DICOM Correction Proposal

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Correction Number	CP-1349
Log Summary: Link from still picture to video	
Name of Standard PS 3.17 2011	
Rationale for Correction:	
In an Electronic Health Record (EHR) a still picture of a medical video may be directly embedded, while the according video may be stored at a different location due to limited data storage space. It is very desirable to have a direct link from the still picture to the according video including the temporal position of the still picture inside the video. It enables the user to selectively just access the part of the video, where he is currently interested. It can significantly reduce network traffic and delay time. The current DICOM standard already provides data fields that enable such functionality. However, some explanatory information is helpful to show how they can be used efficiently.	
Correction Wording:	

PS 3.17 Add new Annex: Link from still picture to video

Annex X   Link from still picture to video (Informative)

X.1 SCOPE

Multi-frame image data such as video typically consists of huge data amounts. In order to limit the memory space on local storage media, often just selected key pictures of a multi-frame image object (e.g. a video) are stored locally, while the whole multi-frame image data is archived on a hospital server.

In certain cases, e.g. complications after surgery, it may be desired to review the recorded surgery video. Retrieval of the whole video can quickly exceed network bandwidth capabilities. An efficient solution is to retrieve only certain video fragments showing key parts of the surgery. A recommended possibility is to store a link to the video in the DICOM metadata of the still picture including the temporal position inside the video. In this annex an efficient use of attributes for linking a still picture to video data is provided.

X.2 LINK TO VIDEO VIA UID

Still pictures of an endoscopic video are stored as Visible Light (VL) or Secondary Capture (SC) image objects. Both IODs include the General Image Module, where the Referenced Image Sequence (0008,1140) attribute is specified in order to reference significantly related images. It is recommended to store the UID of the video object in the Referenced Image Sequence attribute of the according still picture object.

X.3 REFERENCING TEMPORAL POSITION USING REFERENCED FRAME NUMBER

The Referenced Frame Number (0008,1160) attribute of the General Image Module identifies the frame numbers of the still pictures inside the Referenced Image Sequence to which the reference applies. The frame number information enables the Service Class User (SCU) to retrieve the key part of a video according to the still picture without using network capabilities more than necessary. For instance the Service Class Provider (SCP) may send just a few minutes of the video material before and after the temporal position of the still picture.

Notes: 1. The Composite Instance Root Retrieve Service Classes can be used to initiate the retrieval of selected video frames.

2. In case of MPEG-2 or MPEG-4 AVC/H.264 encoded video data the actually transmitted number of frames may depend on the position of key frames. The transmitted video may be slightly longer than requested due to inter-frame coding structure.

3. In the MPEG-2 Transport Stream container format Program Clock Reference (PCR), Presentation Time Stamp (PTS) and Decoding Time Stamp (DTS) values are used to identify time code values inside the video. Conversion from Referenced Frame Number value to PCR and PTS/DTS values can be done easily taking into account the starting time and the frame rate of the video.

4. Considerations for creation of new objects from multi-frame image data can be found in PS 3.17 Annex MM.