Use Case Title: Transplant Care

Overview: Adrian, a 20-year-old, has a failing liver and requires transplant surgery. She undergoes the surgery in the operating room. Following the surgery, she recovers in the ICU. As her condition improves, she is transferred to a general ward room.

Scenario	Vendor	Products	Standards
Adrian, a 20 year old female has a failing liver. The conclusion comes down that she requires a liver transplant.			
She undergoes a liver transplant in the operating room.			
Baseline monitoring is established during operating room preparation and anesthesia is provided. She is monitored during the operation and waveforms are recorded. During surgery, there is an alert for high heart rate and high airway pressure.	Mindray	A7, eGateway, Passport 17M	HL7 v2 IEEE 11073
When multiple devices are involved there is need for an information rollup to show values for all associated devices.	Masimo	UniView, Root, Patient SafetyNet, Radius-7	HL7 v2 IEEE 11073
An infusion is established during operating room preparation No autoprogram in OR (no PIV): Infusion program details: Continuous Infusion: Alfentanil 10000 mg/250 ml dose rate 0.5 mcg/kg/min	Ivenix	Ivenix Infusion System	HL7 v2 IEEE 11073
Infusion pump programming through electronic orders from the EMR. Infusion pump progress is recorded directly into the EMR.	Cerner	CareAware iBus	HL7 v2 IEEE 11073

Following the surgery Adrian recovers in the intensive care unit.			
While in the intensive care unit Adrian is started on fluids and an antibiotic. Primary - 0.9 % Sodium Chloride, 1000 ml bag, @ 75 ml/hr Manually programmed and running before pump is auto programmed with Cefazolin Secondary - Cefazolin (Ancef) 1 g in 10mL, duration 3 minutes The infusion pump programming for this medication is automation assisted.	Ivenix	Ivenix Infusion System	HL7 v2 IEEE 11073
The patient flow is mainly composed of 7 steps, including entrance, evaluation, medical orders, nursing, scoring, documents, quality control, and department discharge. The system will visually display the basic information and critical condition in the ward with a list and a graphical bedside card. At the same time, because the bedside equipment is connected, the data of monitoring devices will be collected and all changes of vital signs will be recorded in our ICIS during her treatment in ICU.	meehealth	Intensive Care Clinical Information System	HL7 v2 IEEE 11073
As Adrian's condition improves she is transferred to a general ward room.			
Now that she is able to move around she is provided with wireless ambulatory patient monitoring displayed on a central monitor	Masimo	UniView, Root, Patient SafetyNet, Radius-7	HL7 v2 IEEE 11073
Alert notifications from all devices are centralized to one alert manager to identify the persons to receive the alert notifications and to manage their delivery and response status.	Bernoulli	Bernoulli One	HL7 v2 IEEE 11073 WCTP
Sending of alert notification text messages to communication devices is processed by an alert communicator system so that the alert manager doesn't need to support the wide variety of communication device protocols.	Spok	Care Connect	WCTP

Data exchange standards:

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
Physiologic monitoring									
Mindray	A7, eGateway, Passport 17M	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven
meehealth	Intensive Care Clinical Informatio n System	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data include in patient record
Physiologic alerting									
Mindray	A7, eGateway, Passport 17M	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report alert high heart rate and high airway pressure
Bernoulli	Bernoulli One	Alert	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report alert
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Physiologic monitoring rollup									

Masimo	UniView, Root, Patient SafetyNet, Radius-7	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven
meehealth	Intensive Care Clinical Informatio n System	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data include in patient record
Manual infusion program in OR									
Infusion observations to patient record									
Ivenix	Ivenix Infusion System	Infusion observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven
meehealth	Intensive Care Clinical Informatio n System	Infusion observations	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data include in patient record
Infusion progress to patient record									
Ivenix	Ivenix Infusion System	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOR	PCD-10	Send	Communicate Infusion Event Data periodic and event driven
Cerner	CareAware iBus	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOC	PCD-10	Receive	Communicate Infusion Event Data include in patient record
Infusion alert communication									
Ivenix	Ivenix Infusion System	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report Alert occlusion

