
VA Center for Applied Systems Engineering



VA-CASE

FY13 Annual Report

FY13 Annual Report

Message from the VA-CASE Director

FY13 was a year of transformation for VA-CASE!



Through the tremendous efforts of our staff, faculty, and academic partners, VA-CASE successfully expanded our organization in FY13, upholding our mission of becoming the primary resource for Health Systems Engineering expertise within VHA.

We are proud to recognize and celebrate the remarkable accomplishments of the VA-CASE staff and faculty, our primary academic partners, Wayne State University and Purdue University, as well as the considerable support of our many VHA partners throughout 2013.

Partnership

In FY13, we were able to leverage our \$1.25M in annual core funding into a total of \$12.4M center funding through expanded partnerships with several VHA National Program Offices, including CBO Purchased Care and Business Policy Program, the Office of Patient Care Services, and the National Homeless Program Office.

Engagement

Our staff and faculty supported over 488 on-site engagements across 124 VHA healthcare facilities, 9 VISN offices and 18 National Program Offices.

Innovation

Through the use of our *Innovation to Impact* rapid deployment strategy, we were able to deploy over 55 initiatives across VHA, with average timelines from concept to field implementation at 12-18 months, while maintaining the highest levels of quality and customer satisfaction.

We would like to express our continued gratitude to our sponsors and key stakeholders: the Indianapolis, Ann Arbor and Detroit VAMC Leadership teams, the VISN11 Leadership team, and VHA Quality Safety and Value (QSV).

Our vision for FY14+ is to continue extending and expanding the application of Health Systems Engineering in support of the transformation of VHA healthcare. We look forward to realizing this vision through the exciting future projects and partnerships at VA-CASE.

Heather Woodward-Hagg, PhD

Heather Woodward-Hagg
Director

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Executive Summary

Center Overview

The VA Center for Applied Systems Engineering (VA-CASE) is an interdisciplinary Veterans Engineering Resource Center (VERC) built on a philosophy of partnership between Healthcare Systems Engineering (HSE) faculty and VHA administrative and clinical management and staff. Our center leverages the significant expertise present within VHA medical centers and affiliated academic partners in operational and technical systems engineering, informatics and implementation science to facilitate transformation within VHA healthcare delivery systems.

VA-CASE is playing a key role in enabling and facilitating this emergent field of Health Systems Engineering (HSE). HSE initiated the NAO/IOM report, “Building a Better Healthcare Delivery System: A New Engineering Health Care Partnership” (2005). Initially envisioned as the hybrid application of operations and systems engineering for the optimization of healthcare delivery systems, HSE is now recognized as an independent engineering discipline encompassing the design, analysis, and management of healthcare delivery systems, including technical as well as social and sociotechnical systems involved in the delivery of healthcare. VA-CASE is currently one of the largest HSE centers in the country.

Within VA-CASE, we strive to be a model for the integration of HSE among clinical, administrative, operations, academic, and research partners within VA healthcare at the local, regional, and national levels. This focus on integration, rather than consultative engagement, ensures that VA-CASE faculty and staff respond to genuine VHA priorities in order to develop innovative methods for applying HSE toward improved healthcare for Veterans.

Highlights

The focus of our center continues to be building the technical and administrative foundation to enable and facilitate development and diffusion of HSE within VHA Healthcare Delivery.

FY13 was a year of significant growth for VA-CASE. We more than doubled the number of engagements across the VHA as compared to the prior year (FY12). To support these expanded efforts, we added partnerships with two new academic partners—Worcester Polytechnic Institute and Northeastern University—and grew our technical and administrative staffing by over 50%, resulting in our current organization of 120 funded VA-CASE staff and faculty.

VA-CASE provided over an estimated 13,000 days of Industrial, Systems Engineering and Informatics support across 124 VHA facilities, 9 VISN offices and 18 National Program Offices in FY13. This support generated an estimated cost savings of over \$8M over externally contracted engineering services. The type of expertise provided ranged from facilitation support for over 231 Lean training events, to development of interactive simulation models in support of programs working to eliminate Veteran homelessness.

We produced several products and programs with significant national impact. The Purchased Care Non-VA Medical

Care National Standardization and FBCS Optimization continue to inform national roll-out of Purchased Care programs. The VA-CASE/Purdue Lean Certification and Training Program engaged over 6,700 VA staff during FY13 in Lean/SR/OSE principles, with an estimated cost savings of over \$5.7M when compared to external Lean Training consultant rates. The continuing partnership with the VHA Homeless Program enabled integration of systems engineering methods into the Homeless Reduction Project, which resulted in identification of the projected number of homeless Veterans between 2013 and 2015 by VA Medical Center (VAMC) Catchment Area and the proactive identification of resource gaps in meeting the needs of Veterans facing homelessness.

VA-CASE continued to expand its support and expertise with National Program Offices to include the Office of Patient Centered Care (OPCC) and Emergency Women's Services (EWS) through our expanded partnership with the Office of Patient Care Services.

VCD Lab In FY13

The Veteran-Centered Design Lab was developed by VA-CASE staff Andrew Carlstrom and Chris Hughes in partnership with the HSR&D Human Computer Interaction (HCI) lab at the Roudebush VAMC in Indianapolis, IN. The VCD Lab serves to aggregate expertise in Ergonomics, HCI, Human Factors Engineering, Design Thinking and Systems Engineering to support healthcare facility and work-station design derived from users' needs. The center includes dedicated, reconfigurable space as well as portable equipment that allows prototyping, simulation and testing of clinical workspace, patient care design layout alternatives, and patient experiences.



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Site Map of VA-CASE Engagement/Support/Training by VHA Facility/VISN Office

The U.S. map indicates the VHA facilities and VISN offices where VA-CASE staff and faculty provided engineering and/or informatics consultation, training or project team support in FY13. Note that individual markings may indicate multiple engagements. In FY13, 488 distinct engagements (engineering and/or informatics consultation, training or project team support) were conducted by VA-CASE staff and faculty across 124 facilities (88% of all VHA healthcare facilities), 9 VISN offices and 18 National Program offices. Appendix C provides an overview of the types of engagements by site for FY13 as well as an overview of the types of engagements by site from FY09-13.



Markers denote VA-CASE Industrial Engineer or Informatics support/training or engagement activity. Individual markings may indicate multiple engagements. (See Appendix C and D for a detailed breakdown by Program.)

VA-CASE Performance Against Strategic Goals, FY13

VA-CASE strives to ensure that our initiatives are aligned to directly impact the VHA Strategic Pillars: Leading People, Leading Change, Business Acumen, and Results Driven. Our leadership team has developed VA-CASE Strategic Goals and Targets in order to assess and measure this impact. A complete summary of these goals and targets from FY09-FY13 is featured in the table below.

In FY13, we continued to meet or exceed performance goals for all strategic targets. Employee retention rates were above target, at greater than 89% across our 75 VA-CASE VHA IE and non-IE employees. Through active recruitment and employee development programs, we maintained the number of VA-CASE employees with Veteran status at greater than 35%, with 19% of VA-CASE staff/faculty at greater than a thirty percent service-connected disability rating. We leveraged our annual \$1.25M in core funding by nearly 9X, resulting in a FY13 budget of \$12.4M. In FY13, that investment returned nearly 1.74 in value (as compared to GSA rates for similar services), with over 33% of our funding supporting the development of new products and innovations. Of the 75 projects on-going in FY13, nearly 90% were partnerships with VHA National Program Offices and over 76% are currently in national deployment.

Strategic Pillar	Strategic Goals	VERC Annual Objective	Strategic Targets	Goal/Target	VA-CASE Annual Results			
				VA-CASE Goals	FY09/10	FY11	FY12	FY13
Leading People	*Successful Integration of Industrial and Systems Engineers within VHA	*Improve/Maintain VERC Retention and Student Conversion	- % Retention (Technical Staff)	>80%	88%	92%	97%	89%
			- % Retention (non-Tech Staff)	>70%	83%	100%	100%	100%
		*Provide Robust Work Environment	- # of VA-CASE VA Employees	varies	23	38	51	75
	- # of VERC Contracted Staff		varies	10	15	25	45	
	- AES Scores		>4	NA	3.9	4.2	3.96	
	*Support Veteran Workforce of the Future	*Increase % of VERC hires that have veteran status	- % employees with veteran status	>25%	17%	26%	39%	36%
- % employees with >30% SC disability			>10%	4%	16%	25%	19%	
Leading Change	*Provide Highest Levels of Customer Service	*Develop/Deploy Robust Program and Project Management Infrastructure	- % on-time project start	>90%	100%	100%	98%	100%
			- % of project with 100% deliverables met	>80%	95%	81%	88%	91%
			- % on-time project completion	>70%	95%	86%	85%	88%
Business Acumen	*Support VHA Culture of Fiscal Responsibility	*Leverage core funding for partnerships with other non-SR/VERC entities	- Total amount of VERC Funding by FY	varies	\$2,600,000	\$4,773,000	\$8,500,000	\$12,400,000
			- % of funding non-SR/VERC	>75%	38%	79%	79%	90%
		*Demonstrate/Validate VERC ROI	- % ROI as compared to GSA	>1.5X	1.97	1.90	1.88	1.74
			- % of funding to new products/innovation	>25%	23%	34%	35%	33%
Results Driven	*Enable development, testing and wide-spread deployment of innovative models of care delivery	*Expand External (non-VERC) Partnerships	- Total # of projects	varies	20	36	52	75
			- % of projects w/ National Program Office Partnerships	>75%	95%	92%	88%	90%
			- % of projects w/ VISN/Facility partnerships	>50%	65%	58%	62%	77%
	*Enable/Facilitate more rapid translation and deployment of research into practice	*Expand HSRD/QUERI Partnerships	- % of projects in National Deployment	>50%	65%	64%	54%	76%
			- % of projects w/ HSRD/QUERI partnerships	>20%	20%	25%	23%	24%
		*Increase publications/presentations related to VERC work	- # of presentations	varies	15	26	12	29
- # of publications	varies		9	6	13	19		

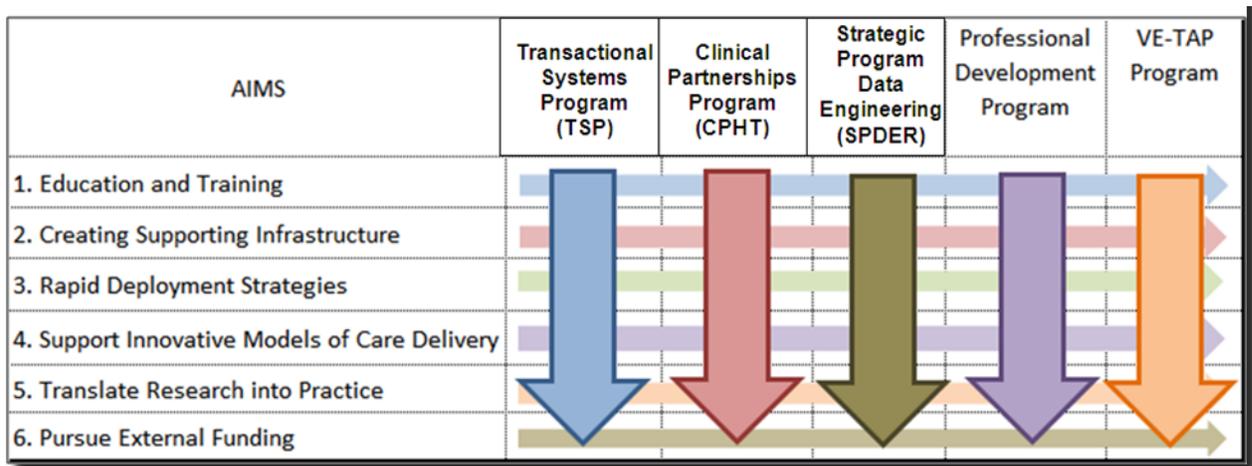
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VA-CASE Mission/Vision

VA-CASE aims to integrate HSE within VA healthcare delivery systems in order to promote systems improvement and support the implementation of innovative models of care delivery. VA-CASE’s mission is to become a catalyst enabling collaboration among clinical, administrative, operations, academic, and research partnerships within VA healthcare at local, regional, and national levels. Our specific aims include:

Specific AIMS

1. Develop/implement **education and training** programs based in HSE disciplines, methods, and tools.
2. Optimize the VHA administrative **infrastructure** to allow integration of HSE resources into the executive leadership and the operational and clinical management structures of VHA facilities.
3. Deploy **rapid implementation strategies**, utilizing HSE techniques, such as Lean and Six Sigma, to enhance implementation and spread of transformed delivery processes.
4. Design, test and implement new clinical and administrative processes that support the development and implementation of **innovative models of care delivery**.
5. Support implementation, effectiveness and evaluation research that enables more rapid translation of clinical and health services **research into practice**, promotes innovation in operational processes, and enhances partnerships with researchers.
6. **Pursue external, non-VA funding** to support research and implementation of health systems engineering (HSE) within VISN11 and the rest of VHA.



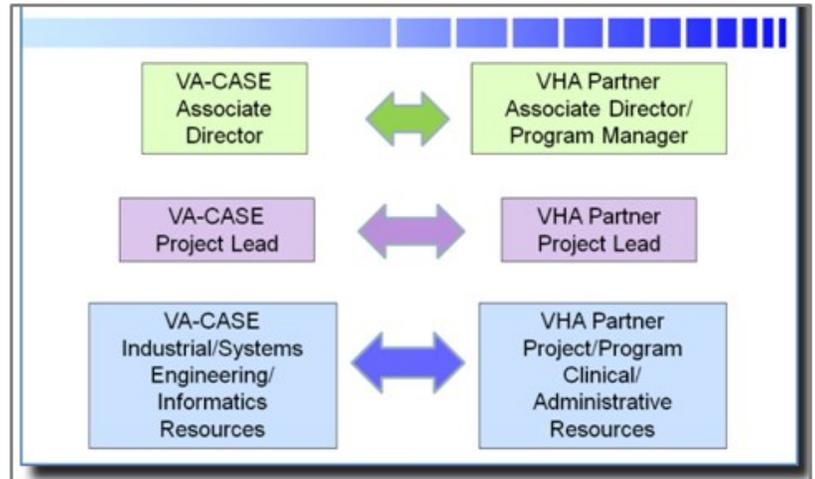
VA-CASE Partnerships

VVA-CASE utilizes a ‘Paired Partnership’ model to align and integrate our resources with partner resources at all levels of the organization, as outlined in the graphic to the right.

Additionally, we will continue to broaden the focus and scope of our five autonomous VA-CASE Program Offices—Transactional Systems Program (TSP), Clinical Partnerships in Health Transformation (CPHT), Strategic Programs and Data Engineering Resources (SPDER), Professional Development Programs and the VHA Engineering Technical

Assistance Programs (VE-TAP)—to allow future growth and innovation into FY14+.

VA-CASE staff and faculty consider our ongoing partnerships with VHA National Program offices, as well as our academic affiliates, to be integral to the successful integration of HSE within VHA healthcare delivery systems. A current outline of VA/VHA and academic/affiliate partners are listed below. The initial partnerships have been expanded to include Worcester Polytechnic Institute and Northeastern University. Throughout FY13, we worked to expand both the VHA and academic/affiliate relationships to ensure a continuous stream of non-core funding as well as Industrial/Systems and Informatics capacity to meet our customers' needs.



VA/VHA Partners	
<ul style="list-style-type: none"> • VISN11 Network Office • Indianapolis VA Medical Center • VA Ann Arbor HCS • Detroit VA Medical Center • VA HSR&D Center Indianapolis • Stroke QUERI • HIV/AIDS QUERI • VISN11 Contracting Office • VHA Office of Patient Care Services (PCS) • VHA Office of Patient Centered Care (OPCC) • VHA Purchased Care Program Office (CBO) • VHA Business Policy Division (CBO) • VHA National ISO9000 Compliance Division (ICD) • VHA Office of Sterile Processing (OSP) 	<ul style="list-style-type: none"> • VHA Office of Informatics/Analytics (OIA) • VHA National Real Time Locating Systems PMO (RTLIS PMO) • VA Office of Policy and Planning (OPP) • VHA National Activation Office (NAO) • VHA Central Patient Account Centers (CPACs) • VHA Health Benefits Appeals (HBA) • VHA Office of Analytics and Business Intelligence (ABI) • DOD Bureau of Medicine, Navy Department • VHA Access and Clinic Administration Program (ACAPs) • VHA National Office of Specialty Care (OSC) • VHA Office of Specialty Care Transformation (OSCT) • VHA National Surgery Office (NSO)
Academic/Affiliate Partners	
<ul style="list-style-type: none"> • Wayne State University • Regenstrief Institute • Purdue Center for Medication Safety Advancement • Purdue School of Engineering & Technology • Indiana University School of Medicine • Worcester Polytechnic Institute • University of North Carolina (UNC)– Chapel Hill • University of Georgia • Northeastern University 	

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FY14+ Plans

Our focus for FY14+ will be to continue efforts to direct our center toward a sustained, customer-oriented Veterans Engineering Resource Center within VA. In FY14+, we will leverage existing partnerships to continue developing and managing a balanced portfolio of projects (i.e. Project Pipeline) across all of our programs. Our portfolio will continue to support rapid project development from proof-of-concept to national dissemination in 12-18 month cycles. We will strive to create and facilitate a culture that will foster innovation among our staff and faculty, and ensure commitments to customers are fulfilled and projects are supported through to national dissemination and deployment.



Organizational Chart

The VA-CASE organizational chart is outlined below. VA-CASE is composed of 6 semi-autonomous program offices, each with an Associate Director and Deputy Directors in supervisory roles. The VA-CASE Director's staff provides continuity in fiscal, contracting, HR and other administrative process across the organization. VA-CASE operations oversight is provided by the VA-CASE steering committee, led by Mr. Paul Bockelman, VISN11 Network Director and the Medical Center Directors from the Indianapolis, Detroit and Ann Arbor VA Medical Centers.



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VA-CASE Innovation to Impact Deployment Strategy

One of VA-CASE’s core strengths is the application of Rapid Cycle Innovation, Implementation, and Impact strategies for project deployment in each of our primary programs. Phases of this strategy include:

Innovation Phase:

Planning: During the planning phase, initial customer insights lead to the identification of problems and the development of an initial project proposal. Proposals are developed and vetted through a review process.

Current State Analysis: Within this phase, current state assessment and evaluation is completed.

Proof of Concept: Initial future state is developed and the innovation is fully integrated.

