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Correction Number CP-1410
Log Summary: Clarify Lossy Image Compression Ratio
Name of Standard PS3.3 2013
Rationale for Correction: The definition of Lossy Image Compression Ratio is exemplified in a note, but not precisely defined. Further, the description of the ratio and the method are verbose, and reference a section that should define the detail; refactor accordingly to assure consistency.
Correction Wording:

Amend DICOM PS3.3 all Module descriptions of Lossy Image Compression Ratio (0028,2112) and Lossy Image Compression Method (0028,2114) to refactor the detail and reference a more specific section, as follows:

Table 1.

Lossy Image Compression Ratio	(0028,2112)	...	<p>Describes the approximate lossy compression ratio(s) that have been applied to this image.</p> <p>See Section C.7.6.1.1.5<u>Section C.7.6.1.1.5.2</u> for further explanation.</p> <p>May be multivalued if successive lossy compression steps have been applied; the value order shall correspond to the values of Lossy Image Compression Method (0028,2114):</p> <p>Note</p> <ol style="list-style-type: none"> For example, a compression ratio of 30:1 would be described in this Attribute with a single value of 30. For historical reasons, the lossy compression ratio should also be described in Derivation Description (0008,2114): <p>...</p>
Lossy Image Compression Method	(0028,2114)	...	<p>A label for the lossy compression method(s) that have been applied to this image.</p> <p>See Section C.7.6.1.1.5<u>Section C.7.6.1.1.5.1</u> for further explanation.</p> <p>May be multi-valued if successive lossy compression steps have been applied; the value order shall correspond to the values of Lossy Image Compression Ratio (0028,2112):</p> <p>...</p>

Amend DICOM PS3.3 C.7.6.1.1.5 as follows.

C.7.6.1.1.5 Lossy Image Compression

The Attribute Lossy Image Compression (0028,2110) conveys that the Image has undergone lossy compression. It provides a means to record that the Image has been compressed (at a point in its lifetime) with a lossy algorithm and changes have been introduced into the pixel data. Once the value has been set to "01", it shall not be reset.

Note

If an image is compressed with a lossy algorithm, the attribute Lossy Image Compression (0028,2110) is set to "01". Subsequently, if the image is decompressed and transferred in uncompressed format, this attribute value remains "01".

The value of Lossy Image Compression (0028,2110) in SOP Instances containing multiple frames in which one or more of the frames have undergone lossy compression shall be "01".

Note

It is recommended that the applicable frames be noted in the Attribute Derivation Description (0008,2111).

If an image is originally obtained as a lossy compressed image from the sensor, then Lossy Image Compression (0028,2110) is set to "01" and Value 1 of the Attribute Image Type (0008,0008) shall be set to ORIGINAL.

If an image is a compressed version of another image, Lossy Image Compression (0028,2110) is set to "01", Value 1 of the Attribute Image Type (0008,0008) shall be set to DERIVED, and if the predecessor was a DICOM image, then the Image shall receive a new SOP Instance UID.

Note

1. It is recommended that the approximate compression ratio be provided in the Attribute Derivation Description (0008,2111). Furthermore, it is recommended that Derivation Description (0008,2111) be used to indicate when pixel data changes might affect professional interpretation (see Section C.7.6.1.1.3).
2. The attribute Lossy Image Compression (0028,2110) is defined as Type 3 for backward compatibility with existing IODs. It is expected to be required (i.e., defined as Type 1C) for new Image IODs and for existing IODs that undergo a major revision (e.g., a new IOD is specified).

C.7.6.1.1.5.1 Lossy Image Compression Method

Lossy Image Compression Method (0028,2114) be multi valued if successive lossy compression steps have been applied; the value order shall correspond to the values of Lossy Image Compression Ratio (0028,2112), if present.

Defined Terms for Lossy Image Compression Method (0028,2114):

ISO_10918_1	JPEG Lossy Compression
ISO_14495_1	JPEG-LS Near-lossless Compression
ISO_15444_1	JPEG 2000 Irreversible Compression
ISO_13818_2	MPEG2 Compression
ISO_14496_10	MPEG-4 AVC/H.264 Compression

C.7.6.1.1.5.2 Lossy Image Compression Ratio

The value of the "compression ratio" is encoded as a numeric value that represents the numerator of an implicit ratio in which the denominator is always one, consistent with the traditional representation in the literature.

Note

For example, a compression ratio of 30:1 would be described with a value of 30.

The value may be an estimate (e.g., the nominal value that is supplied to the compressor), or it may be a measured value (e.g., computed by dividing the uncompressed pixel data size by the size of the compressed bit stream).

Lossy Image Compression Ratio (0028,2112) may be multivalued if successive lossy compression steps have been applied; if so, the value order shall correspond to the multiple values of Lossy Image Compression Method (0028,2114), if present.

Note

For historical reasons, the lossy compression ratio should also be described in Derivation Description (0008,2111).