

Use Case Title: Leveraging Carequality and 360X transitions

Short Description: 21st Century state of the art healthcare delivery for complex patients across multiple settings must include the interoperability modality best suited to each specific patient use case. The scenario for this patient exhibits care optimization through the support of multi-modality protocols, technology and standards. The patient's enhanced care trajectory demonstrates: A multitude of Carequality query and push use cases including actual image exchange; ONC sponsored IHE 360X enabled care transitions; Condition of Participation (CoP) alerting; as well as the patient performing a Carequality individual access query to collect her records using an app that will empower her to make optimal treatment decisions. The standards used and demonstrated include C-CDA, HL7, Direct, Carequality exchange (including IHE-based Query, FHIR, Electronic Case Reporting, *Diagnostic Image Exchange, and notifications). Our patient Carla Cabral, with a remote history of breast cancer, has new onset concerning symptoms. She wants to get her tests and be seen by the necessary specialists as soon as possible to ensure that she literally does not die waiting. 360X facilitates her doctors' direct communication with each other and rapidly moves along the closed loop referral process. The ability for her doctors to be able to perform Carequality queries for her old and new results, including the exchange of her images, required for treatment prevents any delays in her care. Carla wants to retain and be in charge of all of her health information. She uses an application specifically designed for cancer patients such as herself. When she discovers that she has metastatic breast cancer to her brain she wants to know all of her treatment options, including those that her doctors are recommending, but also the clinical trials that might be open to her. Her app helps Carla feel in control of her treatment and make the decisions that are most appropriate for her.

Value Statement: Interoperability facilitates Carla's efficient care process for her cancer recurrence. Carequality queries optimize her providers' receipt of her results and images while empowering her ability to make health decisions. 360X expedites her referrals.

Participating Organizations: Carequality, CVS Health, EClinicalWorks, Epic, Invitae, MedAllies, MEDITECH, Nuance

Scenario	Vendor	Products	Standards
<p>Introduction</p> <p>This demo will illustrate Interoperability Networks and how they work. You will see that clinicians using an edge system, such as an EHR, that is connected to a Network can send and receive messages even from organizations connected to disparate Networks as long as the networks are within the same Governance Framework.</p> <p>Networks are governed by frameworks such as The Carequality Framework which guides Carequality Implementers, and DirectTrust™ which regulates companies that have Direct Networks, also called Health Information Service Providers or HISPs. Some companies, such as MedAllies, offer both Carequality and Direct Networks to their customers. Direct Networks are a push model, whereas Carequality started as a query, or pull, model, but has</p>	MedAllies	N/A	N/A

<p>expanded to include push use cases. During the demo watch for both. Carequality push use cases include sending public health information to a public health registry and a cancer registry. Query or pull use cases include clinicians querying for vital patient information required to efficiently care for the patient. You'll also see in this demo Carequality based image exchange.</p> <p>The Carequality Framework serves as the model for the coming QHINs.</p> <p>The primary goals of 360X are to enhance communication across care transitions improving the quality and efficiency of care, decreasing provider and staff workload, documentation burden, reducing or eliminating transcription errors and decreasing costs by eliminating unnecessary duplicate testing.</p> <p>Carla is a 54-year-old single Caucasian female with a history of breast cancer first diagnosed 4 years ago. She was treated with lumpectomy and radiation and has been cancer free since her treatment was completed. She has no additional medical problems. Carla uses an app to track all of her medical records.</p> <p>She has received four doses of COVID-19 vaccination, but recently began feeling ill following a vacation trip to Europe. Carla has been coughing, feeling congested for the last few days and most significantly is concerned with recent onset severe headaches and nausea which she began experiencing prior to the other symptoms, but she is not sure exactly when. Carla scheduled a visit with her PCP.</p>			
<p>Carla has booked her appointment with her PCP, Dr. Mark Spencer. Dr. Spencer has his system set up to query CVS for Carla's data a day before the appointment so his staff can check for any missing data and so he can be better prepared going into his visits.</p> <p>Now, I pass over to CVS to further demonstrate Carla's immunization history.</p>	eCW		
<p>As part of this demo we're excited to announce an emerging use case for Carequality. CVS Health will soon be live as a Carequality Responder and will be sharing our community pharmacy immunization data to any active Carequality participant in response to queries with a purpose of use of Treatment, Payment or Operations.</p> <p>Our patient, Carla, regularly goes to her local CVS Pharmacies to stay up to date on her immunizations. Specifically over the past two years she has received her initial COVID vaccination, three COVID boosters and her annual Flu shot from three separate CVS Health Pharmacies.</p>	CVS	N/A	FHIR CDA IHE