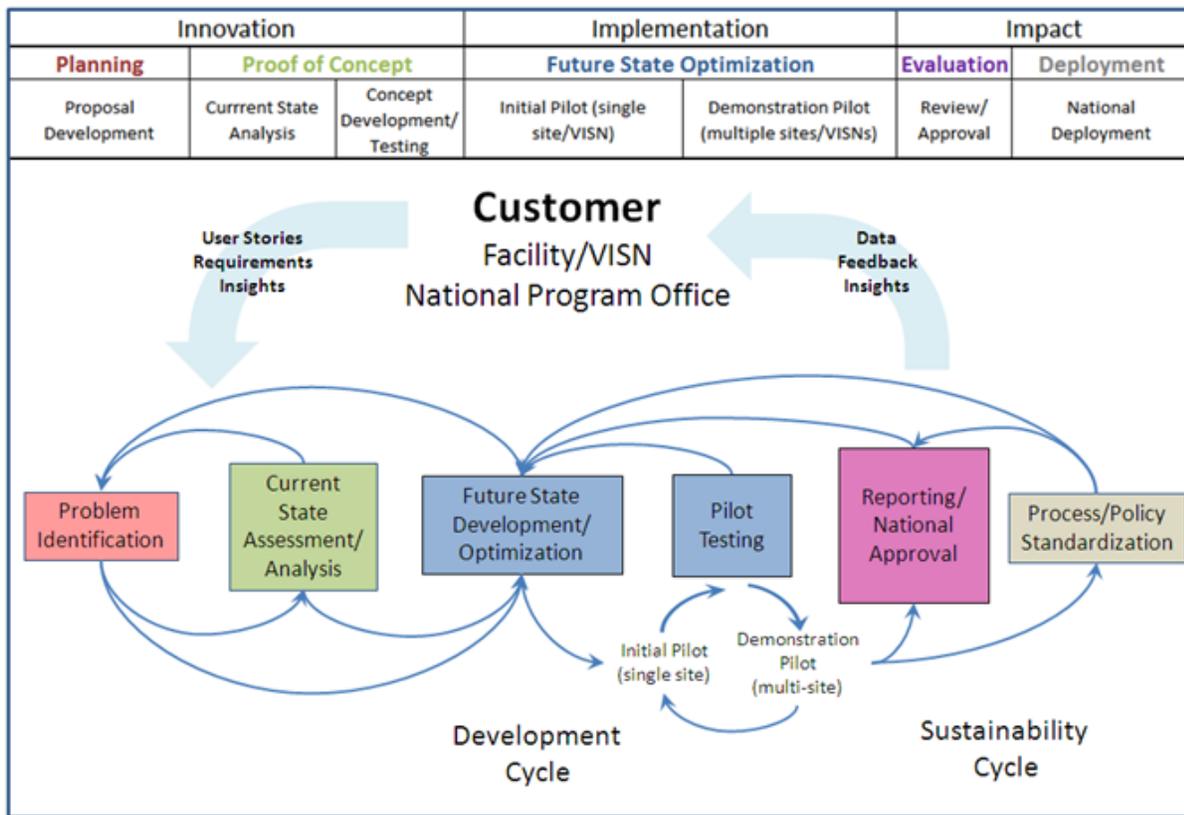
Implementation Phase:

Future State Optimization: Following future state development, pilot testing is conducted in progressively more complex environments (single site to multiple sites/VISNs). The primary characteristic of this phase is the rapid, customer-centered, continuous development cycle to inform optimization of the future state.

Impact Phase:

Evaluation: Reporting and national approval for the optimized future state is obtained.

Deployment: National implementation, reporting/auditing and policy changes implemented as appropriate.



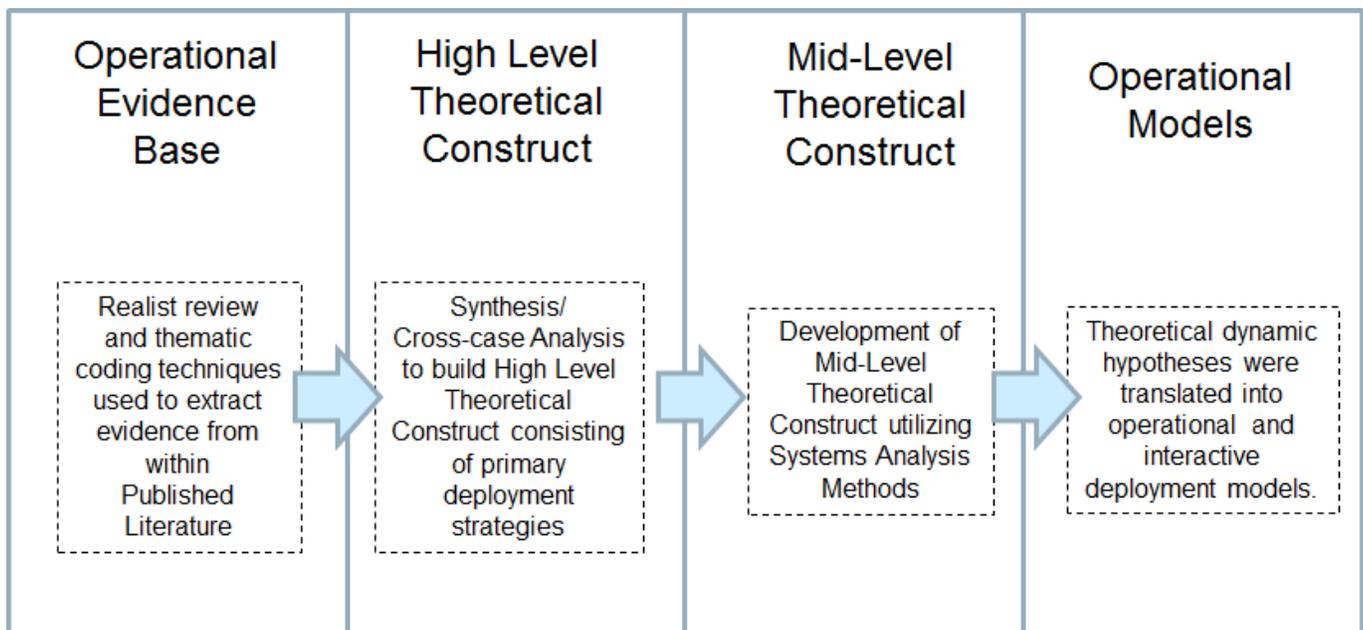
VA-CASE Evidence Based Management Integration Framework

Evidence Based Management (EBMgt) describes the translation of research evidence base into management practice. This field is analogous and complimentary to the clinically based Evidence Based Practice (EBP) efforts that facilitate translation of the clinical evidence base into provider practice.

VA-CASE has developed and deployed a framework for the integration of systems approaches within an Evidence Based Management (EBMgt) Framework:

1. **Build the Operational Evidence Base:** Realist review and thematic coding techniques are used to extract key operational evidence.
2. **Synthesis of Evidence into High-level Theoretical Construct:** Cross-case analysis methods are used to compare, contrast and synthesize the evidence base from the Realist Review into high level deployment strategies and primary outcomes.
3. **Development of Mid-level Theoretical Construct:** The synthesized evidence base is translated into mid-level theoretical dynamic hypotheses.
4. **Translation into Operational Model:** Key parameters and model structure of theoretical dynamic hypotheses are translated into interactive Operational Deployment Models.

Evidence Based Management (EBMgt) Framework



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Progress Against AIMs

AIM1: Develop and implement training and educational programs based in HSE disciplines, methods and tools.

VA-CASE training and educational programs focus on the development, dissemination and evaluation of HSE, Lean, Systems Redesign, and Clinical Informatics training programs for Senior Executive, Management, and Front-Line clinical and administrative staff. Within our education programs, interdisciplinary teams composed of VHA and VERC staff partner with faculty from our academic affiliates, adapt traditional training curriculum to VA-specific requirements, and develop innovative techniques for integrating accelerated learning methods. Significant accomplishments toward this aim include:

- **VHA Lean Training Programs:** The VA-CASE/Purdue Lean Training, Education and Certification Programs have continue in dissemination nationally for the Yellow Belt (Practitioner), Green Belt (Facilitator), Black Belt (Program Manager) and Senior Executive levels. In FY13, over 6,700 VHA staff and faculty participated in our Lean Training Programs across more than 80 facilities, VISN and national offices.
- **VHA Lean Six Sigma Training Programs:** VA-CASE partnered with the CBO Purchased Care Program to develop/deploy a VHA-specific Lean Six Sigma Black Belt Training program. This 9-month program resulted in the completion of 11 Black Belt Level Lean Six Sigma projects, with 11 Black Belt participants and 27 Green Belt participants.
- **CPAC Lean Program:** In partnership with the Consolidated Patient Accounting Centers (CPACs), VA-CASE developed and launched a CPAC-specific Lean education program. Each of the six CPAC sites received training and facilitation at the Senior Level, Yellow Belt, Green Belt and Black Belt levels with over 90 sessions and 2500 participants.
- **VA Lean Practitioners Network:** The VA Lean Practitioners Network (VALPN) is an informal social networking forum for VA practitioners of Lean Healthcare hosted by VA-CASE staff and faculty. To date, this network has over 500 regular VHA participants.
- **VHA Lean Certification:** In FY13, VA-CASE developed and deployed an internal VHA Lean Certification Program at the Yellow Belt, Green Belt and Black Belt Levels. To date, over 1,300 VHA staff have enrolled in this program.
- **Lean Management Pilots:** In FY13, VA-CASE successfully launched the Lean Management Pilot across 7 VHA facilities in order to test the translation of transformational Lean Deployment Strategies within VHA. Participating pilot sites receive Lean Sensei and facilitation/training support in order to test/develop a Continuous Improvement Culture, including expertise and guidance in Large-Scale, System-level improvement efforts (Value Streams); Small-scale, unit-level improvement efforts (Continuous Daily Improvement); Strategic Deployment; and Leadership Development.

Impact to VHA:

- Over 6,700 staff participating in Lean Training Programs in FY13 (16,700 FY09-13), over 1300 staff in queue for certification.
- FY13: \$5.7M in cost savings (as compared to training costs for external programs)

- FY09-13: \$15M in cost savings (as compared to training costs for external programs)
- Lean Enterprise Transformation strategy was translated and is now in testing/validation at 7 VA facilities. Infrastructure/capacity for future diffusion is currently under development (Lean Management System).

AIM2: Optimize the VHA administrative infrastructure to integrate HSE resources into the executive leadership, operational and clinical management structures of VHA facilities.

VA-CASE support for optimizing this AIM has focused on three primary areas: 1) building healthcare-based HSE capacity through active recruiting and effective staff development; 2) supporting development of more robust informatics infrastructure; and 3) initiating and supporting programs that facilitate executive leadership engagement with HSE and operations and clinical management.

In support of this AIM, VA-CASE provided primary HSE support to several high-visibility national initiatives, including the Office of Informatics and Analytics (OIA) T-16 HMP/Hi2 Usability Analytics Project, the National Homeless Program Office, and the Health Benefits Appeals Office. Significant accomplishments include:

- **IE/HSE Recruitment:** In FY13, VA-CASE successfully recruited and hired an additional 20 BS/MS/PhD level Industrial Engineers and Informatics staff for a total of 62 BS/MS/PhD level Industrial and Systems Engineers and Informaticists. Of these positions, retention in FY13 was 89%.
- **Engineering Intern/Co-op Program:** VA-CASE established an engineering internship program with multiple academic partners, resulting in 17 student interns in FY13. Three of the 4 graduating students (75%) were hired in VA-CASE positions upon graduation
- **Executive Sensei Program:** As part of the Lean Management System Pilot program, VA-CASE has provided over 790 days of Executive and mid-level Lean Sensei support to Lean Management Systems Pilot site leadership teams. This support includes mentorship and coaching on the application of Lean tools and methods, including A3 Thinking, Continuous Daily Improvement, Strategic Alignment/Deployment, Rapid Improvement, and Daily Management at the executive and mid-management levels—in support of Lean Enterprise Transformation.
- **Hi2 Usability Analytics:** The hi2 Usability Analytics Project is designed to investigate the feasibility and potential value of creating a Usability Analytics Platform to monitor the efficiency, effectiveness, and satisfaction of the emerging Health Management Platform (HMP). The project aims to make a business case for why a usability analytics platform is necessary for the continued improvement of Electronic Health Records (EHRs) and the quality of healthcare provided to our Veterans.
- **Health Benefits Appeals:** In FY12/13, VA-CASE partnered with CBO's Business Policy department to design, develop, and implement an extensive database and corresponding web-based application for CBO's Health Benefits Appeals (HBA) process. The HBA process is an administrative procedure that provides Veterans a method for requesting a review of an adverse decision issued by the VHA regarding a requested benefit. The developed applications significantly improved visibility into the appeals process and CBO's ability to track and monitor health benefits appeals.
- **Make/Buy Decision Models:** VA-CASE faculty and staff have developed computer-based cost models that allow for service-specific and area-specific decisions regarding the internal versus external cost comparison of Specialty Care Services. The goal is to develop computer-based decision models that VA can use to aid

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decision-making by VA physicians and facilities as care needs are identified. Make/Buy models for Dialysis, GI Clinical Procedures, Polysomnography/Sleep Studies and Acute Stroke/tPA have been developed and deployed nationally.

- **Integrating Systems Engineering into Homeless Programs Operational Planning:** The VHA Homeless Program partnered with VA-CASE to complete a gap analysis of VHA homeless programs. This analysis utilized a planning scenario to identify the current and projected numbers of homeless Veterans between 2013 and 2015 by VAMC catchment area. It also identified current and projected VA and community assets available to address the needs of homeless Veterans. Estimated needs and assets were compared to determine whether VA and VAMC catchment areas had sufficient resources to meet the estimated needs of homeless Veterans through the end of 2015. A first phase of the gap analysis has been completed on all 140 VAMCs.
- **Patient Panel Size Intensity Adjustment Model for Patient Aligned Care:** VHA's Office of Informatics and Analytics (OIA) desired to modify and improve the current model to calculate primary care work intensity scores. VE-TAP Team examined the existing model and, based on the evaluation, identified opportunities for improvement in the model for prediction accuracy. The proposed version of the model combines patients' health conditions with their demographic information to predict their total demand on Primary Care on a yearly basis. To assist in Primary Care management, the patient-level data was further aggregated to the provider, division, and station levels. By identifying panels of comparative predictable workloads, telephone encounters were included and the total workload among providers was balanced as part of the new team-based healthcare system.
- **VA PAIRS Project:** The VA National Chaplain Service required a systematic review of the Practical Application of Intimate Relationship Skills (PAIRS) model. This project developed a framework to integrate, sustain, and expand the PAIRS model. PAIRS is an educational tool utilizing couples counseling retreats to teach communication skills. The team evaluated the current program to document business processes, track key metrics throughout program implementation, and develop a national-level sustainment plan for the VA PAIRS program.
- **Readmission Causal Analysis and Resolution Toolkit (RCART):** This project is designed to evaluate and improve patient re-admission rates by providing methodologies for identifying patients prone to high re-admission and proactively target solutions for reducing the factors that lead to their re-admission following in-patient treatment. A web-based toolkit was developed to assist providers in extracting and analyzing the relevant data to identify high risk readmission patients, identifying the related factors leading to potential readmission and administer appropriate interventions for identified high-risk patients. Models are currently in validation.
- **Program Management Issues and Resolutions System (PrMIRS):** The PrMIRS system is a SharePoint based tool to provide a repository for project management documents, automated tracking of project timelines, milestones and deliverables as well as program and project management visual dashboards for real-time tracking of project portfolios. This project is currently completing Alpha test and scheduled for national deployment in FY14.
- **Beneficiary Travel:** The Beneficiary Travel (BT) initiative is a nationwide effort to improve and standardize processes for Veteran Travel across VHA. VA-CASE Clinical Application Coordinators (CACs) designed content and programming, created ViSTA/CPRS templates, maintained documentation and completed a technical installation guide for these CPRS templates.

Impact to VHA:

- Capacity/expertise of 62 fully-integrated IE/OSE/Informatics technical staff within VHA
- Over 80 VHA Senior Executives coaches and mentored in application of Lean Transformation concepts
- Significant expansion in the application Systems Engineering within executive, operations and clinical management (Office of Informatics/Analytics, Office of Patient Care Services, Office of Patient Centered Care, VA Office of Policy and Planning, Health Benefits Appeals, Chief Business Office)

AIM3: Deploy rapid implementation strategies to enhance implementation and spread of transformed delivery processes, utilizing HSE techniques such as Lean and Six Sigma.

Primary support for this AIM comes from the VA-CASE Professional Development and VHA Engineering Technical Assistance Programs (VE-TAP). The Professional Development Program provides local and national capacity in coaching interdisciplinary teams to apply rapid implementation strategies, such as Lean and Six Sigma, that improve and optimize current administrative and clinical delivery processes. VA-CASE initiatives supporting this AIM utilize the training and innovative methods developed in AIM1 and AIM2 to facilitate the implementation of transformed delivery processes outlined in AIM4. Achievements include:

- **Lean Management Pilots:** The seven LMS pilot sites conducted 18 Value Stream Analysis sessions, conducted over 96 Rapid Improvement Events, with over 800 unique staff participating in these events. Additionally, these sites initiated Continuous Daily Improvement activities in over 78 departments, resulting in over 1400 localized improvements implemented.
- **Knowledge Management:** In FY13, VA-CASE (in partnership with the HIV/AIDs QUERI) expanded the library of Improvement Resource Guides (Toolkits) to include Lung Cancer, Prostate Cancer, Colorectal Cancer, Head and Neck Cancer, Palliative Care and PACT Improvement Resource Guides. These web-based tools provide a central location for Systems Redesign teams to manage and share information related to the timeliness and reliability improvement of the continuum of Cancer Care. These sites have received over 15,000 unique users since their launch in September 2010.
- **National Activations Office Knowledge Management Portal (NAO KMP):** VA-CASE analyzed the FY14 work requirements for the NAO and developed a 2nd iteration Knowledge Management Portal (KMP) to allow NAO to focus on enterprise customer needs and the design and expansion of internal processes, while simultaneously constructing virtual collaboration, communication and oversight for knowledge portal functions.
- **Utilization Management Toolkit Development:** Sponsored by the Office of Utilization and Efficiency Management, VA-CASE is providing a mixed-methods evaluation of high-performing UM sites across VHA, recommendations of models that could be spread within UM across VHA and compiling the content for a new online toolkit to support improved delivery of UM within VHA facilities.
- **VA-CASE Toolkit Series:** The Toolkit Series is a unique partnership between the Office of Patient Care Services, Office of Quality and Performance, Office of Systems Redesign, as well as the QUERI programs and VA-CASE in order to provide access to collections of ready-to-use, concrete innovations (tools) that can be implemented in departments and facilities to assist with improved process and clinical performance. To date, this series has over 12,000 subscribers and 17,000 unique visitors across Cancer, PACT and Specialty Care Toolkit Series.

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- **Wounded Warrior Project Lead Coordinator Support Project:** The Lead Coordinator (LC) model was created by a joint task force between DoD and VA for better Wounded Warrior Care Coordination. To evaluate the success of this model, VA-CASE is providing analysis, feedback and monitoring of the primary metrics associated with this program.
- **Rapid Process Improvement Workshops (RPIWs):** To date (FY09-13) , VA-CASE has conducted over 78 RPIW Facilitation Training Courses (4000 participants), co-facilitated over 32 RPIWs and certified 69 RPIW facilitators across VHA (another 351 are in queue to be certified).
- **Virtual Rapid Process Improvement Event Facilitation (RPIE) Workshops:** In FY13, VA-CASE staff and faculty developed and piloted a virtual training program for RPIE facilitators utilizing flip instruction methods. Two sessions were conducted in FY13, including thorough evaluation to compare/contrast effectiveness against traditional face to face facilitation instruction.

Impact to VHA:

- Rapid Deployment strategies have been fully translated, validated and in use in/across VHA: Rapid Process Improvement Workshops and Innovation to Impact Deployment Model.
- Innovative Knowledge Management Strategies were fully developed, successfully applied, and effectively spread across multiple clinical pathways, with over 17,000 unique users. (VA-CASE Toolkit Series, NAO KMP)
- Lean Management Pilots have successfully integrated rapid improvement techniques throughout the organizations as part of enterprise transformation efforts.
- Wide-spread recognition of VHA as leader in HSE translation, application, and diffusion within healthcare delivery through our extensive publication and presentation portfolio.

AIM4: Design, test and implement new clinical and administrative processes that support the development and implementation of innovative models of care delivery.

VA-CASE has provided significant support to national VHA programs in developing and testing innovative strategies for redesign, evaluation and characterization of optimal VA clinical and administrative processes. To achieve AIM4, project teams work to fundamentally redesign administrative and clinical processes to optimize quality, timeliness and cost of healthcare delivery. Pilots of innovative processes developed and tested within the FY13 project cycle—including Re-Usable Medical Equipment, Fee Basis Claims System Software Optimization, Non-VA Medical Care Coordination, Surgical Flow and Specialty Care—are currently in national roll-out. Significant accomplishments associated with this AIM include:

- **Specialty Care Collaborative:** In FY12/13, VA-CASE provided support for 23 facility-based teams in the VHA National Specialty Care Collaborative (pilot phase). VA-CASE IE staff provided support in the development/deployment of measurement tools and knowledge management to inform the collaborative and further refine the PACT Change Package.
- **Surgical Flow Improvement Initiative:** In FY12/13, VA-CASE provided coaching, facilitation and coordination support for the National VHA Surgical Flow Improvement Initiatives (SFII). The SFII provided a hybrid collaborative model, with integration of virtual symposia and on-site Rapid Process Improvement Workshops (RPIWs) facilitated across 20 participating facilities (40 RPIWs) by VA-CASE staff/faculty.
- **Fee Basis Claims System (FBCS) Optimization:** VA-CASE, in partnership with Chief Business Office

Purchased Care (CBOPC) Program, completed the Alpha and Beta testing for optimized FBCS work processed. The results showed significant improvement in claims processing times and volume of claims processed per day. This project is currently in full national deployment.

