



**Use Case Title: Heart Attack**

**Overview:** Morgan is 40 years old and is experiencing chest pains. A 911 call is placed. Emergency Medical Services arrives and Morgan is evaluated. The decision comes down that he is going to the hospital. Upon arrival he is admitted for intervention, and then coronary artery bypass surgery. After the surgery he recovers in the ICU. As a part of his discharge process the information is made available to his Cardiologist and the originating EMS services and he is scheduled for a follow-up appointment.

**Value:** Heart attack: Making hospital records available via to broader caregivers strengthens population health with visibility to full treatment history including surgical procedures. Interoperability drives STEPS to value by improving the early detection of problems and more speedy resolution of problems when they arise through secure data exchange.

Scenario	Vendor	Products	Standards
Morgan is 40 years old and is experiencing chest pains. A 911 call is placed.			
Emergency Medical Services arrives and Morgan is evaluated. He is placed on an emergency medical services physiologic monitor to record his vital signs while he is being transported to the hospital. This information is collected into a report which is sent for recording in Morgan's records at the hospital.	Zoll	RescueNet Dispatch, ePCR, Care Exchange	HL7 v2
Upon arrival in the hospital emergency department, any archived records about Morgan are retrieved and reviewed.	Ellkay	LK EMR-Archive	Smart on FHIR SAML Ellkay to Epic
It is found that Morgan has a history of high blood pressure, high cholesterol and a history of smoking. Morgan is sent for a heart catheterization and is found positive for unstable angina.			

<p>After the surgery Morgan recovers in the ICU where he is placed on a ventilator and his vital signs are monitored and the device information is recorded in his health records. The ventilator raises an alert which is communicated to the appropriate staff which responds to resolve the alert.</p>	Draeger	Infinity Gateway, Infinity Acute Care System, Infinity V500 ventilator	HL7 v2 IEEE 11073
<p>While in the ICU an infusion of Dexmedetomidine medication is ordered for Morgan. The infusion pump is programmed and the infusion started. While the infusion is taking place device observations and infusion progress are recorded into Morgan's records. During the infusion Morgan inadvertently lies on the infusion tubing and an upstream occlusion occurs. This is detected by the infusion pump and the pump raises an alert. The alert is communicated to the appropriate staff on their mobile device and they arrive to resolve the issue.</p>	Baxter	Spectrum IQ	HL7 v2 IEEE 11073
<p>When alerts are produced by the medical devices associated with Morgan they are sent to an alert management system to determine who best to send each alert to and on what communication device.</p>	Bernoulli	Bernoulli One	HL7 v2 IEEE 11073 WCTP
<p>As alerts are raised the alert text messages are sent to the alert communicator system to communicate the alert text message to the correct device using the appropriate protocol. Delivery confirmation and responses are reported back to the alert management system. A dashboard of active alerts is maintained.</p>	Epic	Epic	WCTP
<p>Once Morgan improves he is discharged from the hospital. As a part of his discharge process the information is made available to his Cardiologist and to the originating EMS services. Morgan's Cardiologist reviews the information regarding his stay in the hospital.</p>	NextGen	Ambulatory EHR	HL7 v2
<p>Information about Morgan's hospital stay is retrieved and a follow-up appointment is scheduled.</p>	Byte Sized Solutions	FHIR Ops Online Scheduling and Messaging	HL7 FHIR

HIMSS18 Interoperability Showcase Use Case

Data exchange standards:

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
<b>EMS physiologic monitoring stored in clinical record</b>									
Zoll	RescueNet Dispatch, ePCR, Care Exchange	Physiologic observations	HL7 v2 IEEE 11073	IHE	XDR	Source	CDA	Send	Provide and Register Document Set
Epic	Epic	Physiologic observations	HL7 v2 IEEE 11073	IHE	XDR	Recipient	CDA	Receive	Provide and Register Document Set include in patient record
<b>Retrieval of archived information</b>									
Ellkay	LK EMR-Archive		HL7 FHIR	IHE	SAML			Send	Retrieve and then communicate information
Epic	Epic		HL7 FHIR	IHE	SAML			Receive	Register and store information
<b>Ventilator and physiologic monitoring device stored in clinical record</b>									
Draeger	Infinity Gateway, Infinity Acute Care System, Infinity V500 ventilator	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
<b>Physiologic Monitoring Alerting</b>									

