

Integrating the Healthcare Enterprise



**IHE Devices
White Paper**

Infusion Pump IV Flush

Revision X.X – Draft for Public Comment

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Foreword

This is a white paper of the IHE Devices.

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General information about IHE can be found at: www.ihe.net.

Information about the IHE Devices domain can be found at: ihe.net/IHE_Domains.

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at: http://ihe.net/IHE_Process and <http://ihe.net/Profiles>.

The current version of the IHE Devices Technical Framework can be found at: http://ihe.net/Technical_Frameworks.

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1 Introduction

This document, the IHE Devices Infusion Pump IV Flush White Paper, describes the use of flushes as performed as a part of infusions. Health care providers use IV flushes to clear out IV lines that deliver medicine directly into the veins of a patient.

1.1 Purpose of the Infusion Pump IV Flush White Paper

This white paper is intended to identify a means for communicating flush events that are performed as a part of infusions. Flushes are administered before and after starting IV medication administrations. This has multiple effects such as:

- Ensures complete delivery of the ordered or prescribed medication
- Prevent adverse reactions between different medication administrations
- Prevent blockages and keep IV lines clean

The primary goal of this paper is to define a solution that allows for the electronic transfer of infusion parameters and communicate the infusion pump events that are specifically related to flush use cases.

1.2 Intended Audience

The intended audience of the IHE Devices Infusion Pump IV Flush White Paper is:

- Clinicians involved in the use of infusion pumps in an integrated environment and others interested in integrating healthcare information systems and infusion pump workflows.
- Experts involved in profile development from healthcare institutions, device and system manufacturers, and regulatory agencies.

2 Problem Description

To support current clinical workflows, this flush concept must meet several key user needs. It must allow the clinician to program the pump as the order is written, even when the line has been primed with medication. It must allow a flush syringe or primary infusate source to be easily programmed for the remaining line volume and with the same medication delivery rate. It must document the medication delivered and the flush phase as a single medication delivery (separate dose vs flush for HIS). Finally, this concept must support the interoperability workflow without a manual entry via automated programming requests from the HIS and allows the infusion pump to display what is infusing (drug or flush). These flush use case concepts must allow for communicating flush events, associating flush events with the related medication infusion, and allow for the auto-programming of those events to maintain seamless interoperability for all workflows between infusion pumps and hospital networks.

3 Conventions

For each event in the use cases (Section 5) all information is reported to a Health Information System (HIS) following IHE PCD-01 and PCD-10. The following information is reported to an HIS for each event:

- Infusion Event
- Pump Status
- Delivery Status
- Order ID
- Infusate Name
- Concentration (xx/mL):
 - Drug Amount
 - Dilute Volume (mL)
- Rate (mL/h)
- VTBI (mL)
- Volume Infused (mL)

For all auto programming requests (APRs) outlined in the use cases (Section 5) is reported to a HIS following IHE PCD-03. The following information is reported as a part of each APR:

- Clinician ID
- Patient ID
- Order Type
- Order ID
- Flush Solution or Medication
- Rate (mL/h)
- VTBI, if applicable

4 Definitions

Term or Acronym	Definition
APR	Auto Programming Request also known as a PCD-03 Communicate Infusion Order
eMAR	Patient’s electronic Medical Administration Record
Hospital Information System (HIS)	A comprehensive, integrated information system that manages the hospital’s operation and provides the eMAR along with partnering with the pump’s interoperable ecosystem.
Order/Med Order	Medication or fluid prescription to be delivered to a patient
Pump Interoperability Gateway (PIG)	Partner that interacts with IHE_HL7 compliant HIS systems to ensure the both the outputs and the inputs of the system are compatible with IHE_HL7 systems.
PCD	Patient Care Devices
PCD-01	IHE PCD transaction that is used to communicate patient care device data between systems.
PCD-03	IHE PCD transaction that is used to communicate infusion order parameters between the device and the HIS
PCD-10	IHE PCD profile that is used to communicate infusion event data between the device and the HIS
Pro Re Nata (PRN)	Medication that should be administered as needed and whose timing is left to the patient, nurse or caregiver.
VTBI	Volume to Be Infused

5 Assumptions and Considerations

The following assumptions and considerations are made for all the following flush use cases.

- Intermittent Dose Volume is equal to the diluent volume
- Flush (PRN) Orders and Med Orders are not linked in the HIS. This is a standard configuration.
- The flush order and Med Order being linked is a rare configuration.
- The volume infused is the volume that the pump has pushed and is not the same as the volume that the patient has received.

6 Use Cases

6.1 Manual Programming Flush After Infusion Complete

6.1.1 Description

The disposable tubing is pre-primed with 0.5 mL of a saline solution. The syringe disposable container is loaded into the pump and the medication (Clindamycin) begins infusing. As the infusion completes, all the dose volume was infused into the tubing but there is still 0.5mL of medication left in the tubing waiting to go to the patient.

6.1.2 Precondition(s)

- The Dose Volume is less than or equal to the volume in the disposable.
- The Clindamycin infusion is back associated with the patient chart in the eMAR and is nearing completion.

6.1.3 Use Case Flow

1. The pump completes the VTBI and issues an Infusion Complete alarm.
2. The pump stops infusing and the PIG reports an infusion program complete event to the HIS as follows:

<u>Reporting Data</u>	Active Primary Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-standby
<i>Order ID:</i>	NULL
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	2.0000

3. The Clinical responds to the Infusion Complete alarm at the bedside.
4. The Clinical opens the EMR and following the BCMA process, scans the patient and the flush syringe disposable.
5. The Clinicians signs administration of flush in the eMAR.
6. The Clinician turns to the pump.
7. The Clinician unloads the medication syringe on the pump, connects and loads the new flush syringe containing about 1 mL of Normal Saline.
8. The Clinician adds a flush option and programs 0.9 mL for the VTBI.

9. The Clinician starts the flush step for Clindamycin on the pump.
10. The pump starts the Clindamycin flush and PIG reports to the HIS a flush start event as follows (See Appendix A.1.1 for HL7 format).

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	Unknown
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.9000
<i>Vol. Infused (mL):</i>	0.0000

NOTE: Clinician does not manually program infusate name for flush. Hence, it is reported as “Unknown.”

11. When the VTBI of 0.9 mL is reached, the pump stops infusing and the PIG reports a flush complete event as follows (See Appendix A.1.2 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	Unknown
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.9000
<i>Vol. Infused (mL):</i>	0.9000

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12. The Clinician reviews the I/O chart in the eMAR and signs values for 2 mL of Clindamycin and 0.9 mL of “Generic flush” over the 2.5 hours. Depending on the HIS implementation, the generic flush may be associated with the Clindamycin.

6.2 Manual Programming Flush After Syringe Empty

6.2.1 Description

The disposable tubing is primed with about 0.5 mL of medication from the 2 mL of the syringe disposable. This creates a situation in which the available volume in the medication syringe is less than what is needed to be infused. The medication disposable is then load into the pump and the remaining medication is administered. The infusion program results in medication container running to syringe empty, dose volume remaining to be infused and drug left in the tubing waiting to go to the patient.