- **NVNS:** The Non-VA Medical Care National Standardization (NVNS) project is a collaborative effort between CBOPC and VA-CASE to standardize business processes associated with the execution, management, and oversight of all Non-VA Medical Care programs and functional areas. The NVNS project encompasses the entire Non-VA Medical Care process, from the time a consult for Non-VA care is entered into CPRS until the claim is received and paid, as well as the following seven program/functional areas: Hospital Notification, Referral Requests/Authorizations, Customer Service, FBCS Claims Processing, VistA Claims Processing, Appeals, and Financial Management.
- **Clinical Program Consulting:** In August 2012, CBOPC–Business Systems Management (CBOPC–BSM) requested that VA-CASE provide clinical consulting services during FY13 to 1) support successful enterprise-wide deployment of the Non-VA Medical Care Coordination (NVCC) model; 2) ensure the alignment of clinical business processes between NVCC and the future VHA non-VA medical care software package (Health Claims Processing, or HCP); and 3) assess the clinical business components across 22 CBO Purchased Care initiatives. Additionally, VA-CASE was asked to ensure that the HCP business requirements, and their supporting business process/IT systems, met VHA clinical standards of practice. The VA-CASE team created and provided CBOPC–BSM with formal reports indicating the outcomes and process maps from each workgroup. Additional project accomplishments include: Dr. Daggett’s development of a report that set forth the Routine Newborn Care Clinical Guidelines, as well as a gap/impact analysis of the 22 CBOPC initiatives.
- **Near Real Time Decision Support System Project (NRT DSS):** The NRT DSS project uses a System of Systems (SoS) approach to implement a framework for automation of the sterile processing cycle based on the Interactive Visual Navigator (IVN). This model is currently in pilot at the Detroit VAMC.
- **Interactive Visual Navigator (IVN):** IVN is a web-based application that presents interactive, multimedia instructions for the RME reprocessing procedure. IVN provides an automated and dynamic work flow process, incorporating systems and human factors engineering principles to ease technician burden, reduce error in re-processing, provide automated data collection, support Quality Management requirements and reporting, and provide safer and better care to Veterans. The system development and deployment includes an iterative user-centered design process that relies on user feedback at each stage in Continuous Engineering Development (CED). IVN is current in deployment at 5 VHA sites.
- **Veteran Centered Design (VCD) Lab:** The Veteran-Centered Design Lab (VCD) is an innovative program in VA-CASE that utilizes a multi-disciplinary, human-centered approach to Design Thinking to transform both the delivery and experience of our Veterans’ Healthcare. The Richard L. Roudebush VAMC partnered with VE-TAP to facilitate a Stakeholder-driven, conceptual design process with the goal of consolidating these various services into an integrated, Veteran-Centered Cancer Care Center, as well as to optimize Pathology and Laboratory Services.

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Impact to VHA:

- Facilitated successful development, testing and national deployment of innovative models of care delivery across 7 distinct clinical and administrative processes within VHA (Cancer, PACT, Specialty Care, Surgical Flow, Non-VA Medical Care, Claims Processing, RME).
- Over 13,000 days of Industrial Engineering/Informatics support at a cost savings of over \$8M as compared to external consulting support + IVN purchase.

AIM5: Support implementation, effectiveness and evaluation research that enables more rapid translation of clinical and health services research into practice, promotes innovation in operational processes and enhances partnerships with researchers.

In FY13, VA-CASE worked to broaden existing collaborations to connect operational improvement and clinical researchers in VA to VERC faculty and staff. We leveraged the research expertise at our participating facilities by: (1) identifying and implementing evidence-based improvements in the delivery of healthcare (especially those developed and tested by our faculty); (2) designing strategies for implementing VERC initiatives that facilitate their adoption based on findings from the field of implementation science; (3) identifying opportunities for complementary research funding; and (4) developing research proposals for projects of mutual interest between the VERC and research centers. Significant accomplishments toward this aim include:

- **INSPIRE Stroke Collaborative:** The Intervention for Stroke Performance Improvement using Redesign Engineering (INSPIRE SDP 09-158) received funding in January 2010 through a partnership with the VHA Stroke QUERI. This study is a randomized-controlled trial of 12 VAMCs with at least 50 ischemic stroke admissions in FY07 that demonstrated room for improvement on two stroke indicators from the OQP dataset (dysphagia screening before oral intake and DVT prophylaxis). The aims of this project are to assess the impact of 1) OQP Stroke Special Project data on facility stroke improvement activities, and 2) SR-based intervention vs. quality indicator feedback alone on the improvement of two in-hospital indicators.
- **Lean Management System Deployment Strategy and Interactive SD model:** VA-CASE staff, Dr. Heather Woodward-Hagg, conducted a realist review of successful non-VA Lean Enterprise Transformation sites, identified common strategies and mechanisms enabling the development of a robust Lean Management System operational deployment strategy and interactive system dynamics model to enable testing and refinement of deployment strategies. This work is currently utilized to support the VA-based Lean Management System pilot.
- **Serious Gaming for Stroke Policy:** The VA Stroke QUERI is actively engaged in identifying opportunities for advancement in Stroke Care for Veterans. VA-CASE developed an experimentation and gaming model to help the Stroke QUERI advance strategic thinking regarding Stroke Care. VA-CASE Industrial Engineers collaborated with Faculty to create a compact System Dynamics model of the VA Stroke System of Care. VA-CASE engineers conducted multiple experimentation sessions with the Stroke QUERI. The tool will be deployed to the broader Stroke community and utilized by Stroke QUERI in their Strategic Planning cycle during FY14.
- **VA-CASE/R&D faculty member Dr. Virginia Daggett** and collaborators developed and submitted several proposals for funding, including a Care Intervention Program for stroke and traumatic brain injury (TBI)

(TASK), Stroke QUERI Rapid Response related to Nursing Education development in the delivery of High Quality Stroke Care; VETS-CARE TBI iOS application; Collaborative Attitudes of Physicians and Nurses and the Effect of Safe Patient Handling on Acute Care Patient Falls with Injury.

- **JGIM supplement:** Dr. Balmatee Bidassie, the VA-CASE CPHT Associate Director, organized a team of authors from VHA Medical Centers to develop a series of 10 manuscripts for submission to JGIM for a VHA PACT supplement in May 2013.

Impact to VHA:

- Joint R&D/HSR&D/VERC funded faculty: 7 Investigators (Edward Miech, Debi Griffith, Allissa Russ, Jason Saleem, Virginia Daggett, Elizabeth Sternke, Jaime Ringer), 2 Clinical Applications Coordinators (Jeff Fahner, Carlton (Mike) Fancher), and 3 Staff/Faculty (Angela Harris, Pearl Howard, Kathy Carlson)
- R&D/HSR&D/QUERI/SDP proposals submitted by VERC co-funded faculty: RE-INSPIRE (approved; 3-year SDP with total budget of \$946K, project started in April 2011, completed in 2013); TASK (approved; 4-year \$1M, started in 2013); Russ CDA (approved; 5-year \$563,000 started in 2013).

AIM6: Pursue external, non-VA funding to support implementation and research of operations systems engineering (OSE) within VISN 11 and the rest of VHA.

VA-CASE and our partners are pursuing funding and resources from other organizations that fund engineering research, healthcare research, and healthcare operations improvement. In future years, we anticipate pursuing funding in partnership with engineering, medicine, nursing, and other academic programs at Purdue University, University of Michigan, Wayne State University, and other academic affiliates. Examples of potential funding sources include: Agency for Healthcare Research and Quality (AHRQ), Blue Cross organizations, Institute of Medicine (IOM), National Science Foundation (NSF), and Robert Wood Johnson Foundation (RWJF).

- **Partnerships for Innovation - Accelerating Innovation Research Alliance (NSF):** VA-CASE has partnered with Northeastern University to submit a proposal for up to \$800,000 of matching funds to support translation of research from the CMS Innovation Center for Healthcare Systems Engineering into VHA Healthcare Delivery. This RFP intends to "...accelerate the translation and transfer of existing research discoveries into competitive technologies and commercial realities, to promote the development of and/or the extension of an academic-based innovation ecosystem around an NSF-funded research alliance, and to enhance knowledge and practice of innovation in faculty and students."

Impact to VHA:

Up to \$800,000 external funding for translation of Health Systems Engineering research into VHA healthcare delivery (if funded).

Program Overview

In FY13, we continued to broaden the focus and scope of the our six VA-CASE Program Offices to support future growth into FY14+:

- **Clinical Partnerships in Healthcare Transformation (CPHT):** The focus of the CPHT is to employ strategies to accelerate integration of OSE within VHA healthcare delivery systems in order to promote systems

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improvement. Key VHA partners include the National Optimizing Care Committee, National Office of Specialty Care, and the National Surgery Office.

- **Strategic Programs and Data Engineering Resources (SPDER):** The Strategic Programs and Data Engineering Resources (SPDER) Program office provides strategic programmatic support and innovation through the design and adaptation of management system theories, program management approaches and data engineering, informatics and analytics services.
- **VHA Engineering Technical Assistance Program (VE-TAP):** VE-TAP is the mechanism to provide training, mentoring, facilitation, and implementation in applying OSE rapid deployment strategies, and advanced OSE tools within VHA, VISN11, and the VHA National Systems Redesign Programs. VE-TAP is organized into the following functional areas: Operational Systems Engineering (OSE) Consultative Services Programs, Re-usable Medical Equipment (RME)/Real Time Location Systems (RTLS) Programs Initiatives, and Strategic Support Programs.
- **Professional Development Program:** The primary mission of the Professional Development Program of the VA-CASE VERC is to provide Systems Engineering-based educational activities to the VA staff and leadership. The formal training sessions, based on Lean and Lean Six Sigma Healthcare strategies, incorporate both didactic and hands-on learning experiences, methods and techniques.
- **Transactional Systems Program (TSP):** The Transactional Systems Program (TSP) is a partnership with the Chief Business Office (CBO) Purchased Care to design, test, and implement optimized business processes in collaboration with station level non-VA medical care offices. The VA-CASE Transactional Systems team of engineers and academic partners integrate applied systems redesign (SRD)/operational systems engineering (OSE) principles and tools into everyday business practices throughout the VHA Purchased Care system, which results in increased efficiency, effectiveness, accountability, accuracy and standardization of workflow and decision making.
- **VISN11 Program:** This program was instituted in late FY12 in order to support VISN11 specific initiatives.

The breakdown of the programs by staffing and funding is shown below.

VA-CASE Program Breakdown FY13						
Program	# of VA Staff	# of contracted staff	# of on-going Funded Projects	External Funding Level	Core Funding Level	# of key external customers
CPHT	7	1	10	\$1,280,000	\$85,000	4 (OSCT, NAO, NSO, MH&C)
PD	15	12	7	\$2,500,000	\$50,000	2(SR, CPAC)
SPDER	12	3	10	\$1,240,918	\$370,000	2 (OIA, NAO)
VE-TAP	15	25	28	\$4,179,082	\$45,000	9 (OPP, OSP, VBACO, 10NC, ABI, ICD, PCS, BUMED,CCMR)
TSP	14	3	7	\$1,700,000	\$150,000	2 (CBO, HBA)
VISN11	1	1	7	\$300,000	\$80,000	VISN11

Budget Summary

VA-CASE received \$43,273,000 of funding from multiple sources in FY09-present (*FY14 estimated), as depicted in the table below:

Funding Breakdown					
	FY09/10	FY11	FY12	FY13	Totals
Core Funding	\$ 1,000,000	\$ 1,000,000	\$ 1,250,000	\$ 1,250,000	\$ 4,500,000
Previous FY Carry-over	\$ 600,000	\$ -	\$ -	\$ -	\$ 600,000
Other Non-Core Funds for Projects/Training	\$ 1,000,000	\$ 3,773,000	\$ 7,250,000	\$ 11,150,000	\$ 23,173,000
Totals	\$ 2,600,000	\$ 4,773,000	\$ 8,500,000	\$ 12,400,000	\$ 28,273,000

VA-CASE expenditures by Program are shown the table below. Note that we aimed to considerably diversify our funding allocations in FY13. The Professional Development (PD) and VE-TAP will each account for ~20% of funding during FY12, with the other programs each accounting for approximately 15%.

Funding by Program	FY09/FY10		FY11		FY12		FY13	
	Core Funding	Non-Core Funding	Core Funding	Non-Core Funding	Core Funding	Non-Core Funding	Core Funding	Non-Core Funding
Transactional Systems Pro	\$ 500,000	\$ 500,000	\$ 500,000	\$ 690,000	\$ 170,000	\$ 700,000	\$ 150,000	\$ 1,700,000
Clinical Partnerships in Health Transformation	\$ 200,000	\$ 300,000	\$ 200,000	\$ 1,030,000	\$ 220,000	\$ 650,000	\$ 85,000	\$ 1,280,000
Informatics/SPDR Program	\$ -	\$ 100,000	\$ 300,000	\$ -	\$ 450,000	\$ 1,100,000	\$ 370,000	\$ 1,250,000
Professional Development	NA		\$ 100,000	\$ 750,000	\$ 60,000	\$ 3,500,000	\$ 50,000	\$ 2,500,000
VE-TAP	\$ 300,000	\$ 500,000	\$ 103,000	\$ 900,000	\$ 250,000	\$ 1,100,000	\$ 50,000	\$ 4,120,000
VISN11							\$ 80,000	\$ 300,000
VA-CASE Admin Staff	\$ 200,000		\$ 200,000		\$ 300,000		\$ 465,000	
Totals	\$2,600,000		\$4,773,000		\$8,500,000		\$12,400,000	

VA-CASE expenditures by type of expense are shown in the table below:

Expenditures by Type	FY09/FY10		FY11		FY12		FY13		Totals	
	\$ Amount	% of Total	\$ Amount	% of Total	\$ Amount	% of Total	\$ Amount	% of Total	\$ Amount	% of Total
Salaries - Direct Hires	\$ 1,000,000	38%	\$2,550,000	53%	\$ 4,120,000	48%	\$ 6,600,000	53%	\$ 14,270,000	50%
Salaries - Contracts/IPAs	\$ 900,000	35%	\$1,400,000	29%	\$ 3,400,000	40%	\$ 4,650,000	38%	\$ 10,350,000	37%
Salaries - Students	\$ 300,000	12%	\$ 300,000	6%	\$ 100,000	1%	\$ 100,000	1%	\$ 800,000	3%
Materials/Supplies	\$ 80,000	3%	\$ 100,000	2%	\$ 180,000	2%	\$ 500,000	4%	\$ 860,000	3%
Lean Certification	\$ 50,000	2%	\$ 33,000	1%	\$ -		\$ -		\$ 83,000	0%
Travel	\$ 270,000	10%	\$ 390,000	8%	\$ 700,000	8%	\$ 550,000	4%	\$ 1,910,000	7%
Totals	\$2,600,000		\$4,773,000		\$8,500,000		\$12,400,000		\$28,273,000	

Note that in FY13, approximately, 53% of VA-CASE funding was allocated to staff and faculty salaries and 38% allocated to contract/IPA mechanisms with academic affiliates. Of the remaining funds, 1% of funds were allocated to student programs and 4% to travel expenses and materials/supplies.

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Cost/Benefit Analysis

The current cost/benefit analysis for VA-CASE can be derived from two sources: 1) savings as compared to the purchase of Industrial Engineering and Informatics expertise from outside agencies (GSA Rates), and 2) savings as compared to the use of external consultants for Lean training and certification:

1. The average VA-CASE daily rate for Industrial Engineering and Informatics Services from FY09-13 was \$865.38. GSA rates for equivalent support (Sr. Engineering and Sr. Scientist Support for this same period) are approximately \$1500/day. Through the 29,900 days of support provided to date, this results in an estimated cost savings of \$18.28M when compared to external services.

VA-CASE Cost for Services compare to GSA Rates					
	FY09/FY10	FY11	FY12	FY13	Totals
	\$ Amount				
Salaries - Direct Hires	\$ 1,000,000	\$ 2,550,000	\$ 4,120,000	\$ 6,600,000	\$ 14,270,000
Salaries - Contracts/IPAs	\$ 900,000	\$ 1,400,000	\$ 3,400,000	\$ 4,650,000	\$ 10,350,000
# of days of Engineering/Informatics Support Provided	2500	5000	9400	13000	29900
VA-CASE Engineering/Informatics Cost/Day	\$760.00	\$790.00	\$800.00	\$865.38	\$823.41
GSA Rates - Sr. Engineering Support (\$180/hour)					\$1,440.00
GSA Rates - Sr. Scientist (PhD) Support (\$210/hour)					\$1,680.00
GSA Rates for 29900 days of Engineering/ Informatics Support (\$1500/day)					\$42,900,000
VA-CASE Rates for 29900 days of Engineering/Informatics Support (\$823.38/day)					\$24,620,000
FY09-Present Savings for VA-CASE vs GSA Industrial Engineering/Informatics Support					\$18,280,000

2. By comparing published external consultant rates for Lean Training to VA-CASE costs per participant, we can determine an estimated cost savings of \$5.7M for FY13 and \$15M for Lean Training FY09-13.

Lean Training Cost Savings FY09-13						
Lean Training/Co-Facilitation	FY13 Only		FY09-13		Participant Costs	
	# of Sessions	# of Trainees/Participants	# of Sessions	# of Trainees/Participants	VA-CASE	External Consultants (Published Rates*)
Yellow Belt	42	1680	156	6240	\$250.00	\$1,195.00
Green Belt	43	1720	95	3800	\$250.00	\$1,195.00
Black Belt	28	420	77	1020	\$350.00	\$1,995.00
Senior Executive Experience (SEE)	1	25	34	735	\$250.00	\$1,295.00
Rapid Process Improvement Workshops (RPIWs)	29	390	92	1405	\$500.00	\$1,250.00
Leading Organizational Improvement Workshops (LOI)	10	765	31	1660	\$875.00	\$1,295.00
Return on Investment Analysis (ROI)	9	360	13	520	\$250.00	\$795.00
Value Stream Analysis	5	60	7	90	\$425.00	\$1,295.00
Lean Six Sigma Black Belt (5-sessions each)	4	140	5	180	\$555.56	\$4,750.00
LMS Coaching/Mentoring Site Visits	60	1200	60	1200	\$325.00	\$650.00
Total Lean Training/Co-Facilitation FY09-Present	231	6760	570	16850		
Estimated Cost Savings (VA-CASE vs External Lean Training)	\$5,769,447		\$15,191,425			

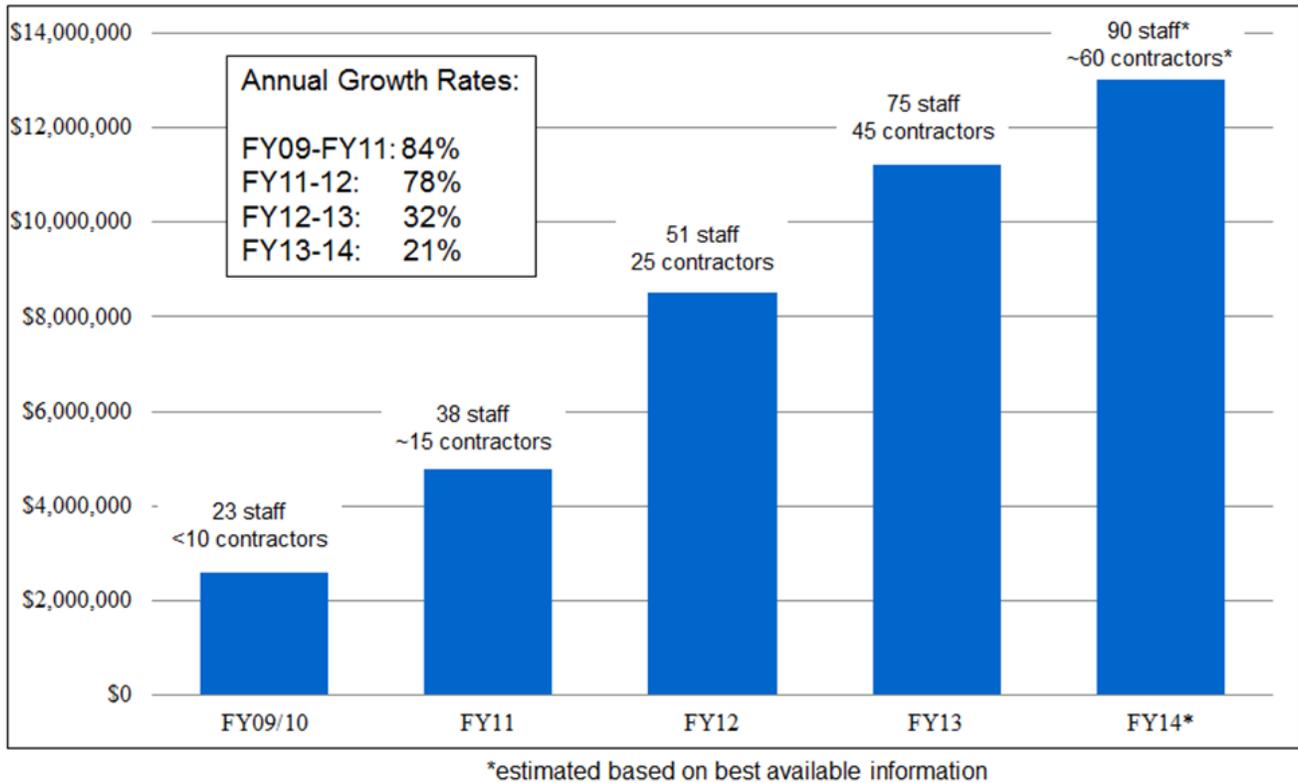
The resultant total VA-CASE cost savings to VHA from FY09-FY13 can be estimated at \$33.4M.