Draeger	Infinity Gateway, Infinity Acute Care System, Infinity V500 ventilator	Alert	HL7 v2 IEEE 11073	IHE	ACM	AR	PCD-04	Send	Report alert Early Warning Scoring (EWS) deterioration advisory
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
Epic	Epic	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Epic	Epic	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
<b>Infusion program</b>									
Epic	Epic	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOP	PCD-03	Send	Communicate Infusion Order Dexmedetomidine
Baxter	Spectrum IQ	Infusion program	HL7 v2 IEEE 11073	IHE	PIV	IOC	PCD-03	Receive	Communicate Infusion Order receive order and program pump
Baxter	Spectrum IQ	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	IHE	PIV	IOP	PCD-03 App Ack	Receive	Acknowledge of Communicate Infusion Order

			IEEE 11073						include in patient record
<b>Infusion observations to patient record</b>									
Baxter	Spectrum IQ	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
<b>Infusion progress to patient record</b>									
Baxter	Spectrum IQ	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOR	PCD-10	Send	Communicate Infusion Event Data periodic and event driven
Epic	Epic	Infusion progress	HL7 v2 IEEE 11073	IHE	IPEC	DOC	PCD-10	Receive	Communicate Infusion Event Data include in patient record
<b>Infusion alert communication</b>									
Baxter	Spectrum IQ	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
Epic	Epic	Alert	WCTP	IHE	ACM	AC	PCD-06	Receive	Disseminate Alert to alert dashboard
Epic	Epic	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

<b>Discharge summary</b>									
Epic	Epic	Discharge Summary	HL7 v2	IHE	ITI			Send	Send discharge summary (CCDA)
NextGen	Ambulatory EHR	Discharge Summary	HL7 v2	IHE	ITI			Receive	Receive discharge summary (CCDA)
<b>Appointment Creation</b>									
NextGen	Ambulatory EHR	Appointment	HL7 v2	IHE	ITI			Send	Send appointment
Epic	Epic	Appointment	HL7 v2	IHE	ITI			Receive	Receive appointment
<b>Query for CCDA then send updated CCDA back</b>									
Byte Sized Solutions	FHIR Ops Online Scheduling and Messaging	Query	HL7 FHIR					Send	Query for CCDA
NextGen	Ambulatory EHR	Query	HL7 FHIR					Receive	Query for CCDA
NextGen	Ambulatory EHR	Query	HL7 FHIR					Send	Respond with CCDA
Byte Sized Solutions	FHIR Ops Online Scheduling and Messaging	Query	HL7 FHIR					Receive	Receive CCDA
Byte Sized Solutions	FHIR Ops Online Scheduling and Messaging	Update	HL7 FHIR					Send	Send updated CCDA
NextGen	Ambulatory EHR	Update	HL7 FHIR					Receive	Receive updated CCDA

**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		Provider satisfaction enhanced with proactive notification of infusion pump occlusion. This allow providers to more quickly address problems and more effectively balance care for multiple patients.	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.	Reduction in infusion programming errors due to automation Reduction in medication management liability Infusion programming automation eases infusion programming process Management of alerting improves staff 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		Proactive alerts from devices and interoperable with EHR-based messaging improves quality of care to speed recognition and resolution of problems when they are early, and may be simpler to address.	Aggregating data can reduce complacency as the search for information becomes a less arduous task.	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

	<p>such as:</p> <ul style="list-style-type: none"> <li>Efficiencies</li> <li>Quality of Care</li> <li>Safety</li> <li>Other treatment/clinical</li> </ul>				<p>which reduce expectations of staff to hear alerting audio indications at distance or behind closed doors.</p>
E: Electronic Secure Data	<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 such as:</p> <ul style="list-style-type: none"> <li>Privacy &amp; Security</li> <li>Data sharing</li> <li>Data reporting</li> <li>Enhanced communication</li> </ul>			<p>Secure and timely data increases confidence in the data provided and can eliminate the need for duplicate testing.</p>	<p>Observational data from devices and infusion progress is captured into patient record.</p>
P: Patient Engagement & Population Management	<p>This type of value focuses on improved population health and reduction in disease due to improved surveillance/screening,</p>	<p>The access to information during the care provides confidence and post event ability</p>	<p>Making hospital records available to broader caregivers strengthen population health with visibility to full</p>	<p>Making information available to the EMS system helps first responders make educated decisions and provide QA/QI for future call types of a similar</p>	<p>Anonymized patient records containing orders, device observations, infusion progress, patient physiologic trends while under infusion, equipment and staff</p>



	immunizations and increased patient engagement due to improved patient education and access to information. Patient Engagement & Population Management includes type of value such as: Patient education Patient engagement Prevention Population Health	to meet the desired care plan in partnership with the provider.	treatment history including surgical procedures.	nature.	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.
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 .			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.	Improved management of alerts saves steps and reduces staff fatigue.