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Phase III

PRINCIPAL INVESTIGATOR:

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CONTRACTING ORGANIZATION:

Conemaugh Valley Memorial Hospital

Johnstown, PA 15905

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14. ABSTRACT

The MIDHT project continues to implement and research health information technologies (HIT) within the Conemaugh Health System, located in Southwestern Pennsylvania. Core technologies under investigation include pharmacy robotics, bar code medication administration (BCMA) and health information exchange via the Nationwide Health Information Network (NwHIN). Statement of work is being delivered as expected.

Significant progress has been made on both arms of the project. Bar code medication administration is widely deployed throughout Conemaugh Memorial Medical Center (CMMC) and Meyersdale Medical Center. Research activities are progressing as planned, including a strong nursing survey sample size. CMMC is participating in the 14th Virtual Lifetime Electronic Record pilot nationwide. Milestones have included expansion of C62 data content, identification of shared patients with VA and preparation for a mass mailing campaign.

15. SUBJECT TERMS

Bar Code Medication Administration   Patient Safety   Pharmacy Automation
Health Information Exchange   Virtual Lifetime Electronic Record

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Introduction

The Military Interoperable Digital Hospital Testbed (MIDHT) is a five-year program of research to develop a real-world testbed environment in Southwestern Pennsylvania. The purpose is to research and evaluate Health Information Exchange (HIE) and health information technology (HIT) and services (HITS) that make health information readily available to consumers and providers. Ideally this will allow for the secure transfer of information between private sector rural providers, federal partners and patients. MIDHT will also define requirements and solutions to optimize healthcare resources for rural communities and identify lessons learned and best practices that benefit both the global MHS environment and stakeholders in the region. The Department of Defense (DoD) and Conemaugh Memorial Medical Center (CMMC) have common requirements for HIE, connecting disparate systems and providers and enabling secure provider-provider and provider-consumer e-communications. Minimal evidence is available on what business, clinical and technical solutions can be used to overcome the lack of specialists, infrastructure and geographical barriers associated with the delivery of care in rural communities.

Arm 1. The Impact of Medication Dispensing/Administration Technology Within a Rural Healthcare System.

In order to improve efficiency and safety of medication dispensing and administration within an inpatient hospital setting, a complementary set of health information technologies have been implemented. A centrally managed pharmacy robotics system implemented in 2011 now works in conjunction with bar coded medications administered at the bed side on all units at CMMC and Meyersdale Medical Center (MYMC). Research objectives focus on medication errors, provider workflow, provider satisfaction and related financial data.

Arm 2. Health Information Exchange (HIE) via the Nationwide Health Information Network (NwHIN).

Building upon work completed the previous year, CMMC continued efforts on health information exchange using the NwHIN standards and specifications. CMMC formally joined the "NwHIN Exchange" as a production participant in January 2012. Various activities have occurred with the Department of Veterans Affairs (VA), including CMMC's participation in the 14th VLER pilot in the nation with the James E. Van Zandt VA Medical Center.   Important project milestones have included conversion to and validation of production data, integration of system-wide inpatient discharge summaries and radiology reports in HITSP C62 format, identification of shared patients with the VA and training of five CMMC primary care practices (pilot).

Re-budget and No-Cost Extension

CMMC submitted a re-budget to USAMRMC and TATRC representatives because of a new indirect rate calculation being used for subcontracting expenses. The re-budget (dated 3/29/12) was approved by modification on 4/11/12. The modification also included a no-cost extension of the period of performance through 10/27/13.

Body

Subtask 1.1 Implement pharmacy robotic technology and bar-coded enabled medication administration (BCMA) in an acute hospital system setting.

Bar Code Medication Administration Implementation

October – December 2011

This quarter was very productive as many units went live at CMMC. Devices (Rubbermaid carts, wireless scanners) were deployed to nursing units according to the live roll-out schedule below. End user classroom AdminRx training was provided frequently for nursing units. IT staff and nursing Super Users provided 24x7 LIVE support to nursing units as needed.

Roll-out Schedule

October
Ashman 8th, 9th and 10th floors
Rose 8th, 9th and 10th floors
Main 7, Pediatrics and Women Services

November
Good Sam 4th, 5th and 6th floors
Behavioral Medicine Good Sam 7th floor

December
Geropsych Good Sam 8th floor
Aloysia Hall Good Sam 8th floor
E Building 4th and 6th floors

January – March 2012

Deployment continued at CMMC to finish remaining units, including On-site support through 1/30/12.

Roll-out Schedule

January

Crichton Center
Intensive Care Unit Ashman 6
Intensive Care Unit Rose 6

BCMA adoption rate for January was 88% of total medications administered for inpatients at CMMC. Adoption rate is defined as the number of medication administrations where all aspects were completed via bar-coding (wristband check, medication barcode, wristband verification) divided by the total number of medication administrations for the same period. All inpatient units at CMMC were live as of the end of January.

Pharmacy and IT staff began meetings with MYMC regarding Admin Rx implementation at their facility. McKesson Domain Expertise Group performed the Post-Live Optimization Assessment at CMMC. MYMC build and planning continued, including device assessment and purchasing. BCMA adoption rate for February was 87% of total medications administered for inpatients at CMMC.

The Post-live optimization assessment was shared with Clinical Steering Committee. Nursing, Patient Access, Health Information Systems, and IT discussed the need for bar-code labels to be printed on nursing units to facilitate BCMA. Testing of build for MYMC facility and staff training were started. BCMA adoption rate for March was 86% of total medications administered for inpatients at CMMC.

April – June 2012:

MYMC went live with BCMA on 4/17/12 as planned and achieved a closed-loop BCMA adoption rate of 95% in the first month. This rate was higher than any department at CMMC at the current time.

Completed Ashman 6 Nurse Station patient ID label printer Pilot in late April and began full deployment in May. All but two of CMMC's 22 Nurse Station locations were equipped with ID label printers as of 6/30/12.

Project team identified placement location for second MedCarousel cabinet in Pharmacy. Configuration was finalized and facility drawings were drafted. As was required for the initial Pharmacy robotics installation, the facility changes required to support the second MedCarousel will require Pennsylvania Dept. of Health approval before work can begin. Successfully implemented the v10.3 version upgrade of AdminRX (BCMA) application and associated Care Organizer application on 6/26/12.

IT staff collaborated with the Respiratory Department in an effort to address staff complaints regarding difficulty pushing the Rubbermaid medication carts. In contrast to Nursing, Respiratory's workflow requires them to move the carts longer distances and also onto elevators. Beginning May 7th, a differently configured cart consisting of a lithium battery and larger cart wheels was put into Pilot use.

Closed-loop BCMA adoption rate at CMMC increased to 88% in June. This was the highest monthly percentage since BCMA was deployed at the stated time. There are numerous variables affecting the adoption rate, including the deployed nurse station label printers.

July – September 2012:

The organization increased the CMMC BCMA adoption rate to 96% for September 2012 from 88% in June and 86% in March as shown in Appendix A. The significant improvement was achieved primarily by providing nurse managers with staff-specific performance reports. Nurse Managers used these reports to work with staff whose rates were low to determine the reasons and address them. MYMC maintained their BCMA adoption rate at a consistent 94% – 96% range through September.

CMMC contracted with McKesson on 9/26/12 for the second MedCarousel dispensing system. As with the first MedCarousel, reinforcement of the floor to handle the weight is required in advance of any work. Target for delivery and installation is first quarter 2013.

CMMC purchased and installed wristband label printers for each inpatient unit. With these printers in place, Nursing can now locally print replacement bar-code wristband labels when needed. Feedback from Nurse Managers has been very positive. The printers have been so popular with Nursing that we are also now using these same printers to print "form labels". Form labels provide improved legibility vs imprinting the forms with a physical ID card and Addressograph machine. CMMC contracted with McKesson for the Medication Safety Analytics application. Implementation will occur in late fall 2012.

IT staff worked with leadership of the School of Nursing on device needs for student nurses. There are some issues still unresolved before the additional medication carts can be purchased. The open issues are locations to house the carts when not in use by the students and whether or not these carts are to be reserved for the exclusive use by students. Cart storage is a significant issue at CMMC where nurse stations are already overly congested. In addition, we are under constant pressure from the State of Pennsylvania to keep hallways clear. We expect to have the plan fully detailed during the next quarter.

Joe Dado met with Terri Gritzer, the new Memorial Pharmacy Director (Paul Troiano resigned as Director in June), to review the MIDHT project. Terri had previously served as Manager of Pharmacy Operations and was already very familiar with BCMA and automation initiatives.

BCMA implementation at Conemaugh Miners Medical Center (MIMC) is delayed.   System-wide formulary consolidation efforts are required before BCMA can be implemented in a way that can be effectively supported. We do not anticipate this work to be completed until after 1/1/13.

Subtask 1.2 Research and analyze the resulting technological impact on medication errors, pharmacist productivity, nurse satisfaction/workflow and patient satisfaction.

Medication Errors

Monthly medication error data has been requested from the Risk Management department. The number of monthly medication doses has been requested from the Pharmacy department. This data will be used to calculate medication error rates from all three facilities.

Pharmacy Survey

An internally developed survey tool was distributed in December 2011 to all pharmacists and technicians at CMMC. The objective was to collect qualitative feedback from users of the pharmacy robotics system. Final sample size was 38, which is approximately 73% of pharmacy staff. Statistical analysis is pending, below are a few key questions with associated descriptive results:

From your perspective, the McKesson Robot-RX® system has increased filling accuracy.

