Update PCD-03 message definition and examples to clarify PCA/Programmed Intermittent Bolus programming

IHE Change Proposal

Tracking information:

IHE Domain	Devices (DEV)
Change Proposal ID:	CP-DEV-022
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Person assigned:	Kurt Elliason

Change Proposal Summary information:

Update PCD-03 message definition and examples to clarify PCA/Programmed Intermittent Bolus programming.	
Submitter's Name(s) and e-mail address(es):	Kurt Elliason kurt.elliason@gmail.com
Submission Date:	2025-04-22
Integration Profile(s) affected:	PCD-03
Actor(s) affected:	IOP/IOC
IHE Technical Framework or Supplement modified:	IHE_PCDTF Vol 2, dated 2024-11-04
Volume(s) and Section(s) affected:	Multiple sections in Vol 2
Rationale for Change: Change Proposal to achieve PCA PIV messaging consistency by adopting a new RXG segment-based approach for different PCA modes, like loading, continuous, and PCA dose, to align with multi-step infusions, while also considering continued support for the existing OBX-based autoprogramming method. The motivation for the RXG approach, is to resolve the confusion of the current OBX method, which necessitates zero values in the RXG segment when only a PCA or clinician bolus is present, and to overcome the existing method's limitation in specifying both a rate and a dose amount. New terms like "PCA bolus" and "intermittent bolus" will need to be added to order type enumerations for the proposed RXG approach.	

Vol 2, page 26 RXG-15 Give Rate Amount
Update line 639 to: Required for LVP and Syringe; Optional for PCA. If present for PCA, contains the basal or continuous rate value.

Vol 2, page 35 OBX-3 Observation Identifier
Starting at line 883, update table for pump programming parameters with deprecated MDC terms listed below.

Pump programming parameter

Vol 2, page 93 PCD-03 Error code
On line 2025 add the following table title.
Table B.3-2: ERR - Error Codes

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Vol 2, page 146 ORC-1 Order Control

Update description of XO to include PCA parameters and be valid for PCA

ORC-1 Value	Use
RE	Start of a new bag, bottle, or container
XO	Change of dose or rate on a currently programmed infusion. (not valid for PCA)
CH	Program a bolus from an existing infusion

Vol 2, starting at page 185 E.2 Examples of transaction [PCD-03]: Communicate Infusion Order

Add a new section:

E.2.5 PCA/Intermittent Bolus Messages

When sending an order that contains multiple delivery mode to an infusion pump, multiple RXG segments can be used for the different delivery modes.

Each RXG segment contains an OBX with a unique *MDC_INFUS_ORDER_TYPE* identifying the delivery mode. When there is no RXG for an order type, that mode should not be used in the therapy.

continuous
pca-dose
loading-dose
clinician-dose
intermittent-dose

The first RXG segment must contain the pump identifier in the VMD (MDC_DEV_PUMP_INFUS_VMD) and the patient specific details such as weight, height, BSA etc. The first RXG segment would contain any device level lockouts such as an OBX for MDC_TIME_PD_PCA_LOCKOUT.

A PCA dose segment will also include an OBX for MDC_TIME_PD_PCA_LOCKOUT.
It may also include OBX's for MDC_TIME_PD_PCA_DOSE_LIMIT and MDC_DOSE_PCA_LIMIT if there is a time based delivery limit or MDC_RATE_PCA_MAX_PATIENT_DOSES_PER_HOUR if there is a limit on the number of PCA doses allowed.

An intermittent dose segment must contain an OBX for MDC_TIME_PD_DOSE_START_INTERVAL and may contain an OBX for MDC_TIME_PROG_NEXT_DOSE.

Example 1

Update PCD-03 message definition and examples to clarify PCA/Programmed Intermittent Bolus programming

Order #12345 for Patient ID 98765 (John Doe), premixed Ropivacaine 2%, to be infused using multiple delivery modes, Pump ID A0001, administered by nurse N0001.

1. *Loading dose (initial bolus)*
2. *Patient dose (PCA dose, patient bolus)*
3. *Lockout interval (lockout time)*
4. *Dose limit (PCA doses per hour)*
5. *Zero Continuous rate (basal rate)*

```
MSH|^~\&|IOPVENDOR^1234560000000001^EUI-64|IOPVENDOR|IOCVENDOR^654321000000000
1^EUI-64|IOCVENDOR|200801011234560600||RGV^O15^RGV_O15|1|P|2.8|||AL|AL||ASCII|
EN^English^ISO659||IHE_PCD_RGV_O15^IHE PCD^1.3.6.1.4.1.19376.1.6.1.3.1^ISO
PID|||98765^^^IHE^PI||Doe^John^^^^L||19660101000000-0600|M
ORC|RE|12345|||||||||||||||N0001
RXG|1|||1234^ ROPivacaine
0.2%^Rx|5||263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM|||||||175|265266^MDC_DIM_MIL
LI_L_PER_HR^MDC^mL/hr^mL/hr^UCUM|||||||
||||||||100|263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM
RXR|^IV^HL70162||^IVP^HL70164|^IV^HL70165
OBX|1||69986^MDC_DEV_PUMP_INFUS_VMD^MDC|0.1.1.0|||||||F|||||||A0001^^654321000
0000001^EUI-64
OBX|2|NM|68063^MDC_ATTR_PT_WEIGHT^MDC|0.1.1.1|81.6|263875^MDC_DIM_KILO_G^MDC||
|||F
OBX|3|NM|68060^MDC_ATTR_PT_HEIGHT^MDC|0.1.1.2|200|263441^MDC_DIM_CENTI_M^MDC|||
||F
OBX|4|NM|188744^MDC_AREA_BODY_SURF_ACTUAL^MDC|0.1.1.3|2.13|263616^MDC_DIM_SQ_X_
M^MDC|||||F
OBX|5|ST|158038^MDC_INFUS_ORDER_TYPE^MDC|0.1.1.4|loading-dose


RXG|2|||1234^ ROPivacaine
0.2%^Rx|5||263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM|||||||175|265266^MDC_DIM_MIL
LI_L_PER_HR^MDC^mL/hr^mL/hr^UCUM|||||||
||||||||100|263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM
RXR|^IV^HL70162||^IVP^HL70164|^IV^HL70165
OBX|7|ST|158038^MDC_INFUS_ORDER_TYPE^MDC|0.1.2.1|pca-dose
OBX|8|NM|157989^MDC_TIME_PD_PCA_LOCKOUT^MDC|0.1.2.2|30|264352^MDC_DIM_MIN^MDC
|||||F
OBX|9|NM|157988^MDC_RATE_PCA_MAX_PATIENT_DOSES_PER_HOUR^MDC|0.1.2.3|2|264704^MD
C_DIM_PER_HR^MDC|||||F
```

