Dialysis Machine HL7 Implementation Guidelines

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Revision History

Version	Change Description	Date
1.0	Initial Release	January 2020
2.0	Added appendix summarizing HL7 Batch Protocol for capturing an entire treatment Added support for multiple filters during a treatment Added description of IEEE private terms for supporting manufacturer specific data. Added support for open-ended treatments that have to specific terminating conditions. Clarified the support for two types of reported alarms/alerts. The guide now supports the IEEE events and the original proposed Boolean values.	October 2020
3.0	Changed "MDCX" to "MDC". Added IEEE Reference IDs	January 2021
3.1	Expanded Patient Identification Section to include IHE PDQ Transaction. Added Prescription Transfer Section. Added Prescription Objects Added Usage Column for all objects.	January 2023
4.0	Added Message Transport section. Added note to alarm limit range report that limits can be fixed or machine generated.	March 2023
5.0	Added support for Peritoneal Dialysis.	January 2025

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1 Introduction & Scope

1.1 Purpose

The Dialysis Machine Implementation Guide is a messaging specification intended to standardize the electronic reporting of patient, clinical, and machine data to electronic health record (EHR) systems and/or electronic medical record (EMR) systems found in most care settings today. The goal of this specification is to provide an applicable set of data definitions and structures that can be adopted as a worldwide industry standard, thereby obviating the need for proprietary solutions for dialysis healthcare interoperability.

1.2 Audience

The standards defined in this guide are intended for use by data exchange systems found in Renal Care groups listed below:

- Renal Care Providers
- Dialysis System Manufacturers
- Other groups or agencies that employ a dialysis machine to EHR/EMR interface

1.3 Scope

This specification covers the reporting of acute and chronic hemodialysis and peritoneal dialysis treatments to the EMR and the receipt of dialysis prescription information from the EMR.

1.4 Assumptions

This document assumes that the user is familiar with the HL7 v2.6 standard as well as the IHE PCD and IHE ITI specifications.

1.5 Conventions

1.5.1 Other Standards

This specification is primarily based on the Integrating the Healthcare Enterprise (IHE), Patient Care Device (PCD) technical framework and IT Infrastructure (ITI) Technical Framework, which is based on a profile as defined in the Health Level 7 (HL7)'s v2.6 Normative Standard. A message profile is an unambiguous specification of an HL7 message type intended for a particular use case, as defined in Section 2.B of the HL7 v2.6 Standard. Additionally, the message structures and terminology are based on the ISO/IEEE 11073 Standard for Medical Device Communication.

An HL7 message profile defines both the *dynamic* aspects of information interchange (i.e., the systems that participate in such interchanges and the real-world events that trigger messaging) as well as the *static* aspects of messaging (i.e., the structure and contents of the electronic messages that are exchanged).

The IHE Patient Care Device Technical Framework uses an information model and a nomenclature from the IEEE 11073. The information model is defined in ISO/IEEE 11073- 10201 Health Informatics – Point-of-care medical device communication – Part 10201: Domain Information Model. The nomenclature is defined in ISO/IEEE 11073-10101 Health Informatics – Point -of-care medical device communication – Part 10101: Nomenclature. Familiarity with these standards is necessary for implementers of the Device Observation Reporter and Device Observation Consumer Actors.

HL7 V2.6 Chapter 7 Observation Reporting defines the general HL7 syntax and coding requirements related to observation reporting, used for PCD data communications in the PCD TF. Familiarity with HL7 Chapter 7 is necessary for implementers of the PCD TF transactions.

This PCD Technical Framework specifies conventions that are used to represent the information model hierarchy for medical devices embodied in the IEEE 11073 Domain Information Model within the syntactic

and semantic conventions of HL7 v. 2.6

The values reported in the observations should be the value as shown to the user on the device. The purpose of this is to create a run sheet that could be referenced back to events as seen by the users. As such, sampling rates, average methods, or other mathematical manipulations of signals is beyond the scope of this standard. Likewise, logic for initiating or terminating events is not defined in this standard. Since these items may vary between manufacturers or machines, if this information is relevant to understanding the reported data, it should be disclosed in the manufacturer's technical documentation.

The IHE IT Integration Technical Framework identifies a subset of the functional components of the healthcare enterprise, called IHE actors, and specifies their interactions in terms of a set of coordinated, standards-based transactions. The Framework offers a common language that healthcare professionals and vendors can use to discuss integration needs of healthcare enterprises and the integration capabilities of information systems in precise terms. Integration Profiles specify implementations of standards that are designed to meet identified clinical needs.

This implementation guide uses the IHE Patient Demographics Query (PDQ) for retrieving information about the dialysis patient. The information includes first name, last name, date of birth, gender, and medical record number. This information is used when requesting prescription information from the EMR.

This implementation guide creates a new query based upon the HL7 Query By Parameter/Segment Pattern Response model. The dialysis machine sends patient identifying information to the EMR which in turn responds with parameters needed to perform the dialysis treatment specific to the patient.

1.5.2 Usage/Cardinality

Optionality (aka. Usage) is defined as one of the values in the following table.

Usage Values

Value	Description
B	Left for backwards compatibility.
C	Conditional
CE	Conditional but maybe empty.
O	Optional
R	Required
RE	Required but maybe Empty. The field or data type component description must stipulate when the field or data type component may be empty.
W	Withdrawn
X	Not used

The following rules are used when converting usage to cardinality.

1. Any object listed as Mandatory will have a cardinality of "1..X". Where X is the maximum number possible or "N" if the number is unlimited/unknown.
2. Any object listed as Optional will have a cardinality of "0..X".
3. Any object listed as Conditional will have a cardinality of "0..X". If the condition is TRUE then the effective cardinality is "1..X". If the condition is FALSE then the effective cardinality is "0..0".
4. If a channel is conditional and the condition is FALSE, then none of the channel's metrics will be present regardless of their MOC/cardinality. This is another way to say cardinality scope applies within the parent container.
5. Metric should not be listed as conditional unless their condition is different from the channel's condition.

1.5.3 Object Reference Identifiers

This standard defines objects to support a wide range of dialysis machines and therapies. Each object is assigned an IEEE 11073 Reference Identifier or Ref ID for short. Although the number of objects is large it is not exhaustive. If there is a need to capture an object that is not defined, 11073 Private Terms may be used. 11073 Terms consists of a Partition and Term Code. The Term is equal to Partition*2^{16} + Term Code. Private metrics are placed in partition 2 and private events are placed in partition 3. Private Terms use Term Codes that are in the range of 0xF000 to 0xFFFF. For Dialysis Machine Private Metrics, these values are in the range of 2:0xF000 and 2:0xFFFF. For example, a manufacturer that needed to define a term for a Blood Warmer Settings could use the following:

192548^MDCACME_BLOOD_TEMP_SETTING^MDC

The value 129548 is partition 2 and item 0xF024.

Text based REFID should be descriptive and unique enough to allow the manufacturer to be identified. For example, "MDCACME".

It is the responsibility of the manufacturer to disclose the meaning of any private terms that they report if they are needed by an external entity.

1.6 Referenced Standards

Ref	Title
[1]	IHE Patient Care Device, Technical Framework Volume 1 - Profiles, Rev 9.0 – Final Text, December 12, 2019
[2]	IHE Patient Care Device, Technical Framework Volume 2 - Transactions, Rev 9.0 – Final Text, December 12, 2019
[3]	IHE Patient Care Device, Technical Framework, Volume 3 – Sematic Content, Rev 9.0 – Final Text, December 12, 2019
[4]	IHE IT Infrastructure (ITI) Technical Framework Volume 1 - Integration Profiles, Rev 14.0, July 21, 2017
[5]	HL7 v2.6 Normative Standard, October 2007
[6]	ISO/IEEE 11073-10101R Health informatics – Point-of-care, Medical Device Communication – Part 10101: Nomenclature, 2020
[7]	ISO/IEEE 11073-10201 Health informatics – Point-of-care, Medical Device Communication – Part 10201: Domain information model, First Edition, 2004-12-15
[8]	ISO/IEEE 11073-10101R Health informatics – Point-of-care, Medical Device Communication – Part 10101b: Nomenclature, 2023
[9]	ISO/IEEE 11073-10301 Health informatics – Point-of-care, Medical Device Communication – Part 10201: Domain information model, First Edition, 2004-12-15
[10]	ISO/IEEE 11073-20101 Health informatics – Point-of-care, Medical Device Communication – Part 20101: Application Profiles – Base Standard, First Edition, 2004-12-15

1.7 Glossary

DEV: An IHE domain formed to address the integration of medical devices into the healthcare enterprise.
DOC: Device Observation Consumer
DOR: Device Observation Reporter
HD: Hemodialysis
IHE: Integrating the Healthcare Enterprise – An initiative by healthcare professionals and

industry to improve the way computer systems in healthcare share information.
ITI: Information Technology Infrastructure
MDS: Medical Device System
MDC: Medical Device Communications
MLLP: Minimal Lower Layer Protocol – is used for transferring HL7 messages over Ethernet. It defines delimiters which identify the beginning and ends of the HL7 message.
MRN: Medical Record Number
PCD: Patient Care Device – An IHE DEV Program formed to address the integration of medical devices into the healthcare enterprise.
PD: Peritoneal Dialysis
VMD: Virtual Medical Device
UOM: Unit of Measure
CARD: Cardinality

2 Time Synchronization

The data reported by a dialysis machine must be reconcilable with data from other parts of the health care enterprise. For this to occur, time must be synchronized between the machines involved in the transactions. To this end, dialysis machines compliant with this standard will use the IHE Consistent Time (CT) Protocol. The Consistent Time Profile specifies the use of the Network Time Protocol (NTP) defined in RFC1305.

3 Message Transport

It is not the intent of this standard to specify the manner in which messages are transported.

That said, the default and minimal transport for messages is the HL7 defined “Minimum Lower Layer Protocol” (MLLP) for sending unencrypted HL7 messages over a TCP/IP connection without additional security provisions. MLLP is widely used at IHE Connectathons and other test venues. It is frequently used for “behind the hospital firewall” Local Area Network (LAN)installations or when using Virtual Private Networks (VPNs) or other security solutions provided by the vendor, customer or third party solution over public networks.

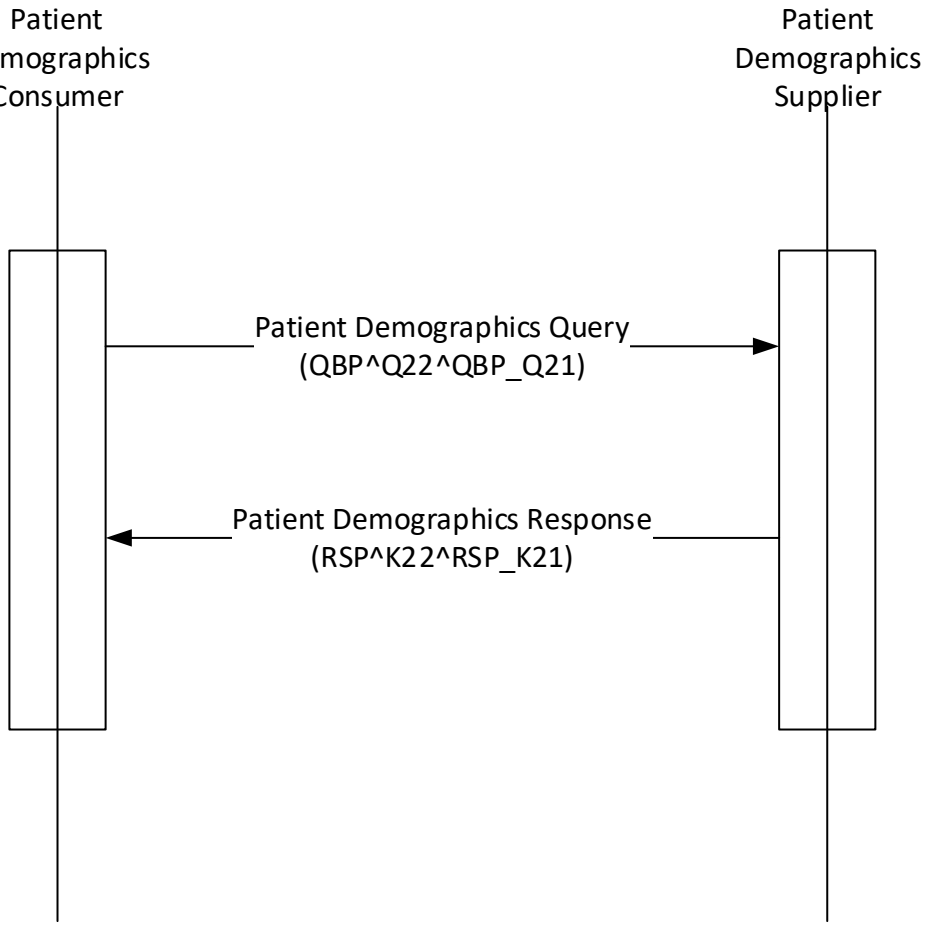
There are other means that could be used for transferring messages. Regardless of the transport method, it is critical that security considerations be taken into account.

4 Patient Identification

4.1 Overview

Patient Identification is perhaps the most essential infrastructural component of any interoperability and communication process, particularly when prescriptions are downloaded from the EMR. It is the key element in medical device, communication, data analysis, reporting and record keeping. Automation of the entry of patient identification to patient care device has the potential for improving throughput, reducing errors, increasing safety and device and drug effectiveness, and efficiency. It is strongly recommended that implementations use IHE Patient Demographics Query (PDQ) Integration Profile compliant transactions for acquisition of a unique Patient Identification. Other mechanisms such as bar code or RFID are also valid alternatives or complements. Examples of Patient Identifiers include Medical Record Number (MR), Person Number (PN), and Social Security Number (SS).

Figure 1 – Patient Demographics Query [ITI-21]



There are 6 use cases that are specifically identified.

Case #1 – Patient Identifier Scanned by Dialysis Machine from Wrist Band

In the case where the Dialysis Machine can scan the Patient Identifier from a wrist band then no further verification activities are needed. This is based on the precedent set by infusion pump manufacturers.

Case #2 – Patient Identifier Scanned from Something other than Wrist Band

There may be cases where some other means of obtaining the Patient Identifier is performed. An example would be an ID card containing a photo of the patient and a barcode containing the Patient Identifier. In this case, the caregiver can verify the link between the artifact used to identify the patient. If this link can be established, then the scanned Patient Identifier could be used with no further verification.

Case #3 – Patient Demographics Loaded from External Device

In this case the patient demographics are loaded from some external device such as a memory card or USB stick. Once the demographics are loaded, this use case is identical to the one in which demographics are manually entered by the caregiver.

Case #4 – Patient Identifier Manually Entered by Caregiver

In the case where the care giver enters the Patient Identifier into the machine manually, the system must verify that no mistake was made. In this case the dialysis machine uses a PDQ transaction to get the demographics information, first name, last name, gender, and date of birth, from the EMR. The dialysis machine displays this information to the user so that they can confirm that the entered Patient Identifier matches the patient.

Case #5 – Patient Demographics Manually Entered by Care Giver

In the case where no Patient Identifier is known, the care giver manually enters the first name, last name, gender, and date of birth. This information is sent to the EMR in a PDQ transaction. The EMR returns a list of matching patients. The user must choose from this list of patients to get the correct Patient Identifier.

Case #6 – No Patient Demographics or Patient Identifier is Available

If no information is available to identify the patient, then the dialysis machine will report the Machine Model and Serial Number as the Patient Identifier. If this is done, then the patient prescription cannot be loaded from the EMR.

4.2 Message Structure

4.2.1 Patient Demographics Query

In the Patient Demographics Query, the Dialysis Machine provides the search criteria for the desired patient.

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
QPD	Query Parameter Definition	R	[1..1]
RCP	Response Control Parameters	R	[1..1]
[DSC]	Continuation Pointer	X	[0..0]

The dialysis machine use of this message does not deviate from the IHE Standard.

For simplicity, this implementation guide specifies use of a Single Domain Patient Demographics Supplier (See IHE ITI Technical Framework Vol 2x, Appendix M). Therefore, Receiving Application (MSH-5) and Receiving Facility (MSH-6) are left blank.

4.2.2 Patient Demographics Response

The EMR replies to the Patient Demographics Request with a Patient Demographics Response. This message will contain 0 or more PIDs segments containing information about the patients matching the criteria specified in the query.

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
MSA	Message Acknowledgment	R	[1..1]
[{ERR}]	Error		
QAK	Query Acknowledge	R	[1..1]
QPD	Query Parameter Definition	R	[1..1]
[{		O	[0..1]
PID	Patient Identifier	O	[0..1]
[PD1]			
[QRI]			
}]			
[DSC]	Continuation Pointer	X	[0..0]

The dialysis machine use of this message does not deviate from the IHE Standard.

Upon receiving the response, the dialysis machine shall verify the following items:

- The Control ID (MSA-2) in the response matches the Control ID (MSH-10) in the request.
- The Query Tag (QAK-1) in the response matches the Query Tag (QPD-2) in the request.

- The Query Name (QAK-3) in the response matches the Query Name (QPD-1) in the request.
- If the dialysis machine does not support continuation, then Hits Remaining (QAK-6) in the response must be 0.

4.3 Sample Messages

4.3.1 Example 1 – Query using Medical Record Number

The query is for the patient with a medical record number of 555444222111.

```
MSH|^~\&|ACME Dialysis Machine^00059AFFFE3C7A00^EUI-
64||||20220412083123000||QBP^Q22^QBP_Q21|20220412083123173|P|2.6|||AL|NE|||||
QPD|IHE PDQ Query|20220412083123174|@PID.3^555444222111^^^^MR
RCP|I||R|
```

4.3.2 Example 2 – Query Response with No Matches

This response to the query for medical record number 555444222111 returns no data.

```
MSH|^~\&|||ACME Dialysis Machine^00059AFFFE3C7A00^EUI-
64||20220412083123000||RSP^K22^RSP_K21|20220412083123174|P|2.6|||NE|NE|||||
MSA|AA|20220412083123173
QAK|20220412083123174|NF|IHE PDQ Query|0|0|0
QPD|IHE PDQ Query|20220412083123174|@PID.3^555444222111^^^^MR
```

4.3.3 Example 3 – Query using First Name and Last Name

The query is for patient John Smith.

```
MSH|^~\&|ACME Dialysis Machine^00059AFFFE3C7A00^EUI-
64||||20220412083123000||QBP^Q22^QBP_Q21|20220412083123138|P|2.6|||AL|NE|||||
QPD|IHE PDQ Query|20220412083123153|@PID.5.1^Smith~@PID.5.2^John
RCP|I||R|
```

4.3.4 Example 4 – Query Response with Multiple Matches

This request for all patients named John Smith returns two patients, one born in 1964 and the other in 2000.

```
MSH|^~\&|||ACME Dialysis Machine^00059AFFFE3C7A00^EUI-
64||20220412083123000||RSP^K22^RSP_K21|20220412083123170|P|2.6|||NE|NE|||||
MSA|AA|20220412083123138
QAK|20220412083123153|OK|IHE PDQ Query|2|2|0
QPD|IHE PDQ Query|20220412083123153|@PID.5.1^Smith~@PID.5.2^John
PID|||555444222111^^^^MR||Smith^John^^^^^U||19640306
PID|||555444999999^^^^MR||Smith^John^^^^^U||02000921
```

4.3.5 Example 5 – Query using Person Number

The query is for the patient with a person number of 010199-000H.

```
MSH|^~\&|ACME Dialysis Machine^00059AFFFE3C7A00^EUI-
64||||20220412083123000||QBP^Q22^QBP_Q21|20220412083123173|P|2.6|||AL|NE|||||
QPD|IHE PDQ Query|20220412083123174|@PID.3^010199-000H^^^^PN
RCP|I||R|
```

5 Prescription Transfer

5.1 Overview

Prescription information is retrieved from the EMR using a custom query that aligns with the HL7 Query By Parameter with a Segment Pattern Response (QBP/RSP). The dialysis machine provides the patient's MRN and the EMR returns a series of OBX records containing the parameters that define the therapy. The parameters in the response are grouped hierarchically following the containment models defined in Section 9.2 and 10.2. Which parameters may be returned are defined by the Rx Use column inTable 2 and Table 4.

Although it is unlikely, it is possible that a patient may have more than one active prescription in the EMR. This could occur when a patient that normally performs dialysis in a home setting is admitted to the hospital for some condition. In this case, the hospital prescription could be different than the home prescription. The dialysis machine expects the EMR to send back one and only-one prescription. It is up to the EMR to decide what is the appropriate prescription to send to the dialysis machine. If the EMR is unable to select a single prescription it should send back an error code in the Dialysis Prescription Response's ERR Segment.

Any setting value that is sent from the EMR to the Dialysis Machine will be sent back in the PCD-01 messages. If the value remains unchanged from the value sent from the EMR, the setting will be identified as a Remote Setting (RSET) in the corresponding OBX-17 field. If a value is changed by the user, this field will change to Manual Setting (MSET). If the setting changes because of internal algorithms within the Dialysis Machine, the OBX-17 field will be Automatic Setting (ASET). Once a remote setting changes to a manual or automatic setting, it will not return to a remote setting even if the user or system returns it to its original value.

5.2 Message Structure

5.2.1 Dialysis Prescription Query

The dialysis prescription query is used by the dialysis machine to request a prescription for a particular MRN from the EMR.

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
QPD	Query Parameter Definition	R	[1..1]
RCP	Response Control Parameters	R	[1..1]
[DSC]	Continuation Pointer	X	[0..0]

QPD-1 Message Query Name

The name of the query shall be the CWE "MDC_HDIALY_RX_QUERY^Hemodialysis Prescription Query^MDC" for a Hemodialysis Prescription and "MDC_PDIALY_RX_QUERY^Peritoneal Dialysis Prescription Query^MDC" for a Peritoneal Dialysis Prescription. The EMR system copies this value into the QAK-3 filed in the response.

QPD-2 Query Tag

The dialysis machine will populate the Query Tag field with an identifier that uniquely identifies this query for the dialysis machine. It does not need to be globally unique. A simple method would be to use a timestamp in the format of "YYYYMMDDHHMMSSZZZ" where "ZZZ" is milliseconds. Assuming no more than one query is sent every millisecond this format will result in a unique value. The EMR system copies this value into the QAK-1 field in the response.

QPD-3 User Parameters

The Dialysis Prescription Query specifies parameters in the same manner as the IHE PDQ message. Initially,

only the MRN field will be included but using this format allows for future expansion.

5.2.2 Dialysis Prescription Response

The EMR responds to a Dialysis Prescription Query with a Dialysis Prescription Response. The response contains the current prescription for the patient with the MRN specified in the query.

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
MSA	Message Acknowledgment	R	[1..1]
[{ERR}]	Error		
QAK	Query Acknowledge	R	[1..1]
QPD	Query Parameter Definition	R	[1..1]
[{		O	[0..1]
ORC	Common Order Segment	O	[0..1]
OBX	Observation Results	O	[0..N]
}]			
[DSC]	Continuation Pointer	X	[0..0]

Upon receiving the response, the dialysis machine shall verify the following items:

- The Control ID (MSA-2) in the response matches the Control ID (MSH-10) in the request.
- The Query Tag (QAK-1) in the response matches the Query Tag (QPD-2) in the request.
- The Query Name (QAK-3) in the response matches the Query Name (QPD-1) in the request.
- The MRN (QPD-3) in the response matches the MRN (QPD-3) in the request.

In cases where the dialysis machine receives a valid Dialysis Prescription Response, but the machine is unable to meet all of the parameters contained in the response, the dialysis machine has several options.

Option 1 – The dialysis machine may discard the prescription in its entirety. Either the treatment is not performed, or the caregiver manually enters the prescription. This is no different than performing a treatment without requesting the prescription. In this case, the Filler Order Number (OBR-3) reported in the PCD-01 Status Messages will be empty.

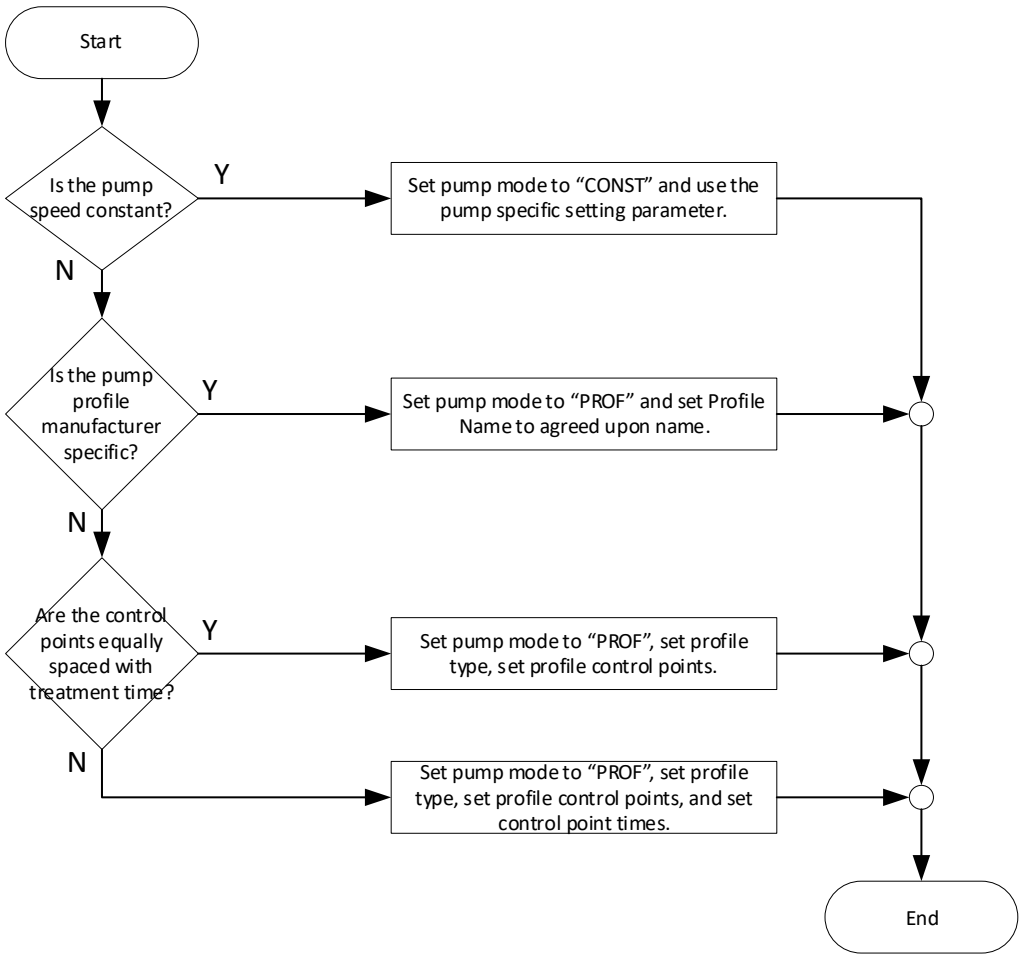
Option 2 – The caregiver can use the Ordering Provider (ORC-12) or Call back Phone Number (ORC-14) to request an updated prescription. In this case, the treatment is delayed. The Filler Order Number (OBR-3) reported and setting parameters in the PCD-01 Status message will match the Filler Order Number (ORC-3) and parameters specified in the Dialysis Prescription Response.

Option 3 – The caregiver can accept the parameters from the prescription that can be performed by the dialysis machine. They can manually override parameters that do not align with the specific dialysis machine. In this case, the Filler Order Number (OBR-3) in the PCD-01 Status message will match Filler Order Number (ORC-3) in the Dialysis Prescription Response but the setting parameters may differ.

5.3 Profile Representation

Dialysis machines support two modes of pump operation, constant speed and profiled speed. For constant speed, the pump always runs at the same speed when it is running. For profiled speed, the speed of the pump changes depending on phase of the treatment. The mechanism used to transfer the prescription from the EMR to the dialysis machines needs to support both modes of operation.

Figure 2 –Profile Flow Chart



The following table identifies the possible profiles in a prescription.

Pump	Mode Parameter	Constant Speed Parameter
Blood	N/A because blood pump does not support profiled speed.	MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_SETTING
Dialysate	MDC_HDIALY_DIALYSATE_FLOW_MODE	MDC_HDIALY_DIALYSATE_FLOW_RATE_SETTING
Post-Filter Substitution (RF) Fluid	MDC_HDIALY_RF_FLOW_MODE	MDC_HDIALY_RF_POST_FILTER_FLOW_RATE_SETTING
Pre-Filter Substitution (RF) Fluid	MDC_HDIALY_RF_FLOW_MODE	MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE_SETTING
Ultra Filtration	MDC_HDIALY_UF_MODE	MDC_HDIALY_UF_RATE_SETTING
Anticoagulant	MDC_HDIALY_ANTICOAG_MODE	MDC_HDIALY_ANTICOAG_INFUS_RATE_SETTING
Sodium	MDC_HDIALY_DIALYSATE_CONC_NA_MODE	MDC_HDIALY_DIALYSATE_CONC_NA_SETTING

The dialysis machine can represent two types of profiles. The first is a manufacturer specific profile. In this type

of profile, the details of the profile are specific to a particular manufacturer. The second type of profile is a generic profile. The Implementation Guide supports 4 type of generic profiles, Constant, Linear, Exponential, and Step. For a generic profile the parameters of the profile are specified as Facet Level 5 objects of the Mode Parameter.

ID	Object Name	Description
1	MDCX_HDIALY_PROFILE_TYPE	Contains the type of the profile. This will be VENDOR, CONSTANT, LINEAR, EXPONENTIAL, or STEP.
2	MDCX_HDIALY_PROFILE_VALUE	Contains the control points of the profile. The control points are a numeric array. For a constant profile there is only one point. For a linear or exponential profile there are two points, one for the starting value and one for the ending value. For step profile there is one value for each step.
3	MDCX_HDIALY_PROFILE_TIME	This parameter is optional. If it is not present, the control points are assumed to be equally space across the total treatment time. If it is present, it is an array of numerical values that are the treatment times at which a control point takes effect.
4	MDCX_HDIALY_PROFILE_EXP_HALF_TIME	This parameter is optional and only applies to the Exponential Profile. It specifies the time at which 50% of the change has been complete.
5	MDCX_HDIALY_PROFILE_NAME	This parameter is optional and only applies to the Vendor Profile. It uniquely identifies the profile.

5.3.1 Vendor Profile

In Vendor Profile, the details of the profile are specific to a particular manufacturer. The profile is identified using the MDCX_HDIALY_PROFILE_NAME object and consists of three components, Manufacturer, Model, and Name. The Manufacturer is a string that uniquely identifies the maker of the dialysis machine. Model is the model of the dialysis machine. If the profile is universal across a manufacturer's product line, then this field may be left blank. For example, "FMC^^Profile 1" or "NxStage^SystemOne^Gentle". It is the manufacturer's responsibility to make sure that these profile identifiers are compatible or unique across device models and software versions. When a manufacturer specific profile is used, it is imperative that this profile be clearly defined. The best way of accomplishing this is by defining the profile in the device's instructions for use.

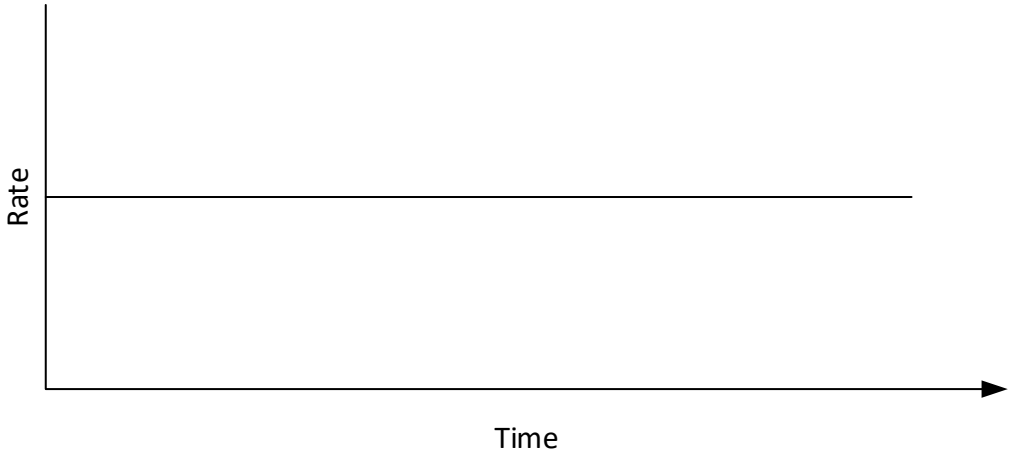
The segments below represent a B-Braun Dialog+ UF Profile 2. Note, to profile name is provided for example only and may not represent an actual profile.

```
OBX|66|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.4.27|PRO-WOT||||||F
OBX|67|ST|0^MDCX_HDIALY_PROFILE_TYPE^MDC|1.1.4.27.1|VENDOR||||||F
OBX|68|NA|0^MDCX_HDIALY_PROFILE_NAME^MDC|1.1.4.27.2|BBRAUN^DIALOGPLUS^UF1||||||F
```

5.3.2 Constant Profile

A constant profile starts at one level and stays at this level for the course of the treatment. A constant profile could also be represented as a linear or exponential profile where the starting and ending values are the same or as step profile with only a single step.

Figure 3 – Constant Profile



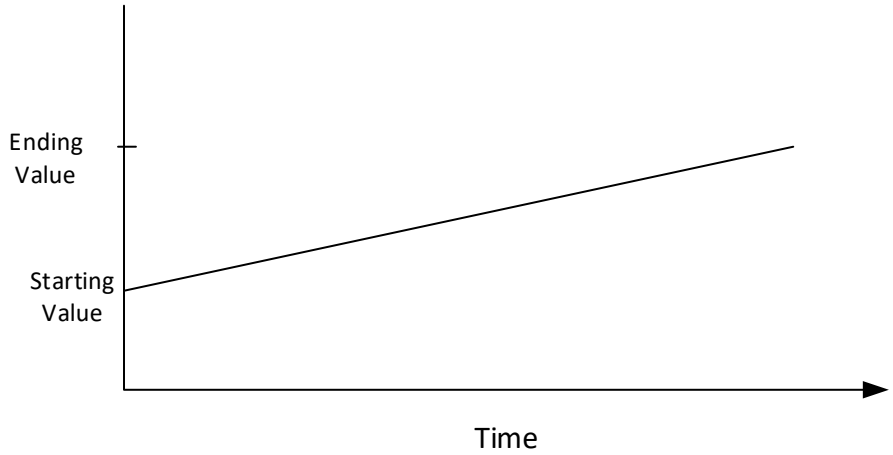
The segments below represent a constant UF profile of 10 ml/hour.

```
OBX|66|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.4.27|PRO-WOT||||||F
OBX|67|ST|0^MDCX_HDIALY_PROFILE_TYPE^MDC|1.1.4.27.1|CONSTANT||||||F
OBX|68|NA|0^MDCX_HDIALY_PROFILE_VALUE^MDC|1.1.4.27.2|10|ml/h^milliliter per||||||F
```

5.3.3 Linear Profile

A linear profile starts at one level and linearly changes to another level.

Figure 4 –Linear Profile



The segments below define a linear profile that starts at 10 ml/hour and ends at 60 ml/hour.

```
OBX|66|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.4.27|PRO-WOT||||||F
OBX|67|ST|0^MDCX_HDIALY_PROFILE_TYPE^MDC|1.1.4.27.1|LINEAR||||||F
OBX|68|NA|0^MDCX_HDIALY_PROFILE_VALUE^MDC|1.1.4.27.2|10^30|ml/h^milliliter per hour^UCUM|||||F
```

5.3.4 Exponential Profile

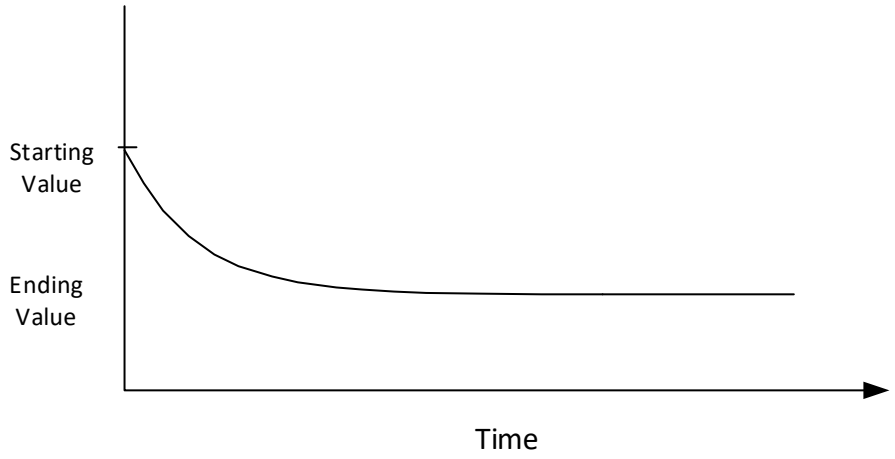
An exponential profile starts at one level and exponentially transitions to another level. The general equation for the exponential curve is

$$y=(A-B)\ e^{-kt} + B$$

The standard has three different ways of specifying the time constant, k.

1) The time constant can be specified by specifying the Half Time, T_{half}, of the change using the MDCX_HDIALY_PROFILE_EXP_HALF_TIME. This value is the time at which 50% of the change has been completed. In this case, k is $0.693/T_{half.}$
2) If a time is specified using MDCX_HDIALY_PROFILE_TIME, then the standard defines this time as the point when 99.7% of the change has been completed. In this case, k is 0.003/T.
3) If neither MDCX_HDIALY_PROFILE_TIME nor MDC_HDIALY_EXP_HALF_TIME is used, then the curve will be computed assuming that 99.7% of the change is completed at the end of the treatment. In this case k is $0.003/T_{tx}$.

