



Use Case Title: Cardiovascular and Diabetes Risk

Overview: Francine, a 65-year-old, has diabetes and is exhibiting cardiovascular risks for which she needs immediate observation and monitoring. She is eventually put into a general ward room where she receives infused medication and is monitored. The equipment and staff associated with her stay are monitored for location and status to make sure she has everything she needs. Infusion of the medications she receives are verified and reconciled. Alerts from devices are sent to the appropriate clinical staff for response. Her physiologic observations are monitored over time for progressing changes, and advisory alerts are sent to staff as needed. As Francine progresses through a variety of care settings, patient and staff safety is not compromised.

Value: Cardiovascular and Diabetes Risk: Automatic data capture with interfaces into a single data repository reduces time spent by clinical staff capturing and recording data from numerous devices. Interoperability drives STEPS to value through increased workflow efficiencies. Efficiency reduces the fatigue levels of staff on duty, reduce staffing needs and can contribute to better and safer patient care.

Scenario	Vendor	Products	Standards
Francine Waters, a 65 year old, white female, is a diabetic. She exhibits shortness of breath and lightheadedness and is rushed to hospital.			
In the emergency room Francine is provided with an infusion of a mixture of nitroglycerin and dextrose. Programming of the infusion pump is assisted through automation based upon the ordered infusion, and assures that the right patient, gets the right medication, in the right dosage, via the right route, in the right time, and on the right pump device. Device data is captured from the pump during infusion as is the progress of the infusion. Information about the pump device itself is communicated so as to better manage the specific pump device amongst all the pumps and other devices at the hospital.	BBraun	Space DoseTrac and DoseLink	HL7 v2 IEEE 11073

While infusing Francine accidentally moves onto the infusion line and an occlusion occurs. The infusion pump detects this and raises an alert. The appropriate clinical staff is notified on their communication device and comes to tend to the issue. The alert appears on the active dashboard of alerts.			
While in the emergency room Francine's blood pressure, heart rate, temperature, consciousness, respiration rate and SPO2 are captured on a periodic basis. The gathered information is collected by an Early Warning Scoring system. The system detects deterioration in her condition and sends an advisory type alert to her assigned clinician on their mobile device. The alert is also displayed on the list of active alerts. The clinician recognizes the change in condition as a normal effect based upon the infusion.	Philips	IntelliVue Guardian System	HL7 v2 IEEE 11073
Francine's health record contains all the information about the infusion order, the progress of the infusion, her vital signs over time, and the alerts that have occurred.	Epic	Epic	HL7 v2 IEEE 11073 WCTP
Once her condition is stabilized Francine is moved from the emergency room to the general ward. While there her vital signs are captured on a periodic basis and stored in her health record.			
The staff and patient movements and equipment status and location are managed throughout Francine's hospital stay. As items are moved and they cross from their current area into another area staff is alerted on their mobile devices as to such movements. Additionally, when clinicians interact with the location management components the information is recorded and appropriate alerts are sent to the appropriate staff.	GuardRFID	AllGuard RTLS	HL7 v2 IEEE 11073
As alerts occur they are recorded and the type of the alert is used to determine who is to be notified and on what communication devices. Responses to the alerts are used to make decisions about escalation notification to additional staff. A list of active alerts is maintained.	Spok	Care Connect	HL7 v2 IEEE 11073 WCTP
When Francine's infusion order is processed there is a recognized critical stocking level of the prescribed medication. The pharmacy inventory management system is requested to identify the location of available supplies and the response is used to find the medication required for Francine's ordered infusion.	Omnicell	Performance Center	HL7 v2

Data exchange standards:

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
Infusion program									
Epic	Epic	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOP	PCD-03	Send	Communicate Infusion Order nitroglycerin/dextrose
BBraun	Space DoseTrac and DoseLink	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOC	PCD-03	Receive	Communicate Infusion Order receive order and program pump
BBraun	Space DoseTrac and DoseLink	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
Epic	Epic	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									
BBraun	Space DoseTrac and DoseLink	Infusion observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven
Epic	Epic	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									
BBraun	Space DoseTrac	Infusion progress	HL7 v2	IHE	IPEC	DOR	PCD-10	Send	Communicate Infusion Event Data periodic and event driven

	and DoseLink		IEEE 11073						
Epic	Epic	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOC	PCD-10	Receive	Communicate Infusion Event Data include in patient record
Infusion alert communication									
BBraun	Space DoseTrac and DoseLink	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report Alert occlusion
Spok	Care Connect	Alert	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report Alert
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Epic	Epic	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Epc	Epic	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to secondary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate alert
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Spok	Care Connect	Alert	WTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Physiologic monitoring									
Philips	IntelliVue Guardian System	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven

Epic	Epic	Physiologic observations	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data include in patient record
Physiologic alerting									
Philips	IntelliVue Guardian System	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report alert Early Warning Scoring (EWS) deterioration advisory
Spok	Care Connect	Alert	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report alert
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Epic	Epic	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Epc	Epic	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to secondary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate alert
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Spok	Care Connect	Alert	WTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Medical equipment management - device management communication									
BBraun	Space DoseTrac and DoseLink	Device management	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven
GuardRFID	AllGuard RTLS	Device management	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data