6.2.2 Precondition(s)

- The Dose Volume is greater than the volume in the disposable.
- The Clindamycin infusion is associated with patient chart in the eMAR and nearing syringe empty.

6.2.3 Use Case Flow

1. Before completing the programmed VTBI, the pump detects the bottom of the disposable and issues a Syringe Empty alarm.
2. The pump stops and the PIG reports an infusion program stop event to the HIS as follows (See Appendix A.2.1 for HL7 format):

<u>Reporting Data</u>	<u>Active Primary Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason:</i>	pump-stopped-alarmed
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	1.5121

3. The Clinical responds to the Syringe Empty alarm at the bedside.
4. The Clinician opens EMR and following BCMA process, scans patient and the flush syringe disposable.
5. The Clinicians signs administration of flush in the eMAR.
6. The Clinician turns to the pump.

7. The Clinician unloads the empty medication syringe on the pump, connects and loads the new flush syringe containing about 1 mL of Normal Saline.
8. The Clinician adds a flush option and an additional flush volume of 0.9 mL to the VTBI.
9. The Clinician restarts the infusion program for Clindamycin on the pump.
10. The pump resumes the Clindamycin infusion and the PIG reports to the HIS a start infusion event with two steps as follows (See Appendix A.2.2 for HL7 format):

<u>Reporting Data</u>	<u>Active Primary Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-delivering
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	1.5121

11. When the pump completes the original Clindamycin dose volume of 2 mL, the PIG reports to the HIS:
 - a. The Clindamycin complete event is reported to the HIS as shown below (See Appendix A.2.3 for HL7 format). The complete event is reported as a complete transitioning with two steps.

<u>Reporting Data</u>	<u>Active Primary Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-transitioning
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000 mL
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	2.0000

- b. The complete event is immediately followed by the flush start event as follows (See Appendix A.2.4 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
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<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing
<i>Med Order ID:</i>	MED0101
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	Unknown
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.4121
<i>Vol. Infused (mL):</i>	0.0000

12. When the additional VTBI of 0.9 mL is reached, the pump stops and the PIG reports a flush complete event as follows (See Appendix A.2.5 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason:</i>	pump-stopped-flushing
<i>Med Order ID:</i>	MED0101
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	unknown
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.4121
<i>Vol. Infused (mL):</i>	0.4121

13. The Clinician reviews I/O chart in the eMAR and signs values for 2 mL of Clindamycin and 0.4121 mL of “Generic flush” over the last 2 hours. The generic flush is associated with the Clindamycin.

6.3 Manual Programming Flush After Micro Dose Volume Primed

6.3.1 Description

The disposable tubing is primed with small volume medication (dose vol. < tubing volume) and requires immediate start of flush disposable to deliver medication. As the infusion completes, all dose volume is infused to the patient and no medication left in tubing.

6.3.2 Precondition(s)

- The Dose Volume (2mL) is less than the tubing volume (3mL).

- The Dose Volume is manually pushed into the disposable tubing between the pump and the patient

6.3.3 Use Case Flow

1. The Clinician opens the EMR and following the BCMA process, scans the patient and the medication disposable.
2. The Clinicians signs administration of medication in the eMAR.
3. The Clinician turns to the pump.
4. After pushing all of the medication into the tubing below the pump, the Clinician loads a flush syringe (3mL or greater) into the pump.
5. Clinician selects Clindamycin from the pump library and proceeds to program the medication parameters
6. The Clinician reviews the program and starts infusion.
7. The pump starts infusing and the PIG reports a start event as follows:

<u>Reporting Data</u>	Active Primary Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-delivering
<i>Order ID:</i>	NULL
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	0.0000

8. The Clinician back associates the infusion with the order in the eMAR.
9. When the programmed VTBI of 2mL is reached, the pump stops infusing and the PIG reports an Infusion Complete event as follows:

<u>Reporting Data</u>	Active Primary Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-standby
<i>Order ID:</i>	NULL
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000

Vol. Infused (mL):	2.0000
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10. The Clinician responds to the Infusion Complete alarm at the bedside
11. Clinician reviews I/O chart in EMAR and signs value for 2 mL of Clindamycin in patient chart.
12. The Clinician following BCMA process, scans patient and the flush syringe disposable.
13. The Clinicians signs administration of flush in the eMAR.
14. The Clinician turns to the pump.
15. The Clinician proceeds with the flush programming and enters 1 mL as the VTBI and selects START.
16. The pump starts infusing and the IE reports an infusion start event as follows:

<u>Reporting Data</u>	Active Flush Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	unknown
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	1.0000
<i>Vol. Infused (mL):</i>	0.0000

17. When the VTBI of 1 mL is reached, the pump stops infusing and the PIG reports a flush complete event as follows:

<u>Reporting Data</u>	Active Flush Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	unknown
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	1.0000
<i>Vol. Infused (mL):</i>	1.0000

18. Clinician reviews I/O chart in eMAR and signs values for 2 mL of Clindamycin and 1 mL of “Generic flush”. Depending on HIS implementation, the generic flush may be associated with the Clindamycin.

6.4 Manual Programming Flush with Primary After Secondary Completes

6.4.1 Description

Disposable tubing is primed with fluid from primary infusate source. The medication is then delivered from a secondary/piggyback source. The infusion program results in the medication container running to dose volume complete and medication volume left in the tubing waiting to go to the patient.

6.4.2 Precondition(s)

- The Dose Volume is equal to the volume in the disposable
- The Clindamycin infusion is associated with patient chart in eMAR

6.4.3 Main Flow

1. Program and start IV fluid.

<u>Reporting Data</u>	Active Primary Step
Infusion Event:	MDC EVT PUMP DELIV START
Pump Status:	pump-status-infusing
Delivery Status:	pump-delivery-status-delivering
Order ID:	MED0101
Infusate Name:	IV Fluid
Drug Amt.:	-
Dil. Vol. (mL):	-
RATE (mL/h):	1.0000
VTBI (mL):	100.0000
Vol. Infused (mL):	0

2. Program prescribed medication on secondary line (IVPB).
3. Program flush volume of 5 mL to deliver following IVPB.
4. Start IVPB.
5. The pump stops the primary infusion line and the PIG reports to the HIS an infusion program stop events as follows:

<u>Reporting Data</u>	Active Primary Step
Infusion Event:	MDC EVT PUMP DELIV STOP
Pump Status:	pump-status-not-infusing
Delivery Status:	pump-delivery-status-switching-source

Order ID:	MED0101
Infusate Name:	IV Fluid
Drug Amt.:	-
Dil. Vol. (mL):	-
RATE (mL/h):	1.0000
VTBI (mL):	100.0000
Vol. Infused (mL):	1.5000