Figure 5 – Exponential Profile



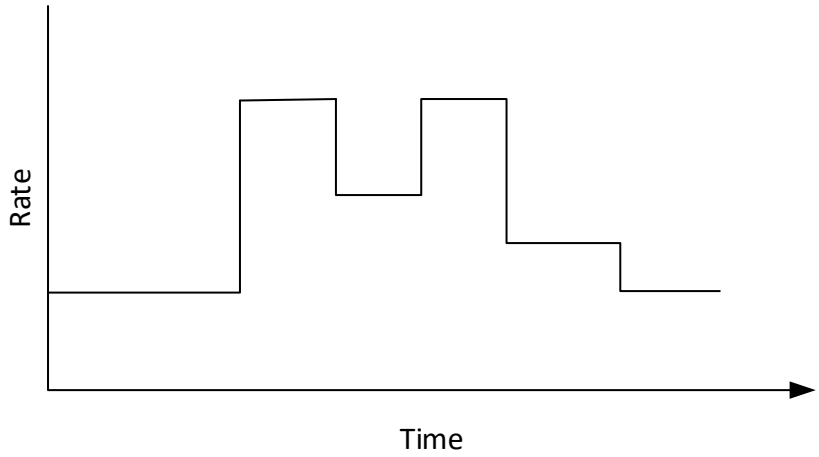
The segments below define a profile that starts at 30 ml/hr and reaches 10 ml/hour after 60 minutes. The transition between these two points is exponential.

```
OBX|66|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.4.27|PRO-WOT||||||F
OBX|67|ST|0^MDCX_HDIALY_PROFILE_TYPE^MDC|1.1.4.27.1|EXPONENTIAL||||||F
OBX|68|NA|0^MDCX_HDIALY_PROFILE_VALUE^MDC|1.1.4.27.2|30^10|ml/h^milliliter per hour^UCUM|||||F
OBX|69|NA|0^MDCX_HDIALY_PROFILE_TIME^MDC|1.1.4.27.3|0^60.0|min^minutes^UCUM|||||F
```

5.3.5 Step Profile

A step profile contains one or more discrete values. Each value is run for a specific amount of time before switching to the next value.

Figure 6 – Step Profile



The segments below define a Step Profile with three steps. It starts at 10 ml/hr. At Tx Time of 30 minutes, it changes to 20 ml/hr. At Tx Time of 60 minutes, it changes to 30 ml/hr. The rate remains at 30 ml/hr for the remainder of treatment.

```
OBX|66|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.4.27|PRO-WOT||||||F
OBX|67|ST|0^MDCX_HDIALY_PROFILE_TYPE^MDC|1.1.4.27.1|STEP||||||F
OBX|68|NA|0^MDCX_HDIALY_PROFILE_VALUE^MDC|1.1.4.27.2|10^20^30|ml/h^milliliter per
hour^UCUM|||||F
OBX|69|NA|0^MDCX_HDIALY_PROFILE_TIME^MDC|1.1.4.27.3|0^30.0^60.0|min^minutes^UCUM|||||F
```

5.4 PD Prescription Representation

There are 3 ways in which a PD treatment can be specified. Which one of the options used is reported in the MDCX_PDIALY_PRESCRIPTION_TYPE object.

Option 1) Exchange Based

When specifying an Exchange Based Treatment, all of the information is conveyed in the Exchange Channels. Each channel must have a Fill Volume, Fill Duration, Dwell Duration, Drain Volume, and Drain Duration. The following terms should NOT be present in the prescription: MDCX_PDIALY_APD_START_TIME_SETTING, MDCX_PDIALY_APD_END_TIME_SETTING, MDCX_PDIALY_APD_TOTAL_VOLUME_SETTING, MDCX_PDIALY_APD_CYCLES_SETTING, MDCX_PDIALY_CAPD_START_TIME_SETTING, MDCX_PDIALY_CAPD_END_TIME_SETTING, MDCX_PDIALY_CAPD_TOTAL_VOLUME_SETTING, and MDCX_PDIALY_CAPD_CYCLES_SETTING.

Option 2a) Treatment Based – End Time Specified

When specifying a Treatment Based Treatment, exchange channels are not present in the prescription. The exchanges are computed by the machine based upon the values on MDCX_PDIALY_APD_END_TIME_SETTING, MDCX_PDIALY_APD_TOTAL_VOLUME_SETTING, MDCX_PDIALY_APD_CYCLES_SETTING, MDCX_PDIALY_CAPD_END_TIME_SETTING, MDCX_PDIALY_CAPD_TOTAL_VOLUME_SETTING, and MDCX_PDIALY_CAPD_CYCLES_SETTING. The machine computes the duration based upon the actual start time and the specified end time. The dwell for each exchange is computed to fit within the computed duration. If a sufficient dwell time cannot be achieved the cycler will display an alert and have the user correct the prescription.

Option 2b) Treatment Based – Duration Specified

When specifying a Treatment Based Treatment, exchange channels are not present in the prescription. The

exchanges are computed by the machine based up on the values on MDCX_PDIALY_APD_START_TIME_SETTING, MDCX_PDIALY_APD_END_TIME_SETTING, MDCX_PDIALY_APD_TOTAL_VOLUME_SETTING, MDCX_PDIALY_APD_CYCLES_SETTING, MDCX_PDIALY_CAPD_START_TIME_SETTING, MDCX_PDIALY_CAPD_END_TIME_SETTING, MDCX_PDIALY_CAPD_TOTAL_VOLUME_SETTING, and MDCX_PDIALY_CAPD_CYCLES_SETTING. The machine computes the duration as the amount of time between specified end time and specified start time. The dwell for each exchange is computed to fit within the computed duration. The actual treatment end time will be the actual start time plus the duration of each exchange. Said another way, the actual end time will change based upon the actual start time.

	1	2a	2b	
	Exchange Based	Treatment Based - Fixed End Time	Treatment Based – Fixed Duration	Condition
MDCX_PDIALY_PRESCRIPTION_TYPE	1..1	1..1	1..1	
MDCX_PDIALY_APD_START_TIME_SETTING	0..0	0..0	0..1	C5
MDCX_PDIALY_APD_END_TIME_SETTING	0..0	0..1	0..1	C5
MDCX_PDIALY_APD_TOTAL_VOLUME_SETTING	0..0	0..1	0..1	C5
MDCX_PDIALY_APD_CYCLES_SETTING	0..0	0..1	0..1	C5
MDCX_PDIALY_CAPD_START_TIME_SETTING	0..0	0..0	0..1	C6
MDCX_PDIALY_CAPD_END_TIME_SETTING	0..0	0..1	0..1	C6
MDCX_PDIALY_CAPD_TOTAL_VOLUME_SETTING	0..0	0..1	0..1	C6
MDCX_PDIALY_CAPD_CYCLES_SETTING	0..0	0..1	0..1	C6
MDCX_PDIALY_FILL_DURATION_SETTING	1..1	0..0	0..0	
MDCX_PDIALY_FILL_VOLUME_SETTING	1..1	0..0	0..0	
MDCX_PDIALY_DWELL_DURATION_SETTING	1..1	0..0	0..0	
MDCX_PDIALY_DRAIN_DURATION_SETTING	1..1	0..0	0..0	
MDCX_PDIALY_DRAIN_VOLUME_SETTING	1..1	0..0	0..0	

5.5 Sample Messages

5.5.1 Example 1 – HD Prescription Request

The following message requests the prescription for the patient with medical record number 555444222111.

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330125317+0000||QBP^D01^QBP_D01|PQ20211216144700|P|2.6|||AL|NE|||||

QPD|0^MDC_HDIALY_RX_QUERY^MDC|Q001|@PID.3^555444222111^^^^MR

RCP|I||R|
```

5.5.2 Example 2 – HD Prescription Response

The following message is the prescription for patient 555444222111. The therapy is HD using RFP-204 bagged dialysate. Blood flow rate is 250 ml/min, Dialysate Flow Rate is 120 ml/min, UF Rate is 400 ml/hr, and the weight to remove is 1 L.

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330125317+0000||RSP^K22^RSP_K21|20220330125317627|P|2.6|||AL|NE|||||

MSA|AA|PQ20211216144700

QAK|Q001|OK|0^MDC_HDIALY_RX_QUERY^MDC|1|1|0
```

```
QPD|0^MDC_HDIALY_RX_QUERY^MDC|Q001|@PID.3^555444222111^^^^MR
OBC|NW|A226677^PC||||N||||444-44-4444^HIPPOCRATES^HAROLD^^^^MD
OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1|||||||F
OBX|2|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F
OBX|3|ST|70939^MDC_DEV_HDIALY_MACH_CONFIG_CHAN^MDC|1.1.1|||||||F
OBX|4|ST|158598^MDC_HDIALY_MACH_TX_MODALITY^MDC|1.1.1.1|HD||||||F
OBX|5|ST|70967^MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN^MDC|1.1.2|||||||F
OBX|6|ST|158618^MDC_HDIALY_THERAPY_COMPLETE_METHOD^MDC|1.1.2.1|UF||||||F
OBX|7|ST|70947^MDC_DEV_HDIALY_BLOOD_PUMP_CHAN^MDC|1.1.3|||||||F
OBX|8|NM|16935956^MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_SETTING^MDC|1.1.3.1|250|ml/min^ml/min^UCUM||||
|F
OBX|9|ST|158604^MDC_HDIALY_BLD_PUMP_MODE^MDC|1.1.3.2|2N||||||F
OBX|10|ST|70951^MDC_DEV_HDIALY_FLUID_CHAN^MDC|1.1.4|||||||F
OBX|11|ST|158606^MDC_HDIALY_DIALYSATE_FLOW_MODE^MDC|1.1.4.1|CONST||||||F
OBX|12|NM|16936008^MDC_HDIALY_DIALYSATE_FLOW_RATE_SETTING^MDC|1.1.4.2|120|ml/min^ml/min^UCUM|||||F
OBX|13|NM|0^MDC_HDIALY_DIALYSATE_VOL_SETTING^MDC|1.1.4.3|25|L^L^UCUM|||||F
OBX|14|ST|158608^MDC_HDIALY_DIALYSATE_NAME^MDC|1.1.4.4|RFP-204||||||F
OBX|15|ST|70971^MDC_DEV_HDIALY_UF_CHAN^MDC|1.1.5|||||||F
OBX|16|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.5.1|CONST-WT||||||F
OBX|17|NM|16936252^MDC_HDIALY_UF_RATE_SETTING^MDC|1.1.5.2|400|ml/h^ml/h^UCUM|||||F
OBX|18|NM|159028^MDC_HDIALY_UF_TARGET_VOL_TO_REMOVE^MDC|1.1.5.3|1000|ml^ml^UCUM|||||F
```

5.5.3 Example 2 – HD Prescription Response for HF Therapy with a Linear UF Profile

The following message is the prescription for patient 555444222111. The therapy is Pre-Filter HF using RFP-400 bagged dialysate. Blood flow rate is 250 ml/min, RF Flow Rate is 120 ml/min, UF Rate starts at 300 and decreases linearly to 100 ml/hr at end of treatment, and the weight to remove is 1 L.

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330132820+0000||RSP^K22^RSP_K21|20220330132820292|P|2.6|||AL|NE|||||
MSA|AA|PQ20211216144700
QAK|Q001|OK|0^MDC_HDIALY_RX_QUERY^MDC|1|1|0
QPD|0^MDC_HDIALY_RX_QUERY^MDC|Q001|@PID.3^555444222111^^^^MR
OBC|NW|A226677^PC||||N||||444-44-4444^HIPPOCRATES^HAROLD^^^^MD
OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1|||||||F
OBX|2|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F
OBX|3|ST|70939^MDC_DEV_HDIALY_MACH_CONFIG_CHAN^MDC|1.1.1|||||||F
OBX|4|ST|158598^MDC_HDIALY_MACH_TX_MODALITY^MDC|1.1.1.1|HF||||||F
OBX|5|ST|70967^MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN^MDC|1.1.2|||||||F
OBX|6|ST|158618^MDC_HDIALY_THERAPY_COMPLETE_METHOD^MDC|1.1.2.1|UF||||||F
OBX|7|ST|70947^MDC_DEV_HDIALY_BLOOD_PUMP_CHAN^MDC|1.1.3|||||||F
OBX|8|NM|16935956^MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_SETTING^MDC|1.1.3.1|250|ml/min^ml/min^UCUM||||
|F
OBX|9|ST|158604^MDC_HDIALY_BLD_PUMP_MODE^MDC|1.1.3.2|2N||||||F
OBX|10|ST|70959^MDC_DEV_HDIALY_CONVECTIVE_CHAN^MDC|1.1.4|||||||F
OBX|11|ST|158613^MDC_HDIALY_RF_DILUTION_LOCATION^MDC|1.1.4.1|PREF||||||F
OBX|12|NM|16936156^MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE_SETTING^MDC|1.1.4.2|120|ml/min^ml/min^UCUM||||
|F
OBX|13|NM|16936164^MDC_HDIALY_RF_PRE_FILTER_VOL_SETTING^MDC|1.1.4.3|25|L^L^UCUM|||||F
OBX|14|ST|158615^MDC_HDIALY_RF_PRE_FILTER_NAME^MDC|1.1.4.4|RFP-400||||||F
```

```
OBX|15|ST|70971^MDC_DEV_HDIALY_UF_CHAN^MDC|1.1.5|||||||F
OBX|16|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.5.1|PRO-WT||||||F
OBX|17|ST|0^MDCX_HDIALY_PROFILE_TYPE^MDC|1.1.5.1.1|LINEAR||||||F
OBX|18|ST|1^MDCX_HDIALY_PROFILE_VALUE^MDC|1.1.5.1.2|300^100|ml/h^ml/h^UCUM|||||F
OBX|19|NM|159028^MDC_HDIALY_UF_TARGET_VOL_TO_REMOVE^MDC|1.1.5.2|1000|ml^ml^UCUM|||||F
```

5.5.4 Example 3 – Prescription Response returning No Prescription

The following message is returned by the EMR is there is no prescription associated with the requested MRN.

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330125317+0000||RSP^K22^RSP_K21|20220330125317737|P|2.6|||AL|NE|||||
MSA|AA|PQ20211216144700
QAK|Q001|NF|0^MDC_HDIALY_RX_QUERY^MDC|0|0|0
QPD|0^MDC_HDIALY_RX_QUERY^MDC|Q001|555444222111
```

5.5.5 Example 4 – PD Prescription Request

The following message requests the prescription for the patient with medical record number 555444222111.

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330125317+0000||QBP^D01^QBP_D01|PQ20211216144700|P|2.6|||AL|NE|||||
QPD|0^MDC_PDIALY_RX_QUERY^MDC|Q001|@PID.3^555444222111^^^^MR
RCP|I||R|
```

5.5.6 Example 5 – PD Prescription Response, Exchange Based

The following message is a prescription for PD Therapy with 3 fluids and 3 exchanges. Exchange #1 uses Fluid 1, Exchange #2 uses Fluids 1 & 2, and Exchange #3 uses Fluid 3

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330132820+0000||RSP^K22^RSP_K21|20220330132820292|P|2.6|||AL|NE|||||
MSA|AA|PQ20211216144700
QAK|Q001|OK|0^MDC_PDIALY_RX_QUERY^MDC|1|1|0
QPD|0^MDC_PDIALY_RX_QUERY^MDC|Q001|@PID.3^555444222111^^^^MR
OBC|NW|A226677^PC||||N||||444-44-4444^HIPPOCRATES^HAROLD^^^^MD
OBX|1|ST|27^MDCX_DEV_PDIALY_MACHINE_MDS^MDC|1|||||||F
OBX|2|ST|0^MDCX_DEV_PDIALY_VMD^MDC|1.1|||||||F
OBX|3|ST|4^MDCX_DEV_PDIALY_TREATMENT_CHAN^MDC|1.1.2|||||||F
OBX|4|ST|5^MDCX_PDIALY_TREAT_TYPE^MDC|1.1.2.1|CAPD||||||F
OBX|5|ST|6^MDCX_PDIALY_TREAT_LOCATION^MDC|1.1.2.2|HOME||||||F
OBX|6|ST|7^MDCX_PDIALY_PRESCRIPTION_TYPE^MDC|1.1.2.3|EXCH||||||F
OBX|7|ST|51^MDCX_DEV_PDIALY_FLUID_1_CHAN^MDC|1.1.3|||||||F
OBX|8|ST|10^MDCX_PDIALY_FLUID_SOURCE^MDC|1.1.3.1|BAG||||||F
OBX|9|NM|9^MDCX_PDIALY_FLUID_BAG_VOLUME^MDC|1.1.3.2|5.000|L^liter^UCUM|||||F
OBX|10|ST|52^MDCX_DEV_PDIALY_FLUID_2_CHAN^MDC|1.1.4|||||||F
OBX|11|ST|10^MDCX_PDIALY_FLUID_SOURCE^MDC|1.1.4.1|BAG||||||F
OBX|12|NM|9^MDCX_PDIALY_FLUID_BAG_VOLUME^MDC|1.1.4.2|5.000|L^liter^UCUM|||||F
```

```
OBX|13|ST|3^MDCX_DEV_PDIALY_EXCHANGE_CHAN^MDC|1.1.5|||||||F
OBX|14|ST|100^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.5.1|1||||||F
OBX|15|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.5.2|PENDING||||||F
OBX|16|NM|12^MDCX_PDIALY_FILL_DURATION_SETTING^MDC|1.1.5.3|13.3|min^minutes^UCUM|||||F
OBX|17|NA|14^MDCX_PDIALY_FILL_VOLUME_SETTING^MDC|1.1.5.4|2.667^0.000|L^liter^UCUM|||||F
OBX|18|NM|16^MDCX_PDIALY_DWELL_DURATION_SETTING^MDC|1.1.5.5|153.3|min^minutes^UCUM|||||F
OBX|19|NM|18^MDCX_PDIALY_DRAIN_DURATION_SETTING^MDC|1.1.5.6|13.3|min^minutes^UCUM|||||F
OBX|20|NM|20^MDCX_PDIALY_DRAIN_VOLUME_SETTING^MDC|1.1.5.7|2.667|L^liter^UCUM|||||F
OBX|21|ST|3^MDCX_DEV_PDIALY_EXCHANGE_CHAN^MDC|1.1.6|||||||F
OBX|22|ST|100^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.6.1|2||||||F
OBX|23|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.6.2|PENDING||||||F
OBX|24|NM|12^MDCX_PDIALY_FILL_DURATION_SETTING^MDC|1.1.6.3|13.3|min^minutes^UCUM|||||F
OBX|25|NA|14^MDCX_PDIALY_FILL_VOLUME_SETTING^MDC|1.1.6.4|2.333^0.333|L^liter^UCUM|||||F
OBX|26|NM|16^MDCX_PDIALY_DWELL_DURATION_SETTING^MDC|1.1.6.5|153.3|min^minutes^UCUM|||||F
OBX|27|NM|18^MDCX_PDIALY_DRAIN_DURATION_SETTING^MDC|1.1.6.6|13.3|min^minutes^UCUM|||||F
OBX|28|NM|20^MDCX_PDIALY_DRAIN_VOLUME_SETTING^MDC|1.1.6.7|2.667|L^liter^UCUM|||||F
OBX|29|ST|3^MDCX_DEV_PDIALY_EXCHANGE_CHAN^MDC|1.1.7|||||||F
OBX|30|ST|100^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.7.1|3||||||F
OBX|31|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.7.2|PENDING||||||F
OBX|32|NM|12^MDCX_PDIALY_FILL_DURATION_SETTING^MDC|1.1.7.3|13.3|min^minutes^UCUM|||||F
OBX|33|NA|14^MDCX_PDIALY_FILL_VOLUME_SETTING^MDC|1.1.7.4|0.000^2.667|L^liter^UCUM|||||F
OBX|34|NM|16^MDCX_PDIALY_DWELL_DURATION_SETTING^MDC|1.1.7.5|153.3|min^minutes^UCUM|||||F
OBX|35|NM|18^MDCX_PDIALY_DRAIN_DURATION_SETTING^MDC|1.1.7.6|13.3|min^minutes^UCUM|||||F
OBX|36|NM|20^MDCX_PDIALY_DRAIN_VOLUME_SETTING^MDC|1.1.7.7|2.667|L^liter^UCUM|||||F
```

5.5.7 Example 6 – PD Prescription Response, Treatment Based

The following message is a prescription for PD Therapy with 2 fluids and 3 exchanges lasting 9 hours.

```
MSH|^~\&|ACME_Dialysis_Machine^00059AFFFE3C7A00^EUI-
64||||20220330132820+0000||RSP^K22^RSP_K21|20220330132820292|P|2.6|||AL|NE|||||
MSA|AA|PQ20211216144700
QAK|Q001|OK|0^MDC_PDIALY_RX_QUERY^MDC|1|1|0
QPD|0^MDC_PDIALY_RX_QUERY^MDC|Q001|@PID.3^555444222111^^^^MR
OBC|NW|A226677^PC||||N||||444-44-4444^HIPPOCRATES^HAROLD^^^^MD
OBX|1|ST|27^MDCX_DEV_PDIALY_MACHINE_MDS^MDC|1|||||||F
OBX|2|ST|0^MDCX_DEV_PDIALY_VMD^MDC|1.1|||||||F
OBX|3|ST|4^MDCX_DEV_PDIALY_TREATMENT_CHAN^MDC|1.1.2|||||||F
OBX|4|ST|5^MDCX_PDIALY_TREAT_TYPE^MDC|1.1.2.1|CAPD||||||F
OBX|5|ST|6^MDCX_PDIALY_TREAT_LOCATION^MDC|1.1.2.2|HOME||||||F
OBX|6|ST|7^MDCX_PDIALY_PRESCRIPTION_TYPE^MDC|1.1.2.3|TXDUR||||||F
OBX|7|TM|25^MDCX_PDIALY_CAPD_START_TIME_SETTING^MDC|1.1.2.4|22:00:00.000||||||F
OBX|8|TM|26^MDCX_PDIALY_CAPD_END_TIME_SETTING^MDC|1.1.2.5|07:00:00.000||||||F
OBX|9|NM|23^MDCX_PDIALY_CAPD_TOTAL_VOLUME_SETTING^MDC|1.1.2.6|8.000|L^liter^UCUM|||||F
OBX|10|ST|24^MDCX_PDIALY_CAPD_CYCLES_SETTING^MDC|1.1.2.7|3||||||F
OBX|11|ST|51^MDCX_DEV_PDIALY_FLUID_1_CHAN^MDC|1.1.3|||||||F
OBX|12|ST|10^MDCX_PDIALY_FLUID_SOURCE^MDC|1.1.3.1|BAG||||||F
```

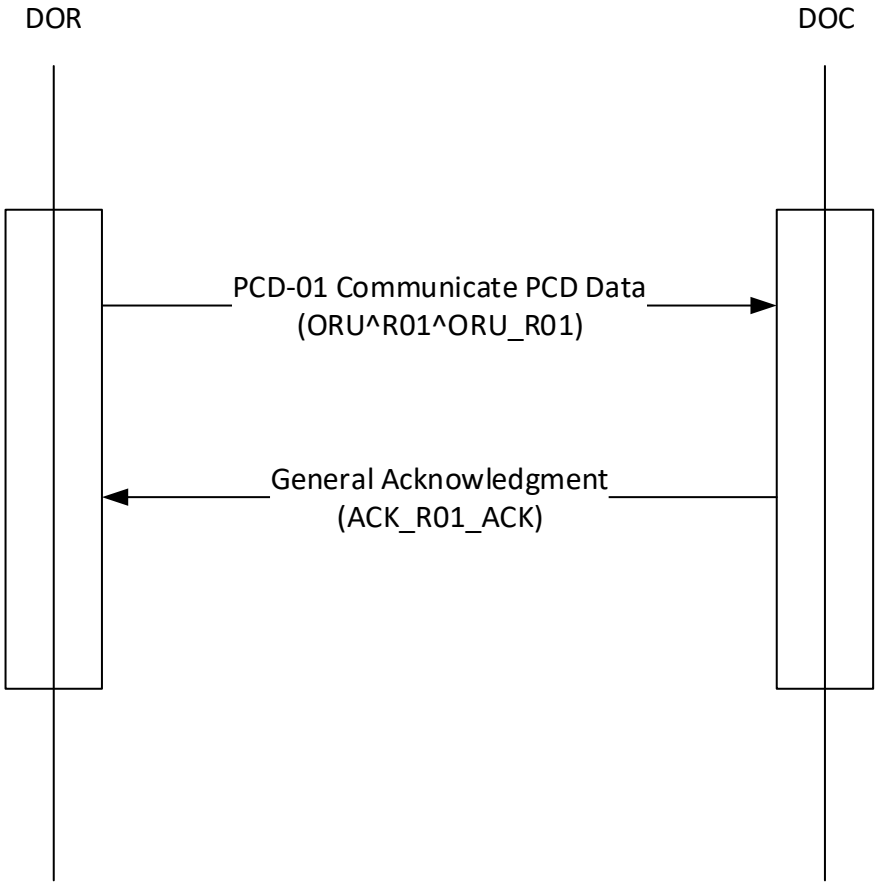
```
OBX|13|NM|9^MDCX_PDIALY_FLUID_BAG_VOLUME^MDC|1.1.3.2|5.000|L^liter^UCUM|||||F
OBX|14|ST|52^MDCX_DEV_PDIALY_FLUID_2_CHAN^MDC|1.1.4|||||||F
OBX|15|ST|10^MDCX_PDIALY_FLUID_SOURCE^MDC|1.1.4.1|BAG|||||F
OBX|16|NM|9^MDCX_PDIALY_FLUID_BAG_VOLUME^MDC|1.1.4.2|5.000|L^liter^UCUM|||||F
```

6 Reporting Treatment Information

6.1 Overview

The sending of Treatment Information to the EMR System is accomplished using the Patient Care Device (PCD) domain in the Device Enterprise Communication (DEC) IHE profile. In doing so, the Dialysis Machine acts as the Device Observation Report (DOR) and the EMR is the Device Observation Consumer (DOC).

Figure 7 - Communicate PCD Data Interaction Diagram



In general, the Dialysis Machine sends periodic reports at an interval of between several times per minute (high acuity) and a maximum interval of 24 hours (chronic, home health). The minimum and maximum intervals are configured at implementation. The Dialysis Machine may also send aperiodic reports for "event type" information.

This specification includes different observation types based upon differing real world triggers. The objects in each observation are indicated in the Phase and Temporal columns of Table 2 and Table 4. The phase column specifies the machine state under which the object is sent. The possible values are:

- All – The object is always sent.
- Intradialytic – The object is only sent when the cycler is delivering therapy

The Temporal column specifies what machine condition causes the object to be sent. The possible values are:

- All – The object is sent in every PCD-01 Message.
- Episodic – The object is sent when the associated alert is active or changing state.

Since PCD-01 messages are sent periodically, at a minimum, objects list as “All” will be sent at the update rate. These will also be sent when a change to an Episodic object causes a PCD-01 Message to be sent.

A Status Report will contain all mandatory elements, the applicable conditional elements, and the optional elements supported by the dialysis machine. In addition, the dialysis machine may report other data objects not identified by this standard. This allows the device manufacturer to report information that is not common across all dialysis machines and is therefore not part of this standard. The hierarchy must be maintained but ordering within a section can change. The ordering in Table 2 and Table 4 do not prescribe a particular order in the PCD-01 message.

The nature of the PCD-01 message is that it contains a snapshot in time of the treatment. The capturing of an entire treatment into a "run sheet" can be accomplished using the HL7 Batch Protocol described in Appendix A.

6.2 Device Request

6.2.1 Message Structure

Segments shown in gray are not used in this standard.

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
[{SFT}]	Software Segment	X	[0..0]
[UAC]	User Authentication Credential	X	[0..0]
{	--- PATIENT_RESULT begin		
[	--- PATIENT begin		
PID	Patient Identification	R	[1..1]
[PD1]	Additional Demographics	X	[0..0]
[{PRT}]	Participation	X	[0..0]
[{NTE}]	Notes and Comments	X	[0..0]
[{NK1}]	Next of Kin/Associated Parties	O	[0..3]
[	--- VISIT begin		
PV1	Patient Visit	R	[1..1]
[PV2]	Patient Visit – Additional Info	X	[0..0]
[{PRT}]	Participation	X	[0..0]
]	--- VISIT end		
]	--- PATIENT end		
{	---ORDER_OBSERVATION begin		
[ORC]	Order Common	X	[0..0]
OBR	Observation Request	R	[1..1]
[{NTE}]	Notes and Comments	O	[0..1]
[{PRT}]	Participation	X	[0..0]
[{	--- TIMING_QTY begin		
TQ1	Timing/Quantity	X	[0..0]
[{TQ2}]	Timing/Quantity Order Sequence	X	[0..0]
}]	--- TIMING_QTY end		

Segment	Meaning	Use	Card
[CTD]	Contact Data	X	[0..0]
[{	--- OBSERVATION begin		
OBX	Observation Result	R	[1..N]
[{PRT}]	Participation	X	[0..0]
[{NTE}]	Notes and comments	X	[0..0]
}]	--- OBSERVATION end		
[{FT1}]	Financial Transaction	X	[0..0]
[{CTI}]	Clinical Trial Identification	X	[0..0]
[{	--- SPECIMEN begin		
SPM	Specimen	X	[0..0]
[{OBX}]	Observation related to Specimen	X	[0..0]
}]	--- SPECIMEN end		
}	--- ORDER_OBSERVATION end		
}	--- PATIENT_RESULT end		
[DSC]	Continuation Pointer	X	[0..0]

6.2.2 Observation Results Structure

Observation results are grouped in the hierarchy of Medical Device System (MDS), Virtual Medical Device (VMD), Channel, and Metric/Observation. When a VMD is not present in the dialysis machine, the VMD information is not reported. For example, when a dialysis machine does not have a blood pressure cuff, the MDC_DEV_PRESS_BLD_NONINV_VMD is not reported. If a Channel does not contain any Metrics/Observations due to dialysis machine therapy or operating mode, the channel is not reported. For example, when a dialysis machine is performing a Hemofiltration Therapy, the MDC_DEV_HDIALY_FLUID_CHAN will not be reported. Because of this dynamic nature, sub-observation IDs will change from treatment to treatment and should not be used for parsing messages from the dialysis machine.

6.2.3 Event Status

This standard allows the use of inline events. These non-actionable events are captured in one of two ways. For events associated with a MDS, VMD, or Channel, the event is shown as a level 4 metric observation. For events associated with a metric, the event is reported as a level 5 facet of the metric.

Example, an event associated with a channel.

```
OBX|20|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|F||||||F
```

Example, an event associated with a metric.

```
OBX|4|NM|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|1.1.3.15|15|mm[Hg]^Millimeters of
    Mercury^UCUM |20-400||||F

OBX|4|CWE|196670^MDC_EVT_LO^MDC|1.1.3.15.1|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|||PH~SP||
    |F
```

This standard allows event information to be transmitted in one of two methods.

- True/False
- Start/Continue/End

When True/False is used, the dialysis machine communicates the state of each event in every PCD-01 message. The event is either active (i.e. True) or Inactive (i.e. False). Since the dialysis machine is sending PCD-01 messages every time status changes instead of just periodically, the time associated with an event state transition is the time of the observation as specified by time point OBX-14 or the default time point specified by OBR-7.

Example, Blood Leak not detected

```
OBX|20|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|F||||||F
```

Example, Blood Leak detected

```
OBX|20|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|T||||||F
```

When Start/Continue/End is used the dialysis machine communicates the starting and ending time of the event. The time associated with these events is expressly indicated in the OBX-14 portion of the event. In PCD-01 messages where the event did not start or end but is still active the dialysis machine reports continue. In the case where a dialysis machine does not know the starting time of an event, it will transmit continue as the first state for the event.

Example, Blood Leak detected

```
OBX|20|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|start||||||||20191003092005+0000
```

Example, Blood Leak ongoing

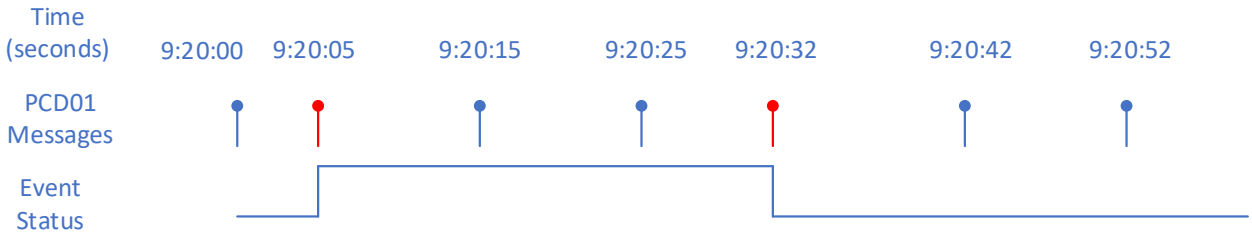
```
OBX|20|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|continue||||||||20191003092015+0000
```

Example, Blood Leak done

```
OBX|20|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|end||||||||20191003092032+0000
```

The following figure shows how the dialysis machine would report an event for each of the two methods.

Figure 8 – Event Status in PCD-01 Messages



Using Start/Continue/End

* PCD01 Msg at Time 9:20:00 would not mention the event.
* PCD01 Msg at Time 9:20:05 would contain the Start with a Time of 9:20:05.
* PCD01 Msg at Time 9:20:15 and 9:20:25 would contain the Continue.
* PCD01 Msg at Time 9:20:32 would contain the End with a timestamp of 9:20:32.
* PCD01 msg at Time 9:20:42 and beyond would not mention the event

Using True/False without Timestamp in OBX

* PCD01 Msg at Time 9:20:00 would have an event value of False.
* PCD01 Msg at Time 9:20:05, 9:20:15, & 9:20:25 would have an event value of True.
* PCD01 Msg at Time 9:20:32 and beyond would have an event value of false.