Bernoulli	Bernoulli One	Alert	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report Alert
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Automation assisted infusion program									
Cerner	CareAware iBus	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOP	PCD-03	Send	Communicate Infusion Order nitroglycerin/dextrose
Ivenix	Ivenix Infusion System	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOC	PCD-03	Receive	Communicate Infusion Order receive order and program pump
Ivenix	Ivenix Infusion System	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOC	PCD-03 App Ack	Send	Acknowledge of Communicate Infusion Order clinician optionally modifies then accepts program program updates send back to programmer
Cerner	CareAware iBus	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOP	PCD-03 App Ack	Receive	Acknowledge of Communicate Infusion Order include in patient record
Infusion observations to patient record									
Ivenix	Ivenix Infusion System	Infusion observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven

meehealth	Intensive Care Clinical Information System	Infusion observations	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data include in patient record
Infusion progress to patient record									
Ivenix	Ivenix Infusion System	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOR	PCD-10	Send	Communicate Infusion Event Data periodic and event driven
Cerner	CareAware iBus	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOC	PCD-10	Receive	Communicate Infusion Event Data include in patient record
Infusion alert communication									
Ivenix	Ivenix Infusion System	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report Alert attempt to power off while infusion
Bernoulli	Bernoulli One	Alert	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report Alert
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Physiologic ambulatory monitoring									
Masimo	UniView, Root, Patient SafetyNet, Radius-7	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven

meehealth	Intensive Care Clinical Informatio n System	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data include in patient record
Physiologic ambulatory alerting									
Masimo	UniView, Root, Patient SafetyNet, Radius-7	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report alert low heart rate
Bernoulli	Bernoulli One	Alert	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report alert
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Bernoulli	Bernoulli One	Alert	WCTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status

HIMSS Value STEPS Framework:

Step	Description	Point of View
S: Satisfaction	This type of value focuses on people, process and technology use cases that increases stakeholders' satisfaction with the delivery of care. Satisfaction includes types of value such as: Patient satisfaction Provider satisfaction Staff satisfaction Other satisfaction	Reduction in infusion programming errors due to automation Reduction in medication management liability Infusion programming automation eases infusion programming process Sending alerts to staff communication devices improves responsiveness which improves patient satisfaction.
T: Treatment/ Clinical	This type of value focuses on effective and improved treatment of patients, reduction in medical errors, inappropriate/duplicate care, increase in safety, quality of care and overall clinical efficiencies. Treatment/Clinical includes types of value such as: Efficiencies Quality of Care Safety Other treatment/clinical	Infusion programming automation reduce time to program pumps Infusion programming automation reduces medication administration errors A reduction in medication administration errors improves patient safety Alerts go to staff communication devices which reduce expectations of staff to hear alerting audio indications at distance or behind closed doors.
E: Electronic Secure Data	This type of value focuses on improved data capture, data sharing, reporting, use of evidence-based medicine, and improved communication by and between physicians, staff and patients. Electronic Secure Data includes types of value such as: Privacy & Security Data sharing Data reporting Enhanced communication	Observational data from devices and infusion progress is captured into patient record.
P: Patient Engagement & Population Management	This type of value focuses on improved population health and reduction in disease due to improved surveillance/screening, immunizations and increased patient engagement due to improved patient education	Anonymized patient records containing orders, device observations, infusion progress, patient physiologic trends while under infusion, equipment and staff movements, alerts and responses to them, and alert counts for fatigue evaluation are all available for retrospective

	and access to information. Patient Engagement & Population Management includes type of value such as: Patient education Patient engagement Prevention Population Health	analysis so as to improve the care of patients over time and to assure efficiency and accuracy of staff actions.
S: Savings	This type of value focuses on documented financial, operational and efficiency savings resulting from factors such as improved charge capture, use of staff resources and workflow and increased patient volume and more efficient use of space .	Management of alerting reduces clinician fatigue which improves efficiencies.