**ORU from Cerner (Lab Results) to eICU**

**1.2**

**Prepared By: Lois Whitley & Tom Fredrickson**

**Date: 7/29/2019**

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# **Document Control**

## Resources

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## Project Distribution List

## Document Version Control

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Modifier** | **Description** |
| V1.0 | 11/29/2016 | Lois Whitley | Originally Created |
| V1.1 | 12/22/2016 | Tom Fredrickson | Updated Cloverleaf Technical Information |
| V1.2 | 07/29/2019 | Yitzhak Magoon | Updated document for Cerner Model |
|  |  |  |  |

# 1. Introduction

## 1.1 Purpose

The purpose of this document is to outline the Lab Results (ORU) interface requirements for the Philips eCareManager application (also known as Virtual ICU and eICU) from Cerner PathNet.

## 1.2 Project Scope

The eICU program includes the Philips eCareManager application which gathers demographic, lab result, pharmacy order, charting, and vital sign information for all inpatients, ED, and outpatients in a bed.

Integration for the eCareManager (eICU) application includes an ADT interface from Soarian, ADT interface from Cerner for Heights and Weights, Orders from the Cerner PharmNet (Pharmacy) system, results from Cerner PathNet (Lab), and CCL flow sheet results from Cerner.

## 1.3 Terminology Standards

### 1.3.1 Acronyms

ACK – General acknowledgement message

ADT – Admission, Discharge and Transfer Message

eICU – electronic intensive care unit; critical care telehealth program

ORU – Observation result/unsolicited

### 1.3.2 Glossary

eCareManager – Enterprise Telehealth Software suite

Philips – vendor name

## 1.4 Document References

ECAREMANAGER Lab Results Inbound Interface Vendor Specs

eICU Integration Roadmap

# 2*.* Diagram

eCareManager IPC Interface patient Cache

Cerner PathNet ORU

oru\_cer\_in\_lab\_xi7

eCareManager

Database

TCP/IP

TCP/IP

Orion Rhapsody Interface Gateway for eCareManager

Cloverleaf

oru\_eicu\_out\_lab

# 3. Requirements

## 3.1 Functional Requirements

Provide detail for the below functional requirements. The message transformation requirements for the components defined in this specification should be specified in section 4.2 of this document.

|  |  |  |
| --- | --- | --- |
| **Cloverleaf** |  |  |
| **Number** | **Requirement Name** | **Requirement Description** |
|  |  |  |
| FR.2016.1.0 | Facility filter | There is a facility filter for limiting messages to just those facilities that have implemented eICU beds. This includes the following:  MSH-5.1 = one of the following: MCS MDU MPH NBY SAH SFB SJN SJS BAH SJH BRM WHH. |
|  |  |  |
| FR.2016.2.0 | Filter unwanted transactions from eICU | Transactions >=4 days post-discharge.  Outpatients not in a bed.  Pediatric patients. |
|  |  |  |
| FR.2016.3.0 | Patient Identifier | Moved FIN# PID:18 to PID:3 |
| FR.2016.4.0 | Determine Lab Code Valid | If OBX-3.1 is contained in the table: eicu\_lab\_filter.tbl then Continue the message. |
|  |  |  |
| FR.2016.5.0 | Convert abnormal flags to eICU values | Convert abnormal flags to eICU values. |