6. The pump starts the Clindamycin infusion on the secondary line and the PIG reports to the HIS an infusion program start event as follows:

<u>Reporting Data</u>	Active Secondary Step
Infusion Event:	MDC EVT PUMP DELIV START
Pump Status:	pump-status-infusing
Delivery Status:	pump-delivery-status-delivering
Order ID:	MED0102
Infusate Name:	Clindamycin
Drug Amt.:	200.0000 mg
Dil. Vol. (mL):	10.0000
RATE (mL/h):	15.0000
VTBI (mL):	10.0000
Vol. Infused (mL):	0

7. When the pump completes the Clindamycin dose volume of 10 mL on the secondary line, the PIG reports to the HIS:
- The Clindamycin Complete event as follows:

<u>Reporting Data</u>	Active Secondary Step
Infusion Event:	MDC EVT PUMP DELIV COMP
Pump Status:	pump-status-not-infusing
Delivery Status:	pump-delivery-status-not-delivering
Order ID:	MED0101
Infusate Name:	Clindamycin
Drug Amt.:	200.0000 mg
Dil. Vol. (mL):	10.0000
RATE (mL/h):	15.0000
VTBI (mL):	10.0000
Vol. Infused (mL):	10.0000

- Immediately followed by transition of the pump back to the primary line, the PIG reports to the HIS, a Start Event for Clindamycin flush follows. The volume infused is accumulated from the primary bag:

<u>Reporting Data</u>	Active Flush Step
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<i>Infusion Event:</i>	MDC EVT PUMP DELIV START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing
<i>Med Order ID:</i>	MED0101
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	IV Fluid
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	15.0000
<i>VTBI (mL):</i>	5.0000
<i>Vol. Infused (mL):</i>	1.5000

8. When the programmed VTBI of 5 mL is reached, the pump stops the flush and the PIG reports a flush complete event as follows:

<u>Reporting Data</u>	Active Flush Step
<i>Infusion Event:</i>	MDC EVT PUMP DELIV COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-flushing
<i>Med Order ID:</i>	MED0101
<i>Flush Order ID:</i>	NULL
<i>Infusate Name:</i>	IV Fluid
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	15.0000
<i>VTBI (mL):</i>	5.0000
<i>Vol. Infused (mL):</i>	6.5000

9. The pump automatically resumes the original primary rate on the primary line:

<u>Reporting Data</u>	Active Primary Step
<i>Infusion Event:</i>	MDC EVT PUMP DELIV START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-delivering
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	IV Fluid
<i>Drug Amt.:</i>	-
<i>Dil. Vol. (mL):</i>	-
<i>RATE (mL/h):</i>	1.0000
<i>VTBI (mL):</i>	100.0000
<i>Vol. Infused (mL):</i>	6.5000

6.5 Auto Programming Flush After Infusion Complete

6.5.1 Description

Disposable tubing is pre-primed with 0.5 mL of a solution. The syringe disposable is load into the pump and the medication begins infusing. The medication step results in medication container running to infusion complete, all the dose volume was infused by pump but there is medication volume left in the tubing waiting to go to the patient.

6.5.2 Precondition(s)

- A PRN flush order exists in the HIS
- The Dose Volume is less than the volume in the disposable
- The Clindamycin infusion was associated with patient chart in eMAR and nearing completion

6.5.3 Use Case Flow

1. The pump completes the VTBI and issues an Infusion Completion alarm
2. The pump stops infusing and the PIG reports to the HIS an infusion program complete event as follows:

<i>Reporting Data</i>	<i>Active Primary Step</i>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-standby
<i>Order ID:</i>	NULL
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	2.0000

3. The Clinician responds to the Infusion Complete alarm at the bedside.
4. The Clinician opens EMR and following the BCMA process, scan the patient, flush syringe disposable, and the pump.
5. The Clinician sends a FLUSH APR PRN order for Normal Saline to the pump as follows (See Appendix B.1 for APR HL7 format):

Flush APR Details	
<i>Clinician ID:</i>	RatchedRN

<i>Patient ID:</i>	W.Yueh
<i>Order Type:</i>	PrnFlush
<i>Order ID:</i>	FLUSHIE2000
<i>Flush Solution:</i>	Normal Saline
<i>VTBI:</i>	0.5000

6. The PIG validates and accepts the Flush Request.
7. The Clinician turns to the pump.
8. The Clinician unloads the medication syringe and connects and loads the flush syringe containing about 2 mL of Normal Saline.
9. The Clinician reviews auto-populated parameters and starts the flush step for Clindamycin on the pump.
10. The pump starts the Clindamycin flush and PIG reports to the HIS a flush start event as follows (See Appendix A.3.1 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Infusate Name:</i>	Normal Saline
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.5000
<i>Vol. Infused (mL):</i>	0.0000

11. The Clinician returns to the eMAR to sign the administration of the flush.
12. When the VTBI of 0.5 mL from the APR is reached, the pump stops infusing and the PIG reports a flush complete event as follows (See Appendix A.3.2 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Infusate Name:</i>	Normal Saline
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333

<i>VTBI (mL):</i>	0.5000
<i>Vol. Infused (mL):</i>	0.5000

- Clinician reviews I/O chart in eMAR and signs values for 2 mL of Clindamycin and 0.5 mL of Normal Saline infused over the last 2 hours. Depending on HIS implementation, the saline flush may be associated with the Clindamycin.

6.6 Auto Programming Flush After Syringe Empty

6.6.1 Description

Disposable tubing is primed with about 0.5 mL of medication from the 2 mL of the syringe disposable. This creates a situation in which the available volume in the medication syringe is less than what is needed to be infused. The medication disposable is then load into the pump and the remaining medication is administered. The infusion program results in medication container running to syringe empty, dose volume remaining to be infused and drug left in the tubing waiting to go to the patient.

6.6.2 Precondition(s)

- A PRN flush order exists in the HIS
- The Dose Volume is greater than the volume in the disposable
- The Clindamycin infusion is associated with patient chart in eMAR and nearing syringe empty

6.6.3 Use Case Flow

- Before completing the programmed VTBI, the pump detects the bottom of the disposable and issues a Syringe Empty alarm.
- The pump stops and the PIG reports to the HIS an infusion program stop event as follows:

<u>Reporting Data</u>	<u>Active Primary Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason:</i>	pump-stopped-alarming
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	1.5121

- The Clinician responds to the Syringe Empty alarm at the bedside.