6.2.4 Example 1 – Minimal Message when Idle

This message is a periodic report of the dialysis machine status. It is reported when the machine is Idle or in Service.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092006+0000||ORU^R01^ORU_R01|20191003092005|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|||20191003092005+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F

OBX|2|ST|531970^MDC_ID_MODEL_MANUFACTURER^MDC|1.0.0.1|NxStage||||||F

OBX|3|ST|531969^MDC_ID_MODEL_NUMBER^MDC|1.0.0.2|System One||||||F

OBX|4|ST|531972^MDC_ID_PROD_SPEC_SERIAL^MDC|1.0.0.3|1000478||||||F

OBX|5|ST|531975^MDC_ID_PROD_SPEC_SW^MDC|1.0.0.4|1.2.3.4||||||F

OBX|6|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F

OBX|7|ST|70939^MDC_DEV_HDIALY_MACH_CONFIG_CHAN^MDC|1.1.1|||||||F

OBX|8|DTM|67975^MDC_ATTR_TIME_ABS^MDC|1.1.1.1|20191003092005+0000||||||F

OBX|9|ST|158594^MDC_HDIALY_MACH_MODE_OF_OPERATION^MDC|1.1.1.3|IDL||||||F
```

6.2.5 Example 2 – Minimal HD Message when Treating

This message is a periodic report of a HD treatment status. It contains the minimum number of reported items.

Note, this standard reports Boolean event values in the PCD-01 transaction. This is done so that a complete record of the machine state is captured in the PCD-01. The state of the events is not considered clinically actionable. Clinically actionable alerts and events are communicated in the PCD-04 transaction.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092006+0000||ORU^R01^ORU_R01|20191003092005|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|||20191003092005+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F

OBX|2|ST|531970^MDC_ID_MODEL_MANUFACTURER^MDC|1.0.0.1|NxStage||||||F

OBX|3|ST|531969^MDC_ID_MODEL_NUMBER^MDC|1.0.0.2|System One||||||F

OBX|4|ST|531972^MDC_ID_PROD_SPEC_SERIAL^MDC|1.0.0.3|1000478||||||F

OBX|5|ST|531975^MDC_ID_PROD_SPEC_SW^MDC|1.0.0.4|1.2.3.4||||||F

OBX|6|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F

OBX|7|ST|70939^MDC_DEV_HDIALY_MACH_CONFIG_CHAN^MDC|1.1.1|||||||F

OBX|8|DTM|67975^MDC_ATTR_TIME_ABS^MDC|1.1.1.1|20191003092005+0000||||||F

OBX|9|ST|158594^MDC_HDIALY_MACH_MODE_OF_OPERATION^MDC|1.1.1.3|TX||||||F

OBX|10|ST|158596^MDC_HDIALY_MACH_BLD_PUMP_ON^MDC|1.1.1.7|T||||||F

OBX|11|ST|158597^MDC_HDIALY_MACH_TX_FLUID_BYPASS^MDC|1.1.1.8|F||||||F

OBX|12|ST|158598^MDC_HDIALY_MACH_TX_MODALITY^MDC|1.1.1.9|HD||||||F

OBX|13|NM|158720^MDC_HDIALY_MACH_THERAPY_TIME^MDC|1.1.1.10|180|min^min^UCUM|||||F

OBX|14|NM|158724^MDC_HDIALY_MACH_TIME_REMAIN^MDC|1.1.1.11|600|min^min^UCUM|||||F
```

```
OBX|15|ST|70947^MDC_DEV_HDIALY_BLOOD_PUMP_CHAN^MDC|1.1.3|||||||F

OBX|16|NM|16935956^MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_SETTING^MDC|1.1.3.2|250|ml/min^ml/min^
    UCUM|||||F

OBX|17|NM|158744^MDC_HDIALY_BLD_PRESS_ART^MDC|1.1.3.4|-75|mm[Hg]^mm[Hg]^UCUM|< -200||||F

OBX|18|ST|158604^MDC_HDIALY_BLD_PUMP_MODE^MDC|1.1.3.5|2N||||||F

OBX|19|ST|198242^MDC_EVT_HDIALY_BLD_PUMP_STOP^MDC|1.1.3.6|F||||||F

OBX|20|NM|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|1.1.3.15|200|mm[Hg]^mm[Hg]^UCUM|20-
    400||||F

OBX|21|ST|70951^MDC_DEV_HDIALY_FLUID_CHAN^MDC|1.1.4|||||||F

OBX|22|ST|158606^MDC_HDIALY_DIALYSATE_FLOW_MODE^MDC|1.1.4.1|CONST||||||F

OBX|23|NM|16936008^MDC_HDIALY_DIALYSATE_FLOW_RATE_SETTING^MDC|1.1.4.2|100|ml/min^ml/min^UCUM|
    ||||F

OBX|24|NM|158792^MDC_HDIALY_DIALYSATE_FLOW_RATE^MDC|1.1.4.3|99|ml/min^ml/min^UCUM|||||F

OBX|25|NM|158788^MDC_HDIALY_DIALYSATE_COND^MDC|1.1.4.4|13.81|mS/cm^mS/cm^UCUM|||||F

OBX|26|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.5|F||||||F

OBX|27|ST|70955^MDC_DEV_HDIALY_FILTER_CHAN^MDC|1.1.5|||||||F

OBX|28|NM|158852^MDC_HDIALY_FILTER_TRANSMEMBRANE_PRESS^MDC|1.1.5.2|35|mm[Hg]^mm[Hg]^UCUM|||||
    F

OBX|29|ST|70963^MDC_DEV_HDIALY_SAFETY_SYSTEMS_CHAN^MDC|1.1.7|||||||F

OBX|30|ST|198252^MDC_EVT_HDIALY_SAFETY_ART_AIR_DETECT^MDC|1.1.7.1|F||||||F

OBX|31|ST|198254^MDC_EVT_HDIALY_SAFETY_DIALYSATE_AIR_DETECT^MDC|1.1.7.2|F||||||F

OBX|32|ST|198258^MDC_EVT_HDIALY_SAFETY_SYSTEM_GENERAL^MDC|1.1.7.3|F||||||F

OBX|33|ST|198216^MDC_EVT_SELFTEST_FAILURE^MDC|1.1.7.4|F||||||F

OBX|34|ST|198262^MDC_EVT_HDIALY_SAFETY_VEN_AIR_DETECT^MDC|1.1.7.5|F||||||F

OBX|35|ST|70967^MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN^MDC|1.1.8|||||||F

OBX|36|ST|158618^MDC_HDIALY_THERAPY_COMPLETE_METHOD^MDC|1.1.8.18|UF||||||F

OBX|37|ST|70971^MDC_DEV_HDIALY_UF_CHAN^MDC|1.1.9|||||||F

OBX|38|NM|159028^MDC_HDIALY_UF_TARGET_VOL_TO_REMOVE^MDC|1.1.9.1|2000|ml^ml^UCUM|||||F

OBX|39|NM|159032^MDC_HDIALY_UF_ACTUAL_REMOVED_VOL^MDC|1.1.9.2|555|ml^ml^UCUM|||||F

OBX|40|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.9.3|CONST-WT||||||F

OBX|41|NM|159036^MDC_HDIALY_UF_RATE^MDC|1.1.9.4|100|ml/h^ml/h^UCUM|||||F

OBX|42|NM|16936252^MDC_HDIALY_UF_RATE_SETTING^MDC|1.1.9.5|100|ml/h^ml/h^UCUM|||||F

OBX|43|ST|198276^MDC_EVT_HDIALY_UF_RATE_RANGE^MDC|1.1.9.6|F||||||F
```

6.2.6 Example 3 – Full HD Message

This message reports all mandatory and optional fields for a pre/post dilution HDF therapy.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092025+0000||ORU^R01^ORU_R01|20191003092024|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|||20191003092024+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F

OBX|2|ST|531970^MDC_ID_MODEL_MANUFACTURER^MDC|1.0.0.1|NxStage||||||F

OBX|3|ST|531969^MDC_ID_MODEL_NUMBER^MDC|1.0.0.2|System One||||||F

OBX|4|ST|531972^MDC_ID_PROD_SPEC_SERIAL^MDC|1.0.0.3|1000478||||||F

OBX|5|ST|531975^MDC_ID_PROD_SPEC_SW^MDC|1.0.0.4|1.2.3.4||||||F

OBX|6|ST|67916^MDC_ATTR_ID_UDI^MDC|1.0.0.6|+M535NX10003A0/$$+735241/16D20180305J||||||F
```

```
OBX|7|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F
OBX|8|ST|70939^MDC_DEV_HDIALY_MACH_CONFIG_CHAN^MDC|1.1.1|||||||F
OBX|9|DTM|67975^MDC_ATTR_TIME_ABS^MDC|1.1.1.1|20191003092024+0000||||||F
OBX|10|ST|158593^MDC_HDIALY_MACH_MODE_DESCRIPTION^MDC|1.1.1.2|NxStage System One||||||F
OBX|11|ST|158594^MDC_HDIALY_MACH_MODE_OF_OPERATION^MDC|1.1.1.3|TX||||||F
OBX|12|NM|184195^MDC_TIME_PD_MAINTENANCE_TO_NEXT_SERVICE^MDC|1.1.1.4|12|h^h^UCUM|||||F
OBX|13|DTM|184199^MDC_MAINTENANCE_NEXT_SERVICE_DATE^MDC|1.1.1.5|20191003||||||F
OBX|14|NM|158595^MDC_HDIALY_MACH_MAINT_TX_REMAIN^MDC|1.1.1.6|45||||||F
OBX|15|ST|158596^MDC_HDIALY_MACH_BLD_PUMP_ON^MDC|1.1.1.7|T||||||F
OBX|16|ST|158597^MDC_HDIALY_MACH_TX_FLUID_BYPASS^MDC|1.1.1.8|F||||||F
OBX|17|ST|158598^MDC_HDIALY_MACH_TX_MODALITY^MDC|1.1.1.9|HDF||||||F
OBX|18|NM|158720^MDC_HDIALY_MACH_THERAPY_TIME^MDC|1.1.1.10|180|min^min^UCUM|||||F
OBX|19|NM|158724^MDC_HDIALY_MACH_TIME_REMAIN^MDC|1.1.1.11|600|min^min^UCUM|||||F
OBX|20|NM|188508^MDC_TEMP_ROOM^MDC|1.1.1.12|20|Cel^Cel^UCUM|||||F
OBX|21|ST|70943^MDC_DEV_HDIALY_ANTICOAG_PUMP_CHAN^MDC|1.1.2|||||||F
OBX|22|ST|198236^MDC_EVT_HDIALY_ANTICOAG_STOP^MDC|1.1.2.4|F||||||F
OBX|23|ST|158599^MDC_HDIALY_ANTICOAG_NAME^MDC|1.1.2.5|heparin||||||F
OBX|24|ST|158600^MDC_HDIALY_ANTICOAG_MODE^MDC|1.1.2.6|CON||||||F
OBX|25|NM|0^MDC_HDIALY_ANTICOAG_INFUS_RATE_SETTING^MDC|1.1.2.7|50.0|ml/hr^ml/hr^UCUM|||||F
OBX|26|NM|158736^MDC_HDIALY_ANTICOAG_INFUS_RATE^MDC|1.1.2.8|50.0|ml/hr^ml/hr^UCUM|||||F
OBX|27|NM|158728^MDC_HDIALY_ANTICOAG_ACCUM_DELIV^MDC|1.1.2.9|60.0|ml^ml^UCUM|||||F
OBX|28|NM|68142^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.2.10|1||||||F
OBX|29|ST|198238^MDC_EVT_HDIALY_ANTICOAG_SYRINGE_EMPTY^MDC|1.1.2.11|F||||||F
OBX|30|ST|158602^MDC_HDIALY_ANTICOAG_SYRINGE_BRAND^MDC|1.1.2.12|Fishman||||||F
OBX|31|NM|158603^MDC_HDIALY_ANTICOAG_SYRINGE_VOL^MDC|1.1.2.13|60|ml^ml^UCUM|||||F
OBX|32|ST|198240^MDC_EVT_HDIALY_ANTICOAG_SYRINGE_SIZE^MDC|1.1.2.14|F||||||F
OBX|33|ST|70947^MDC_DEV_HDIALY_BLOOD_PUMP_CHAN^MDC|1.1.3|||||||F
OBX|34|NM|158740^MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE^MDC|1.1.3.1|250|ml/min^ml/min^UCUM|||||F
OBX|35|NM|16935956^MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_SETTING^MDC|1.1.3.2|250|ml/min^ml/min^
    UCUM|||||F
OBX|36|NM|158743^MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_MEAN^MDC|1.1.3.3|250|ml/min^ml/min^UCUM|
    ||||F
OBX|37|NM|158744^MDC_HDIALY_BLD_PRESS_ART^MDC|1.1.3.4|-75|mm[Hg]^mm[Hg]^UCUM|< -200||||F
OBX|38|ST|158604^MDC_HDIALY_BLD_PUMP_MODE^MDC|1.1.3.5|2N||||||F
OBX|39|ST|198242^MDC_EVT_HDIALY_BLD_PUMP_STOP^MDC|1.1.3.6|F||||||F
OBX|40|ST|158605^MDC_HDIALY_BLD_PUMP_TUBING_SIZE^MDC|1.1.3.7|8 mm||||||F
OBX|41|NM|158748^MDC_HDIALY_BLOOD_TEMP_ART^MDC|1.1.3.8|39.1|Cel^Cel^UCUM|||||F
OBX|42|NM|158752^MDC_HDIALY_BLD_PUMP_CHANGE_IN_ENERGY^MDC|1.1.3.9|1|kJ/h^kJ/h^UCUM|||||F
OBX|43|NM|158756^MDC_HDIALY_BLD_PUMP_PRESS_ART_POST_PUMP^MDC|1.1.3.10|100|mm[Hg]^mm[Hg]^UCUM|
    ||||F
OBX|44|NM|158760^MDC_HDIALY_BLD_PUMP_PRIMING_VOL^MDC|1.1.3.11|191|ml^ml^UCUM|||||F
OBX|45|NM|158764^MDC_HDIALY_BLD_PUMP_SINGLE_NEEDLE_PRESS^MDC|1.1.3.12|200|mm[Hg]^ml[Hg]^UCUM|
    ||||F
OBX|46|NM|158772^MDC_HDIALY_BLD_PUMP_BLOOD_PROCESSED_TOTAL^MDC|1.1.3.14|120|L^L^UCUM|||||F
OBX|47|NM|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|1.1.3.15|200|mm[Hg]^mm[Hg]^UCUM|20-
    400||||F
OBX|48|NM|158780^MDC_HDIALY_BLOOD_TEMP_VEN^MDC|1.1.3.16|39.1|Cel^Cel^UCUM|||||F
OBX|49|NM|16935996^MDC_HDIALY_BLOOD_TEMP_VEN_SETTING^MDC|1.1.3.17|39.0|Cel^Cel^UCUM|||||F
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OBX|50|ST|70951^MDC_DEV_HDIALY_FLUID_CHAN^MDC|1.1.4|||||||F
OBX|51|NM|158784^MDC_HDIALY_BICARB_COND^MDC|1.1.4.1|13.81|mS/cm^mS/cm^UCUM|||||F
OBX|52|NM|16936000^MDC_HDIALY_BICARB_COND_SETTING^MDC|1.1.4.2|13.81|mS/cm^mS/cm^UCUM|||||F
OBX|53|NM|158788^MDC_HDIALY_DIALYSATE_COND^MDC|1.1.4.3|13.81|mS/cm^mS/cm^UCUM|||||F
OBX|54|NM|16936004^MDC_HDIALY_DIALYSATE_COND_SETTING^MDC|1.1.4.4|13.81|mS/cm^mS/cm^UCUM|||||F
OBX|55|NM|158792^MDC_HDIALY_DIALYSATE_FLOW_RATE^MDC|1.1.4.5|99|ml/min^ml/min^UCUM|||||F
OBX|56|NM|16936008^MDC_HDIALY_DIALYSATE_FLOW_RATE_SETTING^MDC|1.1.4.6|100|ml/min^ml/min^UCUM|
    ||||F
OBX|57|ST|158606^MDC_HDIALY_DIALYSATE_FLOW_MODE^MDC|1.1.4.7|CONST||||||F
OBX|58|NM|158800^MDC_HDIALY_DIALYSATE_AMMONIA^MDC|1.1.4.10|0.00|[ppm]^[ppm]^UCUM|||||F
OBX|59|NM|158795^MDC_HDIALY_DIALYSATE_FLOW_RATE_MEAN^MDC|1.1.4.11|100|ml/min^ml/min^UCUM|||||
    F
OBX|60|NM|16936020^MDC_HDIALY_CONC_HCO3_SETTING^MDC|1.1.4.13|32.0|mmol/L^mmol/L^UCUM|||||F
OBX|61|ST|158607^MDC_HDIALY_CONC_HCO3_MODE^MDC|1.1.4.14|PRO||||||F
OBX|62|ST|198244^MDC_EVT_HDIALY_BLOOD_LEAK^MDC|1.1.4.15|F||||||F
OBX|63|ST|158608^MDC_HDIALY_DIALYSATE_NAME^MDC|1.1.4.16|FMC smartbag 111.5||Bbraun Duosol
    35||||F
OBX|64|NM|158808^MDC_HDIALY_DIALYSATE_CONC_ACETATE^MDC|1.1.4.17|3.00|mmol/L^mmol/L^UCUM|||||F
OBX|65|NM|158812^MDC_HDIALY_DIALYSATE_CONC_HCO3^MDC|1.1.4.18|35.0|mmol/L^mmol/L^UCUM|||||F
OBX|66|NM|158816^MDC_HDIALY_DIALYSATE_CONC_CHLORIDE^MDC|1.1.4.19|108.00|mmol/L^mmol/L^UCUM|||
    ||F|||20191003085024+0000
OBX|67|NM|158820^MDC_HDIALY_DIALYSATE_CONC_MG^MDC|1.1.4.20|0.5|mmol/L^mmol/L^UCUM|||||F|||201
    91003085024+0000
OBX|68|NM|158824^MDC_HDIALY_DIALYSATE_CONC_CA^MDC|1.1.4.21|1.50|mmol/L^mmol/L^UCUM|||||F|||20
    191003085024+0000
OBX|69|NM|158828^MDC_HDIALY_DIALYSATE_CONC_CITRATE^MDC|1.1.4.22|0.0|mmol/L^mmol/L^UCUM|||||F
OBX|70|NM|158832^MDC_HDIALY_DIALYSATE_CONC_GLU^MDC|1.1.4.23|1.00|mmol/L^mmol/L^UCUM|||||F
OBX|71|NM|158836^MDC_HDIALY_DIALYSATE_CONC_K^MDC|1.1.4.24|1.00|mmol/L^mmol/L^UCUM|||||F|||201
    91003085024+0000
OBX|72|NM|158840^MDC_HDIALY_DIALYSATE_CONC_NA^MDC|1.1.4.25|138|mmol/L^mmol/L^UCUM|||||F|||201
    91003085024+0000
OBX|73|NM|16936056^MDC_HDIALY_DIALYSATE_CONC_NA_SETTING^MDC|1.1.4.26|140|mmol/L^mmol/L^UCUM||
    |||F
OBX|74|ST|158609^MDC_HDIALY_DIALYSATE_CONC_NA_MODE^MDC|1.1.4.27|CONST||||||F
OBX|75|NM|158844^MDC_HDIALY_DIALYSATE_CONC_PH^MDC|1.1.4.28|7.0|[pH]^[pH]^UCUM|||||F
OBX|76|NM|158848^MDC_HDIALY_DIALYSATE_VOL_DELIV^MDC|1.1.4.29|24.34|L^L^UCUM|||||F
OBX|77|ST|70955^MDC_DEV_HDIALY_FILTER_CHAN^MDC|1.1.5|||||||F
OBX|78|ST|158610^MDC_HDIALY_FILTER_NAME^MDC|1.1.5.1|NxStage CAR125||||||F
OBX|79|NM|158852^MDC_HDIALY_FILTER_TRANSMEMBRANE_PRESS^MDC|1.1.5.2|35|mm[Hg]^mm[Hg]^UCUM|||||
    F
OBX|80|NM|158611^MDC_HDIALY_FILTER_NUM^MDC|1.1.5.3|1|| ||||F
OBX|81|ST|158612^MDC_HDIALY_FILTER_UDI^MDC|1.1.5.4|
    (01)00842289101845(17)201200(10)LOT00606|| ||||F
OBX|82|ST|70959^MDC_DEV_HDIALY_CONVECTIVE_CHAN^MDC|1.1.6|||||||F
OBX|83|ST|158613^MDC_HDIALY_RF_DILUTION_LOCATION^MDC|1.1.6.1|PREF-POSTF||||||F
OBX|84|ST|158614^MDC_HDIALY_RF_POST_FILTER_NAME^MDC|1.1.6.2|multiBIC|| ||||F
OBX|85|NM|158856^MDC_HDIALY_RF_POST_FILTER_CONC_ACETATE^MDC|1.1.6.3|0|mmol/L^mmol/L^UCUM|||||
    F
OBX|86|NM|158860^MDC_HDIALY_RF_POST_FILTER_CONC_HCO3^MDC|1.1.6.4|35.0|mmol/L^mmol/L^UCUM|||||
    F
OBX|87|NM|158864^MDC_HDIALY_RF_POST_FILTER_CONC_CHLORIDE^MDC|1.1.6.5|111.00|mmol/L^mmol/L^UCU
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M|||||F
OBX|88|NM|158868^MDC_HDIALY_RF_POST_FILTER_CONC_MG^MDC|1.1.6.6|0.5|mmol/L^mmol/L^UCUM|||||F
OBX|89|NM|158824^MDC_HDIALY_DIALYSATE_CONC_CA^MDC|1.1.6.7|1.50|mmol/L^mmol/L^UCUM|||||F
OBX|90|NM|158876^MDC_HDIALY_RF_POST_FILTER_CONC_CITRATE^MDC|1.1.6.8|0.0|mmol/L^mmol/L^UCUM|||
||F
OBX|91|NM|158880^MDC_HDIALY_RF_POST_FILTER_CONC_GLU^MDC|1.1.6.9|5.55|mmol/L^mmol/L^UCUM|||||F
OBX|92|NM|158884^MDC_HDIALY_RF_POST_FILTER_CONC_K^MDC|1.1.6.10|2.00|mmol/L^mmol/L^UCUM|||||F
OBX|93|NM|158888^MDC_HDIALY_RF_POST_FILTER_CONC_NA^MDC|1.1.6.11|140|mmol/L^mmol/L^UCUM|||||F
OBX|94|NM|158892^MDC_HDIALY_RF_POST_FILTER_FLOW_RATE^MDC|1.1.6.12|60|ml/min^ml/min^UCUM|||||F
OBX|95|NM|16936108^MDC_HDIALY_RF_POST_FILTER_FLOW_RATE_SETTING^MDC|1.1.6.13|60|ml/min^ml/min^
UCUM|||||F
OBX|96|NM|158895^MDC_HDIALY_RF_POST_FILTER_FLOW_RATE_MEAN^MDC|1.1.6.14|60|ml/min^ml/min^UCUM|
||||F
OBX|97|NM|158896^MDC_HDIALY_RF_POST_FILTER_TEMP^MDC|1.1.6.15|39.9|Cel^Cel^UCUM|||||F
OBX|98|NM|16936112^MDC_HDIALY_RF_POST_FILTER_TEMP_SETTING^MDC|1.1.6.16|41.0|Cel^Cel^UCUM|||||
F
OBX|99|NM|158900^MDC_HDIALY_RF_POST_FILTER_VOL^MDC|1.1.6.17|6.00|L^L^UCUM|||||F
OBX|100|NM|16936116^MDC_HDIALY_RF_POST_FILTER_VOL_SETTING^MDC|1.1.6.18|12.00|L^L^UCUM|||||F
OBX|101|ST|158615^MDC_HDIALY_RF_PRE_FILTER_NAME^MDC|1.1.6.19|multiBIC||||||F
OBX|102|NM|158904^MDC_HDIALY_RF_PRE_FILTER_CONC_ACETATE^MDC|1.1.6.20|0|mmol/L^mmol/L^UCUM||||
|F
OBX|103|NM|158908^MDC_HDIALY_RF_PRE_FILTER_CONC_HCO3^MDC|1.1.6.21|35.0|mmol/L^mmol/L^UCUM|/L|
|||F
OBX|104|NM|158912^MDC_HDIALY_RF_PRE_FILTER_CONC_CHLORIDE^MDC|1.1.6.22|111.00|mmol/L^mmol/L^UC
UM|||||F
OBX|105|NM|158916^MDC_HDIALY_RF_PRE_FILTER_CONC_MG^MDC|1.1.6.23|0.5|mmol/L^mmol/L^UCUM|||||F
OBX|106|NM|158920^MDC_HDIALY_RF_PRE_FILTER_CONC_CA^MDC|1.1.6.24|1.50|mmol/L^mmol/L^UCUM|||||F
OBX|107|NM|158924^MDC_HDIALY_RF_PRE_FILTER_CONC_CITRATE^MDC|1.1.6.25|0.0|mmol/L^mmol/L^UCUM||
|||F
OBX|108|NM|158928^MDC_HDIALY_RF_PRE_FILTER_CONC_GLU^MDC|1.1.6.26|5.55|mmol/L^mmol/L^UCUM|||||
F
OBX|109|NM|158932^MDC_HDIALY_RF_PRE_FILTER_CONC_K^MDC|1.1.6.27|2.00|mmol/L^mmol/L^UCUM|||||F
OBX|110|NM|158936^MDC_HDIALY_RF_PRE_FILTER_CONC_NA^MDC|1.1.6.28|140|mmol/L^mmol/L^UCUM|||||F
OBX|111|NM|158940^MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE^MDC|1.1.6.29|60|ml/min^ml/min^UCUM|||||F
OBX|112|NM|16936156^MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE_SETTING^MDC|1.1.6.30|60|ml/min^ml/min^
UCUM|||||F
OBX|113|NM|158943^MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE_MEAN^MDC|1.1.6.31|60|ml/min^ml/min^UCUM|
||||F
OBX|114|NM|158944^MDC_HDIALY_RF_PRE_FILTER_TEMP^MDC|1.1.6.32|39.9|Cel^Cel^UCUM|||||F
OBX|115|NM|16936160^MDC_HDIALY_RF_PRE_FILTER_TEMP_SETTING^MDC|1.1.6.33|41.0|Cel^Cel^UCUM|||||
F
OBX|116|NM|158948^MDC_HDIALY_RF_PRE_FILTER_VOL^MDC|1.1.6.34|1.23|L^L^UCUM|||||F
OBX|117|NM|16936164^MDC_HDIALY_RF_PRE_FILTER_VOL_SETTING^MDC|1.1.6.35|3.00|L^L^UCUM|||||F
OBX|118|NM|158952^MDC_HDIALY_RF_CONV_CLEARANCE^MDC|1.1.6.36|31.6|ml/min^ml/min^UCUM|||||F
OBX|119|ST|198246^MDC_EVT_HDIALY_RF_EXCESS_DELIV^MDC|1.1.6.37|F||||||F
OBX|120|ST|198248^MDC_EVT_HDIALY_RF_INSUFF_DELIV^MDC|1.1.6.38|F||||||F
OBX|121|NM|16936172^MDC_HDIALY_RF_PRE_POST_FLOW_RATIO_SETTING^MDC|1.1.6.39|3.00||||||F
OBX|122|NM|158960^MDC_HDIALY_RF_BOLUS_RATE^MDC|1.1.6.40|0|ml/min^ml/min^UCUM|||||F
OBX|123|NM|16936180^MDC_HDIALY_RF_BOLUS_VOL_SETTING^MDC|1.1.6.42|3.00|mL^mL^UCUM|||||F
OBX|124|NM|158968^MDC_HDIALY_RF_BOLUS_VOL_DELIVERED^MDC|1.1.6.41|0.00|mL^mL^UCUM|||||F
OBX|125|ST|158616^MDC_HDIALY_RF_FLOW_MODE^MDC|1.1.6.43|CONST||||||F
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OBX|126|ST|158617^MDC_HDIALY_RF_SOURCE^MDC|1.1.6.44|BAG||||||F
OBX|127|ST|70963^MDC_DEV_HDIALY_SAFETY_SYSTEMS_CHAN^MDC|1.1.7|||||||F
OBX|128|ST|198252^MDC_EVT_HDIALY_SAFETY_ART_AIR_DETECT^MDC|1.1.7.1|F||||||F
OBX|129|ST|198254^MDC_EVT_HDIALY_SAFETY_DIALYSATE_AIR_DETECT^MDC|1.1.7.2|F||||||F
OBX|130|ST|198256^MDC_EVT_HDIALY_SAFETY_DIALYSATE_COMPOSITION^MDC|1.1.7.3|F||||||F
OBX|131|ST|198258^MDC_EVT_HDIALY_SAFETY_SYSTEM_GENERAL^MDC|1.1.7.4|F||||||F
OBX|132|ST|198216^MDC_EVT_SELFTEST_FAILURE^MDC|1.1.7.5|F||||||F
OBX|133|ST|198260^MDC_EVT_HDIALY_SAFETY_VEN_ACCESS^MDC|1.1.7.6|F||||||F
OBX|134|ST|198262^MDC_EVT_HDIALY_SAFETY_VEN_AIR_DETECT^MDC|1.1.7.7|F||||||F
OBX|135|ST|198264^MDC_EVT_HDIALY_SAFETY_WETNESS_DETECT_ALERT^MDC|1.1.7.8|F||||||F
OBX|136|ST|198266^MDC_EVT_HDIALY_SAFETY_WETNESS_DETECT_ERROR^MDC|1.1.7.9|F||||||F
OBX|137|ST|68489^MDC_ATTR_ALERT_ID_NUM^MDC|1.1.7.10|0||||||F
OBX|138|ST|68546^MDC_ATTR_ALERT_TEXT^MDC|1.1.7.11|||||||F
OBX|139|ST|70967^MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN^MDC|1.1.8|||||||F
OBX|140|NM|158972^MDC_HDIALY_THERAPY_MASS_TRF_AREA_COEFF^MDC|1.1.8.1|700||||||F
OBX|141|NM|158976^MDC_HDIALY_THERAPY_ACCESS_FLOW^MDC|1.1.8.2|250|ml/min^ml/min^UCUM|||||F
OBX|142|NM|158980^MDC_HDIALY_THERAPY_RATIO_EKT_OVER_V_DELIVERED^MDC|1.1.8.4|1.1|%^%^UCUM
|||||F
OBX|143|NM|158984^MDC_HDIALY_THERAPY_KT_DELIVERED^MDC|1.1.8.5|42.0|L^L^UCUM|||||F
OBX|144|NM|158988^MDC_HDIALY_THERAPY_RATIO_SPKT_OVER_V_DELIVERED^MDC|1.1.8.6|1.1|%^%^UCUM
|||||F
OBX|145|ST|198268^MDC_EVT_HDIALY_THERAPY_PAT_TX_GENERAL^MDC|1.1.8.7|F||||||F
OBX|146|NM|158992^MDC_HDIALY_THERAPY_RATIO_KT_OVER_V_GOAL^MDC|1.1.8.10|1.21|%^%^UCUM |||||F
OBX|147|NM|159019^MDC_HDIALY_THERAPY_UREA_CLEARANCE_MEAN^MDC|1.1.8.11|70||||||F
OBX|148|NM|159000^MDC_HDIALY_THERAPY_BODY_START_WT^MDC|1.1.8.12|75.9|kg^kg^UCUM|||||F
OBX|149|NM|159004^MDC_HDIALY_THERAPY_PCT_RECIRC^MDC|1.1.8.13|20|%^%^UCUM|||||F
OBX|150|NM|159008^MDC_HDIALY_THERAPY_PLASMA_NA_CONC^MDC|1.1.8.14|140|mmol/L^mmol/L^UCUM|||||F
OBX|151|NM|159012^MDC_HDIALY_THERAPY_RATIO_SPKT_OVER_V_PROJECTED^MDC|1.1.8.16|1.1|%^%^UCUM
|||||F
OBX|152|ST|158618^MDC_HDIALY_THERAPY_COMPLETE_METHOD^MDC|1.1.8.18|UF||||||F
OBX|153|ST|198270^MDC_EVT_HDIALY_THERAPY_TX_END_TIME^MDC|1.1.8.19|F||||||F
OBX|154|NM|159016^MDC_HDIALY_THERAPY_UREA_CLEARANCE^MDC|1.1.8.20|196||||||F
OBX|155|NM|159020^MDC_HDIALY_THERAPY_BODY_END_WT^MDC|1.1.8.21|75.9|kg^kg^UCUM|||||F
OBX|156|ST|70971^MDC_DEV_HDIALY_UF_CHAN^MDC|1.1.9|||||||F
OBX|157|ST|198272^MDC_EVT_HDIALY_UF_LO^MDC|1.1.9.1|F||||||F
OBX|158|ST|198274^MDC_EVT_HDIALY_UF_NEG^MDC|1.1.9.2|F||||||F
OBX|159|NM|159024^MDC_HDIALY_UF_TIME_TO_TARGET^MDC|1.1.9.3|55|min^min^UCUM|||||F
OBX|160|NM|159028^MDC_HDIALY_UF_TARGET_VOL_TO_REMOVE^MDC|1.1.9.4|2000|ml^ml^UCUM|||||F
OBX|161|NM|159032^MDC_HDIALY_UF_ACTUAL_REMOVED_VOL^MDC|1.1.9.5|555|ml^ml^UCUM|||||F
OBX|162|ST|198276^MDC_EVT_HDIALY_UF_RATE_RANGE^MDC|1.1.9.6|F||||||F
OBX|163|ST|198278^MDC_EVT_HDIALY_UF_GOAL_MET^MDC|1.1.9.7|F||||||F
OBX|164|ST|158619^MDC_HDIALY_UF_MODE^MDC|1.1.9.8|CONST-WT||||||F
OBX|165|NM|159036^MDC_HDIALY_UF_RATE^MDC|1.1.9.9|100|ml/h^ml/h^UCUM|||||F
OBX|166|NM|16936252^MDC_HDIALY_UF_RATE_SETTING^MDC|1.1.9.9|100|ml/h^ml/h^UCUM|||||F
OBX|167|ST|198276^MDC_EVT_HDIALY_UF_RATE_RANGE^MDC|1.1.9.10|F||||||F
OBX|168|NM|16936257^MDC_HDIALY_UF_RATE_LIMIT_HIGH_SETTING^MDC|1.1.9.11|150|ml/h^ml/h^UCUM||||
|F
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OBX|169|NM|16936259^MDC_HDIALY_UF_RATE_LIMIT_LOW_SETTING^MDC|1.1.9.12|90|ml/h^ml/h^UCUM|||||F
OBX|170|ST|70686^MDC_DEV_PRESS_BLD_NONINV_VMD^MDC|1.2|||||||F
OBX|171|ST|70687^MDC_DEV_PRESS_BLD_NONINV_CHAN^MDC|1.2.1|||||||F
OBX|172|NM|67979^MDC_ATTR_TIME_PD_MSMT^MDC|1.2.1.1|30|min^min^UCUM|||||F|||20191003085024+000
    0
OBX|173|ST|68135^MDC_ATTR_PT_BODY_POSN^MDC|1.2.1.2|SUPINE||||||F|||20191003085024+0000
OBX|174|NM|150022^MDC_PRESS_BLD_NONINV_DIA^MDC|1.2.1.3|80|mm[Hg]^mm[Hg]^UCUM|||||F|||20191003
    085024+0000
OBX|175|NM|149546^MDC_PULS_RATE_NON_INV^MDC|1.2.1.4|70|{beats}/min^{beats}/min^UCUM|||||F|||2
    0191003085024+0000
OBX|176|NM|150023^MDC_PRESS_BLD_NONINV_MEAN^MDC|1.2.1.5|100|mm[Hg]^mm[Hg]^UCUM|||||F|||201910
    03085024+0000
OBX|177|NM|150021^MDC_PRESS_BLD_NONINV_SYS^MDC|1.2.1.6|120|mm[Hg]^mm[Hg]^UCUM|||||F|||2019100
    3085024+0000
OBX|178|ST|69642^MDC_DEV_ANALY_SAT_O2_VMD^MDC|1.3|||||||F
OBX|179|ST|69643^MDC_DEV_ANALY_SAT_O2_CHAN^MDC|1.3.1|||||||F
OBX|180|NM|150456^MDC_PULS_OXIM_SAT_O2^MDC|1.3.1.1|98|%^%^UCUM|||||F
OBX|181|NM|149530^MDC_PULS_OXIM_PULS_RATE^MDC|1.3.1.2|67|{beats}/min^{beats}/min^UCUM|||||F
OBX|182|ST|196638^MDC_EVT_ERR^MDC|1.3.1.3|F||||||F
OBX|183|ST|70974^MDC_DEV_BLOOD_CHEM_VMD^MDC|1.4|||||||F
OBX|184|ST|70975^MDC_DEV_BLOOD_CHEM_CHAN^MDC|1.4.1|||||||F
OBX|185|ST|158620^MDC_HDIALY_PLASMA_VOL_MARKER^MDC|1.4.1.1|NONE||||||F
OBX|186|ST|158621^MDC_HDIALY_PLASMA_VOL_PROFILE^MDC|1.4.1.2|FLAT||||||F
OBX|187|NM|160132^MDC_CONC_HCT_GEN^MDC|1.4.1.3|0.45|%{vol}^%{vol}^UCUM|||||F
OBX|188|NM|160120^MDC_CONC_HB_GEN^MDC|1.4.1.4|13.6|g/dL^g/dL^UCUM|||||F
OBX|189|NM|159044^MDC_HDIALY_REL_BLOOD_VOL^MDC|1.4.1.5|35|%^%^UCUM|||||F
OBX|190|NM|150316^MDC_SAT_O2^MDC|1.4.1.6|98|%^%^UCUM|||||F
```

6.2.7 Example 4 – PD Message

In this message the PD treatment is dwelling in the second of three exchanges.

```
MSH|^~\&|ACME_Dialysis_Machine^025041FFFE000001^EUI-
64||||20241217125311+0000||ORU^R01^ORU_R01|20241217125311437|P|2.6|||AL|NE|||||IHE_PCD_001^IHEPCD^1.
3.6.1.4.12559.11.1.1.129^ISO
PID|||Shifter 100/19640306^^^^U||^^^^^^U||
OBR|1||025041FFFE0000012024121712531 1^ACME_Dialysis_Machine^025041FFFE000001^EUI-
64|27^MDCX_DEV_PDIALY_MACHINE_MDS^MDC|||20241217125311+0000
OBX|1|ST|27^MDCX_DEV_PDIALY_MACHINE_MDS^MDC|1|||||||F
OBX|2|ST|531969^MDC_ID_MODEL_NUMBER^MDC|1.0.0.1|Shifter 100||||||F
OBX|3|ST|531970^MDC_ID_MODEL_MANUFACTURER^MDC|1.0.0.2|Acme||||||F
OBX|4|ST|531972^MDC_ID_PROD_SPEC_SERIAL^MDC|1.0.0.3|19640306||||||F
OBX|5|ST|531975^MDC_ID_PROD_SPEC_SW^MDC|1.0.0.4|1.2.3.4||||||F
OBX|6|ST|0^MDCX_DEV_PDIALY_VMD^MDC|1.1|||||||F
OBX|7|ST|1^MDCX_DEV_PDIALY_MACH_CONFIG_CHAN^MDC|1.1.1|||||||F
OBX|8|DTM|67975^MDC_ATTR_TIME_ABS^MDC|1.1.1.1|20241217125311+0000||||||F
OBX|9|ST|4^MDCX_DEV_PDIALY_TREATMENT_CHAN^MDC|1.1.2|||||||F
OBX|10|ST|5^MDCX_PDIALY_TREAT_TYPE^MDC|1.1.2.1|CAPD||||||F
OBX|11|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.2.2|DWELL||||||F
OBX|12|ST|6^MDCX_PDIALY_TREAT_LOCATION^MDC|1.1.2.3|HOME||||||F
OBX|13|ST|7^MDCX_PDIALY_PRESCRIPTION_TYPE^MDC|1.1.2.4|EXCH||||||F
```

```
OBX|14|ST|51^MDCX_DEV_PDIALY_FLUID_1_CHAN^MDC|1.1.3|||||||F
OBX|15|ST|29^MDCX_PDIALY_FLUID_NAME^MDC|1.1.3.1|Dialneal Low Calcium 2.5%||||||F
OBX|16|ST|10^MDCX_PDIALY_FLUID_SOURCE^MDC|1.1.3.2|BAG||||||F
OBX|17|NM|9^MDCX_PDIALY_FLUID_BAG_VOLUME^MDC|1.1.3.3|5.000|L^liter^UCUM|||||F
OBX|18|ST|52^MDCX_DEV_PDIALY_FLUID_2_CHAN^MDC|1.1.4|||||||F
OBX|19|ST|29^MDCX_PDIALY_FLUID_NAME^MDC|1.1.4.1|Dialneal Low Calcium 2.5%||||||F
OBX|20|ST|10^MDCX_PDIALY_FLUID_SOURCE^MDC|1.1.4.2|BAG||||||F
OBX|21|NM|9^MDCX_PDIALY_FLUID_BAG_VOLUME^MDC|1.1.4.3|5.000|L^liter^UCUM|||||F
OBX|22|ST|3^MDCX_DEV_PDIALY_EXCHANGE_CHAN^MDC|1.1.5|||||||F
OBX|23|ST|100^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.5.1|1||||||F
OBX|24|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.5.2|COMPLETE||||||F
OBX|25|NM|12^MDCX_PDIALY_FILL_DURATION_SETTING^MDC|1.1.5.3|13.3|min^minutes^UCUM|||||F
OBX|26|NA|14^MDCX_PDIALY_FILL_VOLUME_SETTING^MDC|1.1.5.4|2.667^0.000|L^liter^UCUM|||||F
OBX|27|DTM|37^MDCX_PDIALY_FILL_START_TIME^MDC|1.1.5.5|20230913220000+0000||||||F
OBX|28|DTM|38^MDCX_PDIALY_FILL_END_TIME^MDC|1.1.5.6|20230913221320+0000||||||F
OBX|29|NM|11^MDCX_PDIALY_FILL_DURATION^MDC|1.1.5.7|13.3|min^minutes^UCUM|||||F
OBX|30|NA|13^MDCX_PDIALY_FILL_VOLUME^MDC|1.1.5.8|2.667^0.000|L^liter^UCUM|||||F
OBX|31|NM|16^MDCX_PDIALY_DWELL_DURATION_SETTING^MDC|1.1.5.9|153.3|min^minutes^UCUM|||||F
OBX|32|DTM|39^MDCX_PDIALY_DWELL_START_TIME^MDC|1.1.5.10|20230913221320+0000||||||F
OBX|33|DTM|40^MDCX_PDIALY_DWELL_END_TIME^MDC|1.1.5.11|20230914004640+0000||||||F
OBX|34|NM|15^MDCX_PDIALY_DWELL_DURATION^MDC|1.1.5.12|153.3|min^minutes^UCUM|||||F
OBX|35|NM|18^MDCX_PDIALY_DRAIN_DURATION_SETTING^MDC|1.1.5.13|13.3|min^minutes^UCUM|||||F
OBX|36|NM|20^MDCX_PDIALY_DRAIN_VOLUME_SETTING^MDC|1.1.5.14|2.667|L^liter^UCUM|||||F
OBX|37|DTM|41^MDCX_PDIALY_DRAIN_START_TIME^MDC|1.1.5.15|20230914004640+0000||||||F
OBX|38|DTM|42^MDCX_PDIALY_DRAIN_END_TIME^MDC|1.1.5.16|20230914010000+0000||||||F
OBX|39|NM|17^MDCX_PDIALY_DRAIN_DURATION^MDC|1.1.5.17|13.3|min^minutes^UCUM|||||F
OBX|40|NM|19^MDCX_PDIALY_DRAIN_VOLUME^MDC|1.1.5.18|2.667|L^liter^UCUM|||||F
OBX|41|ST|3^MDCX_DEV_PDIALY_EXCHANGE_CHAN^MDC|1.1.6|||||||F
OBX|42|ST|100^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.6.1|2||||||F
OBX|43|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.6.2|DWELL||||||F
OBX|44|NM|12^MDCX_PDIALY_FILL_DURATION_SETTING^MDC|1.1.6.3|13.3|min^minutes^UCUM|||||F
OBX|45|NA|14^MDCX_PDIALY_FILL_VOLUME_SETTING^MDC|1.1.6.4|2.333^0.333|L^liter^UCUM|||||F
OBX|46|DTM|37^MDCX_PDIALY_FILL_START_TIME^MDC|1.1.6.5|20230914010000+0000||||||F
OBX|47|DTM|38^MDCX_PDIALY_FILL_END_TIME^MDC|1.1.6.6|20230914011320+0000||||||F
OBX|48|NM|11^MDCX_PDIALY_FILL_DURATION^MDC|1.1.6.7|13.3|min^minutes^UCUM|||||F
OBX|49|NA|13^MDCX_PDIALY_FILL_VOLUME^MDC|1.1.6.8|2.333^0.333|L^liter^UCUM|||||F
OBX|50|NM|16^MDCX_PDIALY_DWELL_DURATION_SETTING^MDC|1.1.6.9|153.3|min^minutes^UCUM|||||F
OBX|51|DTM|39^MDCX_PDIALY_DWELL_START_TIME^MDC|1.1.6.10|20230914011320+0000||||||F
OBX|52|NM|18^MDCX_PDIALY_DRAIN_DURATION_SETTING^MDC|1.1.6.11|13.3|min^minutes^UCUM|||||F
OBX|53|NM|20^MDCX_PDIALY_DRAIN_VOLUME_SETTING^MDC|1.1.6.12|2.667|L^liter^UCUM|||||F
OBX|54|ST|3^MDCX_DEV_PDIALY_EXCHANGE_CHAN^MDC|1.1.7|||||||F
OBX|55|ST|100^MDC_ATTR_CHAN_NUM_LOGICAL^MDC|1.1.7.1|3||||||F
OBX|56|ST|8^MDCX_PDIALY_CURRENT_PHASE^MDC|1.1.7.2|PENDING||||||F
OBX|57|NM|12^MDCX_PDIALY_FILL_DURATION_SETTING^MDC|1.1.7.3|13.3|min^minutes^UCUM|||||F
OBX|58|NA|14^MDCX_PDIALY_FILL_VOLUME_SETTING^MDC|1.1.7.4|0.000^2.667|L^liter^UCUM|||||F
OBX|59|NM|16^MDCX_PDIALY_DWELL_DURATION_SETTING^MDC|1.1.7.5|153.3|min^minutes^UCUM|||||F
```

```
OBX|60|NM|18^MDCX_PDIALY_DRAIN_DURATION_SETTING^MDC|1.1.7.6|13.3|min^minutes^UCUM|||||F
OBX|61|NM|20^MDCX_PDIALY_DRAIN_VOLUME_SETTING^MDC|1.1.7.7|2.667|L^liter^UCUM|||||F
```

6.3 EMR Response

The EMR responds with a simple Acknowledgement Message (ACK_R01_ACK). Although the response to a missing or rejected response is machine specific, this standard recommends the following actions:

1) If the EMR does not respond, then the dialysis machine should retry the message. If no response is received for the retry, the dialysis machine should generate an alert locally.
2) If the EMR responds but rejects the PCD-01 message, the dialysis machine should generate an alert locally.

6.3.1 Message Structure

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
[{SFT}]	Software Segment	X	[0..0]
[UAC]	User Authentication Credential	X	[0..0]
MSA	Message Acknowledgement	R	[1..1]
ERR	Error	RE	[0..100]

6.3.2 Example 1 – Accepted Response

The following message is an example of an accepted PCD-01 message.

