**Integrating the Healthcare Enterprise**



# IHE Devices
# White Paper

# Infusion Pump IV Flush

## Revision X.X – Draft for Public Comment


Date: <Month xx, 20xx>

Author: Devices Technical Committee / PCD Program

Email: <domain_name@ihe.net>


**Please verify you have the most recent version of this document.** See here for Published Versions and here for Public Comment versions.


Copyright © 20XX: IHE International, Inc.

## Foreword

This is a white paper of the IHE Devices.

<*For Public Comment Versions:*> This white paper is published on <Month XX, 201x> for Public Comment. Comments are invited and can be submitted at http://www.ihe.net/Public_Comment/#domainname. In order to be considered in development of the subsequent version of the white paper, comments must be received by <Month XX, 201X>.

<*For Published Versions:*> This white paper is published on <Month XX, 201X>. Comments are invited and can be submitted at http://www.ihe.net/Public_Comment/#domainname.

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.

 Copyright © 201x: IHE International, Inc.

**CONTENTS**

1 Introduction 5
1.1 Purpose of the Infusion Pump IV Flush White Paper 5
1.2 Intended Audience 5
2 Problem Description 5
3 Conventions 6
4 Definitions 7
5 Assumptions and Considerations 7
6 Use Cases 8
6.1 Manual Programming Flush After Infusion Complete 8
6.1.1 Description 8
6.1.2 Precondition(s) 8
6.1.3 Use Case Flow 8
6.2 Manual Programming Flush After Syringe Empty 10
6.2.1 Description 10
6.2.2 Precondition(s) 10
6.2.3 Use Case Flow 10
6.3 Manual Programming Flush After Micro Dose Volume Primed 12
6.3.1 Description 12
6.3.2 Precondition(s) 12
6.3.3 Use Case Flow 13
6.4 Manual Programming Flush with Primary After Secondary Completes 15
6.4.1 Description 15
6.4.2 Precondition(s) 15
6.4.3 Main Flow 15
6.5 Auto Programming Flush After Infusion Complete 17
6.5.1 Description 17
6.5.2 Precondition(s) 18
6.5.3 Use Case Flow 18
6.6 Auto Programming Flush After Syringe Empty 20
6.6.1 Description 20
6.6.2 Precondition(s) 20
6.6.3 Use Case Flow 20
6.7 Auto Programming Flush After Micro Volume Primed 23
6.7.1 Description 23
6.7.2 Precondition(s) 23
6.7.3 Use Case Flow 23
Appendices 26
Appendix A – Event Messages in HL7 format 26
A.1 Manual Flush After Infusion Complete 26
A.1.1 Flush Start Event 26
A.1.2 Flush Complete Event 27

 Copyright © 201x: IHE International, Inc.

A.2 Manual Programming Flush After Syringe Empty 29
A.2.1 Infusion Stop Event 29
A.2.2 Infusion Start Event (with two steps) 31
A.2.3 Infusion Stop Event (with transitioning step) 33
A.2.4 Flush Start Event (Immediately following Stop Event) 36
A.2.5 Flush Complete Event 37
A.3 Auto Programming Flush After Infusion Complete 39
A.3.1 Flush Start Event 39
A.3.2 Flush Complete Event 41
A.4 Auto Programming Flush After Syringe Empty 43
A.4.1 Infusion Start Event 43
A.4.2 Infusion Complete Event 45
A.4.3 Flush Start Event 48
A.4.4 Flush Complete Event 49
Appendix B – Auto-Programming Request (APR) in HL7 format 51
B.1 FLUSH APR PRN 51
B.2 FLUSH APR 52
Glossary 53

 Copyright © 201x: IHE International, Inc.

# 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.

 Copyright © 201x: IHE International, Inc.

# 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

 Copyright © 201x: IHE International, Inc.

# 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.

 Copyright © 201x: IHE International, Inc.

# 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:

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

 Copyright © 201x: IHE International, Inc.

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).

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

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

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.

 Copyright © 201x: IHE International, Inc.

## 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):

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

 Copyright © 201x: IHE International, Inc.

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):

| ***Reporting Data*** | **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:* | Clindamycin |
| *Drug Amt.:* | 200.0000 mg |
| *Dil. Vol. (mL):* | 2.0000 |
| *RATE (mL/h):* | 1.3333 |
| *VTBI (mL):* | 2.0000 |
| *Vol. Infused (mL):* | 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.

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

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

| ***Reporting Data*** | **Active Flush Step** |
|---|---|

 Copyright © 201x: IHE International, Inc.

| | |
|---|---|
| *Infusion Event:* | MDC_EVT_PUMP_DELIV_START |
| *Pump Status:* | pump-status-infusing |
| *Delivery Status:* | pump-delivery-status-flushing |
| *Med Order ID:* | MED0101 |
| *Flush Order ID:* | NULL |
| *Infusate Name:* | Unknown |
| *Drug Amt.:* | ---- |
| *Dil. Vol. (mL):* | ---- |
| *RATE (mL/h):* | 1.3333 |
| *VTBI (mL):* | 0.4121 |
| *Vol. Infused (mL):* | 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):

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

 Copyright © 201x: IHE International, Inc.

- 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:

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

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

 Copyright © 201x: IHE International, Inc.

| | |
|---|---|
| *Vol. Infused (mL):* | 2.0000 |

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:

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

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

 Copyright © 201x: IHE International, Inc.

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.

| ***Reporting Data*** | **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:

| ***Reporting Data*** | **Active Primary Step** |
|---|---|
| *Infusion Event:* | MDC_EVT_PUMP_DELIV_STOP |
| *Pump Status:* | pump-status-not-infusing |
| *Delivery Status:* | pump-delivery-status-switching-source |

 Copyright © 201x: IHE International, Inc.

| | |
|---|---|
| *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:

| ***Reporting Data*** | **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:

   a. The Clindamycin Complete event as follows:

| ***Reporting Data*** | **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 |

   b. 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:

| ***Reporting Data*** | **Active Flush Step** |
|---|---|

 Copyright © 201x: IHE International, Inc.

| | |
|---|---|
| *Infusion Event:* | MDC_EVT_PUMP_DELIV_START |
| *Pump Status:* | pump-status-infusing |
| *Delivery Status:* | pump-delivery-status-flushing |
| *Med Order ID:* | MED0101 |
| *Flush Order ID:* | NULL |
| *Infusate Name:* | IV Fluid |
| *Drug Amt.:* | ---- |
| *Dil. Vol. (mL):* | ---- |
| *RATE (mL/h):* | 15.0000 |
| *VTBI (mL):* | 5.0000 |
| *Vol. Infused (mL):* | 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:

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

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

| ***Reporting Data*** | **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):* | 6.5000 |

 Copyright © 201x: IHE International, Inc.

## 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:

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

3. The Clinician responds to the Infusion Complete alarm at the beside.
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** | |
|---|---|
| *Clinician ID:* | RatchedRN |

 Copyright © 201x: IHE International, Inc.

| | |
|---|---|
| *Patient ID:* | W.Yueh |
| *Order Type:* | PrnFlush |
| *Order ID:* | FLUSHIE2000 |
| *Flush Solution:* | Normal Saline |
| *VTBI.:* | 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):

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

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

 Copyright © 201x: IHE International, Inc.

| | |
|---|---|
| *VTBI (mL):* | 0.5000 |
| *Vol. Infused (mL):* | 0.5000 |

13. 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

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 to the HIS an infusion program stop event as follows:

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

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

 Copyright © 201x: IHE International, Inc.

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 | |
|---|---|
| *Clinician ID:* | RatchedRN |
| *Patient ID:* | W.Yueh |
| *Order Type:* | PrnFlush |
| *Flush Order ID:* | FLUSHIE2000 |
| *Flush Solution:* | Normal Saline |
| *VTBI:* | 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):

| ***Reporting Data*** | **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:* | Clindamycin |
| *Drug Amt.:* | 200.0000 mg |
| *Dil. Vol. (mL):* | 2.0000 |
| *RATE (mL/h):* | 1.3333 |
| *VTBI (mL):* | 2.0000 |
| *Vol. Infused (mL):* | 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):

| ***Reporting Data*** | **Active Primary Step** |
|---|---|

 Copyright © 201x: IHE International, Inc.

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

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

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

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

 Copyright © 201x: IHE International, Inc.

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:

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

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

 Copyright © 201x: IHE International, Inc.

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

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

| **Flush APR Details** | |
|---|---|
| *Clinician ID:* | RatchedRN |
| *Patient ID:* | W.Yueh |
| *Order Type:* | PrnFlush |
| *Order ID:* | FLUSHIE2000 |
| *Flush Solution:* | Normal Saline |
| *VTBI.:* | 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:

| ***Reporting Data*** | **Active Flush Step** |
|---|---|
| *Infusion Event:* | MDC_EVT_PUMP_DELIV_START |
| *Pump Status:* | pump-status-infusing |
| *Delivery Status:* | pump-delivery-status-flushing |

 Copyright © 201x: IHE International, Inc.

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

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

 Copyright © 201x: IHE International, Inc.

# 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|||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|||20220517084831-0700|||||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^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

Copyright © 20XX: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

### 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|||20220517084831-0700|||||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|||20220517084831-0700|||||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|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|||20220517092221-0700|||||20220517092221-0700


Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

## 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|||20220517092221-0700|||||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|||20220517092221-0700|||||20220517092221-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-primary|||||R|||20220517092221-0700|||||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^UCUM|||||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|||||20220517092221-0700
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-deliverng^MDC|||||R|||20220517091144-0700|||||20220517091144-0700

 Copyright © 201x: IHE International, Inc.