4. The Clinician opens EMR and following BCMA process, scans patient, flush syringe disposable, and the pump.
5. The Clinician sends a FLUSH APR PRN order for Normal Saline to the pump as follows (See Appendix B.1 for HL7 format):

Flush APR Details	
<i>Clinician ID:</i>	RatchedRN
<i>Patient ID:</i>	W.Yueh
<i>Order Type:</i>	PrnFlush
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Flush Solution:</i>	Normal Saline
<i>VTBI:</i>	1.0000

6. The PIG validates and accepts the Flush Request.
7. The Clinician turns to the pump.
8. The Clinician unloads the empty medication syringe on the pump, connects and loads the scanned flush syringe containing about 1 mL of Normal Saline.
9. The Clinician reviews auto-populated parameters and restarts the Clindamycin infusion.
10. The pump resumes the Clindamycin infusion and PIG reports to the HIS a start infusion event as follows (See Appendix A.4.1 for HL7 format):

<u>Reporting Data</u>	Active Primary Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-delivering
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	1.5121

11. The Clinician returns to the eMAR to sign the administration of the flush.
12. When the Clindamycin volume infused reaches 2 mL which is equal to the dose volume, the PIG reports to the HIS:
 - a. The Clindamycin complete event as follows (See Appendix A.4.2 for HL7 format):

<u>Reporting Data</u>	Active Primary Step
------------------------------	----------------------------

<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-transitioning
<i>Order ID:</i>	MED0101
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000 mL
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	2.0000

- b. Immediately followed by the a start event for the Clindamycin flush as follows (See Appendix A.4.3 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing
<i>Med Order ID:</i>	MED0101
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Infusate Name:</i>	Normal Saline
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.5121
<i>Vol. Infused (mL):</i>	0.0000

13. When the VTBI of 1 mL from the APR is reached, the pump stops infusing and the PIG reports a flush complete event (See Appendix A.4.4 for HL7 format):

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-flushing
<i>Med Order ID:</i>	MED0101
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Infusate Name:</i>	Normal Saline
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.5121
<i>Vol. Infused (mL):</i>	0.5121

14. The Clinician reviews I/O chart in eMAR and signs values for 2 mL of Clindamycin and 0.5121 mL of Normal Saline infused. The saline flush is associated with the Clindamycin.

6.7 Auto Programming Flush After Micro Volume Primed

6.7.1 Description

Disposable tubing is primed with small volume medication (dose vol. < tubing volume) and requires immediate start of flush disposable. The flush results in disposable running to infusion complete, all dose volume infused and no medication left in tubing.

6.7.2 Precondition(s)

- The Dose Volume is less than the tubing volume
- Dose volume is manually pushed into tubing between pump and patient

6.7.3 Use Case Flow

1. The Clinician opens EMR and following BCMA process, scans patient, medication syringe disposable, and the pump.
2. The Clinician sends a medication APR for Clindamycin to the Pump
3. The Clinician turns to the pump.
4. After pushing all of the medication into the tubing below the pump, the Clinician loads Flush disposable into the pump.
5. The Clinician reviews auto-populated parameters and starts the Clindamycin infusion.
6. The pump starts infusing and the PIG reports a start event on the pump as follows:

<u>Reporting Data</u>	Active Primary Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-delivering
<i>Order ID:</i>	NULL
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	0.0000

7. The Clinician returns to the eMAR to sign the administration of the Clindamycin medication.

8. When the programmed VTBI of 2 mL is reached, the pump stops infusing and the PIG reports an Infusion Complete event as follows:

<u>Reporting Data</u>	<u>Active Primary Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_COMP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-standby
<i>Order ID:</i>	NULL
<i>Infusate Name:</i>	Clindamycin
<i>Drug Amt.:</i>	200.0000 mg
<i>Dil. Vol. (mL):</i>	2.0000
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	2.0000
<i>Vol. Infused (mL):</i>	2.0000

9. The Clinician responds to the Infusion Complete alarm at the bedside
10. The Clinician reviews I/O chart in eMAR and sees a row for 2 mL of Clindamycin in patient chart.
11. The Clinician opens EMR and following BCMA process, scans patient, flush syringe disposable, and the pump.
12. Clinician sends a FLUSH APR order for Normal Saline to the Pump as follows (See Appendix B.2 for HL7 format):

<u>Flush APR Details</u>	
<i>Clinician ID:</i>	RatchedRN
<i>Patient ID:</i>	W.Yueh
<i>Order Type:</i>	PrnFlush
<i>Order ID:</i>	FLUSHIE2000
<i>Flush Solution:</i>	Normal Saline
<i>VTBI.:</i>	0.5000

13. The PIG validates and accepts the Flush Request.
14. The Clinician turns to the pump.
15. The Clinician reviews auto-populated parameters and starts the flush step for Clindamycin on the pump.
16. The pump starts the Clindamycin flush and PIG reports to the HIS a flush start event as follows:

<u>Reporting Data</u>	<u>Active Flush Step</u>
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_START
<i>Pump Status:</i>	pump-status-infusing
<i>Delivery Status:</i>	pump-delivery-status-flushing

<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Infusate Name:</i>	Normal Saline
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.5000
<i>Vol. Infused (mL):</i>	0.0000

17. The Clinician returns to the eMAR to sign the administration of the flush.

18. When the VTBI of 0.5 mL is reached, the pump stops infusing and the PIG reports a flush complete event as follows:

<u>Reporting Data</u>	Active Flush Step
<i>Infusion Event:</i>	MDC_EVT_PUMP_DELIV_STOP
<i>Pump Status:</i>	pump-status-not-infusing
<i>Delivery Status:</i>	pump-delivery-status-not-delivering
<i>Not Delivering Reason</i>	pump-stopped-flushing
<i>Med Order ID:</i>	NULL
<i>Flush Order ID:</i>	FLUSHIE2000
<i>Infusate Name:</i>	Normal Saline
<i>Drug Amt.:</i>	----
<i>Dil. Vol. (mL):</i>	----
<i>RATE (mL/h):</i>	1.3333
<i>VTBI (mL):</i>	0.5000
<i>Vol. Infused (mL):</i>	0.5000

19. The Clinician reviews I/O chart in eMAR and signs values for 2 mL of Clindamycin and 0.5 mL of Normal Saline infused. The saline flush is associated with the Clindamycin.

Appendices

- **Appendix A – Event Messages in HL7 format**

The key portions of the event messages are highlighted in yellow to demonstrate the differences between events as seen in the use cases.