```
MSH|^~\&|EMR||||20191003092025+0000||ACK^R01^ACK|XX3657|P|2.6|||NE|NE
MSA|AA|20191003092024
```

6.3.3 Example 2 – Rejected Response

The following message is an example of a rejected PCD-01 message.

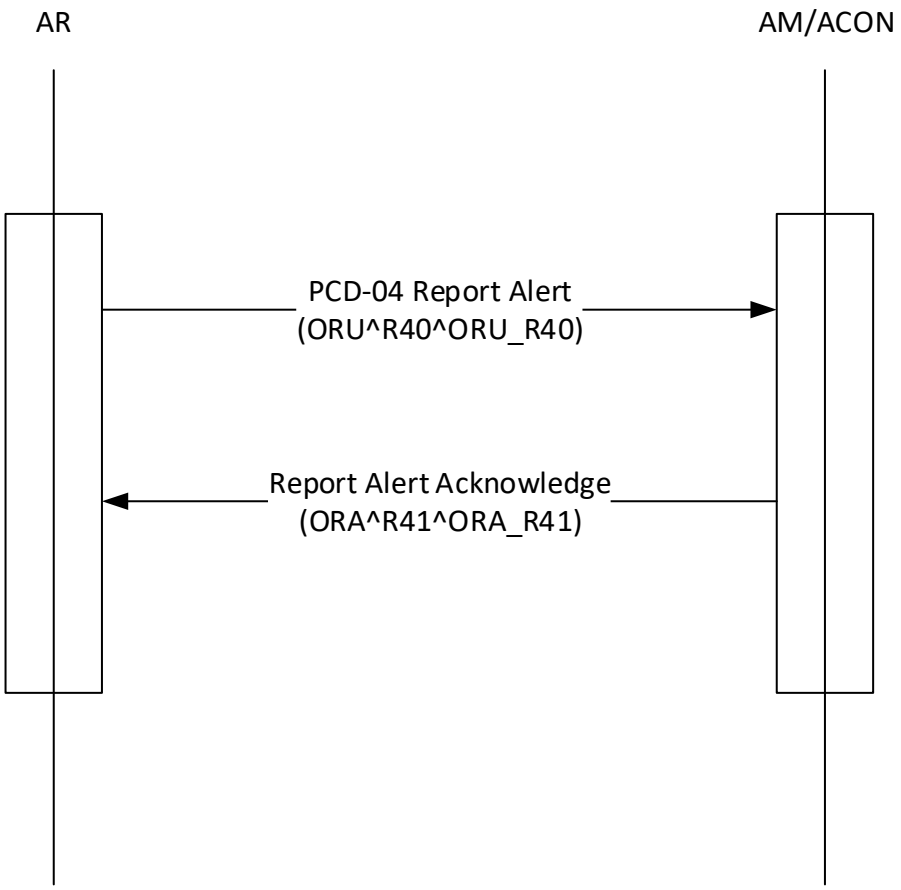
```
MSH|^~\&|EMR||||20191003092025+0000||ACK^R01^ACK|XX3657|P|2.6|||NE|NE
MSA|AR|20191003092024
ERR||PID^1^11^^9|103^Table Value Not Found|E
```

7 Reporting Alarm Information

7.1 Overview

The sending of Alarm Information to the EMR System is accomplished using the PCD-04 Transaction of the Patient Care Device (PCD) domain in the Device Enterprise Communication (DEC) IHE profile. In doing so, the Dialysis Machine acts as the Alert Reporter (AR) and the EMR is the Alert Manager (AM) and/or the Alert Consumer (ACON).

Figure 9 - AR sends Report Alert to AM and/or ACON as an HL7 ORU message.



The Dialysis Machine will report the alarm when the alarm state changes, when the alarm activity state changes, and periodically while it is active. The period of the "keep-alive" PCD-04 messages should be disclosed in the manufacturer's documents. It is recommended that this be between 10 and 30 seconds. The dialysis machine will send the appropriate parameters and measurements with each alarm. For example, when an Arterial Pressure High Alarm is reported, the message will contain the Arterial pressure measurement and upper alam limit.

The ORU^R40 message represents a unitary alert, which is to be acknowledged, in whole, by an ORA message. Multiple alerts requiring separate acknowledgement will be sent as individual messages.

7.2 Device Request

The PCD-04 Report Alert message is used to communicate ACM data from an Alert Reporter (AR) to Alert Manager (AM) and/or Alert Consumer (ACON). In addition, the Dialysis Machine sends a PCD-04 Message to the Device Observation Consumer (DOC) so that the information can be logged with the PCD-01 Message.

Common HL7 segments are defined in HL7 Data Elements. There are sections discussing considerations specific to PCD-04 where applicable.

While there can be multiple OBR segments per PCD-04 transaction (in support of inclusion of alert common containment and evidentiary data) there is at most one alert per PCD-04 transaction.

7.2.1 Message Structure

Message Type - ORU^R40^ORU_R40

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
[{SFT}]	Software Segment	X	[0..0]
{	--- ALERT_begin		
[	--- PATIENT begin		
PID	Patient Identification	R	[1..1]
[	--- LOCATION begin		
PV1	Alert Location	O	[0..1]
]	--- LOCATION end		
]	--- PATIENT end		
{	--- ALERT_IDENTIFICATION begin		
[ORC]	Alert Order Common	X	[0..0]
{OBR}	Alert Identification	R	[1..*]
[{	--- ALERT_OBSERVATION begin		
{OBX}	Alert observations relative to OBR	R	[1..*]
{[NTE]}	Notes and Comments	X	[0..0]
}]	--- ALERT OBSERVATION end		
}	--- ALERT_IDENTIFICATION end		
}	--- ALERT end		

A single Report Alert [PCD-04] transaction contains at most one alert for a given patient. The PCD-04 message contains a single OBR segment that contains five OBX segments in a specific order.

- OBX 1 identifies the type of alarm.
- OBX 2 identifies the event source. For numeric values this includes the object value and limits. This is the Source Column of Table 3 and 5.
- OBX 3 identifies the event phase.
- OBX 4 identifies the alarm state.
- OBX 5 identifies the alarm activity state.

The first OBX (ID=1) identifies the type of alert.

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBX
2	ID	C	0125	Value Type
3	CWE	R		Observation Identifier
4	ST	R		Observation Sub-ID
5	varies	R		Observation Value
6	CWE	R		Units

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
7	ST	X		References Range
8	CWE	X		Interpretation Codes
9	NM	X		Probability
10	ID	X	0080	Nature of Abnormal Test
11	ID	R	0085	Observation Result Status
12	DTM	X		Effective Date of Reference Range
13	ST	X		User Defined Access Checks
14	DTM	X		Date/Time of the Observation
15	CWE	X		Producer's ID
16	XCN	X		Responsible Observer
17	CWE	X		Observation Method
18	EI	X		Equipment Instance Identifier
19	DTM	X		Date/Time of the Analysis
20	CWE	X	0163	Observation Site
21	EI	X		Observation Instance Identifier
22	CNE	X	0725	Mood Code
23	XON	X		Performing Organization Name
24	XAD	X		Performing Organization Address
25	XCN	X		Performing Organization Medical Director
26	ID	X	0909	Patient Results Release Category

OBX-1 Set ID

This field contains the sequence number. For this segement it will always be 1.

OBX-2 Value Type

This field defines the data type of OBX-5, Observation Value. For this segment the value will always be "CWE".

OBX-3 Observation Identifier

This field will be one of the following.

Field Value	Usage
196670^MDC_EVT_LO^MDC	This value is used when the alarm is generated because a measure value is below a numeric limit.
196648^MDC_EVT_HI^MDC	This value is used when the alarm is generated because a measure value is above a numeric limit.
196616^MDC_EVT_ALARM^MDC	This value is used when the alarm is not generated due to a numeric value.

OBX-4 Observation Sub-ID

This value will always be "1.0.0.0.1".

OBX-5 Observation Value

This field identifies the alarm being generated. For numeric values, this field is the value in the Source Column in Table 3. For non-numeric alarms, this field is the Event Identifier Column in Table 3.

For example, "198240^MDC_EVT_HDIALY_ANTICOAG_SYRINGE_SIZE^MDC"

"198242^MDC_EVT_HDIALY_BLD_PUMP_STOP^MDC"

OBX-8 Interpretation Codes

This field is used to provide the Alarm Priority and Alarm Type, and optionally the Abnormality Type. Supported values for these items can be found in the definition of OBX-8.

Examples,

High Priority, Technical, Upper Limit Alarm H~ST~PH

Non-Numeric High Priority, Technical Alarm ST~PH

OBX-11 Observation Result Status

For this segment the value will always be "F".

The second OBX (ID=2) identifies the parameter and the reference range.

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBX
2	ID	C	0125	Value Type
3	CWE	R		Observation Identifier
4	ST	R		Observation Sub-ID
5	varies	R		Observation Value
6	CWE	R		Units
7	ST	X		References Range
8	CWE	X		Interpretation Codes
9	NM	X		Probability
10	ID	X	0080	Nature of Abnormal Test
11	ID	R	0085	Observation Result Status
12	DTM	X		Effective Date of Reference Range
13	ST	X		User Defined Access Checks
14	DTM	X		Date/Time of the Observation
15	CWE	X		Producer's ID
16	XCN	X		Responsible Observer
17	CWE	X		Observation Method
18	EI	X		Equipment Instance Identifier
19	DTM	X		Date/Time of the Analysis
20	CWE	X	0163	Observation Site
21	EI	X		Observation Instance Identifier
22	CNE	X	0725	Mood Code
23	XON	X		Performing Organization Name
24	XAD	X		Performing Organization Address
25	XCN	X		Performing Organization Medical Director
26	ID	X	0909	Patient Results Release Category

OBX-1 Set ID

For this segment the value will always be 2.

OBX-2 Value Type

This field defines the data type of OBX-5, Observation Value. For numeric alarms, this value will be "NM". For non-numeric alarms, this value will be "CWE".

OBX-3 Observation Identifier

For numeric alarms, this field identifies the object being monitored. This object is identified in the Source Column in Table 3.

For non-numeric alarms, this field will always be "68480^MDC_ATTR_ALERT_SOURCE^MDC".

OBX-4 Observation Sub-ID

For numeric alarms, this field identifies the object being measured. This value is the Observation Sub ID of the object identified in the Source Column in Table 3.

For non-numeric alarms, this field identifies the VMD of the device generating the alarm. This value is the Observation Sub-ID of the object identified in the Source Column in Table 3.

In both cases, the observation sub-ID has ".2" appended to signify facet 2.

For example, the Therapy Outcomes VMD would be reported as "1.1.8.2".

OBX-5 Observation Value

For numeric alarms, this field contains the value of the object that resulted in the alarm.

For non-numeric alarms, this field contains the identifier of the VMD generating the alarm. This is identified in the Source Column in Table 3.

Example, "70967^MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN^MDC".

OBX-6 Observation Units

For numeric alarms, this field contains the units of measure for the object.

For non-numeric alarms, this field is blank.

OBX-7 Reference Range

This field contains the alarm limits for numeric alarms. For non-numeric alarms this field is empty. Ranges can be specified in one of three ways.

	Format	Example
Upper Limit Only	> Upper	> 400
Lower Limit Only	< Lower	< -200
Upper and Lower Limit	Lower – Upper	20 - 400

Note, alarm limits may be fixed or machine generated.

OBX-11 Observation Result Status

For this segment the value will always be "F".

The third OBX (ID=3) identifies the event phase.

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBX
2	ID	C	0125	Value Type
3	CWE	R		Observation Identifier
4	ST	R		Observation Sub-ID
5	varies	R		Observation Value
6	CWE	R		Units
7	ST	X		References Range
8	CWE	X		Interpretation Codes

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
9	NM	X		Probability
10	ID	X	0080	Nature of Abnormal Test
11	ID	R	0085	Observation Result Status
12	DTM	X		Effective Date of Reference Range
13	ST	X		User Defined Access Checks
14	DTM	X		Date/Time of the Observation
15	CWE	X		Producer's ID
16	XCN	X		Responsible Observer
17	CWE	X		Observation Method
18	EI	X		Equipment Instance Identifier
19	DTM	X		Date/Time of the Analysis
20	CWE	X	0163	Observation Site
21	EI	X		Observation Instance Identifier
22	CNE	X	0725	Mood Code
23	XON	X		Performing Organization Name
24	XAD	X		Performing Organization Address
25	XCN	X		Performing Organization Medical Director
26	ID	X	0909	Patient Results Release Category

OBX-1 Set ID

This field contains the sequence number. For this segement it will always be 3.

OBX-2 Value Type

This field defines the data type of OBX-5, Observation Value. For this segment the value will always be "ST".

OBX-3 Observation Identifier

This field will always be "68481^MDC_ATTR_EVENT_PHASE^MDC".

OBX-4 Observation Sub-ID

This value will always be "1.0.0.0.3".

OBX-5 Observation Value

This value will always be one of the following.

- start - start of an interval event/alert, an end is expected.
- continue - continuation of an ongoing interval event/alert.
- End - end of an interval event/alert.

OBX-11 Observation Result Status

For this segment the value will always be "F".

The third OBX (ID=4) identifies the alarm state.

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBX
2	ID	C	0125	Value Type
3	CWE	R		Observation Identifier
4	ST	R		Observation Sub-ID

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
5	varies	R		Observation Value
6	CWE	R		Units
7	ST	X		References Range
8	CWE	X		Interpretation Codes
9	NM	X		Probability
10	ID	X	0080	Nature of Abnormal Test
11	ID	R	0085	Observation Result Status
12	DTM	X		Effective Date of Reference Range
13	ST	X		User Defined Access Checks
14	DTM	X		Date/Time of the Observation
15	CWE	X		Producer's ID
16	XCN	X		Responsible Observer
17	CWE	X		Observation Method
18	EI	X		Equipment Instance Identifier
19	DTM	X		Date/Time of the Analysis
20	CWE	X	0163	Observation Site
21	EI	X		Observation Instance Identifier
22	CNE	X	0725	Mood Code
23	XON	X		Performing Organization Name
24	XAD	X		Performing Organization Address
25	XCN	X		Performing Organization Medical Director
26	ID	X	0909	Patient Results Release Category

OBX-1 Set ID

This field contains the sequence number. For this segement it will always be 4.

OBX-2 Value Type

This field defines the data type of OBX-5, Observation Value. For this segment the value will always be "ST".

OBX-3 Observation Identifier

This field will always be "68482^MDC_ATTR_ALARM_STATE^MDC".

OBX-4 Observation Sub-ID

This value will always be "1.0.0.0.4".

OBX-5 Observation Value

This value will one of the following:

- off
- inactive
- active
- latched

OBX-11 Observation Result Status

For this segment the value will always be "F".

The third OBX (ID=5) identifies the alarm activity state.

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBX
2	ID	C	0125	Value Type
3	CWE	R		Observation Identifier
4	ST	R		Observation Sub-ID
5	varies	R		Observation Value
6	CWE	R		Units
7	ST	X		References Range
8	CWE	X		Interpretation Codes
9	NM	X		Probability
10	ID	X	0080	Nature of Abnormal Test
11	ID	R	0085	Observation Result Status
12	DTM	X		Effective Date of Reference Range
13	ST	X		User Defined Access Checks
14	DTM	X		Date/Time of the Observation
15	CWE	X		Producer's ID
16	XCN	X		Responsible Observer
17	CWE	X		Observation Method
18	EI	X		Equipment Instance Identifier
19	DTM	X		Date/Time of the Analysis
20	CWE	X	0163	Observation Site
21	EI	X		Observation Instance Identifier
22	CNE	X	0725	Mood Code
23	XON	X		Performing Organization Name
24	XAD	X		Performing Organization Address
25	XCN	X		Performing Organization Medical Director
26	ID	X	0909	Patient Results Release Category

OBX-1 Set ID

This field contains the sequence number. For this segement it will always be 5.

OBX-2 Value Type

This field defines the data type of OBX-5, Observation Value. For this segment the value will always be "ST".

OBX-3 Observation Identifier

This field will always be "68483^MDC_ATTR_ALARM_INACTIVATION_STATE^MDC".

OBX-4 Observation Sub-ID

This value will always be "1.0.0.0.5".

OBX-5 Observation Value

This value will one of the following:

- enabled
- audio-paused
- audio-off
- alarm-paused
- alarm-off
- alert-acknowledged (IEC 60601-1-8 Amendment 1; CP126)

OBX-11 Observation Result Status

For this segment the value will always be "F".

7.2.2 Example 1 - Alarm Initiation

The following message is an example of a Venous Pressure Low Alarm.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092025+0000||ORU^R40^ORU_R40|20191003092024|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|196616^MDC_EVT_ALARM^MDC|||20191003092024+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F

OBX|2|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F

OBX|3|CWE|196670^MDC_EVT_LO^MDC|1.0.0.0.1|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|||PH~SP~L|
    ||F

OBX|4|NM|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|1.1.3.15.2|15|mm[Hg]^Millimeters of
    Mercury^UCUM |20-400||||F

OBX|5|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start||||||F

OBX|6|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F

OBX|7|ST|68483^MDC_ATTR_ALARM_INACTIVATION_STATE^MDC|1.0.0.0.5|enabled||||||F
```

7.2.3 Example 2 - Alarm Cessation

The following message shows the cessation of a Blood Pump Stopped alarm.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092025+0000||ORU^R40^ORU_R40|20191003092024|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|196616^MDC_EVT_ALARM^MDC|||20191003092024+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F

OBX|2|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F

OBX|3|CWE|196616^MDC_EVT_ALARM^MDC|1.0.0.0.1|198242^MDC_EVT_HDIALY_ALARM_BLD_PUMP_STOP^MDC|||
    |||F

OBX|4|CWE|68480^MDC_ATTR_ALERT_SOURCE^MDC|1.1.3.0.2|||||||F

OBX|5|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|end||||||F

OBX|6|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|inactive||||||F

OBX|7|ST|68483^MDC_ATTR_ALARM_INACTIVATION_STATE^MDC|1.0.0.0.5|enabled||||||F
```

7.2.4 Example 3 - Alarm Mute

The following message shows a VP Low Alarm that has been muted by the user.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092025+0000||ORU^R40^ORU_R40|20191003092024|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|196616^MDC_EVT_ALARM^MDC|||20191003092024+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F
```

```
OBX|2|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F

OBX|3|CWE|196670^MDC_EVT_LO^MDC|1.0.0.0.1|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|||PH~SP|||
    F

OBX|4|NM|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|1.1.3.15.2|15|mm[Hg]^Millimeters of
    Mercury^UCUM |20-400||||F

OBX|5|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|continue||||||F

OBX|6|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F

OBX|7|ST|68483^MDC_ATTR_ALARM_INACTIVATION_STATE^MDC|1.0.0.0.5|audio-paused||||||F
```

The following message shows a VP Low Alarm whose mute has expired.

```
MSH|^~\&|ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64||||20191003092025+0000||ORU^R40^ORU_R40|20191003092024|P|2.6|||AL|NE|||||IHE_PCD_001^IH
    EPCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO

PID|||Scrubber 2000/SC678932^^^"^U||^^^^^^U

OBR|1||080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-
    64|196616^MDC_EVT_ALARM^MDC|||20191003092024+0000

OBX|1|ST|70929^MDC_DEV_HDIALY_MACHINE_MDS^MDC|1.0.0|||||||F

OBX|2|ST|70934^MDC_DEV_HDIALY_VMD^MDC|1.1|||||||F

OBX|3|CWE|196670^MDC_EVT_LO^MDC|1.0.0.0.1|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|||PH~SP|||
    F

OBX|4|NM|158776^MDC_HDIALY_BLD_PUMP_PRESS_VEN^MDC|1.1.3.15.2|15|mm[Hg]^Millimeters of
    Mercury^UCUM |20-400||||F

OBX|5|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|continue||||||F

OBX|6|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F

OBX|7|ST|68483^MDC_ATTR_ALARM_INACTIVATION_STATE^MDC|1.0.0.0.5|enabled||||||F
```

7.2.5 Example 4 – Vendor Specific Alarm

The following shows how to report a vendor specific alarm. In this case a Venous Air Alarm. The vendor specific alarm information is reported following the mandatory PCD-04 alarm information. In this case, the Alam ID is “10” and the Alarm Text is “Venous Air”.

```
MSH|^~\&|ACME_Dialysis_Machine^025041FFFE000001^EUI-
64||||20241121154324+0000||ORU^R40^ORU_R40|20241121154324827|P|2.6|||AL|NE|||||IHE_PCD_ACM_00
1^IHEPCD^1.3.6.1.4.1.19376.1.6.4.4^ISO

PID|||Scrubber 2000/SC678932^^^^U||^^^^^^U||

OBR|1||025041FFFE000001202411211543 24^ACME_Dialysis_Machine^025041FFFE000001^EUI-
64|196616^MDC_EVT_ALARM^MDC|||20241121154324+0000

OBX|1|CWE|61439^MDC_EVT_NOS^MDC|1.0.0.1.1|||||||F

OBX|2|CWE|70934^MDC_DEV_HDIALY_VMD^MDC|1.0.0.1.2|||||||F

OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.1.3|start||||||F

OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.1.4|active||||||F

OBX|5|ST|68483^MDC_ATTR_ALARM_INACTIVATION_STATE^MDC|1.0.0.1.5|enabled||||||F

OBX|6|ST|999999^MDC_ATTR_VENDOR_ALERT_ID^MDC|1.0.0.2|10||||||F

OBX|7|ST|999999^MDC_ATTR_VENDOR_ALERT_TEXT^MDC|1.0.0.3|Venous Air||||||F
```

7.3 EMR Response

The EMR responds with a Report Alert Acknowledgement (ORA^R41^ORA_R41).

7.3.1 Message Structure

Message Type - ORA^R41^ORA_R41

Segment	Meaning	Use	Card
MSH	Message Header	R	[1..1]
[{SFT}]	Software Segment	X	[0..0]
[UAC]	User Authentication Credential	X	[0..0]
MSA	Message Acknowledgement	R	[1..1]
ERR	Error	RE	[0..100]
[{PRT}]	Participation (Acknowledging User)	O	[0..1]

7.3.2 Example 1 – Accepted Response

The following message is an example of an accepted PCD-04 message.

```
MSH|^~\&|EMR||||20191003092025+0000||ACK^R40^ACK|XX3657|P|2.6|||NE|NE
MSA|AA|20191003092024
```

8 HL7 Data Elements

The information contained in this section is a subset of the full HL7 Specification. Only segments used by this standard are shown. Restrictions that are specific to this specification are identified for each segment.

8.1 Tables

The values contained in the tables in this section may be a subset of the values supported by the HL7 specification. Only values supported or used by Dialysis Machines are shown.

HL7 Table 0003 – Event

Value	Description
R01	PCD-01, PCD-01 Ack
R40	PCD-04, PCD-04 Ack
D01	Prescription Query Request
K22	Prescription Query Response, Patient Query Response
Q22	Patient Query Request
	Other values not used in this specification.

HL7 Table 0004 – Patient Class

Value	Description
B	Obstetrics (Not Used)
C	Commercial (Not User)
E	Emergency
I	Inpatient (Used for acute treatments)
N	Not Applicable
O	Outpatient (Used for chronic incenter treatments)
P	Preadmit (Not Used)
R	Recurring Patient (Used for chronic home treatments)
U	Unknown

HL7 Table 0008 - Acknowledgment Code

Value	Description
AA	Original mode: Application Accept - Enhanced mode: Application acknowledgment: Accept
AE	Original mode: Application Error - Enhanced mode: Application acknowledgment: Error
AR	Original mode: Application Reject - Enhanced mode: Application acknowledgment: Reject
CA	Enhanced mode: Accept acknowledgment: Commit Accept
CE	Enhanced mode: Accept acknowledgment: Commit Error
CR	Enhanced mode: Accept acknowledgment: Commit Reject

HL7 Table 0038 - Order status

Value	Description
A	Some, but not all, results available
CA	Order was canceled
CM	Order is completed
DC	Order was discontinued
ER	Error, order not found
HD	Order is on hold
IP	In process, unspecified
RP	Order has been replaced
SC	In process, scheduled

HL7 Table 0076 – Message Type

Value	Description
ORU	PCD-01, PCD-04
ACK	PCD-01 Ack
QBP	Prescription Query Request, Patient Query Request
RSP	Prescription Query Response, Patient Query Response
	Other values not used in this specification.

HL7 Table 0085 - Observation result status codes interpretation

Value	Description
F	Final results; Can only be changed with a corrected result.

HL7 Table 0091 – Query Priority

Value	Description
D	Deferred
I	Immediate

HL7 Table 0123 - Result status for OBR segment

Value	Description
O	Order received; specimen not yet received
I	No results available; specimen received, procedure incomplete
S	No results available; procedure scheduled, but not done
A	Some, but not all, results available
P	Preliminary: A verified early result is available, final results not yet obtained
C	Correction to results

Value	Description
R	Results stored; not yet verified
F	Final results; results stored and verified. Can only be changed with a corrected result.
X	No results available; Order canceled.
Y	No order on record for this test. (Used only on queries)
Z	No record of this patient. (Used only on queries)

1526

1527 **HL7 Table 0125 - Value type**

Value	Description
DT	Date
NM	Numeric
ST	String Data.
TM	Time

1528

1529 **HL7 Table 0155 - Accept/application acknowledgment conditions**

Value	Description
AL	Always

1530

1531 **HL7 Table 0208 – Query Response Status**

Value	Description
OK	Data found, no errors. This is the default value.
NF	No data found, no errors.
AE	Application Error
AR	Application Reject

1532

1533 **HL7 Table 0354 – Message Structure**

Value	Description
ORU_R01	PCD-01
ORU_R40	PCD-04
ACK	PCD-01 Ack, PCD-03 Ack
QBP_DO1	Prescription Request
RSP_K22	Prescription Response
QBP_Q21	Patient Query Request
RSP_K21	Patient Query Response
	Other values not used in the standard

1534

1535 **HL7 table 0357 – Message Error Condition Codes**

Value	Description	Comment
0	Message accepted	Success. Optional, as the AA conveys success. Used for systems that shall always return a status code.
100	Segment sequence error	Error: The message segments were not in the proper order, or required segments are missing.
101	Required field missing	Error: A required field is missing from a segment
102	Data type error	Error: The field contained data of the wrong data type, e.g. an NM field contained "FOO".
103	Table value not found	Error: A field of data type ID or IS was compared against the corresponding table, and no match was found.
200	Unsupported message type	Rejection: The Message Type is not supported.

Value	Description	Comment
201	Unsupported event code	Rejection: The Event Code is not supported.
202	Unsupported processing id	Rejection: The Processing ID is not supported.
203	Unsupported version id	Rejection: The Version ID is not supported.
204	Unknown key identifier	Rejection: The ID of the patient, order, etc., was not found. Used for transactions *other than* additions, e.g. transfer of a non-existent patient.
205	Duplicate key identifier	Rejection: The ID of the patient, order, etc., already exists. Used in response to addition
206	Application record locked	Rejection: The transaction could not be performed at the application storage level, e.g., database locked.
207	Application internal error	Rejection: A catchall for internal errors not explicitly covered by other codes.

HL7 Table 0394 – Response Modality

Value	Description
R	Real Time
T	Bolus (a series of responses sent at the same time without use of batch formatting)
B	Batch

HL7 Table 0396 – Coding Systems

Value	Description
MDC	ISO/IEEE
UCUM	Unified Code for Units of Measure (UCUM)

HL7 table 0516 – Error Severity

Value	Description	Comment
W	Warning	Transaction successful, but there may issues
I	Information	Transaction was successful but includes information e.g., inform patient
E	Error	Transaction was unsuccessful

8.2 Segments

8.2.1 MSA – Message Acknowledgement Segment

The MSA segment contains INFORMATION sent while acknowledging another message. This message is sent from the EMR System to the Dialysis Machine. Although other fields may be present, the Dialysis Machine processes MSA-1 Acknowledgement Code and MSA-2 Message Control ID.

HL7 Attribute Table - MSA Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ID	R	0008	Acknowledgment Code
2	ST	R		Message Control ID
3		W		Text Message
4	NM	O		Expected Sequence Number
5		W		Delayed Acknowledgment Type
6		W		Error Condition
7	NM	O		Message Waiting Number

HL7 Attribute Table - MSA Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
8	ID	O	0520	Message Waiting Priority

MSA-1 Acknowledgment Code (ID)

HL7 Definition: This field contains an acknowledgment code, see message processing rules. Refer to HL7 Table 0008 - Acknowledgment Code for valid values.

In this table, the value "CA" corresponds to "Enhanced mode: Accept acknowledgment: Commit Accept." This value means that the receiving system has committed the message to safe storage in a manner that releases the sending system from the need to resend the message. "CR" means that a message was rejected for a message uniquely identified by the information in MSH-9, MSH-12, MSH-11, MSH-21. "CE" is a message processing error or failure condition.

This Specification: The Dialysis Machine accepts both original and enhanced mode responses. The response of the Dialysis Machine to an Error or Rejected message is device and manufacturer specific and is not covered by this guide.

MSA-2 Message Control ID (ST)

HL7 Definition: This field contains the message control ID of the message sent by the sending system. It allows the sending system to associate this response with the message for which it is intended.

This Specification: Note that the combination of the values in *MSA-2 Message Control ID* and *MSH-6 Receiving Facility* should be unique to the recipient of the acknowledgement message (i.e., the Order Fulfiller).

Note on Element Length: The element length for MSA-2 has been extended to 50 characters from the HL7-prescribed length of 20 characters. This element has been extended to accommodate the extended element length of MSH-10 Message Control ID in the ORU message types.

8.2.2 MSH – Message Header Segment

The MSH segment defines the intent, source, destination, and some specifics of the syntax of a message.

HL7 Attribute Table - MSH Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ST	R		Field Separator
2	ST	R		Encoding Characters
3	HD	R	0361	Sending Application
4	HD	X	0362	Sending Facility
5	HD	X	0361	Receiving Application
6	HD	X	0362	Receiving Facility
7	DTM	R		Date/Time of Message
8	ST	X		Security
9	MSG	R		Message Type
10	ST	R		Message Control ID
11	PT	R		Processing ID
12	VID	R		Version ID
13	NM	X		Sequence Number
14	ST	X		Continuation Pointer
15	ID	X	0155	Accept Acknowledgment Type

HL7 Attribute Table - MSH Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
16	ID	X	0155	Application Acknowledgment Type
17	ID	X	0399	Country Code
18	ID	X	0211	Character Set
19	CWE	X		Principal Language Of Message
20	ID	X	0356	Alternate Character Set Handling Scheme
21	EI	R		Message Profile Identifier
22	XON	X		Sending Responsible Organization
23	XON	X		Receiving Responsible Organization
24	HD	X		Sending Network Address
25	HD	X		Receiving Network Address

MSH-1 Field separator (ST)

HL7 Definition: This field contains the separator between the segment ID and the first real field. As such it serves as the separator and defines the character to be used as a separator for the rest of the message. Recommended value is | (ASCII 124).

This Specification: This value will be | (ASCII 124).

MSH-2 Encoding characters (ST)

HL7 Definition: This field contains four characters in the following order: the component separator, repetition separator, escape character, and subcomponent separator. Recommended values are ^~\& (ASCII 94, 126, 92, and 38, respectively).

This Specification: This value will be recommended values are ^~\& (ASCII 94, 126, 92, and 38, respectively).

MSH-3 Sending Application (HD)

HL7 Definition: This field uniquely identifies the sending application among all other applications within the network enterprise. The network enterprise consists of all those applications that participate in the exchange of HL7 messages within the enterprise.

This Specification: This value will be the name of the dialysis machine and the Extended Unique Identified (EUI-64). For example,

ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-64

The EUI-64 is created from the MAC Adress of the interface sending the messages. If the MAC address of the interface is 12-34-56-78-AB-CD then the EUI-64 is 123456FFFE78ABCD.

MSH-7 Date/time of message (TS)

HL7 Definition: This field contains the date/time that the sending system created the message. If the time zone is specified, it will be used throughout the message as the default time zone.

MSH-9 Message type (MSG)

HL7 Definition: This element contains the message type, trigger event, and the message structure ID for the message.

CM Components: <message type (ID)> ^ <trigger event (ID)> ^ <message structure (ID)>

The allowed components of this element are listed in several tables maintained by HL7. See HL7 Table 0076 – Message Type, HL7 Table 0003 – Event, and HL7 Table 0354 – Message Structure.

This Specification: In the MT-ACK-1 message type, this element shall be hard coded to ACK^R01^ACK

MSH-10 Message control ID (ST)

HL7 Definition: This element contains a number or other identifier that uniquely identifies the message.

This Specification: The sending system shall assign an identifier for the message that is unique within the namespace of the sending facility and/or application.

Note that the value of this element is *not* a reference to the message that is being acknowledged. The Message control ID of the acknowledged message appears in MSA-2 Message Control ID.

Note on Element Length: The element length for MSH-10 has been extended to 50 characters from the HL7-prescribed length of 20 characters. This extension allows sending systems to use globally unique identifiers (such as GUIDs) for Message IDs, an increasingly common practice.

MSH-11 Processing ID (PT)

HL7 Definition: This field is used to decide whether to process the message as defined in HL7 Application (level 7) Processing rules.

This Specification: This value will be "P".

MSH-12 Version ID (VID)

HL7 Definition: This field identifies the version.

This Specification: This value will be "2.6".

MSH-21 Message Profile Identifier (EI)

HL7 Definition: Sites may use this element to assert adherence to a Conformance Statement published by HL7 or by a site. Conformance Statements contain detailed explanations of grammar, syntax, and usage for a particular message or set of messages. This element is treated like all EI data type information, if the underscores or dashes are used as encoding characters in an interface, those characters shall be escaped to be sent in the above element.