OBX|28|CWE|158006^MDC_DEV_PUMP_NOT_DELIVERING_REASON^MDC|1.1.8.2|^pump-stopped-alarming^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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

### 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^HL7^00D0750000000154^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|||20220517084831-0700|||||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|||20220517084831-0700|||||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^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|||||20220517084831-0700
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^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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

### 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^HL7^00D0750000000154^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|||20220517084831-0700|||||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|||20220517084831-0700|||||20220517084831-0700
OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-primary||||||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||70071^MDC_DEV_PUMP_INFUSATE_SOURCE_PRIMARY_CHAN^MDC|1.1.2.0|||||||X|||20220517084831-0700|||||20220517084831-0700
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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

### 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|||20220517084831-0700|||||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^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|1.1.8.0|||||||X|||20220512135317-0700|||||20220512135317-0700

 Copyright © 201x: IHE International, Inc.

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|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^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|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|||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

 Copyright © 201x: IHE International, Inc.

### 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|||20220517084831-0700|||||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|||20220517084831-0700|||||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|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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

## A.3 Auto Programming Flush After Infusion Complete

### A.3.1 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|||W.Yueh^^^HL7^PI||^^^^^^U||||||||||||||||||||||||||||||||

OBR|1|FLUSHIE2000^HL7^00D0750000000154^EUI-64|744^ SyrPump^744^EUI-64|A10005^Normal Saline|||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|||20220517084831-0700|||||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^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|1.1.8.0||||||X|||20220512135317-0700|||||20220512135317-0700

 Copyright © 201x: IHE International, Inc.

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|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^UCUM|||||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|||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|2|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|2|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

 Copyright © 201x: IHE International, Inc.

### A.3.2 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|||W.Yueh^^^HL7^PI||^^^^^^U||||||||||||||||||||||||||||||||

OBR|1|FLUSHIE2000^HL7^00D0750000000154^EUI-64|744^ SyrPump^744^EUI-64|A10005^Normal Saline|||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|||20220517084831-0700|||||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|||20220517084831-0700|||||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|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|1.1.8.0|||||||X|||20220512135317-0700|||||20220512135317-0700

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

 Copyright © 201x: IHE International, Inc.

## A.4 Auto Programming Flush After Syringe Empty

### A.4.1 Infusion Start Event

MSH|^~\&|DEVICE_PUMPVEDNOR^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|||W.Yueh^^^HL7^PI||^^^^^^U||||||||||||||||||||||||||||||||

OBR|1|MED0101^HL7^00D0750000000154^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|||20220517084831-0700|||||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|||20220517084831-0700|||||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^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^MDC|1.1.2.0|||||||X|||20220517084831-0700|||||20220517084831-0700

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

### A.4.2 Infusion 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|||W.Yueh^^^HL7^PI||^^^^^^U||||||||||||||||||||||||||||||||

OBR|1|MED0101^HL7^00D0750000000154^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|||20220517084831-0700|||||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|||20220517084831-0700|||||20220517084831-0700

OBX|7|CWE|158016^MDC_DEV_PUMP_ACTIVE_SOURCES^MDC|1.1.1.3|^pump-source-info-primary|||||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||70071^MDC_DEV_PUMP_INFUSATE_SOURCE_PRIMARY^MDC|1.1.2.0|||||||X|||20220517084831-0700|||||20220517084831-0700

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

### A.4.3 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|||W.Yueh^^^HL7^PI||^^^^^^U||||||||||||||||||||||||||||||

OBR|1|FLUSHIE2000^HL7^00D0750000000154^EUI-64|744^ SyrPump^744^EUI-64|A10005^Normal Saline|||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|||20220517084831-0700|||||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^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|1.1.8.0|||||||X|||20220512135317-0700|||||20220512135317-0700

 Copyright © 201x: IHE International, Inc.

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|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^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

 Copyright © 201x: IHE International, Inc.

### A.4.4 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|||W.Yueh^^^HL7^PI||^^^^^^U||||||||||||||||||||||||||||||

OBR|1|FLUSHIE2000^HL7^00D0750000000154^EUI-64|744^ SyrPump^744^EUI-64|A10005^Normal Saline|||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|||20220517084831-0700|||||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|||20220517084831-0700|||||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|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|1.1.8.0|||||||X|||20220512135317-0700|||||20220512135317-0700

 Copyright © 201x: IHE International, Inc.

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

 Copyright © 201x: IHE International, Inc.

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

## B.1 FLUSH APR PRN

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|||||||||||^^^

## B.2 FLUSH APR

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|||||||||||^^^

 Copyright © 201x: IHE International, Inc.

 Copyright © 201x: IHE International, Inc.

## 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) |

 Copyright © 201x: IHE International, Inc.