									be aware of equipment - identification and status
BBraun	Space DoseTrac and DoseLink	Device management	HL7 v2 IEEE 11073	IHE	IPEC	DOR	PCD-10	Send	Communicate Infusion Event Data periodic and event driven
GuardRFID	AllGuard RTLS	Device management	HL7 v2 IEEE 11073	IHE	IPEC	DOC	PCD-10	Receive	Communicate Infusion Event Data be aware of equipment - identification and status
BBraun	Space DoseTrac and DoseLink	Device management	HL7 v2 IEEE 11073	IHE	MEMDMC	DIOR	PCD-15	Send	Device Management Information Observation
GuardRFID	AllGuard RTLS	Device management	HL7 v2 IEEE 11073	IHE	MEMDMC	DIOC	PCD-15	Receive	Device Management Information Observation
Philips	IntelliVue Guardian System	Device management	HL7 v2 IEEE 11073	IHE	DEC	DOR	PCD-01	Send	Communicate Patient Care Device Data periodic and event driven
GuardRFID	AllGuard RTLS	Device management	HL7 v2 IEEE 11073	IHE	DEC	DOC	PCD-01	Receive	Communicate Patient Care Device Data be aware of equipment - identification and status
Medical equipment management - location services									
GuardRFID	AllGuard RTLS	Location services	HL7 v2 IEEE 11073	IHE	MEMLS	LOR	PCD-16	Send	Report Location Observation
BBraun	Space DoseTrac and DoseLink	Location services	HL7 v2 IEEE 1073	IHE	MEMLS	LOC	PCD-16	Receive	Report Location Observation cache last known location of object for inclusion in later messages
Medical equipment management - location alerting									

GuardRFID	AllGuard RTLS	Location alerting	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report Alert advisory type alert for change in location or operator interaction with tracking device
Spok	Care Connect	Location alerting	HL7 v2 IEEE 11073	IHE	ACM	AM	PCD-04	Receive	Report Alert
Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to primary recipient
Epic	Epic	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Epc	Epic	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
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Spok	Care Connect	Alert	WCTP	IHE	ACM	AM	PCD-06	Send	Disseminate Alert to secondary recipient
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate alert
Spok	Care Connect	Alert	WCTP	IHE	ACM	AC	PCD-07	Send	Report Dissemination Alert Status
Spok	Care Connect	Alert	WTP	IHE	ACM	AM	PCD-07	Receive	Report Dissemination Alert Status
Pharmacy medication inventory management									
Epic	Epic	Medication inventory management	HL7 v2	-	-	-	ORM 001	Send	General Order Message need medication to fill infusion order
Omniceil	Performance Center	Medication inventory management	HL7 v2	-	-	-	ORM 001	Receive	General Order Message
Omniceil	Performance Center	Medication inventory management	HL7 v2	-	-	-	ORR 002	Send	General Order Response Message found some

Epic	Epic	Medication inventory management	HL7 v2	-	-	-	ORR O02	Receive	General Order Response Message
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HIMSS Value STEPS Framework:

Step	Description	Point of View	Point of View	Point of View	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	Various alerts that are combined and routed to a single dashboard improve provider and staff satisfaction. Alerts that help staff monitor patients and alert them when needed can improve patient satisfaction by reducing patient and family worries.	Reduction in infusion programming errors due to automation Reduction in medication management liability Infusion programming automation eases infusion programming process Early warning scoring and related alerting communication condition trends to staff prior to physiologic alarms occurring	Patient satisfaction is demonstrated through timely patient-provider communications on status update and confirmation of no drug interaction with existing medications.	Patients can rest easy knowing the ability to check against drug interactions and allergies is automated within the system. Using previous and current medical history, dosing is spot checked against a number of conflicts. Clinicians can also benefit from this same process and check for possible drug conflicts.

<p>T: Treatment/Clinical</p>	<p>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</p>	<p>Reducing the number of reporting screens and consolidating data from multiple monitoring devices improves situational awareness and increases cognitive integration of data, leading to faster and better decision-making. Making care more efficient reduces the caregiver's mental and physical fatigue, potentially decreasing errors.</p>	<p>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.</p>		<p>Aggregating data can reduce complacency as the search for information becomes a less arduous task.</p>
<p>E: Electronic Secure Data</p>	<p>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</p>	<p>Automatic data capture with interfaces into a single data repository such as the EHR reduces time spent by clinical staff capturing and recording data from</p>		<p>Observational data from devices and infusion progress is captured into patient record. Equipment management and location services</p>	

	<p>such as:</p> <ul style="list-style-type: none"> Privacy & Security Data sharing Data reporting Enhanced communication 	<p>numerous devices. This reduces the opportunity for data capture errors and data omissions. Automatic alerts with predetermined communication channels enhances communication between clinical staff.</p>		<p>makes equipment identification, status, and location available to various systems</p>	
<p>P: Patient Engagement & Population Management</p>	<p>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 and access to information. Patient Engagement & Population Management includes type of value such as:</p> <ul style="list-style-type: none"> Patient education Patient engagement Prevention Population Health 		<p>Family members and the patient can be more confident in care, which can provide an opportunity for patient engagement on the importance of data access & device interoperability.</p>	<p>Improved patient education and engagement through regular screenings and preventive activities before the illness occurs.</p>	<p>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 analysis so as to improve the care of patients over time and to assure efficiency and accuracy of staff actions.</p>

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 .	Consolidating data into the EHR to provide information in the fewest number of data displays and notifying staff through pre-determined communication channels improve efficiency for the staff in terms of communication between clinical staff, with pharmacy and with hospital supply. Efficiency reduces the fatigue levels of staff on duty and may also reduce staffing needs. Reduced fatigue could contribute to better and safer patient care.		Improved medication stores utilization through automated management. Improved equipment utilization through active awareness of equipment status and location.	Insurance aside, patients will see reduced costs as repeated tests and imaging are no longer needed. However, it could be argued that the medical facility may lose revenue by not doing these tests.
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