Response	Percentage
Strongly Agree	5.3 %
Agree	34.2 %
Neutral	28.9 %
Disagree	21.1 %
Strongly Disagree	10.5 %
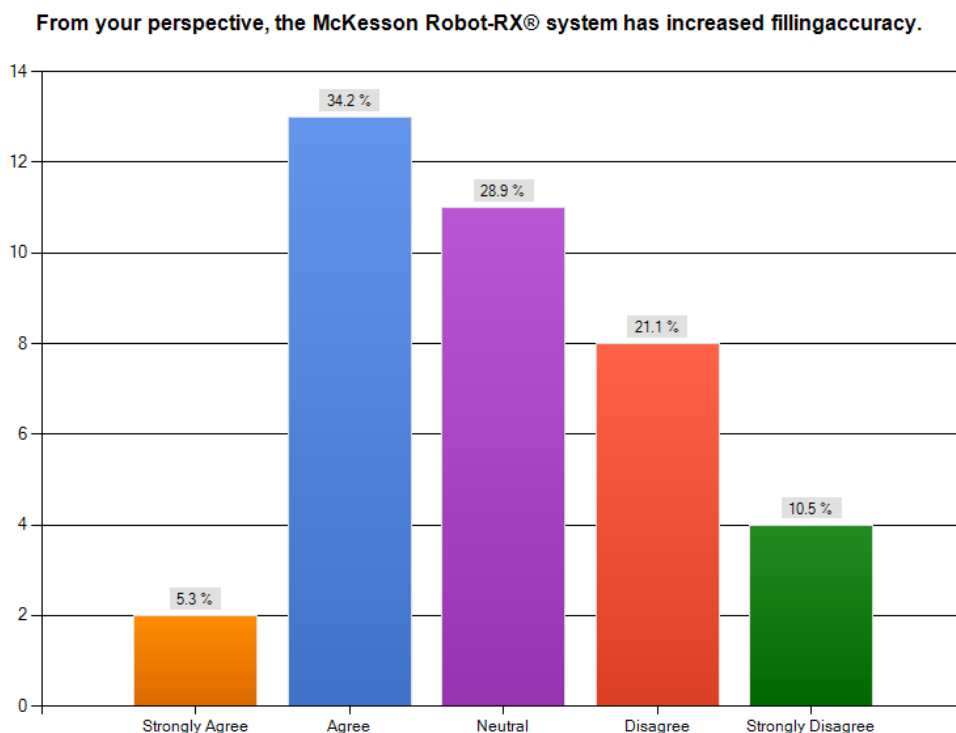
From your perspective, the McKesson Robot-RX® system has significantly reduced the amount of checking time needed and medications are delivered to the floor quicker.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5.3 %	7.9 %	34.2 %	52.6 %
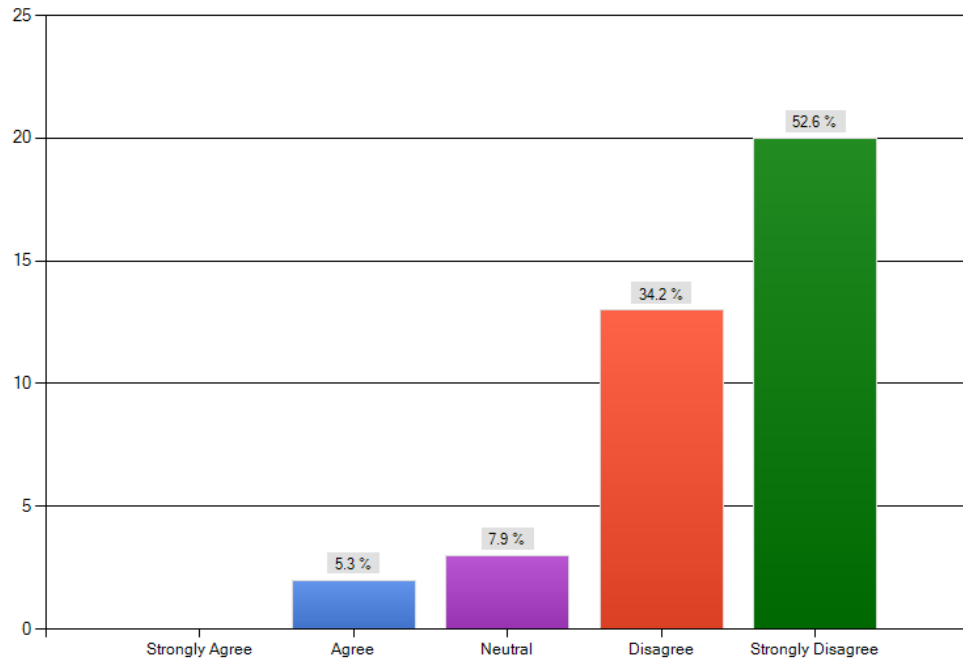
From your perspective, the McKesson Robot-RX® system has improved patient safety through a reduction in "near misses" and reportable medication errors.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		13.2 %	23.7 %	39.5 %	23.7 %
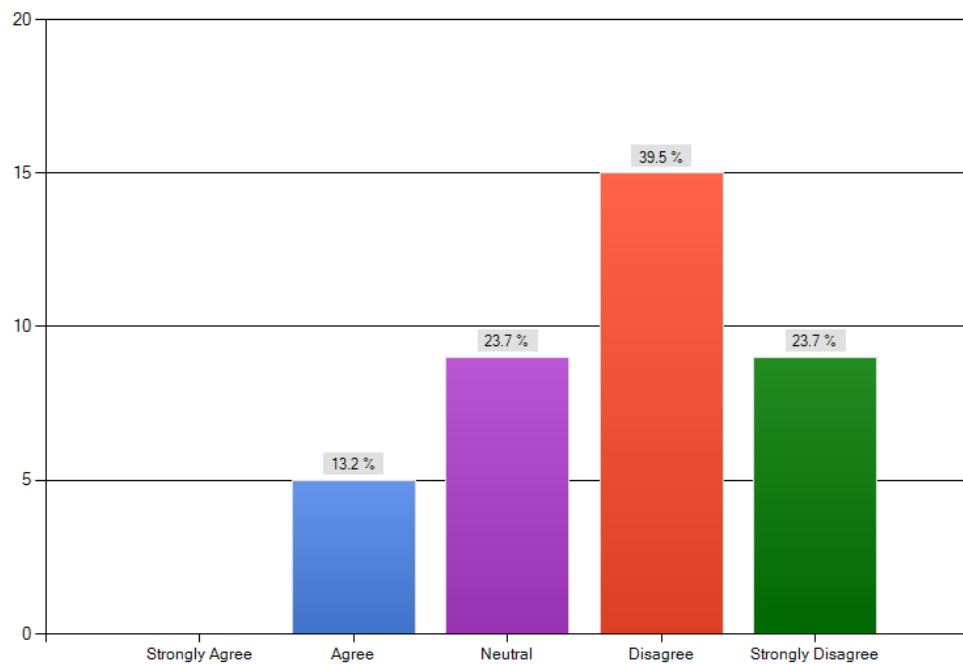
Nursing Survey

The POST Medication Administration System Survey – Nurses' Assessment Survey was made available to all inpatient nursing and related staff at CMMC in early March 2012. A token incentive was available to staff for properly completed surveys. Communication methods included an article in the employee newsletter, direct communications with nursing managers and placement of the survey link on the CMMC intranet page. The objective was to obtain qualitative feedback from BCMA users using a validated survey instrument (n=344). Survey distribution (POST) at MYMC was completed in July 2012 (n=28. A second POST distribution for CMMC began in September 2012 (n=277). The survey will close in early October. Baseline survey collection at MIMC occurred in January 2012 (n= 14). The second POST distribution at MYMC will likely occur in January 2013.

Interim Statistical analyses for all three CMMC survey data sets (PRE, POST 1, POST 2) are as follow:

Q30: Overall, how satisfied are you with the current medication administration system?
Q26: I am more satisfied with this new medication administration system than with the previous one.

Taken together, Q30 and Q26, provide an overall picture of the satisfaction of medication administration users. An ANOVA over the three time periods for Q30 yields a significant omnibus (between groups) p-value, 0.001. The mean satisfaction decreases from Baseline to Post 1 and slightly increases for Post 2. Pairwise analysis yields significant difference between Baseline and Post 1 (p-value, 0.001) and Post 2 (p-value, 0.011) with no significance between post time periods. The mean satisfaction hovers under a value of 5, neither satisfied nor dissatisfied. The change in satisfaction is depicted visually in the following graph.

Q30: Overall, how satisfied are you with the current medication administration system?

Q30 Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Baseline	218	5.66	1.983	.134	5.40	5.93	1	10
Post 1	285	4.98	2.310	.137	4.71	5.24	1	10
Post 2	236	5.08	2.243	.146	4.80	5.37	1	10
Total	739	5.21	2.213	.081	5.05	5.37	1	10

NOTE: 1 = Completely Dissatisfied <> 5 = neither <> 10 = Completely Satisfied
Homogeneity of Variance is not preserved between groups, Levene Statistic p-value = .039

Q30 Multiple Comparisons

Dependent Variable:Q30

Multiple Comparison Adjustment	(I) Time Period	(J) Time Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Games-Howell	Baseline	Post 1	.685*	.192	.001	.23	1.14
		Post 2	.576*	.198	.011	.11	1.04
	Post 1	Baseline	-.685*	.192	.001	-1.14	-.23
		Post 2	-.109	.200	.848	-.58	.36
	Post 2	Baseline	-.576*	.198	.011	-1.04	-.11
		Post 1	.109	.200	.848	-.36	.58

*. The mean difference is significant at the 0.05 level.

5 equals "neither satisfied nor dissatisfied"
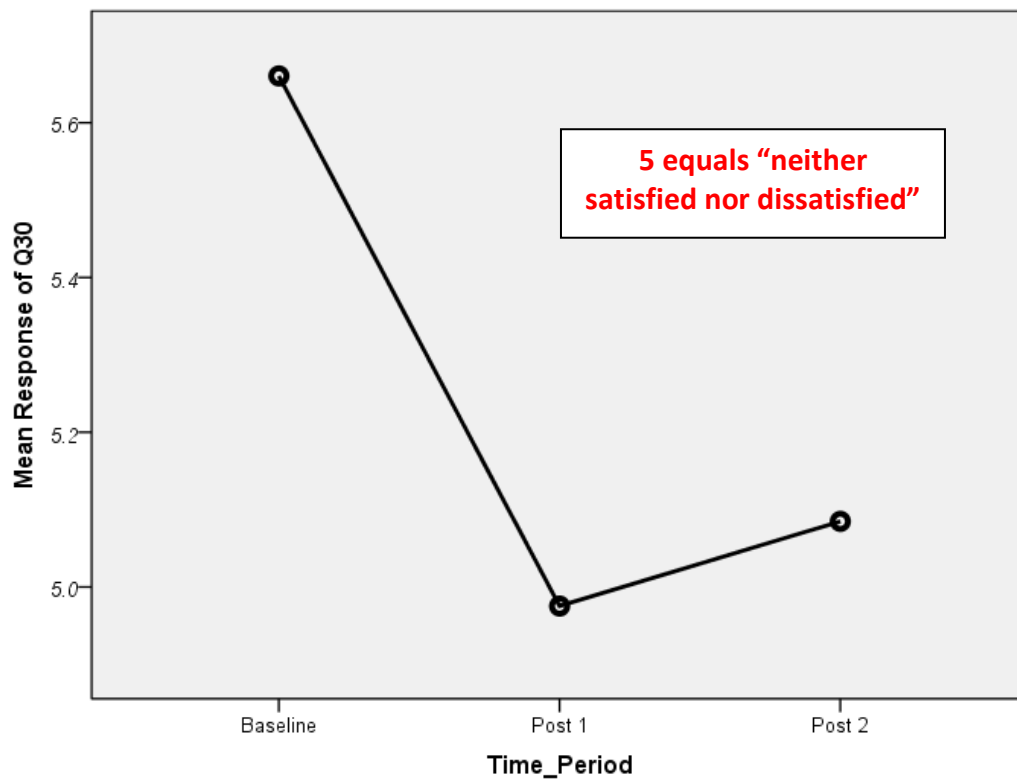
Q26: I am more satisfied with this new medication administration system, BCMA, than with the previous one.

Q26 Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Notes
					Lower Bound	Upper Bound			
Post 1	288	3.66	1.613	.095	3.47	3.85	1	6	
Post 2	236	3.63	1.682	.110	3.41	3.84	1	6	
Total	**524**	**3.65**	1.643	.072	3.50	3.79	1	6	

a. Between-component variance is negative. It was replaced by 0.0 in computing this random effects measure.
b. Homogeneity of Variance preserved between Post 1 and 2

Since the ANOVA p-value, 0.821, is not statistically significant, Post 1 and Post 2 can be treated collectively for Q26. The mean score of Q26 is consistent with the results of Q30 in that the respondents do not favor the new BCMA system over the original system.