FY14+ Plans

We will continue efforts to migrate from our Center's 'start-up' phase of development, striving to create a sustained, customer-oriented VERC within VHA. Each of our program areas will continue to leverage existing partnerships to build a balanced portfolio of projects (i.e. Project Pipeline) that will continue to support rapid project development cycles—from proof-of-concept to national dissemination—in 12-18 months. We will continue to create and facilitate the development of a culture that will foster innovation among our staff/faculty, and ensure commitments to customers are fulfilled and projects are supported through to national dissemination. Leading into FY14, we have added nearly \$2.5M in non-core funded projects, bringing the total amount of funding to nearly \$15M. This funding will be utilized to facilitate the continued expansion of existing programs and to embed increased programmatic and project management support.

Additionally, as shown in the graph below, we will strive to continue growth, but at a pace of less than 20% per year, in contrast to growth rates at 30-80% in prior years.

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FY14 Specific Goals

AIM1 Education and Training: Our Professional Development programs continue to expand at a rapid rate. In FY14, we will continue the transition away from tools/methods-focused training into specific support for transformational Lean Management System approaches, such as Strategic Deployment/Alignment, Value Stream Analysis, Rapid Improvement Approaches, Continuous Daily Improvement, Daily Management and Leadership Development.

AIM2 Building the Support Infrastructure: We plan to add an additional 15 FTEE of Industrial, Operations Engineering and Informatics support, with at least 5 technical positions filled by graduating students from our internship programs.

AIM3 Rapid Implementation Strategies: VA-CASE will continue to refine our rapid deployment strategy, *Innovation to Impact*, to reduce deployment timelines to less than 12 months while still maintaining the highest quality of service and customer satisfaction.

AIM4 Support Innovative Models of Care Delivery: VA-CASE will continue to support development and deployment efforts for innovative models of care delivery, to include support for initiatives such as the homeless program, Non-VA Medical Care National Standardization, Surgical Flow and Specialty Care Transformation Initiatives and the Veteran Centered Design Lab. We will also introduce initiatives related to Women’s Health, Clinical Systems Engineering and Data Engineering.

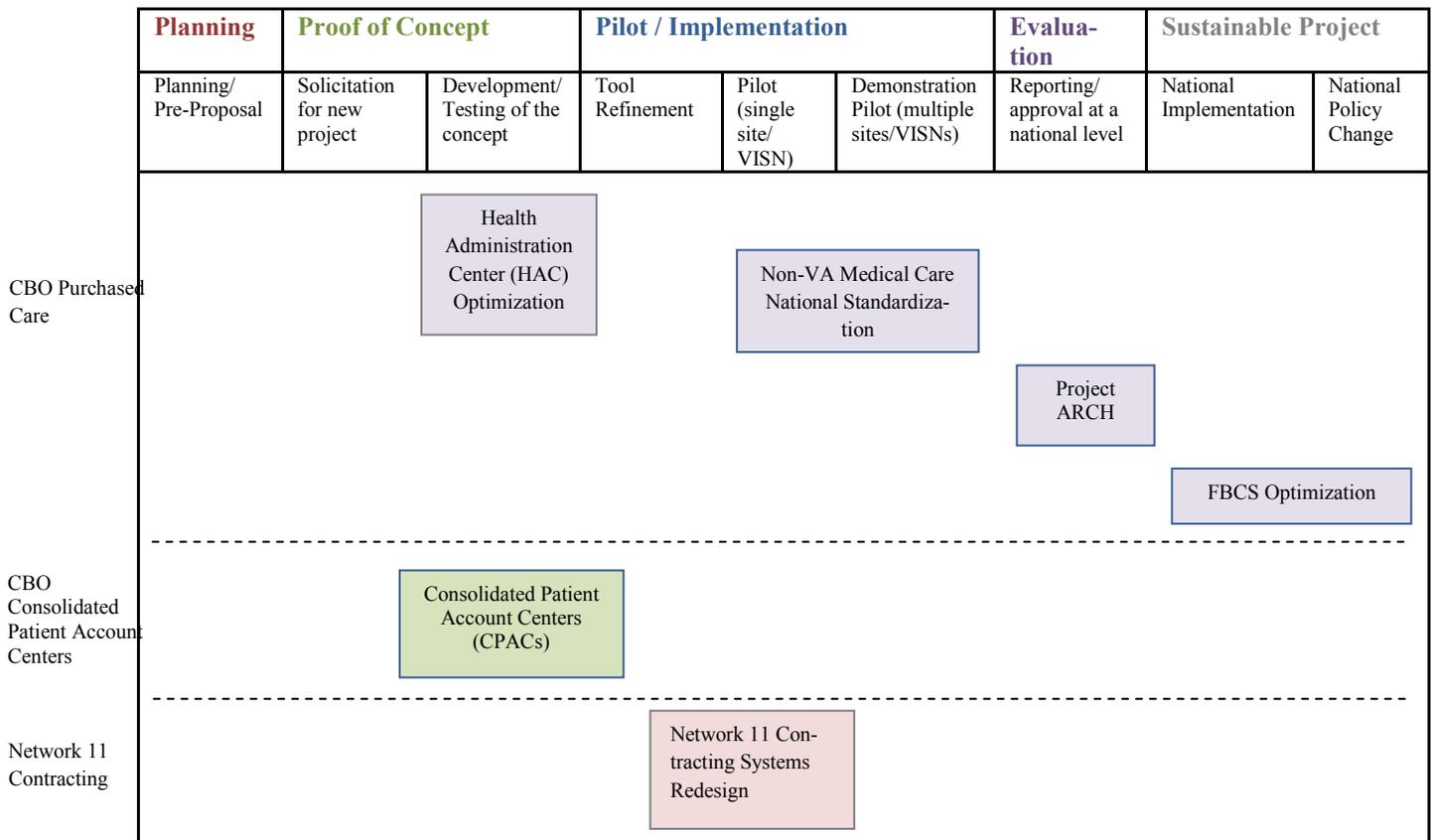
AIM5 Translate Research into Practice: VA-CASE will continue to support and develop HSRD/QUERI/VERC partnerships through our co-funded faculty and initiatives, such as the INSPIRE, RE-INSPIRE and TASK initiatives. We will continue to disseminate VA-CASE work through publications and presentations in VHA and non-VHA forums.

AIM6 Pursue External Funding: We will continue to pursue external funding mechanisms and increase the amount of funding generated through external (non-VA) agencies. Our goal is to increase the amount of external funding by at least 25% in FY14.

Transactional Systems Program (TSP)

The Transactional Systems Program (TSP) specializes in the development and delivery of systems redesign and operational systems engineering tools that increase the efficiency, effectiveness, accountability, accuracy and standardization of workflow and decision making within transactional systems. The overarching goal of TSP projects is the optimization of processes associated with the business/administrative aspects of VA health care delivery. TSP's primary partnership is with the Chief Business Office Purchased Care (CBOPC), which is responsible for the management and delivery of health care services external to VA facilities for which Veterans and their dependents are eligible. In FY13, TSP experienced a 50% increase in staffing and had an operational budget of \$1.8M, of which 18% was allocated from VA-CASE core funds. TSP's FY13 project portfolio included: NVCC Clinical Applications Coordinator Support, Health Benefits Appeals – Phase 2, FBCS Optimization, Non-VA Medical Care National Standardization, Clinical Consulting, Project ARCH, and Network 11 Contracting Systems Redesign – Phase 1.

VA-CASE Transactional Systems Project Pipeline



VA-CASE Transactional Systems Program Project Summaries

Non-VA Medical Care Coordination (NVCC) Clinical Applications Coordinator Support

Project Overview

The NVCC initiative was a nationwide effort sponsored by CBO Purchased Care to improve and standardize the front-end of the non-VA medical care process. The NVCC model included a system of standardized business processes (referral review, appointment management, unauthorized and Millennium Bill claims adjudication, appeals, hospital notifications) and tools (standardized referral templates, CPRS Non-VA Care Coordination and Non-VA Care Hospitalization progress note templates, CPRS patient appointment letters and appeals management tool) implemented to support clinical care coordination of Non-VA health care services and standardize Non-VA Medical Care Programs across the enterprise.

Project Objectives

VA-CASE has collaborated with CBO Purchased Care on this initiative since its inception in 2010. VA-CASE provided engineering and Clinical Applications Coordinator (CAC) support for each phase of the project, including evaluation of current state processes; the design, development and testing of future state processes; and national deployment, which began in the first quarter of FY12 and was completed in FY13.

Project Results

CBO Purchased Care determined that hiring an internal technical resource was advantageous for the successful enterprise-wide deployment of the NVCC model and related programs, as it would ensure organizational consistency and integrity. In order to achieve this goal, CBO Purchased Care requested VA-CASE provide CAC services during the first two quarters of FY13 to meet the technical needs of the end-users in the field while simultaneously providing orientation and training to the new CBO CAC.

Project Impact

In response, VA-CASE developed an NVCC CAC skills assessment checklist and training plan. These documents were utilized to successfully train the CBO CAC on the NVCC technical support functions and responsibilities, as well as to ensure appropriate access to the required VistA and CPRS NVCC accounts. The full transition of all NVCC CAC duties occurred in March 2013, including the development and/or modification of myriad VistA/CPRS NVCC templates, tools, and technical guides.

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Health Benefits Appeals (HBA)—Phase 2

Project Overview

In FY12, VA-CASE partnered with CBO's Business Policy department to design, develop, and assist with the implementation of process improvements in CBO's health benefits appeals (HBA) process. The HBA process is an administrative procedure that provides Veterans a method for requesting a review of an adverse decision issued by the Veterans Health Administration (VHA) regarding a requested benefit.

Project Objectives

CBO provides oversight of the appeals program and perfects appeals before certification to the Board of Veterans Appeals (BVA).

Project Results

VA-CASE provided CBO with project deliverables in two phases. In Phase 1, VA-CASE developed an extensive database and corresponding web-based application to improve CBO's ability to track and monitor health benefits appeals, as well as increase visibility into the appeals process. Phase 1 was completed in February 2013; Phase 2 began in March 2013 and was completed in September 2013. The objective of Phase 2 was to complete enhancements and expand the reporting functionality of the database and web-based application.

Project Impact

Deliverables in Phase 2 included: (1) design and development of various enhancements to core functionality developed in Phase 1; (2) design and development of additional in-depth reporting functionality (see figure below); (3) pre-population of several boxes within VA Form 7216a, "Request For and/or Notice of Transfer of Veterans Records"; and (4) training CBO management and frontline staff to use the new functionality enhancements and reporting features.

HBA Database – Report filter based on a variety of search criteria with option to export reports to Excel, PDF, or Word formats.

All Pending C-File Requests made on or before the selected date

7/1/2013
Select Date

Dates are mandatory. Dropdown lists are optional to filter recordset. Any combination can be selected.

Filter by Appeal Type
Filter by VISN Number
Filter by VAMC Location
Filter by Hearing Type

Get Pending C-File Requests Print / Export Report

1 of 1 100% Find | Next Print / Export Report

Excel
PDF
Word

Future Plans

Due to a high level of customer satisfaction with the application, CBO requested that VA-CASE provide continuing application development in FY14 to complete additional enhancements.

Fee Basis Claims System (FBCS) Optimization

Project Overview

The FBCS Optimization initiative, currently in national deployment, is sponsored by the Chief Business Office Purchased Care (CBOPC) and supported by VA-CASE. The goal of the initiative is to improve and standardize the processes associated with the use of FBCS across the VHA. Its scope is to optimize processes between the time a claim is received from a non-VA provider and when a claim is rejected, denied, or paid.

Project Objectives

In FY10, CBOPC and VA-CASE collaborated with subject matter experts from various Non-VA Medical Care Units across the country to develop standardized business processes to optimize the use of the FBCS software. The following were identified as areas of frequent bottlenecks: scanning, verification, distribution and processing, clinical review, and customer service calls. Therefore, these were targeted as key focus areas for optimization. In FY11/FY12, the optimized FBCS processes were piloted at Alpha and Beta test sites. The results from the pilot showed improved timeliness in processing claims and an increase in the volume of claims processed per day. Based on these outcomes, CBOPC decided to nationally deploy FBCS Optimization, which began in July 2012 and is ongoing. National deployment is targeted to be completed by September 2014.

Project Results

The FBCS Optimization initiative has achieved a number of successful results and deliverables, including an 1) implementation strategy, 2) deployment materials, and 3) measurement and performance improvement:

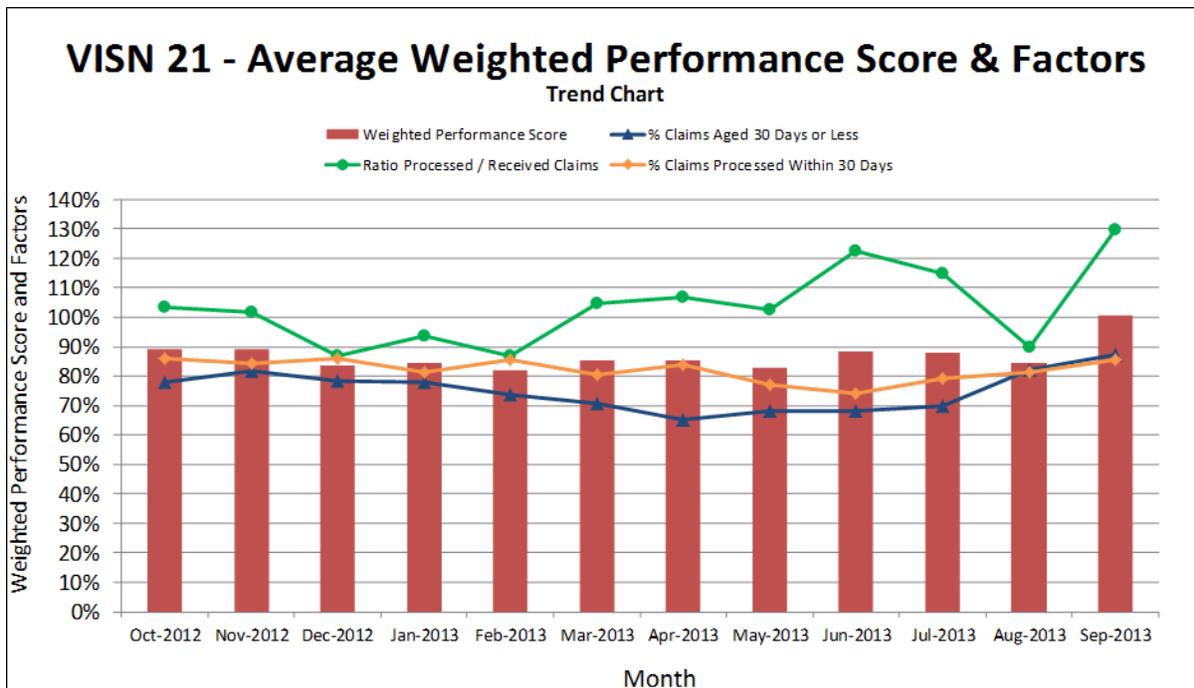
1) Implementation Strategy: The CBOPC/VA-CASE team developed an implementation strategy to deploy FBCS Optimization to all Fee Units within a VISN simultaneously, with deployment occurring at an average of four VISNs per quarter. VISN deployment consisted of three phases totaling 13 months: 1) Pre-Implementation (1 month); 2) Implementation (5 months); and 3) Post-Implementation (7 months). During Pre-Implementation, each Fee Unit completed a Site Survey from which VA-CASE completed a Readiness Assessment/Gap Analysis and a site-specific Implementation Plan. Additionally, a two-day FBCS/claims processing training session was conducted by the National Non-VA Medical Care Program Office (NNPO) Field Assistance Team. During the Implementation phase, the CBOPC/VA-CASE team facilitated weekly calls with each VISN team to provide training on various FBCS Optimization tools, discuss incremental progress towards implementation goals, and answer questions. During Post-Implementation, the team facilitated monthly calls to monitor sustainment of the process changes, and reviewed each site's performance utilizing the FBCS Optimization Metrics Dashboard.

- Deployment Status: As of 9/30/13, FBCS Optimization was deployed to twenty VISNs. Of these VISNs, 3 have completed Post-Implementation; 11 are in the Post-Implementation phase; 5 are in the Implementation phase; and 1 is in the Pre-Implementation phase.

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2. **Deployment Materials:** The VA-CASE team developed detailed Implementation Guides, Technical Guides, and Excel-based tools to assist Fee Management in implementing the optimized processes. An Alpha Split tool assisted the Non-VA Medical Care Units in creating a balanced workload for claims processors by assigning letter(s) of the alphabet to each processor based on claim volumes and the number of processors. Staffing tools were developed for mailroom and scanning functions, verification, and a modified call center. The Metrics Dashboard and Monthly Metrics Reports Analysis Tools were used by all participating VISNs/facilities to monitor overall performance. Throughout FY13, many of these tools were modified to maximize usability based on feedback from the field. These tools are available on the FBCS Optimization Intranet Site (<http://nonvacare.hac.med.va.gov/fbcs/optimization/default.as>).

3. **Measurement and Performance Improvement:** The FBCS Optimization Metrics Dashboard tracks performance metrics in multiple categories, including claim volume, throughput, inventory, and timeliness. The key performance metric is a weighted performance score (WPS) comprised of three equally weighted factors that serve specific functions: 1) percent of claims pending, aged less than thirty days, to track backlogged claim inventory; 2) ratio of processed claims to received claims, to measure productivity in relationship to claim volume; and 3) percent of claims processed within thirty days, to monitor the timeliness of claims processing. A monthly WPS report is distributed to each participating VISN, summarizing the facilities' overall performance. An example graph featured in the monthly report is displayed below. The graph assesses the change in a VISN's performance over a one year period.



