DICOM Correction Proposal Form

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Correction Number	CP-146	
Log Summary: Clarification of Query/Retrieve Behaviour		
Type of Modification	Name of Standard	
	PS 3.4,3.7-1999	

Rationale for Correction

Several problems have been identified with the Q/R Service Class.

1. PS 3.4-1998 Section C.4.1.1.3.2 specifies attributes that shall be present in a C-FIND
response identifier, including the mutually alternative Retrieve AE Title Data Element or the
Storage Media File-Set ID/Storage Media File Set UID Data Elements.

It is not entirely clear that the SCP shall always provide these Attributes in the response and
they should never be included in the request. A note is added to clarify this.

Also it is made more clear that Retrieve AE Title Data Element or the Storage Media File-Set
ID/Storage Media File Set UID are mutually exclusive.

2. The requirements for the presence or absence of an Identifier in a C-Move or C-Get
Response are in conflict:

- in PS 3.7-1998 Section 9.1.4.1 describing the C-Move Parameters and Section 9.1.3.1
describing the C-Get Parameters, the Identifier in the Response/Confirmation is specified as
User Optional with its contents and rules defined in PS 3.4. This is consistent with the
separation of layer definition between Part 4 and Part 7 but is potentially confusing.

- in PS 3.4-1998 Sections C.4.2.1.4 and C.4.3.1.3 it states both the C-Move/C-Get requests and
responses contain an Identifier

- in PS 3.4-1998 Sections C.4.2.1.4.2 and C.4.3.1.3.2 it states that an identifier in a C-Move/C-
Get responses shall conditionally contain the Failed SOP Class UID List if sub-operations failed,
and be absent otherwise

It is proposed here that all these sections specify Conditional, not User Optional or Required.

3. PS 3.4-1998 Section C.6 implies that at the IMAGE level in a C-MOVE or C-GET, a list of SOP Instance UIDs may be specified for retrieval. This is also suggested by the plural "SOP Instance UIDs" in C.4.2.1.4.1 and C.4.3.1.3.1. This is further implied by the description of additional behaviour that is possible for relational retrievals in C.4.2.2.2.1 and C.4.3.2.2.1.

Unfortunately, the descriptions of the baseline behaviour of SCU (C.4.2.2.1 and C.4.3.2.1) and SCP (C.4.2.3.1 and C.4.3.3.1) are in conflict. The SCU behaviour states that a list of UIDs may be specified at the level of the retrieve, whereas the SCP behaviour states that a suboperations may be initiated only for a list of SOP Instance UIDs.

Even though SOP Instance UID in PS 3.6-1998 has a VM of 1, this VM doesn't apply since the rules for List of UID matching specified in PS 3.4-1998 C.2.2.2.2 already imply that the dictionary VM is overridden for query/retrieve.

What is not clearly stated is that, for the baseline behaviour, a List of UIDs or other non-single matching may be specified at the lowest level of the C-MOVE or C-GET, but that may be any level of the model, not just the IMAGE level.

It is proposed here that this be clarified with notes to C.4.2.1.4.1 and C.4.3.1.3.1 and C.6.1.1.6 and C.6.2.1.5.

4. In the description of the C-MOVE SCP behavior, it is stated that the SCP of the C-MOVE must be the SCU of the C-STORE. This is incorrect.

Sections of documents affected

PS 3.4-1998 Sections C.4, C.6

PS 3.7-1998 Section 9.1

Correction Wording:

Amend PS 3.4-1998 Section C.4.1.1.3.2 to clarify C_FIND response contents.

C.4.1.1.3.2   Response Identifier Structure

An Identifier in a C-FIND response shall contain:

— Key Attributes with values corresponding to Key Attributes contained in the Identifier of the request.

> **Note: The remaining Attributes described in this section are required to be contained in the response as specified, and should never be requested as Key Attributes in the Identifier of the request.**

— Query/Retrieve Level, element (0008,0052) which defines the level of the query. The Query/Retrieve level shall be equal to the level specified in the request.

— Conditionally, the Attribute Specific Character Set (0008,0005). This Attribute is required if expanded or replacement character sets are used.

The C-FIND SCP is required to support either the Retrieve AE Title Data Element or the Storage Media File-Set ID/Storage Media File Set UID Data Elements**, but is not required to support both, though it may**. An Identifier in a C-FIND response shall contain:

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Amend PS 3.4-1998 Section C.4.2 and C.4.3 to clarify C_MOVE and C-GET Identifiers.