This Specification: In the MT-ACK-1 message type, MSH-21 Conformance statement ID should be: DIALY_MT-ACK-1_R1

8.2.3 ORC – Order Common

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ID	R	0119	Order Control
2	EI	R		Placer Order Number
3	EI	X		Filler Order Number
4	EI	X		Placer Group Number
5	ID	X	0038	Order Status
6	ID	O	0121	Response Flag
7		X		Quantity/Timing
8	EIP	X		Parent
9	DTM	X		Date/Time of Transaction
10	XCN	X		Entered By
11	XCN	X		Verified By
12	XCN	O		Ordering Provider
13	PL	X		Enterer's Location
14	XTN	O		Call Back Phone Number
15	DTM	X		Order Effective Date/Time
16	CWE	X	9999	Order Control Code Reason

SEQ	DT	OPT	TBL#	ELEMENT NAME
17	CWE	X	9999	Entering Organization
18	CWE	X	9999	Entering Device
19	XCN	X		Action By
20	CWE	X	0339	Advanced Beneficiary Notice Code
21	XON	X		Ordering Facility Name
22	XAD	X		Ordering Facility Address
23	XTN	X		Ordering Facility Phone Number
24	XAD	X		Ordering Provider Address
25	CWE	X	9999	Order Status Modifier
26	CWE	X	0552	Advanced Beneficiary Notice Override Reason
27	DTM	X		Filler's Expected Availability Date/Time
28	CWE	X	0177	Confidentiality Code
29	CWE	X	0482	Order Type
30	CNE	X	0483	Enterer Authorization Mode
31	CWE	X		Parent Universal Service Identifier
32	DT	X		Advanced Beneficiary Notice Date
33	CX	X		Alternate Placer Order Number

ORC-1 Order Control

Determines the function of the order segment. For the Prescription Query Response, the Order Control will always be "NW" (new order).

ORC-2 Placer Order Number

This field is the placer application's order number. The value is echoed back in the OBR-2 of the PCD-1 and PCD-4 messages.

ORC-6 Response Flag

This field allows the placer (sending) application to determine the amount of information to be returned from the filler. For the Prescription Query Response, the Response Flag will always be "N" (Only the MSA Segment is returned).

ORC-12 Ordering Provider

This field contains the identity of the person who is responsible for creating the request (i.e., ordering physician). If this field is present it may be used by the dialysis machine for prescription confirmation. In other words, the care-giver could ask if Dr. Smith is the patient's nephologist.

ORC-14 Call Back Phone Number

This field contains the telephone number to call for clarification of a request or other information regarding the order. If this field is present, a dialysis machine could be present its value to the user in case of a problem with prescription.

8.2.4 OBR– Observation Request Segment

The ORU message may include discrete OBX segments for individual observations reported. An OBR Segment will be used for each set of such OBX segments to establish the equipment context for the observations. All observation dates and times reported here should match OBX segments that report the same information.

HL7 Attribute Table - OBR Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBR
2	EI	C		Placer Order Number
3	EI	R		Filler Order Number
4	CWE	R	9999	Universal Service Identifier
5		X		Priority
6		X		Requested Date/Time
7	DTM	R		Observation Date/Time #
8	DTM	X		Observation End Date/Time #
9	CQ	X		Collection Volume *
10	XCN	X		Collector Identifier *
11	ID	X	0065	Specimen Action Code *
12	CWE	X	9999	Danger Code
13	ST	X		Relevant Clinical Information
14		X		Specimen Received Date/Time *
15		X		Specimen Source
16	XCN	X		Ordering Provider
17	XTN	X		Order Callback Phone Number
18	ST	X		Placer Field 1
19	ST	X		Placer Field 2
20	ST	X		Filler Field 1 +
21	ST	X		Filler Field 2 +
22	DTM	X		Results Rpt/Status Chng – Date/Time +
23	MOC	X		Charge to Practice +
24	ID	X	0074	Diagnostic Serv Sect ID
25	ID	C	0123	Result Status +
26	PRL	X		Parent Result +
27		X		Quantity/Timing
28	XCN	X		Result Copies To
29	EIP	X		Parent
30	ID	X	0124	Transportation Mode
31	CWE	X	9999	Reason for Study
32	NDL	X		Principal Result Interpreter +
33	NDL	X		Assistant Result Interpreter +
34	NDL	X		Technician +
35	NDL	X		Transcriptionist +
36	DTM	X		Scheduled Date/Time +
37	NM	X		Number of Sample Containers *
38	CWE	X	9999	Transport Logistics of Collected Sample *
39	CWE	X	9999	Collector's Comment *
40	CWE	X	9999	Transport Arrangement Responsibility
41	ID	X	0224	Transport Arranged
42	ID	X	0225	Escort Required
43	CWE	X	9999	Planned Patient Transport Comment
44	CNE	X	0088	Procedure Code
45	CNE	X	0340	Procedure Code Modifier
46	CWE	X	0411	Placer Supplemental Service Information
47	CWE	X	0411	Filler Supplemental Service Information
48	CWE	X	0476	Medically Necessary Duplicate Procedure Reason
49	CWE	X	0507	Result Handling
50	CWE	X		Parent Universal Service Identifier

HL7 Attribute Table - OBR Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
51	EI	X		Observation Group ID
52	EI	X		Parent Observation Group ID
53	CX	X		Alternate Placer Order Number

OBR-2 Placer Order Number

If the dialysis machine downloaded a prescription, then this field will contain the value from OBC-2. Otherwise, the field is blank.

OBR-3 Filler Order Number

HL7 Definition: This field is the order number associated with the filling application. This is a permanent identifier for an order and its associated observations.

This specification: This value is used to convey a unique identifier for the therapy being performed. It is a concatenation of the Dialysis Machine EUI-64 (see MSH-3) and a timestamp. The format is

Therapy_ID^Machine_Name^Extended_Unique_Identifier^EUI-64

The Machine Name and Extended Unique identified are the same as conveyed in the MSH-3. The Therapy_ID is the Extended Unique Identifier concatenated with the timestamp using the following format.

XXXXXXXXXXXXXXXXYYYYMMDDhhmmss

Where XXXXXXXXXXXXXXXX is the Extended Unique Identifier

YYYY is the year

MM is the month with zero padding.

DD is the day of the month with zero padding.

hh is the hours (0-23) with zero padding.

mm is the minutes with zero padding

ss is the seconds with zero padding

Example of a Therapy_ID, 080019FFFE3ED02D2011060204584

Example of the OBR-3 Field,
080019FFFE3ED02D20110602045842^ACME_Dialysis_Machine^080019FFFE3ED02D^EUI-64

OBR-4 Universal Service ID

HL7 Definition: This field contains the identifier code for the requested observation/test/battery.

This specification: Identifier and Text can identify unique OBR segments that partition observations. The values for this field will be taken from the 11073_10103 MDC_IDC_SESS_TYPE enumerator MDC_IDC_ENUM_SESS_TYPE.

OBR-7 Observation Date/Time

HL7 Definition: This field is the clinically relevant date/time of the observation. In the case of observations taken directly from a subject, it is the actual date and time the observation was obtained. In the case of a specimen associated study, this field shall represent the date and time the specimen was collected or obtained. (This is a results-only field except when the placer or a third party has already drawn the

specimen.) This field is conditionally required. When the OBR is transmitted as part of a report message, the field must be filled in. If it is transmitted as part of a request and a sample has been sent along as part of the request, this field must be filled in because this specimen time is the physiologically relevant date/time of the observation.

This Specification: This value will be the same as the message time, MSH-7.

OBR-25 Result Status

HL7 Definition: This field contains the status of results for this order. This conditional field is required whenever the OBR is contained in a report message. See HL7 Table 0085 - Observation result status codes interpretation.

This Specification: This value will always be Final ("F").

8.2.5 OBX– Observation Results Segment

Discrete OBX segments for individual observations will be encoded into separate OBX segments as individual observations or measurements. These OBX segments will be preceded by an appropriate OBR segment to set the context for observations dealing with the dialysis device, characteristics, or treatment measurements.

HL7 Attribute Table - OBX Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID – OBX
2	ID	C	0125	Value Type
3	CWE	R	9999	Observation Identifier
4	ST	R		Observation Sub-ID
5	varies	R		Observation Value
6	CWE	R	9999	Units
7	ST	CE		References Range
8	CWE	X		Interpretation Codes
9	NM	X		Probability
10	ID	X	0080	Nature of Abnormal Test
11	ID	R	0085	Observation Result Status
12	DTM	X		Effective Date of Reference Range
13	ST	X		User Defined Access Checks
14	DTM	CE		Date/Time of the Observation
15	CWE	X	9999	Producer's ID
16	XCN	X		Responsible Observer
17	CWE	X	9999	Observation Method
18	EI	X		Equipment Instance Identifier
19	DTM	X		Date/Time of the Analysis
20	CWE	X	0163	Observation Site
21	EI	X		Observation Instance Identifier
22	CNE	X	0725	Mood Code
23	XON	X		Performing Organization Name
24	XAD	X		Performing Organization Address
25	XCN	X		Performing Organization Medical Director
26	ID	X	0909	Patient Results Release Category

OBX-1 Set ID

HL7 Specification: This field contains the sequence number.

OBX-2 Value Type

HL7 Specification: This field defines the data type of OBX-5, Observation Value.

This specification: Only value identified in the table below will be used. The value is based upon the value type as identified in Table 2 – Dialysis Machine Data Objects.

IEEE to HL7 Data Type Matching

Applicable IEEE 11073 MDC_IDC types	HL7 v2 data type
String	ST
Enumerated	CWE or CNE
Date Time	DTM
Numeric	NM

OBX-3 Observation Identifier

HL7 Specification: This field contains a unique identifier for the observation.

This specification: The format is that of the Coded Element (CWE). Example: "158606^MDC_HDIALY_DIALYSATE_FLOW_MODE^MDC".

OBX-4 Observation Sub-ID

HL7 Specification: This field is used to distinguish between multiple OBX segments with the same observation ID organized under one OBR.

This specification: This value is expressed in a dotted notation consisting of 4 parts, MDS, VMD, CHAN, and Parameter.

OBX-5 Observation Value

HL7 Specification: This field contains the value observed by the observation producer.

This specification: This is the actual value is expressed a string value.

OBX-6 Unit

HL7 Specification: This field contains the units of measurement for the value.

This specification: Will be coded with the MDC_IDC Nomenclature (based on UCUM) Unit for associated observation. Example, "ml/min^milliliter per minute^UCUM"

OBX-7 Reference Range

HL7 Specification: Reference range for the value.

a) lower limit-upper limit (when both lower and upper limits are defined, e.g., for Venous Pressure, 20-400)

b) > lower limit (if no upper limit, e.g., >10)

c) < upper limit (if no lower limit, e.g., <15)

This specification: Dialysis Machines use this field in two ways.

1) For numeric measurements, this field may be used to provide the alarm limits.

2) For settings, this field may be used to specify legal values. For example, to require blood pump rate remain below 200 ml/min, a value of "< 200" would be used. To lock the blood pump rate at 250, a value of "250-250" would be used.

OBX-8 Interpretation Codes

HL7 Specification: One or more codes specifying a categorical assessment of the observation value (OBX-5), such as "Normal", "Abnormal", "Positive", "Negative", "Resistant", "Susceptible", etc.

This specification: This field is used to provide zero or more codes separated by the tilde ("~"). A dialysis machine provides two mandatory codes, Alarm priority and Alarm Type, and one optional code, Abnormality Type.

The alarm priority is dialysis machine specific and may vary by manufacturer.

Alarm Priority	Code
High	PH
Medium	PM
Low	PL
Informational	PI
Priority Not Indicated	PN
Priority Unknown	PU

The Alarm Type is specific in the Alert Type Column in Table 2 – Dialysis Machine Data Objects.

Alarm Type	Code
Phsysiological	SP
Technical	ST
Advisory	SA

Abnormality Type	Code
Below low normal	L
Above high normal	H

OBX-11 Observation Result Status

HL7 Specification: This field contains the observation result status. See HL7 Table 0085 - Observation result status codes interpretation.

This specification: This field will always be Final ("F").

OBX-14 Date/Time of Observation

HL7 Specification: This field is required in two circumstances. The first is when the observations reported beneath one report header (OBR) have different dates/times. This could occur in the case of queries, timed test sequences, or clearance studies where one measurement within a battery may have a different time than another measurement.

This specification: Dialysis Machines use this field to report the time and date of spot check values such as non-invasive blood pressure.

OBX-17 Observation Method

HL7 Specification: This optional field can be used to transmit the method or procedure by which an observation was obtained when the sending system wishes to distinguish among one measurement obtained by different methods and the distinction is not implicit in the test ID.

This specification: Dialysis Machines will follow the IHE PCD recommendations for this field.

OBX-17	Description
AMEAS^auto-measurement^MDC	A measurement automatically taken by the machine. Examples are Arterial Pressure and Dialysate Temperature.
MMEAS^manual-measurement^MDC	A measurement taken due to user interaction. An example would be a Blood Pressure measurement taken using the NIBP system.
ASET^auto-setting^MDC	A setting that is being automatically determined by the machine.
MSET^manual-setting^MDC	A setting that was manually set or changed by the user. A prescription setting that was changed by the user would fall into this category.
RSET^remote-setting^MDC	A setting that was remotely set through a prescription downloaded from an EMR.

The field is optional for measurements. It is required for settings.

8.2.6 PID – Patient Identification Segment

The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently.

HL7 Attribute Table - PID Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID - PID
2		X		Patient ID
3	CX	R		Patient Identifier List
4		X		Alternate Patient ID - PID
5	XPN	R	0200	Patient Name
6	XPN	X		Mother's Maiden Name
7	DTM	X		Date/Time of Birth
8	CWE	X	0001	Administrative Sex
9		X		Patient Alias
10	CWE	X	0005	Race
11	XAD	X		Patient Address
12		X		County Code
13	XTN	X		Phone Number - Home
14	XTN	X		Phone Number - Business
15	CWE	X	0296	Primary Language
16	CWE	X	0002	Marital Status
17	CWE	X	0006	Religion
18	CX	X	0061	Patient Account Number
19		X		SSN Number - Patient
20		X		Driver's License Number - Patient
21	CX	X	0061	Mother's Identifier
22	CWE	X	0189	Ethnic Group
23	ST	X		Birth Place
24	ID	X	0136	Multiple Birth Indicator
25	NM	X		Birth Order
26	CWE	X	0171	Citizenship
27	CWE	X	0172	Veterans Military Status
28		X		Nationality

HL7 Attribute Table - PID Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
29	DTM	X		Patient Death Date and Time
30	ID	X	0136	Patient Death Indicator
31	ID	X	0136	Identity Unknown Indicator
32	CWE	X	0445	Identity Reliability Code
33	DTM	X		Last Update Date/Time
34	HD	X		Last Update Facility
35	CWE	X	0446	Species Code
36	CWE	X	0447	Breed Code
37	ST	X		Strain
38	CWE	X	0429	Production Class Code
39	CWE	X	0171	Tribal Citizenship
40	XTN	X		Patient Telecommunication Information

PID-3.1 Patient Identifier List

ID Number contains a unique identifier for the patient assigned by the Device or entered by the User. Sample Identifier Type Codes are shown Table 0203 listed below (others can be included as defined in the HL7 Standard). The last identifier will always be the unique model/serial number of the Dialysis Machine with an identifier type code of U (see table following).

HL7 Table 0203

Code	Description	Notes	Use
MR	Medical Record Number		O
PN	Person Number		O
SS	Patient Social Security Number		O
U	Machine Identifier	Model, MDC_ID_MODEL_NUMBER, and Serial number, MDC_ID_PROD_SPEC_SERIAL, will be concatenated together to uniquely identify the machine. The format of the ID will be following: "model/serial"	R

Example Patient Identifier List with just model and serial number.

```
Scrubber 2000/SC678932^^^^U
```

Example Patient Identifier List with Medical Record Number

```
555444222111^^^^MR~Scrubber 2000/SC678932^^^^U
```

Example Patient Identifier List with Person Number

```
010199-000H^^^^PN~Scrubber 2000/SC678932^^^^U
```

8.2.7 PV1 – Patient Visit Segment

The PV1 segment is used by Registration/Patient Administration applications to communicate information on an account or visit-specific basis. Because it is required in the PCD-01 Message, it is included in this standard. The Dialysis Machine Provides the bare minimum of data to be compliant.

HL7 Attribute Table - PV1 Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	SI	R		Set ID - PV1
2	CWE	R	0004	Patient Class
3	PL	O		Assigned Patient Location
4	CWE	X	0007	Admission Type
5	CX	X		Preadmit Number
6	PL	X		Prior Patient Location
7	XCN	X	0010	Attending Doctor
8	XCN	X	0010	Referring Doctor
9	XCN	X		Consulting Doctor
10	CWE	X	0069	Hospital Service
11	PL	X		Temporary Location
12	CWE	X	0087	Preadmit Test Indicator
13	CWE	X	0092	Re-admission Indicator
14	CWE	X	0023	Admit Source
15	CWE	X	0009	Ambulatory Status
16	CWE	X	0099	VIP Indicator
17	XCN	X	0010	Admitting Doctor
18	CWE	X	0018	Patient Type
19	CX	RE		Visit Number
20	FC	X	0064	Financial Class
21	CWE	X	0032	Charge Price Indicator
22	CWE	X	0045	Courtesy Code
23	CWE	X	0046	Credit Rating
24	CWE	X	0044	Contract Code
25	DT	X		Contract Effective Date
26	NM	X		Contract Amount
27	NM	X		Contract Period
28	CWE	X	0073	Interest Code
29	CWE	X	0110	Transfer to Bad Debt Code
30	DT	X		Transfer to Bad Debt Date
31	CWE	X	0021	Bad Debt Agency Code
32	NM	X		Bad Debt Transfer Amount
33	NM	X		Bad Debt Recovery Amount
34	CWE	X	0111	Delete Account Indicator
35	DT	X		Delete Account Date
36	CWE	X	0112	Discharge Disposition
37	DLD	X	0113	Discharged to Location
38	CWE	X	0114	Diet Type
39	CWE	X	0115	Servicing Facility
40		X		Bed Status
41	CWE	X	0117	Account Status
42	PL	X		Pending Location
43	PL	X		Prior Temporary Location
44	DTM	X		Admit Date/Time
45	DTM	X		Discharge Date/Time
46	NM	X		Current Patient Balance
47	NM	X		Total Charges
48	NM	X		Total Adjustments
49	NM	X		Total Payments
50	CX	X	0203	Alternate Visit ID

HL7 Attribute Table - PV1 Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
51	CWE	X	0326	Visit Indicator
52		X		Other Healthcare Provider
53	ST	X		Service Episode Description
54	CX	X		Service Episode Identifier

PV1-2 Patient Class (CWE)

HL7 Definition: This field is used by systems to categorize patients by site. See HL7 Table 0004.

This specification: Dialysis machines will always use the Unknown Patient Class.

PV1-3 Patient Class (PL)

HL7 Definition: This field contains the patient's initial assigned location or the location to which the patient is being moved.

This specification: This field contains the patient's current location.

The fields of the Person Location (PL) data type are complex and the reader is referred to the HL7 Chapter on Data Types. Several examples from that chapter are shown below.

Example: Nursing Unit

A nursing unit at Community Hospital: 4 East, room 136, bed B

```
4E^136^B^CommunityHospital^^N^^^
```

Example: Clinic

A clinic at University Hospitals: Internal Medicine Clinic located in the Briones building, 3rd floor.

```
InternalMedicine^^^UniversityHospitals^^C^Briones^3^
```

Example: Home

The patient was treated at his home.

```
^^^^^H^^^
```

PV1-19 Visit Number (CX)

HL7 Definition: This field contains the unique number assigned to each patient visit.

This specification: This field will be empty.

8.2.8 QAK – Query Acknowledge

HL7 Attribute Table - QAK Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ST	R		Query Tag
2	ID	R	0208	Query Response Status
3	CWE	O		Message Query Name
4	NM	O		Hit Count Total
5	NM	O		Hits In this Message
6	NM	R		Hits Remaining

QAK-1 Query Tag

HL7 Specification: This field may be valued by the initiating system to identify the query and may be used to match response messages to the originating query.

QAK-2 Query Response Status

HL7 Specification: This field allows the responding system to return a precise response status. It is especially useful in the case where no data is found that matches the query parameters, but where there is also no error.

QAK-3 Message Query Name

HL7 Specification: This field contains the name of the query.

QAK-4 Hit Count Total

HL7 Specification: This field contains the total number of records found by the EMR that matched the query.

QAK-5 Hits In This Message

HL7 Specification: This field contains the total number of matching records that the Server sent in the current response.

QAK-6 Hits Remaining

HL7 Specification: This field contains the number of matching records found by the Server that have yet to be sent.

This specification: This value is used by the dialysis machine to determine when it has received all the results of a query.

8.2.9 QPD – Query Parameter Definition

HL7 Attribute Table - QPD Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	CWE	R		Message Query Name
2	ST	C		Query Tag
3-N	varies	R		Query Parameters

This segment is used in both the Patient Demographics Query (PDQ) transaction and the Patient Prescription Query (PPQ). The details of the fields are specified in those sections.

8.2.10RCP – Response Control Parameters

HL7 Attribute Table - RCP Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ID	R	0091	Query Priority
2	CQ	X	0126	Quantity Limited Request
3	CNE	R	0394	Response Modality
4	DTM	X		Execution and Delivery Time
5	ID	X	0395	Modify Indicators
6	SRT	X		Sort By Field

HL7 Attribute Table - RCP Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
7	ID	X	0391	Segment Group Inclusion

RCP-1 Query Priority

HL7 Specification: This field contains the time frame in which the response is expected, See HL7 Table 0091 – Query Priority.

This specification: This field will always be Immediate ("I").

RCP-3 Response Modality

HL7 Specification: This field specifies the timing and grouping of the response message(s), see HL7 Table 0394 – Response Modality.

This specification: This field will always be Real Time ("R").

9 Hemodialysis Data Elements

9.1 Tables

This section defines tables of values used by the message elements.

HD_TBL_01 – Mode of Operation

Value	Description
PRETX	Pre-Treatment - Preparing for dialysis but no blood in extracorporeal circuit
TX	Treatment - Blood in the extracorporeal circuit
POSTTX	Post-Treatment - After dialysis but no longer any blood in extracorporeal circuit
DIS	Disinfection or rinse of dialysis fluid path.
IDL	Idle
SVC	Service mode

HD_TBL_02 – Treatment Modality

Value	Description
HD	Hemodialysis – dialysis with diffusive transport of solutes. AKA CVVHD
HDF	Hemodiafiltration – dialysis with both diffusive and convective transport of solutes, CVVHDF
HF	Hemofiltration – dialysis with convective transport of solutes. CVVH
SLED	Sustained low efficiency dialysis.
IUF	Isolated Ultrafiltration - Removal of plasma water without dialysis, SCUF
HP	Hemoperfusion – Removal of solutes from blood by adsorption.

HD_TBL_03 – Anticoagulation Mode

Value	Description
BOL	Bolus - Administration of a fixed amount of anticoagulant drug during a specific time
CON	Continuous - Anticoagulant drug administered at a constant rate
BOLCON	Combination of Bolus and Continuous mode
PRO	Profile - Anticoagulant drug administered at a variable rate according to a programmed profile
BOLPRO	Combination of Bolus and Profile mode
NONE	None

HD_TBL_04 – Patient Position

Value	Description
SITTING	Sitting
STANDING	Standing
SUPINE	Supine

HD_TBL_05 – Blood Pump Mode

Value	Description
2N	Double Needle - Separate needles/catheter lumens for arterial and venous blood flow
1N1P	Single Needle/Single Pump - The same needle/catheter lumen used for both arterial and venous blood flow, blood flow controlled by one pump

HD_TBL_05 – Blood Pump Mode

Value	Description
1N2P	Single Needle/Double Pump - The same needle/catheter lumen used for both arterial and venous blood flow, blood flow controlled by two pumps

HD_TBL_06 – Dialysis Flow Mode

Value	Description
CONST	Constant dialysis fluid flow
AUTO	Auto - Dialysis fluid flow is automatically controlled by the dialysis machine
PRO	Profile - Variable dialysis fluid flow according to a programmed profile
STBY	Standby - dialysis fluid flow is reduced when dialysis machine is not providing treatment
NONE	Dialysis fluid does not flow.

HD_TBL_07 – Replacement Fluid Delivery Mode

Value	Description
CONST	Constant replacement fluid flow
PRO	Profile - Variable replacement fluid flow according to a programmed profile
NONE	None, Not Applicable.
BOLUS	Bolus - administration of a fixed amount of replacement fluid during a specific time
AUTO	Automatic - Replacement fluid flow is automatically controlled by the dialysis machine

HD_TBL_08 – RF Dilution Location

Value	Description
PREF	Pre-Filter
POSTF	Post-Filter
PREF-POSTF	Both Pre-Filter and Post-Filter
PREP-POSTF	Both Pre-Pump and Post-Filter
MIDF	Mid Filter

HD_TBL_09 – Fluid Source

Value	Description
BAG	Bag – Replacement fluid
ONLINE	Online - Replacement fluid prepared by dialysis machine

HD_TBL_10 – Plasma Volume Marker

Value	Description
NONE	None – No selection made at time of reading/reporting
SYMP	Symptomatic – Noting a symptom for continue monitoring.
INTER	Intervention – Action was taken or a machine setting was changed

HD_TBL_11 – Plasma Volume Profile

Value	Description
FLAT	Change less than or equal to 3% per hour
GRAD	Change greater than 3% and less than or equal to 6.5% per hour

HD_TBL_11 – Plasma Volume Profile

Value	Description
STEEP	Change greater than 6.5% per hour

HD_TBL_12 – Completion Method

Value	Description
CT	Clock Time
AT	Actual Treatment Time
UF	UF Removed
KTV	Kt/V
USER	The treatment runs until stopped by the user.

HD_TBL_13 – Ultrafiltration Mode

Value	Description
NONE	None
CONST-WT	UF removed at a constant rate with a target volume
PRO-WT	UF removed according to a programmed profile with a Target Volume
CONST-WOT	UF removal at a constant rate without a target Volume
PRO-WOT	UF removed according to programmed profile without a target volume.

HD_TBL_14 – Bicarb Delivery Mode

Value	Description
CONST	Constant – Bicarbonate concentration in dialysis fluid is constant.
PRO	Profile - Bicarbonate concentration in

HD_TBL_14 – Bicarb Delivery Mode

Value	Description
	dialysis fluid is adjusted according to a programmed profile
NA	Not Applicable

HD_TBL_15 – Sodium Delivery Mode

Value	Description
CONST	Constant - Sodium concentration in dialysis fluid is constant
PRO	Profile - Sodium concentration in dialysis fluid is adjusted according to a programmed profile

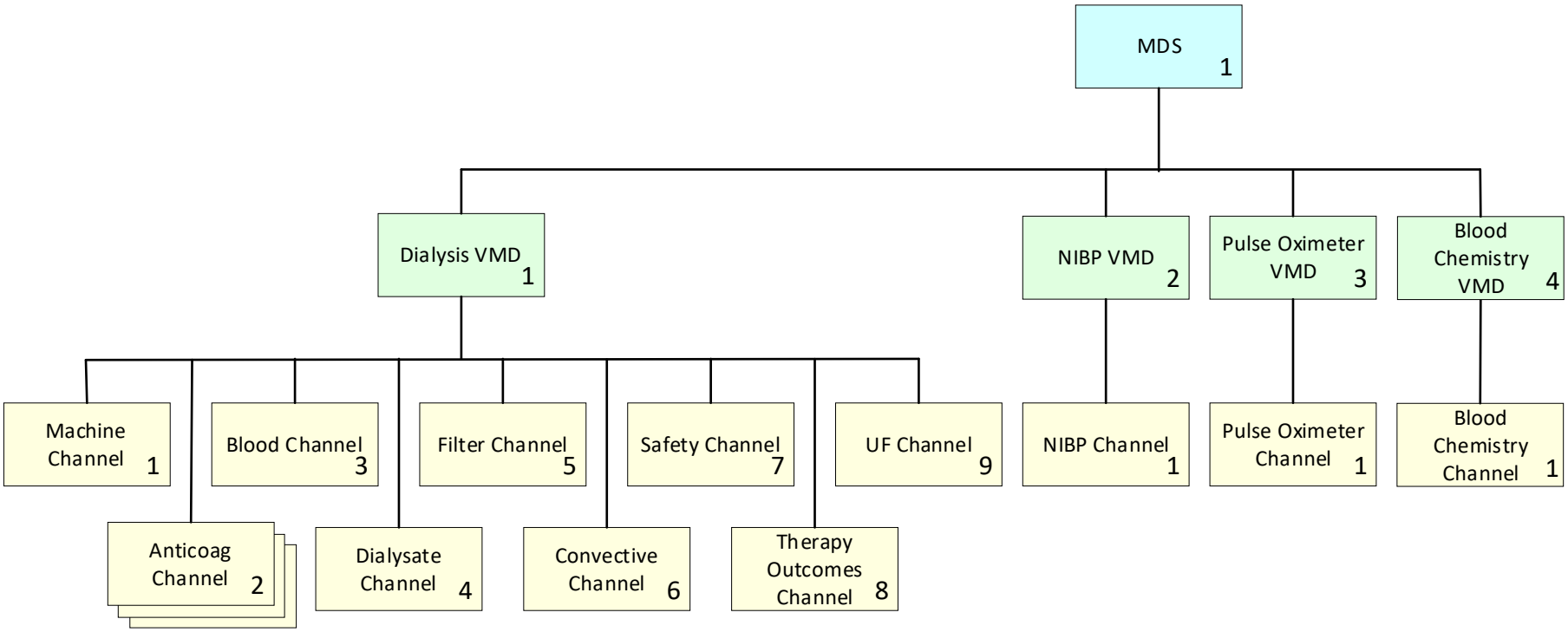
HD_TBL_16 – Anticoagulant Delivery Location

Value	Description
PREP	Before the blood pump
PREF	After the blood pump but before the filter.
POSTF	After the filter.
PAT	At the patient

HD_TBL_17 – Profile Type

Value	Description
CONST	Constant rate
LINEAR	Linear profile
EXPONENTIAL	Exponential profile
STEP	Step profile
VENDOR	Vendor Specific Profile

9.2 Data Objects



In the table below when usage is conditional (C), a number is given. The number refers to one of the following conditions. If the condition is not met then the cardinality is "0..0".

1) If Anticoagulation Mode is not None
2) If Anticoagulation Mode includes Bolus
3) If Anticoagulation Mode includes Continuous or Profile
4) One for each anticoagulant pump
5) If Blood Pump Mode is not double needle
6) If Mode is HD or HDF
7) If Mode is HF or HDF and Dilution is Post or Pre-Post
8) If Mode is HDF or HF
9) If Replacement Fluid Mode is Bolus
10) If Completion Method is not None
11) if UF removal includes a target volume
12) If Mode is HD or HDF and the dialysis machine knows the conductivity through direct measurement or by knowing what type of bagged fluid is being used.
13) If alarm limit is being set.
14) If Completion Method (MDC_HDIALY_THERAPY_COMPLETE_METHOD) is Clock Time.
15) If Completion Method (MDC_HDIALY_THERAPY_COMPLETE_METHOD) is Treatment Time.
16) If Mode is HF or HDF and Dilution is Pre or Pre-Post
17) If Completion Method (MDC_HDIALY_THERAPY_COMPLETE_METHOD) is Kt/V.
18) If UF Target (MDC_HDIALY_UF_TARGET_VOL_TO_REMOVE) or Treatment Time (MDC_HDIALY_THERAPY_TX_TIME_SETTING) is not present.
19) If UF Mode (MDC_HDIALY_UF_MODE) is not constant.
20) If Anticoagulant Mode (MDC_HDIALY_ANTICOAG_MODE) is not constant.
22) If Dialysate Mode (MDC_HDIALY_DIALYSATE_FLOW_MODE) is not constant.
23) If Sodium Mode (MDC_HDIALY_DIALYSATE_CONC_NA_MODE) is not constant.
24) If RF Delivery Mode (MDC_HDIALY_RF_FLOW_MODE) is not constant.
91) If Profile Type is not Vendor then ‘M’ otherwise ‘X’.
92) If Profile Type is not Vendor then ‘O’ otherwise ‘X’.
93) If Profile Type is Exponential then ‘O’ otherwise ‘X’.
94) If Profile Type is Vendor then ‘M’ otherwise ‘X’.
95) If Profile Type is Vendor then ‘O’ otherwise ‘X’.

In addition to the above conditions, the following general rule applies.

1) Any prescription setting sent from the EMR to the dialysis machine, will be reported in the PCD-01 Status message.

Any object below that is a cumulative total is the total since the start of treatment and not since the start of the filter.

Table 1 – Profile Parameters contains the objects that are needed to define a profile. These objects are referenced in Table 2 – Dialysis Machine Data Objects where appropriate.

Table 1 – Profile Parameters

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . . MDCX_HDIALY_PROFILE_TYPE			Profile Type	Contains the anticoagulant profile type.	All		Episodic	Enum	**HD_TBL_17**	N/A	1..1	M	M
. . . . MDCX_HDIALY_PROFILE_VALUE			Profile Values	Contains the control points of the profile. The control points are a numeric array. For a constant profile there is only one point. For a linear or exponential profile there are two points, one for the starting value and one for the ending	All		Episodic	Array	Numeric	mL/h	0..1	C91	C91
. . . . MDCX_HDIALY_PROFILE_TIME			Profile Times	This parameter is optional. If it is not present, the control points are assumed to be equally space across the total treatment time. If it is present, it is an array of numerical values that are the treatment times at which a control point takes effect.	All		Episodic	Array	Numeric	min	0..1	C92	C92
. . . . MDCX_HDIALY_PROFILE_EXP_HALF_TIME			Exponential Half Time	This parameter is optional and only applies to the Exponential Profile. It specifies the time at which 50% of the change has been complete.	All		Episodic	Numeric	Numeric	min	0..1	C93	C93
. . . . MDCX_HDIALY_PROFILE_NAME			Profile Name	Vendor specific profile name.	All		Episodic	String	Alphanumeric	N/A	0..1	C94	C94
. . . . MDCX_HDIALY_PROFILE_PARAMETERS			Profile Parameters	Vendor specific parameters for a vendor specific profile.	All		Episodic	Array	Numeric	N/A	0..1	C95	C95

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
MDC_DEV_HDIALY_MACHINE_MDS (70929)											**1..1**	**M**	**M**
. . . MDC_ID_MODEL_MANUFACTURER (531970)		**Dialysis Device**	Dialysis Device Manufacturer	String containing device manufacturer's name	All		All	String	Alphanumeric	N/A	1..1	M	X
. . . MDC_ID_MODEL_NUMBER (531969)		**Dialysis Device**	Dialysis Device Model	String containing device manufacturer's model identifier for the device	All		All	String	Alphanumeric	N/A	1..1	M	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_ID_PROD_SPEC_SERIAL (531972)		**Dialysis Device**	Dialysis Device Serial Number	String containing the device's serial number	All		All	String	Alphanumeric	N/A	1..1	M	X
. . . MDC_ID_PROD_SPEC_SW (531975)		**Dialysis Device**	Device Software Version	String defining the version of the software on the machine	All		All	String	Alphanumeric	N/A	1..1	M	X
. . . MDC_ATTR_ID_UDI (67916)		**Dialysis Device**	Dialysis Device UDI	String containing the device's FDA required Universal Device Identifier [Note: MDC_ATTR_ID_UDI contains three components: UdiAuthority, UdiIssuer, UdiLabel to support non-FDA entities, but currently there is no approved way of encoding this using HL7 V2; PRT-10 and PRT-16-20 is used instead; UdiLabel = PRT-10.]	All		All	String	Alphanumeric	N/A	1..1	O	X
. MDC_DEV_HDIALY_VMD (70934)											**1..1**	**M**	**M**
. . MDC_DEV_HDIALY_MACH_CONFIG_CHAN (70939)											**1..1**	**M**	**M**
. . . MDC_ATTR_TIME_ABS (67975)		**Dialysis Device**	Dialysis Device Time	Date and time as recorded on the dialysis device's internal clock with offset to UTC (based on location and DST)	All		All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	M	X
. . . MDC_HDIALY_MACH_MODE_DESCRIPTION (158593)		**Dialysis Device**	Machine Mode Description	Manufacturer-specific description of the machine mode of operation	All		Episodic	String	Alphanumeric	N/A	0..1	O	X
. . . MDC_HDIALY_MACH_MODE_OF_OPERATION (158594)		**Dialysis Device**	Machine Mode Of Operation	Process the machine is currently performing	All		Episodic	Enum	**HD_TBL_01**	N/A	1..1	M	X
. . . MDC_TIME_PD_MAINTENANCE_TO_NEXT_SERVICE (184195)		**Dialysis Device**	Preventive Maintenance Time Remaining	Hours of operation remaining until next preventative maintenance is required	All		Episodic	Numeric	XXXX	hours	0..1	O	X
. . . MDC_MAINTENANCE_NEXT_SERVICE_DATE (184199)		**Dialysis Device**	Preventative Maintenance Due Date	The date on which preventative maintenance is due.	All		Episodic	Date	YYYYMMDD	N/A	0..1	O	X
. . . MDC_HDIALY_MACH_MAINT_TX_REMAIN (158595)		**Dialysis Device**	Preventive Maintenance Treatments Remaining	Number of treatments remaining until next preventative maintenance is required	All		Episodic	Numeric	XXXX	N/A	0..1	O	X
. . . MDC_HDIALY_MACH_BLD_PUMP_ON (158596)		**Dialysis Device**	Treatment Blood Pump On	Status indicating if blood pump is running	Intradialytic		Episodic	Bool	T / F	N/A	1..1	M	X
. . . MDC_HDIALY_MACH_TX_FLUID_BYPASS (158597)		**Dialysis Device**	Treatment Fluid Bypass	Fluid pathway state to indicate if fluid is NOT flowing through dialyzer	Intradialytic		Episodic	Bool	T / F	N/A	1..1	M	X
. . . MDC_HDIALY_MACH_TX_MODALITY (158598)		**Dialysis Device**	Treatment Modality	The way a patient receives dialysis	All		Episodic	Enum	**HD_TBL_02**	N/A	1..1	M	M