Average VISN WPS and Three Contributing Factors, over 12-Month Period

Project Impact

Using the twelve-month timeframe immediately preceding Implementation as a Baseline period, VA-CASE assessed performance changes in participating facilities' Baseline and Post-Implementation periods. By September 2013, 34 facilities among VISNs 1, 4, 7, 10, 15, 20 and 21 had experienced at least three months of Post-Implementation. VA-CASE analyzed the percentage improvement in their weighted performance scores (WPSs) from the Baseline into the Post-Implementation periods. Across the 34 facilities, WPSs improved an average of 1 percent. However, a more accurate account of facilities' overall performance changes is visible when 3 outlier facilities that experienced independent staffing issues and significant increases to claim volume are excluded from these assessments. Performance changes at the remaining 31 facilities improved by an average of 3 percent. When comparing throughput rates between the Baseline and Post-Implementation periods among these 31 facilities, total claims processed per month improved an average of 10 percent. The comparison between participating Non-VA Medical Care Units' Baseline and Post-Implementation performance is summarized in the table below:

Facility	FBSC Optimization National Deployment Performance Measures						
	Legend: ✔ 90-100% ⊕ 80-89.99% ✘ <80% 🌱 >0% Improvement 🌱 <0% Improvement						
	Weighted Performance Score			Throughput			
	Baseline	Post-Imp	% Improvement	Baseline	Post-Imp	% Improvement	
National Average	✔ 90.5%	✔ 90.9%	🌱 1%	7489	7940	🌱 10%	
VISN 1 - Average	✔ 93%	⊕ 88%	🌱 -5%	3656	3350	🌱 -7%	
Togus, ME	⊕ 86%	✘ 70%	🌱 -19%	7369	6472	🌱 -12%	
White River Junction, VT	✔ 100%	✔ 99%	🌱 -1%	2238	1730	🌱 -23%	
Bedford, MA	✔ 95%	✔ 94%	🌱 0%	2539	1373	🌱 -46%	
Boston, MA	✔ 99%	✔ 101%	🌱 3%	5039	4234	🌱 -16%	
Manchester, NH	⊕ 87%	✔ 92%	🌱 6%	2473	2799	🌱 13%	
Northampton, MA	⊕ 89%	✘ 64%	🌱 -28%	2290	2710	🌱 18%	
Providence, RI	✔ 93%	✔ 94%	🌱 1%	3641	4135	🌱 14%	
VISN 4 - Average	✔ 93%	✔ 96%	🌱 3%	3134	3680	🌱 22%	
Wilmington, DE	⊕ 83%	✔ 94%	🌱 13%	1636	1853	🌱 13%	
Altoona, PA	✔ 92%	✔ 91%	🌱 -1%	2442	3025	🌱 24%	
Butler, PA	✔ 94%	✔ 96%	🌱 1%	2317	2286	🌱 -1%	
Clarksburg, WV	✔ 96%	✔ 101%	🌱 5%	1620	2958	🌱 83%	
Coatesville, PA	✔ 98%	✔ 98%	🌱 0%	2211	2498	🌱 13%	
Erie, PA	⊕ 89%	✔ 95%	🌱 6%	3196	4073	🌱 27%	
Lebanon, PA	✔ 99%	✔ 99%	🌱 -1%	3132	4093	🌱 31%	
Philadelphia, PA	✔ 90%	✔ 94%	🌱 5%	5845	5903	🌱 1%	
Pittsburgh, PA	✔ 96%	✔ 103%	🌱 7%	5043	5375	🌱 7%	
Wilkes-Barre, PA	✔ 95%	✔ 93%	🌱 -2%	3896	4735	🌱 22%	
VISN 7 - Average	✔ 91%	✔ 92%	🌱 1%	6725	6831	🌱 2%	
Decatur, GA	⊕ 85%	⊕ 88%	🌱 4%	10225	10508	🌱 3%	
Augusta, GA	⊕ 94%	⊕ 90%	🌱 -4%	2800	2797	🌱 0%	
Birmingham, AL	⊕ 85%	✔ 96%	🌱 12%	7236	7829	🌱 8%	
Charleston, SC	✔ 96%	✔ 93%	🌱 -3%	7376	7690	🌱 4%	
Columbia, SC	⊕ 81%	⊕ 82%	🌱 0%	9496	7822	🌱 -18%	
Dublin, GA	⊕ 93%	✔ 93%	🌱 -1%	5926	6997	🌱 18%	
Montgomery-West, AL	✔ 96%	✔ 98%	🌱 1%	6278	6883	🌱 10%	
Tuscaloosa, AL	✔ 95%	✔ 95%	🌱 0%	4462	4121	🌱 -8%	
VISN 10 - Average	✘ 69%	⊕ 82%	🌱 19%	45840	44280	🌱 -3%	
VISN 10 CFU	✘ 69%	⊕ 82%	🌱 19%	45840	44280	🌱 -3%	
VISN 15 - Average	✔ 93%	✔ 96%	🌱 4%	5829	7894	🌱 2%	
St. Louis, MO	✔ 98%	✔ 104%	🌱 6%	5264	5975	🌱 13%	
Marion, IL	⊕ 86%	⊕ 88%	🌱 2%	10888	9812	🌱 -10%	
VISN 20 - Average	⊕ 78%	✘ 79%	🌱 2%	54829	59513	🌱 9%	
VISN 20 NPC	✘ 78%	✘ 79%	🌱 2%	54829	59513	🌱 9%	
VISN 21 - Average	⊕ 88%	⊕ 85%	🌱 -3%	5417	7097	🌱 32%	
Fresno, CA	✔ 92%	✔ 95%	🌱 3%	2381	3186	🌱 34%	
N. California, CA	✘ 79%	✘ 79%	🌱 0%	6961	10118	🌱 45%	
Palo Alto, CA	✔ 92%	⊕ 90%	🌱 -3%	9314	11176	🌱 20%	
Reno, NV	⊕ 85%	✘ 71%	🌱 -16%	3907	5606	🌱 43%	
San Francisco, CA	✔ 91%	✔ 92%	🌱 1%	4523	5400	🌱 19%	

National Deployment Performance Measures for Facilities at least 3 months into Post-Implementation Phase

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Non-VA Medical Care National Standardization (NVNS)

Project Overview

The Non-VA Medical Care National Standardization (NVNS) project is a collaborative effort between Chief Business Office Purchased Care (CBOPC) and VA-CASE to standardize business processes associated with the execution, management, and oversight of all Non-VA Medical Care programs and functional areas. The NVNS team leverages work conducted in other Non-VA Medical Care initiatives—such as Non-VA Care Coordination (NVCC) and Fee Basis Claims System (FBCS) Optimization—to align standardized business processes with future state Non-VA Medical Care software and Healthcare Claims Processing (HCP) systems. The outcomes achieved through NVNS will serve as the foundation for future Non-VA Medical Care improvement efforts.



Project Objectives

The NVNS project encompasses the entire Non-VA Medical Care process from the time a consult for Non-VA care is entered into CPRS until the claim is received and paid, as well as the following seven program/functional areas: Hospital Notification, Referral Requests/Authorizations, Customer Service, FBCS Claims Processing, VistA Claims Processing, Appeals, and Financial Management.

Project Results

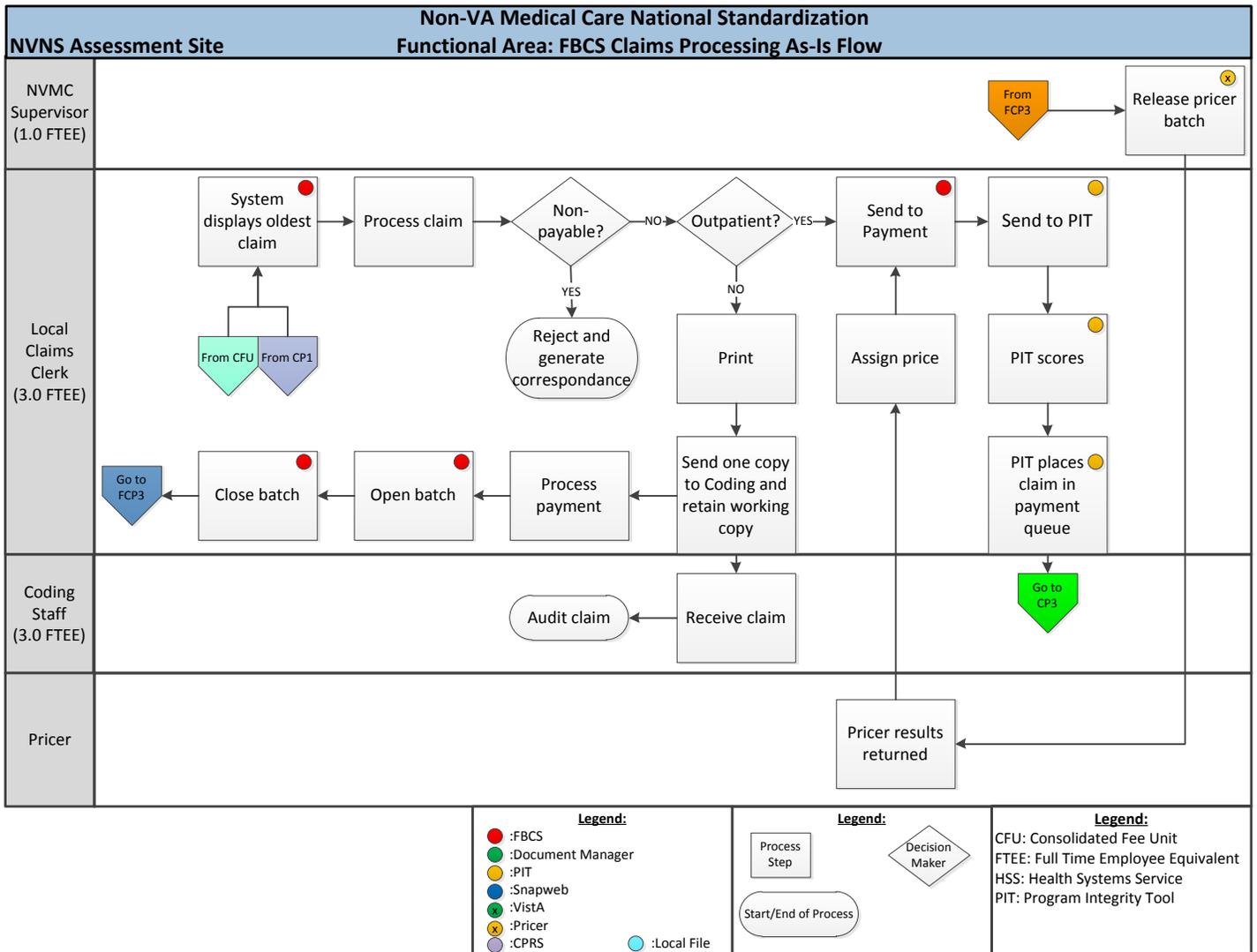
Phase 1 of the collaborative project was completed in FY13. The goal of Phase 1 was to capture the current state of Non-VA Medical Care business processes implemented in high-performing Non-VA Medical Care sites with both consolidated and individual medical center units. The CBO/VA-CASE team developed an action plan to capture the current state processes, which included various engineering tools and an extensive survey/questionnaire completed by the Non-VA Medical Care sites prior to the team's site visit. This provided the team with information about the site's operation and processes so they were knowledgeable of facilities' current states at the start of each visit. The team conducted one week site visits at multiple locations across five VISNs. VA-CASE developed and validated current state process maps for all processes observed at the Non-VA Medical Care units, and analyzed and assessed each process for efficiency and effectiveness.

Project Impact

The project is currently in Phase 2, where the team is assessing the most efficient and effective current processes and incorporating them into standardized future-state processes. Phase 2 began in late September 2013 with a face-to-face team meeting in Denver. The team reviewed as-is process maps and documented strong practices observed within each program/functional area. Next, the team drafted future-state standardized business processes and performance metrics that will serve as a foundation for the team's recommendations to CBO leadership in the 2nd quarter of FY14.

The figure below provides an example of the current state as-is process flow for FBCS claims processing at one of the NVNS assessment sites. The process map depicts tasks that are completed by the Supervisor, Claims Clerk, Coding Staff, and Pricer. Additionally, the map indicates the software/system that may be required to complete each task.

Excerpt from FBCS Claims Processing As-Is Flow at a NVNS Assessment Site



Future Plans

A two-tiered vetting process will be conducted in February and March 2014, when subject matter experts and CBO Leadership will review all future state recommendations. Once feedback from the vetting sessions is incorporated and final approval from CBO is obtained, the team will proceed with finalizing desk procedures, training materials, and plans for testing the future-state standardized business processes and recommendations. Full implementation and deployment will occur in Phase 3, which is scheduled to begin in FY15.

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Clinical Program Consulting

Project Overview

In August 2012, CBO Purchased Care–Business Systems Management (CBOPC – BSM) requested that VA-CASE provide clinical consulting services during FY13 to 1) support successful enterprise-wide deployment of the Non-VA Medical Care Coordination (NVCC) model; 2) ensure the alignment of clinical business processes between NVCC and the future VHA non-VA medical care software package (Health Claims Processing, or HCP); and 3) assess the clinical business components across twenty-two CBO Purchased Care initiatives. Additionally, VA-CASE was asked to ensure the HCP business requirements and supporting business process/IT systems met VHA clinical standards of practice. VA-CASE clinical consultant, Virginia Daggett, PhD, RN, collaborated with CBOPC – BSM to achieve the project objectives, which were successfully completed in June 2013.

Project Results

CBOPC – BSM originally selected three areas of non-VA medical care to be Dr. Daggett’s clinical focus: Geriatric Extended Care (GEC), Newborn Care, and Dental Care. They subsequently decided to exclude GEC from the project. For the two remaining clinical areas, Dr. Daggett formed and facilitated two workgroups consisting of subject matter experts (SMEs) from national VHA program offices, regional VISNs, and local facilities. The objective of the Newborn Care and Dental Care workgroups was to develop a standard non-VA medical care process for the complete timeframe, from consult initiations in the Computerized Patient Record System (CPRS) through to payment disbursements. The scope of the workgroups included the development of standard newborn and dental care Non-VA Medical Care CPRS templates. Each workgroup created current state process maps to determine inefficiencies and variation within process flows. They then developed and mapped ideal future-state processes that would eliminate redundant and non-value added steps. Based on these future-state processes, the workgroups developed recommendations for improvements to the HCP Referral and Authorization Module, and prioritized the improvements utilizing an impact/effort matrix.

Project Impact

The VA-CASE team created and provided CBOPC – BSM with formal reports indicating the outcomes and process maps from each workgroup. Additional project accomplishments include Dr. Daggett’s development of a report that set forth the Routine Newborn Care Clinical Guidelines, as well as a gap/impact analysis of the 22 CBOPC initiatives. Additional research by Dr. Daggett is featured after the CPHT section of this report.

Project Access Received Closer to Home (ARCH)

Project Overview

There are many barriers aside from cost that can prevent Veterans from receiving needed health care, including long drive times and geographic inaccessibility. To improve access to care for Veterans with long travel distances to VHA healthcare facilities, VHA has implemented a number of initiatives, including Community Based Outpatient Clinics, mobile units, and telemedicine. Continuing the effort to provide more accessible health care, Project ARCH (Access Received Closer to Home) provides an additional mechanism for Veterans to seek care from non-VHA, community health care providers closer to where the Veterans live. Project ARCH is a three-year pilot administered by VHA Chief Business Office Purchased Care (CBOPC) and funded through the Office of Rural Health (ORH). By partnering with non-VHA care providers, Project ARCH provides Veterans in rural and highly rural areas with health care services

closer to home. Project ARCH began providing care to eligible Veterans on August 29, 2011 in five pilot sites across the country: Farmville, VA; Pratt, KS; Caribou, ME; Flagstaff, AZ; and Billings, MT. The Project ARCH pilot contracts expire on September 30, 2014.

Project Objectives

In May 2013, CBO requested VA-CASE provide project management and technical writing services for the purpose of convening and managing an Interdisciplinary Project Team (IPT) to develop recommended options for extending, expanding and/or ending Project ARCH after the pilot period. The IPT was also charged with drafting an Executive Decision Memorandum (EDM) detailing their recommendations for the future of Project ARCH to CBO, ORH, and VHA leadership.

Project Results

In October 2013, CBOPC/VA-CASE formally chartered an IPT, which began meeting and conducting analysis activities to make recommendations on the service expansion or extension of Project ARCH after the three-year pilot period. The IPT included leadership representation from CBO, ORH, and Contracting, as well as representatives from each of the five Project ARCH Pilot sites. The IPT selected and researched several key assessment factors, including areas of need for rural and highly rural Veterans, administrative costs of care, and potential contracting solutions for a possible future follow-on program to Project ARCH. Options and recommendations were presented in an EDM and Issue Brief to CBOPC and the Under Secretary for Health.

Project Impact

VA-CASE provided IPT management and technical writing for the development and revision of the Project ARCH Issue Brief and EDM, which are both targeted for submission by the end of January 2014. VA-CASE also assisted CBO with writing and revising Project ARCH instructional materials and reports for submission to internal and external stakeholders. The documentation included: Project ARCH fact sheets, public relations letters, project timelines, informational slides, Program and Funding Guidance, Standard Operating Procedures, a Patient Satisfaction report, and the Project ARCH Quarterly and Annual reports and addendum submitted to Congress.

Network 11 Contracting Office (NCO 11) Systems Redesign – Phase 1

Project Overview

The Network 11 Contracting Office (NCO 11) processes a large volume of contracting actions each year, with approximately 7,700 transactions totaling \$336 million in FY13 and 9,400 transactions totaling \$360 million in FY12. Significant challenges to their current contracting process include:

- Mandated use of two different software systems requiring redundant manual entry of data
- Many of the process steps are required by Federal regulations
- Variability in contracting actions based on the dollar value and type of purchase being requested
- Limited standardization in processes and requirements

Project Objectives

In FY13, NCO 11 requested an evaluation of their internal business processes to identify existing inefficiencies, locate process improvement opportunities, complete a staffing analysis, develop optimized business processes, and assist with implementation. The project was chartered based on a two-phase approach. Phase 1 ran from February-

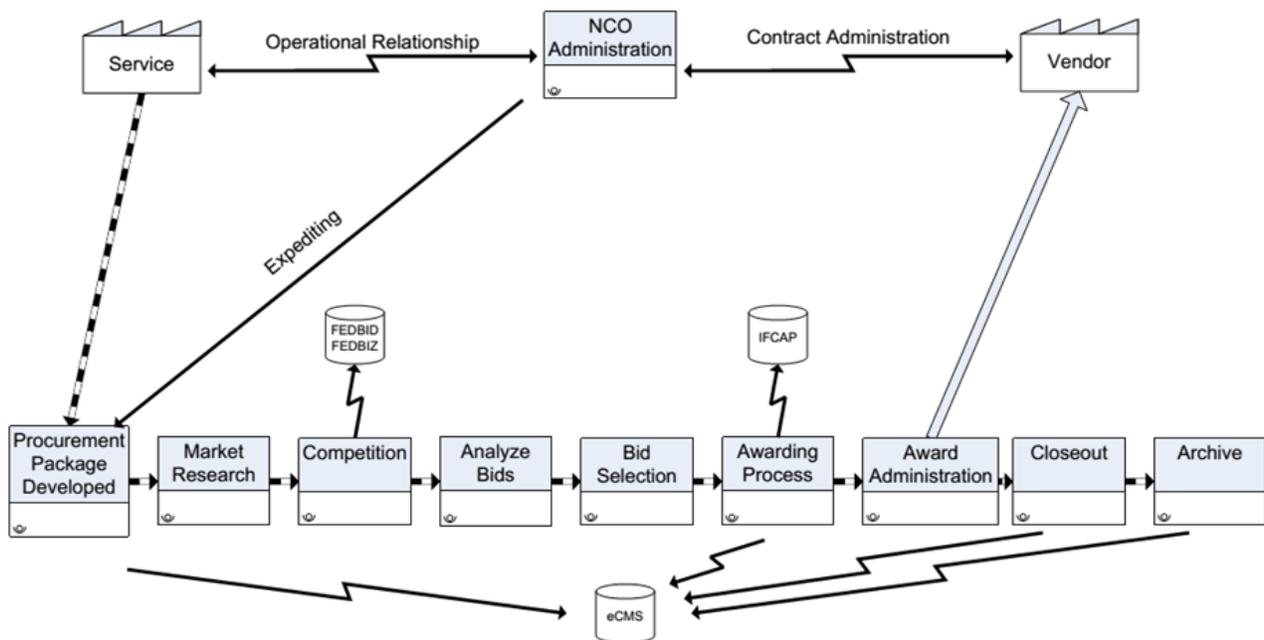
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September 2013. Phase 2 began in mid-October 2013 and will be completed in March 2014. The NCO 11 System Redesign project addresses internal business processes utilized in fulfilling procurement requests. This process begins with the receipt of request documentation from a facility or service, proceeds with development of market research for the best value or lowest-cost, awards a contract to the selected vendor, and ends with administrative accounting and records-keeping tasks at completion of the procurement. The scope excludes: the Purchased Card Program; the processes utilized by the eight VISN 11 medical centers in conjunction with the development of Statements of Work and Purchase Requests; and modifications to the functionality of the two contracting software systems (eCMS and IFCAP).