A.1 Manual Flush After Infusion Complete

A.1.1 Flush Start Event

```
MSH|^~\&|DEVICE_PUMPVENDOR^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517084831-0700||ORU^R42^ORU_R01|10e8590d-298c-4047-bb13-1d923bd001c3|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID||2392^^^HL7^PI||^U|||||
OBR|1|Unknown^HL7^00D0750000000154^EUI-64|744^PUMPVENDOR^744^EUI-64|999999^Medication_Unknown||202205170
84831-0700|||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0||||X||20220517084831-0700|||M8110S1298100^SyrPump^00D075
156BB466B4^EUI-64|20220517084831-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0||||X||20220517084831-0700|||M8110S54321^SyrPump
^00D0750036E62C71^EUI-64|20220517084831-0700
OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197288^MDC_EVT_PUMP_DELIV_START^MDC||||R||202205170
84831-0700||||20220517084831-0700
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2||||X||20220517084831-0700|||20220517084831-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0||||X||20220517084831-0700|||20220517084831-0700
OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-infusing^MDC||||R||20220517084831-0700|||
|20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-flush||||R||20220517084831-0700|
||20220517084831-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UC
UM||||R||20220517084831-0700|||20220517084831-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R||20220517084831-0700|||20220517084831
-0700
```

OBX|10||0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC|1.1.8.0|||||X|||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-flushing^MDC||||R|||20220512135317-0700||||20220512135317-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R|||20220512135317-0700||||20220512135317-0700

OBX|14|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.8.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R|||20220517091144-0700||||20220517091144-0700

OBX|15|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Unknown||||R|||20220512135317-0700||||20220512135317-0700

OBX|16|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|Unknown||||R|||20220512135317-0700||||20220512135317-0700

OBX|17|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R|||20220512135317-0700||||20220512135317-0700

OBX|18|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R|||20220512135317-0700||||20220512135317-0700

OBX|19|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R|||20220512135317-0700||||20220512135317-0700

OBX|20||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0|||||X|||20220512135317-0700||||20220512135317-0700

OBX|21|ST|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R|||20220512135317-0700||||20220512135317-0700

OBX|22|ST|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R|||20220512135317-0700||||20220512135317-0700

OBX|23|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R|||20220512135317-0700||||20220512135317-0700

OBX|24|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R|||20220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0|||||X|||20220512135317-0700||||20220512135317-0700

A.1.2 Flush Complete Event

MSH|^~\&| DEVICE_PUMPVENDOR ^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517084831-0700||ORU^R42^ORU_R01|10e8590d-298c-4047-bb13-1d923bd001c3|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID||2392^^^HL7^PI||^U|||||||
OBR|1|Unknown^HL7^00D0750000000154^EUI-64|744^
SyrPump^744^EUI-64|999999^Medication_Unknown||20220517084831-0700|||||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0||||X||20220517084831-0700|||M8110S1298100^
SyrPump^00D075156BB466B4^EUI-64|20220517084831-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0||||X||20220517084831-0700|||M8110S54321^
SyrPump^00D0750036E62C71^EUI-64|20220517084831-0700
OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197290^MDC_EVT_PUMP_DELIV_STOP^MDC||||R||20220517084
831-0700||||20220517084831-0700
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2||||X||20220517084831-0700|||20220517084831-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0||||X||20220517084831-0700|||20220517084831-0700
OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-not-infusing^MDC||||R||20220517084831-07
00||||20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-flush||||R||20220517084831-0700|
|||20220517084831-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|0|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||
||R||20220517084831-0700||||20220517084831-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R||20220517084831-0700|||20220517084831
-0700
OBX|10||0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC
^MDC|1.1.8.0||||X||20220512135317-0700|||20220512135317-0700
OBX|11||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.8.2||||X||20220512135317-0700|||20220512135317-0700
OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^
MDC||||R||20220512135317-0700|||20220512135317-0700
OBX|13|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-flush^MDC||||R||202205
17092221-0700||||20220517092221-0700

OBX|14|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700
OBX|15|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.8.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517091144-0700||||20220517091144-0700
OBX|16|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Unknown||||R||20220512135317-0700||||20220512135317-0700
OBX|17|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|Unknown||||R||20220512135317-0700||||20220512135317-0700
OBX|18|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|19|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|20|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|21|ST|70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700
OBX|22|ST|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700
OBX|23|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700
OBX|24|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|25|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|26|0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

A.2 Manual Programming Flush After Syringe Empty

A.2.1 Infusion Stop Event

MSH|^~\&|DEVICE_PUMPVENDOR_v1.7^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517092221-0700||ORU^R42^ORU_R01|8db9924f-5e2a-4e61-9f59-d53990da2d1c|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID||1658^^^HL7^PI||^U|||||
OBR|1|MED0101^HL7^00D0750000000165^EUI-64|1361^Neo^1361^EUI-64|Clindamycin^Clindamycin||20220517091144-0700||||
|||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0||||X||20220517092221-0700||M8110S1298100^
SyrPump^00D075156BB466B4^EUI-64|20220517092221-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0||||X||20220517092221-0700||M8110S12345^
SyrPump^00D0750036E58879^EUI-64|20220517092221-0700
**OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197290^MDC_EVT_PUMP_DELIV_STOP^MDC||||R||20220517092
221-0700||||20220517092221-0700**
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2||||X||20220517092221-0700||||20220517092221-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0||||X||20220517092221-0700||||20220517092221-0700
**OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-not-infusing^MDC||||R||20220517092221-07
00||||20220517092221-0700**
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-primary||||R||20220517092221-07
00||||20220517092221-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|0.0000|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UC
UM||||R||20220517092221-0700||||20220517092221-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R||20220517092221-0700||||20220517092221
-0700
OBX|10||70071^MDC_DEV_PUMP_INFUSATE_SOURCE_PRIMARY_CHAN^MDC|1.1.2.0||||X||20220517092221-0700||||20220
517092221-0700
OBX|11|0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.8.2||||X||20220512135317-0700||||20220512135317-0700
**OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.2.1|^pump-delivery-status-not-delivering^
MDC||||R||20220517091144-0700||||20220517091144-0700**

OBX|28|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-alarmed^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.2.3|^pump-program-delivery-mode-continuous^MDC||||R||20220517091144-0700||||20220517091144-0700

OBX|14|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.2.9|0|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|15|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.2.10|Clindamycin||||R||20220517091144-0700||||20220517091144-0700

OBX|16|SN|157760^MDC_CONC_DRUG^MDC|1.1.2.11|200.0000/2.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|17|ST|184515^MDC_DRUG_ID^MDC|1.1.2.15|Clindamycin||||R||20220517091144-0700||||20220517091144-0700

OBX|18|ST|184516^MDC_PUMP_DRUG_LIBRARY_CARE_AREA^MDC|1.1.2.16|Some Drug Library||||R||20220517091144-0700||||20220517091144-0700

OBX|19|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.2.31|1.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|20|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.2.32|0.4879|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|21|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.2.33|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|22|NM|157924^MDC_RATE_DOSE^MDC|1.1.2.41|200.0000|263890^MDC_DIM_MILLI_G^MDC^^mg^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|24|NM|0^MDCX_BASE_CONC_DRUG^MDC|1.1.2.111|100.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|25||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|26|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|27|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|28|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|29|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|0.9000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||
R||20220512135317-0700||||20220512135317-0700
OBX|26|0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0|||||X||20220512135317-0700||||20220512135317-0700

A.2.2 Infusion Start Event (with two steps)

