



Use Case Title: Reinventing Medication Management

Overview: Richard Hawkins, a 20 year old, has a history of seizures, falls and hurts his leg. He is transported to ED where he undergoes a radiological exam. Exam is positive for leg fracture requiring surgery. He is tracked across areas: pre-OP, OR, Med Surg. Antibiotic and pain meds are ordered post-operatively. Connectivity platform optimizes data exchange protecting Richard against med errors and workflow inefficiency.

Value: Real time monitoring and using tracking system to locate the medication usage will better use staff resources, improve workflow and improve the quality of care. Interoperability drives STEPS to value through protecting the patient against medication errors and workflow inefficiency.

Scenario	Vendor	Product	Standards
Richard Hawkins is a 20 year old that has a history of seizures. During a seizure, he falls and is unable to move his leg so he is taken to the hospital ED.	Epic	Epic	N/A
ED triage followed by Medical Screening Exam. Findings include confusion, leg pain and impaired mobility and penicillin allergy. Physical exam indicates leg fracture. Diagnosis confirmed with radiograph. Physician orders immediate surgery and a prophylactic dose of Vancomycin (antibiotic). The nurse assigns patient's RTLS badge through the EMR.	Epic/GE	Epic/Centricity Clinical Archive	IHE & HL7
The badge is tied to Richard's patient record and sends location data to the EMR.	STANLEY Healthcare	MobileView	ADT & RTLS HL7
Upon entering Pre-Op, Epic's OpTime board automatically shows the patient's location and milestone update as Pre-Op.	STANLEY Healthcare	MobileView	RTLS HL7
After prep, Richard is then sent to the OR for surgery. OpTime is automatically updated as Richard enters the OR.	STANLEY Healthcare	MobileView	RTLS HL7
After surgery, the physician orders patient-controlled analgesia (PCA)morphine and Vancomycin for Richard and is transferred to the M/S floor so he can be closely monitored.	STANLEY Healthcare	MobileView Epic - CPOE	RTLS HL7

In Pharmacy, the Pharmacist reviews and approves medication orders in PIS. Various technologies receive order information including IV compounding system and dispensing cabinets.	BD	BD Pyxis™ Enterprise Server BD Pyxis™ MedStation™ ES system Epic - PIS	HL7
The Pharmacist accesses the Vancomycin order, compounds it and sends it out for delivery to Med/Surg floor.	BD	BD Pyxis™ IV Prep BD HealthSight™ Track & Deliver Epic - EHR	HL7
Nurse remotely tracks delivery of compounded med (Vancomycin) from pharmacy and sees where it has been delivered. Nurse queues PCA morphine syringe at the workstation on wheels for removal from the cabinet.	BD	BD Pyxis ES™/Epic interoperability	FHIR
Nurse retrieves compounded med (Vancomycin) from the delivery location. Nurse removes queued PCA morphine syringe from cabinet.	BD	BD Pyxis™ MedStation™ ES system	HL7
Nurse accesses RTLS dashboard from mobile device to locate a clean, available infusion PCA pump module to add on to an infusion pump that already has an LVP pump module. Nurse sees nearest PCA pump module is in use and identifies another one that is available in clean utility closet. Nurse gets available, clean PCA pump module and attaches it to pump.	BD	BD Alaris™ Asset Management BD Alaris™ System MobileView	IHE
Nurse initiates PCA infusion and Vancomycin via smart pump/EMR interoperability (sends orders to LVP and PCA modules). Infusion status data sent to EMR. Pump sends message to MobileView that it is in use. Nurse validates data which is then documented in patient's EMR record.	BD	BD Alaris EMR interoperability BD Alaris System Epic	IHE
The antibiotic infusion becomes occluded because the patient bends his arm at the IV site. The pump is automatically paused, which generates an Occlusion Alarm that is sent to the Alert management actor(AM) Spok. The AM reads the PCD-04 message sent from the infusion pump, picking out information about the event from the message based on the event type. The actor then adds additional information about the patient if needed from their record and immediately sends a notification to the proper care team role who is carrying an application on their device from Epic who is the Alert Communicator (AC). once the Epic reaches the caregiver they can use the Epic app to respond to the event (using a PCD-07 message). Should they not respond or need to manually forward, the AM actor (Spok) can automatically escalate the event to a backup caregiver based on care team assignments,	BD	BD Alaris EMR interoperability Spok Care Connect Epic Hyperspace app	IHE

Via a BD HealthSight™ Viewer display in the Pharmacy, Pharmacist sees a continuous infusion for Richard is running low. She acknowledges the dose and adds it to the IV compounding queue, reinitiating the compounding, tracking, delivery and administration workflow.	BD	BD HealthSight™ Viewer (Continuous Infusion view)	HL7, FHIR
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Data exchange standards:

The BD Care Coordination Engine is a single platform that supports connectivity across products listed below.