Example 2

Order #12345 for Patient ID 98765 (John Doe), premixed Ropivacaine 2%, to be infused using multiple delivery modes, Pump ID A0001, administered by nurse N0001.

1. *Clinician dose (predefined clinician bolus)*
2. *Patient dose (PCA dose, patient bolus)*

2a. *Lockout interval (lockout time)*

2b. *Dose limit (Delivery limit per x hours)*

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3. *Continuous rate (basal rate)*
4. *Programmed Intermittent Bolus*

```
MSH|^~\&|IOPVENDOR^1234560000000001^EUI-64|IOPVENDOR|IOCVENDOR^654321000000000
1^EUI-64|IOCVENDOR|20080101123456060O||RGV^O15^RGV_O15|1|P|2.8|||AL|AL||ASCII|
EN^English^ISO659||IHE_PCD_RGV_O15^IHE PCD^1.3.6.1.4.1.19376.1.6.1.3.1^ISO
PID|||98765^^^IHE^PI||Doe^John^^^^L||19660101000000-0600|M
ORC|RE|12345|||||||||||||||N0001
RXG|1|||1234^ ROPivacaine
0.2%^Rx|5||263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM|||||||175|265266^MDC_DIM_MIL
LI_L_PER_HR^MDC^mL/hr^mL/hr^UCUM|||||||
||||||||100|263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM
RXR|^IV^HL70162||^IVP^HL70164|^IV^HL70165
OBX|1||69986^MDC_DEV_PUMP_INFUS_VMD^MDC|0.1.1.0|||||||F|||||||A0001^^654321000
0000001^EUI-64
OBX|2|NM|68063^MDC_ATTR_PT_WEIGHT^MDC|0.1.1.1|81.6|263875^MDC_DIM_KILO_G^MDC||
|||F
OBX|3|NM|68060^MDC_ATTR_PT_HEIGHT^MDC|0.1.1.2|200|263441^MDC_DIM_CENTI_M^MDC|||
||F
OBX|4|NM|188744^MDC_AREA_BODY_SURF_ACTUAL^MDC|0.1.1.3|2.13|263616^MDC_DIM_SQ_X_
M^MDC|||||F
OBX|5|ST|158038^MDC_INFUS_ORDER_TYPE^MDC|0.1.1.4|clinician-dose

RXG|2|||1234^ ROPivacaine
0.2%^Rx||||||||||5|265266^MDC_DIM_MILLI_L_PER_HR^MDC^mL/hr^mL/hr^UCUM|||||||
||||||||100|263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM
RXR|^IV^HL70162||^IVP^HL70164|^IV^HL70165
OBX|6|ST|158038^MDC_INFUS_ORDER_TYPE^MDC|0.1.2.1|continuous

RXG|3|||1234^ ROPivacaine
0.2%^Rx|5||263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM|||||||175|265266^MDC_DIM_MIL
LI_L_PER_HR^MDC^mL/hr^mL/hr^UCUM|||||||
||||||||100|263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM
RXR|^IV^HL70162||^IVP^HL70164|^IV^HL70165
OBX|7|ST|158038^MDC_INFUS_ORDER_TYPE^MDC|0.1.3.1|pca-dose
OBX|8|NM|157989^MDC_TIME_PD_PCA_LOCKOUT^MDC|0.1.3.2|30|264352^MDC_DIM_MIN^MDC
|||||F
OBX|9|NM|157987^MDC_TIME_PD_PCA_DOSE_LIMIT^MDC|0.1.3.3|1|264384^MDC_DIM_HR^MDC|
||||F
OBX|10|NM|157985^MDC_DOSE_PCA_LIMIT^MDC|0.1.3.4|14|263762^MDC_DIM_MILLI_L^MDC||
|||F|


RXG|4|||1234^ ROPivacaine
0.2%^Rx|4||263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM|||||||175|265266^MDC_DIM_MIL
LI_L_PER_HR^MDC^mL/hr^mL/hr^UCUM|||||||
||||||||100|263762^MDC_DIM_MILLI_L^MDC^mL^mL^UCUM
RXR|^IV^HL70162||^IVP^HL70164|^IV^HL70165
OBX|12|ST|158038^MDC_INFUS_ORDER_TYPE^MDC|0.1.4.1|intermittent-dose
OBX|13|NM|157998^MDC_TIME_PD_DOSE_START_INTERVAL^MDC|0.1.4.2|60|264352^MDC_DIM_
MIN^MDC|||||F
```

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OBX|14|NM|158025^MDC_TIME_PROG_NEXT_DOSE^MDC|0.1.4.3|10|264352^MDC_DIM_MIN^MDC|
||||F
```