



**Use Case Title:** Cardiac Patient and Referral Management

**Short Description:** Cameron reports new-onset chest pain to his PCP and is urgently referred to cardiology. His physicians determine he needs non-emergent cardiac surgery, for which he is scheduled. When he is in the hospital for bypass surgery, his medical device data and alarms prevent decompensation. During post-op, he is discharged to home with PCP follow-up. His PCP determines that the patient requires a referral to behavioral health for depression and alcohol abuse.

**Scheduled times:** This demonstration will occur 45 minutes after the hour

**Participants:** Draeger, eClinicalworks, Epic, ICU Medical, Masimo, MedAllies, NetSmart, Qvera

Scenario	Vendor	Products	Standards
<p>During an encounter with his primary care physician (PCP) today, Cameron reports having chest pain and shortness of breath with exertion, resolved with rest. Together, Cameron and the PCP agree on the prudence of a referral to cardiology. The PCP requests an urgent referral to cardiology, indicating that the patient must be seen within 48 hours. The PCP orders a referral, including the referral note C-CDA, which is sent using the 360X standards and protocol via Direct to a cardiologist across the MedAllies HISP.</p>	<p>eClinicalWorks/ MedAllies</p>	<p>MedAllies HISP eClinicalWorks EMR V11.</p>	<p>360x - Closed Loop Referrals using Direct, HL7, C-CDA</p>

In the cardiologist's Qvera system the urgent referral request is reviewed by the cardiology office staff and declined. The decline causes the encounter note, EKG and the Referral C-CDA to be purged. The decline 360X message is sent via Direct to eCW over the MedAllies HISP.	MedAllies/Qvera	Qvera Interface Engine (QIE) MedAllies HISP	360x - Closed Loop Referrals using Direct, HL7, C-CDA
The decline is received and reviewed by the PCP staff. The decline automatically closes the referral loop per 360X standards and protocol. A second referral request is sent to a second cardiologist using the 360X standards and protocol via Direct with a new unique referral ID number.	eCW/Epic		360x - Closed Loop Referrals using Direct, HL7, C-CDA
The urgent referral request is reviewed and accepted, a new patient record is created, the discrete data from the C-CDA is pulled into the chart, and a same day appointment is scheduled. Cameron goes to the cardiologist's office for his consultation. The cardiologist performs some tests, studies, enters a diagnostic code, and prescribes a medication for chest pain. The results determine that Cameron requires bypass surgery. The cardiologist staff send the Consult C-CDA to the PCP. The Consult C-CDA is received, the medications and problems are reconciled. A non-urgent Cardiac Surgery is scheduled.	Epic/eCW		
Cameron is admitted to the hospital for surgery. He is received into the OR from Pre-Op and is monitored. During surgery, anesthesia will be delivered to Cameron and the Dräger combined clinical workstation provides the anesthesiologist with a fully consolidated view of all of Cameron's relevant physiological data. During the case all physiologic and anesthesia information is continuously sent to Epic to populate the anesthesia record.	Dräger/Epic	Monitor: Dräger Infinity Acute Care System; Anesthesia Machine: Dräger Perseus A500	IHE PCD-01
After surgery, once in the ICU, the physician determines that Cameron has a low cardiac index and orders dobutamine at an initial dose of 2.5 mcg/kg/min. The nurse administers the dobutamine using the Epic system to program the ICU Medical infusion pump. Once the infusion pump has started, the dose and volume infused information is continuously sent back to Epic, and the nurse can verify the infusion information in the flowsheet.	ICUMedical	ICU Medical Plum 360 infusion pump	IHE PCD-03, PCD-10
During the infusion, Cameron adjusts his position and rolls onto the tubing, causing the infusion pump to generate an alarm. The alarm information is sent to Masimo's Patient SafetyNet system, where it can be displayed, filtered, and then sent to the designated nurse's phone or pager.	Masimo/ICUMedical		IHE PCD-06, PCD-01