Project Results

The VA-CASE team visited contracting offices across Indiana and Michigan to interview front-line staff; developed current-state process maps for each of seven functional teams within NCO 11; and initiated time studies to establish time usage within the staff's workload. The team used this information to identify process barriers and develop improvement recommendations. A high-level value stream map of the NCO 11 general contracting process is depicted in the figure below.

High Level Value Stream Map of the NCO 11 Contracting Process



In an effort to identify the primary daily tasks completed by the NCO 11 contracting staff, the VA-CASE team developed a web-based data collection tool that allowed the staff to self-report their work activities. Tasks were categorized into 26 pre-defined activities confirmed by the customer to be the best representation of all tasks that occur throughout the workday. Reporting was anonymous, but the tool was set up to allow for analysis by GS-level and functional team (displayed in the figure below).

Web-Based Data Collection Tool Developed to Capture Daily Tasks Performed By NCO 11 Staff

Team	Healthcare and Leasing
GS Level	GS- 9
Task Date	8/9/2013
Task	..select
Time on Task	1 minutes. (Max 60 per entry.)
Save Cancel	

Entry	Team	GS	Date	Task	Time
Delete 120	Healthcare and Leasing	GS-9	August 09	Reviews	37
Delete 121	Healthcare and Leasing	GS-9	August 09	Document Generation	15
Delete 122	Healthcare and Leasing	GS-9	August 09	Email	10
Delete 123	Healthcare and Leasing	GS-9	August 09	Email	10

Project Impact

A one-week trial of the staff's use of the tool was conducted in August 2013. At the completion of the trial, NCO 11 leadership requested the time study be delayed until Phase 2 due to the staff's heavy workload at the end of the fiscal year. In order to establish the baseline for contract completion time within each functional team, monthly contract completion totals and on-hand inventory data was extracted from the Electronic Contract Management System (eCMS) and segregated by team. Limitations of available data resulted in an estimation for several measures. Little's Law was employed to calculate the average contract completion time using available data. The estimated average contract completion time for individual NCO 11 teams from October 2012 – June 2013 is displayed in the table below.

Estimated Average Contract Completion Times by NCO 11 Functional Team (October 2012 – June 2013)

Team	Requests Completed	Outstanding Requests	Requests Present [L]	Requests Received [λ]	Completion Time (Working Days)	Completion Time (Calendar Days)
S&S (South)	48	78	126	50	53	76
S&S (North)	58	90	148	44	71	102
Specialized	467	163	629	483	27	39
Construction	7	43	50	14	74	106
Healthcare & Leasing	16	22	38	16	49	70

Future Plans

Phase 2 is scheduled for completion in March 2014. Objectives during Phase 2 include the development of a staffing analysis, completion of a Voice of the Customer survey, and the facilitation of multiple Rapid Process Improvement Workshops (RPIWs) to implement and test improvements to business processes based on the approved recommendations identified in Phase 1.

Clinical Partnerships in Healthcare Transformation (CPHT)

The VA-CASE Clinical Partnerships in Healthcare Transformation (CPHT) Program is a partnership with the Veteran Health Administration (VHA) specializing in the development and delivery of systems redesign and operational systems engineering tools that increase the efficiency, effectiveness, accountability, accuracy and standardization of workflow and decision-making within the various clinical systems of VA Hospitals. The overarching goal of CPHT national projects is the long term transformation of the Veterans Health Administration through the optimization of processes that allow Veterans to receive timely health care within a patient-centric, team-based, data-driven, and continuously improving healthcare delivery system.

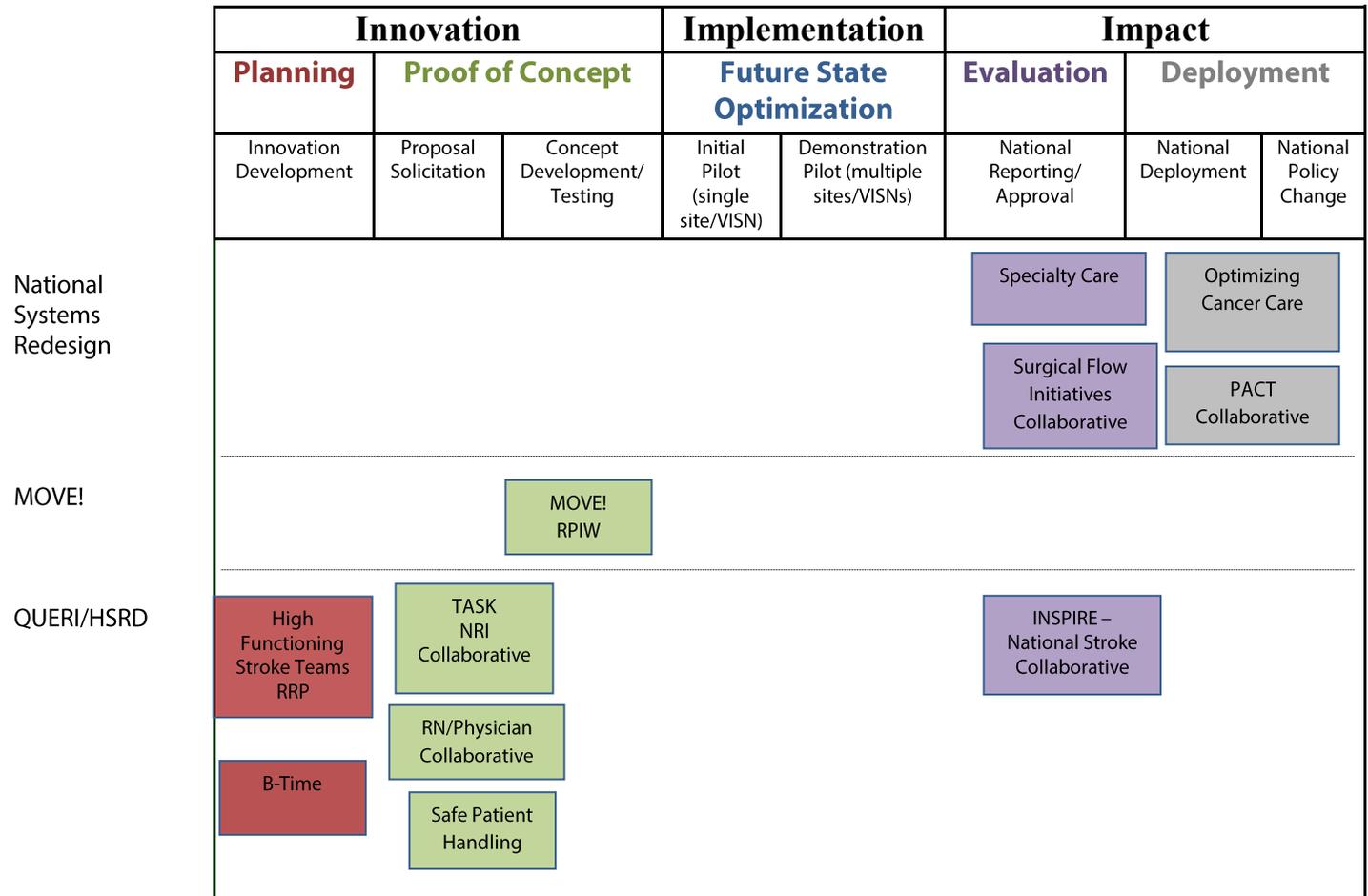


VA-CASE VERC Team (L to R): Shaiju Eapen (IE), Pranav Radhakrishnan (IE), Carlos Garcia (F), Balmatee Bidassie (PM, F), Virginia Daggett (Admin), George Ponte (F), Russell Cech (F), Sandra Serrano (F), Shruthi Musunuri (IE), Jamie Workman-Germann (F), Brian Poyner (F)

The VA-CASE CPHT team of engineers, program analysts, and academic partners design, test, and implement optimized business processes that integrate applied Systems Redesign (SRD) and Operational Systems Engineering (OSE) principles and tools into the national SR collaborative, as well as everyday business practices throughout the VHA, with an aim of increasing efficiency, effectiveness, accountability, accuracy and standardization of workflow, and decision-making. CPHT group is separated into five distinct support areas: 1) Industrial/Systems Engineering support; 2) Informatics and Clinical Application support; 3) Development and dissemination of Improvement Resource Guides; 4) Real-time and rapid-cycle evaluation tools and approaches; and 5) Application of advanced OSE techniques, such as simulation and modeling to inform further system optimization.

In FY13, CPHT had an operational budget of \$750K and a project portfolio including: Cancer Care, Access Academy, Stroke, Office of Specialty Care, Surgery Office, MOVE!®, Health Systems Research and Development (HSR&D), Office of Primary Care, and Office of Specialty Care.

VA-CASE Collaborative Project Pipeline



VA-CASE CPHT Project Summaries

National Optimizing Cancer Care Collaborative

Project Overview

Beginning in FY09, VA-CASE partnered with the National VHA Optimizing Cancer Care (OCC) National Systems Redesign (SRD) Committee, as well as the VAPHS VERC and NEHCP VERC. The VA Cancer Care Collaborative is focused on optimizing the timeliness and quality of cancer care throughout the VA health care system. The Cancer Care Collaborative has provided the mechanism to measure, analyze and implement changes to assure timely diagnosis and the timely initiation of evidence-based treatment. Through its partnership with OCC, VA-CASE applies OSE and SRD methods to provide capacity and capability for diffusing and implementing collaborative strong practices that contribute to the development and implementation of systematic processes for cancer care.

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Project Objectives

- Provide Industrial and Systems Engineering training/coaching in OSE/SRD methods to collaborative teams to facilitate implementation of next generation Cancer Care Processes.
- Create and implement informatics tools to enable standardized reporting methods associated with assessment and evaluation of timeliness and reliability of Cancer Care Treatment processes.
- Synthesize current strong practice recommendations for next generation Cancer Care Processes and Programs within Improvement Resource Guides.
- Partner with the existing national VHA Optimizing Cancer Care (OCC) and National Systems Redesign Committees to develop and test initiatives for real-time and rapid-cycle evaluation of collaborative teams.
- Develop/utilize advanced OSE tools and methods to facilitate implementation and diffusion of next generation Cancer Care Processes (i.e. capacity/staffing models, scheduling models, usability testing of electronic medical record user interfaces, etc.).

Project Results

Nineteen teams across four Cancer Types (Lung, Breast, Colorectal (CRC), and Prostate) participated in the Phase I collaborative (January 2009 - January 2010); 21 teams across five Cancer Types (Lung, Prostate, HCC, Head and Neck, CRC) participated in the Phase II collaborative (January 2010 - January 2011); and 22 teams across 2 Cancer Types (Lung and Head and Neck) participated in the Phase III collaborative (June 2011 - February 2012). During FY13, various VHA members have reached out to the CPHT group to spread the process improvement and measurement techniques from the three cancer care Collaboratives. VA-CASE Industrial Engineers have provided over 1,200 days of on-site IE support across the 60 Phase I/II/III teams. The engineers have introduced a variety of improvement approaches to the collaborative teams, such as the VA-TAMMCS model, Lean, Six Sigma, performance improvement, ACA, and rapid process improvement.

The VA-CASE IEs were also integral to the development of standardized measurement and tracking tools for each type of cancer, introducing advanced system redesign methods for specific aims, and performing appropriate and impactful data analysis. For Phase III of the Cancer Care Collaborative, VA-CASE IEs facilitated development of standardized measurement and tracking tools for each cancer type. The tool identifies key timeliness and quality measures as a function of entered patient data. Each type of cancer tool contains a "Data Entry Sheet," "Measurement Sheet," and "Chart Sheet." When users enter data in the "Data Entry Sheet," measurements and charts are automatically generated. Charts are utilized during the collaborative learning sessions to identify process constraints and "bottle necks" as well as quality of care issues.

Project Impact

In Phase I, 78% of the 64 AIMs (Breast, CRC, Lung, Prostate) were met at 18 facilities. In Phase II, 72% of the 94 AIMs (CRC, HCC, Head & Neck, Lung, Prostate) were met at 21 facilities. In Phase III, 47% of the 64 AIMs (Head & Neck, Lung) were met at 11 facilities. CPHT group presented results in the Applied Science track at the 2013 IE Annual Conference, held May 18-23, 2013 in San Juan, Puerto Rico.

Future Plans

In FY14, CPHT group will work with VA Salt Lake City and VA Washington DC to conduct evidence-based practice and evidence-based management across the clinical sectors in all of VHA.

Patient Aligned Care Team (PACT) Collaborative

Project Overview

In 2010, the VHA embarked upon an 18-month nationwide PACT Collaborative to align patient-centered care to a more Veteran-centric model. The national PACT Collaborative was divided into five regions: Mid-South, Central, West, Southeast, and Northeast. Each region designed, developed, and delivered six learning sessions and five action periods. VA-CASE provided support services, including administration, coordination, coaching and technical support for each of the five regions. Support was provided through a national Co-Coordinator, a national Co-Director, Industrial Engineers, and an Education Coordinator. VA-CASE worked together with the New England VERC, Pittsburgh VERC, and Midwest Mountain VERC to identify and allocate one Industrial Engineer and one Coordinator per region for the 18-month Collaborative.

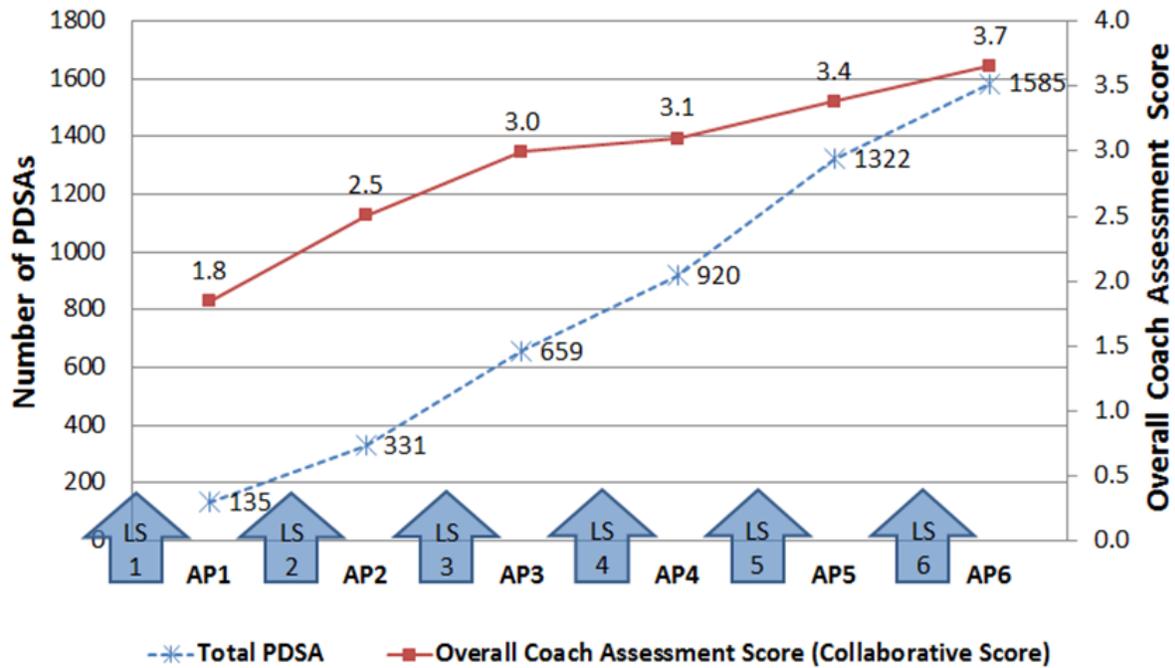
Project Objectives

- Provide administration and coordination support to the National PACT Steering Committee and Regional PACT Steering Committees.
- Provide training/coaching in highly effective collaborative methods to National PACT Steering Committee and Regional PACT Steering Committees.
- Partner with National PACT Steering Committee and Regional PACT Steering Committees in development, implementation, diffusion and maintenance of PACT measurement and informatics tools throughout national collaborative teams.
- Partner with National PACT Steering Committee and Regional PACT Steering Committees in development, implementation, maintenance and diffusion of PACT “Change Package” throughout national collaborative teams.
- Develop, test and implement evaluation methods and tools to enable real-time and rapid-cycle assessment and feedback of regional collaborative effectiveness at the individual, team and collaborative levels.

Project Results

At the end of the last action period, 141 teams attempted 1,591 PDSAs and completed 1,514 PDSAs (with slightly more focus on Access and Practice Redesign). 1,291 Standardized PDSAs were acted upon; 28 PDSAs were abandoned; 223 PDSAs were modified or planned as a new test; and 49 PDSAs are still being implemented. After the end of the PACT Collaborative, CPHT group remained engaged in support, sustainment, and spread efforts at the facility and nationwide levels. Coach Assessment Scores increased across each action period, indicating that teams were working towards their goals.

Trend of Cumulative PDSAs & Overall Coach Assessment Scores across Six Learning Sessions



0 = no effort in this area
 1.0 = discussion has started and likely to move into action

1.5 = plans for action begun
 2.0 = a few tests of change have occurred
 2.5 = tests of change begun, no measureable progress

2.0 = several successful tests of change with outcomes

3.5 = testing multiple changes; measurable progress over > 2 data points

4.0 = achieved aim (s)
 4.5 = surpassed team's aims; spread to wider area

*Coach Assessment Score (Scoring 0-4.5 scale)

Project Impact

During the Collaborative, the VA-CASE Industrial Engineers (IEs):

- Served as a resource for regional planning committees and site coaches, who asked questions and received guidance related to the VA-TAMMCS model and other improvement approaches;
- Served as Learning Session Faculty, presenting breakout and plenary sessions, and participating in monthly calls;
- Provided expertise in designing spreadsheets to support measurement, knowledge-mining, and management, and further refine the PACT Change Package for the Collaborative; and
- Developed easy-to-use team measurement tools—one for each pillar—that were tested and rolled out as the standardized national measurement tool for the PACT Collaborative.

The Industrial Engineers also created a *VAO Measures Dashboard*—a high-level, one-page report that shows the status of metrics in the VA (at both VISN and national levels) via outpatient, inpatient, telephone, consult, and virtual classifications. The report was created to be a monthly report with SPC charts and identifications of best practice and improvement opportunities, although some of the metrics required do not update data monthly. The report will provide the best/worst VISN's and best/worst facilities within VISNs of all metrics in order to decipher the areas that need the most improvement. There will be a monthly report for every VISN and for the USH.

In FY13, the *Journal of General Internal Medicine* (JGIM) published a “VA PACT Special Supplement” to highlight the results of qualitative and quantitative evaluations of the PACT. Balmatee Bidassie, the VA-CASE CPHT Associate Director, organized a team of authors from VA Medical Centers across the USA to put together a series of ten (10) manuscripts for submission to *JGIM* for a VHA PACT supplement in May 2013. She also received support from the VHA/VA Central Office and Primary Care to help assemble a team of reviewers who are considered among our top leaders and architects of PACT because of their in-depth knowledge and understanding of PACT. A Microsoft SharePoint page was also created by CPHT group to ensure that the latest document was available to everyone. Dr. Bidassie was first author for one of the manuscripts, “VA Experience in Implementing Patient-Centered Medical Home Using a Breakthrough Series Collaborative,” which was accepted for publication and will be released in FY14.