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
EPIC	E H R	EMR	HL7	IHE PCD	PIV	IOP	PCD-03	Send	Receive infusion parameters and pre-populate pump
			HL7	IHE PCD	DEC	DOC	PCD-01	Receive	Communicate infusion status updates to EMR
			HL7	IHE PCD	IPEC	DOC	PCD-10	Receive	Communicate infusion status start to EMR
			HL7 v2.x	NA	NA	NA	NA	Send Receive	Send ADT allergy info, med concentration volume, strength (V2.x RDE) Receive inventory and dispense (RDS)
			HL7 FHIR	NA	NA	NA	NA	Send	Single Sign On Send patient context
			HL7	NA	NA	NA	NA	Send	Send clinical results. NSHN reporting via CDA
			HL7	NA	NA	NA	NA	Send Receive	Send order (RDE) Communicate dispense (RDS)
			HL7	NA	NA	NA	NA	Send	Send order, ADT, infusion status
			WCTP	IHE PCD	ACM	AC	PCD-06	Receive	Receive alarms message from AM
BD	Pyxis IV Prep	IV compounding	HL7	NA	NA	NA	Receive Send	Receive order (RDE) Communicate dispense (RDS)	
Stanley	STANLEY MobileView Asset Management	Real-Time Location System	HL7	IHE PCD	IPEC/DEC	DOC	PCD-10/ PCD-01	Receive	Receive infusion status from pump to identify location of clean pump
Stanley	STANLEY MobileView Patient Flow	Real-Time Location System	HL7 v3	NA	NA	NA	NA	Receive Send	Receive RTLS patient tag/badge assignment from Epic Send RTLS patient location update to Epic

BD	BD Alaris	Infusion pump	HL7	IHE PCD	PIV	IOC	PCD-03	Receive	Receive infusion parameters to pre-populate pump programming
			HL7	IHE PCD	DEC	DOR	PCD-01	Send	Communicate observations to EMR (periodic)
			HL7	IHE PCD	IPEC	DOR	PCD-10	Send	Infusion progress and status updates (event)
			HL7	IHE PCD	ACM	AR	PCD-04	Send	Communicates alarm message to AM
Spok	Care Connect	Clinical event managements	HL7	IHE PCD	ACM	AM	PCD-04	Receive	Receive occlusion event notification
			HL7	IHE PCD	ACM	AM	PCD-04	Send	Send WCTP notification to Epic AC with responses
			HL7	IHE PCD	ACM	AM	PCD-07	Receive	Receive PCD-07 from Epic AC and pause alarm or escalate.
BD	BD Pyxis ES system (BD Pyxis MedStation ES, BD Pyxis Med Link Queue & Waste)	Automated med dispensing	HL7	NA	NA	NA	NA	Receive Send	Receive ADT allergy info, med concentration volume, strength (V2.x RDE) Send inventory and dispense (RDS)
		Nursing mobility solution	HL7 FHIR	NA	NA	NA	NA	Receive	Single Sign On Receive patient context
BD	BD HealthSight™ Viewer	Repository / Analytics	HL7 FHIR	NA	NA	NA	NA	Receive	Receive order, ADT, infusion status

HIMSS Value STEPS Framework:

Step	Description	Point of View	Point of View	Point of View
S: Satisfaction	<p>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:</p> <ul style="list-style-type: none"> Patient satisfaction Provider satisfaction Staff satisfaction Other satisfaction 	<p>Monitoring alerts about infusions can help with a recent patient safety goal regarding pain management. Recognizing the patient isn't getting the appropriate dosage due to an error improve patient satisfaction.</p> <p>Conveniently, making sure the pain is controlled also improves the Clinician experience with the patient.</p>	<p>Staff satisfaction: the nurse can monitor the medication availability and easily locate the medication.</p>	<p>Patient satisfaction: the patient probably won't understand how most of the drugs work or how they may impact him - so being under monitoring in real time and being able to communicate IRT what's happening will have big impact on his comfort</p>
T: Treatment/ Clinical	<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:</p> <ul style="list-style-type: none"> Efficiencies Quality of Care Safety Other treatment/clinical 	<p>Tracking medication delivery and automated pharmacy interaction eliminates errors and improves efficiency. Checking for drug interactions through the course of the stay improves safety.</p>	<p>Real-time monitoring will increase the safety of IV injection and efficiencies</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 such as: Privacy & Security Data sharing Data reporting Enhanced communication</p>	<p>You have to assume the data is secure in order to gain the trust benefits that data provides. If you have confidence in the information provided, you can make a diagnosis using it as a data source.</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: Patient education Patient engagement Prevention Population Health</p>			<p>Patients need simple interfaces and clear guides on how to insert data - also providing both a choice of answers and space to write one's own helps in collecting more reliable insights.</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 .	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.	Real time monitoring and using tracking system to locate the medication usage will better use staff resources and provide a smooth workflow; in turn, it could increase # of patients under an individual nurse's supervision without impact quality of care.	
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