MSH|^~\&|DEVICE_PUMPVENDOR^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517084831-0700||ORU^R42^ORU_R01|10e8590d-298c-4047-bb13-1d923bd001c3|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID||2392^^^HL7^PI||^U|||||||
OBR|1|MED0101^HL7^00D075000000154^EUI-64|744^
SyrPump^744^EUI-64|Clindamycin^Clindamycin||20220517084831-0700|||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0||||X||20220517084831-0700|||M8110S1298100^
SyrPump^00D075156BB466B4^EUI-64|20220517084831-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0||||X||20220517084831-0700|||M8110S54321^
SyrPump^00D0750036E62C71^EUI-64|20220517084831-0700
OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197288^MDC_EVT_PUMP_DELIV_START^MDC||||R||202205170
84831-0700||||20220517084831-0700
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2||||X||20220517084831-0700|||20220517084831-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0||||X||20220517084831-0700|||20220517084831-0700
OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-infusing^MDC||||R||20220517084831-0700|||
|20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-primary||||R||20220517084831-07
00||||20220517084831-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UC
UM||||R||20220517084831-0700||||20220517084831-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R||20220517084831-0700|||20220517084831
-0700
OBX|10||70071^MDC_DEV_PUMP_INFUSATE_SOURCE_PRIMARY_CHAN^MDC|1.1.2.0||||X||20220517084831-0700|||20220
517084831-0700
OBX|11|0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.8.2||||X||20220512135317-0700|||20220512135317-0700
OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.2.1|^pump-delivery-status-delivering^MD
C||||R||20220517084831-0700|||20220517084831-0700
OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.2.3|^pump-program-delivery-mode-continu
ous^MDC||||R||20220517084831-0700|||20220517084831-0700

OBX|15|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.2.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|16|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.2.10|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|17|SN|157760^MDC_CONC_DRUG^MDC|1.1.2.11|200.0000/2.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|18|ST|184515^MDC_DRUG_ID^MDC|1.1.2.15|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|19|ST|184516^MDC_PUMP_DRUG_LIBRARY_CARE_AREA^MDC|1.1.2.16|Some Drug Library||||R||20220517084831-0700||||20220517084831-0700

OBX|20|ST|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.2.31|1.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|21|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.2.32|0.4879|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|22|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.2.33|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|23|NM|157924^MDC_RATE_DOSE^^MDC|1.1.2.41|200.0000|263890^MDC_DIM_MILLI_G^MDC^^mg^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|24|NM|99977^MDCX_BASE_CONC_DRUG^MDC|1.1.2.111|100.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|25||70071^MDC_DEV_PUMP_INFUSATE_SOURCE_PRIMARY_CHAN^MDC|1.1.8.0||||X||20220512135317-0700||||20220512135317-0700

OBX|26|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|27|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-standby^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|28|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|29|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|30|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|Unknown||||R||20220512135317-0700||||20220512135317-0700

OBX|31|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|32|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|33|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|34|70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700
OBX|35|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700
OBX|36|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700
OBX|37|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|38|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|38|0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

A.2.3 Infusion Stop Event (with transitioning step)

MSH|^~\&|DEVICE_PUMPVENDOR^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517084831-0700||ORU^R42^ORU_R01|10e8590d-298c-4047-bb13-1d923bd001c3|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID||2392^^^HL7^PI||^U|||||||
OBR|1|MED0101^HL7^00D075000000154^EUI-64|744^
SyrPump^744^EUI-64|Clindamycin^Clindamycin||20220517084831-0700|||||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0||||X||20220517084831-0700|||M8110S1298100^
SyrPump^00D075156BB466B4^EUI-64|20220517084831-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0||||X||20220517084831-0700|||M8110S54321^
SyrPump^00D0750036E62C71^EUI-64|20220517084831-0700
OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197290^MDC_EVT_PUMP_DELIV_COMP^MDC||||R||2022051708
4831-0700||||20220517084831-0700
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2||||X||20220517084831-0700|||20220517084831-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0||||X||20220517084831-0700|||20220517084831-0700
OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-not-infusing^MDC||||R||20220517084831-07
00||||20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-primary||||R||20220517084831-07
00||||20220517084831-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|0|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||
||R||20220517084831-0700||||20220517084831-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R||20220517084831-0700|||20220517084831
-0700
OBX|10||70071^MDC_DEV_PUMP_INFUSATE_SOURCE_PRIMARY_CHAN^MDC|1.1.2.0||||X||20220517084831-0700|||20220
517084831-0700
OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.2.1|^pump-delivery-status-transitioning^M
DC||||R||20220517084831-0700|||20220517084831-0700
OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.2.3|^pump-program-delivery-mode-continu
ous^MDC||||R||20220517084831-0700|||20220517084831-0700

OBX|15|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.2.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|16|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.2.10|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|17|SN|157760^MDC_CONC_DRUG^MDC|1.1.2.11|200.0000/2.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|18|ST|184515^MDC_DRUG_ID^MDC|1.1.2.15|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|19|ST|184516^MDC_PUMP_DRUG_LIBRARY_CARE_AREA^MDC|1.1.2.16|Some Drug Library||||R||20220517084831-0700||||20220517084831-0700

OBX|20|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.2.31|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|21|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.2.32|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|22|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.2.33|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|23|NM|157924^MDC_RATE_DOSE^^MDC|1.1.2.41|200.0000|263890^MDC_DIM_MILLI_G^MDC^^mg^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|24|NM|99977^MDCX_BASE_CONC_DRUG^MDC|1.1.2.111|100.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|25|0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC|1.1.8.0||||X||20220512135317-0700||||20220512135317-0700

OBX|26|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|27|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-standby^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|28|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|29|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|30|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|Unknown||||R||20220512135317-0700||||20220512135317-0700

OBX|31|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|32|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|33|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|34|70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700
OBX|35|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700
OBX|36|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700
OBX|37|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|38|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700
OBX|26|0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

A.2.4 Flush Start Event (Immediately following Stop Event)

MSH|^~\&|DEVICE_PUMPVENDOR^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517084831-0700||ORU^R42^ORU_R01|10e8590d-298c-4047-bb13-1d923bd001c3|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID|||2392^^^HL7^PI||^U|||||||
OBR|1|Unknown^HL7^00D0750000000154^EUI-64|744^
SyrPump^744^EUI-64|999999^Medication_Unknown|||20220517084831-0700|||||MED0101|||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0|||||X|||20220517084831-0700|||M8110S1298100^
SyrPump^00D075156BB466B4^EUI-64|20220517084831-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0|||||X|||20220517084831-0700|||M8110S54321^
SyrPump^00D0750036E62C71^EUI-64|20220517084831-0700
OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197288^MDC_EVT_PUMP_DELIV_START^MDC||||R|||202205170
84831-0700|||||20220517084831-0700
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2|||||X|||20220517084831-0700|||||20220517084831-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0|||||X|||20220517084831-0700|||||20220517084831-0700
OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-infusing^MDC||||R|||20220517084831-0700|||
|20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-flush||||R|||20220517084831-0700|
|||20220517084831-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UC
UM||||R|||20220517084831-0700|||||20220517084831-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R|||20220517084831-0700|||||20220517084831
-0700
OBX|10||0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC|1.1.8.0|||||X|||20220512135317-0700|||||20220512135317-07
00