Dr. Bidassie also presented, “Leadership VA PACT: How to Build the Goldmine: Tools and Resources for Practice Redesign” in the *PACT Leadership Virtual Conference Series* held at Veterans Affairs eHealth University (VeHU) on Thursday, November 14th 2013. The presentation focused on leaders’ roles in changing PACT processes and practices. The presentation, targeted at the leadership level, helped participants become familiar with resources and roadmaps for leading successful teams. The session reviewed available resources and provided real-life examples of high-functioning teams.

Measurement Tool for Access Academy FY13

Project Overview

The Access Academy will transition from a face-to-face environment to a virtual environment in FY14. In preparation for this transition, there exists a need to develop supporting materials that participants and faculty can use to supplement the virtual learning environment. The transition into a virtual environment requires an Access Academy Measurement Guide. Additionally, user guides are needed to support the use of current spreadsheet tools.

Project Objectives

VISN 11 Veterans Engineering Resource Center (VERC), in collaboration with Access Academy planning and faculty members, are developing an Access Academy Measurement Guide and Measurement Tool User Guide to support Access Academy activities. CPHT industrial engineers began by developing a measurement tool for Access Academy FY13. Next, with input from Access Academy planning and faculty members, CPHT IEs developed 1) an Access Academy Measurement Guide; 2) a Clinic Calculator User Guide; and 3) an Access Academy Measurement Tool User Guide to support Access Academy activities for FY14. The Measurement Guide incorporates content from previous versions of the PACT Prewrite Guide and Specialty and Surgical Care Collaborative Phase 2 (SSCC P2) Measurement Guide, as well as additional content identified by Access Academy planning members and faculty. The guides were

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designed to support users of the MS Excel-based Clinic Calculator and Measure Tool, and include tutorial exercises that allow participants to work through example scenarios.

Project Results

The tool tracks Primary Care (PC) metrics from both macro- and micro-levels that facilitate PC performance measures on either a yearly or weekly basis. The tool allows users to input information and PC managers to automatically track performance through graphical analysis. In FY14 and beyond, it will help teams balance supply and demand and reduce backlogs.

The tool's functions include macro-level measures estimated on a rolling basis each month for the last 12 months, and micro-level measures evaluated on a weekly basis. Macro-level measures include the following supply-demand analysis items: total supply (# of grids); PCP used leaves; missed opportunities; panel turnover rates; total care demand; and total number of used grids. Micro-level measures include: time to the third next available appointment; daily demand (# of appointments) from new and established patients; daily supply for both new and established patients; daily completed appointments for both new and established patients; percentage of appointments completed within 10 minutes after the scheduled time; and descriptions of the tool and definitions of terms to guide users from participating teams.

Project Impact

The Access Academy Measurement Guide focuses mainly on measures related to Access with some additional topics related to Care Coordination & Management and Practice Redesign for Primary, Specialty and Surgical Care areas. The Measurement Guide will draw heavily on the PACT Prework Guide and the SSCC P2 Measurement Guide.

The Clinic Calculator and Access Academy Measurement spreadsheet tools have already been developed and significant updates or changes (requiring more than 8 hours of effort total) to those tools are not within the scope of this project. User guides for the spreadsheet tools will include screen shots from the tools and step-by-step procedures for accessing the tool, data entry, and analysis. User guides will also include tutorial exercises that allow users to practice in multiple scenarios.

Future Plans

In a future phase, an addendum can be considered to add components relevant to measures of Access for the Mental Health clinical area. At the time of this proposal, a Mental Health collaborative is being planned and measures are being identified. As that effort matures, there may be components identified that would be appropriate to add to the Access Academy Measurement Guide.

INSPIRE Stroke Collaborative

Project Overview

The Intervention for Stroke Performance Improvement using Redesign Engineering (INSPIRE SDP 09-158) received funding in January 2010 through a partnership with the VHA Stroke QUERI. This study is a randomized-controlled trial of 12 VAMCs with 1) at least 50 ischemic stroke admissions in FY07 and 2) evidence that improvement is needed on two stroke indicators from the OQP dataset (dysphagia screening before oral intake and DVT prophylaxis).

In April 2011, VA-CASE led a learning event to educate INSPIRE participants on the VA-TAMMCS improvement model. INSPIRE participants utilized this model to improve their rates of dysphagia screening before oral intake and their usage of DVT prophylaxis. In June 2011, site visits began for all intervention teams including Nashville, Birmingham, Houston, Miami, and Loma Linda. In November 2011, the Los Angeles team became committed to the INSPIRE initiative and was provided an onsite Learning Session. CPHT group continued to partner with Health Systems Research and Development (HSR&D) Group to collaborate on evidence-based practice.

Project Objectives

The aims of this project are to assess 1) the impact of OQP Stroke Special Project data on facility stroke improvement activities, and 2) the impact of SR-based intervention vs. quality indicator feedback alone on the improvement of two in-hospital indicators. The INSPIRE study aims to identify the relative effect of a formal SR-based collaborative on performance improvement and to identify site characteristics associated with improvement in care in both the intervention and control sites. This study is complemented and will be extended by the “RE-INSPIRE” SDP, which involves a more in-depth contextual evaluation of the same 12 sites, including additional site visits, measurements of team dynamics over time, and assessment of performance sustainability and use of change methods after the original study ends. The “RE-INSPIRE” began in April 2011 and site visits were initiated in Spring 2012.

Project Results/Impact

- A total of 37 PDSA cycles are being assessed at the 6 INSPIRE Stroke Initiative sites.
- All sites continue to work on PDSAs to improve their Stroke outcomes and are monitored monthly via telephone conferences. Intervention sites work to share their successful PDSAs—particularly CPRS admission template models and a popular dysphagia protocol video developed by the Houston team—with other intervention sites.
- Thus far, the quality of stroke care has increased at six of the largest volume VA facilities, which could lead to improved outcomes for Veterans receiving care at the intervention sites. This intervention also provides an opportunity to critically evaluate System Redesign strategies and impacts on performance improvement.
- As of January 2012, baseline semi-structured interviews were completed at all 12 sites. The obtained qualitative data is currently under analysis. The 2009 baseline performance data was abstracted, and the data feedback was processed for 11 sites. 2011 and 2012 prospective performance data is currently being abstracted for 11 sites.

Future Plans

A joint manuscript is in process based on qualitative data to highlight the positive outcomes of clinical coaches partnering with industrial engineers to coach process improvement in Veteran Affairs Hospitals. This manuscript will be presented in FY14 to the peer-reviewed journal *Implementation Science*.

Specialty Care Collaborative

Project Overview

The Specialty Care Collaborative will explore alternatives to the traditional models of healthcare delivery, which often lack coordination among its various settings and providers, including ECHO project, SCAN, and E-Consults. In FY12, the VHA-wide set consisted of 2 Specialty Care Collaboratives—one with a focus on surgical specialties in Orthopedics and Urology, and one with a focus on Medicine/General specialty of Cardiology and GI. In FY13 and FY14, it is expected that the focused specialty areas will increase to 6. The plan is to continue with the 4 specialty

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areas from FY12 plus an additional 2 areas that will be determined at a later date. The Specialty Care Collaborative will seek to develop, learn and spread healthcare delivery systems that highlight the patient as the center; coordinate specialty care services with PACT (Care Coordination Agreements); and disseminate care services via non-traditional means, such as telephonic, secure messaging, video and web-based technologies.

Project Objectives

The virtual Collaborative is structured so that up to 1 team per VA facility participates in 6 Learning Sessions spanning an eighteen (18) month time span, from December 2012 thru June 2014. Participation is voluntary and teams are selected for participation in the respective Specialty Care collaborative based on interest and potential for improving access to specialty care clinics. Each team is typically comprised of at least 5-10 members. Thus, FY13-14 Specialty Care Collaborative will each involve a maximum of approximately 25 teams with potential for additional members based on one of two options:

- Divide country by "Specialty" yielding 6 categories—one IE for each category, or
- Divide teams (logistically) by regions and assign an IE to each region.

This set of Collaboratives involves the following elements:

- **6 (3 for FY13) Learning Sessions per Collaborative:** These virtual LIVE broadcast programs gather teams from the front line of care to implement principles and strategies that will improve access to outpatient specialty care. Cross-team interaction is woven into the virtual setting.
- **Pre-work:** Completion of pre-work by the improvement teams includes identifying team members, gathering and analyzing relevant data, developing Aim (measurable goal) statements, and other actions related to improvement work, such as flow mapping the process, identifying areas of constraint, measuring demand for a service, measuring supply for a service, etc.
- **3 Action Periods:** These occur each fiscal year after each Learning Session. During the action periods, the Collaborative teams implement, test, and monitor the impact of their changes.
- **Conference calls:** During these action periods the respective collaborative directors conduct conference calls with coaches, planning & steering groups, Industrial Engineers (IEs) and the teams during which the teams report on their progress and obtain guidance on challenges or barriers they are experiencing.
- **Team reports:** Improvement teams report on their accomplishments. Team coaches and VERC IEs review these reports and provide teams with written feedback.
- **Spread:** Plans for Sustaining & Spreading the Specialty Care Collaborative improvements will be included in the Learning Sessions and Action periods.

Project Results

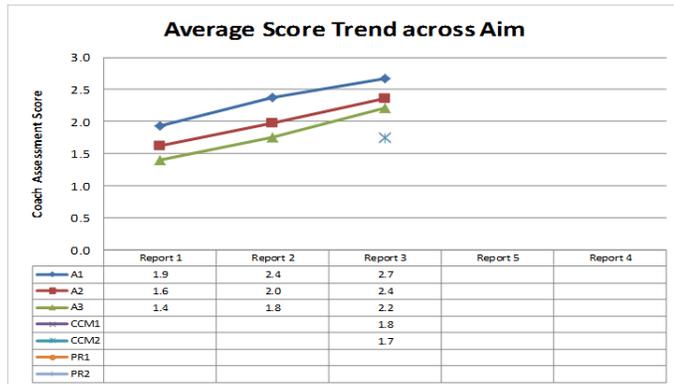
96 reports were required and 84 reports (88%) were submitted.

Project Impact

During the Collaborative, VA-CASE Industrial Engineers (IEs) serve with the regional planning committees and site coaches as a resource for questions and guidance related to the VA-TAMMCS model and other improvement approaches. In addition, IEs act as Learning Session Faculty, presenting breakout and plenary sessions, and participating in weekly calls. VA-CASE IEs also provide expertise in designing spreadsheets to support the measurement tools, and assist with knowledge-mining and management to inform the Collaborative and further

refine the PACT Change Package. ProClarity constructed briefing books that will eventually be published through VSSC for teams to use when drilling down from clinic to provider level data. Reports will be distributed monthly to teams for 13 different measures pulled from VSSC reports and cubes.

Coach Assessment Score



- 0 = no effort in this area
- 1.0 = discussion has started and likely to move into action
- 1.5 = plans for action begun
- 2.0 = a few tests of change have occurred
- 2.5 = tests of change begun, no measureable progress
- 3.0 = several successful tests of change with outcomes
- 3.5 = testing multiple changes; measurable progress over > 2 data points
- 4.0 = achieved aim (s)
- 4.5 = surpassed team's aims; spread to wider area
- 5.0 = spreading work into other areas, coaching others

Future Plans

A Specialty Care Toolkit that will link each tool to one or more Specialty Care pillars is currently in the design phase. This toolkit will be available nationally across the VA for other facilities to download and adopt locally. There are currently 11 tools that have been collected from the Phase 1 teams. A fourth round of emails containing a link to the new toolkit SharePoint site will be sent out to Phase 1 teams, who will be able to share tools and information via posts. The Toolkit Committee will soon discuss strategies for soliciting tools from the Phase 2 teams.

Surgical Flow Improvement Initiatives Collaborative

Project Overview

The Veterans Health Administration (VHA) Office of Systems Redesign (SR), in collaboration with the National Surgery Office (NSO), conducted a national Surgical Flow Improvement Initiative (SFII) in FY12. The national SFII was designed to improve VHA operating room flow, efficiency, and operations. The Veterans Engineering Resource Center (VERC) provided implementation support services to the national SFII, including administrative, coordinative, and technical assistance to the SFII planning committee. This collaborative structure ensured that clinical and administrative processes were optimized to allow the most effective and efficient use of resources, ensuring timely and appropriate access to care for our Veterans.

Project Objectives

The overall objective of this collaboration was to provide VERC IE support to teams participating in SFII FY12, and to assist with sustainment and spread efforts in FY13. Support efforts were completed in two phases. A total of twenty (20) teams participated in SFII FY12 (see table below). In Phase 1 (Feb-Apr 2013), VERC IEs reached out to all 20 teams

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participating in SFII FY12 to assess each team’s status and provide necessary assistance with Sustainment and Spread Efforts in each facility. In Phase 2 (Apr-Sept 2013), VERC IEs provided support only to those teams who participated in FY12 Sustainment and Spread Efforts.

Teams Participating in the Surgical Flow Improvement Initiative (SFII) FY12/13

VISN/Facility		VISN/Facility	
1	VA Maine Healthcare System, Augusta, ME	15	St. Louis VAHCS, St. Louis, Missouri
2	Western New York, Buffalo VAMC, NY	16	Jack C. Montgomery VAMC, Muskogee, OK
4	VAMC Wilmington, DE	17	Central Texas Veterans HCS, Temple, Texas
5	VA Maryland HCS (Baltimore/Perry Point VAMCs)	18	New Mexico VA Health Care System, Albuquerque, NM
6	McGuire VAMC, Richmond, VA	19	Eastern Colorado HCS, Denver, CO
7	Charlie Norwood VAMC, Augusta, GA	20	VA Puget Sound HCS, Seattle, Washington
8	VA Caribeña HCS, San Juan, Puerto Rico	21	VA Palo Alto HCS, Palo Alto, CA
9	Lexington VAMC, Lexington, KY	22	VA Greater LA Healthcare System, Los Angeles, CA
10	Cincinnati VA Medical Center, Cincinnati, OH	23	VA Nebraska-Western Iowa Healthcare Sys-
11	Richard L Rhodabush VAMC, Indianapolis, IN		

In FY13, SFII Sustain and Spread support varied across teams, but the overall approach remained the same. IEs maintained frequent contact by participating in bi-weekly/monthly calls or e-mail communications with the entire team or point of contact (POC). Plan-Do-Study-Act (PDSA) data were collected and tracked in PDSA database. IEs continued to assist teams with data population and analysis in the SFII OR (Operating Room) measurement tool. In addition to IE support, VERC provided detailed presentations to the SFII planning committee on team successes and barriers during bi-weekly calls.

VERC IEs used Microsoft Excel to design a Standardized Measurement Tool to assess and monitor the progress for the National Measure made by teams participating in the SFII. The measurement tool was designed to help OR teams establish baseline data and monitor progress towards their goals via 7 measures that account for all moving parts in the OR.

Project Results

Out of eleven teams who originally expressed interest in IE support, five teams (VISN 2, 5, 6, 8, and 11) actively participated in the complete SFII Sustain and Spread Effort FY13. These five teams held team meetings, regularly monitored data, followed the SFII sustainability plan, and implemented all or a majority of PDSAs with "in-progress" status. These teams have not achieved all their aims yet because their work is still in progress. Notably, teams in VISN 2, 5, and 12 are utilizing tools/templates from SFII FY12 to spread their work to other areas within their facilities.

Plan-Do-Study-Act (PDSA) Progress

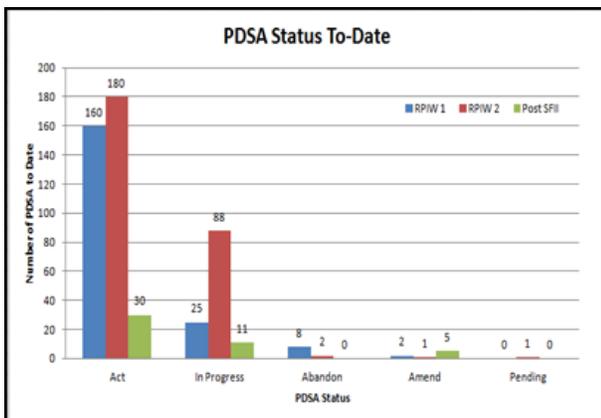
Project Overview

Used in the Institute for Healthcare Improvement’s "Methods and Tools for Breakthrough Improvement" course, the PDSA Worksheet has been used by hundreds of health care organizations. The Plan-Do-Study-Act (PDSA) is a useful tool for documenting a test of change. The PDSA cycle is shorthand for testing a change by developing a plan to test the change (Plan), carrying out the test (Do), observing and learning from the consequences (Study), and determining what modifications should be made to the test (Act). PDSA activity was documented and each PDSA was categorized based on the following five categories:

- **Act** – Completed PDSA
- **Amend** – Modified PDSA
- **Abandon** – Team decided not to work on this PDSA (Started or Never started on PDSA).
- **In-progress** – Team is currently working on this PDSA.
- **Pending** (Leadership Attention Might be Required) – PDSA is documented in the Completion Plan, but team has not started as yet (i.e. resource issues).

The figure below shows the PDSA Status to date. In total, 370 PDSAs have been completed and implemented. Thirty (30) PDSAs have been implemented since SFII FY12 by teams participating in SFII Sustain and Spread Efforts FY13. One-hundred and twenty four (124) PDSAs were in progress at the end of SFII Sustain and Spread Effort FY13. Teams did not create new PDSAs post-SFII FY12.

PDSA Status to Date



	RPIW 1		RPIW 2		Post-SFII		Total	
	n	%	n	%	n	%	n	%
Act	160	82%	180	66%	30	65%	370	73%
In-progress	25	13%	88	32%	11	24%	124	24%
Abandon	8	4%	2	1%	0	0%	10	2%
Amend	2	1%	1	0%	5	11%	8	1%
Pending	0	0%	1	0%	0	0%	1	0%
New PDSA after SFII					0	0%	0	0%

Table and graph only reflect data from teams who participated in Sustain/Spread Efforts FY13.

Project Impact

There were several factors leading to the success of Sustain and Spread Efforts FY13. VISN 2, 5, 8, and 11 are potential role models for their progress and continued effort in sustaining their aims. Contributing factors to their success included strong leadership support, regular data monitoring, and regular team meetings. Leadership support gave teams the opportunity to experiment with changes to current processes using the PDSA approach. Regular team meetings often encouraged participants to review data and address possible barriers. Chief of Surgery and OR nurses

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were key players in each team's success. Chief of surgery demonstrated leadership initiative, suggesting that process improvement is most successful when there is a top-down initiative. VISNs 6 and 7 encountered barriers in attaining success in Sustain and Spread Efforts in FY13, likely because teams lacked leadership support, and did not meet regularly or monitor data.

There were several challenges to sustain and spread efforts revealed by the VERC IE assessment post-SFII FY12. Teams that were not successful did not implement a strong, hands-off process, establish accountability paths, or follow the implementation plan post-SFII FY12. Leadership was not involved in sustain and spread efforts, and did not meet regularly as a team to review data. Teams also did not utilize VA-CASE IE support post-SFII FY12. Finally, there was a lack of motivation to work on new PDSAs. After the National Surgery Office (NSO) released data for all facilities, a majority of the teams discontinued their use of the SFII measurement tool due to the discrepancy between NSO and measurement tool analysis.

Project Results

From these challenges, VERC identified lessons learned from SFII Sustain and Spread Effort FY13 and developed recommendations for future initiatives, including:

- Implement the sustain/spread plan by getting the teams to think about the "sustain and spread plan" at the beginning of the improvement initiative.
- Require teams to monitor data regularly to detect any sudden changes and create new PDSAs as needed.
- Require teams to submit their data at the national level, thus creating accountability for leadership and teams.
- Introduce teams to Sustain and Spread during symposiums at the beginning of the initiative by conducting activities on various topics related to sustain/spread.
- Ask teams to initiate a strong implementation plan from the beginning, and focus on it throughout the initiative.