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_MACH_THERAPY_TIME (158720)		**Dialysis Device State**	Elapsed Treatment Time	Accumulated time that the patient has been actively treated. This does not include time spend in alarms, recirculating or rinsing back.	Intradialytic		Periodic	Numeric	XXXX	minutes	1..1	M	X
. . . MDC_HDIALY_MACH_TIME_REMAIN (158724)		**Dialysis Device State**	Remaining Treatment Time	Number of minutes left for current dialysis session	Intradialytic		Periodic	Numeric	XXXX	minutes	1..1	C10	X
. . . MDC_TEMP_ROOM (188508)		**Dialysis Device State**	Room Temperature	Room Temperature in which the Dialysis Machine is operating	All		Periodic	Numeric	XX.X	°C	0..1	O	X
. . MDC_DEV_HDIALY_ANTICOAG_PUMP_CHAN (70943)											**1..***	**C1**	**C1**
. . . MDC_ATTR_CHAN_NUM_LOGICAL (68142)		**Anticoagulant Pump**	Anticoagulant Pump Number	The number associated with the anticoagulant pump in this channel. The value starts at 1 and is incremented for each anticoagulant pump in use.	Intradialytic		Episodic	Numeric	X	N/A	1..1	M	M
. . . MDC_HDIALY_ANTICOAG_MODE (158600)		**Anticoagulant Pump**	Anticoagulation Mode	Method of anticoagulant administration during dialysis treatment	Intradialytic		Episodic	Enum	**HD_TBL_03**	N/A	1..1	C4	M
. . . . Profile Parameters				Anticoagulant Profile								C20	C20
. . . MDC_HDIALY_ANTICOAG_INFUS_RATE_SETTING (0)		**Anticoagulant Pump**	Anticoagulant Infusion Rate Setting	User defined amount of anticoagulation drug to be administered per unit time	Intradialytic		Episodic	Numeric	XX.X	mL/h	0..1	C3	M
. . . MDC_HDIALY_ANTICOAG_INFUS_RATE (158736)		**Anticoagulant Pump**	Anticoagulant Infusion Rate	User defined amount of anticoagulation drug to be administered per unit time	Intradialytic		Episodic	Numeric	XX.X	mL/h	0..1	C3	X
. . . MDC_HDIALY_ANTICOAG_ACCUM_DELIV (158728)		**Anticoagulant Pump**	Accumulated Delivered Anticoagulant	Total amount of anticoagulation drug administered to patient since the start of treatment	Intradialytic		Both	Numeric	XXX.X	mL	0..1	C1	X
. . . MDC_HDIALY_ANTICOAG_BOLUS_VOL (158732)		**Anticoagulant Pump**	Anticoagulant Bolus Volume	User defined amount of anticoagulation drug to be administered in this single large dose	Intradialytic		Episodic	Numeric	XX.X	mL	0..1	C2	O
. . . MDC_HDIALY_INFUS_TIME_SETTING (0)		**Anticoagulant Pump**	Anticoagulant Infusion Time Setting	User specified infusion time.	Intradialytic		Episodic	Numeric	XXXX	minutes	0..1	O	O
. . . MDC_EVT_HDIALY_ANTICOAG_STOP (198236)	tech	**Anticoagulant Pump**	Anticoagulant Pump Stop	Notification that the anticoagulant pump has stopped	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_ANTICOAG_NAME (158599)		**Anticoagulant Pump**	Anticoagulant Type	Name of the anticoagulant	Intradialytic		Episodic	String	Alphanumeric	N/A	0..1	O	M

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_EVT_HDIALY_ANTICOAG_SYRINGE_EMPTY (198238)	tech	**Anticoagulant Pump**	Syringe Empty	Notification that the syringe plunger has reached the end of its functional range	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_ANTICOAG_SYRINGE_BRAND (158602)		**Anticoagulant Pump**	Syringe Name	Name of the syringe	Intradialytic		Episodic	String	Alphanumeric	N/A	0..1	O	O
. . . MDC_HDIALY_ANTICOAG_SYRINGE_VOL (158603)		**Anticoagulant Pump**	Syringe Volume	Volume of the syringe with anticoagulant.	Intradialytic		Episodic	Numeric	XXX	mL	0..1	O	O
. . . MDC_EVT_HDIALY_ANTICOAG_SYRINGE_SIZE (198240)	tech	**Anticoagulant Pump**	Wrong Syringe Size	Notification that the size of the syringe is not the size defined for anticoagulant administration	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_ANTICOAG_LOCATION (0)		**Anticoagulant Pump**	Anticoagulant Deliver Location	Location for delivery of the anticoagulant.	Intradialytic		Episodic	Enum	**HD_TBL_16**	N/A	0..1	O	M
. . MDC_DEV_HDIALY_BLOOD_PUMP_CHAN (70947)											**1..1**	**M**	**M**
. . . MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_SETTING (16935956)		**Blood Pump**	Blood Flow Rate Setting	The rate at which the user programmed the blood flow	Intradialytic		Episodic	Numeric	XXX	mL/min	1..1	M	M
. . . MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE (158740)		**Blood Pump**	Actual Blood Flow Rate	Adjusted blood flow rate based on the blood flow rate setting and pressure drop caused by blood line, needle and vascular access	Intradialytic		Periodic	numeric	XXX	mL/min	0..1	O	X
. . . MDC_HDIALY_BLD_PUMP_BLOOD_FLOW_RATE_MEAN (158743)		**Blood Pump**	Average Blood Flow Rate	Average of the actual blood flow rate over the course of treatment.	Intradialytic		Periodic	Numeric	XXX	mL/min	0..1	O	X
. . . MDC_HDIALY_BLD_PRESS_ART (158744)	phys tech high low thr	**Blood Pump**	Arterial Pressure	Pressure of arterial access line pre blood pump	Intradialytic		Periodic	Numeric	±XXX	mmHg	1..1	M	X
. . . MDC_HDIALY_BLD_PUMP_MODE (158604)		**Blood Pump**	Blood Pump Mode	Therapy method in which blood is retrieved and returned to the patient.	Intradialytic		Episodic	Enum	**HD_TBL_05**	N/A	1..1	M	M
. . . MDC_EVT_HDIALY_BLD_PUMP_STOP (198242)	tech	**Blood Pump**	Blood Pump Stop	Notification that the blood pump has stopped	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_HDIALY_BLD_PUMP_TUBING_SIZE (158605)		**Blood Pump**	Blood Tubing Size	Inner diameter of pump segment of tubing used in extracorporeal circulation	Intradialytic		Episodic	String	alphanumeric	N/A	0..1	O	X
. . . MDC_HDIALY_BLOOD_TEMP_ART (158748)		**Blood Pump**	Arterial Blood Temperature	Arterial blood temperature as measured by the device.	Intradialytic		Periodic	Numeric	XX.X	°C	0..1	O	X
. . . MDC_HDIALY_BLD_PUMP_CHANGE_IN_ENERGY (158752)		**Blood Pump**	Change In Energy	Measurement of the energy (temperate) flux to and from the patient	Intradialytic		Periodic	Numeric	±XXX.X	kJ/h	0..1	O	X
. . . MDC_HDIALY_BLD_PUMP_PRESS_ART_POST_PUMP (158756)	tech high low thr	**Blood Pump**	Post Pump Arterial Pressure	Pressure of arterial access line post blood pump	Intradialytic		Periodic	Numeric	±XXX	mmHg	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_BLD_PUMP_PRIMING_VOL (158760)		**Blood Pump**	Priming Volume	Volume of fluid used to prime the extracorporeal circuit	Intradialytic		Episodic	Numeric	XXX	mL	0..1	O	X
. . . MDC_HDIALY_BLD_PUMP_SINGLE_NEEDLE_PRESS (158764)	tech high low thr	**Blood Pump**	Single Needle Switching Pressure	In single needle mode, the pressure used to switch phases at high pressure	Intradialytic		Episodic	Numeric	± XXX	mmHg	0..1	O	X
. . . MDC_HDIALY_BLD_PUMP_STROKE_VOL (158768)		**Blood Pump**	Stroke Volume	The volume of blood passing through the dialyzer during each single needle cycle.	Intradialytic		Periodic	Numeric	XXX	mL	0..1	C5	X
. . . MDC_HDIALY_BLD_PUMP_BLOOD_PROCESSED_TOTAL (158772)		**Blood Pump**	Total Blood Processed	Accumulated volume of blood circulated by extracorporeal circulation.	Intradialytic		Periodic	Numeric	XXXX.XX	L	0..1	O	X
. . . MDC_HDIALY_BLD_PUMP_PRESS_VEN (158776)	phys tech high low thr	**Blood Pump**	Venous Pressure	Pressure of the venous access line	Intradialytic		Periodic	Numeric	±XXX	mmHg	1..1	M	X
. . . MDC_HDIALY_BLOOD_TEMP_VEN (158780)		**Blood Pump**	Venous Temperature	Temperature of the blood measured in the venous access line	Intradialytic		Periodic	Numeric	XX.X	°C	0..1	O	X
. . . MDC_HDIALY_BLOOD_TEMP_VEN_SETTING (16935996)		**Blood Pump**	Venous Temperature Setting	Desired temperature of the blood in the venous access line	Intradialytic		Periodic	Numeric	XX.X	°C	0..1	O	O
. . MDC_DEV_HDIALY_FLUID_CHAN (70951)											**1..1**	**C6**	**C6**
. . . MDC_HDIALY_DIALYSATE_FLOW_MODE (158606)		**Dialysis Fluid**	Dialysate Flow Mode	The mode of controlling dialysate flow rate	All		Episodic	Enum	**HD_TBL_06**	N/A	1..1	C6	M
. . . . Profile Parameters				Dialysate pump profile parameters								C22	C22
. . . MDC_HDIALY_DIALYSATE_FLOW_RATE_SETTING (16936008)		**Dialysis Fluid**	Dialysate Flow Rate Setting	Rate at which the user programmed the dialysate flow	Intradialytic		Episodic	Numeric	XXXX	mL/min	0..1	C6	M
. . . MDC_HDIALY_DIALYSATE_FLOW_RATE (158792)	tech low	**Dialysis Fluid**	Actual Dialysate Flow Rate	Rate of dialysate flow at any given point during a treatment	Intradialytic		Periodic	Numeric	XXXX	mL/min	1..1	C6	X
. . . MDC_HDIALY_DIALYSATE_VOL_DELIV (158848)		**Dialysis Fluid**	Total Dialysate Volume	Total amount of dialysate delivered to patient during a treatment	Intradialytic		Periodic	Numeric	XXX.XX	L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_VOL_DELIV_SETTING (0)		**Dialysis Fluid**	Dialysate Volume Setting	User programmed dialysate volume to deliver	Intradialytic		Episodic	Numeric	XXX.XX	L	0..1	O	O
. . . MDC_HDIALY_DIALYSATE_NAME (158608)		**Dialysis Fluid**	Dialysate Name	String containing a descriptive name of the dialysate	Intradialytic		Episodic	String	Alphanumeric	N/A	1..1	O	M
. . . MDC_HDIALY_BICARB_COND (158784)		**Dialysis Fluid**	Actual Bicarbonate Conductivity	Measured conductivity of bicarbonate	Intradialytic		Periodic	Numeric	XX.XX	mS/cm	0..1	O	X
. . . MDC_HDIALY_BICARB_COND_SETTING (16936000)		**Dialysis Fluid**	Bicarbonate Conductivity Setting	Bicarbonate conductivity	Intradialytic		Episodic	Numeric	XX.XX	mS/cm	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_DIALYSATE_COND (158788)	tech high low	**Dialysis Fluid**	Actual Conductivity	Measured conductivity of dialysate	Intradialytic		Periodic	Numeric	XX.XX	mS/cm	1..1	C12	X
. . . MDC_HDIALY_DIALYSATE_COND_SETTING (16936004)		**Dialysis Fluid**	Dialysate Conductivity Setting	Acid and Bicarbonate conductivity combined	Intradialytic		Episodic	Numeric	XX.XX	mS/cm	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_TEMP (158796)	tech high low	**Dialysis Fluid**	Actual Dialysate Temperature	Temperature of dialysate	Intradialytic		Periodic	Numeric	XX.X	°C	1..1	O	X
. . . MDC_HDIALY_DIALYSATE_TEMP_SETTING (16936012)		**Dialysis Fluid**	Dialysate Temperature Setting	Temperature at which dialysate is to be delivered to patient	Intradialytic		Episodic	Numeric	XX.X	°C	1..1	O	O
. . . MDC_HDIALY_DIALYSATE_AMMONIA (158800)		**Dialysis Fluid**	Ammonia Concentration	Measured ammonia concentration of the dialysate	Intradialytic		Periodic	Numeric	XX.XX	ppm	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_FLOW_RATE_MEAN (158795)		**Dialysis Fluid**	Average Dialysate Flow Rate	Average rate of dialysate flow during course of treatment	Intradialytic		Periodic	Numeric	XXXX	mL/min	0..1	O	X
. . . MDC_HDIALY_CONC_HCO3_SETTING (16936020)		**Dialysis Fluid**	Bicarbonate Concentration Setting	User programmed Bicarbonate concentration in dialysate.	Intradialytic		Episodic	Numeric	XXX.X	mmol/L	1..1	O	O
. . . MDC_HDIALY_CONC_HCO3_MODE (158607)		**Dialysis Fluid**	Bicarbonate Mode	Process for delivering adjusted bicarbonate concentration in dialysate	Intradialytic		Episodic	Enum	**HD_TBL_14**	N/A	1..1	O	O
. . . MDC_EVT_HDIALY_BLOOD_LEAK (198244)	tech	**Dialysis Fluid**	Blood Leak	Notification that blood has been detected in the dialysate fluid	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_HDIALY_DIALYSATE_CONC_ACETATE (158808)		**Dialysis Fluid**	Dialysate Acetate Concentration	Acetate concentration in dialysate	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_HCO3 (158812)		**Dialysis Fluid**	Dialysate Bicarbonate Concentration	Bicarbonate concentration in dialysate	Intradialytic		Episodic	Numeric	XXX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_CHLORIDE (158816)		**Dialysis Fluid**	Dialysate Chloride Concentration	Chloride concentration in dialysate	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_MG (158820)		**Dialysis Fluid**	Dialysate Magnesium Concentration	Magnesium concentration in dialysate	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_CA (158824)		**Dialysis Fluid**	Dialysate Calcium Concentration	Calcium concentration in dialysate	Intradialytic		Episodic	Numeric	X.XX	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_CITRATE (158828)		**Dialysis Fluid**	Dialysate Citrate Concentration	Citrate concentration in dialysate	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_GLU (158832)		**Dialysis Fluid**	Dialysate Glucose Concentration	Glucose concentration in dialysate	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_DIALYSATE_CONC_K (158836)		**Dialysis Fluid**	Dialysate Potassium Concentration	Potassium concentration in dialysate	Intradialytic		Episodic	Numeric	X.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_NA (158840)		**Dialysis Fluid**	Dialysate Sodium Concentration	Sodium concentration in dialysate	Intradialytic		Episodic	Numeric	XXXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_DIALYSATE_CONC_NA_SETTING (16936056)		**Dialysis Fluid**	Dialysate Sodium concentration Setting	User programmed sodium concentration in dialysate	Intradialytic		Episodic	Numeric	XXXX	mmol/L	1..1	O	O
. . . MDC_HDIALY_DIALYSATE_CONC_NA_MODE (158609)		**Dialysis Fluid**	Dialysate Sodium Mode	Process for delivering adjusted sodium concentration in dialysate	Intradialytic		Episodic	Enum	**HD_TBL_15**	N/A	1..1	O	O
. . . . Profile Parameters				Sodium Mode								C23	C23
. . . MDC_HDIALY_DIALYSATE_CONC_PH (158844)		**Dialysis Fluid**	pH	Measured pH of the dialysate	Intradialytic		Periodic	Numeric	XX.X	pH	0..1	O	X
. . MDC_DEV_HDIALY_FILTER_CHAN (70955)											**1..1**	**M**	**M**
. . . MDC_HDIALY_FILTER_NAME (158610)		**Filter (Dialyzer)**	Dialyzer Name	Dialyzer manufacturer and model	Intradialytic		Episodic	String	Alphanumeric	N/A	0..1	O	M
. . . MDC_HDIALY_FILTER_TRANSMEMBRANE_PRESS (158852)	tech high low	**Filter (Dialyzer)**	Actual Transmembrane Pressure	Difference in pressure between blood compartment and dialysate compartment of dialyzer	Intradialytic		Periodic	Numeric	±XXX	mmHg	1..1	M	X
. . . MDC_HDIALY_FILTER_NUM (158611)		**Filter (Dialyzer)**	Filter Number	The filter number since the start of treatment. This value starts at 1 and increments with each new filter used during the current treatment.	Intradialytic		Periodic	Numeric	X	N/A	0..1	O	X
. . . MDC_HDIALY_FILTER_UDI (158612)		**Filter (Dialyzer)**	Filter UDI	The UDI for the current filter.	Intradialytic		Periodic	String	N/A	N/A	0..1	O	X
. . MDC_DEV_HDIALY_CONVECTIVE_CHAN (70959)											**1..1**	**C8**	**C8**
. . . MDC_HDIALY_RF_DILUTION_LOCATION (158613)		**Replacement Fluid**	Replacement Fluid Dilution Location	Delivery location of the replacement fluid	Intradialytic		Episodic	Enum	**HD_TBL_08**	N/A	1..1	C8	M
. . . MDC_HDIALY_RF_FLOW_MODE (158616)		**Replacement Fluid**	Replacement Fluid Flow Mode	The mode of controlling replacement fluid flow rate	All		Episodic	Enum	**HD_TBL_07**	N/A	1..1	C8	C8
. . . . Profile Parameters				RF Delivery profile parameters								C24	C24
. . . MDC_HDIALY_RF_POST_FILTER_FLUID_NAME (158614)		**Replacement Fluid**	Post Filter Replacement Fluid Name	String containing a descriptive name of the post-filter replacement fluid	Intradialytic		Episodic	String	Alphanumeric	N/A	1..1	O	C7
. . . MDC_HDIALY_RF_POST_FILTER_CONC_ACETATE (158856)		**Replacement Fluid**	Post-Filter RF Acetate Concentration	Acetate concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_RF_POST_FILTER_CONC_HCO3 (158860)		**Replacement Fluid**	Post-Filter RF Bicarbonate Concentration	Bicarbonate concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XXX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_CHLORIDE (158864)		**Replacement Fluid**	Post-Filter RF Chloride Concentration	Chloride concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_MG (158868)		**Replacement Fluid**	Post-Filter RF Magnesium Concentration	Magnesium concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_CA (158872)		**Replacement Fluid**	Post-Filter RF Calcium Concentration	Calcium concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	X.XX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_CITRATE (158876)		**Replacement Fluid**	Post-Filter RF Citrate Concentration	Citrate concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_GLU (158880)		**Replacement Fluid**	Post-Filter RF Glucose Concentration	Glucose concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_K (158884)		**Replacement Fluid**	Post-Filter RF Potassium Concentration	Potassium concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	X.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_CONC_NA (158888)		**Replacement Fluid**	Post-Filter RF Sodium Concentration	Sodium concentration in the post-filter replacement fluid	Intradialytic		Episodic	Numeric	XXXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_FLOW_RATE_SETTING (16936108)		**Replacement Fluid**	Post-Filter Replacement Fluid Flow Rate Setting	Rate at which the user programmed the post -filter replacement fluid flow	Intradialytic		Episodic	Numeric	XXXX	mL/min	0..1	C7	C7
. . . MDC_HDIALY_RF_POST_FILTER_FLOW_RATE (158892)		**Replacement Fluid**	Actual Post-Filter Replacement Fluid Flow Rate	Rate of post -filter replacement fluid flow at any given point during a treatment	Intradialytic		Periodic	Numeric	XXXX	mL/min	1..1	C7	X
. . . MDC_HDIALY_RF_POST_FILTER_FLOW_RATE_MEAN (158895)		**Replacement Fluid**	Average Post-Filter Replacement Fluid Flow Rate	Average rate of post -filter replacement fluid flow during course of treatment.	Intradialytic		Periodic	Numeric	XXXX	mL/min	0..1	O	X
. . . MDC_HDIALY_RF_POST_FILTER_VOL_SETTING (16936116)		**Replacement Fluid**	Post-Filter Replacement Fluid Volume setting	Programmed total amount of post -filter replacement fluid volume	Intradialytic		Episodic	Numeric	XXX.XX	L	0..1	O	C7
. . . MDC_HDIALY_RF_POST_FILTER_VOL (158900)		**Replacement Fluid**	Total Post-Filter Replacement Fluid Volume	Total amount of post -filter replacement fluid used during a treatment	Intradialytic		Periodic	Numeric	XXX.XX	L	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_RF_POST_FILTER_TEMP_SETTING (16936112)		**Replacement Fluid**	Post-Filter Replacement Fluid Temperature Setting	Temperature at which post-filter replacement fluid is to be delivered to patient	Intradialytic		Episodic	Numeric	XX.X	°C	1..1	C7	O
. . . MDC_HDIALY_RF_POST_FILTER_TEMP (158896)		**Replacement Fluid**	Actual Post-Filter Replacement Fluid Temperature	Temperature of post-filter replacement fluid	Intradialytic		Periodic	Numeric	XX.X	°C	1..1	C7	X
. . . MDC_HDIALY_RF_PRE_FILTER_FLUID_NAME (158615)		**Replacement Fluid**	Pre-Filter RF Name	String containing a descriptive name of the pre-filter replacement fluid	Intradialytic		Episodic	String	Alphanumeric	N/A	1..1	O	C16
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_ACETATE (158904)		**Replacement Fluid**	Pre-Filter RF Acetate Concentration	Acetate concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_HCO3 (158908)		**Replacement Fluid**	Pre-Filter RF Bicarbonate Concentration	Bicarbonate concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XXX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_CHLORIDE (158912)		**Replacement Fluid**	Pre-Filter RF Chloride Concentration	Chloride concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_MG (158916)		**Replacement Fluid**	Pre-Filter RF Magnesium Concentration	Magnesium concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_CA (158920)		**Replacement Fluid**	Pre-Filter RF Calcium Concentration	Calcium concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	X.XX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_CITRATE (158924)		**Replacement Fluid**	Pre-Filter RF Citrate Concentration	Citrate concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XX.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_GLU (158928)		**Replacement Fluid**	Pre-Filter RF Glucose Concentration	Glucose concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_K (158932)		**Replacement Fluid**	Pre-Filter RF Potassium Concentration	Potassium concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	X.X	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_CONC_NA (158936)		**Replacement Fluid**	Pre-Filter RF Sodium Concentration	Sodium concentration in the pre-filter replacement fluid	Intradialytic		Episodic	Numeric	XXXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE_SETTING (16936156)		**Replacement Fluid**	Pre-Filter Replacement Fluid Flow Rate Setting	Rate at which the user programmed the pre-filter replacement fluid flow	Intradialytic		Episodic	Numeric	XXXX	mL/min	0..1	C8	C16
. . . MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE (158940)		**Replacement Fluid**	Actual Pre-Filter Replacement Fluid Flow Rate	Rate of pre-filter replacement fluid flow at any given point during a treatment	Intradialytic		Periodic	Numeric	XXXX	mL/min	1..1	C7	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_RF_PRE_FILTER_FLOW_RATE_MEAN (158943)		**Replacement Fluid**	Average Pre-Filter Replacement Fluid Flow Rate	Average rate of pre-filter replacement fluid flow during course of treatment.	Intradialytic		Periodic	Numeric	XXXX	mL/min	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_VOL_SETTING (16936164)		**Replacement Fluid**	Pre-Filter Replacement Fluid Volume Setting	Programmed total amount of pre -filter replacement fluid volume	Intradialytic		Episodic	Numeric	XXX.XX	L	0..1	O	C16
. . . MDC_HDIALY_RF_PRE_FILTER_VOL (158948)		**Replacement Fluid**	Total Pre-Filter Replacement Fluid Volume	Total amount of pre-filter replacement fluid used during a treatment	Intradialytic		Periodic	Numeric	XXX.XX	L	0..1	O	X
. . . MDC_HDIALY_RF_PRE_FILTER_TEMP_SETTING (16936160)		**Replacement Fluid**	Pre-Filter Replacement Fluid Temperature Setting	Temperature at which pre-filter replacement fluid is to be delivered to patient	Intradialytic		Episodic	Numeric	XX.X	°C	1..1	C7	O
. . . MDC_HDIALY_RF_PRE_FILTER_TEMP (158944)		**Replacement Fluid**	Actual Pre-Filter Replacement Fluid Temperature	Temperature of pre-filter replacement fluid	Intradialytic		Periodic	Numeric	XX.X	°C	1..1	C7	X
. . . MDC_HDIALY_RF_CONV_CLEARANCE (158952)		**Replacement Fluid**	Convective Clearance - Urea	The product of the sieving coefficient and the total water flux. KX = QUF x SX where KX is Convective Clearance for solute "X", QUF is Ultrafiltration flow across membrane and SX is Membrane sieving coefficient for solute "X"	Intradialytic		Periodic	Numeric	XXX.X	mL/min	0..1	O	X
. . . MDC_EVT_HDIALY_RF_EXCESS_DELIV (198246)	tech-high	**Replacement Fluid**	Excessive Replacement Fluid Bolus Delivered	Notification that more replacement fluid has been delivered than intended	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_EVT_HDIALY_RF_INSUFF_DELIV (198248)	tech-low	**Replacement Fluid**	Insufficient Replacement Fluid Bolus Delivered	Notification that less replacement fluid has been delivered than intended	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_RF_PRE_POST_FLOW_RATIO_SETTING (16936172)		**Replacement Fluid**	Pre-Post Replacement Fluid Flow Rate Ratio Setting	The ratio desired between the pre and post Replacement Fluid Flow Rate Settings	Intradialytic		Episodic	Numeric	XX.X	N/A	0..1	O	O
. . . MDC_HDIALY_RF_BOLUS_RATE (158960)	tech high low	**Replacement Fluid**	Replacement Fluid Bolus Rate	User defined replacement fluid bolus rate.	Intradialytic		Episodic	Numeric	XXXX	mL/min	0..1	C9	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_RF_BOLUS_VOL_SETTING (16936180)		**Replacement Fluid**	Replacement Fluid Bolus Volume Setting	User defined amount of replacement fluid to be delivered in this single large dose	Intradialytic		Episodic	Numeric	XXX	mL	0..1	C9	O
. . . MDC_HDIALY_RF_BOLUS_VOL_DELIVERED (158968)	tech high low	**Replacement Fluid**	Replacement Fluid Bolus Volume Delivered	Amount of replacement fluid delivered in a single large dose.	Intradialytic		Episodic	Numeric	XXX	mL	0..1	C9	X
. . . MDC_HDIALY_RF_SOURCE (158617)		**Replacement Fluid**	Replacement Fluid Source	The source of the replacement fluid.	Intradialytic		Episodic	Enum	**HD_TBL_09**	N/A	0..1	O	X
. . . MDC_EVT_HDIALY_RF_BOLUS (198250)		**Replacement Fluid**	Replacement Fluid Bolus Event	True when an RF Bolus is occurring.	Intradialytic		Episodic	Bool	T / F	N/A	0..1	C9	X
. . MDC_DEV_HDIALY_SAFETY_SYSTEMS_CHAN (70963)											**1..1**	**M**	**X**
. . . MDC_EVT_HDIALY_SAFETY_ART_AIR_DETECT (198252)	tech	**Safety Systems**	Arterial Air Detector	Notification that air is sensed in the arterial blood lines	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_EVT_HDIALY_SAFETY_DIALYSATE_AIR_DETECT (198254)	tech	**Safety Systems**	Dialysate Air Detector	Notification that air is sensed in dialysate line	Intradialytic		Episodic	Bool	T / F	N/A	0..1	C6	X
. . . MDC_EVT_HDIALY_SAFETY_DIALYSATE_COMPOSITION (198256)	tech	**Safety Systems**	Dialysis Composition	Notification that the dialyzing fluid composition is incorrect	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_EVT_HDIALY_SAFETY_SYSTEM_GENERAL (198258)	tech	**Safety Systems**	General System	Notification of any dialysis machine malfunction that are not related to patient treatment	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_EVT_SELFTEST_FAILURE (198216)	tech	**Safety Systems**	Self-Test	Notification that a self-test failed	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_EVT_HDIALY_SAFETY_VEN_ACCESS (198260)	tech	**Safety Systems**	Venous Access	Notification that the venous access may have become disconnected	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_EVT_HDIALY_SAFETY_VEN_AIR_DETECT (198262)	tech	**Safety Systems**	Venous Air Detector	Notification that air is sensed in the venous blood lines	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_EVT_HDIALY_SAFETY_WETNESS_DETECT_ALERT (198264)	tech	**Safety Systems**	Wetness Detector	Notification that the wetness detector has sensed fluid	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_EVT_HDIALY_SAFETY_WETNESS_DETECT_ERROR (198266)	tech	**Safety Systems**	Wetness Detector Error	Notification of a detected error on the wetness detector device	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_ATTR_ALERT_ID_NUM (68489)		**Safety Systems**	Alert ID	The number associated with the current alert. If no alert is active then this object is not reported.	Intradialytic		Episodic	String	XXXX	N/A	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_ATTR_ALERT_TEXT (68546)		**Safety Systems**	Alert Text	The text name of the current alert. If no alert is active then this object is not reported. IN most case this object will contain the text shown to the user.	Intradialytic		Episodic	String	N/A	N/A	0..1	O	X
. . MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN (70967)											**1..1**	**M**	**M**
. . . MDC_HDIALY_THERAPY_MASS_TRF_AREA_COEFF (158972)		**Therapy Outcomes**	KoA	Overall mass transfer coefficient multiplied by surface area of a dialyzer	Intradialytic		Episodic	Numeric	XXXX	N/A	0..1	O	X
. . . MDC_HDIALY_THERAPY_ACCESS_FLOW (158976)		**Therapy Outcomes**	Access Flow	Flow through a fistula or other conduit connecting an artery to a vein	Intradialytic		Periodic	Numeric	±XXXX	mL/min	0..1	O	X
. . . MDC_HDIALY_THERAPY_RATIO_KT_OVER_V_GOAL (158992)		**Therapy Outcomes**	Kt/V Goal	Target dialysis treatment adequacy measurement	Intradialytic		Episodic	Numeric	X.XX	%	0..1	O	C17
. . . MDC_HDIALY_THERAPY_UREA_CLEARANCE_MEAN (159019)		**Therapy Outcomes**	Mean Urea Clearance	Time weighted average of the individual effective conductivity clearance measurements	Intradialytic		Episodic	Numeric	XXX	N/A	0..1	O	X
. . . MDC_HDIALY_THERAPY_UREA_CLEARANCE (159016)		**Therapy Outcomes**	Urea Clearance	Calculated clearance based on the change in conductivity of the pre-dialyzer vs post dialyzer dialysate.	Intradialytic		Episodic	Numeric	XXX	N/A	0..1	O	X
. . . MDC_HDIALY_THERAPY_UREA_DISTRIBUTION_VOL_SETTING (0)		**Therapy Outcomes**	Urea Distribution Volume Setting	User setting for urea distribution volume used as V in the equation Kt/V.	All		Episodic	Numeric	X.XX	L	0..1	O	O
. . . MDC_HDIALY_THERAPY_KT_DELIVERED (158984)		**Therapy Outcomes**	Delivered Kt	Volume of fluid cleared of urea by dialysis treatment	Intradialytic		Episodic	Numeric	X.XX	L	0..1	O	X
. . . MDC_HDIALY_THERAPY_RATIO_EKT_OVER_V_DELIVERED (158980)		**Therapy Outcomes**	Delivered Equilibrated Kt/V	Fractional solute clearance for an intermittent treatment corrected to take account of solute redistribution following the treatment	Intradialytic		Episodic	Numeric	X.XX	%	0..1	O	X
. . . MDC_HDIALY_THERAPY_RATIO_SPKT_OVER_V_DELIVERED (158988)		**Therapy Outcomes**	Delivered Single Pool Kt/V	Fractional solute clearance, calculated on the basis of solute concentration before and after an intermittent treatment, and on the basis of effluent dialysate volume and anthropometric estimate of volume of urea distribution for peritoneal dialysis	Intradialytic		Episodic	Numeric	X.XX	%	0..1	O	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_THERAPY_RATIO_SPKT_OVER_V_PROJECTED (159012)		**Therapy Outcomes**	Projected Single Pool Kt/V	Fractional solute clearance, calculated on the basis of solute concentration before and after an intermittent treatment, and on the basis of effluent dialysate volume and anthropometric estimate of volume of urea distribution for peritoneal dialysis, projected on the basis of data available before the treatment occurs or before the treatment is completed	Intradialytic		Episodic	Numeric	X.XX	%	0..1	O	X
. . . MDC_EVT_HDIALY_THERAPY_PAT_TX_GENERAL (198268)	phys	**Therapy Outcomes**	General Patient Treatment	Notification that the machine has detected an alarm condition not covered by other alarms that is related to patient treatment.	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_THERAPY_PCT_RECIRC (159004)		**Therapy Outcomes**	Percent Recirculation	Percentage of the blood flow in the access line that is coming directly from the venous line without going through the patient's body.	Intradialytic		Periodic	Numeric	±XXX.X	%	0..1	O	X
. . . MDC_HDIALY_THERAPY_PLASMA_NA_CONC (159008)		**Therapy Outcomes**	Plasma Sodium Concentration	Sodium ion concentration measured in patient plasma.	Intradialytic		Episodic	Numeric	XXX	mmol/L	0..1	O	X
. . . MDC_HDIALY_THERAPY_COMPLETE_METHOD (158618)		**Therapy Outcomes**	Treatment Completion Method	Parameter used to determine when treatment has been complete	Intradialytic		Episodic	Enum	**HD_TBL_12**	N/A	1..1	M	M
. . . MDC_EVT_HDIALY_THERAPY_TX_END_TIME (198270)	tech	**Therapy Outcomes**	Treatment Time Ended	Notification that target time of treatment has been met	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_THERAPY_BODY_START_WT (159000)		**Therapy Outcomes**	Patient Start Weight	Weight of patient at beginning of treatment	All		Episodic	Numeric	XXX.X	Kg	0..1	O	X
. . . MDC_HDIALY_THERAPY_BODY_END_WT (159020)		**Therapy Outcomes**	Patient End Weight	Weight of patient at end of treatment	All		Episodic	Numeric	XXX.X	Kg	0..1	O	X
. . . MDC_HDIALY_THERAPY_BODY_END_WT_SETTING (0)		**Therapy Outcomes**	Patient End Weight Target	Desired weight of patient at end of treatment. This is present as a means to specify UF when patient weight is changing. Requires patient's pre-treatment weight which could come from patient, scale, or EMR.	All		Episodic	Numeric	XXX.X	Kg	0..1	O	O

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_HDIALY_THERAPY_END_TIME_SETTING (0)		**Therapy Outcomes**	Treatment End Time	The clock time that the therapy ends when completion method is Clock Time,	All		Episodic	Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	0..1	O	C14
. . . MDC_HDIALY_THERAPY_TX_TIME_SETTING (0)		**Therapy Outcomes**	Treatment Time	The duration of the therapy when completion method is Tx Time.	All		Episodic	Numeric	XXXX	minutes	0..1	O	C15
. . MDC_DEV_HDIALY_UF_CHAN (70971)											**1..1**	**M**	**M**
. . . MDC_HDIALY_UF_MODE (158619)		**Ultrafiltration System**	Ultrafiltration Mode	Process used to remove fluid volume from the patient	Intradialytic		Episodic	Enum	**HD_TBL_13**	N/A	1..1	M	M
. . . . Profile Parameters				UF Profile parameters								C19	C19
. . . MDC_HDIALY_UF_RATE_SETTING (16936252)		**Ultrafiltration System**	Ultrafiltration Rate	Rate at which fluid is removed from the patient For systems that compute this value using Treatment Time and UF Target, this value would be reported as an Automatic Setting (ASET).	Intradialytic		Periodic	Numeric	XXXX	mL/h	1..1	M	C18
. . . MDC_HDIALY_UF_RATE (159036)		**Ultrafiltration System**	Ultrafiltration Rate	Current rate at which fluid is removed from the patient	Intradialytic		Periodic	Numeric	XXXX	mL/h	1..1	M	X
. . . MDC_EVT_HDIALY_UF_LO (198272)	tech-low	**Ultrafiltration System**	Insufficient Ultrafiltration	Notification that the ultrafiltration system is not removing as much fluid as intended	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_EVT_HDIALY_UF_NEG (198274)	tech-low	**Ultrafiltration System**	Negative Ultrafiltration	Notification that the ultrafiltration system has resulted in a negative ultrafiltration rate	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_UF_TIME_TO_TARGET (159024)		**Ultrafiltration System**	Remaining Ultrafiltration Time	Time remaining until target volume to remove will have been achieved.	Intradialytic		Periodic	Numeric	XXXX	minutes	0..1	O	X
. . . MDC_HDIALY_UF_TARGET_VOL_TO_REMOVE (159028)		**Ultrafiltration System**	Target Volume To Remove	Planned fluid removal	Intradialytic		Episodic	Numeric	XXXX	mL	1..1	C11	C11
. . . MDC_HDIALY_UF_ACTUAL_REMOVED_VOL (159032)		**Ultrafiltration System**	Total Fluid Volume Removed	Measured fluid removed from patient	Intradialytic		Periodic	Numeric	XXXX	mL	1..1	M	X

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. . . MDC_EVT_HDIALY_UF_RATE_RANGE (198276)	tech-range	**Ultrafiltration System**	Ultrafiltration Rate Out of Range	Notification that the ultrafiltration rate has deviated from the intended ultrafiltration rate more than is safe. Specified another way, MDC_HDIALY_UF_RATE is not between MDC_HDIALY_UF_RATE_LIMIT_LOW_SETTING and MDC_HDIALY_UF_RATE_LIMIT_HIGH_SETTING	Intradialytic		Episodic	Bool	T / F	N/A	0..1	M	X
. . . MDC_EVT_HDIALY_UF_GOAL_MET (198278)	tech	**Ultrafiltration System**	Ultrafiltration Goal Met	Notification that target ultrafiltration volume has been met	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. . . MDC_HDIALY_UF_RATE_LIMIT_HIGH_SETTING (16936257)		**Ultrafiltration System**	UF Rate Upper Limit	Maximum ultrafiltration rate allowed without an alarm generation.	Intradialytic		Episodic	Numeric	XXXX	mL/h	0..1	O	X
. . . MDC_HDIALY_UF_RATE_LIMIT_LOW_SETTING (16936259)		**Ultrafiltration System**	UF Rate Lower Limit	Maximum ultrafiltration rate allowed without an alarm generation.	Intradialytic		Episodic	Numeric	XXXX	mL/h	0..1	O	X
. MDC_DEV_PRESS_BLD_NONINV_VMD (70686)				**Non-Invasive Blood Pressure Monitor**							**0..1**	**O**	**O**
. . MDC_DEV_PRESS_BLD_NONINV_CHAN (70687)											**0..1**	**O**	**O**
. . . MDC_ATTR_TIME_PD_MSMT (67979)		**Blood Pressure Monitor**	Blood Pressure Measurement Interval Setting	Time allowed to elapse between automatic blood pressure measurements. A value of zero indicates that automatic measurements are not being taken.	All		Episodic	Numeric	XXX	minutes	0..1	O	X
. . . MDC_ATTR_PT_BODY_POSN (68135)		**Blood Pressure Monitor**	Blood Pressure Measurement Position	Patient position at time of blood pressure measurement	All		Episodic	Enum	**HD_TBL_04**	N/A	0..1	O	X
. . . MDC_PRESS_BLD_NONINV_DIA (150022)	phys high low thr	**Blood Pressure Monitor**	Diastolic Pressure	Minimum arterial pressure during relaxation and dilatation of the ventricles of the heart when the ventricles fill with blood	All		Episodic	Numeric	XXX	mmHg	0..1	O	C13
. . . MDC_PULS_RATE_NON_INV (149546)	phys high low thr	**Blood Pressure Monitor**	Heart Rate	Number of heart beats per minute	All		Episodic	Numeric	XXX	beats/min	0..1	O	C13
. . . MDC_PRESS_BLD_NONINV_MEAN (150023)		**Blood Pressure Monitor**	Mean Arterial Pressure	Average pressure in a patient's arteries during one cardiac cycle	All		Episodic	Numeric	XXX	mmHg	0..1	O	C13
. . . MDC_PRESS_BLD_NONINV_SYS (150021)	phys high low thr	**Blood Pressure Monitor**	Systolic Pressure	Maximum arterial pressure during contraction of the left ventricle of the heart	All		Episodic	Numeric	XXX	mmHg	0..1	O	C13