<p>Historically providers such as PCPs, have not had access to their patient’s pharmacy immunization data. But at CVS Health we are ready to change that by making immunization history data available from our 9,000 pharmacy locations across the county.</p> <p>We are aggregating all our patient’s clinical data into a secure, rigorously governed, FHIR native data repository. This enables us to now share a consolidated view of standardized pharmacy data, such as immunizations delivered by CVS Health pharmacists, to any active Carequality participant. With this easy access to CVS Health Pharmacy data providers will be able to view a more complete history of their patients to help address gaps, ensure comprehensive care and inform care plans.</p> <p>When Dr. Spencer sends the pre-visit query to CVS we first try to match Carla’s demographics to our patient records. If a match is found, we retrieve information about all the immunizations she has received at any CVS Pharmacy location. We then consolidate that immunization history into a Continuity of Care Document that’s sent directly to the Dr. Spencer’s Electronic Health Record (EHR) for review and to support Carla's ongoing care.</p>			
<p>As we can see here in the Right Chart Panel also known as Interactive Clinical Wizard, Carla has already had 4 COVID-19 vaccinations and her FLU vaccine for 2022 and 2023 as sent over by CVS.</p>	eCW		
<p>Carla Arrives at the PCP Office</p>			
<p>When Carla arrives for her visit, she complains of Covid-19 symptoms so she is tested for Covid-19. The test comes back positive. By documenting this result in the note, this data will be automatically shared through Electronic Case Reporting to the participating public health agencies. Dr. Spencer orders a course of Paxlovid to treat her Covid.</p> <p>During her appointment, Carla is also complaining of persistent headaches and nausea, which she believes began a few weeks before her covid symptoms. Dr. Spencer would like to get this checked out further given her history of cancer, so he orders a Brain MRI and lets Carla know that she can follow-up pending her results.</p> <p>Now, I pass over to Ted from Meditech.</p>	eCW		
<p>Carla goes to a local Meditech hospital to get her MRI. Once the brain scan is performed, the radiologist reviews it and finds a brain lesion consistent with metastatic cancer.</p> <p>The Radiologist enters these findings into the PACS system at the hospital, which transmits the results to the MEDITECH Expanse EHR. Carla’s visit is completed, and a CDA document including the findings is made available for review for Carla’s care team, including her Primary Care Physician. The MRI image is also made available for sharing in the PACS system.</p> <p>An HL7 v2 message including the MRI report is transmitted to the PCP.</p>	MEDITECH	Expanse	HL7 v2 CDA

Dr. Spencer receives the report from the Brain MRI that he ordered and sees that the test found a brain lesion consistent with cancer. He utilizes 360X to send two referrals – 1 to Oncology and 1 to Neurosurgery for a brain biopsy. Now I pass over to MedAllies.	eCW		
This is an example of how clinicians using different networks will still receive the information required. In this case the PCP uses the eCW Direct Network to send the 360X referral request. This is then delivered to the MedAllies Direct Network which transmits the referral to both the Oncologist and Neurosurgeon who are using the Epic and the MedAllies Direct Network. Perfectly illustrating how networks work, no matter the entry point the edge system (EHR) uses you get to the correct edge endpoint EHR	MedAllies	MedAllies Direct Solutions	Direct Secure Messaging via the Direct Standard®
Thanks Dr. Miller, Jack Hathway from Epic here. I will be taking you through Carla's journey with her Oncology Specialist. <ul style="list-style-type: none"> ● First stop is with the front desk staff at the Oncology office. <ul style="list-style-type: none"> ○ Thanks to the 360x standard we are able to use the discrete referral information to automatically generate a referral in the system and have it quickly triaged to the oncology staff for evaluation. They are able to review the clinical data that has been sent across from our eCW friends to determine that we can take Carla on as a patient and accepts the referral. ○ This triggers a ticket to be created and sent to Carla's MyChart so she can schedule the appointment with her Oncologist. ○ Pass back to Holly with Medallies. 	Epic		360X
The "Accept" response from Epic travels across the MedAllies Direct Network to the eCW DirectNetwork to eCW	MedAllies	MedAllies Direct Solutions	Direct Secure Messaging via the Direct Standard®
Utilizing 360X technology, we have received the "Accept" status from EPIC system which traveled over the MedAllies direct network and is visible here on our Referral screen in eCW. The Referral coordinator views the Accept status and schedules the follow up visit with Carla. Now, we pass it back to MedAllies.	eCW		
The Neurosurgeon's staff receive and accept the referral, Thanks to 360X the staff is able to rapidly schedule the appointment and the neurosurgeon rapidly schedules and performs the brain biopsy at the Meditech Hospital.(Talk to only). Once the biopsy is completed and the pathology has been read, the neurosurgeon sends back the consult C-CDA per 360X protocol back to the eCW PCP who made the referral and this closes the 360X loop.	MedAllies	MedAllies Direct Solutions	Direct Secure Messaging via the Direct Standard®