Following recovery, Cameron is discharged to home, and the hospital sends a discharge C-CDA with the reconciled medications and problem list to the PCP (eCW) in near real time.	Epic		Direct, HL7, C-CDA
The PCP reviews the Hospital discharge C-CDA and reconciles the diagnosis and medications. Cameron is seen by his PCP for a follow up encounter a few days after discharge. Cameron has a prior history of depression, and during the encounter, admits to his PCP that he is again depressed and has been drinking heavily to self-medicate. The PCP adds diagnosis codes for depression and alcohol use, and orders the referral to Cameron's established psychiatrist (who had previously treated him for depression). The staff attach the PHQ9 form that Cameron completed during the encounter, and the referral note C-CDA to the psychiatrist using the 360X via Direct standards and protocol across the MedAllies HISPs to Netsmart.	eClinicalWorks/ MedAllies	MedAllies HISP	360x - Closed Loop Referrals using Direct, HL7, C-CDA
The psychiatrist office staff receive the referral request and send an accept message and appointment to the PCP using the 360X via Direct standards and protocol across the MedAllies HISP. The Netsmart system automatically matches Cameron's information in their system. Administrative staff uploads the PHQ9 form.  Cameron has an encounter with the psychiatrist, who adds a medication and diagnosis for depression, and refers Cameron to Alcoholics Anonymous. The staff schedule a follow up appointment and send the interim consult C-CDA to the PCP using the 360X via Direct standards and protocol across the MedAllies HISP.	Netsmart/MedAllies	MedAllies HISP	360x - Closed Loop Referrals using Direct, HL7, C-CDA
The PCP receives the interim consult C-CDA and reconciles the medication and diagnosis. As Cameron has a follow-up appointment scheduled with the psychiatrist, this interim Consult C-CDA does not close the referral loop.	eClinicalWorks		

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Data exchange standards:

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
eClinicalworks	eCW EMR V11, eClinicalDirect HISP	HISP/Edge System	HL7, CDA,XDM	IHE	360x	Referral Recipient	ITI	Receive	<b>Receive 360x Accept, Decline, Closed Loop Referral Request</b>
			HL7, CDA,XDM	IHE	360x	Referral Initiator	ITI	Send	Send 360x Referral Request
Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
Epic	Care Everywhere	EHR	XDM with SMTP, Direct	IHE PCC	360X	Referral Recipient	PCC-55 Referral Request	Receive	
						Referral Recipient	PCC-57 Referral Outcome	Send	
Epic	EpicCare	EHR	HL7 v2.x	IHE PCD	DEC,ACM				
Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
Draeger	Infinity Gateway Server	Vital Sign Export and Alarm Annunciation	HL7 v2.6	IHE PCD	DEC	DOR	PCD-01	Send	Communicate observations to EMR
			HL7 v2.6	IHE PCD	ACM	AR	PCD-04	Send	Originate alerts for communication to staff

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
ICU Medical	Plum 360	Infusion Pump	HL7	IHE PCD	DEC	Device Observation Reporter	PCD-01	Send	Communicate PCD Data
			HL7	IHE PCD	IPEC	Device Observation Reporter	PCD-10	Send	Communicate Infusion Event Data
			HL7	IHE PCD	PIV	Infusion Order Consumer	PCD-03	Receive	Communicate Infusion Order
			HL7	IHE PCD	ACM	Alert Reporter	PCD-04	Send	Report Alert

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
MedAllies	MedAllies HISP v.3.4	HISP	ebXML	IHE ITI	XDR	Document Source	ITI-41	Send	Provide and Register Document Set-b
			ebXML	IHE ITI	XDR	Metadata-Limited Document Source	ITI-41	Send	Provide and Register Document Set-b
			ebXML	IHE ITI	XDR	Portable Media Creator	ITI-32	Send and Receive	Distribute Document Set on Media
Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
NetSmart	CareConnect /myAvatar	Interface Engine/EHR	DIRECT	IHE PCC	Direct/360X			Receive	Receive 360X Closed loop referral, send

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description	
									acknowledgement for acceptance and completion	
Qvera	Qvera Interface Engine (QIE)	Interface Engine / Integration Engine	HL7, CDA, PnR	IHE PCC	360x	Referral Recipient	PCC-55 Referral Request	Receive	Receive 360x Closed Loop Referral Request	
			HL7, PnR	IHE PCC	360x	Referral Recipient	PCC-56 Referral Decline	Send	Send 360x Closed Loop Referral Decline	

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
Masimo	Patient SafetyNet with Replica	Alarm Management	HL-7 2.X	IHE PCD	ACM	AM	PCD-06	Receive	Manage alarms from Masimo Device and 3rd Party infusion pump
			HL-7 2.X	IHE PCD	DEC	DOC	PCD-01	Receive	Data from 3rd party infusion pump
			HL-7 2.X	IHE PCD	DEC	DOR	PCD-01	Send	Report data from Masimo and 3rd party devices to EMR