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-flushing^MDC||
||R||20220512135317-0700||||20220512135317-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continu
ous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|14|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal
Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|15|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|Unknown||||R||20220512135317-0700||||20220512135317-0700

OBX|16|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL
^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|17|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCU
M||||R||20220512135317-0700||||20220512135317-0700

OBX|18|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||2022
0512135317-0700||||20220512135317-0700

OBX|19||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|20|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|21|ST|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|22|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135
317-0700||||20220512135317-0700

OBX|23|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||2
0220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

A.2.5 Flush Complete Event

MSH|^~\&|DEVICE_PUMPVENDOR^00D07500001^EUI-64|PUMPVENDOR^00D07500001^EUI-64|Receiving
App|HOSTFACILITY|20220517084831-0700||ORU^R42^ORU_R01|10e8590d-298c-4047-bb13-1d923bd001c3|P|2.6||AL|NE||||IHE
PCD-10^IHE PCD^1.3.6.1.4.1.19376.1.6.4.10^ISO
PID|||2392^^^HL7^PI||^U|||||
OBR|1|MED0101^HL7^00D0750000000154^EUI-64|744^
SyrPump^744^EUI-64|999999^Medication_Unknown|||20220517084831-0700|||||MED0101|||||
OBX|1||69985^MDC_DEV_PUMP_INFUS_MDS^MDC|1.0.0.0||||X|||20220517084831-0700|||M8110S1298100^
SyrPump^00D075156BB466B4^EUI-64|20220517084831-0700
OBX|2||70054^MDC_DEV_PUMP_INFUS_SYRINGE_VMD^MDC|1.1.0.0||||X|||20220517084831-0700|||M8110S54321^
SyrPump^00D0750036E62C71^EUI-64|20220517084831-0700
OBX|3|CWE|68487^MDC_ATTR_EVT_COND^MDC|1.1.0.1|197290^MDC_EVT_PUMP_DELIV_STOP^MDC||||R|||20220517084
831-0700|||||20220517084831-0700
OBX|4|ST|68488^MDC_ATTR_EVT_SOURCE^MDC|1.1.0.2||||X|||20220517084831-0700|||||20220517084831-0700
OBX|5||70067^MDC_DEV_PUMP_DELIVERY_INFO^MDC|1.1.1.0||||X|||20220517084831-0700|||||20220517084831-0700
OBX|6|CWE|184519^MDC_PUMP_INFUSING_STATUS^MDC|1.1.1.1|^pump-status-not-infusing^MDC||||R|||20220517084831-07
00|||||20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-flush||||R|||20220517084831-0700|
|||||20220517084831-0700
OBX|8|NM|158014^MDC_FLOW_FLUID_PUMP^MDC|1.1.1.2|0|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||
||R|||20220517084831-0700|||||20220517084831-0700
OBX|9|ST|158012^MDC_PUMP_SOURCE_CHANNEL_LABEL^MDC|1.1.1.52|A||||R|||20220517084831-0700|||||20220517084831
-0700
OBX|10||0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC^MDC|1.1.8.0||||X|||20220512135317-0700|||||20220512135
317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|27|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^ump-stopped-flush^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|14|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|15|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|Unknown||||R||20220512135317-0700||||20220512135317-0700

OBX|16|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|17|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|18|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.4121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|19||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|20|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syringe type||||R||20220512135317-0700||||20220512135317-0700

OBX|21|ST|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|22|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|23|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-flushing^MDC||
||R||20220512135317-0700||||20220512135317-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continu
ous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|14|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.8.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^U
CUM||||R||20220517091144-0700||||20220517091144-0700

OBX|15|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal
Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|16|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|A10005||||R||20220512135317-0700||||20220512135317-0700

OBX|17|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL
^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|18|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.5000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCU
M||||R||20220512135317-0700||||20220512135317-0700

OBX|19|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.5000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||2022
0512135317-0700||||20220512135317-0700

OBX|20||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|21|ST|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|22|ST|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|23|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|2|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135
317-0700||||20220512135317-0700

OBX|24|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|2|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||2
0220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|13|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-flush^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|14|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|15|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.8.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517091144-0700||||20220517091144-0700

OBX|16|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|17|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|A10005||||R||20220512135317-0700||||20220512135317-0700

OBX|18|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0.5000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|19|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|20|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.5000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|21|ST|70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|22|ST|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|23|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|24|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|25|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1.5000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.2.1|^pump-delivery-status-delivering^MDC||||R||20220517084831-0700||||20220517084831-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.2.3|^pump-program-delivery-mode-continuous^MDC||||R||20220517084831-0700||||20220517084831-0700

OBX|15|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.2.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|16|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.2.10|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|17|SN|157760^MDC_CONC_DRUG^MDC|1.1.2.11|200.0000/2.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|18|ST|184515^MDC_DRUG_ID^MDC|1.1.2.15|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|19|ST|184516^MDC_PUMP_DRUG_LIBRARY_CARE_AREA^MDC|1.1.2.16|Some Drug Library||||R||20220517084831-0700||||20220517084831-0700

OBX|20|ST|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.2.31|1.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|21|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.2.32|0.4879|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|22|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.2.33|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|23|NM|157924^MDC_RATE_DOSE^^MDC|1.1.2.41|200.0000|263890^MDC_DIM_MILLI_G^MDC^^mg^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|24|NM|99977^MDCX_BASE_CONC_DRUG^MDC|1.1.2.111|100.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|25||0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC|1.1.8.0||||X||20220512135317-0700||||20220512135317-0700

OBX|26|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|27|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-standby^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|28|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|29|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|30|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|A10005||||R||20220512135317-0700||||20220512135317-0700

OBX|31|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|32|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|33|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|34||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|35|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|36|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|37|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|38|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.2.1|^pump-delivery-status-transitioning^MDC||||R||20220517084831-0700||||20220517084831-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.2.3|^pump-program-delivery-mode-continuous^MDC||||R||20220517084831-0700||||20220517084831-0700

OBX|15|NM|157784^MDC_FLOW_FLUID_PUMP^MDC|1.1.2.9|1.3333|265266^MDC_DIM_MILLI_L_PER_HR^MDC^^mL/h^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|16|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.2.10|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|17|SN|157760^MDC_CONC_DRUG^MDC|1.1.2.11|200.0000/2.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|18|ST|184515^MDC_DRUG_ID^MDC|1.1.2.15|Clindamycin||||R||20220517084831-0700||||20220517084831-0700

OBX|19|ST|184516^MDC_PUMP_DRUG_LIBRARY_CARE_AREA^MDC|1.1.2.16|Some Drug Library||||R||20220517084831-0700||||20220517084831-0700

