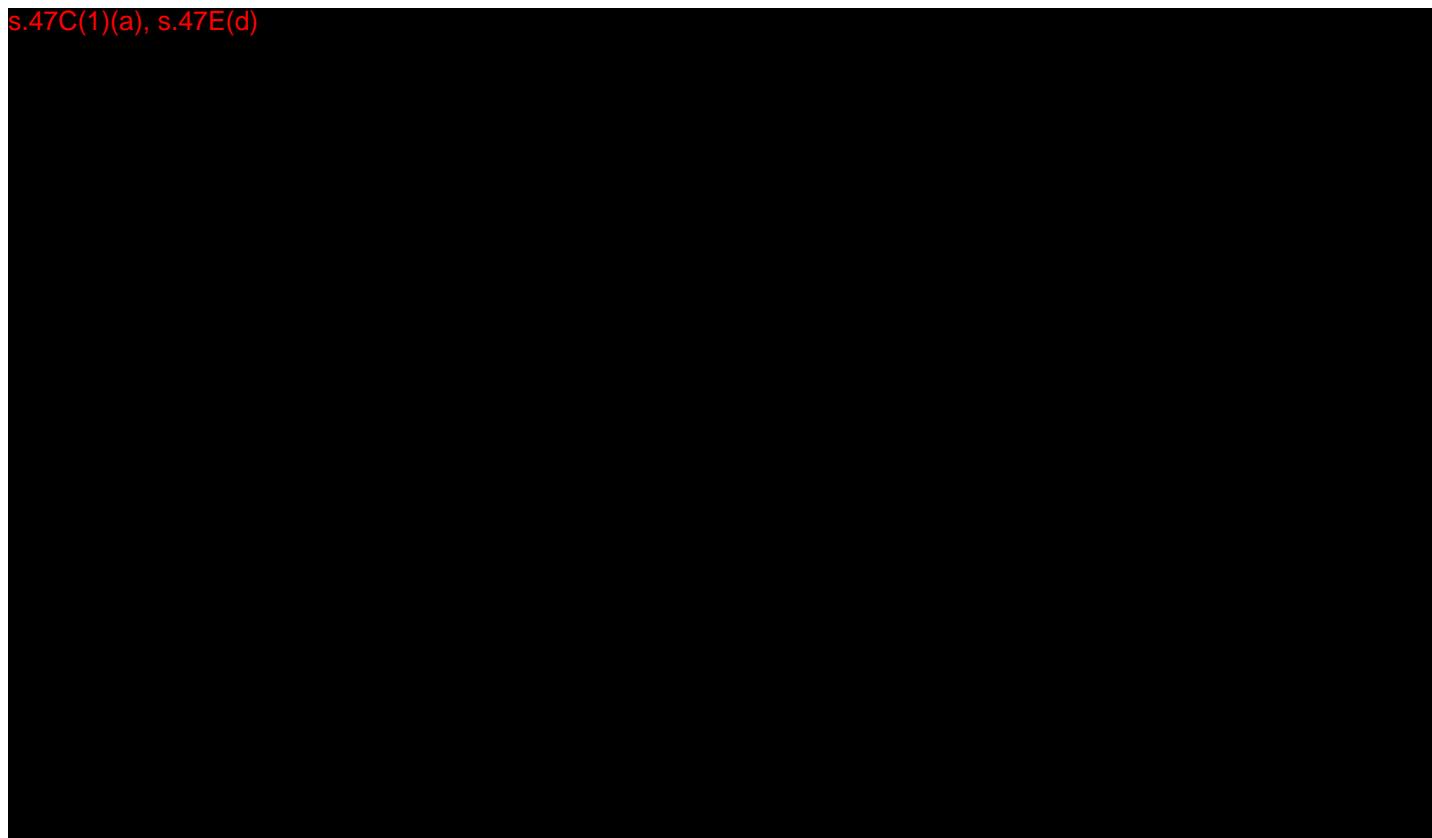
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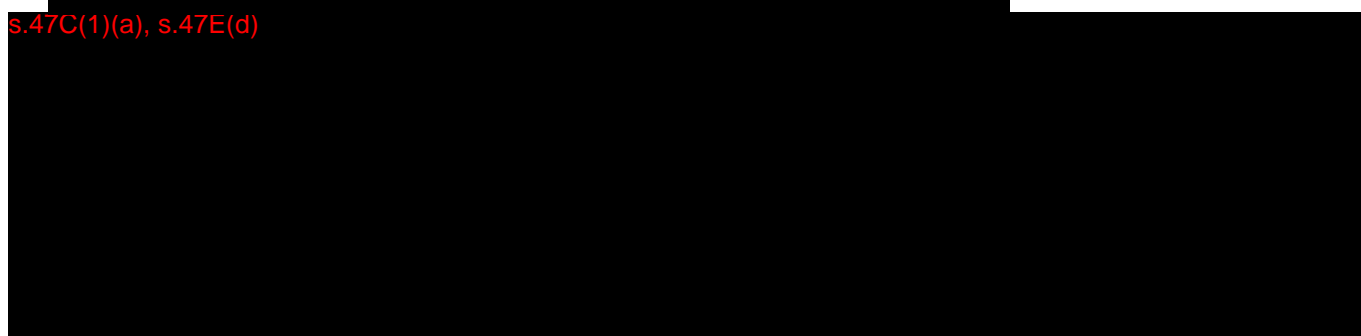