C.4.2.1.4   Identifier

~~Both t~~ **T**he C-MOVE request ~~and response~~ **shall** contain an Identifier. **The C-MOVE response shall conditionally contain an Identifier as required in C.4.2.1.4.2.**

> **Note: The Identifier is specified as U in the definition of the C-MOVE primitive in PS 3.7 but is specialized for use with this service.**

C.4.2.1.4.1   Request Identifier Structure

An Identifier in a C-MOVE request shall contain:

— the Query/Retrieve Level (0008,0052) which defines the level of the retrieval
— Unique Key Attributes which may include Patient ID (0010,0020), Study Instance UID**s** (0020,000D), Series Instance UID**s** (0020,000E), and the SOP Instance UIDs (0008,0018)

The Unique Keys at each level of the hierarchy and the values allowable for the level of the retrieval shall be defined in the SOP Class definition for the Query/Retrieve Information Model.

> **Note: In the Baseline behaviour, more than one entity may be retrieved if the Query/Retrieve Level is IMAGE, SERIES or STUDY, using List of UID matching, but only Single Value Matching value may be specified for Patient ID (0010,0020).**

C.4.2.1.4.2   Response Identifier Structure

The Failed SOP Instance UID List (0008,0058) specifies a list of UIDs of the C-STORE sub-operation SOP Instances for which this C-MOVE operation has failed. An Identifier in a C-MOVE response shall conditionally contain the Failed SOP Instance UID List (0008,0058) based on the C-MOVE response status value. If no C-STORE sub-operation failed, Failed SOP Instance UID List (0008,0058) is absent and therefore no Data Set shall be sent in the C-MOVE response.

The Identifier in a C-MOVE response with a status of:

— Canceled, Failed, Refused, or Warning shall contain the Failed SOP Instance UID List Attribute
— Pending shall not contain the Failed SOP Instance UID List Attribute (no Data Set)

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C.4.2.2.1   Baseline Behavior of SCU

An SCU conveys the following semantics with a C-MOVE request:

— The SCU shall supply a single value in the Unique Key Attribute for each level above the Query/Retrieve level. For the level of retrieve, the SCU shall supply ~~at least~~ one ~~UID~~ **unique key if the level of retrieve is above the STUDY level,** and ~~may~~ **shall** supply **one UID,** or a list of UIDs if a retrieval of several items is desired **and the retrieve level is STUDY, SERIES or IMAGE**. The SCU shall also supply a move destination. The move destination shall be the DICOM Application Entity Title of a DICOM Application Entity capable of serving as the SCP of the Storage Service Class.

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C.4.2.3.1   Baseline Behavior of SCP

An SCP conveys the following semantics with a C-MOVE response:

— The SCP shall identify a set of Entities at the level of the transfer based upon the values in the Unique Keys in the Identifier of the C-MOVE request. The SCP shall initiate C-STORE sub-operations for the corresponding storage SOP Instances. These C-STORE sub-operations shall occur on a different Association from the C-MOVE operation. ~~The SCP of the Query/Retrieve Service Class shall serve as an SCU of the Storage Service Class.~~

    ...

— The SCP shall initiate C-STORE sub-operations over the new Association for all stored SOP Instances related to the Patient ID, **List of** Study Instance UID**s**, **List of** Series Instance UID**s**, or List of SOP Instance UIDs depending on the Query/Retrieve level specified in the C-MOVE request.

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C.4.3.1.3   Identifier

~~Both t~~ **T**he C-GET request ~~and response~~ **shall** contain an Identifier. **The C-GET response shall conditionally contain an Identifier as required in C.4.3.1.3.2.**

> Note: **The Identifier is specified as U in the definition of the C-GET primitive in PS 3.7 but is specialized for use with this service.**

C.4.3.1.3.1   Request Identifier Structure

An Identifier in a C-GET request shall contain:

— the Query/Retrieve Level (0008,0052) which defines the level of the retrieval
— Unique Key Attributes which may include Patient ID (0010,0020), Study Instance UID (0020,000D) Series Instance UID (0020,000E), and SOP Instance UIDs (0008,0018)

The Unique Keys at each level of the hierarchy and the values allowable for the level of the retrieval shall be defined in the SOP Class definition for the Query/Retrieve Information Model.

> Note: **In the Baseline behaviour, more than one entity may be retrieved if the Query/Retrieve Level is IMAGE, SERIES or STUDY, using List of UID matching, but only Single Value Matching value may be specified for Patient ID (0010,0020).**

C.4.3.1.3.2   Response Identifier Structure

The Failed SOP Instance UID List (0008,0058) specifies a list of UIDs of the C-STORE sub-operation SOP Instances for which this C-GET operation has failed. An Identifier in a C-GET

response shall conditionally contain the Failed SOP Instance UID List (0008,0058) based on the C-GET response. If no C-STORE sub-operation failed, Failed SOP Instance UID List (0008,0058) is absent and therefore no Data Set shall be sent in the C-GET response.