|  |  |  |
| --- | --- | --- |
| **Cerner** |  |  |
| **Number** | **Requirement Name** | **Requirement Description** |
| FR.2018.01.1 | **ESO Interface Trigger:**  Observation Reporting/ORU Discrete Gen Lab/CE Server GLB/GRP (CQM Class: CE) | This trigger causes the BayCare Laboratory results to be processed outbound when entered in Pathnet as long as the result items are not aliased with DONOTSEND for contributor source INVISION on code set 72.  - The following segments are set to be sent outbound by this trigger:   * HL7 MSH * HL7 PID * HL7 PV1   HL7 OBR/OBX/NTE |
| FR.2018.01.2 | Global Script:  - route\_out | route\_out (global script): Logic to route BayCare Laboratory results to the ORU\_LAB\_RESULTS\_OUT comserver. Logic is based on:   * Message Type = ORU, cqm\_type in “AP”, “MICRO”, or “GRP” * End logic for all ORU messages outbound is sent to these comservers:   - ORU\_LAB\_RESULTS\_OUT |
| FR.2019.07.29 | New scripts:  fsi\_common (generic)  oru\_lab\_out (mod object)  fsi\_add\_pcpe (generic) | oru \_lab\_out, Mod Object script, for BayCare Laboratory  results outbound:   * Calls the fsi\_common generic script to load all subroutines * Adds the correct ordering provider to OBR.16, the correct order name/description to OBR.4, and the correct order alias to OBR.3 for AP results. * Replace any primary care physician (PCP) with the PCP at the encounter level in the PD1 segment. * Deletes any DONOTSEND\* result items and renumbers the OBX segments accordingly. \*Note: This is a known Cerner issue where LOINC coding overrides the DONOTSEND functionality. Custom Coding was needed to fix the issue.   Filters all ORU messages if there is no OBX segment after the OBX segments are stripped as described above.   |  |  | | --- | --- | | tpsCernerLabResultsModifier | Null PID.5.7  Null various PV1.19 visit number fields:  PV1.19.2  PV1.19.3  PV1.19.4.1  PV1.19.4.2  PV1.19.4.3  PV1.19.5  PV1.19.6.1  PV1.19.6.2  PV1.19.6.3  Swap various ORC.2 and ORC.3 fields:  ORC.2.1 and ORC.3.1  ORC.2.2 and ORC.3.2  ORC.2.3 and ORC.3.3  ORC.2.4 and ORC.3.4  Swap various OBR.2 and OBR.3 fields:  OBR.2.1 and OBR.3.1  OBR.2.2 and OBR.3.2  OBR.2.3 and OBR.3.3  OBR.2.4 and OBR.3.4  If OBX.3.3 =LOINC, swap OBX.3.4 with OBR.3.1 and swap OBX.3.5 with OBX.3.2.  Else, swap OBX.3.4 and OBX.3.1, OBX.3.5 and OBX.3.2 and OBX.3.6 and OBX.3.3. | |

## 3.2 Non-Functional Requirements

Provide concise detail for the below non-functional requirements. The below requirements must be evaluated for every project.

|  |  |  |
| --- | --- | --- |
| **Cloverleaf** |  |  |
| **Number** | **Requirement Name** | **Requirement Description** |
| NFR.20XX.1.0 | Click here to enter text. | Click here to enter text. |

## 3.3 Messaging Protocols

Below are listed the details for the messaging protocols that will be leveraged for this integration. Please see the reference document located on the Integration SharePoint server: <insert link to document here>

### 3.3.1 Inbound from Cerner to Cloverleaf

* Site: eicu\_9\_p Thread: oru\_cer\_in\_lab\_xi7

### 3.3.2 Outbound to eICU

* Site: eicu\_9\_p Thread: oru\_eicu\_out\_lab

### 

### 3.3.3 Inbound from Cerner to Cloverleaf

Test

IP Address: 10.5.250.203

Port Number: 22004

Prod

IP Address: 10.5.250.201

Port Number: 22004

### 3.3.4 Outbound to eICU

Test

IP Address: 10.44.110.109

Port Number: 10002

Prod

IP Address: 10.44.110.77

Port Number: 10002

# 

# 4. HL7 Messaging

## 4.1 Messaging Format

### 4.1.1 Segments

The segments utilized for this interface are:

MSH

PID

OBR

OBX

NTE

*Message Construction Notes:*

*[Square Brackets] – Optional*

*{Curly Brackets} – Repeatable*

*MSH – Message Header*

*PID – Patient ID segment*

*OBR – Observation Request segment*

*OBX – Observation/Result segment*

*NTE – Notes and Comments segment*

*[{ – Start of optional, repeatable group*

*}] – End of optional, repeatable group*

### 4.1*.*2 Messaging Event Types

Below are the messages types necessary for this integration

|  |  |
| --- | --- |
| **Event Type** | **Description** |
| R01 | Unsolicited transmission of an observation |

### 4.1*.*3 Cloverleaf Configuration Files

tpsAdvHL7Filter.tcl

tpsFilterEICU.tcl

tpsEicuConvrtAbnrmlAndFilterLab.tcl

cerner\_eicu\_lab.xlt

### 4.1.4 Cloverleaf Site Location

eicu\_9

## 4.2 Data Transformation Requirements

| **Field Description** | **HL7 Field Loc.** | **Required Y/N** | **Data Type** | **Length** | **Notes** |
| --- | --- | --- | --- | --- | --- |
| Message Header | MSH |  |  |  |  |
| Sending Application | MSH.3 |  |  |  | BCHS\_LAB |
| Sending Facility | MSH.4 |  |  |  |  |
| Receiving Application | MSH.5 |  |  |  | eICU |
| Receiving Facility | MSH.6 |  |  |  |  |
| Date/Time of Message | MSH.7 |  |  |  | YYYYMMDDHHMMSS  Date/Time the ACK message was created |
| Message Type | MSH.9 |  |  |  | ORU^R01 |
| Message Control ID | MSH.10 |  |  |  | Unique identifier for the message |
| Patient Identification | PID |  |  |  |  |
| Patient ID (Internal ID) | PID.3 |  |  |  | Unique for instance of care FIN# Moved PID:18 to PID:3 |
| Observation Request | OBR |  |  |  |  |
| Filler Order Number | OBR.3 |  |  |  | Primary key for Lab results processing |
| Observation Date/Time | OBR.7 |  |  |  | Used to identify which results are an update versus a new result |
| Specimen Source | OBR.15 |  |  |  | Satisfies regulatory requirements to be able to identify specimen for lab; displays on View Details screen in Labs; (i.e. serum blood, urine, etc.) |
| Observation/Result | OBX |  |  |  |  |
| Set ID | OBX.1 |  |  |  |  |
| Observation Identifier Text | OBX.3 |  |  |  | Identifier^Text^Name of Coding System  Identifier = primary key for mapping  Text=populates Lab Value Name  Name of Coding System = used to select mapping table to use |
| Observation value | OBX.5 |  |  |  | Used to populate the “Lab Value” field |
| Units | OBX.6 |  |  |  | Used to populate the “Units” field |
| Reference Range | OBX.7 |  |  |  | Used to populate the “Range” field |
| Abnormal Flags | OBX.8 |  |  |  | Used to populate the “abnormalFlag” field:  L=Low  H=High  LL=Very Low  HH=Very High  A=Abnormal  AA=Very Abnormal |
| Observation Result Status | OBX.11 |  |  |  | Used to populate “Results Status” field:  C=Correction  F=Final  W=Wrong  D=Delete  U=Update to Final  P=Preliminary  S=Partial  Any other values will be rejected |
| Date/Time of Observation | OBX.14 |  |  |  | Used to populate element “Date/Time Result Revised” for each individual lab value and for maintaining chronological sequencing of lab data once it gets to eCareManager; date and time this particular message was created or revised |
| Notes and Comments | NTE |  |  |  | Only NTE segments associated with OBX segments are processed |
| Comment | NTE.3 |  |  |  | Used to populate the Lab View Details notes information |

