IHE Change Proposal

Tracking information:

IHE Domain	Patient Care Devices
Change Proposal ID:	CP-PCD-097
Change Proposal Status:	Submitted
Date of last update:	2014.04.10
Person assigned:	(assigned by Domain Technical Committee)

Change Proposal Summary information:

Clarify Usage of OBX-4	
Submitter's Name(s) and e-mail address(es):	Todd Cooper <Todd@Center4MI.org>
Submission Date:	2014.03.31
Integration Profile(s) affected:	All PCD profiles that use OBX segments (e.g., DEC, ACM, IPEC, etc.)
Actor(s) affected:	All in affected profiles
IHE Technical Framework or Supplement modified:	IHE PCD TF
Volume(s) and Section(s) affected:	Volume 2, Appenedix A & B.8

Rationale for Change:

Implementors have found a lack of clarity on the normative requirements for OBX-4 content and what may vary per message source. This lack of clarity can challenge the message consumer, which may be receiving messages from multiple sources of the same device modality. Two key issues have been raised:

1. Are the values in OBX-4 for a specific device modality, information model and parameter normative? For example, if an infusion pump has a parameter, MDC_PUMP_INFUSING_STATUS, contained in the pump's "delivery" channel, will the associated OBX-4 always have a (1) in the channel slot (e.g., <mds>|<vmd>|1|<param #>)?
2. Can the OBX-4 containment values change from message-to-message, though they are sent from the same actor during a single session?

NOTE: During review of this CP at the IHE PCD 2014 Spring F2F meetings in Cleveland, it was determined that question (2) and the concept of a "session" should not be addressed by OBX-4 usage.

The changes below add clarification to the text to answer question (1) above.

Add the following section in Appendix A (before section A.1):

For example the OBX-4 for the <VS Mon> <ECG> <Ctach> <HR> would be expressed as 1.2.1.3.

NOTE: The ordinal numbers in an OBX-4 are not normative for a given parameter (identified in OBX-3) and may vary between implementations. Each OBX-4 Sub-Id must be unique within a given containment.

In OBX-2 the valid HL7 types for the mapping are NM, ST, SN, CWE, CF (String may have some implied structure)

Add the following section in Appendix B-8, OBX-4 subsection:

OBX-4 Observation Sub-ID

This field shall be used to distinguish between multiple OBX segments and represent the hierarchical (containment) relations among the segments. It does so by providing an unambiguous mapping from observation contained in the OBX segment to the IEEE 11073 containment tree for the Medical Device System sourcing the observation (See **Error! Reference source not found. Error! Reference source not found.**). For device related data this field is used to group devices hierarchically. For metric related data this field is used to associate metrics to devices hierarchically, and to each other. The dotted notation provided for in HL7 Ch7, 7.4.2.4, Fig 4 shall be used as follows: <MDS>.<VMD>.<Channel>.<Metric> [.FACET [.SUBFACET]], where the optional facet and subfacet entries are used only when specified for a particular profile, and distinguish multiple information items related to the same metric according to a specific scheme documented with the particular profile. For device related data that convey information about hierarchical levels higher than METRIC (that is, information about an MDS, VMD, or Channel), the entries in the dotted notation concerning the lower dot-levels (that is, VMD, Channel or metric levels for an MDS, channel and METRIC for a VMD, and so forth) have no meaning and this should be signified by setting them to zero). So, for information relating to the first MDS, OBX-4 should be 1.0.0.0. Receiving systems shall recognize from such trailing zeros in OBX-4 when the information applies to an MDS, VMD, or channel rather than a metric.

This scheme allows the VMD, CHAN, METRIC and FACET information to be associated with 'ancestor' information higher up in the observation hierarchy. This is especially critical for devices like infusion pumps that have multiple channels with the same METRIC level identifiers. The scheme uses simple dotted decimal numeric identifiers where each number is a nonnegative integer. These must create unique n-tuples for each OBX. (That is, each OBX in a set grouped within the scope of an OBR segment must have a distinct value of OBX-4).

The OBX-4 Sub-ID is not normative for a given metric (identified in OBX-3). For example, an OBX-4 of 1.2.3.4 is not fixed to "heart rate." If a parameter is included in multiple places within a containment (i.e., OBX-3 has the same value), the OBX-4 Sub-ID will be unique between each instance. Different systems may generate different OBX-4 identifiers for the same metric – the only requirement is that the OBX-4 uniquely identifies each instance of a metric within a containment.

The special value '0' implies an 'anonymous' placeholder for the corresponding position in the containment hierarchy, for example an unspecified VMD and/or CHAN except when the '0' is part of a sequence of trailing '0' entries signifying that the dotted notation identifies data related to an MDS, VMD, or channel rather than a metric (see above).

IEEE 11073-20601 for Personal Health Devices does not use the VMD or CHAN levels, e.g., 1.0.0.1 would be used for the observation hierarchy MDC_DEV_SPEC_PROFILE_ PULS_OXIM / ~~VMD~~ / ~~CHAN~~ / MDC_PULS_OXIM_PULS_RATE.

The values of the 'dotted notations' of the OBX segments associated with a particular OBR (forming an ORDER_OBSERVATION segment group) establish a nested hierarchical arrangement representing the containment of lower-level within higher-level constructs (for example, all metric OBXes with a dotted notation beginning with '1.2' belong to the second VMD of the first MDS). This is exploited to support a form of inheritance for time stamps (see Section **Error! Reference source not found. Error! Reference source not found.**) so that, for example,

a time stamp given in OBX-14 at the channel level applies to all metrics contained within that channel unless overridden by a time stamp in OBX-14 in the metric itself.

To facilitate processing and use of this containment hierarchy, OBX segments should be arranged in "dictionary order" of dotted notations, meaning for example that all metrics belonging to the second channel should appear together in order of their metric-level element of the dotted notation (x.y.2.1, x.y.2.2, etc.) after any metrics belonging to the first channel (x.y.1.z) and before any metrics belonging to the third channel (x.y.3.z). Similarly, all OBX segments belonging to the second VMD should be placed before those belonging to the second, and so forth. This scheme may be used for '0' values in any position simply by inserting them in the sort order before '1' values (simple numeric sort within dot position). Note that this is not a simple string sort, because of the possibility that the numbers in a particular level may be more than a single digit long (e.g., 1.11.2.3).

This ‘dictionary order’ should also be applied to device-related as well as to metric OBX segments: all MDS device-related segments for the first device should precede all VMD device-related segments for the first VMD of the first device, which in turn should precede any channel device-related segment(s) for the first channel, if any, of the first device (recall that channels are optional), and any channel segments should precede all the metric OBX segments of the first VMD and channel of the first device. The order goes to the second channel of the first VMD if any, and so on until the contents of all the channels of the first VMD have been given, then device-related segments for the second VMD, and so on in a similar fashion. (This is in effect a depth-first traversal of the 11073 “containment tree” of the objects in the device).