<p>Carla undergoes a Brain Biopsy at the MEDITECH Hospital. The biopsy shows conclusively that Carla’s breast cancer has metastasized and spread to her brain.</p> <p>The biopsy report is finalized and made available for retrieval as part of a CDA document. Retrieval can be accomplished using the Carequality framework, ensuring that Carla’s entire care team is able to review the biopsy results.</p>	MEDITECH	Expense	CDA Discharge Summary FHIR DocReference
<p>Carla arrives at Oncology Office</p>			
<p>Thanks Ted, with the comprehensive clinical document we got from the initial referral through 360x we only need the Biopsy report. As Ted said, we are able to pull that data through the Carequality connection in background so that the information is ready for the clinicians when Carla arrives.</p> <ul style="list-style-type: none"> First the nurse is in with Carla and is able to reconcile the new problems, medications, and allergies that came through from the 360x document. 	Epic		360X
<p>Dr. Allen then reviews the Biopsy and MRI report but feels that she wants to view the full MRI itself in order to make a proper treatment plan. We are going to pass this over to Jill at Nuance to show how she is able to get access to the MRI.</p>	Epic		IHE XCPD, IHE XCA
<p>Dr. Allen then queries MEDITECH hospital for the Brain Scan image</p>	Nuance		
<p>Oncology office uses Nuance Powershare, which queries the MEDITECH hospital PACS to retrieve the image into the oncology system</p>	Nuance	PowerShare	DICOM
<p>Then back in Epic Dr. Allen is able to talk with Carla and work through the various treatment options available including the possibility of Gamma Knife.</p> <ul style="list-style-type: none"> Carla tells Dr Allen that she would like some time to think over her options and that she also wants to consult her Citizen App from Ivitae. Carla arranges an appointment with Dr. Allen for the following week. At the close of this encounter the system automatically sends the consult message back to the PCP at eCW to make them aware of what was discussed and make them aware of the upcoming follow-up. Back to Garry at Meditech to continue the patient's journey. 	Epic		
<p>The next day, Carla experiences a seizure and is rushed to the hospital. There she is stabilized using medications including Dilantin and a corticosteroid and is subsequently discharged. A discharge notification is sent to her Oncologist and PCP.</p> <p>The care team must be made aware when patients under their care are hospitalized. In this case, electronic discharge notifications using the DirectTrust™ framework are sent out to Carla’s PCP and Oncologist. These notifications allow a patient’s care team to improve care coordination and schedule follow up care efficiently. They include the facility</p>	MEDITECH		Direct messaging ADT Notifications using DirectTrust

where care was provided, the date of discharge, and information about the care team involved, as well as any recorded diagnoses.			
<p>CoP discharge notification to the Oncologist travels from MEDITECH over the MedAllies Direct Network to Epic. This is an example of two different EHR edge systems using the same Network.</p> <p>CoP discharge alert to PCP travels from MEDITECH over the MedAllies Direct Network to the eCW Direct Network to eCW. Another example of critical information from one edge system across two Networks to arrive at the destination EHR.</p>	MedAllies	MedAllies Direct Solutions	<p>Event Notifications via the Direct Standard®</p> <p>Direct Secure Messaging via the Direct Standard®</p>
<p>This is another place where standards shine. Thanks to the discrete information that accompanies the message the system is able to identify that this is an Inpatient discharge notification for a patient Dr. Allen is actively working with.</p> <ul style="list-style-type: none"> • The hospital is then able to create a routing framework to route the message to the provider directly while allowing most of the other messages to be worked by other clinical staff and allow Dr. Allen to focus on her patients. • The provider is then able to review the notification, pull the clinical data through Carequality and use that to inform the upcoming follow-up. • We are going to pass this back to Malik/Mansi at eCW for what the PCP sees for the discharge. 	Epic		Event Notifications via the Direct Standard®
<p>shows the receipt of discharge alert</p> <p>Dr. Spencer receives the Discharge notification. As the seizure is related to the patient’s brain tumor the PCP knows that the oncologist will be following up with the patient and anticipates receiving another 360X consult note from the oncologist once Dr. Allen has seen her.</p> <p>Now, I will pass over to Invitae.</p>	eCW		
Patient App			
<p>Patient uses her Invitae app to perform an IAS query once home to explore treatment options and clinical trials</p> <p>“We are now going to travel with Carla back home after her most recent care episode. Due to her previous cancer diagnosis she joined the Ciitizen Patient Network. The Ciitizen Platform by Invitae is a free personal health app for any patient, and has additional advanced services for patients with cancer and rare neurological disorders.</p> <p>This is an example of the additional categorization and refinement of Carla’s clinical data. Drilling down we can see that the pertinent details are extracted from her data to make these easier for partners to search.</p>	Invitae	Ciitizen, Cures Gateway	IHE XCPD, XCA