Although the respondents do not favor BCMA over the original system, they do consider BCMA to be safer as indicated by the mean value of Q24, 2.63, between moderately and slightly agree.

Q24: This is a safer system for patients.

Q24 Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Notes
					Lower Bound	Upper Bound			
Post 1	287	2.67	1.486	.088	2.50	2.85	1	6	
Post 2	237	2.59	1.512	.098	2.39	2.78	1	6	
Total	**524**	**2.63**	1.497	.065	2.51	2.76	1	6	

a. Between-component variance is negative. It was replaced by 0.0 in computing this random effects measure.
b. Homogeneity of Variance preserved between Post 1 and 2

Since the ANOVA p-value, 0.513, is not statistically significant, Post 1 and Post 2 can be treated collectively for Q24.

Questions 4, 5, 6, 7, 13, 15, and 18 can be interpreted as a response block which provides insight into the perception of the change-in medication reconciliation and safety.

Q04: Because of information available through the current medication administration system I know both the intended actions and side effects of medications I administer.
Q05: I find the drug alert feature (drug/drug or drug/food interaction) of the current medication administration system helpful.
Q06: The current medication administration system makes it easy to check active medication orders before administering medications.

Q07: The current medication administration system provides me with information to know that a medication order has been checked by a pharmacist before I administer the medication.

Q13: The current medication administration system makes it easy to check that I am following the "5 rights" when I administer medications.

Q15: The current medication administration system is effective in reducing and preventing medication errors.

Q18: Information available through the current medication administration system helps me to know what to do should my patient have any bad reactions from a medication.

Omnibus ANOVA p-values showed significance for Q04, Q06, Q07, and Q15. Homogeneity of variance was preserved for all questions except Q07.

Multiple pairwise comparisons by time period yield significant differences between Baseline and at least one Post period. Q04 shows improvement over baseline, while Q05, Q06, and Q15 display a decline.

Question	omnibus ANOVA (betweeen groups) p-value	MEAN Baseline	MEAN Post 1	MEAN Post 2
Q04	0.001	2.93	3.18	3.52
Q05	0.091	2.87	2.56	2.73
Q06	0.036	2.85	2.77	2.50
Q07	0	2.91	2.43	2.40
Q13	0.169	2.46	2.34	2.22
Q15	0.029	3.35	3.17	2.97
Q18	0.408	3.85	3.68	3.85
Valid N (listwise) >>>>>>>>>>>>>>>>>>		214	275	232

Multiple Comparisons							95% Confidence Interval	
Question (DV)	Multiple Comparison Adjustment	(I) Time Period	(J) Time Period	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Q04	Sidak	Baseline	Post 1	-0.252	0.153	0.268	-0.62	0.11
			Post 2	-.595*	0.16	0.001	-0.98	-0.21
		Post 1	Baseline	0.252	0.153	0.268	-0.11	0.62
			Post 2	-0.343	0.152	0.07	-0.71	0.02
		Post 2	Baseline	.595*	0.16	0.001	0.21	0.98
			Post 1	0.343	0.152	0.07	-0.02	0.71
Q06	Sidak	Baseline	Post 1	0.085	0.136	0.898	-0.24	0.41
			Post 2	.349*	0.142	0.042	0.01	0.69
		Post 1	Baseline	-0.085	0.136	0.898	-0.41	0.24
			Post 2	0.264	0.135	0.143	-0.06	0.59
		Post 2	Baseline	-.349*	0.142	0.042	-0.69	-0.01
			Post 1	-0.264	0.135	0.143	-0.59	0.06
Q07	Games-Howell	Baseline	Post 1	.476*	0.135	0.001	0.16	0.79
			Post 2	.506*	0.141	0.001	0.17	0.84
		Post 1	Baseline	-.476*	0.135	0.001	-0.79	-0.16
			Post 2	0.03	0.122	0.969	-0.26	0.32
		Post 2	Baseline	-.506*	0.141	0.001	-0.84	-0.17
			Post 1	-0.03	0.122	0.969	-0.32	0.26
Q15	Sidak	Baseline	Post 1	0.176	0.134	0.468	-0.15	0.5
			Post 2	.374*	0.14	0.024	0.04	0.71
		Post 1	Baseline	-0.176	0.134	0.468	-0.5	0.15
			Post 2	0.197	0.132	0.356	-0.12	0.51
		Post 2	Baseline	-.374*	0.14	0.024	-0.71	-0.04
			Post 1	-0.197	0.132	0.356	-0.51	0.12
*. The mean difference is significant at the 0.05 level.								

Plot of Means

Med Rec (Safety)

Q04, Q06, Q07, Q15
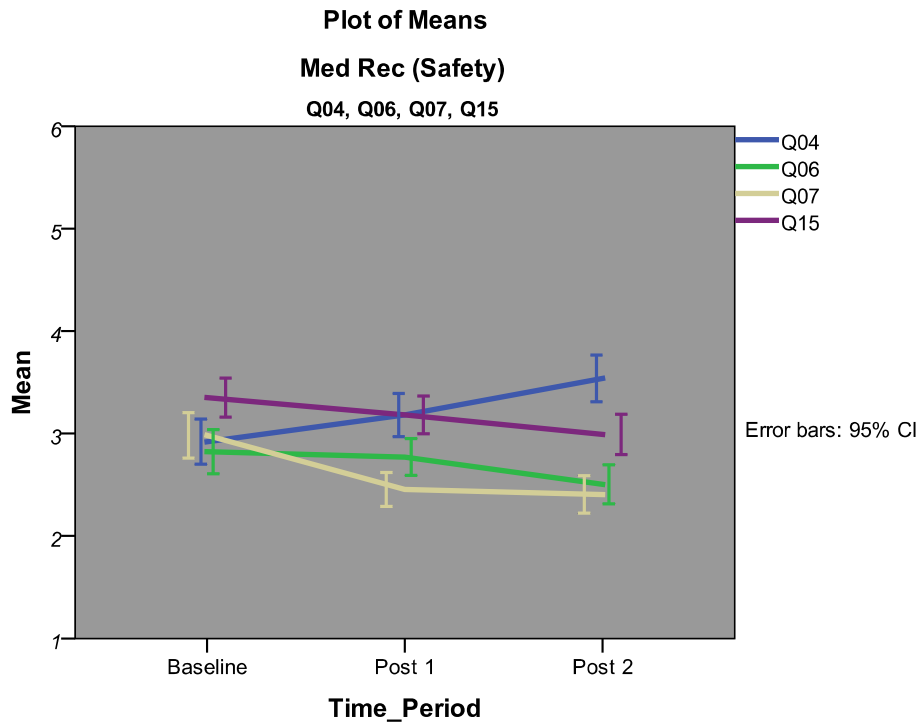
As a block, the questions asking solely about the BCMA system show a rather neutral mean response as depicted by the following chart. This is consistent with the results discussed early for overall satisfaction.

Plot of Means, post
BCMA ONLY questions
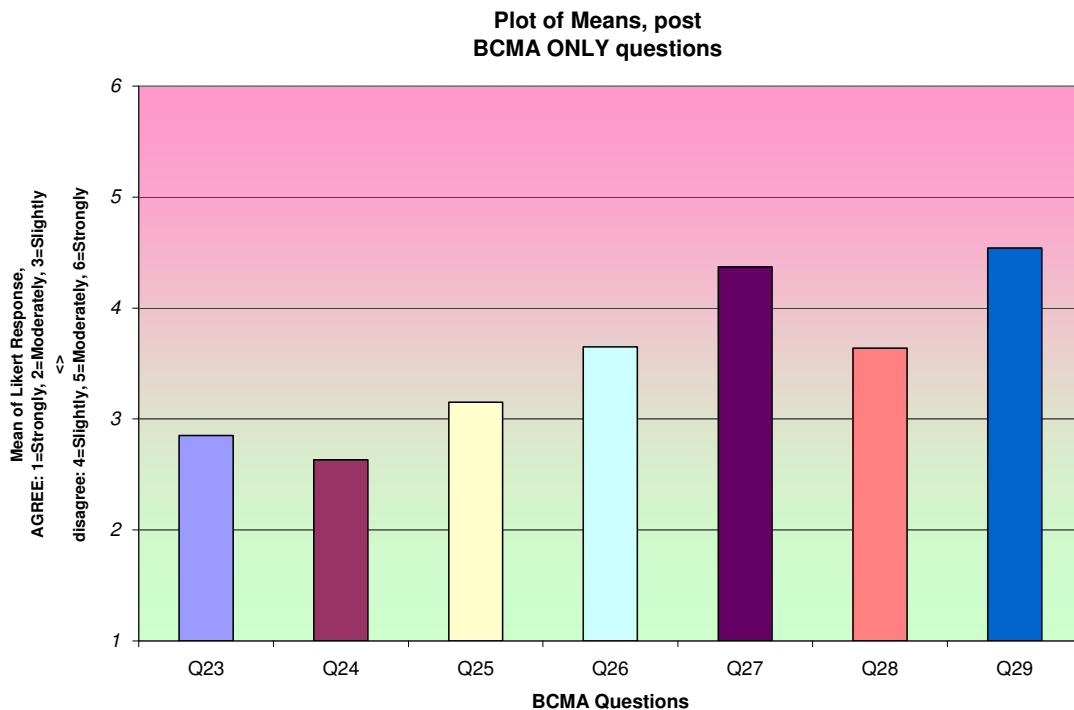
Q23: It is easier to do all the checking steps needed during the medication administration process.

Q24: This is a safer system for patients.

Q25: With the new system, it is easier to access information I need to administer medications.

Q26: I am more satisfied with this new medication administration system than with the previous one.

Q27: I have more time to spend with patients.

Q28: Barcode/eMAR has made the medication administration process more efficient for me.

Q29: Medications are more readily available when I need them for patients.

Nursing Workflow

Research staff shadowed Nursing staff on select inpatient units three months post BCMA implementation. The following data collection was completed and transferred from tablets to a secure server. A total of 27 four-hour observations were completed during the year. Statistical analysis of the PRE and POST data sets is pending.

| Date	Location
3/19/2012	M7
3/20/2012	
3/21/2012	
3/22/2012	
3/29/2012	
3/29/2012	
4/9/2012	GS 5
4/10/2012	
4/11/2012	
4/11/2012	
4/23/2012	
4/24/2012	
4/25/2012	
4/26/2012	
2/13/2012	Rose 10
2/14/2012	
2/15/2012	
2/16/2012	
3/5/2012	
3/7/2012	
3/7/2012	
3/8/2012	
1/26/2012	Ashman 9
1/27/2012	
1/30/2012	
1/31/2012	
8/8/2012	Meyersdale
5/17/2012	Miners

Pharmacy Workflow
The "Post" time and motion observations are pending until the second MedCarousel unit is deployed in the Pharmacy.

Physician eMAR Survey

A mass mailing was completed in the middle of May 2012 to all admitting physicians at CMMC to communicate a survey opportunity regarding the new eMAR module in Care Portal. The survey response to date has been low (n=9), additional strategies are under discussion in order to improve the response rate.

Subtask 2.1   Deploy a limited production, NHIN standards-based HIE focusing on the bi-directional exchange of electronic medical records between CHS and the Military Health System. CHS information to include data domains residing in acute care and ambulatory settings.