Create a digital signature

Malformed reference element issue: When a clinical document is created, the next step is to create the digital signature using software libraries provided by the computer operating system. In 2016, it was found that almost all clinical information systems were creating the digital signature incorrectly, resulting in a part of the digital signature being malformed. This had no impact until Microsoft issued a Windows security patch on the 8 March 2016. The patch resulted in the Windows operating system reporting an error when the software library was not used correctly. s.47C(1)(a), s.47E(d)



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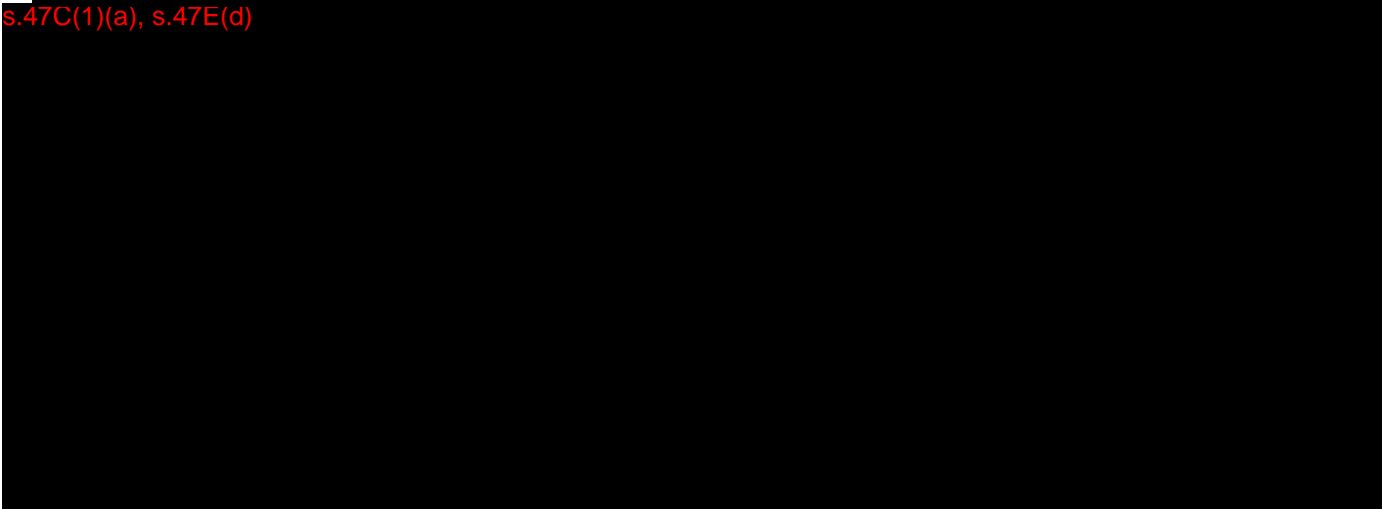
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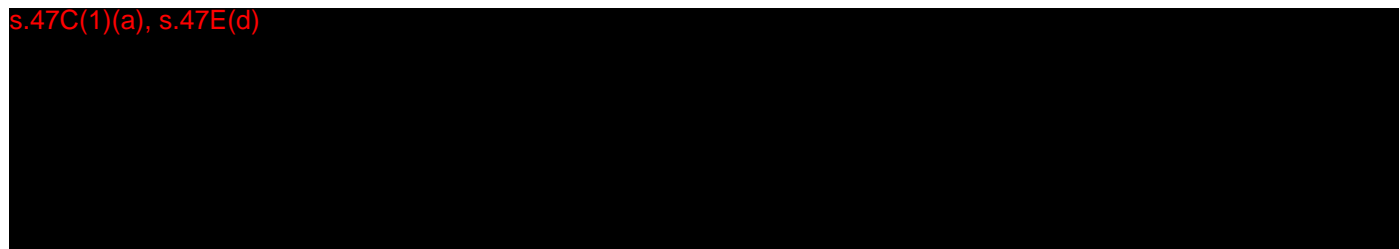
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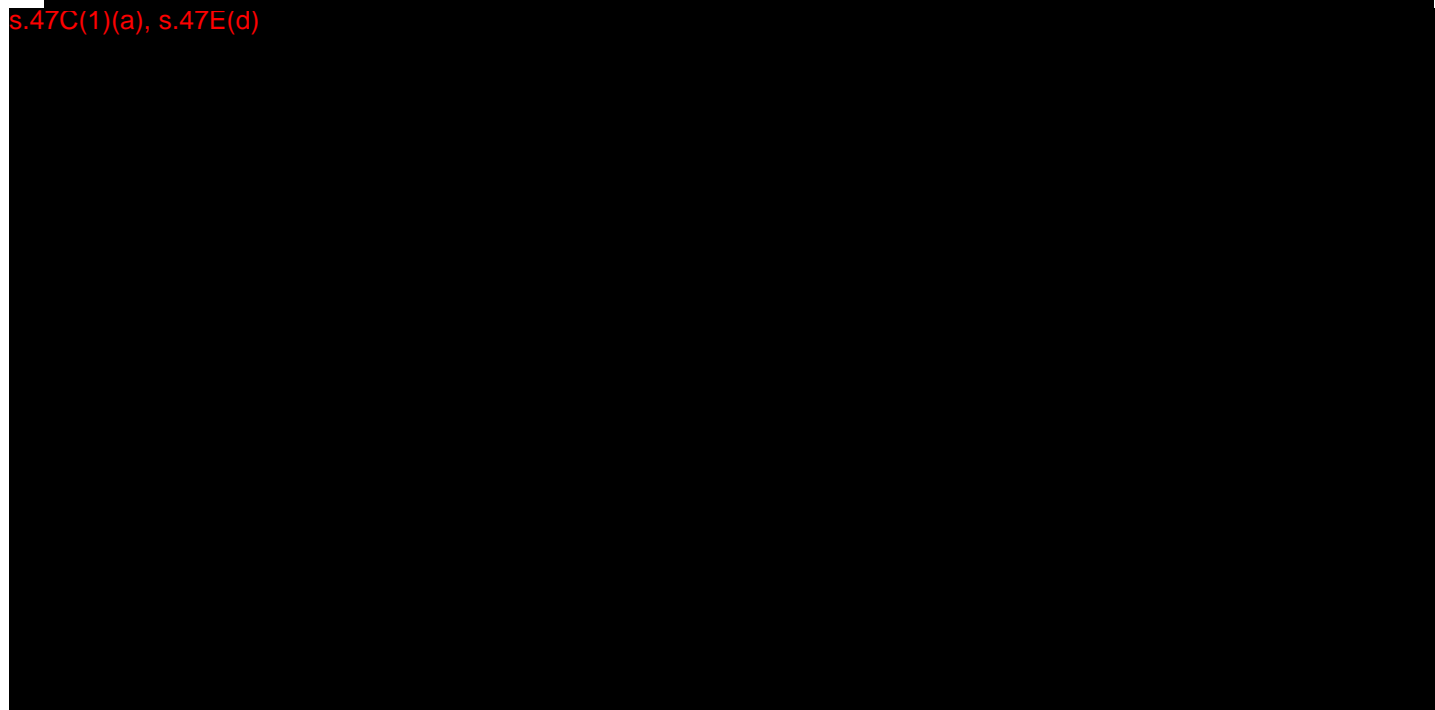
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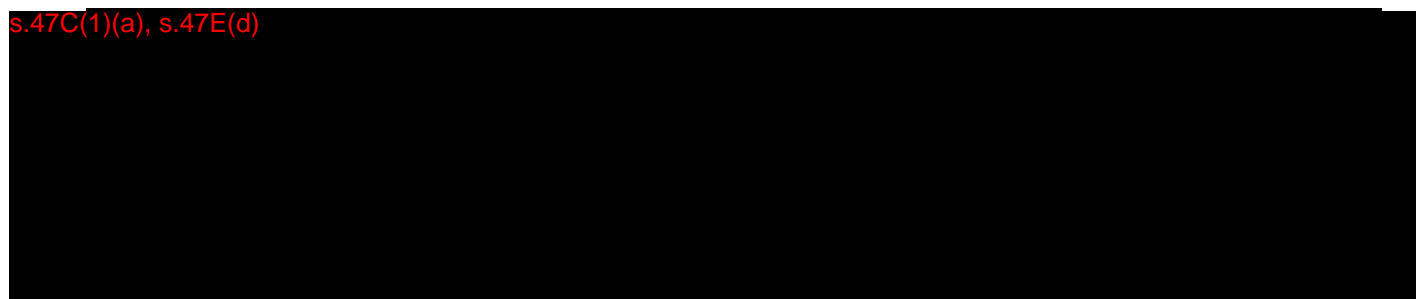
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s.47E(d)

- A **digital certificate**, also known as a public key certificate, is an electronic document used to establish trust between two software systems such as a clinical information system and the HI Service, or a clinical information system and the My Health Record system.
- A **digital signature** is an XML file containing a digital certificate and information about the date when a clinical document was digitally signed.
- **HIPS** is a product provided by the Agency for use by hospitals, and pathology and diagnostic imaging laboratories, to help them modify their clinical and laboratory information systems to access digital health infrastructure, including the HI Service and My Health Record system.
- **Persistence** is the state where a clinical document has been accepted into the My Health Record system, i.e. the clinical document was not rejected.
- **Standing consent** means that, because a consumer has a My Health Record, clinical documents for that consumer may be uploaded to the My Health Record system without needing any further agreement from the consumer. A consumer is allowed to explicitly withdraw consent.
- A My Health Record **template package** is a collection of instructions applied by the My Health Record system to perform a partial check of the conformance of a clinical document. Anything reported by a template package is treated as an error with the clinical document.

s.47E(d), s.47C(1)(a)

s.47E(d), s.47C(1)(a)