## 4.3 Sample Message

LABS

MSH|^~\&|BCHS\_LAB|SJS|||20161027152505||ORU^R01|Q2642459368T32725191|P|2.3

PID|||6000023629^^^&BCHS^FIN^&SJS

OBR|||000002016301000443||||20161027140000||||||||Blood

OBX|1||L670786^Glucose^BCHS\_LAB||99|mg/dL|70-99||||F|||20161027152457

OBX|2||L666992^BUN^BCHS\_LAB||18|mg/dL|6-26||||F|||20161027152457

OBX|3||L670671^Creatinine^BCHS\_LAB||0.950|mg/dL|0.300-1.300||||F|||20161027152457

OBX|4||L671169^Sodium^BCHS\_LAB||135|mmol/L|136-145|L|||F|||20161027152457

OBX|5||L671092^Potassium^BCHS\_LAB||3.7|mmol/L|3.5-5.1||||F|||20161027152457

OBX|6||L670614^Chloride^BCHS\_LAB||120|mmol/L|98-107|H|||F|||20161027152457

OBX|7||L670629^Carbon Dioxide^BCHS\_LAB||28|mmol/L|21-32||||F|||20161027152457

OBX|8||L670570^Calcium^BCHS\_LAB||12.0|mg/dL|8.5-10.1|H|||F|||20161027152457

OBX|9||L670442^Albumin^BCHS\_LAB||8.0|g/dL|3.4-5.0|H|||F|||20161027152457

OBX|10||L671656^T Protein^BCHS\_LAB||8.0|g/dL|6.4-8.2||||F|||20161027152457

OBX|11||L670550^Bili Total^BCHS\_LAB||0.6|mg/dL|0.2-1.0||||F|||20161027152457

NTE|||"Note: there may be a spurious elevation of total bilirubin

NTE|||in patients taking Naproxen"

OBX|12||L670449^Alk Phos^BCHS\_LAB||30|IU/L|45-117|L|||F|||20161027152457

OBX|13||L670460^ALT^BCHS\_LAB||40|IU/L|12-78||||F|||20161027152457

OBX|14||L670525^AST^BCHS\_LAB||80|IU/L|7-37|H|||F|||20161027152457

# **5. Testing**

## 5.1. Unit Testing Scenarios

|  |  |
| --- | --- |
| **Scenario** | **Expected Result** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## 5.2 Integrated Testing Scenarios

|  |  |
| --- | --- |
| **Scenario** | **Expected Result** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## 5.3 Testing Approvals

|  |  |  |  |
| --- | --- | --- | --- |
| **Testing Phase** | **Date** | **Department** | **Team Member** |
| PH1.UNIT |  |  |  |
| PH1.INTEGRATED |  |  |  |

### 

## 5.4 Piloting

List the facilities and associated networks in scope for pilot testing.

## 5.5 Approvals

|  |  |  |  |
| --- | --- | --- | --- |
| **Testing Phase** | **Date** | **Department** | **Team Member** |
| PH1.0 |  |  |  |
|  |  |  |  |
|  |  |  |  |

# 6. Deployment / Implementation Model

Provide the detail as to how to deploy the solution defined in the IDBB from both the BAYCARE and vendor perspective.

## 6.1 Alerts

Are you going to need alerting on this connection?

|  |  |
| --- | --- |
| Yes |  |
| No |  |

If the answer is yes, please complete the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Site Name** | **Hours of Support** | **Distribution Group** | **Comments** |
|  |  |  |  |
|  |  |  |  |

# Appendix A: Risks and Concerns

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Project Name** |  |  | | |  |  |  |  |
| **Number** | **Risk / Concern** | **Comment** | **Mitigation** | | |  |  |  |
| RC.2013.1.0 |  |  | |  | |  |  |  |

# Appendix B: Issues List

This is a dynamic list of the open issues related to the IDBB that remain to be solved, including but not limited to TBDs, pending decisions, information needed, conflict awaiting resolution, and the like.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Project Name** |  |  | | |  |  |  |  |
| **Number** | **Issue** | **Comment** | **Fix** | | |  |  |  |
| I.2013.1.0 |  |  | |  | |  |  |  |

* End of document