CMMC and Northrop Grumman Corporation (NGC) have worked closely together to design and implement a standards-based health information exchange (see Fig. 1) using the five core NwHIN specifications, which are patient discovery, document query, document retrieve, messaging and authorization. The two organizations are pleased to report a production ready health information exchange with the Department of Veterans Affairs as part of only the 14th Virtual Lifetime Electronic Record (VLER) pilot in the United States.
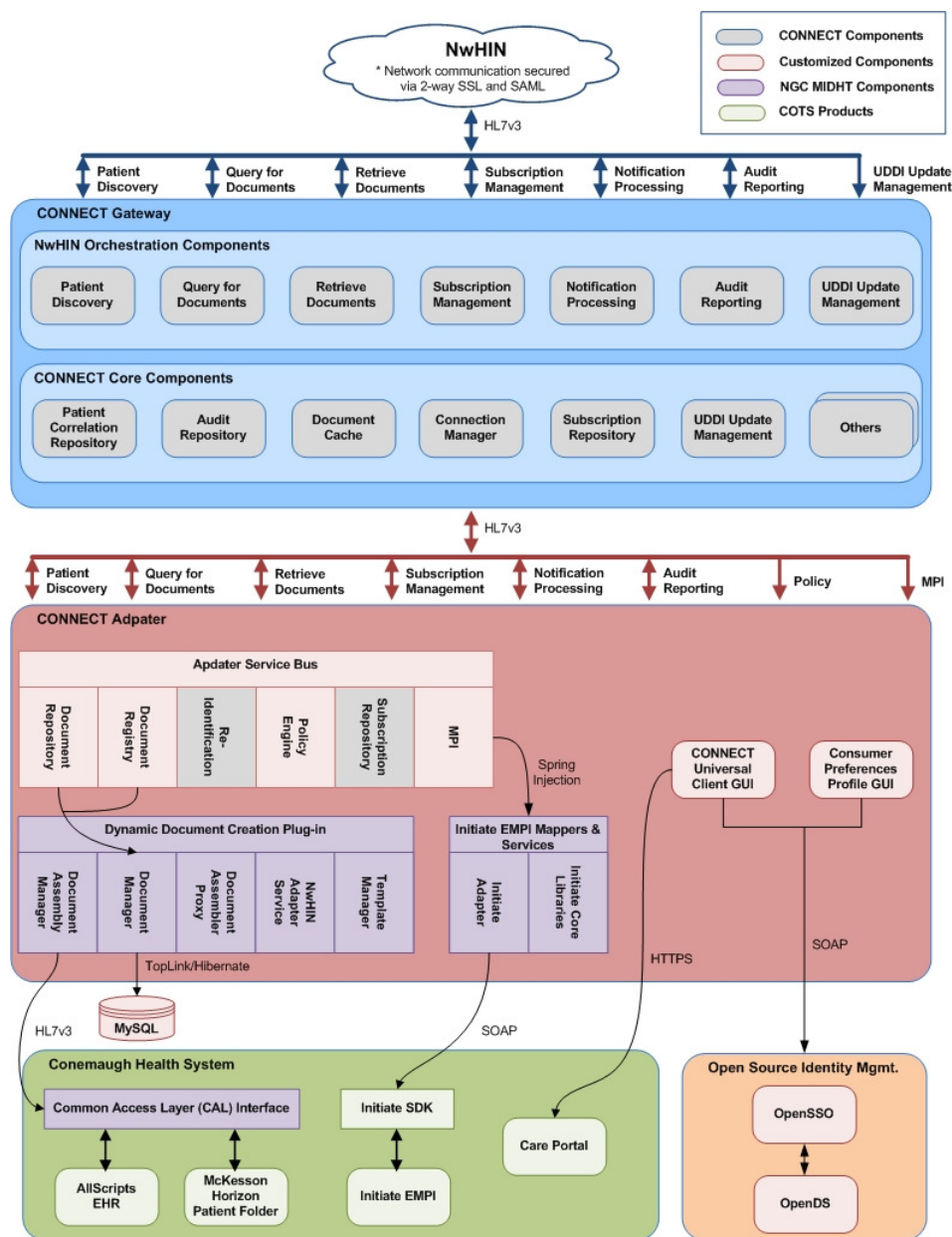
Completed Conemaugh Activities

NwHIN

On 1/27/12, CMMC successfully completed all required Onboarding activities. These included operationalizing the Go-Live endpoints by addition to the production UDDI and installing the production ONC certificate on the MIDHT server.

John Hargreaves attended various NwHIN meetings, including monthly coordinating committee meetings and special transition meetings. It is important to note that ONC will officially transition NwHIN operations to HealtheWay, a newly formed private non-profit organization, on 10/1/12. The "NwHIN Exchange" has been rebranded to "eHealth Exchange." As part of the transition, a participant fee schedule has been established with mandatory fees starting in FY 2014. Conemaugh has decided not to become an "Anchor Participant."

HIMSS Conference

John Hargreaves represented CMMC at the HIMSS Interoperability Showcase in Las Vegas, NV on 2/20 – 2/23/12. CMMC demonstrated health information exchange capabilities with other TATRC partners. It was a great opportunity to network with fellow professionals and demonstrate the MIDHT project. CMMC took the lead in fronting payments to HIMSS and issuing invoices to other TATRC partners.

VA Collaboration

NwHIN discussion was held with Jamie Bennett, Tim Cromwell and Glen Crandall on 10/31/11. It was a very productive meeting that reviewed high-level patient consent, MPI matching and timelines. CMMC subsequently shared sample documents and points of contact. CMMC received VA sample documents on 11/7/11 via email. Project kick-off and initial data analysis teleconference was held on 12/13/11. CMMC answered some key questions and also completed an XPATH spreadsheet for C32 documents. Stakeholders tentatively agreed to begin testing in January 2012 with a scheduled "Go Live" in late March 2012. On 12/14/11, CMMC received an email including the test patients to be used for testing with the VA.   CMMC received specific list of VA C62 class codes from Frank Fontaine. These class codes were added as an option in the doc query request to the VA.

John Hargreaves and Joe Dado attended a VLER kick-off meeting at the James E. Van Zandt VA Medical Center in Altoona, PA on 2/15/12. A 2-hour meeting was held to review project scope and future action steps. Jennifer Cohen from the Buffalo VA will help Altoona during the project implementation.

On 3/1/12, Altoona VA leadership sent communication that they did not want to participate in the NwHIN/VLER pilot at this time. On 3/14/12, John Hargreaves was introduced to Peggy Chan, who was the current VA testing point of contact. On 3/19/12, Jamie Bennett sent email communication that Altoona VA will participate in the VLER pilot and the first phase will focus on the outpatient clinic in Johnstown. CMMC provided an update on Care Portal integration and C62 development.

Testing with VA continued during the weeks of March 19 and 26. CMMC was able to successfully query and retrieve all document types from the VA, including:

Partner QD for C62 Clinical Note Category
Discharge Summaries
Summarization of Episode Note
Consults/Referrals
History & Physicals
Results of Diagnostics Studies OR Procedure Notes
Radiology Studies
Pathology Reports
Perioperative Records

A conference call was held with local VA stakeholders on 4/3/12 to discuss implementation of the initial VLER pilot. It was agreed that Dr. Weber would secure a small amount of patient authorizations at the VA Johnstown Community Based Outpatient Clinic. A total of 13 patients were "opted in" and been successfully correlated via patient discovery. Since patients were now correlated, both parties have performed validation testing against production data. An additional meeting occurred on 5/24/12 to clear up misconceptions regarding availability of Conemaugh C32 data and to further discuss data quality issues.

To further streamline identification of Veterans seen at both organizations, CMMC provided an extensive patient list (consisting of 116,616 patients) to VA on 7/11/12. The file had patients that have C32 and C62 data available (from the past two years). The VA performed a match against the Altoona patient population in order to create the "shared patient" list to be used for the mass mailing of consent forms. CMMC received the file (consisting of 3,326 shared patients) in person on 9/11/12. Once received, IT staff added mailing address and primary care provider (PCP) for each patient. For those patients that did not have a PCP on file, team members used the Allscripts EHR to locate that information if available. Once the PCP was identified, lists were generated for each provider and sent for review to the pilot physician

practices stated below. It is anticipated 350-400 joint letters with CMMC and VA consent forms will be mailed (by CMMC) to Veterans the first week of October 2012. Once received, staff will "Opt-in" patients, forward forms to VA, and communicate with CPG providers. During the period, a total of 16 successful correlations were completed and zero document queries for treatment purposes.

CMMC participated in various testing activities with the VA team after they introduced a new version of their adapter software. Testing included the addition of new test patients as requested.

<u>Patient Consent</u>

We have decided to implement an "Opt In" approach, which will require individual written consent from Veterans, whose data may be shared through this new service. CMMC completed the initial draft of patient letter regarding electronic exchange of data via NwHIN. The patient letter and authorization were reviewed internally and with select community stakeholders. After discussion, it was decided a joint letter from CMMC and VA would be authored and sent to shared patients. The draft letter developed by CMMC was sent to VA for review. A copy of the joint VLER letter and CMMC authorization can be found in Appendix B and C respectively.

<u>CONNECT Universal Client GUI</u>

CMMC has competed a final version of the CONNECT Universal Client GUI User Manual. The document available at www.connectopensource.org has been significantly modified for project use. A link has been placed on the GUI website for future reference by clinicians on how to properly utilize the system to access documents from the NwHIN.

<u>Marketing & Communications</u>

Project leadership has worked with the CMMC marketing department to create awareness of project and VA partnership. Content has been distributed via an employee newsletter and physician newsletter. A health information exchange FAQ's flyer was also created to accompany the consent form, both documents can be found in Appendix D.

Internal meetings and project training were completed with the following pilot CMMC providers:

- o Ebandjieff/Park Hill on 5/31/12
- o Goucher on 6/29/12
- o Portage Health Center on 7/9/12
- o East Hills on 7/24/12

A project press release was sent to the media and published by CMMC on 9/11/12. The release was reviewed in advance by TATRC representatives. A copy can be found in Appendix E.

Software Development

CMMC transitioned to a new Allscripts EHR version (11.2) that is "meaningful use" certified. Changes were made by CMMC developers to the FindDocumentWithContent endpoint in order to add attending physician name and hospital name to metadata for all discharge summaries. The new data has been incorporated by NGC into the end result C62 clinical document for exchange.

Changes were made by CMMC developers to the FindDocumentWithContent endpoint in order to add inpatient discharge summaries from three Conemaugh hospitals. VA was able to successfully query/retrieve a discharge summary on 3/20/12.

In order to spur adoption of the NwHIN service by CMMC providers, technical teams have integrated the CONNECT UniversalClientGUI with the existing McKesson Care Portal. A new tab has been created and enrolled users will be able to access NwHIN data from an application that is used heavily on a daily basis. Context sharing has been implemented so the provider does not have to duplicate the patient search.

Integration and testing of production MPI and clinical systems via CAL occurred during the month of April 2012. Issues identified during testing were quickly resolved by the CMMC development team. Project team confirmed that all C32 data (problems, allergies, medications) is active to the patient and removed the default order date for "recorded" medications.

