

DICOM Correction Proposal Form

Tracking Information - Administration Use Only	
Correction Proposal Number	CP-1066
Status	Final Text
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Person Assigned	Rob Horn
Submitter Name	Gunter Zeilinger gunterze@gmail.com
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Correction Number	CP-1066
Log Summary: Encoding of Attributes with value length > 64KiB with Explicit VR	
Type of Modification	Name of Standard
Enhancement	PS 3.5
<p>Rationale for Correction</p> <p>Data Elements whose Value Representation is none of OB, OW, OF, SQ or UT and whose value length exceeds 65534 ($2^{16}-2$) cannot be encoded with explicit VR, because of the limitation of the Value Length Field to 16-bit. Encoding with Implicit VR LE Transfer Syntax will lose VR information of Private Data Elements, disables the possibility to use compression, is not possible for export to Media and is not required to be supported by DICOM Data Providers of Hosted Applications (PS3.19).</p> <p>There is nothing in PS3.5 or PS3.6 that forbids encoding in Implicit VR such "too long for the VL in Explicit VR" data elements.</p> <p>There is a large installed base of RT applications that create implicit VR datasets with such large data elements, e.g., for the Dose Volume Histogram (DS VR), and there is a practical need to resolve this problem rather than asserting that it should not happen.</p> <p>There is no risk that this will weaken the "type safety" of DICOM VRs, since the use of UN for this purpose is specifically constrained (and is no better or worse than the introduction of UN in the first place in Supplement 14 to address transformation of unknown implicit to explicit representation, which establishes the precedent).</p>	
Sections of documents affected	
PS 3.5 Section 6.2.2	
Correction Wording:	

6.2.2 Unknown (UN) Value Representation

The Unknown (UN) VR shall only be used for Private Attribute Data Elements and Standard Data Elements previously encoded as some DICOM VR other than UN using the DICOM Default Transfer Syntax (Implicit VR Little Endian), and whose Value Representation is currently unknown, **or whose known Value Representation is none of OB, OD, OF, OW, SQ, UC, UR or UT and whose value length exceeds 65534 ($2^{16}-2$) and therefore cannot be encoded as a**

16-bit unsigned integer in the Value Length Field defined for the known Value Representation (see section 7.2.1). As long as the VR is unknown the Value Field is insensitive to Little/Big Endian byte ordering and shall not be 'byte-swapped' (see section 7.3). In the case of undefined length sequences, the value shall remain in implicit VR form. See section 7.8 for a description of Private Data Attribute Elements and section 10 and Annex A for a discussion of Transfer Syntaxes.

The UN VR shall not be used for Private Creator Data Elements (i.e. the VR is equal to LO, see section 7.8.1).

The UN VR shall not be used for File Meta Information Data Elements (any Tag (0002,xxxx), see PS 3.10).

- Notes:
1. All other (non-default) DICOM Transfer Syntaxes employ explicit VR in their encoding, and therefore any Private and/or Standard Data Element Value Field Attribute value encoded and decoded using any Transfer Syntax other than the default, and not having been translated to the DICOM Default Transfer Syntax default in the interim, will have a known VR.
 2. If at some point an application knows the actual VR for an Attribute of VR UN (e.g. has its own applicable data dictionary), it can assume that the Value Field of the Attribute is encoded in Little Endian byte ordering with implicit VR encoding, irrespective of the current Transfer Syntax.
 3. This VR of UN is needed when an explicit VR must be given to a Data Element whose Value Representation is unknown (e.g. store and forward). ~~UN is a means to explicitly indicate that the Value Representation of a Data Element is unknown.~~
 4. **This VR of UN is also needed for the encoding of Data Elements with explicit VR whose value length exceeds 65534 ($2^{16}-2$) (FFFEH, the largest even length unsigned 16 bit number) but which are defined to have a 16 bit explicit VR length field.**
 5. The length field of the Value Representation of UN may contain the value of "~~unknown length~~**Undefined Length**", in which case the contents can be assumed to be encoded with implicit VR. See section 7.5.1 to determine how to parse Data Elements with an ~~unknown length~~**Undefined Length**.
 56. An example of a Standard Data Element using a UN VR is a Type 3 or Type U Standard Attribute added to an SOP Class definition. An existing application that does not support that new Attribute (and encounters it) could convert the VR to UN.