OBX|20|ST|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.2.31|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|21|ST|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.2.32|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|22|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.2.33|2.0000|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|23|NM|157924^MDC_RATE_DOSE^^MDC|1.1.2.41|200.0000|263890^MDC_DIM_MILLI_G^MDC^^mg^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|24|NM|99977^MDCX_BASE_CONC_DRUG^MDC|1.1.2.111|100.0000|264306^MDC_DIM_MILLI_G_PER_ML^MDC^^mg/mL^UCUM||||R||20220517084831-0700||||20220517084831-0700

OBX|25||0^MDCX_DEV_PUMP_INFUSATE_SOURCE_FLUSH^MDC|1.1.8.0||||X||20220512135317-0700||||20220512135317-0700

OBX|26|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|27|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-standby^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|28|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|29|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|30|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|A10005||||R||20220512135317-0700||||20220512135317-0700

OBX|31|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|32|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|33|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|34||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|35|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|36|NM|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|37|NM|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|38|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-flushing^MDC||
||R||20220512135317-0700||||20220512135317-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continu
ous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|14|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal
Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|15|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|A10005||||R||20220512135317-0700||||20220512135317-0700

OBX|16|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0|263762^MDC_DIM_MILLI_L^MDC^^mL
^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|17|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCU
M||||R||20220512135317-0700||||20220512135317-0700

OBX|18|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||2022
0512135317-0700||||20220512135317-0700

OBX|19||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|20|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|21|ST|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|22|ST|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135
317-0700||||20220512135317-0700

OBX|23|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||2
0220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

OBX|12|CWE|158005^MDC_DEV_PUMP_CURRENT_DELIVERY_STATUS^MDC|1.1.8.1|^pump-delivery-status-not-delivering^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|27|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^ump-stopped-flush^MDC||||R||20220517092221-0700||||20220517092221-0700

OBX|13|CWE|158008^MDC_DEV_PUMP_PROGRAM_DELIVERY_MODE^MDC|1.1.8.3|^pump-program-delivery-mode-continuous^MDC||||R||20220512135317-0700||||20220512135317-0700

OBX|14|ST|184514^MDC_DRUG_NAME_LABEL^MDC|1.1.8.10|Normal Saline||||R||20220512135317-0700||||20220512135317-0700

OBX|15|ST|184515^MDC_DRUG_ID^MDC|1.1.8.15|A10005||||R||20220512135317-0700||||20220512135317-0700

OBX|16|NM|158084^MDC_VOL_FLUID_DELIV_METHOD_TOTAL^MDC|1.1.8.31|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|17|NM|157872^MDC_VOL_FLUID_TBI_REMAIN^MDC|1.1.8.32|0|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|18|NM|157884^MDC_VOL_FLUID_TBI^MDC|1.1.8.33|0.5121|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|19||70091^MDC_DEV_PUMP_SYRINGE_INFO^MDC|1.1.9.0||||X||20220512135317-0700||||20220512135317-0700

OBX|20|NM|184476^MDC_SYRINGE_TYPE^MDC|1.1.9.1|syring type||||R||20220512135317-0700||||20220512135317-0700

OBX|21|ST|184488^MDC_SYRINGE_MANUFACTURER^MDC|1.1.9.2|BD||||R||20220512135317-0700||||20220512135317-0700

OBX|22|ST|157880^MDC_VOL_SYRINGE^MDC|1.1.9.3|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|23|NM|157984^MDC_VOL_SYRINGE_ACTUAL^MDC|1.1.9.4|1|263762^MDC_DIM_MILLI_L^MDC^^mL^UCUM||||R||20220512135317-0700||||20220512135317-0700

OBX|26||0^MDCX_MDC_DEV_PUMP_FLUSH_INFO^MDC|1.1.10.0||||X||20220512135317-0700||||20220512135317-0700

- **Appendix B – Auto-Programming Request (APR) in HL7 format**

B.1 FLUSH APR PRN

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MSH|^~\&|EMR|EMR|DEVICE_PUMPVENDOR|PUMPVENDOR|20220520130034-0600||RGV^O15^RGV_O15|10|P|2.6||AL|AL||  
||IHE_PCD_RGV_O15^IHE_PCD^1.3.6.1.4.1.19376.1.6.1.3.1^ISO|  
PID||W.Yueh^AE^PI^PI|W^Yueh^^^^L||19710101|M||15 N  
SAGUARO^^TUCSON^AZ^85701^USA^^PIMA|PIMA||||AccountId^B^||||N||||  
ORC|RE|FLUSHIE2000|||||20220520130034|||||RatchedRN^R^RN^^  
RXG|1||A10005^Normal Saline|0.5000||263762^MDC_DIM_MILLI_L^MDC|||||||||  
RXR|^IV^HL70162|^SYR^HL70164|^IV^HL70165  
OBX|1||69986^MDC_DEV_PUMP_INFUS_VMD^MDC|||||||||M8110S12382855^^M8110S12382855^  
OBX|2||158038^MDC_INFUS_ORDER_TYPE^MDC||PrnFlush|||||||||^^^
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B.2 FLUSH APR

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MSH|^~\&|EMR|EMR|DEVICE_PUMPVENDOR  
|PUMPVENDOR|20220520130034-0600||RGV^O15^RGV_O15|10|P|2.6||AL|AL||||IHE_PCD_RGV_O15^IHE  
PCD^1.3.6.1.4.1.19376.1.6.1.3.1^ISO|  
PID||W.Yueh^AE^PI^PIE|W^Yueh^^^^L||19710101|M||15 N  
SAGUARO^^TUCSON^AZ^85701^USA^^PIMA|PIMA||||AccountId^B^||||N||||  
ORC|RE|FLUSHIE2000|||||20220520130034|||||RatchedRN ^R^RN^^  
RXG|1||A10005^Normal Saline |0.5000||263762^MDC_DIM_MILLI_L^MDC|||||||||  
RXR|^IV^HL70162|^SYR^HL70164|^IV^HL70165  
OBX|1||69986^MDC_DEV_PUMP_INFUS_VMD^MDC|||||||||M8110S12382855^^M8110S12382855^  
OBX|2||158038^MDC_INFUS_ORDER_TYPE^MDC||flush|||||||||^^^
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Glossary

The complete IHE Glossary is available [here](#).

Term	Definition
alarm	A clinical alarm is an indication from a system or device, that when activated, indicates a condition requiring urgent clinical assessment and possible intervention.
Auto Program	A pump program in which some or all settings are received from another system such as an eMAR or BCMA system.
event	An occurrence about which it is desired to communicate information between devices and information systems.
Health Level 7	Founded in 1987, Health Level Seven International (HL7) is a not-for-profit, ANSI-accredited standards developing organization dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services.
PatientID	(When used in the context of ATNA) A free text that holds the system-internal patient identifier being unique within that system domain. The patient identifier domain is that assigned to the system that generated the audit event record. The patient information in audit event records corresponds to the information available to identify a patient at the time the audit record was generated and does not reflect later updates (e.g. patient reconciliation)