Project team decided to add radiology reports (C62) from various CMMC facilties to the production CAL service. Development work was completed on 8/10/12, which included all radiology modalities (e.g. xray, CT, etc.) from the McKesson Horizon Patient Folder system. Consequently, an update was provided to the VA team and they quickly confirmed successful receipt of the said data.

Project team has also begun initial investigation of adding lab results to the C32 clinical document per request from Altoona VA Medical Center; implementation timeframe is TBD pending allocation of resources and collaboration with Sunquest (lab system).

Immunizations

John Hargreaves and TATRC representatives met with Gautam Kesarinath from the Centers for Disease Control during HIMSS. Stakeholders reviewed the Public Health Information Exchange (PHIX) framework. More information can be found at http://phix.phiresearchlab.org/index.jsf. MIDHT team reviewed the feasibility of using PHIX in regards to immunizations exchange with the State of Pennsylvania. The State of Pennsylvania has not committed to a query-based exchange with CMMC using CONNECT. IT staff has been working with Allscripts representatives on an interface with the state of Pennsylvania (not project related) and we hope to utilize that leverage to spark discussions again.

McKesson Continuity of Care Document (CCD) Viewer

CMMC contracted with McKesson on 9/21/12 for their physician portal CCD viewer module. Implementation is scheduled for Fall 2012.

Completed Northrop Grumman Corporation Activities (selected)

October – December 2011

- o Fixed the issue where documents are not caching properly, as multiples of the same document are stored in the document repository.
- o C32 validation errors (as per the NIST CDA validation tool).
- o Incorporated the Address, Telephone Number and Social Security Number (SSN) that are received from a remote Patient Discovery request into the request to Initiate.
- o Added SSN, Date of Birth (DoB) and Gender to the search results page of the Consumer Preferences Profile (CPP) graphical user interface (GUI).
- o Added middle name as parameter to the Initiate request. Also, removed the address and telephone number parameters.
- o C32 Medication supply unit attributes that are not units of measure were enclosed in braces ({}).
- o Replaced the existing Document Manager component of the Document Assembler with the Document Manager component that was received from TATRC.
- o Demonstrated the ability to secure the MIDHT GUI's using OpenSSO in conjunction with OpenDS and document the installation procedures.
- o Zeke Bravo was formally introduced as the new MIDHT Program Manager.
- o On October 21, 2011, Allen Barger and Zeke Bravo participated in a demonstration of the Consumer Preferences Profile (CPP) GUI in which the opt-in and opt-out capabilities were displayed.
- o Added OpenSSO Token Authentication Security code to "Page3" (both .jsp and .java files) of the CONNECT Universal Client GUI.
- o Moved the OpenSSO Token Security logic from the "prerender" method to the "init" method for every Java class that has an associated .jsp contained within the CONNECT Universal Client GUI and CPP GUI. This fixed a bug in which the page logic keeps processing, even in the event of failed authentication.
- o Directions for installing and configuring OpenSSO and OpenDS for use with on the MIDHT project were created and have been updated as necessary.
- o Two new SOAPUI test suites were created for Patient Discovery. One test does "internal" testing (self queries) and the other test performs "external" testing (communication with remote gateway).
- o Resolved the Creation Time discrepancy that appears within the "Documents" tab of the CONNECT Universal Client GUI by removing the "patch" from VLER 1a that rolls a document's creation time back by 24 hours before saving it to the repository.

- Added the CHS logo to Page1.jsp and Page2.jsp of the Universal Client GUI and the userlogin.jsp page of the CPP GUI.
- Masked the first five digits of the SSN (XXX-XX-) on both GUIs.
- Added search boxes for DOB and middle initial to both GUIs.
- Updated the Initiate "internal" min score to the value of "99".
- Resolved differences with the Document Query response for documents that are generated for the first time vs. documents that are generated (and cached) subsequent times.
- Added Warning disclaimer to the login page of the Universal Client GUI.
- Built a proof of concept which demonstrates how documents that are retrieved from remote NwHIN gateways can be cached in a local repository and made available for retrieval.
- Eliminate multiple calls to McKesson during C62 document creation process.
- On November 11/3/11, Northrop Grumman received an email from John Hargreaves which contained highlights from a teleconference about MIDHT Deliverable 12 that took place between John and members of TATRC, including Dr. Steve Steffensen, Betty Levine and Ollie Grey.
- Four IBM servers and an EMC Storage Area Network (SAN) need installed and configured for MIDHT use.
- MIDHT OpenSSO and OpenDS configuration files and documentation were uploaded to the TATRC SVN on 11/9/11.
- On 11/16/11, Ben Herr successfully racked and powered-up the four IBM servers and located KVM dongles for three of the four servers. EMC was contacted and asked to provide support by properly installing and configuring the production SAN appliance. In advance of their arrival, a readiness review was conducted with several members of the EMC support team.
- Open SSO and OpenDS were configured to resemble the authentication and authorization scheme that TATRC had used for their KMR demo. However, modifications to the OpenDS Lightweight Directory Access Protocol (LDAP) were necessary in order to meet Conemaugh's user profile requirements.
- Assisted the CMMC IT staff with modifying the "Find Documents with Content" Common Access Lay (CAL) endpoint so that it returns additional Assigned Author information. The information is used to create two Author (<author>) sections in the assembled Clinical Document.
- Fixed the C62 validation errors that occurred after adding the required Realm Code and Template IDs.
- Revised the C32 creation code so that sections with empty data are not returned.
- Added a user manual link to both the Universal Client GUI and CPP GUI.
- Updated the populateTestData.sql file to exclude the "repositoryId" field. Since Hibernate dynamically creates the "repositoryId" field, the script fails if executed ahead of the Hibernate code.
- An entry is now made in the CONNECT audit log whenever a Patient Search is conducted from within the Universal Client GUI.

- o Updated the SoapUI tests for Document Retrieve and Patient Discovery.
- o Added CHS Copyright header information to all Document Assembler code files.
- o Added additional VA class codes to the Universal Client GUI.
- o Within the Universal Client GUI, removed the default wording from the documents table (in order to eliminate confusion as to whether a query has already been performed).
- o Added a custom message to the documents table of the Universal Client GUI that lets the user know when no documents have been returned from a query to the NwHIN.
- o Correctly formatted the Document Query response service times.
- o Revised the Document Query response to include the XDSDocumentEntry.TypeCode.
- o Updated Document Assembly and Document Manager code to comply with the NIST message validator.
- o Fixed C32 validation errors.
- o It was decided that the old MIDHT-BETA server will be used for interoperability testing with the VA.
- o Microsoft Server 2008 R2 licenses were received by Northrop Grumman on 12/6/11.
- o On 12/8/11, Microsoft Server 2008 R2 was installed on one of the new IBM servers but could not be configured with a RAID that is suitable for MIDHT production use.
- o On 12/8/11, an external IP address was issued for the MIDHT production server.
- o On 12/15/11, EMC completed VNX firmware upgrade.
- o On 12/29/11, five VNX hard drives were received by NG.
- o Anti-virus software was received by Northrop Grumman on 12/12/11.
- o After a discussion with Ken Weaver from CMMC, it was determined that the wrong number of hard drives was initially ordered for the EMC VNX. Additional hard drives were purchased for the VNX. The additional drives will allow the VNX appliance to be configured to a RAID 5.
- o The Activation Production Services Registry Form and Activation Production Certificate Authority Form were completed and returned to Conemaugh for submission to ONC.
- o On 12/13/11, Allen Barger attended a Kick-off Call in which members of both the VA and CHS were in attendance. Prior to the meeting, a questionnaire and an XPath analysis was completed and submitted to the VA.

January – March 2012

- o Populated the Security Accent Markup Language (SAML) header, after a successful login to the UC GUI or CPP GUI, with the user name and role that are returned from OpenDS. Note: the user name is the first and last name of the user, rather than their system login name.
- o Converted the generic Lantana testing style sheet into a style sheet which correctly displays C32 information from the VA.
- o Updated the Initiate external min score value to "150".
- o Installed a new testing certificate on the PRE-PROD server in order to facilitate testing with the VA.
- o Installed ONC production certificate on the MIDHT-GOLIVE server.

- Fixed CONNECT JIRA bug #GATEWAY-217: Doc Query sends remote patient id to the policy engine in the resource area, should be local patient id.
- Modified the policy check for outbound Doc Retrieve requests so that the check is performed using the patient Id and not the document Id.
- Added CMMC Copyright header information to all modified CONNECT Core Library files
- Scrubbed all passwords, usernames, URLs and OIDs from code donation to TATRC.
- Uploaded all Phase 3 MIDHT code to TATRC share site (for donation to Open Source Community).
- Donated UC GUI code to DocBox and helped them correctly configure the GUI for use with the TATRC HIMSS demo.
- On 1/20/12, EMC made an onsite visit to the NG Data Center in order to complete the configuration of the MIDHT VNX. A mismatch in drive speeds (10k vs. 15k) prevented a RAID 5 configuration across all available drives. In addition, the VNX could not be connected to the host server because of a missing iSCSI module.
- At the request of ONC and CMMC, MIDHT team members assisted Cogon Systems in resolving SAML Assertion issues that had been preventing them from passing conformance testing.
- NG participated in VA testing sessions on the following dates: 1/23, 1/24, 1/26, 1/27 and 1/31.
- In preparation for the Interoperability Showcase demo at HIMSS, a successful exchange of documents was established between CMMC and DocBox.
- A MIDHT Certificate Authority was established and self-signed certificates were issued to the DoD and DocBox.
- Arrangements were made to have NG ship a 19" monitor to HIMSS.
- A connection has been established between the Conemaugh gateway and DoD gateway, but DoD MPI configuration issues prevented successful tests of PD, DQ and DR.
- Configured Glassfish "domain2" (OpenSSO) as a Windows Service on MIDHT-GOLIVE in order to ensure the domain automatically starts when the physical server is started.
- Removed all instances of "TBD" from the Document Query Response.
- Fixed the "codeSystemName" and "codeSystem" values for the Role attribute of the Patient Discovery request.
- Removed the Initiate inactive ("I") flag from the CMMC gateway so that only active records are returned within a Patient Discovery response.
- Updated the document repository table to be compatible with CONNECT v3.1 and increased the size of the "rawData" column which is used to store clinical documents
- Configured the NwHIN UDDI service on MIDHT-GOLIVE in order to retrieve endpoints from NwHIN participants
- Performed Document Query stress tests and identified errors. During stress testing, it was discovered that more than 20 concurrent Document Query connections causes errors to be thrown within the document assembly process.
- Five new VNX hard drives and an iSCSI module were ordered from EMC and shipped on 2/24/12.
- The new VNX hard drives and iSCSI module were received by Northrop Grumman on 2/27/12.

- The MIDHT-GOLIVE server was regularly monitored for incoming traffic from NwHIN partners.
- NG participated in VA testing sessions on 2/6, 2/7, 2/9 and 2/10.
- NG assisted with the completion of a C32 XPath spreadsheet that will be used to ensure compatibility.
- Installed DoD style sheet and removed the CMMC logo.
- Conducted numerous Patient Discovery requests against TATRC's flat-file MPI and OpenEMPI installations.
- Updated "stock" CONNECTUniversalClientGUI to include date of birth on patient search screen and donated to TATRC.
- Provided the metadata needed to properly stage C32 and C62 documents.
- Uncovered issue with OpenEMPI in which the middle name was not getting properly parsed during Patient Discovery requests to the TATRC gateway.
- Identified a namespace issue with the ProvideAndRegister request that TATRC uses to load static documents into the repository of their test gateway.
- NG participated in dry run sessions of the HIMSS demo on 2/6, 2/10 and 2/15.
- Modified the Universal Client GUI to accept and process encrypted or unencrypted patient id and user name URL parameters from CMMC's Care Portal system.
- Modified the Universal Client GUI login page to auto-populate the "Username" field when the end-user accesses the GUI from within Care Portal.
- Upon successful authentication and authorization of a user who is accessing the Universal Client GUI from within Care Portal, a patient lookup against the Initiate EMPI is performed using the "GetMember" web service call. Upon successful completion of the patient lookup, the user will automatically be redirected to the "Patient Discovery" tab.
- Moved the location of the "Documents" tab error messages. The error message should not interfere with the patient demographics that are displayed near the top of the web page.
- Created and distributed Care Portal Integration documentation.
- Created and distributed NwHIN Specifications Gap Analysis documentation.
- Modified the list of Universal Client GUI Target Communities to display the name of each organization (rather than their UDDI description).
- Provided CMMC development team with encryption/decryption .NET libraries and code examples.
- Removed the CMMC entry from the "Patient Discovery" tab's list of Target Communities.
- Provided a Universal Client GUI User's Manual entry regarding the opening of multiple web browser tabs.
- Assisted CMMC in creating a CONNECT JIRA ticket announcing CMMC's intention to donate the revised Dynamic Document Assembly code base.
- Reconfigured the MIDHT stress testing suite to use the MIDHT-PREPROD server (in order to better mimic the production architecture).
- Resolved "Attempting to execute an operation on a closed EntityManager" IllegalStateException errors when concurrent Query for Document requests are received by the CHS gateway.

- Removed unused document types from the Universal Client GUI "Documents" tab and added "Results of Diagnostic Studies" for document type 28570-0.
- Removed duplicate CONNECTCoreLib files from the InitiateCoreLib and updated references to CONNECTCoreLib for the files that are no longer in InitiateCoreLib.
- All patient correlation expirations now default to five years.
- Created Healthcare Facility, Practice Setting and Display Name metadata values for Discharge Summary documents.
- Created and distributed updated Document Assembler install instructions.
- Resolved the misspelling of the word "clinic" in the value of the C32_HCFT_CODE_DESCR property.
- Removed obsolete entries from the internalConnectionInfo.xml file on MIDHT-GOLIVE.
- On 3/19/12, EMC Implementation Delivery Specialist Greg Carl visited the NGC datacenter in order to install the VNX hard drives, connect the MIDHT-GOLIVE server to the VNX appliance, and copy the D:\ volume from the go-live server to the VNX.
- Because it took longer than expected to format the VNX hard drives, a follow-up Web-Ex with EMC was conducted on 3/23/12.
- Conformance testing with the VA resumed on 3/24/12.
- Downloaded Windows patch KB20509553 from Microsoft and applied to the MIDHT-GOLIVE server.
- Changed Local Group Policy Editor settings on the MIDHT-GOLIVE server.
- Changed Glassfish admin password on the MIDHT-GOLIVE server.
- Disabled TRACE/TRACK Glassfish feature on the MIDHT-GOLIVE server.
- The following Perimeter Security Assessment (PSA) scans were performed:
  — Internal Nessus scan – 3/6/12.
  — Penetration test scans (NMAP, Metasploit, Nikto) – 3/5/12 through 3/14/12.
  — Internal Nessus rescan – 3/16/12.
  — Penetration test rescans (NMAP, Metasploit, Nikto) - 3/15/12 and 3/16/12.

April – June 2012

- Installed, configured, tested and documented CONNECT v3.3 using Glassfish v3.1.1.
- Provided the CMMC technical team with instructions on how to implement 2-way SSL on Apache Tomcat and Microsoft IIS application servers.
- Exchanged certificates with CMMC and then tested 2-way SSL on the Initiate development server.
- Enabled 2-way SSL between the production CAL web service interface and the MIDHT-GOLIVE server by installing the required Conemaugh certificate.
- Correctly formatted and populated the "NameID" SAML header field and ensured the value of the field was correctly stored in the audit repository's "userId" column.
- Updated the "DAS_DATASERVICE_ENDPOINT" property on MIDHT-GOLIVE with the production CAL WSDL URL.
- Revised the Universal Client GUI code to best handle incoming requests to the login page from users who access the GUI for the first time, users who fail to successfully log-

in to the system on their first attempt, users who entered the GUI and then logged-out, and users who access the GUI from an active browser session.

o Updated the "member.wsdl" property on MIDHT-GOLIVE with the new URL to the production Initiate WSDL.

o Distribute high-level documentation to FHA regarding the successful install of CONNECT v3.3 on Glassfish 3.1.1.

o Evaluated the capabilities of Glassfish's monitoring tools and forwarded the findings to CMMC for review.

o Reviewed CMMC's proposed NwHIN Provider Enrollment form and provided feedback.

o Added the role "Medical assistant" and the associated 311234009 SNOMED code to the CMMC Gateway.

o Confirmed that onset dates originating from the CMMC CAL were properly represented in the dynamic C32 documents.

o Enabled Glassfish monitoring on the MIDHT-GOLIVE server and documented the start date.

o Replaced the CONNECT Universal Client GUI user's manual with the updated copy provided by Conemaugh.

o Resolved CONNECT v3.1 audit log entry issue in which all of the Document Retrieve audit log entries appeared to originate from the Entity interface.

o Furnished Conemaugh with flow diagrams of the Document Query and Document Retrieve audit log process.

o Provided CMMC an architecture diagram which showed a distinction between CONNECT, custom-built, and COTS components.

o Captured network speed metrics on the MIDHT-GOLIVE server and sent to the Conemaugh technical team for analysis.

o CMMC IT staff visited the NG datacenter on April 10, 2012 in order to help troubleshoot the suboptimal connection between the go-live server and the EMC VNX.

o As per CMMC's suggestion, NG ordered an HP-V1810-24G network switch on 4/16/12.

o On 4/25/12, NG successfully installed the new HP network switch.

o On 4/27/12, CMMC IT staff returned to the NG datacenter in order to configure the EMC VNX to use a 1Gbps network connection.

o CONNECT v3.1 and v3.3 compliant versions of the Dynamic Document Generation plug-in source code and binaries were made available to FHA via the TATRC SVN.

o The original Dynamic Document Generation plug-in installation and configuration guide was revised and donated back to FHA.

o Created a summary results matrix for Glassfish Optimization and submitted to CMMC for review.

o Carried out approved optimization changes on the MIDHT GO-LIVE server, the MIDHT production server and the MIDHT development server.

o Imported production CAL SSL certificate (issued on May 1st) into the MIDHT-GOLIVE server's trust store.

o Imported the development Initiate SSL certificate into the trust store of every server that is used for MIDHT development.

- Resolved the CONNECT Universal Client GUI issue that repeatedly caused the "Username" textbox to disappear after failed login attempts.
- Changed the "member.wsdl" property in the initiateAdapter.properties file to reflect the new URL that Conemaugh assigned to the development Initiate WSDL.
- Enabled the Policy Engine on all MIDHT servers and workstations.
- Helped CMMC identify which IP addresses should be granted access to the CAL (prod & dev) and Initiate (prod & dev) web service endpoints.
- Worked with the TATRC Advanced Concept Team (ACT) to identify potential threats that can occur when web service endpoints are secured via HTTPS & IP restriction, rather than 2-way SSL.
- Changed the "DAS_DATASERVICE_ENDPOINT" property in the docassembly.properties file to reflect the new URL that CMMC assigned to the development CAL WSDL.
- Created MIDHT CONNECT Universal Client GUI accounts
- Conducted gateway-to-gateway Document Query tests to the MIDHT pre-prod (VA testing) server and validated the results.
- Carried out the TATRC ACT's request to get CONNECT v3.3 working with the Apache Tomcat application server and uploaded all modified code to the TATRC SVN repository.
- Complied with the VA's User Acceptance Testing (UAT) prep by implementing and testing their new OID and URLs on the MIDHT production (VA testing) server.
- Retrieved dynamically generated C32 documents from the MIDHT-GOLIVE server log and delivered to Conemaugh for examination.
- Exported the May 2012 audit log entries from the MIDHT-GOLIVE server and delivered to CMMC.
- NG received, approved and countersigned the TSA and SOW modifications on 5/30/12 extending the period of performance until 9/30/13.
- Invalidated the session of the current CONNECT Universal Client GUI user whenever a new user tries to access the GUI within the same browser session (an existing browser window or new browser tab).
- Moved the "EncryptionType" property, which toggles on and off the decrypting of URL parameters sent to the Universal Client GUI, from the adapter.properties file to the universalClient.properties file.
- Documented how to successfully install CONNECT v3.3 on the Apache Tomcat application server and saved the documentation to the TATRC SVN repository.
- Supplied Conemaugh testing evidence from the VA's User Acceptance Testing (UAT) sessions.
- Supported CMMC's testing of medications data by providing log file snippets that contain a response from the Common Access Layer (CAL) medications endpoint.
- Analyzed the MIDHT-GOLIVE audit log to determine how many Document Query requests were received by the CMMC gateway for the month of June.
- Monitored the number of entries in the "correlatedidentifiers" database table and ensured the number of entries matches the number of opted-in patients.
- Identified and documented an appropriate CAL endpoint to use for Laboratory Results.
- Added "UATTHREE" test patient to the TATRC OpenEMPI MPI and conduct Patient Discovery tests from the MIDHT PRE-PROD (Demo) server.

- Prepared the CONNECTUniversalClientGUI project for donation to FHA by uploading the code to the TATRC SVN and distributing the accompanying release notes.
- A meeting was held on 6/25/12 to discuss CMMC's desire to establish a Virtual Private Network (VPN) connection between the MIDHT sub-net and the CMMC network.
- A technical discussion about CONNECT was held between CMMC, NG and members of the Home Base Program on 6/14/12. During the meeting, MIDHT team members provided the Home Base Program attendees some lessons learned regarding the installation and configuration of CONNECT.
- On 7/21/12, a meeting took place between CMMC, NG and Mary Kasal from Quality Health Network. The meeting focused on how Conemaugh develops C62 documents (for transmission across the NwHIN).

July – September 2012

- Revised the Connect Universal Client GUI's "Document Types" list (combo box) by adding 15 new entries and removing one existing entry to align with the VA
- Exported the June 2012 audit log entries from the MIDHT-GOLIVE repository and delivered to CMMC.
- Added custom transformations code to the VA style sheet that filters out all "Accession" entries from the "Lab Results – Chemistry and Hematology" section.
- Corrected the spelling of the word "Primary" in the VA style sheet.
- Removed the expired Entrust SSL certificate from the MIDHT-PROD server's trust store & key store and replace with a new certificate from the Entrust web site.
- Attended the July 2012 CONNECT Sprint review and planning session.
- Added code to the document assembler that passes-thru the Radiology Studies Class Code (when one is specified in the incoming Document Query request) or adds the Radiology Studies Class Code (when no class codes are specified in the Document Query request) to the Find Document With Content (FDWC) CAL web service request.
- Attended the CONNECT-sponsored webinar regarding CONNECT's proposed roadmap for version 4.0.
- Modified the TATRC ACT version of the document assembler to be compliant with CONNECT version 3.3.
- Helped the CMMC technical team review and debug the Radiology Studies responses that get returned from the CAL web service interface.
- Provided evidence that the C32 documents originating from CMMC's gateway do contain a support module.
- Created a GitHub account (as required by the FHA donation process) and installed and configured Git.
- Evaluated and fixed the CONNECTUDDIModifierGUI project that is available in CONNECT version 3.3.
- NG reviewed the Patient Consent Pilot documentation from Jericho Systems and is onboard with supporting the effort.

- A MIDHT technical diagram was given to the Home Base Program team members and found to be "remarkably helpful".
- Modified the C62 document builder code to build Radiology Studies documents from information provided by Conemaugh's CAL web service interface.
- Evaluated the differences and similarities between the VLER (Phase 1a) Property Accessor files the Property Accessor files that reside in the CONNECT Core Libraries. If the root functionality is the same, then remove the VLER files and re-route all instantiating code to CONNECT Core Libraries.
- Helped troubleshoot Radiology Studies issues that originate from CMMC CAL interface and provided log entries when requested.
- Used the Lantana testing tool to validate the structure of CMMC's Radiology Studies documents.
- Monitored the correlation database table on the GO-LIVE server for changes and reported the discovery of new correlations to CMMC.
- Exported a sample Consent document from the CONNECT repository and sent to CMMC for review.
- Donated the MIDHT CONNECT Universal Client GUI code to FHA:
    — Created a virtual machine, running CONNECT v3.3.1, that can be used to test MIDHT code donations
    — Prepared a Release Notes document for the CONNECT UC GUI code donation
    — Upgraded the MIDHT CONNECT UC GUI to work with CONNECT v3.3.1
    — Staged, committed and pushed code changes to the MIDHT Fork in GitHub
    — Submitted a Pull Request from within GitHub
    — Updated the TATRC Subversion repository with the revised GUI code
    — Installed the CONNECT formatting templates for the NetBeans IDE.
- On 8/8/12, NG completed and returned the Site-to-Site VPN Implementation Document to CMMC.
- On 8/8/12, NG participated in a planning meeting with CMMC and Jericho Systems. As a follow-up, NG also attended a Use Case/User Story review meeting on 8/20/12.
- NG participated in the CONNECT Sprint Review sessions on 8/13 and 8/27. During the 8/27/12 session, Allen Barger provided a CMMC code donation status update.
- On 8/13/12, Jericho Systems was sent the MIDHT PRE-PROD server's web service endpoints and self-signed certificate.
- Allen Barger attended the CONNECT Code-A-Thon, held at George Mason University on 8/16-8/17, in support of the MIDHT project. He actively participated in discussions regarding the Dynamic Document Generation Plug-in and the CONNECT Universal Client GUI. While at the event, Allen worked with members of the CONNECT technical team to establish a Git environment that is suitable for pushing code donations to GitHub.
- Created a new Subversion trunk to hold the CONNECT v3.3.1.2 code base.
- Monitored the audit log repository on the GO-LIVE server for Document Query requests that originate from Conemaugh.
- Exported the August 2012 audit log entries into a Microsoft Excel format and delivered to CMMC.
- Donated the MIDHT Common Access Layer (CAL) code to FHA:

- Cleaned up the AdapterCommonDataLayerEJB project by removing all of the deprecated files and "dead" code
- Prepared release notes, change list and install instructions documentation
- Upgraded the AdapterCommonDataLayerEJB project to work with CONNECT v3.3.1
- Staged, committed and pushed the code changes to the MIDHT Fork in GitHub
- Submitted a Pull Request to the CONNECT 3.3_integration branch
- Updated the TATRC Subversion repository with the revised code
- Installed and applied the CONNECT formatting templates for the NetBeans IDE
- Created a SoapUI project that can be used to test the CAL donation
- Removed all CMMC-specific identifiers from the donated code and configuration files.
  - NG completed the work required to establish a VPN tunnel between the CMMC Network and the MIDHT sub-net.
  - NG participated in the CONNECT Sprint Review sessions that were held on 9/10/12 and 9/24/12. During each meeting, Allen Barger updated participants on the status of the CMMC code donation.
  - On 9/7/12, Allen Barger, Emily Reynolds and Bob Menkel attended a CONNECT Transition Planning meeting that was scheduled by CMMC.
  - At CMMC's request, NG conducted a review of the IHE IT Infrastructure Technical Framework Supplement for On-Demand Documents and the NwHIN Query for Documents Web Service Interface Specification to determine if the MIDHT architecture would require upgrades to support the creation of On-Demand Documents.
  - On 9/26/12, Allen Barger participated in an On-Demand Documents discussion with Eric Helfin from Healtheway Inc. and John Hargreaves from CMMC.
  - The CONNECT v3.3.1.2 code base was successfully retrieved from GitHub and uploaded into the MIDHT Subversion repository.
  - The MIDHT developers have each installed a virtual CONNECT v3.3.1.2 development environment, which will allow for the simultaneous build & deployment of CONNECT v3.1 and CONNECT v3.3.

Subtask 2.2 Provide technical and documentation assistance on DoD-managed Virtual Lifetime Electronic Record (VLER) efforts.

CMMC has not been asked by TATRC representatives to provide direct support for DoD specific VLER initiatives to date.

Subtask 2.3 Investigate productizing a Patient Consent module using established standards, such as TP20/XACML.

Deliverable completed by NG during previous year. Related work may occur with Jericho Systems on a ONC Data Segmentation for Privacy (DS4P) pilot project.

Subtask 2.4 Assess and analyze NHIN-related activities, to include data center performance metrics, physician evaluation and usage of the NHIN Portal, and resulting benefits of HIE with federal participants.

Research protocol developed by the research team and completed in June 2012. On 7/12/12, the protocol was approved by the CMMC Scientific Review Committee. Local IRB approval was received on 7/17/12, and USAMRMC IRB approval was received on 8/13/12. Study documents were reviewed in advance by Dr. Jeffrey Stephenson (TATRC). Data collection will occur as health information exchange matures.

Key Research & Development Accomplishments

Arm 1:

- Wide-scale BCMA deployment at CMMC and MYMC facilities

- Completion of Time & Motion activities at CMMC and MYMC facilities

- Large sample size of completed BCMA surveys; interim statistical analysis completed

Arm 2:

- Participation in 14th Virtual Lifetime Electronic Record (VLER) pilot nationwide

- High patient discovery correlation rate with VA (94%)

- Deployment and testing of production (LIVE) clinical and MPI systems

- Successful creation of shared patient list with VA

Reportable Outcomes

Arm 1:

- None

Arm 2:

- John Hargreaves and Allen Barger represented the MIDHT project at the HIMMS Interoperability Showcase on 2/20-2/24/12 in Las Vegas, NV.

- John Hargreaves co-presented the VLER project at the 2012 Community Response Symposium VII ~ Welcoming Returning OIF/OEF Veterans on 8/15/12 in Johnstown, PA.

- John Hargreaves and Allen Barger presented MIDHT concepts at the CONNECT Code-A-Thon on 8/16-8/17/12 at George Mason University in Fairfax, VA.

Conclusion

CMMC continues to make significant progress on both arms of the project. The Statement of Work (SOW) tasks are being executed as expected. Technical implementations and research activities are progressing on schedule without deviation. We hope other organizations find our lessons learned useful.

Bar code medication administration is widely deployed throughout CMMC and MYMC. Research activities are progressing as planned, including a strong survey sample size. Conemaugh is participating in the 14th Virtual Lifetime Electronic Record pilot in the nation. Milestones have included expansion of C62 data content, identification of shared patients with VA and an upcoming mass mailing for patient consent.

Appendix A – BCMA Adoption at CMMC by Denoted Month

MMC BCMA Closed Loop Adoption

Mar-12

Dept	#Not Givens	Total Possible Admins	Net Total Admins	#BC Admins	% BC Admins
5K	127	660	533	454	85%
7R	712	5,406	4,694	3,572	76%
A1	1800	15,153	13,353	11,702	88%
A6	1419	8,640	7,221	6,346	88%
A7	1458	13,726	12,268	10,465	85%
A8	2144	12,211	10,067	8,843	88%
A9	1480	10,410	8,930	7,275	81%
AL	112	1,221	1,109	810	73%
C5	136	1,208	1,072	894	83%
CR	1653	19,023	17,370	15,393	89%
E4	1267	9,253	7,986	6,819	85%
E6	1312	9,671	8,359	7,216	86%
G4	1073	9,482	8,409	7,398	88%
G5	2394	17,728	15,334	13,541	88%
G6	2534	18,965	16,431	14,166	86%
G7	1124	9,307	8,183	6,511	80%
GP	798	8,870	8,072	6,723	83%
L5	118	812	694	638	92%
M5	395	2,693	2,298	2,096	91%
M7	1622	14,084	12,462	10,008	80%
N5	31	331	300	277	92%
R1	1442	10,816	9,374	8,353	89%
R6	1042	6,818	5,776	4,713	82%
R7	875	5,879	5,004	4,651	93%
R8	1249	11,251	10,002	8,823	88%
R9	2551	10,429	7,878	6,464	82%
S5	565	2,902	2,337	2,101	90%
Total	31,433	236,949	205,516	176,252	86%

Jun-12

Dept	#Not Givens	Total Possible Admins	Net Total Admins	#BC Admins	% BC Admins
5K	71	513	442	353	80%
7R	933	5,055	4,122	3,252	79%
A1	1441	12,351	10,910	9,565	88%
A6	1413	8,449	7,036	6,070	86%
A7	1185	10,159	8,974	8,207	91%
A8	1651	10,953	9,302	7,760	83%
A9	1287	9,328	8,041	6,965	87%
AL	62	740	678	486	72%
C5	96	958	862	764	89%
CR	1329	16,759	15,430	13,693	89%
E4	861	7,105	6,244	5,497	88%
E6	1024	7,577	6,553	5,571	85%
G4	1001	6,892	5,891	5,213	88%
G5	1820	13,743	11,923	10,844	91%
G6	1537	11,389	9,852	8,707	88%
G7	1320	9,121	7,801	7,245	93%
GP	768	8,115	7,347	6,435	88%
L5	113	840	727	640	88%
M5	454	2,711	2,257	2,132	94%
M7	1189	8,851	7,662	6,583	86%
N5	60	564	504	455	90%
R1	988	8,855	7,867	6,755	86%
R6	1081	6,047	4,966	4,005	81%
R7	766	5,157	4,391	4,118	94%
R8	1061	8,365	7,304	6,593	90%
R9	1954	9,449	7,495	6,416	86%
S5	290	1,453	1,163	1,001	86%
Total	25,755	191,499	165,744	145,325	88%

Sep-12

Dept	#Not Givens	Total Possible Admins	Net Total Admins	#BC Admins	% BC Admins
5K	121	768	647	619	96%
7R	974	5,127	4,153	3,935	95%
A1	1735	15,500	13,765	12,760	93%
A6	1369	8,740	7,371	6,976	95%
A7	1493	12,171	10,678	10,433	98%
A8	1838	11,699	9,861	9,457	96%
A9	1555	10,317	8,762	8,438	96%
AL	80	989	909	824	91%
C5	111	1,479	1,368	1,306	95%
CR	1563	17,380	15,817	15,161	96%
E4	1176	9,041	7,865	7,642	97%
E6	1668	10,278	8,610	8,377	97%
G4	1299	8,774	7,475	6,956	93%
G5	2085	15,185	13,100	12,447	95%
G6	1710	13,615	11,905	11,471	96%
G7	1148	12,009	10,861	10,488	97%
GP	672	7,126	6,454	6,394	99%
L5	84	635	551	507	92%
M5	528	2,633	2,105	2,052	97%
M7	963	7,387	6,424	6,244	97%
N5	49	501	450	450	100%
R1	1415	9,804	8,389	7,868	94%
R6	1095	5,927	4,832	4,496	93%
R7	741	5,935	5,194	5,121	99%
R8	1226	9,410	8,184	7,840	96%
R9	1775	9,054	7,279	6,931	95%
S5	459	2,678	2,219	2,141	96%
Total	28,932	214,162	185,228	177,334	96%

Appendix B – VLER Joint Patient Letter

Conemaugh Health System

James E. Van Zandt
VA Medical Center

Dear Veteran,

There is a new way to share information with your healthcare providers in southwestern Pennsylvania!

The Virtual Lifetime Electronic Record (VLER) health program will allow you to share your electronic health information, via the Nationwide Health Information Network (NwHIN), with your providers who are members of the Conemaugh Health System and the James E. Van Zandt VA Medical Center in Altoona, PA.

We invite you to sign up for the VLER Health program by completing and signing the enclosed forms. After you join, your health care providers will be able to see your current medical issues, emergency room reports, discharge summaries, medications, allergies, and other important information in your medical record as necessary for your treatment. This information will be used to improve the care you receive from your providers, and avoid duplicating services. Access to your information will be strictly controlled and protected using data security standards commonly used in the banking industry.

Once you have completed and signed the forms we have included, please return them in the envelope provided. Signing these forms means that you are agreeing to share your health information among health care providers in the NwHIN Exchange who provide your medical treatment.

If you have questions, please contact:
John Hargreaves, Conemaugh Health System, at (814) 269-5277, and/or
Barbara Babiak, VLER Coordinator, James E. Van Zandt VA Medical Center, at (814) 943 8164 Ext. 8022.

We are proud to serve Veterans that served our country!

Scott Becker
Chief Executive Officer
Conemaugh Health System

William Mills
Medical Center Director
James E. Van Zandt VA Medical Center

If you decide not to join, do nothing. Your health record will not be shared with private healthcare facilities using this program. Your choice will not affect the care you receive from your providers, your future care at the VA, or your VA benefits. If you choose to join now and later change your mind, please contact the VA Release of Information Office at (814) 943 8164 Ext. 8022.

Appendix C – CMMC NwHIN Consent Form

Conemaugh Health System

Request for and Consent to Release Protected Health Information to Nationwide Health Information Network (NwHIN)

Privacy Act Information: By completing this form, no release of information will occur other than that stated below. The form allows for the release of information in accordance with the Health Insurance Portability and Accountability Act (HIPAA), 45 CFR Parts 160/164 and 5 U.S.C. 552a. Your consent to release the information on this form is voluntary. If the information containing the last four digits of your Social Security Number (SSN) is not accurate, NwHIN will be unable to comply with the request. The SSN will be used to locate records for release. The Conemaugh Health System (CHS) may not condition treatment or other actions on signing of this consent. CHS may release the information you put on this form as allowed by law. CHS may make "routine use" disclosure of the information as stated in the CHS "Notice of Privacy Practices". Failure to participate will not have any affect on care to which you may receive. CHS may also use this information on this form to identify patients and their records. Other purposes involving this information may occur as allowed by law.

_____

Name: _____

Last 4 digits of SSN: _____

Date of Birth: _____

Requestor Name: _____ Approved NwHIN Participants _____

Information Requested:

Health information from electronic health record systems.

I permit CHS to release my protected health information (PHI) for treatment purposes to those communities that are participating in the NwHIN. As covered by 38 U.S.C. 7332, this information may consist of:

- Diagnosis of Sickle Cell Anemia
- Treatment of or referral for drug abuse
- Treatment of or referral for alcohol abuse
- Treatment of or testing for HIV/AIDS

This consent covers conditions that I may have upon signing of the consent. It also covers conditions that I may acquire in the future. This consent will remain in effect for five years. I may withdraw this consent, in writing, at any time. I understand that actions may already have been taken to comply with it. Written withdrawal is effective upon receipt by CHS. Redisclosure of my electronic health records by others may occur without my further written consent. Redisclosure by others may also no longer be protected.

CONSENT: I certify that this request has been made freely and without force. The information given above is accurate and complete to the best of my knowledge.

_____   _____
                 Patient Signature   **Date**

Appendix D – Health Information Exchange FAQ's Flyer

CONEMAUGH HEALTH SYSTEM

Health Information Exchange FAQ's

Make your electronic medical records available to your providers.

Conemaugh Health System is pleased to introduce sharing of health records through the Nationwide Health Information Network (NwHIN). The goal of the project is to securely exchange electronic medical records and patient data with external organizations, including the Altoona VA Medical Center, to provide veterans timely and accurate healthcare services.

How Does It Benefit Me?
Veterans may receive some of their care from non-VA care providers. Electronic medical record sharing allows additional providers to access secure, updated health information to provide you accurate and timely care. Electronic files also eliminate the need for you to carry your confidential medical records between providers.

Is my information secure?
Conformance testing to ensure compliance with messaging, privacy and security specifications at Conemaugh Health System was completed with the Office of the National Coordinator for Health Information Technology, part of the Department of Health and Human Services. The information is sent securely through the Nationwide Health Information Network. Only healthcare providers that are participating in the exchange will be able to view your records with the strict purpose of providing direct patient care.

EXCELLENCE. EVERY PATIENT. EVERY TIME.

With over 23,000 Veterans in Cambria and Somerset counties, healthcare providers in our region will have quicker access to more health information by accessing the exchange.

Appendix D – Health Information Exchange FAQ's, continued.

CONEMAUGH HEALTH SYSTEM
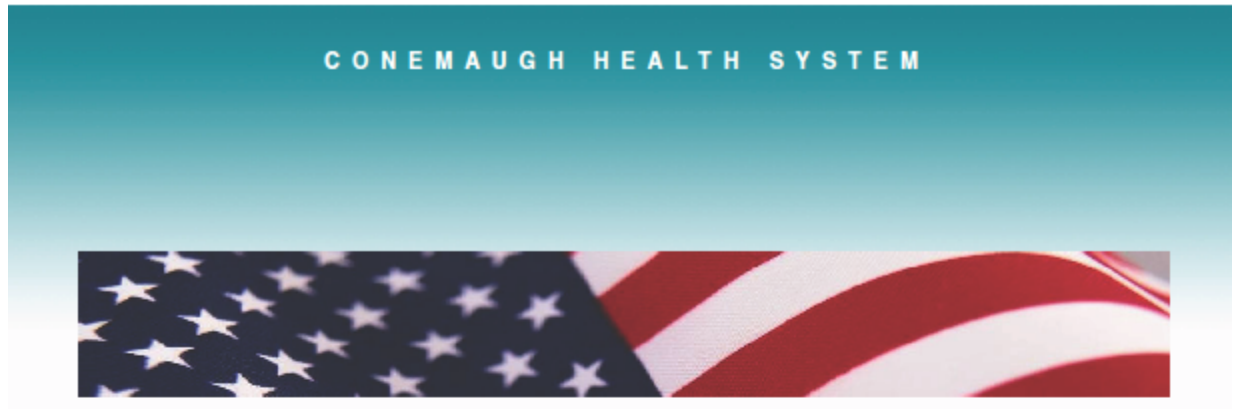
Shared Information includes:
- Continuity of Care (meds, problems, allergies)
- Radiology Reports
- Emergency Room Reports
- Discharge Summaries

I Only See One Provider. Should I still Join?

Unfortunately, unforeseen accidents and emergencies occur. When they do, Conemaugh Health System services may be the closest available. Providing additional health information to health care entities in our network can help save your life in an emergency.

How Do I Participate?

Participation in this program is voluntary and free. Signing up is fast and easy! Request a form from your primary care provider or call 814-269-5277. Mail form to John Hargreaves, Conemaugh East Hills, 1450 Scalp Avenue, Suite 120, Johnstown, PA 15904

What If I Decide Not To Join?

Participation in this program is strictly voluntary. Your decision not participate will not impact the quality care you receive through the Conemaugh Health System.

Conemaugh
Health System

Appendix E – MIDHT Press Release

Conemaugh Health System one of first hospitals to join Nationwide Health Information Network (NwHIN)

Conemaugh
Health System

Home > About Us > Media Center > Press Releases > Conemaugh Health System one of first hospitals to join Nationwide Health Information Network (NwHIN)

Posted: 2012-09-11

The Conemaugh Health System is the first Pennsylvania non-government health care system and one of just 30 in the United States to go "LIVE" on the Nationwide Health Information Network (NwHIN) Exchange. The NwHIN Exchange is sponsored by the federal government's Office of the National Coordinator as a way to securely share health information over the Internet – aka Health Information Exchange.

The Conemaugh Health System, comprised of Conemaugh Memorial Medical Center, Conemaugh Miners Medical Center, Conemaugh Meyersdale Medical Center, and the Conemaugh Physician Group has attained NwHIN Exchange operational status as part of the Military Interoperable Digital Hospital Testbed (MIDHT), a research and development pilot project designed to promote secure health information sharing between government and private sector healthcare systems.

The goal of the project at Conemaugh is to securely exchange electronic medical records and patient data with external organizations, including the James E. Van Zandt VA Medical Center in Altoona through the Virtual Lifetime Electronic Record (VLER) pilot program. With over 3,000 veterans seeking care from both organizations, clinicians will have on line access to more health information by accessing the "NwHIN Exchange." Conemaugh will provide continuity of care records, hospital discharge summaries and radiology reports to partners in order to improve care coordination, enhance decision making and reduce duplicate testing. Shared patients will be contacted via postal mail in the coming weeks to enroll into the program.

"We are excited to participate in the VLER program, the first in the state of Pennsylvania. I encourage veterans to complete both consent forms and hope providers utilize the "Exchange" to improve care in our region," said John S. Hargreaves, MIDHT Project Manager.

Conformance testing to ensure compliance with messaging, privacy and security specifications was completed with the Office of the National Coordinator for Health Information Technology, part of the Department of Health and Human Services. After review, Conemaugh was accepted as a Participant in the "NwHIN Exchange".

The MIDHT project is sponsored by the U.S. Army Medical Research & Materiel Command's (USAMRMC) Telemedicine & Advanced Technology Research Center (TATRC) and is funded by the Department of Defense through Contract # W81XWH-10-2-0180. Northrop Grumman Corporation is a subcontractor to this