The Identifier in a C-GET response with a status of:

— Canceled, Failed, Refused, or Warning shall contain the Failed SOP Instance UID List Attribute
— Pending shall not contain the Failed SOP Instance UID List Attribute (no Data Set)

C.4.3.2.1   Baseline Behavior of SCU

An SCU conveys the following semantics with a C-GET request:

...

— The SCU shall supply a single value in the Unique Key Attribute for each level above the Query/Retrieve level. For the level of retrieve, the SCU shall supply ~~at least~~ one ~~UID~~ **unique key if the level of retrieve is above the STUDY level,** and ~~may~~ **shall** supply **one UID,** or a list of UIDs if a retrieval of several items is desired **and the retrieve level is STUDY, SERIES or IMAGE**.

...

C.4.3.3.1   Baseline Behavior of SCP

An SCP conveys the following semantics with a C-GET response:

...
— The SCP shall initiate C-STORE sub-operations over the same Association for all stored SOP Instances related to the Patient ID, **List of** Study Instance UID**s**, **List of** Series Instance UID**s**, or List of SOP Instance UIDs depending on the Query/Retrieve level specified in the C-GET request.

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Amend PS 3.4-1998 Section C.6.1.1.6 and C.6.2.1.5 to Key Attribute matching for IMAGE level.

C.6.1   Patient Root SOP Class Group

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C.6.1.1.6   Scope of the GET and MOVE Commands and Sub-Operations

A C-MOVE or C-GET request may be performed to any level of the Query/Retrieve Model. However, the transfer of Stored SOP Instances shall always take place at the Image level. A C-MOVE or C-GET where the Query/Retrieve level is the:

— PATIENT level indicates that all images related to a Patient shall be transferred.
— STUDY level indicates that all images related to a Study shall be transferred.
— SERIES level indicates that all images related to a Series shall be transferred.
— IMAGE level indicates that selected individual images shall be transferred.

> **Note:** **In the Baseline behaviour, more than one entity may be retrieved if the Query/Retrieve Level is IMAGE, SERIES or STUDY, using List of UID matching, but only Single Value Matching value may be specified for Patient ID (0010,0020).**

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C.6.2   Study Root SOP Class Group

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C.6.2.1.5   Scope of The GET and MOVE Commands and Sub-Operations

A C-MOVE or C-GET request may be performed to any level of the Query/Retrieve Model. However, the transfer of Stored SOP Instances shall always take place at the Image level. A C-MOVE or C-GET where the Query/Retrieve level is the:

— STUDY level indicates that all images related to a Study shall be transferred
— SERIES level indicates that all images related to a Series shall be transferred
— IMAGE level indicates that selected individual images shall be transferred

> **Note:** **In the Baseline behaviour, more than one entity may be retrieved if the Query/Retrieve Level is IMAGE, SERIES or STUDY, using List of UID matching,**

Amend PS 3.7-1998 Section 9.1.4.1 and 9.1.3.1 to clarify C_MOVE and C-GET response Identifier.

9.1.3.1   C-GET parameters

See Table 9.1-3.

Table 9.1-3
C-GET PARAMETERS

DIMSE-C Parameter Name	Req/Ind	Rsp/Conf	CnclReq/CnclInd
Message ID	M		
Message ID Being Responded To		M	M
Affected SOP Class UID	M	U(=)	
Priority	M		
Identifier	M	U	
Status		M	
Number of Remaining Sub-operations		C	
Number of Completed Sub-operations		C	
Number of Failed Sub-operations		C	
Number of Warning Sub-operations		C	

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9.1.3.1.5   Identifier

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In the response/confirmation, this is a list of Attributes which provide status information about the C-GET operation. The list of Attributes allowed and the rules which define the usage of the Identifier are specified in PS 3.4.

> **Note: The Identifier is specified as U in the Response/Confirmation, but Services defined in PS 3.4 that uses this primitive may impose mandatory or conditional requirements on its presence.**

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9.1.4.1   **C-MOVE parameters**

See Table 9.1-4.

Table 9.1-4
C-MOVE PARAMETERS

DIMSE-C Parameter Name	Req/Ind	Rsp/Conf	CnclReq/CnclInd
Message ID	M		
Message ID Being Responded To		M	M
Affected SOP Class UID	M	U(=)	
Priority	M		
Move Destination	M		
Identifier	M	U	
Status		M	
Number of Remaining Sub-operations		C	
Number of Completed Sub-operations		C	
Number of Failed Sub-operations		C	
Number of Warning Sub-operations		C	

...

9.1.4.1.6   Identifier

...

In the response/confirmation, this is a list of Attributes which provide status information about the C-MOVE operation. The list of Attributes allowed and the rules which define the usage of the Identifier are specified in PS 3.4.

> **Note: The Identifier is specified as U in the Response/Confirmation, but Services defined in PS 3.4 that uses this primitive may impose mandatory or conditional requirements on its presence.**