Carla wants to request this new data from her providers. She navigates to Manage where she can initiate an IAS, or individual access services, query. This query is supported through the MedAllies Gateway. I will let Dr. Miller describe what happens in the background.”			
MedAllies operates both a Direct network and a Carequality Enabled Network. In this transition the Query message from Invitae goes across the MedAllies Carequality Enabled Network to another Carequality network in the Carequality Framework to Meditech and eCW. eCW and MEDITECH respond to the query across another Carequality network in the Carequality Framework to the Medallies Carequality Enabled Network and onto Invitae.	MedAllies	Carequality Enabled Network	IHE XCPD, XCA
Patient will look at the information in the app and review the clinical trial she is eligible for “Unbeknownst to Carla, her request went to MedAllies and CareQuality to reach her providers and back, all in near real-time. After the new documents have been received and added into Carla’s record, her data goes through Invitae’s machine learning, AI and natural language processing functions, and then reviewed by human clinicians. The data is enhanced to research grade and then based on her consent is exposed to researchers and principal investigators for eligibility to clinical trials or new treatments. Now Carla will be prepared to discuss treatment options and clinical trials at her next oncology appointment.”	Invitae	Ciitizen, Cures Gateway	IHE XCPD, XCA

Data Exchange Standards:

Vendor	Product	Category	Protocol	Interop Body	Interop Profile	Interop Actor	Interop Message	Send or Receive	Transaction Description
MEDITECH	Expanse EHR	Electronic Health Record	HL7 v2	HL7	v2	Lab Result Provider	ORU Lab Result	Send	Send Lab Results
			Direct	DirectTrust	Discharge Notifications	Notification Provider	Direct Message	Send	Discharge Notification
			FHIR	HL7	Document Reference	Document Query Responder	Document Reference	Send	Query Response for Documents
Epic	EpicCare	Electronic Health Record	HL7 V3	IHE ITI	XCPD	Initiating Gateway	ITI-55	Receive	Cross Community Patient Gateway
			ebRIM HL7 CDA	IHE ITI	XCA	Initiating Gateway	ITI-38 ITI-39	Receive	Cross Gateway Query Cross Gateway Retrieve

			HL7 v2 HL7 CDA	IHE PCC	360X	Referral Recipient	PCC-55 PCC-57	Receive	Referral Request Referral Outcome
MedAllies	Carequality Enabled Network Services	Pull Network	HL7 V3	IHE ITI	XCPD	Initiating Gateway	ITI-55	Receive	Cross Community Patient Gateway
			HL7	IHE ITI	XCA	Initiating Gateway	ITI-38	Receive	Cross Gateway Query
			HL7	IHE ITI	XCA	Initiating Gateway	ITI-39	Receive	Cross Gateway Retrieve
	MedAllies Direct Solutions	HISP	SOAP	IHE	XDR/XDM	Transport	XD/XDM	Send/Rec eive	Direct Secure Messages sent or received to a connected Edge System
			Direct	DirectTru st	SMIME/SMTP	Transport	Direct	Send/Rec eive	Direct Secure Messages sent or received to a connected Edge System
Invitae	Ciitizen/ Cures Gateway	Personal Health Application/ Interoperability Gateway	HL7	IHE ITI	XCPD	Initiating Gateway	ITI-55	Send	Patient Discovery
			HL7	IHE ITI	XCPD	Initiating Gateway	ITI-55	Receive	PD Response
			HL7	IHE ITI	XCA	Initiating Gateway	ITI-38	Send	Cross Gateway Query
			HL7	IHE ITI	XCA	Initiating Gateway	ITI-38	Receive	CGQ Response
			HL7	IHE ITI	XCA	Initiating Gateway	ITI-39	Send	Cross Gateway Retrieve
			HL7	IHE ITI	XCA	Initiating Gateway	ITI-39	Receive	CGR Response
Nuance	PowerShare Network	Medical Images	DICOM				DICOM C-FIND/ DICOM C-MOVE	Receive	Query/Retrieve DICOM Images

References:

