HL7 ADT, ORM and ORU & DICOM tag agreement with RIS, PACS and VNA
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ADT messages update patient demographics in PACS, RIS and VNA. ADT messages also update current patient location and responsible consultant when they are admitted to the hospital on PACS and RIS.

ADT message—segment, fields and triggers

PID Segment—Patient Demographics (Required by PACS, VNA and RIS)
   a. Patient Name (HL7 PID Field 5)—DICOM tag -(0010,0010)-PatientName
   b. Date of Birth (HL7 PID Field 7)-DICOM tag-(0010,0030)-PatientBirthDate
   c. Gender (HL7 PID Field 8)—DICOM tag —0010,0040-PatientSex
   d. Address (HL7 PID Field 11)—DICOM tag—0010,1040-PatientAddress
   e. PAS ID (Internal ID --Field 3)—DICOM tag 0010,0020-PatientID
   f. NHS No (External ID--Field 3 in the newer version of HL7 or field 2 for older versions of HL7)—DICOM tag-0010,1000-OtherPatientIDs

PD1 Segment—Additional Patient Demographics —ONLY required by RIS (NOT PACS or VNA)
   a. Registered GP Practice NACS Code (Field 3—Patient Primary Facility)
   b. Name and National GMC Code for GP (Field 4—Primary Care Provider Name and ID)

HL7 ADT TRIGGERS FOR updating PID and PD1 segments: The Patient demographics information (PID segment) on RIS, VNA and PACS and PD1 segment on RIS, should ONLY be updated by PAS (NOT by any other system).

PID and PD1 segment update triggers are:
   A-04 New patient Registration
   A-08 Update patient Information
   A-40-Merge patient Internal ID

PV1 Segment—Patient Visit Information (Admission to hospital).
The 2 key fields are for RIS and PACS (VNA does NOT need PVI triggers as it is an archival system only—not display)
   a. Current Location (Field 3—called Assigned Patient Location on HL7-Ward and Bed no)
   b. Current Responsible Clinician (Field 9 —Consulting Doctor—include Name, GMC number, Grade*, Main Specialty**) 

HL7 ADT TRIGGERS FOR updating PV1 segment on RIS and PACS: PV1 segment HL7 ADT should ONLY be updated by PAS (NOT by any other system) by the following ADT message triggers
   A-01-Admit Patient
   A-02—Transfer patient
   A-03-Discharge patient
Patient Banner on RIS and PACS will be blank when NOT in hospital (triggered by A-03 message)
HL7 ORM messages called Order messages—used for transmitting radiology requests from Ordercomms and RIS to RIS, DMWL and PACS
HL7 ORU messages called Order Result message—used for transmitting reports from RIS to PACS, EPR. Etc (or any other system that wishes to receive radiology reports)

ORM messages are generated by Ordercomms and RIS.
Electronic request for an investigation HL7 ORM would be initiated in Ordercomms.
For paper requests these ORM messages are generated in the RIS.
Scheduled information (appointment date and time) is added on the RIS (when ORM is initiated in Ordercomms).
RIS sends ORM messages to PACS, DMWL server and also sends updates back to Ordercomms.

ORM and ORU message has 4 important segments-PID, ORC, OBR and OBX
Event Trigger for ORM –O01—new, edit, cancel, hold, status changed, Accession no assigned
Event Triggers for ORU Message –R01 –new, cancel and update

PID segment in ORM and ORU are used for association of the Order and Result with the patient in the RIS and PACS database, BUT should NOT update the patient demographics on the downstream systems (RIS or PACS).
PID, PD1 and PV1 segments should ONLY be updated by ADT message event triggers

ORC Segment is called the Common Order Segment is created in Ordercomms for electronic requests and RIS for paper requests.
ORC segments has the following fields that are of importance to RIS, PACS and modalities (via the DMWL server)
   a. Event Triggers for updating the HL7 ORM message (Field 1-Order control)
      New Order-NW
      Edit Order-XO
      Cancel Order-CA
      Hold Order-RE
      Status Changed-SC
      Accession number assigned by RIS-NA (update Ordercomms)
   b. Order no—Unique number generated in the Ordercomms for each exam in an Order Group (ORC Field 2—Placer Order no)—DICOM tag—0040, 1006-PlacerOrderNumberProcedure
   c. Accession no --Unique number generated in the RIS for each exam (ORC Field 3-Filler Order no.)—DICOM tags—0040, 1007-FillerOrderNumberProcedure & 0008, 0050-AccessionNumber
   d. Group Order number –This will identify a group of exams requested at the same time on Ordercomms or Unique number that identifies a group of studies to be done with one clinical requesting history in the OBX segment (field 4--Placer Group number)
   e. Order status (ORC Field 5—status -requested, held, scheduled, arrived, completed, cancelled)—DICOM tag—0032, 000A-StudyStatusID
   f. Date and time of Request (ORC Field 9—Date/Time of transaction)—DICOM tag—0040, 2004-IssueDateOfImagingServiceRequest
g. Requester –Junior doctor, nurse specialist etc --Name/ID/job-role/Specialty/Institution (ORC Field 10–Entered by)--only for electronic requests sent from Ordercomms DICOM tag -0040, 2008-OrderEnteredBy
h. Referring Consultant/GP/Clinician—Name/ID-GMCno/job-role/Specialty/Institution (ORC Field 11—Verified by)* DICOM tags-- 0032, 1032-RequestingPhysician and 0032, 1031 – RequestingPhysicianIdentificationSequence
i. Main Specialty of the Consultant/GP which requests the investigation--NHS data dictionary for Main specialty codes (ORC Field 12 –Ordering Provider) DICOM tag- 0032, 1033 -RequestingService
j. Referring Location (ORC Field 13—Enterer’s location)--GP, OPD, A&E or Ward name—DICOM tag 0040, 2009-OrderEntererLocation
k. GP/Consultants Phone/extn number (ORC Field 14—Call back phone number)--if passed from Ordercomms only—DICOM tag –0040, 2010-OrderCallbackPhoneNumber
l. Referring Consultants/GP Institution-Use NACS Codes for GP practice or Hospital name (ORC Field 17—Enterers institution)-DICOM tag—0038,001E ScheduledPatientInstitutionResidence
m. Reason for cancellation or changing the exam—free text field reason for cancellation or changing the exam code (ORC Field 16—Order control code reason–maximum length of characters is 200) –DICOM tag--0074, 1238-ReasonForCancellation
n. PC Identification –(ORC Field 18—Entering Device)
o. Person Editing OBR4 or Cancelling the exam—(Field 19—Actioned by)

OBR Segment –Called Observation Request Segment
a. Order number—(OBR Field 2—Placer Order no)- DICOM tag—0040, 1006-PlacerOrderNumberProcedure
b. Accession no—(OBR Field 3—Filler Order no)- DICOM tags—0040, 1007 FillerOrderNumberProcedure & 0008, 0050-AccessionNumber
c. National Exam Code and description for NHS (OBR Field 4—Universal Service ID)-DICOM tag: 0008,1030-StudyDescription
d. Priority- (OBR Field 5 –Priority) -DICOM tag—0040, 1003 RequestedProcedurePriority & 0040,1009-ReportingPriority
e. Requested Date/Time (OBR Field 6)- DICOM tag—0040, 2004 IssueDateOfImagingServiceRequest
f. Radiographers completion date/time (OBR Field 8— Observation End Date/Time)—DICOM tag-0032,1050-StudyCompletionDate
g. Results Date/Time (OBR Field 22-results date/time)—DICOM tags 4008, 0100- InterpretationRecordedDate and 4008, 0101 -InterpretationRecordedTime
h. Modality (OBR Field 24-Diagnostic serv set ID)-DICOM tag: 0008,0060 —modality
i. Result status (OBR field 25–result status—Dictated, Provisional, Verified, Addendum)—DICOM tag 4008, 0212-InterpretationStatusID
j. Primary reporter—Name/ID/job-role/Specialty/Institution - (OBR field 32--Principle result interpreter) *-DICOM tag—4008, 010C-InterpretationAuthor
k. 2nd reporter- Name/ID/job-role/Specialty/Institution (OBR field 33--Assistant Results Interpreter*

l. Radiographer/Operator: Name/ID/job-role/Specialty/Institution (OBR field 34—Technician)*- DICOM tag: 0008,1070-OperatorsName
m. Transcriptionist name with job-role as per NHS Data Dictionary(OBR field 35—Transcriptionist)—DICOM tag-4008, 010A-InterpretationTranscriber
n. Scheduled Date/Time (OBR field 36—appointment date and time—same as arrival date and time for walk-in patients)—DICOM tag 0032, 1000-ScheduledStudyStartDate

*COMPOSITE DATA FIELDS:
- ORC 10—Entered by
- ORC 11—Verified by
- ORC 19—Actioned by
- OBR 32—Principle Result Interpreter
- OBR 33—Assistant Result Interpreter
- OBR 34—Technician

ORC 10, 11 and 19 and OBR 32, 33 and 34 are composite HL7 fields and should could the following data items:
- Name
- ID (for example GMC number)
- Job-role—as per NHS data dictionary
- Main specialty—as per NHS data dictionary

MULTIPLE EXAMS REQUESTED TOGETHER in ORDERCOMMS
1. All exams requested together should have a “common” Group Order number—ORC field 4—Group Placer Order no)--By Ordercomms
2. Each exam should have a unique Order number—ORC Field 2—Placer Order no--By Ordercomms
3. Each exam should be given a unique Accession number—ORC Field 3—Filler Order no--By RIS
4. When multiple exams are sent out as HL7 ORM message, they should be sent as “ORC and OBR pairs” for each exam within the order group.
5. RIS should be able to combine or separate these exams for its workflow—including scheduling, cancellation, image acquisition and reporting.
6. OBX segment (Clinical History and questions-answers) should be linked to each exam whether single or combined.
7. It should be possible to edit or cancel exams individually on both Ordercomms and RIS

Accession No (field 3 of ORC and OBR segments) and Appointment Date and time (field 36 of OBR) will be generated by RIS only as part of HL7 ORM message updates.

Cancellation Workflow and ORM Communication
An exam maybe cancelled in Ordercomms (referrers) or RIS (radiologists or radiographers during vetting)
Reason for Cancellation should be a free text field populated by person cancelling exam(Field 16 – Order Control Code Reason)
Event Trigger for cancellation should be HL7 ORM O-01 CA
ORC—19 —Actioned by –should be used for identifying the person who cancelled the exam

Vetting Workflow and HL7 ORM communications:
Many a time a requesting doctor may choose an incorrect exam.
During vetting a radiologist or radiographer may change the exam type. HL7 OBR 4 (National Exam Code and description for NHS--Field 4—Universal Service ID) is changed (sometimes this may result in OBR 24-- modality being changed too -- e.g. a CT head request is changed to MRI Head by radiologist during vetting). Edit order trigger—HL7 ORM ORC 01—XO should be sent by RIS. The following fields need to be communicated with this trigger:

- OBR 4—new exam code and description
- ORC 16—Order control code reason—free text should be used for radiologists or radiographers to document the reason for changing the exam type.
- ORC 19—Actioned by

This should then update Ordercomms with the new exam with the clinical requester being able to see why any exam has been changed.

**OBX Segment**—called observation segment. These can be multiple and repeatable. OBX is used for narrative text and can be part of both ORM and ORU messages. In the ORM message it will contain the narrative clinical history, whilst ORU will be the narrative report.

**A. OBX segment of ORM** --Radiology Request narrative information

**B. OBX segment of ORU message** ---Radiology Report narrative text

**OBX Fields** ---
Type of data —TX -text (field 2-Value type)--both ORM and ORU
Narrative clinical history in Ordercomms or narrative report from RIS (Text—length upto 65,536) (field 5—Observation value)--both ORM and ORU
Critical, significant or unexpected report (Field5—abnormal flags)--ORU only