Table 2 – Dialysis Machine Data Objects

REFID	Alert Type	Dialysis Device VMD	Dialysis Common Name	Definition	Phase		Temp-oral	Data Type	Format	UOM	CARD	USE	Rx Use
. MDC_DEV_ANALY_SAT_O2_VMD (69642)											0..1	O	O
.. MDC_DEV_ANALY_SAT_O2_CHAN (69643)											0..1	O	O
... MDC_PULS_OXIM_SAT_O2 (150456)	phys high low thr	**Pulse Oximeter Monitor**	SpO2 Oxygen Saturation	Hemoglobin oxygen saturation in patient blood measured by pulse oximetry	Intradialytic		Periodic	Numeric	XXX	%	0..1	O	C13
... MDC_PULS_OXIM_PULS_RATE (149530)	phys high low thr	**Pulse Oximeter Monitor**	SpO2 Pulse Rate	Number of heart beats per minute measured by pulse oximetry	Intradialytic		Periodic	Numeric	XXX	beats/min	0..1	O	C13
... MDC_EVT_ERR (196638)	tech	**Safety Systems**	Pulse Oximeter Error	Notification of a detected error on the pulse oximeter device	Intradialytic		Episodic	Bool	T / F	N/A	0..1	O	X
. MDC_DEV_BLOOD_CHEM_VMD (70974)											**0..1**	**O**	**X**
.. MDC_DEV_BLOOD_CHEM_CHAN (70975)				**Blood Chemistry Channel**							**0..1**	**O**	**X**
... MDC_HDIALY_PLASMA_VOL_MARKER (158620)		**Therapy Outcomes**	Plasma Volume Marker	An indicator applied to the blood volume percent reading to designate an event	Intradialytic		Periodic	Enum	**HD_TBL_10**	N/A	0..1	O	X
... MDC_HDIALY_PLASMA_VOL_PROFILE (158621)		**Therapy Outcomes**	Plasma Volume Profile	The rate of change in relative blood volume.	Intradialytic		Periodic	Enum	**HD_TBL_11**	N/A	0..1	O	X
... MDC_CONC_HCT_GEN (160132)	phys low high thr	**Therapy Outcomes**	Hematocrit	100*(sample red blood cell volume/blood sample volume)	Intradialytic		Periodic	Numeric	XX.X	%{vol}	0..1	O	X
... MDC_CONC_HB_GEN (160120)	phys low high thr	**Therapy Outcomes**	Hemoglobin	Concentration of hemoglobin in a sample expressed as mass/volume	Intradialytic		Periodic	Numeric	±XXX.X	g/dL	0..1	O	X
... MDC_HDIALY_REL_BLOOD_VOL (159044)	phys low thr	**Therapy Outcomes**	Relative Blood Volume	The percent change in blood volume since the start of the treatment. The BV change value is calculated from the following equation: ΔBV% = [(H0/H1) - 1] x 100 Where H0 = initial Hct or Hb H1 = current Hct or Hb	Intradialytic		Episodic	Numeric	XXX.X	%	0..1	O	X
... MDC_SAT_O2 (150316)	phys low high thr	**Therapy Outcomes**	SpO2 Oxygen Saturation	Hemoglobin oxygen saturation in patient blood	Intradialytic		Periodic	Numeric	XXX	%	0..1	O	X

9.3 Events

Table 3 – Hemodialysis Machine Alarms/Alerts

Source Identifier	Event Identifier[1]	Alert Type	Dialysis Common Name	Definition	Use
MDC_DEV_HDIALY_MACHINE_MDS					
MDC_DEV_HDIALY_VMD					
MDC_DEV_HDIALY_MACH_CONFIG_CHAN					
MDC_DEV_HDIALY_ANTICOAG_PUMP_CHAN					
MDC_HDIALY_ANTICOAG_PUMP_CHAN	MDC_EVT_HDIALY_ANTICOAG_STOP	tech	Anticoagulant Pump Stop	Notification that the anticoagulant pump has stopped	O
MDC_HDIALY_ANTICOAG_PUMP_CHAN	MDC_EVT_HDIALY_ANTICOAG_SYRINGE_EMPTY	tech	Syringe Empty	Notification that the syringe plunger has reached the end of its functional range	O
MDC_HDIALY_ANTICOAG_PUMP_CHAN	MDC_EVT_HDIALY_ANTICOAG_SYRINGE_SIZE	tech	Wrong Syringe Size	Notification that the size of the syringe is not the size defined for anticoagulant administration	O
MDC_DEV_HDIALY_BLOOD_PUMP_CHAN					
MDC_HDIALY_BLD_PRESS_ART	MDC_EVT_HI	tech high thr	Arterial Pressure High	Notification that the arterial pressure has exceeded maximum setting	M
MDC_HDIALY_BLD_PRESS_ART	MDC_EVT_LO	tech low thr	Arterial Pressure Low	Notification that the arterial pressure has fallen below the minimum setting	M
MDC_HDIALY_BLOOD_PUMP_CHAN	MDC_EVT_HDIALY_BLD_PUMP_STOP	tech	Blood Pump Stop	Notification that the blood pump has stopped	M
MDC_HDIALY_BLD_PUMP_PRESS_ART_POST_PUMP	MDC_EVT_HI	tech high thr	Post Pump Arterial Pressure High	Notification that the post-pump arterial pressure is above limit.	O
MDC_HDIALY_BLD_PUMP_PRESS_ART_POST_PUMP	MDC_EVT_LO	tech low thr	Post Pump Arterial Pressure Low	Notification that the post-pump arterial pressure is below limit.	O
MDC_HDIALY_BLD_PUMP_SINGLE_NEEDLE_PRESS	MDC_EVT_HI	tech high thr	Needle Pressure High	Notification that the needle pressure is above limit.	O
MDC_HDIALY_BLD_PUMP_SINGLE_NEEDLE_PRESS	MDC_EVT_LO	tech low thr	Needle Pressure Low	Notification that the needle pressure is below limit.	O
MDC_HDIALY_BLD_PUMP_PRESS_VEN	MDC_EVT_HI	tech high thr	Venous Pressure High	Notification that the venous pressure has exceeded maximum setting	M
MDC_HDIALY_BLD_PUMP_PRESS_VEN	MDC_EVT_LO	tech low thr	Venous Pressure Low	Notification that the venous pressure has fallen below the minimum setting	M
MDC_DEV_HDIALY_FLUID_CHAN					
MDC_HDIALY_DIALYSATE_COND	MDC_EVT_HI	tech high	Conductivity High	Notification that the conductivity of the dialysate has exceeded the maximum setting	O
MDC_HDIALY_DIALYSATE_COND	MDC_EVT_LO	tech low	Conductivity Low	Notification that the conductivity of the dialysate has fallen below the minimum setting	O
MDC_HDIALY_DIALYSATE_FLOW_RATE	MDC_EVT_LO	tech low	Dialysate Flow Low	Notification that the dialysate flow is below the dialysate flow rate minimum setting	O
MDC_HDIALY_DIALYSATE_TEMP	MDC_EVT_LO	tech low	Dialysate Temperature Low	Notification that the dialysate temperate has fallen below the minimum temperate setting	C (if mode is HD or HDF)
MDC_HDIALY_DIALYSATE_TEMP	MDC_EVT_HI	tech high	Dialysate Temperature High	Notification that the dialysate temperate exceeds the maximum temperate setting	C (if mode is HD or HDF)
MDC_HDIALY_FLUID_CHAN	MDC_EVT_HDIALY_BLOOD_LEAK	tech	Blood Leak	Notification that blood has been detected in the dialysate fluid	M
MDC_DEV_HDIALY_FILTER_CHAN					
MDC_HDIALY_FILTER_TRANSMEMBRANE_PRESS	MDC_EVT_LO	tech low	Transmembrane Pressure Low	Notification that transmembrane pressure has fallen below the minimum setting	M

Table 3 – Hemodialysis Machine Alarms/Alerts

Source Identifier	Event Identifier[1]	Alert Type	Dialysis Common Name	Definition	Use
MDC_HDIALY_FILTER_TRANSMEMBRANE_PRESS	MDC_EVT_HI	tech high	Transmembrane Pressure High	Notification that transmembrane pressure has exceeded the maximum setting	M
MDC_DEV_HDIALY_CONVECTIVE_CHAN					
MDC_HDIALY_CONVECTIVE_CHAN	MDC_EVT_HDIALY_RF_EXCESS_DELIV	tech-high	Excessive Replacement Fluid Bolus Delivered	Notification that more replacement fluid has been delivered than intended	O
MDC_HDIALY_CONVECTIVE_CHAN	MDC_EVT_HDIALY_REPLACE_FLUID_INSUFF_DELIV	tech-low	Insufficient Replacement Fluid Bolus Delivered	Notification that less replacement fluid has been delivered than intended	O
MDC_HDIALY_RF_BOLUS_RATE	MDC_EVT_HI	tech high	Replacement Fluid Bolus Rate High	Notification that the replacement fluid bolus is delivering more fluid than intended	O
MDC_HDIALY_RF_BOLUS_RATE	MDC_EVT_LO	tech low	Replacement Fluid Bolus Rate Low	Notification that the replacement fluid bolus is delivering less than the intended.	O
MDC_HDIALY_RF_BOLUS_VOL_DELIVERED	MDC_EVT_HI	tech high	Replacement Fluid Bolus Volume High	Notification that the replacement fluid bolus delivered more fluid than intended	O
MDC_HDIALY_RF_BOLUS_VOL_DELIVERED	MDC_EVT_LO	tech low	Replacement Fluid Bolus Volume Low	Notification that the replacement fluid bolus delivered less fluid than intended.	O
MDC_DEV_HDIALY_SAFETY_SYSTEMS_CHAN					
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_ART_AIR_DETECT	tech	Arterial Air Detector	Notification that air is sensed in the arterial blood lines	M
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_DIALYSATE_AIR_DETECT	tech	Dialysate Air Detector	Notification that air is sensed in dialysate line	C (if mode is HD or HDF)
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_DIALYSATE_COMPOSITION	tech	Dialysis Composition	Notification that the dialyzing fluid composition is incorrect	O
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_SYSTEM_GENERAL	tech	General System	Notification of any dialysis machine malfunction that are not related to patient treatment	M
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_SELFTEST_FAILURE	tech	Self-Test	Notification that a self-test failed	M
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_VEN_ACCESS	tech	Venous Access	Notification that the venous access may have become disconnected	O
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_VEN_AIR_DETECT	tech	Venous Air Detector	Notification that air is sensed in the venous blood lines	M
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_WETNESS_DETECT_ALERT	tech	Wetness Detector	Notification that the wetness detector has sensed fluid	O
MDC_HDIALY_SAFETY_SYSTEMS_CHAN	MDC_EVT_HDIALY_SAFETY_WETNESS_DETECT_ERROR	tech	Wetness Detector Error	Notification of a detected error on the wetness detector device	O
MDC_DEV_HDIALY_THERAPY_OUTCOMES_CHAN					
MDC_HDIALY_THERAPY_OUTCOMES_CHAN	MDC_EVT_HDIALY_THERAPY_PAT_TX_GENERAL	phys	General Patient Treatment	Notification that the machine has detected an alarm condition not covered by other alarms that is related to patient treatment.	O
MDC_HDIALY_THERAPY_OUTCOMES_CHAN	MDC_EVT_HDIALY_THERAPY_TX_END_TIME	tech	Treatment Time Ended	Notification that target time of treatment has been met	O
MDC_DEV_HDIALY_UF_CHAN					
MDC_HDIALY_UF_CHAN	MDC_EVT_HDIALY_UF_LO	tech low	Insufficient Ultrafiltration	Notification that the ultrafiltration system is not removing as much fluid as intended	O
MDC_HDIALY_UF_CHAN	MDC_EVT_HDIALY_UF_NEG	tech low	Negative Ultrafiltration	Notification that the ultrafiltration system has resulted in a negative ultrafiltration rate	O
MDC_HDIALY_UF_CHAN	MDC_EVT_HDIALY_UF_GOAL_MET	tech	Ultrafiltration Goal Met	Notification that target ultrafiltration volume has been met	O

Table 3 – Hemodialysis Machine Alarms/Alerts

Source Identifier	Event Identifier[1]	Alert Type	Dialysis Common Name	Definition	Use
MDC_HDIALY_UF_CHAN	MDC_EVT_HDIALY_UF_RATE_RANGE	tech range	Ultrafiltration Rate Out of Range	Notification that the ultrafiltration rate has deviated from the intended ultrafiltration rate more than is safe	M
MDC_DEV_PRESS_BLD_NONINV_VMD					
MDC_DEV_PRESS_BLD_NONINV_CHAN					
MDC_PRESS_BLD_NONINV_DIA	MDC_EVT_HI	phys high thr	Diastolic High	Notification that diastolic pressure exceeded the diastolic maximum setting	O
MDC_PRESS_BLD_NONINV_DIA	MDC_EVT_LOW	phys low thr	Diastolic Low	Notification that diastolic pressure fell below the diastolic minimum setting	O
MDC_PULS_RATE_NON_INV	MDC_EVT_HI	phys high thr	Heart Rate High	Heart rate exceeded heart rate maximum setting	O
MDC_PULS_RATE_NON_INV	MDC_EVT_LOW	phys low thr	Heart Rate Low	Heart rate fell below heart rate minimum setting	O
MDC_PRESS_BLD_NONINV_SYS	MDC_EVT_HI	phys high thr	Systolic High	Notification that systolic pressure exceeded the systolic maximum setting	O
MDC_PRESS_BLD_NONINV_SYS	MDC_EVT_LOW	phys low thr	Systolic Low	Notification that systolic pressure fell below the systolic minimum setting	O
MDC_DEV_ANALY_SAT_O2_VMD					
MDC_DEV_ANALY_SAT_O2_CHAN					
MDC_PULS_OXIM_SAT_O2	MDC_EVT_HI	phys high thr	Oximeter Oxygen Saturation High	Notification that Oxygen Saturation is above limit.	O
MDC_PULS_OXIM_SAT_O2	MDC_EVT_LO	phys low thr	Oximeter Oxygen Saturation Low	Notification that Oxygen Saturation is below limit.	
MDC_PULS_OXIM_PULS_RATE	MDC_EVT_HI	phys high thr	Oximeter Pulse High	Notification that the pulse rate measure by the pulse oximeter is above limit.	O
MDC_PULS_OXIM_PULS_RATE	MDC_EVT_LO	phys low thr	Oximeter Pulse Low	Notification that the pulse rate measure by the pulse oximeter is below limit.	
MDC_DEV_ANALY_SAT_O2_CHAN	MDC_EVT_ERR	tech	Pulse Oximeter Error	Notification of a detected error on the pulse oximeter device	O
MDC_DEV_BLOOD_CHEM_VMD					
MDC_DEV_BLOOD_CHEM_CHAN					
MDC_CONC_HCT	MDC_EVT_HI	phys high thr	Hematocrit High	Notification that patient hematocrit has risen above limit.	O
MDC_CONC_HCT	MDC_EVT_LO	phys low thr	Hematocrit Low	Notification that patient hematocrit has fallen below limit.	O
MDC_CONC_HB	MDC_EVT_HI	phys high thr	Hemoglobin High	Notification that patient hemoglobin has risen above limit.	O
MDC_CONC_HB	MDC_EVT_LO	phys low thr	Hemoglobin Low	Notification that patient hemoglobin has fallen below limit.	O
MDC_HDIALY_REL_BLOOD_VOL	MDC_EVT_LO	phys low thr	Blood Volume	Notification that the relative blood volume has dropped below the defined setting	O
MDC_SAT_O2	MDC_EVT_HI	phys high thr	Oxygen Saturation High	Notification that Patient Oxygen Saturation has risen above limit.	O
MDC_SAT_O2	MDC_EVT_LO	phys low thr	Oxygen Saturation Low	Notification that Patient Oxygen Saturation has fallen below limit.	O

Notes

1) In the case where the Event Identified is MDC_EVT_LO or MDC_EVT_HI, the dialysis machine will report the value of the parameter that is out of bounds in OBX-2 in the second observation. The parameter that is reported is shown in the Source Identifier column. The limit/range that is violated is reported in OBX-7 in the second observation.

10 Peritoneal Dialysis Data Elements

10.1Tables

PD_TBL_01 – Treatment Type

Value	Description
CAPD	Continuous Ambulatory Peritoneal Dialysis
APD	Automated Peritoneal Dialysis
CCPD	Continuous Cycling Peritoneal Dialysis
NIPD	Nocturnal Intermittent Peritoneal Dialysis
PDplus	PD Plus
TPD	Tidal Peritoneal Dialysis
aAPD	Adapted Automated Peritoneal Dialysis
IPD	Intermittent Peritoneal Dialysis
Other	A treatment that does not fit into any of the other defined types.

PD_TBL_02 – Treatment Location

Value	Description
Home	Home
Clinic	Clinic
Other	Other

PD_TBL_03 – Treatment Phase

Value	Description
PENDING	Pending
FILL	Fill
DWELL	Dwell
DRAIN	Drain
COMPLETE	Complete

PD_TBL_04 – Osmotic Agent

Value	Description
GLU	Glucose
DEX	Dextrose
ICO	Icodextrin
OTHER	Other

PD_TBL_05 – Fluid Source

Value	Description
BAG	Bags
ONLINE	Online
UNKNOWN	Unknown

PD_TBL_06 – Fill Mode

Value	Description
AUTO	Cycler
MANUAL	Manual

PD_TBL_07 – Drain Mode

Value	Description
TOBAG	Cycler to Bag
TODRAIN	Cycler to Drain
UNKNOWN	Manual

PD_TBL_08 – Transport Type

Value	Description
LOW	Low
MEDLOW	Medium-Low
MEDHIGH	Medium-High
HIGH	High

PD_TBL_09 – Catheter Type

Value	Description
STRAIGHT-TENCK	Straight Tenckhoff
OREO-ZELL	Oreopoulos-Zellerman
TWH	Toronto Western Hospital
COILED-TENCK	Coiled Tenckhoff
STRAIGHT-SWAN-TENCK	Straight Swan-neck Tenckhoff
COILED-SWAN-TENCK	Coiled Swan-neck Tenckhoff
STRAIGHT-MO-SWAN	Straight Missouri Swan-neck
COLIED-MO-SWAN	Coiled Missouri Swan-neck
MON-POP	Moncrief-Popovich
VINCENZA	Vincenza
DO-PAOLA	Do Paolo
VALLI	Valli (Balloon)
ASH-ADV	Ash Advantage (T-Fluted)
CRUZ	Cruz (Pail-Handle)
OTHER	Other/Unknown

PD_TBL_10 – Measurement Phase

Value	Description
NONE	A measurement is not taken.
PRE	A measurement is taken prior to the start of the treatment.
POST	A measurement is taken after the treatment is complete.
BOTH	A measurement is taken prior to the start of treatment and again when the treatment is complete.

PD_TBL_11 – Air Sensor State

Value	Description
AIR	The sensor is reading air.
FLUID	The sensor is reading fluid.
UNKNOWN	The state of the sensor is unknown.

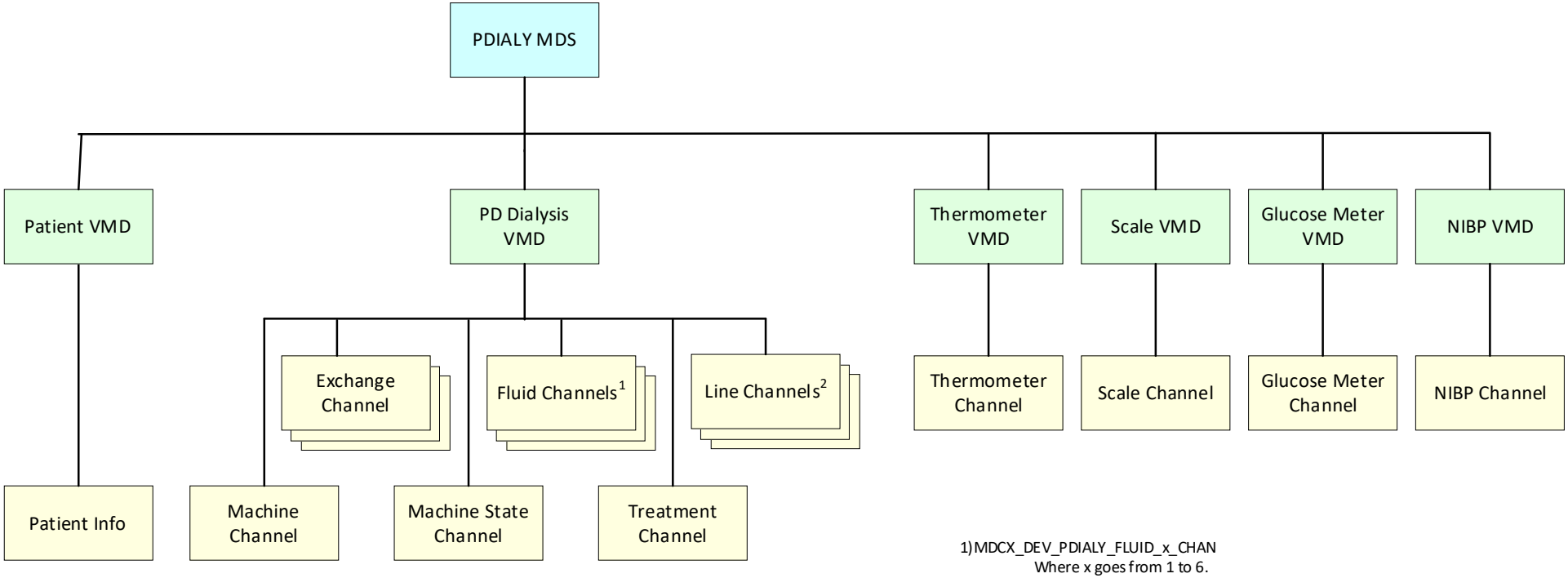
PD_TBL_12 – Last Drain Mode

Value	Description
NEVER	It will never take place
ALWAYS	It will always take place
UFLIMIT	It will take place if the total estimated UF for the therapy is below the Extra Drain UF Limit. The Extra Drain UF Limit is expressed as a percentage of total estimated UF for the therapy.

PD_TBL_13 – Prescription Type

Value	Description
EXCH	Exchange Based
TXDUR	Treatment Based with Fixed Duration
TXEND	Treatment Based with Fixed End Time

10.2 Data Object



Fluid Channels

A PD PCD-01 Message (Prescription or Treatment Status) will contain one Fluid Channel for each fluid source. A fluid source will be a single bag or online delivery system. The standard supports the use of up to 6 fluid sources. The machine reports each source in a separate channel. These channels are numbered from 1 to 6. The channels' name is abbreviated as MDCX_DEV_PDIALY_FLUID_x_CHAN. In the PCD-01 message, "x" is replaced with the source number. For example, a treatment that has 3 bags will report fluid channels MDCX_DEV_PDIALY_FLUID_1_CHAN, MDCX_DEV_PDIALY_FLUID_2_CHAN, and MDCX_DEV_PDIALY_FLUID_3_CHAN.

Exchanges

A PD exchange uses data from one or more fluid sources. The cycler reports how much volume from each source is used in the MDCX_PDIALY_FILL_VOLUME object. This object is a numeric array. The number of items in the array will be the same as the number of fluid channels. If a particular source is not used during the exchange, then the volume will be 0. For example, given a treatment with three sources, the cycler would report [0.000^0.000^2.500] for an exchange of 2.5 L from the last bag.

Supply Lines

The supply lines are part of the Disposable Set. The Disposable Set varies from cycler to cycler. The supply lines are physically connected to the fluid sources and convey fluid from the bags to the cycler. The Supply Line Channel represents all lines that are connected to a Fluid Source. If the cycler can associate an event (low flow, no flow, etc.) with one of the Fluid Sources, then the cycler will link the event to the appropriate Fluid Source Channel. If the cycler cannot relate the event to a specific fluid source, the cycler will link the event to the generic Supply Line Channel.

In the table below when usage is conditional (C), a number is given. The number refers to one of the following conditions. If the condition is not met then the cardinality is "0..0".

1) The Exchange Phase is Fill or greater (MDCX_PDIALY_CURRENT_PHASE = FILL or DWELL or DRAIN or COMPLETE).
2) The Exchange Phase is Dwell or greater (MDCX_PDIALY_CURRENT_PHASE = DWELL or DRAIN or COMPLETE).
3) The Exchange Phase is Drain or greater (MDCX_PDIALY_CURRENT_PHASE = DRAIN or COMPLETE).
4) The Fluid Source is bags (MDCX_PDIALY_FLUID_SOURCE = BAG).
5) There are APD exchanges (MDCX_PDIALY_TREAT_TYPE = APD).
6) There are CAPD exchanges (MDCX_PDIALY_TREAT_TYPE = CAPD).
7) The prescription type is exchange based (MDCX_PDIALY_PRESCRIPTION_TYPE = EXCH).

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
MDCX_DEV_PDIALY_MACHINE_MDS		Hemodialysis machine	A device or system used to treat renal failure delivered by removing toxins from the blood through an artificial kidney, called a dialyzer.	All	All				**1..1**	**M**	**M**
. . . MDC_ID_MODEL_MANUFACTURER (531950)		Dialysis Device Manufacturer	String containing device manufacturer's name	All	All	String	Alphanumeric	N/A	1..1	M	X
. . . MDC_ID_MODEL_NUMBER (531969)		Dialysis Device Model	String containing device manufacturer's model identifier for the device	All	All	String	Alphanumeric	N/A	1..1	M	X

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDC_ID_PROD_SPEC_SERIAL		Dialysis Device Serial Number	String containing the device's serial number	All	All	String	Alphanumeric	N/A	1..1	M	X
. . . MDC_ID_PROD_SPEC_SW		Device Software Version	String defining the version of the software on the machine	All	All	String	Alphanumeric	N/A	1..1	M	X
. . . MDC_ATTR_ID_UDI		Dialysis Device UDI	String containing the device's FDA required Universal Device Identifier. [Note: MDC_ATTR_ID_UDI contains three components: UdiAuthority, UdiIssuer, UdiLabel to support non-FDA entities, but currently there is no approved way of encoding this using HL7 V2; PRT-10 and PRT-16-20 is used instead; UdiLabel = PRT-10.]	All	All	String	Alphanumeric	N/A	1..1	O	X
. MDCX_DEV_PDIALY_VMD		Hemodialysis subsystem	A device or subsystem used to treat renal failure delivered by removing toxins from the blood through an artificial kidney, called a dialyzer.	All	All				**1..1**	**M**	**M**
. . MDCX_DEV_PDIALY_MACH_CONFIG_CHAN		Hemodialysis configuration	The principal dialysis machine operational modes, treatment modality, settings and other information about the dialysis machine.	All	All				**1..1**	**M**	**X**
. . . MDC_ATTR_TIME_ABS (67975)		Dialysis Device Time	Date and time as recorded on the dialysis device's internal clock with offset to UTC (based on location and DST)	All	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	M	X
. . MDCX_DEV_PDIALY_TREATMENT_CHAN		**Treatment**		**Intradialytic**	**All**				**1..1**	**M**	**M**
. . . MDCX_PDIALY_TREAT_TYPE		Treatment Type	Treatment Type	Intradialytic	All	Enumeration	PD_TBL_01	N/A	1..1	M	M
. . . MDCX_PDIALY_TREAT_LOCATION		Treatment Location	Treatment Location	Intradialytic	All	Enumeration	**PD_TBL_02**	N/A	0..1	O	O
. . . MDCX_PDIALY_CURRENT_PHASE		Current Phase	The current treatment phase.	Intradialytic	All	Enumeration	**PD_TBL_03**	N/A	1..1	M	X
. . . MDCX_PDIALY_PRESCRIPTION_TYPE		Prescription Type	Prescription Type	Intradialytic	All	Enumeration	**PD_TBL_13**	N/A	1..1	M	M
. . . MDCX_PDIALY_APD_START_TIME_SETTING		APD Start Time	APD Start Time	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C5	C5
. . . MDCX_PDIALY_APD_END_TIME_SETTING		APD End Time	APD End Time	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C5	C5
. . . MDCX_PDIALY_APD_TOTAL_VOLUME_SETTING		APD Total Volume	Total volume in APD exchanges.	Intradialytic	All	Numeric	X.XXX	L	1..1	C5	C5
. . . MDCX_PDIALY_APD_CYCLES_SETTING		APD Cycles	APD Cycles	Intradialytic	All	Numeric	XX	N/A	1..1	C5	C5

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDCX_PDIALY_CAPD_START_TIME_SETTING		CAPD Start Time	CAPD Start Time	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C6	C6
. . . MDCX_PDIALY_CAPD_END_TIME_SETTING		CAPD End Time	CAPD End Time	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C6	C6
. . . MDCX_PDIALY_CAPD_TOTAL_VOLUME_SETTING		CAPD Exchanges	CAPD Exchanges	Intradialytic	All	Numeric		N/A	1..1	C6	C6
. . . MDCX_PDIALY_CAPD_CYCLES_SETTING		CAPD Total Volume	Total volume in CAPD exchanges	Intradialytic	All	Numeric	XX	N/A	1..1	C6	C6
. . . MDCX_PDIALY_TIDAL_PERCENTAGE		Tidal Percentage	The percentage of Night Fill Volume to be drained during a tidal cycle.	Intradialytic	All	Numeric	XXX.X	%	0..1	O	O
. . . MDCX_PDIALY_FULL_DRAIN_FREQ		Full Drain Frequency	The number of cycles between full drains when performing tidal exchanges. The value is expressed as the number of drains between full drains.	Intradialytic	All	Numeric	X	N/A	0..1	O	O
. . . MDCX_PDIALY_PERITONEUM_VOL_MAX		Maximum Peritoneum Volume		Intradialytic	All	Numeric	X.XXX	L	0..1	O	O
. . . MDCX_PDIALY_INIT_MIN_DRAIN_VOL_SETTING		Minimum Initial Drain Volume	The minimum volume to remove during the initial drain.	Intradialytic	All	Numeric	X.XXX	L	0..1	O	O
. . . MDCX_PDIALY_INIT_MAX_DRAIN_VOL_SETTING		Maximum Initial Drain Time	The maximum volume to remove during the initial drain.	Intradialytic	All	Numeric	X.XXX	L	0..1	O	O
. . . MDCX_PDIALY_SAMPLE_REMINDER		Sample Reminder	This value is true when the user should be reminded to collect an effluent sample.	Intradialytic	All	Bool	T / F	N/A	0..1	O	O
. . . MDCX_PDIALY_MEDICATION_SURVEY		Medications Survey	This value is true when the user should be surveyed for medications taken.	Intradialytic	All	Bool	T / F	N/A	0..1	O	O
. . . MDCX_PDIALY_EXCHANGE_SURVEY		Exchange Survey	This value is true when the user should be surveyed for number of day exchanges performed.	Intradialytic	All	Bool	T / F	N/A	0..1	O	O
. . . MDCX_PDIALY_DAY_DRAIN_TIME_MIN		Minimum Day Drain Time	Minimum duration for a day time drain.	Intradialytic	All	Numeric	XXX.X	min	0..1	O	O
. . . MDCX_PDIALY_DAY_DRAIN_VOL_PCT_MIN		Minimum Day Drain Volume Percent	The min amount of fluid to drain expressed as a percentage of the fill volume.	Intradialytic	All	Numeric	XXX.X	%	0..1	O	O
. . . MDCX_PDIALY_NIGHT_DRAIN_TIME_MIN		Minimum Night Drain Time	Minimum duration for a night time drain.	Intradialytic	All	Numeric	XXX.X	min	0..1	O	O
. . . MDCX_PDIALY_LAST_DRAIN_MODE		Extra Last Drain Mode	This value specifies how the last drain phase is performed.	Intradialytic	All	Enumeration	**PD_TBL_12**	N/A	0..1	O	O

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDCX_PDIALY_LAST_DRAIN_UF_LIMIT		Extra Last Drain UF Limit	This limits which determines if the extra drain is performed. If the total estimated UF for the therapy is below the Extra Drain UF Limit the extra drain is performed. The Extra Drain UF Limit is expressed as a percentage of total estimated UF for the therapy.	Intradialytic	All	Numeric	XXX.X	%	0..1	O	O
. . . MDCX_PDIALY_NIGHT_UF_ESTIMATE		Estimated Night UF	The estimated UF volume for the night therapy. This value is used to keep track of the fluid balance for the patient, so that the fluid that was filled plus the fluid generated as UF is drained from the patient.	Intradialytic	All	Numeric	X.XXX	L	0..1	O	O
. . . MDCX_PDIALY_TEMP_DIALYSATE_SETTING		Dialysate Temperature Setting	Desired dialysate temperature during treatment	Intradialytic	All	Numeric	XX.X	˚C	0..1	O	X
. . MDCX_DEV_PDIALY_FLUID_1_CHAN . . MDCX_DEV_PDIALY_FLUID_2_CHAN . . MDCX_DEV_PDIALY_FLUID_3_CHAN . . MDCX_DEV_PDIALY_FLUID_4_CHAN . . MDCX_DEV_PDIALY_FLUID_5_CHAN . . MDCX_DEV_PDIALY_FLUID_6_CHAN		**Fluid Definition**		**Intradialytic**	**All**				**1..1**	**M**	**M**
. . . MDCX_PDIALY_FLUID_NAME		Dialysate Name	Dialysate Name	Intradialytic	All	String	Alphanumeric	N/A	0..1	O	O
. . . MDCX_DIALY_FLUID_GLUCOSE_CONC		Glucose	Glucose	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_ICODEXTRIM_CONC		Icodextrin	Icodextrin	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_AMINO_ACID_CONC		Amino acid	Amino acid	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_OSMOTIC_AGENT		Other osmotic agent type	Other osmotic agent type	Intradialytic	All	Enumeration	**PD_TBL_04**	N/A	0..1	O	O
. . . MDCX_DIALY_FLUID_OSMOTIC_AGENT_CONC		Other osmotic agent concentration	Other osmotic agent concentration	Intradialytic	All	Numeric	XX.XX	%	0..1	O	O
. . . MDCX_DIALY_FLUID_BICARB_CONC		Bicarbonate (HCO3)	Bicarbonate (HCO3)	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_CHLORIDE_CONC		Chloride (CL)	Chloride (CL)	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_LACTATE_CONC		Lactate	Lactate	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_CALCIUM_CONC		Calcium (CA)	Calcium (CA)	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_CITRATE_CONC		Citrate	Citrate	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDCX_DIALY_FLUID_POTASSIUM_CONC		Potassium (K)	Potassium (K)	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_DIALY_FLUID_MAGNESIUM_CONC		Magnesium	Magnesium	Intradialytic	All	Numeric	XXX.X	mmol/L	0..1	O	O
. . . MDCX_PDIALY_FLUID_BAG_VOLUME		Bag Volume	Bag Volume	Intradialytic	All	Numeric	X.XXX	L	1..1	C4	C4
. . . MDCX_PDIALY_FLUID_SOURCE		Fluid Source	Source of the fluid.	Intradialytic	All	Enumeration	**PD_TBL_05**	N/A	1..1	M	M
. . MDCX_DEV_PDIALY_EXCHANGE_CHAN		Peritoneal Exchange	The values for the current and previous exchanges.	Intradialytic	All				**1..1**	**M**	**C7**
. . . MDC_ATTR_CHAN_NUM_LOGICAL		Exchange Number	The number of the exchange in the current treatment. The first exchange is number 1.	Intradialytic	All	Numeric	X	N/A	1..1	M	C7
. . . MDCX_PDIALY_CURRENT_PHASE		Current Phase	The current exchange phase.	Intradialytic	All	Enumeration	**PD_TBL_03**	N/A	1..1	M	X
. . . MDCX_PDIALY_FILL_START_TIME		Fill Start time	The time that the fill phase started.	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C1	X
. . . MDCX_PDIALY_FILL_END_TIME		Fill End time	The time that the fill phase ended.	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C1	X
. . . MDCX_PDIALY_FILL_MODE		Fill mode	Fill mode	Intradialytic	All	Enumeration	**PD_TBL_06**	N/A	1..1	C1	C7
. . . MDCX_PDIALY_FILL_DURATION_SETTING		Prescribed Fill duration	Prescribed fill duration	Intradialytic	All	Numeric	XXX.X	min	1..1	C1	C7
. . . MDCX_PDIALY_FILL_DURATION		Actual fill duration	Actual fill duration	Intradialytic	All	Numeric	XXX.X	min	1..1	C1	X
. . . MDCX_PDIALY_FILL_VOLUME_SETTING		Prescribed Fill volume	Prescribed Fill volume	Intradialytic	All	Numeric Array	X.XXX	L	1..1	C1	C7
. . . MDCX_PDIALY_FILL_VOLUME		Actual Fill volume	Actual Fill volume	Intradialytic	All	Numeric Array	X.XXX	L	1..1	C1	X
. . . MDCX_PDIALY_FLUID_TEMP_SETTING		Fluid temperature setting	Fluid temperature	Intradialytic	All	Numeric	XX.X	degC	0..1	O	O
. . . MDCX_PDIALY_FLUID_TEMP		Fluid temperature	Fluid temperature	Intradialytic	All	Numeric	XX.X	degC	0..1	O	X
. . . MDCX_PDIALY_DWELL_START_TIME		Dwell Start time	The time that the dwell phase started.	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C2	X
. . . MDCX_PDIALY_DWELL_END_TIME		Dwell End time	The time that the dwell phase ended.	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C2	X
. . . MDCX_PDIALY_DWELL_DURATION_SETTING		Prescribed Dwell Duration	Prescribed dwell duration	Intradialytic	All	Numeric	XXX.X	min	1..1	M	C7
. . . MDCX_PDIALY_DWELL_DURATION		Actual Dwell Duration	Actual dwell duration	Intradialytic	All	Numeric	XXX.X	min	1..1	M	X
. . . MDCX_PDIALY_DRAIN_START_TIME		Drain Start time	The time that the drain phase started.	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C3	X
. . . MDCX_PDIALY_DRAIN_END_TIME		Drain End time	The time that the drain phase ended.	Intradialytic	All	Date Time	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	1..1	C3	X

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDCX_PDIALY_DRAIN_MODE		Drain mode	Drain mode	Intradialytic	All	Enumeration	**PD_TBL_07**	N/A	1..1	C3	C7
. . . MDCX_PDIALY_DRAIN_DURATION_SETTING		Prescribed Drain Duration	Prescribed drain duration	Intradialytic	All	Numeric	XXX.X	min	1..1	C3	C7
. . . MDCX_PDIALY_DRAIN_DURATION		Actual Drain Duration	Actual drain duration	Intradialytic	All	Numeric	XXX.X	min	1..1	C3	X
. . . MDCX_PDIALY_DRAIN_VOLUME_SETTING		Prescribed Drain volume	Prescribed Drain volume	Intradialytic	All	Numeric	X.XXX	L	1..1	C3	C7
. . . MDCX_PDIALY_DRAIN_VOLUME		Actual Drain volume	Actual Drain volume	Intradialytic	All	Numeric	X.XXX	L	1..1	C3	X
. . MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN				**All**	**All**				**0..1**	**O**	**X**
. . . MDCX_PDIALY_PRESSURE_DIALYSATE		Dialysate Supply Pressure Sensor Value	Dialysate pressure in the supply line(s).	Intradialytic	All	Numeric	XXXX	mmHg	0..1	O	X
. . MDCX_DEV_PDIALY_DRAIN_LINE_CHAN				**All**	**All**				**0..1**	**O**	**X**
. . . MDCX_PDIALY_PRESSURE_DRAIN		Drain Pressure Sensor Value	Dialysate pressure in the drain line.	Intradialytic	All	Numeric	XXXX	mmHg	0..1	O	X
. . MDCX_DEV_PDIALY_PATIENT_LINE_CHAN				**All**	**All**				**0..1**	**O**	**X**
. . . MDCX_PDIALY_PRESSURE_PATIENT		Patient Pressure Sensor Value	Dialysate pressure in the patient line.	Intradialytic	All	Numeric	XXXX	mmHg	0..1	O	X
. . MDCX_DEV_PDIALY_HEATER_LINE_CHAN				**All**	**All**				**0..1**	**O**	**X**
. . MDCX_DEV_PDIALY_MACH_STATE_CHAN				**All**	**All**				**0..1**	**O**	**X**
. . . MDC_VENDOR_ALERT_NUM		Alert ID	The number associated with the current alert. If no alert is active, then this object is not reported.	All	All	Numeric	XXXX	N/A	0..1	O	X
. . . MDC_VENDOR_ALERT_TEXT		Alert Text	The text name of the current alert. If no alert is active, then this object is not reported. In most case this object will contain the text shown to the user.	All	All	String	N/A	N/A	0..1	O	X
. . . MDCX_PDIALY_AIR_SENSOR_STATE		Air sensor state	The state of the air sensor.	All	All	Enumeration	**PD_TBL_11**	N/A	0..1	O	X
. . . MDCX_PDIALY_PUMP_SPEED		Pump Speed	The speed of the pump.	All	All	Numeric	XXX.X	ml/min	0..1	O	X
. . . MDCX_PDIALY_PUMP_PRESSURE		Pump Pressure	The pressure at the pump outlet.	All	All	Numeric	XXX.X	mmHg	0..1	O	X

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDCX_PDIALY_TEMP_DIALYSATE_IN	tech high low thr	Dialysate Temperature Sensor Input	Dialysate temperature at the inlet.	All	All	Numeric	XX.X	˚C	0..1	O	X
. . . MDCX_PDIALY_TEMP_DIALYSATE_OUT	tech high low thr	Dialysate Temperature Sensor Output	Dialysate temperature at the outlet.	All	All	Numeric	XX.X	˚C	0..1	O	X
. . . MDCX_PDIALY_TEMP_HEATER_BAG		Dialysate Heater Bag Temperature Sensor	Dialysate temperature in the heater bag.	All	All	Numeric	XX.X	˚C	0..1	O	X
. . . MDC_TEMP_DEVICE_INTERNAL		Device Internal Temperature Monitoring	Temperature inside the cycler.	All	All	Numeric	XX.X	˚C	0..1	O	X
. . . MDCX_PDIALY_AIR_SENSOR_IN		Inlet Air Sensor Value	Measurement of the air going to the patient.	All	All	Numeric	XXX	mL	0..1	O	X
. . . MDCX_PDIALY_AIR_SENSOR_OUT		Outlet Air Sensor Value	Measurement of the air coming from the patient.	All	All	Numeric	XXX	mL	0..1	O	X
. . . MDCX_PDIALY_LEAK_SENSOR		Leak Sensor(s)	Detects fluid leaks in the cycler.	All	All	Bool			0..1	O	X
. . . MDCX_ATTR_AC_MAINS_RMS		Mains Power Monitoring	Monitors AC line in.	All	All	Numeric	XXX.X	V	0..1	O	X
. . . MDCX_PDIALY_VOLTAGE_MOTOR		Motor Voltage Monitoring	Motor Voltage Monitoring	All	All	Numeric	XXX.X	V	0..1	O	X
. . . MDCX_PDIALY_VOLTAGE_HEATER		Heater Input Voltage	The heater input voltage level is monitored.	All	All	Numeric	XXX.X	V	0..1	O	X
. . . MDC_ATTR_BATT_VOLTAGE		Battery Charge Level Monitoring	The battery voltage level is monitored.	All	All	Numeric	XX.X	V	0..1	O	X
. . . MDCX_ATTR_POWER_SUPPLY_VOLTAGE		Voltage Monitoring	The cycler monitors power supply voltages.	All	All	Numeric	XX.X	V	0..1	O	X
. . . MDCX_PDIALY_PRESSURE_COMPRESSED_AIR		Pneumatic: Compressed air pressure	Air pressure is monitored. Compressed air is positive pressure.	All	All	Numeric	XXXX	mmHg	0..1	O	X
. . . MDCX_PDIALY_PRESSURE_VACUUM		Pneumatic: Vacuum pressure	Vacuum level is monitored. Vacuum is negative pressure.	All	All	Numeric	XXXX	mmHg	0..1	O	X
. . . MDCX_PDIALY_PRESSURE_PNEUMATIC		Hydraulic Fluid Pressure	Hydraulic pump fluid pressure is monitored.	All	All	Numeric	XXXX	mmHg	0..1	O	X
. . . MDCX_PDIALY_VOLUME_SUPPLY_BAG		Dialysate Supply Bag Volume Status Monitoring	The cycler monitors the volume of solution pumped out of the supply bag(s).	All	All	Numeric	X.XXX	L	0..1	O	X
. . . MDCX_PDIALY_VOLUME_HEATER_BAG		Dialysate Heater Bag Volume Status Monitoring	The cycler monitors the volume of solution pumped into and out of the heater bag.	All	All	Numeric	X.XXX	L	0..1	O	X
. . . MDCX_PDIALY_WEIGHT_HEATER_BAG		Heater Bag Weight	Weight of the heater bag	All	All	Numeric	XXXX.X	g	0..1	0	X
. MDCX_DEV_PDIALY_PATIENT_VMD		**Patient "Device"**		**Intradialytic**	**All**				0..1	**O**	**O**
. . MDCX_DEV_PATIENT_INFO		Patient channel	A channel to hold information about the patient.	Intradialytic	All				0..1	**O**	**O**

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDCX_PDIALY_PATIENT_TRANSPORT_TYPE		Transport Type	The rate at which small molecules cross the peritoneal membrane.	Intradialytic	All	Enumeration	**PD_TBL_08**	N/A	0..1	O	O
. . . MDCX_PDIALY_PATIENT_CATHETER_TYPE		Catheter Type	Catheter Type	Intradialytic	All	Enumeration	**PD_TBL_09**	N/A	0..1	O	O
. . . MDCX_PDIALY_PATIENT_CATHETER_DATE		Catheter Placement date	Catheter Placement date	Intradialytic	All	Date	YYYYMMDDHHMMSS[.SSS]+/-ZZZZ	N/A	0..1	O	O
. . . MDCX_PDIALY_PAT_TARGET_WT		Target Weight	The patient's target weight. This is captured for information purposes only and is not used by the dialysis machine when determining treatment settings.	Intradialytic	All	Numeric	XXX.X	Kg	0..1	O	O
. MDC_DEV_PRESS_BLD_NONINV_VMD		Non-invasive blood pressure	Instrument for the non-invasive measurement of blood pressure.	Intradialytic	All				**0..1**	**O**	**O**
. . MDC_DEV_PRESS_BLD_NONINV_CHAN				**Intradialytic**	**All**				**0..1**	**O**	**O**
. . . MDCX_DIALY_BLD_MEAS_PHASE		Blood Pressure Measurement Phase	The phase of the treatment when the patient should perform a blood pressure measurement.	Intradialytic	All	String	**PD_TBL_10**	N/A	0..1	O	O
. . . MDCX_DIALY_PUL_MEAS_PHASE		Pulse Measurement Phase	The phase of the treatment when the patient should perform a pulse measurement.	Intradialytic	All	String	**PD_TBL_10**	N/A	0..1	O	O
. . . MDC_ATTR_TIME_PD_MSMT		Blood Pressure Measurement Interval Setting	Time allowed to elapse between automatic blood pressure measurements. A value of zero indicates that automatic measurements are not being taken.	Intradialytic	All	Numeric	XXX	minutes	0..1	O	O
. . . MDC_ATTR_PT_BODY_POSN		Patient body position	Patient body position at the time of the {blood pressure} measurement.	Intradialytic	All	Enumeration	**HD_TBL_04**	N/A	0..1	O	O
. . . MDC_PRESS_BLD_NONINV_DIA	phys high low thr	Diastolic Pressure	Minimum arterial pressure during relaxation and dilatation of the ventricles of the heart when the ventricles fill with blood	Intradialytic	All	Numeric	XXX	mmHg	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Diastolic Pressure Entry Limits	The minimum and maximum value that the user can enter for a diastolic pressure.	Intradialytic	All	Numeric Range	XXX^XXX	mmHg	0..1	0	O
. . . MDC_PULS_RATE_NON_INV	phys high low thr	Heart Rate	Number of heart beats per minute	Intradialytic	All	Numeric	XXX	BPM	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Pulse Entry Limits	The minimum and maximum value that the user can enter for a pulse measurement.	Intradialytic	All	Numeric Range	XXX^XXX	BPM	0..1	0	O
. . . MDC_PRESS_BLD_NONINV_MEAN		Mean Arterial Pressure	Average pressure in a patient's arteries during one cardiac cycle	Intradialytic	All	Numeric	XXX	mmHg	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Mean Arterial Pressure Entry Limits	The minimum and maximum value that the user can enter for a mean arterial pressure.	Intradialytic	All	Numeric Range	XXX^XXX	mmHg	0..1	0	O

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDC_PRESS_BLD_NONINV_SYS	phys high low thr	Systolic Pressure	Maximum arterial pressure during contraction of the left ventricle of the heart	Intradialytic	All	Numeric	XXX	mmHg	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Systolic Pressure Entry Limits	The minimum and maximum value that the user can enter for a systolic pressure.	Intradialytic	All	Numeric Range	XXX^XXX	mmHg	0..1	0	O
. MDC_DEV_SPEC_PROFILE_GLUCOSE		**Glucose "Device"**		Intradialytic	**All**				0..1	**O**	**O**
. . MDC_DEV_CHAN		Glucose Channel	A channel to hold information about the patient's glucose.	**Intradialytic**	All				0..1	**O**	**O**
. . . MDCX_DIALY_PAT_GLU_MEAS_PHASE		Glucose Measurement Phase	The phase of the treatment when the patient should perform a glocuse measurement.	Intradialytic	All	String	**PD_TBL_10**	N/A	0..1	O	O
. . . MDC_CONC_GLU_CAPILLARY_PLASMA		Blood Glucose	Blood glucose at the start of treatment	Intradialytic	All	Numeric	XX.X	mmol/L	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Glucose Entry Limits	The minimum and maximum values for entry by the user.	Intradialytic	All	Numeric Range	XX.X^XX.X	mmol/L	0..1	O	O
. MDC_DEV_SPEC_PROFILE_SCALE		**Scale "Device"**		Intradialytic	**All**				0..1	**O**	**O**
. . MDC_DEV_CHAN		Weight Channel	A channel to hold information about the patient's weight.	**Intradialytic**	All				0..1	**O**	**O**
. . . MDCX_DIALY_PAT_WT_MEAS_PHASE		Weight Measurement Phase	The phase of the treatment when the patient should perform a weight measurement.	Intradialytic	All	String	**PD_TBL_10**	N/A	0..1	O	O
. . . MDC_MASS_BODY_ACTUAL		Patient Weight	Weight of patient at beginning or end of treatment	Intradialytic	All	Numeric	XXX.X	Kg	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Weight Entry Limits	The minimum and maximum values for entry by the user.	Intradialytic	All	Numeric Range	XXX.X^XXX.X	Kg	0..1	O	O
. MDC_DEV_SPEC_PROFILE_TEMP		**Thermometer "Device"**		Intradialytic	**All**				0..1	**O**	**O**
. . MDC_DEV_CHAN		Temperature Channel	A channel to hold information about the patient's temperature.	**Intradialytic**	All				0..1	**O**	**O**
. . . MDCX_DIALY_PAT_TEMP_MEAS_PHASE		Temperature Measurement Phase	The phase of the treatment when the patient should perform a temperature measurement.	Intradialytic	All	String	**PD_TBL_10**	N/A	0..1	O	O
. . . MDC_TEMP_TYMP	phys high thr	Patient Temperature	Patient's temperature when measured at the ear drum.	Intradialytic	All	Numeric	XX.X	°C	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Temperature Entry Limits	The minimum and maximum values for entry by the user.	Intradialytic	All	Numeric Range	XX.X^XX.X	°C	0..1	O	O
. . . MDC_TEMP_ORAL	phys high thr	Patient Temperature	Patient's temperature when measured orally.	Intradialytic	All	Numeric	XX.X	°C	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Temperature Entry Limits	The minimum and maximum values for entry by the user.	Intradialytic	All	Numeric Range	XX.X^XX.X	°C	0..1	O	O
. . . MDC_TEMP_BODY	phys high thr	Patient Temperature	Patient's temperature when measured at an unknown location	Intradialytic	All	Numeric	XX.X	°C	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Temperature Entry Limits	The minimum and maximum values for entry by the user.	Intradialytic	All	Numeric Range	XX.X^XX.X	°C	0..1	O	O

Table 4 – Peritoneal Dialysis Data Objects

REFID	Alert Type	Common Term	Description	Phase	Temporal	Data Type	Format	UOM	Card	Use	Rx Use
. . . MDC_TEMP_AXILLA	phys high thr	Patient Temperature	Patient's temperature when measured at the arm pit.	Intradialytic	All	Numeric	XX.X	°C	0..1	O	X
. . . . MDC_ATTR_VAL_RANGE		Temperature Entry Limits	The minimum and maximum values for entry by the user.	Intradialytic	All	Numeric Range	XX.X^XX.X	°C	0..1	O	O

10.3 Events

Table 5 – Peritoneal Dialysis Alarms/Alerts

Source	Event	Alert Type	Dialysis Common Name	Definition	Usage
MDC_MASS_BODY_ACTUAL	MDC_EVT_ADVIS_SETTING_CHK	tech		The user should check the patient weight.	O
MDCX_DEV_PDIALY_DRAIN_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED	tech		A line is blocked; checking is required.	O
MDCX_DEV_PDIALY_DRAIN_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED_CHK_REQD	tech		Slow flow in drain line should be checked by user.	O
MDCX_DEV_PDIALY_DRAIN_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED_OUTFLOW	tech		Blocked flow in drain line.	O
MDCX_DEV_PDIALY_DRAIN_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_SLOW	tech		Slow flow in drain line.	O
MDCX_DEV_PDIALY_DRAIN_LINE_CHAN	MDCX_EVT_PDIALY_LINE_CHK	tech		Check drain line.	O
MDCX_DEV_PDIALY_HEATER_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED	tech		A line is blocked	O
MDCX_DEV_PDIALY_HEATER_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_SLOW	tech		Slow flow in heater line.	O
MDCX_DEV_PDIALY_HEATER_LINE_CHAN	MDCX_EVT_PDIALY_HEATER_BAG_POSN_ERR _OR_LINE_CLAMPED_CHK_REQD	tech		Verify that the heater bag is on the heater tray and the heater line is not clamped	O
MDCX_DEV_PDIALY_HEATER_LINE_CHAN	MDCX_EVT_PDIALY_LINE_CHK	tech		Check heater line.	O
MDCX_DEV_PDIALY_MACH_STATE_CHAN	MDCX_EVT_PROGRAM_SYNC_ERROR	tech		Error during monitoring of program execution synchronization	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_AC_POWER_FAIL	tech		AC Power fail (or short circuit in one of the devices connected to an auxiliary outlet)	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_BATT_LO	tech	Low Battery	{device or sensor} Battery low	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_HID_MALF	tech		HID failure	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_INTERNAL_SYSTEM_FAULT	tech		Unspecified system fault.	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_MSMT_OUT_OF_RANGE	tech		Unspecified measurement out of range	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_SELFTEST_FAILURE	tech		Unspecified selftest failure	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_SPEAKER_FAIL	tech		The speaker power and signals are monitored to ensure the speaker is active.	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_TOUCHSCREEN_FAIL	tech		One or more elements touchscreen have failed.	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDC_EVT_UNRECOV_ERR	tech		Unrecoverable state machine error in communication.	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_AC_POWER_RESTORED	tech		AC power restored	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_DEVICE_TILTED	tech		Device tilted	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_EXTERNAL_MEMORY_ERROR	tech		External memory device error (e.g. external memory not available, cannot communicate, cannot be read, cannot be written)	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_DISPLAY_FAIL	tech		One or more elements of the display have failed.	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_PATIENT_ID_INVALID	tech		Invalid Patient ID	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_TREATMENT_ERR	tech		An error occurred during treatment	O
MDCX_DEV_PDIALY_MACHINE_MDS	MDCX_EVT_UNRECOV_TREATMENT_ERR	tech		An unrecoverable error occurred during treatment	O

Table 5 – Peritoneal Dialysis Alarms/Alerts

Source	Event	Alert Type	Dialysis Common Name	Definition	Usage
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_DRAIN_COMPLICATION_CHK_REQD	tech		Drain complication encountered: check patient and drain lines	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FILL_COMPLICATION_CHK_REQD	tech		Fill complication encountered: check heater, patient and drain lines	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED	tech		Tubing system blocked during inflow to patient.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED_CHK_REQD	tech		Slow flow in patient line should be checked by user.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED_INFLOW	tech		Blocked flow in patient inlet line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED_OUTFLOW	tech		Blocked flow in patient outlet line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_SLOW	tech		Slow flow in patient line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_SLOW_INFLOW	tech		Slow flow in patient inlet line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_SLOW_OUTFLOW	tech		Slow flow in patient outlet line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_LINE_ABSENT	tech		Missing or disconnected patient line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_PDIALY_LINE_CHK	tech		Check patient line.	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_STAT_PDIALY_PATIENT_DRAIN_PHASE	tech		Patient drain phase	O
MDCX_DEV_PDIALY_PATIENT_LINE_CHAN	MDCX_EVT_STAT_PDIALY_PATIENT_FILL_PHASE	tech		Patient fill or refill phase	O
MDCX_DEV_PDIALY_FLUID_1_CHAN MDCX_DEV_PDIALY_FLUID_2_CHAN MDCX_DEV_PDIALY_FLUID_3_CHAN MDCX_DEV_PDIALY_FLUID_4_CHAN MDCX_DEV_PDIALY_FLUID_5_CHAN MDCX_DEV_PDIALY_FLUID_6_CHAN MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED	tech		Tubing system blocked during outflow from patient.	O
MDCX_DEV_PDIALY_FLUID_1_CHAN MDCX_DEV_PDIALY_FLUID_2_CHAN MDCX_DEV_PDIALY_FLUID_3_CHAN MDCX_DEV_PDIALY_FLUID_4_CHAN MDCX_DEV_PDIALY_FLUID_5_CHAN MDCX_DEV_PDIALY_FLUID_6_CHAN MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_BLOCKED_CHK_REQD	tech		Slow flow in supply line should be checked by user.	O
MDCX_DEV_PDIALY_FLUID_1_CHAN MDCX_DEV_PDIALY_FLUID_2_CHAN MDCX_DEV_PDIALY_FLUID_3_CHAN MDCX_DEV_PDIALY_FLUID_4_CHAN MDCX_DEV_PDIALY_FLUID_5_CHAN MDCX_DEV_PDIALY_FLUID_6_CHAN MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN	MDCX_EVT_PDIALY_FLOW_SLOW	tech		Slow flow in supply line.	O
MDCX_DEV_PDIALY_FLUID_1_CHAN MDCX_DEV_PDIALY_FLUID_2_CHAN MDCX_DEV_PDIALY_FLUID_3_CHAN MDCX_DEV_PDIALY_FLUID_4_CHAN MDCX_DEV_PDIALY_FLUID_5_CHAN MDCX_DEV_PDIALY_FLUID_6_CHAN MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN	MDCX_EVT_PDIALY_LINE_ABSENT	tech		Missing or disconnected dialysate line.	O
MDCX_DEV_PDIALY_FLUID_1_CHAN MDCX_DEV_PDIALY_FLUID_2_CHAN MDCX_DEV_PDIALY_FLUID_3_CHAN MDCX_DEV_PDIALY_FLUID_4_CHAN MDCX_DEV_PDIALY_FLUID_5_CHAN	MDCX_EVT_PDIALY_LINE_CHK	tech		Check dialysate/supply line.	O

Table 5 – Peritoneal Dialysis Alarms/Alerts

Source	Event	Alert Type	Dialysis Common Name	Definition	Usage
MDCX_DEV_PDIALY_FLUID_6_CHAN MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN					
MDCX_DEV_PDIALY_FLUID_1_CHAN MDCX_DEV_PDIALY_FLUID_2_CHAN MDCX_DEV_PDIALY_FLUID_3_CHAN MDCX_DEV_PDIALY_FLUID_4_CHAN MDCX_DEV_PDIALY_FLUID_5_CHAN MDCX_DEV_PDIALY_FLUID_6_CHAN MDCX_DEV_PDIALY_SUPPLY_LINE_CHAN	MDCX_EVT_PDIALY_SOLUTION_NOT_REQD	tech		Dialysate solution detected on a line where it is not required by the prescription.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDC_EVT_ADVIS_SETTING_CHK	tech		The user should check the therapy time setting.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDC_EVT_ADVIS_SETTING_CHK	tech		The user should check the total UF setting.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDC_EVT_ADVIS_SETTING_CHK	tech		The user should check the total volume setting.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDC_EVT_ADVIS_SETTING_CHK	tech		The user should check an unspecified treatment setting.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDC_EVT_LO	tech		Total UF volume is too low.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDC_EVT_LO	tech		Initial drain volume is too low.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDCX_EVT_PDIALY_PRESCRIPTION_ERROR	tech		Invalid prescription received.	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDCX_EVT_PDIALY_ULTRAFILTRATION_NEG	tech		Negative Ultrafiltration	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDCX_EVT_PDIALY_ULTRAFILTRATION_POS	tech		Positive Ultrafiltration	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDCX_EVT_TREATMENT_DATA_INVALID	tech		Invalid treatment data (e.g. possibly after a power failure)	O
MDCX_DEV_PDIALY_TREATMENT_CHAN	MDCX_EVT_VOLUME_DEVIATION	tech		Patient volume monitoring has identified a deviation	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_ADVIS_PDIALY_USER_MESSAGE	tech		Machine specific advisory	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_COMM_ERR_EXTERNAL	tech		Internal communication error.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_COMM_ERR_INTERNAL	tech		Internal communication error.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_DISPLAYED_VALUES_INCONSISTENT	tech		Inconsistent safety-relevant information displayed	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_DISPOSABLE_SET_LEAK	tech		Disposable set leak	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_LOAD_NEW_SET	tech		Load a new set	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_LOAD_NEW_SET_AND_BAGS	tech		Load new set and bags	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_ADVIS_TREATMENT_MAY_BE_INSUFFICIENT	tech		Potentially insufficient treatment detected	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_AIR_DETECTED	tech		Maximum allowable air detected in cassette or lines.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_CASSETTE_ABSENT	tech		Cassette not detected	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_CASSETTE_AIR_DETECTED	tech		Maximum allowable air detected in cassette.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_CASSETTE_FAILURE	tech		Cassette failure	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_COMM_FAILURE	tech		The cycler monitors the information flow to the cloud to determine that the information has been sent.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_INITIAL_DRAIN_VOLUME_UNEXPECTED	tech		Unexpected volume (of fluid) during initial drain	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_PRIMING_ERROR	tech		Priming error	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_PUMP_FAILURE	tech		The cycler has determined that the pump is no longer functional.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_RELOAD_SET	tech		Reload the disposable set	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_SET_POSITION_WRONG	tech	Disposable Set Position Sensor	The disposable set status is monitored.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_STRAIN_GAUGE_FAILURE	tech	Strain Gauge Sensor Status	The strain gauge state is monitored.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_TREATMENT_PAUSED_TOO_LONG	tech		Treatment delay	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PDIALY_TREATMENT_TIME_EXCEEDED	tech		Treatment time exceeded	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_PT_SECURITY_KEY_ABSENT	tech		Patient security key or other credential is missing.	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_STAT_DOOR_NOT_CLOSED_OR_LOCKED_CORRECTLY	tech		Door is not closed or locked correctly.	O

Table 5 – Peritoneal Dialysis Alarms/Alerts

Source	Event	Alert Type	Dialysis Common Name	Definition	Usage
MDCX_DEV_PDIALY_VMD	MDCX_EVT_STAT_PDIALY_HEATER_BAG_FILLING	tech		Filling heater bag	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_STAT_PDIALY_PT_DISCONN	tech		Patient disconnect timeout (intentional)	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_STAT_PDIALY_TREATMENT_PAUSED	tech		Treatment paused (e.g. stop button pressed)	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_SW_ERR	tech		Software error	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_TIMER_ERR	tech		Error during the plausibility check of the time counter	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_TREATMENT_RESULTS_INCONSISTENT	tech		Inconsistent treatment results	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_UNRECOV_TREATMENT_DATA_ERR	tech		An unrecoverable data error occurred during treatment	O
MDCX_DEV_PDIALY_VMD	MDCX_EVT_VALVE_MALF	tech		Valve malfunction	O
MDCX_PDIALY_DRAIN_VOLUME	MDC_EVT_HI	tech		Drain volume too high	O
MDCX_PDIALY_DRAIN_VOLUME	MDC_EVT_LO	tech		Drain volume too low	O
MDCX_PDIALY_DRAIN_VOLUME	MDCX_EVT_PDIALY_DRAIN_PHASE_NOT_COMPLETED	tech		Drain phase not completed	O
MDCX_PDIALY_FILL_VOLUME_SETTING	MDC_EVT_ADVIS_SETTING_CHK	tech		User should check the day fill volume setting.	O
MDCX_PDIALY_FILL_VOLUME_SETTING	MDC_EVT_ADVIS_SETTING_CHK	tech		User should check the fill volume setting.	O
MDCX_PDIALY_FILL_VOLUME_SETTING	MDC_EVT_ADVIS_SETTING_CHK	tech		User should check the last fill volume setting.	O
MDCX_PDIALY_FILL_VOLUME_SETTING	MDC_EVT_ADVIS_SETTING_CHK	tech		User should check the nigh fill volume setting.	O
MDCX_PDIALY_FILL_VOLUME	MDCX_EVT_PDIALY_FILL_PHASE_NOT_COMPLETED	tech		Fill or refill phase not completed	O
MDCX_PDIALY_PRESSURE_DRAIN	MDC_EVT_MSMT_OUT_OF_RANGE	tech		Drain pressure out of range	O
MDCX_PDIALY_PRESSURE_DRAIN	MDC_EVT_SELFTEST_FAILURE	tech		Drain pressure selftest failure	O
MDCX_PDIALY_PRESSURE_PATIENT	MDC_EVT_HI	tech		Patient pressure too high	O
MDCX_PDIALY_PRESSURE_PATIENT	MDC_EVT_LO	tech		Patient Pressure too low	O
MDCX_PDIALY_PRESSURE_PATIENT	MDC_EVT_MSMT_ERR	tech		Unspecified error in patient pressure	O
MDCX_PDIALY_PRESSURE_PATIENT	MDC_EVT_SELFTEST_FAILURE	tech		Patient pressure selftest failure	O
MDCX_PDIALY_PRESSURE_PATIENT	MDCX_EVT_HDIALY_PT_LINE_PRESS_HI_LOW_POSN_CHK_REQD	tech		Patient line pressure too high or low; check patient position	O
MDCX_PDIALY_PRESSURE_PNEUMATIC	MDC_EVT_HI	tech		Pneumatic pressure too high	O
MDCX_PDIALY_PRESSURE_PNEUMATIC	MDC_EVT_LEAK	tech		Leakage in a gas or fluid filled system detected.	O
MDCX_PDIALY_PRESSURE_PNEUMATIC	MDC_EVT_LO	tech		Pneumatic pressure too low	O
MDCX_PDIALY_PRESSURE_PNEUMATIC	MDC_EVT_SELFTEST_FAILURE	tech		Pneumatic pressure selftest failure	O
MDCX_PDIALY_PRESSURE_PNEUMATIC	MDCX_EVT_PDIALY_VALVE_LEAK	tech		Valve or pressure leak	O
MDCX_PDIALY_PRESSURE_VACUUM	MDC_EVT_HI	tech		Vacuum pressure too high	O
MDCX_PDIALY_PRESSURE_VACUUM	MDC_EVT_LEAK	tech		Leakage in a gas or fluid filled system detected.	O
MDCX_PDIALY_PRESSURE_VACUUM	MDC_EVT_LO	tech		Vacuum pressure too low	O
MDCX_PDIALY_PRESSURE_VACUUM	MDC_EVT_MSMT_OUT_OF_RANGE	tech		Vacuum pressure out of range	O
MDCX_PDIALY_PRESSURE_VACUUM	MDC_EVT_SELFTEST_FAILURE	tech		Vacuum pressure selftest failure	O
MDCX_PDIALY_TEMP_DIALYSATE_IN	MDC_EVT_HI	tech		Dialysate inlet temperature too high	O
MDCX_PDIALY_TEMP_DIALYSATE_IN	MDC_EVT_LO	tech		Dialysate inlet temperature too low	O
MDCX_PDIALY_TEMP_DIALYSATE_OUT	MDC_EVT_HI	tech		Dialysate temperature too high	O
MDCX_PDIALY_TEMP_DIALYSATE_OUT	MDC_EVT_LO	tech		Dialysate temperature too low	O
MDCX_PDIALY_TEMP_DIALYSATE_OUT	MDC_EVT_MSMT_ERR	tech		Unspecified error in dialysate temperature	O
MDCX_PDIALY_TEMP_DIALYSATE_OUT	MDC_EVT_MSMT_OUT_OF_RANGE	tech		Dialysate temperature out of range	O
MDCX_PDIALY_TEMP_DIALYSATE_OUT	MDCX_EVT_STAT_SOLUTION_WARMING	tech		Dialysate solution is warming	O
MDCX_PDIALY_TEMP_HEATER_BAG	MDC_EVT_HI	tech		Heater bag temperature too high	O
MDCX_PDIALY_TEMP_HEATER_BAG	MDC_EVT_LO	tech		Heater bag temperature too low	O
MDCX_PDIALY_TEMP_HEATER_BAG	MDC_EVT_MSMT_OUT_OF_RANGE	tech		Heater Bag Temperature out of range	O
MDCX_PDIALY_TEMP_HEATER_BAG	MDC_EVT_MSMT_OUT_OF_RANGE_HI	tech		Heater bag temperature too high	O
MDCX_PDIALY_TEMP_HEATER_BAG	MDC_EVT_SELFTEST_FAILURE	tech		Heater bag temperature selftest failure	O

Table 5 – Peritoneal Dialysis Alarms/Alerts

Source	Event	Alert Type	Dialysis Common Name	Definition	Usage
MDCX_PDIALY_TEMP_HEATER_BAG	MDCX_EVT_TEMP_ERR	tech		Temperature sensor error	O
MDCX_PDIALY_TIDAL_PERCENTAGE	MDC_EVT_ADVIS_SETTING_CHK	tech		The user should check the tidal setting.	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDC_EVT_HI_GT_LIM	tech		A metric exceeds a given threshold	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDC_EVT_MSMT_ERR	tech		Unspecified error in heater bag weight	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDC_EVT_MSMT_FAIL	tech		Failure in heater bag weight	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDCX_EVT_PDIALY_ABRUPT_WEIGHT_CHANGE	tech		Abrupt weight change; possible scale interference.	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDCX_EVT_PDIALY_FLUID_BAG_WEIGHT_VOLUME_ERROR	tech		Fluid bag weight scale (volume) measurement error.	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDCX_EVT_PDIALY_HEATER_BAG_ON_HEATER_TRAY_UNEXPECTED	tech		Heater bag detected on the heater tray when not expected.	O
MDCX_PDIALY_WEIGHT_HEATER_BAG	MDCX_EVT_WEIGHT_INVALID_CHK_REQD	tech		The dialysis machine has detected an invalid weight change and the user must verify/confirm the weight.	O
MDC_PRESS_BLD_NONINV_DIA	MDC_EVT_HI	phys	Diastolic High	Diastolic pressure is too high.	O
MDC_PRESS_BLD_NONINV_DIA	MDC_EVT_LO	phys	Diastolic Low	Diastolic pressure is too low.	O
MDC_PRESS_BLD_NONINV_SYS	MDC_EVT_HI	phys	Systolic High	Systolic pressure is too high.	O
MDC_PRESS_BLD_NONINV_SYS	MDC_EVT_LO	phys	Systolic Low	Systolic pressure is too low.	O
MDC_PULS_RATE_NON_INV	MDC_EVT_HI	phys	Pulse High	Pulse is too high.	O
MDC_PULS_RATE_NON_INV	MDC_EVT_LO	phys	Pulse Low	Pulse is too low.	O
MDC_TEMP_TYMP	MDC_EVT_HI	phys	Temperature High	Temperature is too high	O
MDC_TEMP_ORAL	MDC_EVT_HI	phys	Temperature High	Temperature is too high	O
MDC_TEMP_BODY	MDC_EVT_HI	phys	Temperature High	Temperature is too high	O
MDC_TEMP_AXILLA	MDC_EVT_HI	phys	Temperature High	Temperature is too high	O

Appendix A – HL7 Batch Protocol

To capture an entire dialysis machine treatment, the HL7 Batch Protocol should be used. This protocol combines a series of intact MSH messages into a single message. The Batch Protocol preserves the content of the original PCD-01 DEC MSH messages. Although they are not required the manufacturer may include the ACK messages in the batch.

Segment	Meaning	Use	Card
[FHS]	File Header Segment	R	[1..1]
{	Batch Begin		
[BHS]	Batch Header Segment	R	[1..1]
{ [	Message begin		
MSH	One or more HL7 Messages	R	[1..N]
...			
...			
] }	MESSAGE end	R	[1..1]
[BTS]	Batch Trailer Segment	R	[1..1]
[FTS]	File Trailer Segment	R	[1..1]

A.1 Segments

A.1.1 BHS – Batch Header Segment

The BHS segment defines the start of a batch.

HL7 Attribute Table - BHS Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ST	R		Batch Field Separator
2	ST	R		Batch Encoding Characters
3	HD	R		Batch Sending Application
4	HD	O		Batch Sending Facility
5	HD	O		Batch Receiving Application
6	HD	O		Batch Receiving Facility
7	DTM	O		Batch Date/Time of Message
8	ST	O		Batch Security
9	ST	O		Batch Name/ID/Type
10	ST	O		Batch Comment
11	ST	O		Batch Control ID
12	ST	O		Reference Batch Control ID
13	HD	O		Batch Sending Network Address
14	HD	O		Batch Receiving Network Address

This standard does not change any field definitions from the HL7 Standard.

BHS-3 Batch Sending Application

This Standard: This value is the same as the MSH-3 of the observations.

A.1.2 BTS – Batch Trailer Segment

The BTS segment defines the end of a batch.

HL7 Attribute Table - BTS Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ST	O		Batch Message Count
2	ST	O		Batch Comments
3	NM	X		Batch Totals

BTS-3 Batch Totals (NM)

HL7 Definitions: We encourage new users of this field to use the HL7 Version 2.3 data type of NM and to define it as "repeating." This field contains the batch total. If more than a single batch total exists, this field may be repeated.

This Standard: The dialysis machines do not use the batch totals as this information is already conveyed by observation data.

A.1.3 FHS – File Header Segment

The FHS segment is used to head a file (group of batches).

HL7 Attribute Table - FHS Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ST	R		File Field Separator
2	ST	R		File Encoding Characters
3	HD	R		File Sending Application
4	HD	O		File Sending Facility
5	HD	O		File Receiving Application
6	HD	O		File Receiving Facility
7	DTM	O		File Creation Date/Time
8	ST	O		File Security
9	ST	O		File Name/ID
10	ST	O		File Comment
11	ST	O		File Control ID
12	ST	O		Reference File Control ID
13	HD	O		File Sending Network Address
14	HD	O		File Receiving Network Address

This standard does not change any field definitions from the HL7 Standard.

FHS-3 File Sending Application

This Standard: This value is the same as the MSH-3 of the observations.

A.1.4 FTS – File Trailer Segment

The FTS segment defines the end of a file.

HL7 Attribute Table - FHS Segment

SEQ	DT	OPT	TBL#	ELEMENT NAME
1	ST	O		File Batch Count
2	ST	O		File Trailer Comments

This standard does not change any field definitions from the HL7 Standard.