A total of seventeen (17) tools were collected for toolkit in FY12/13:

1. Practices for Environmental Cleaning in the Preoperative Setting Schedule (Standard vs. Terminal)
2. Pre-op Checklist
3. Management Tool for Process / Visual Board
4. SharePoint for SFII RPIW Team
5. Electronic format patient flow (Excel based spreadsheet to store all the patient information for PACU)
6. PACU Huddle Report
7. Standardized information dissemination sheet
8. Standardized use of the web-based calendar between ASU and OR staff
9. White board bay assignment system to decrease number of incorrect patient contacts prior to locating correct patient
10. OR room cleaning checklist
11. Coordinated time schedule for surgical team assessment and huddle (anesthesia, surgeon and OR nurse) to improve patient arrival time in OR

12. Pre-operative telephone contact template
13. Vendor compliance inventory tracking list
14. Pre-surgery screening patient questionnaire and OEC RN scoring tool
15. OR scheduling tool
16. Visual cue for the team to know who has completed role in Veteran prep
17. White board showing arrival status of the Attending via sign-in board in the preoperative area

MOVE!® Weight Management Program for Veterans (MOVE!®)

Project Overview

VA-CASE, in collaboration with James A. Haley VA Hospital, conducted a Rapid Process Improvement Workshop (RPIW) for the MOVE!® program to achieve MOVE!® target goals and establish a best practice model for optimizing health care services that address the obesity crisis among Veterans.

Project Objectives

The collaboration aimed to position the correct people in the correct program in a timely manner; improve the scheduling process for Veterans in the program; and improve the structure and content of MOVE!® classes.

Project Results

Overall, this project was a success with its intended aims. MOVE!® National is interested in spreading these implemented process improvements to other MOVE!® groups at other facilities. VA-CASE and MOVE!® James A. Haley VA Hospital made a presentation to the Preventative Committee in February 2013, sharing results and discussing potential future collaborations.

Aligning Transitions of Care for Post-Stroke Patients with Hypertension

Project Overview

This is a joint project with the QUERI–Indianapolis group. VA-CASE will serve as a consultant to help design the voice of the customer interviews and train interviewers for Specific Aim 1: “Describe the lived experience of a sample of patients, caregivers, inpatient teams, and primary care clinicians with respect to post-stroke/TIA hypertension management across transitions from hospital to home, and from home to primary care follow up-visits.” Semi-structured qualitative interviews with a purposeful sample of inpatient and primary care clinicians, patients, and caregivers will be audio-recorded, transcribed, and analyzed.

Interviews have been conducted with Outpatient Providers, Neurology Providers, Inpatient PharmDs, and a select number of Inpatient RNs. Interviewers still need to complete 5 Inpatient MD interviews, 2 RN interviews, and 10 more patient interviews.

Project Results

Although interview recording, transcription, and analysis are still underway, early interviews indicate that providers tend not to be very forthcoming about the quality of team communication, especially communication between outpatient and inpatient teams.

NEW CPHT Projects for FY13 and Beyond

CHPT achieved the goal of expanding its clinical partnership in healthcare transformation into four new areas outside of the regular Collaborative program: Mental-Health Chaplaincy Program, Specialty Care Transformation Office, National Activation Office, and Detroit Homelessness Community Outreach Program (Homeless Programming—Veterans Community Resource & Referral Center). These new projects are briefly described below:

Mental-Health Chaplaincy Program (FY13-15)

VA-CASE is collaborating on a program to improve patient-centered care by integrating chaplains into VA and DOD mental health care systems. VA-CASE will not only support the project with program management, coordination, and industrial engineering, but CPHT will also serve as a Co-Director for the Collaborative. This VA/DOD Mental Health and Chaplaincy (MH&C) learning collaborative will bring together motivated teams of chaplains and mental health representatives to develop and implement tools for enhanced integration (e.g. enhanced charting, collaborative assessments, joint clinical conferences).

- Project funded FY13-FY15
 - Planning: July-September 2013
 - First Planning Kickoff Meeting: July 18-19, 2013
 - Pework and Symposium 1: October-December 2013
 - Collaborative: April-October 2014
 - LS1: April 7-8, 2014
 - LS2: July 21-22, 2014
 - LS3: October 27-28, 2014

Specialty Care Transformation (SCT) Hybrid Collaborative Model

This project improves Veterans' access to specialty care through the development of team-based multi-specialty care, referred to as Specialty Care (SC) Neighborhood. In addition to improving quality of care overall, specific intended outcomes of this project include:

- Coordination of care across specialties for complex conditions including, but not limited to, oncology, integrated neurology, complex cardiovascular conditions (e.g. heart failure, procedures, complex diabetes, chronic renal disease), specialized surgery (including solid organ and stem cell transplantation), transitions of care from inpatient to outpatient, musculoskeletal pain, and women's health;
- Extension of specialty care to all associated community-based outpatient clinics (CBOCs) through virtual modalities; and
- Enhancement of Veteran experience by allowing them to receive specialty care in their neighborhood.

Project funded for FY13-FY14:

- 11 sites were selected from 47 RFP to be included in the SCT Improvement Initiative
 - Planning: July-September, 2013
 - Pework: October-December, 2013

RPIWs: January-August, 2014

National Activations Office (NAO)

NAO will partner with CPHT and points of contact from VA Society of Manufacturing Engineers (SME) Sterile Processing Services (SPS) and Intensive Care Unit (ICU) to identify the tasks, requirements, criteria, and documentations for an activation project and to sequence activities for a process path. VERC team's goal is to coordinate with NAO, SPS, and ICU subject matter experts to gather information on the tasks and documentations for each activation project phase; map the flow of activities; design standardized checklists; and sequence tasks.

This project focuses exclusively on two VA SME units:

- Intensive Care Unit (ICU): The process for ICU will begin after all parts of a new ICU are complete, and immediately before the ICU is deemed operational. The process will end once all parts of the ICU checklist are completed with affirmative responses, and the ICU is deemed ready to safely accept patients.
- Sterile Processing Services (SPS): The process for SPS will begin after all parts of a new SPS department are complete, and immediately before the department is deemed operational. The process will end once all parts of the SPS checklist are complete with affirmative responses, and the department is deemed ready to begin operations.

VA SME critical operations must:

- be succinct, clear and user friendly
- be computer-based
- be used as part of a final physical survey and inspection
- meet all critical requirements
- confirm the department is deemed ready to operate
- include categories for: Furniture and Fixtures; Equipment and Supplies; Safety; Staffing; and Policies and Procedures.

The operational elements critical to deciding that VA SME units are ready to begin operations include:

- Furniture and Fixtures: Movable furniture or fixtures that have no permanent connection to the structure of a building or utilities
- Equipment and Supplies: Equipment that has no permanent connection to the structure of a building or utility, and reusable or consumable resources
- Safety: Overarching practices ensuring safety for patients, family and staff
- Staffing: Qualified workforce to meet the demands of the service/program
- Policies & Procedures: Policies, implemented as procedures or protocols, are statements of intent that guide decisions and achieve rational outcomes.
- Any element deemed not critical to safe operations is beyond the scope of this project.

Detroit Homelessness Community Outreach Program (Homeless Programming—Veterans Community Resource & Referral Center)

VA-CASE met with the Chief of the Detroit Homelessness Community Outreach Program to discuss potential collaboration opportunities with the CPHT program. The planning phase will commence soon.

VA-CASE Research Initiatives Conducted by Dr. Daggett & Collaborators

A number of research studies and initiatives have been developed, proposed, and conducted by VA-CASE partner, Dr. Virginia S. Daggett and collaborators. These efforts include a Care Intervention Program for stroke and traumatic brain injury (TBI); INSPIRE Intervention for stroke performance improvement; Stroke QUERI Rapid Response; B-TIME materials; VETS-CARE TBI iOS application; Collaborative Attitudes of Physicians and Nurses; and the Effect of Safe Patient Handling on Acute Care Patient Falls with Injury. Dr. Daggett also provided the following services to VA-CASE:

- Informal facilitator for Polytrauma QUERI Family Care Practice Advisory Group
- Monthly VA reviewer on IU IRB-05 Neurology
- Member of National Nursing Research Advisory Group (NRAG) and co-chair Goal Group 2, focusing on the infrastructure of VA nursing research; currently leading the development of a “Roadmap” for nurse researchers on a national level; and working to improve these processes at our local VAMC by collaborating with R&D staff
- AHA moderator for International Stroke Conference, February 12, 2014
- Invited reviewer for Office of Nursing proposals, International Stroke Conference Nursing Symposium, *Dysphagia* Journal

Caregiver Nursing Research Initiative (NRI) Collaborative (VA-CASE, Stroke QUERI, IU): Telephone Assessment and Skill-Building Intervention for Informal Caregivers

Co-Investigators

Virginia S. Daggett, PhD RN, PI, Teresa Damush, PhD, Michael Weaver, PhD RN, (IU School of Nursing), Linda S. Williams, MD, Archana Dube, PhD (IU School of Liberal Arts), Jon Mathews (IU School of Medicine, Department of Biostatistics and Health Information and Translational Sciences), Laura Murray, PhD, CCC-SLP (Department of Speech and Hearing Sciences, IU Bloomington) Jane Anderson, PhD, NP (Michael E. DeBakey VAMC, Houston); NRI VA Nurse mentor, Bonnie Wakefield, PhD, RN

Project Overview

Stroke and traumatic brain injury (TBI) are leading causes of long-term disability among Veterans, and result in the need for care from informal caregivers after discharge to the home setting. There are very few evidence-based, easy-to-deliver, follow-up programs that train caregivers in providing care after hospitalization. The telephone assessment and skill-building interventions developed through this initiative consist of an 8-week program delivered by telephone nurses who address both the needs of the Veterans and their caregivers.

Project Objectives

The objectives of this 4-year HSR&D funded study are to (a) evaluate the efficacy of a Veteran-centric telephone assessment and skill-building intervention tool for informal caregivers of Veterans with stroke, and (b) estimate effect sizes of the intervention for informal caregivers of Veterans with TBI. Both stroke and TBI interventions are compared with an educational intervention that serves as an attention control group.

Specific aims include:

- Testing the short term (immediately post-intervention) and long-term/sustained (12 and 24 weeks, and 1 year)

efficacy of a Veteran-centric Caregiver Stroke Intervention for improving the primary outcomes of stroke caregivers' depressive symptoms, caregiving-related negative life changes, and unhealthy days;

- Testing the short term (immediately post-intervention) and long-term/sustained (12 and 24 weeks, and 1 year) efficacy of the Caregiver Stroke Intervention for improving the primary outcome mediators of stroke caregivers' task difficulty, optimism, and threat appraisal; and
- Evaluating program delivery costs for the Caregiver Stroke and TBI Interventions and attention control procedures, and to assess the cost-effectiveness of these interventions in terms of non-caregiving hours and unhealthy days in caregivers of Veterans with both stroke and TBI.



Annie Plahitko and Sarah Harvey

Exploratory aims include:

- Estimating effect sizes for the Caregiver TBI Intervention on (a) the primary outcomes for TBI caregivers' depressive symptoms, caregiving-related negative life changes, unhealthy days, and (b) the TBI caregivers' primary outcome mediators of task difficulty, optimism, and threat appraisal; and
- Estimating interventions (stroke and TBI) effect sizes on the secondary outcomes of social participation, self-efficacy of caregiving, and the quality of the relationship between the caregiver of the Veteran with stroke or TBI and the Veteran survivors.

Methods

We will conduct a randomized, controlled trial to evaluate the Veteran-centric Caregiver stroke and TBI Interventions. Informal caregivers of Veterans with stroke (N = 222) or TBI (N = 108) who have received care at the Michael E. DeBakey VAMC in Houston or the Richard L. Roudebush VAMC in Indianapolis will be randomized to the respective intervention or to the respective attention control group. Both the interventions and attention control procedures involve 8 telephone sessions delivered over 8 weeks, with a booster session at 12 weeks. Data collections will occur at baseline, 8 weeks (short-term intervention effect), 12 weeks (after booster), 24 weeks, and 1 year after baseline (long-term sustainability of intervention effect). Linear mixed models will be applied to the repeated-measures data to test program efficacy for stroke caregivers and to estimate effect sizes in TBI caregivers. An incremental cost-effectiveness ratio (ICER) will be employed to address the comparative costs and outcomes for the Caregiver stroke intervention and attention control groups.

Project Results

IRB and R&D approvals have been obtained at Indianapolis. Start-up processes have begun but recruitment has been delayed due to current modifications in the project.

Project Impact

Caring for a family member after a stroke or a TBI can be very challenging. This Veteran-centric intervention is a unique, comprehensive Caregiver Intervention Program that enables caregivers to develop the necessary skills to manage care for the survivor, while also taking care of themselves as caregivers, thus improving both patient and

caregiver outcomes. The long-term goal of this study is to implement this intervention for family caregivers of Veterans with stroke and TBI across VHA by offering comprehensive training and support.

INSPIRE: Intervention for Stroke Performance Improvement using Redesign Engineering VA HSR&D Stroke QUERI Service Directed Project, 2009-2013 (Secondary Analyses): Nursing Education: A Critical Need in the Delivery of High Quality Stroke Care

Co-Investigators

Virginia Daggett, Linda Williams, Nicholas Burrus, Jennifer Myers, Laurie Plue, Joshua Robinson, Edward Miech, Heather Woodward-Hagg, Teresa Damush, Oral presentation at International Stroke Conference, February 12, 2014, San Diego, CA

Project Overview

High quality stroke care is complex and requires strong multidisciplinary teams, including nurses, to ensure care processes are timely and appropriate. The purpose of this study was to identify the training needs of nurses delivering care to patients who 1) present with acute stroke and 2) are admitted to inpatient units.

Methodology

Using semi-structured interviews, we conducted a qualitative study for a formative evaluation in 12 VAMCs that 1) had ≥ 50 acute ischemic stroke admissions a year, and 2) were diverse in the structure of stroke care. The interviews focused on current context and structure of stroke care, including educational practices and training needs. Secondary analyses were conducted, targeting frontline nurse and physician respondents (N = 113) in emergency, acute care and rehabilitation units.

Project Results

Respondents across the sites reported insufficient nurse education and training for acute stroke care as an overarching theme. Moreover, themes related to the acute stroke care quality indicators emerged as competency areas for which nurses needed continuous training, including: a) timely recognition of acute stroke and transient ischemic attacks; b) NIH Stroke Scale and neurological exams; c) dysphagia screening; d) administration of tissue plasminogen activator and management post treatment; and e) deep vein thrombosis prophylaxis. Themes that were related to structure of stroke care and/or context also emerged and were attributed to training challenges across the sites, listed in order of prevalence: a) centralized care versus decentralized care; b) low volume of acute strokes; c) nurse engagement; d) structured acute stroke care education; and e) release time.

Project Impact

VA stroke care providers identified key barriers to care, as well as educational needs around specific stroke quality indicators, including lower volume and time for training and engagement of nursing staff in acute stroke care. Future programs to improve VA stroke care need to address these barriers to optimally support high quality multidisciplinary stroke care.

± In response to the secondary analyses above, the following project—Stroke QUERI Rapid Response Proposal—was submitted on December 20, 2013; it is a collaboration between VA-CASE and VA HSR&D Stroke QUERI, and we partnered with the Central Office of Nursing Services to develop the specific aims of the following study.

**Stroke QUERI Rapid Response Proposal:
High-Functioning Stroke Teams: Evaluation of Nurse Champion Roles and Practices**

Co-Investigators

Virginia Daggett, PI; Teresa Damush, PhD, Linda Williams, MD, Laurie Plue, MA, Jane Anderson, PhD

Project Overview

Based on our previous work, we know that nursing roles and practices are critical to the success of facility stroke teams, and that nurse roles are not uniformly applied across VA facilities. Data have also demonstrated that VA nurses who care for Veterans with acute stroke often have not received adequate training about the acute stroke quality clinical indicators specified by the VHA Acute Ischemic Stroke (AIS) Directive. In 2011, the VHA National Taskforce on Early Acute Stroke Care Management outlined mandatory components for each VAMC to transition into one of the three levels of VHA Stroke Centers (Primary, Limited Hours, Supporting). This task force provided virtual training for VA acute stroke care clinicians; however, in many cases, nursing participation was limited. A framework was neither specified nor provided to guide VAMC administrators and providers in delivering primary stroke education to nurses; defining roles; and establishing scopes of practice within the new VA Stroke Centers.

Project Objectives

The objective of this study is to conduct a formative evaluation in order to gain understanding and typology of current nursing roles, including identified nurse champions, their training, and practices in both high- and low-functioning acute stroke care teams at VA Stroke Centers. A high-functioning VA acute stroke team is defined as a team that has sufficiently organized to consistently report Inpatient Evaluation Center (IPEC) data each month, adhering to the VA AIS Stroke Directive/Guidelines for Stroke Centers and maintaining performance on the acute stroke care indicators at a level above the national average for at least six consecutive months in Fiscal Year 2013 (FY13). A low-functioning team is defined as a facility team that that organized sufficiently to consistently report IPEC data each month, but did not maintain performance on the acute stroke care indicators above the national average for at least six consecutive months in FY13.

Specific aims include:

- Identify and compare nursing roles (specifically nurse champions), practices, expertise in practice and inter-professionalism, as well as the evolution and practice scope of these roles within high- and low- functioning acute stroke care teams at VA Stroke Centers;
- Identify and compare acute stroke care training methodologies for nurses and determine how these methods support and sustain acute stroke care clinical assessments and skills of nurses in high- and low-functioning stroke care teams; and
- Evaluate the context and facilitating factors in which nurses on high- and low-functioning teams practice and identify any barriers that they have to overcome to achieve this level of practice.

Methods

We will apply a mixed method approach for this evaluation, utilizing standardized, semi-structured interviews. We will purposely interview VA nurses who have been identified as nurse champions, clinicians in high- and low-functioning teams in VA Stroke Centers, and key stakeholders in the respective VAMC.

Project Impact

Our contribution to the VHA is to evaluate the roles and training of frontline nurse champions, and identify how nurse champions integrate into and work effectively within VA Stroke Centers. By studying high- and low-performing facilities, we can better understand which structures, roles, and training methods are most associated with high-functioning teams. In understanding these practices and processes, we can in turn plan interventions to address the gap in VA acute stroke nursing education across the VHA, facilitating the implementation of nurse education and processes with frontline staff at other VA Stroke Centers, improving acute stroke care quality indicators and outcomes for Veterans with acute stroke.

Bundle, with Tailored Implementation Methods and Education (B-TIME) Materials: VA HSR&D Stroke QUERI Service Directed Project (submitted December 2013)

Co-Investigators

Jane Anderson, PhD NP, PI, Stephanie Daniels, PhD SLP, Co-PI, Virginia Daggett, PhD, RN, Edward Miech, PhD-Ed (VA-CASE Co-investigators), Drs. Robert Morgan, Shweta Pathak, Suja Rajan (University of Texas Medical School Houston Co-investigators)

Project Overview

Screening for risk of dysphagia is a well-established best practice in providing quality care for patients with stroke; it allows for immediate interventions that reduce morbidity, length of stay, and healthcare costs. The VHA recently released the Directive for Treatment of Acute Ischemic Stroke (AIS), which requires that VA facilities implement protocols that incorporate dysphagia screening for patients with AIS and track performance with completing dysphagia screening prior to oral intake as a measure of quality care. In response to the directive, the Inpatient Evaluation Center (IPEC) established a stroke module for facilities to self-report dysphagia screening rates in patients with AIS; however, these data are currently only being reported by one-third of VA facilities and there have been no assessments of the validity of this self-report data. Many practices for dysphagia screening are unknown—despite the VA's focus on dysphagia screening as a measure of quality stroke care. These unknown practices, when coupled with performance, highlight quality and knowledge gaps in the care of patients with stroke, magnifying the need for effective strategies to facilitate implementation of evidence-based dysphagia screening in Veterans with stroke.

To address the quality and knowledge gaps around stroke dysphagia screening, this project focuses on the following aims:

1. Determine the effectiveness of the B-TIME intervention, over time, for improving evidence-based dysphagia screening processes among patients that present to the ED with suspected stroke;
2. Evaluate B-TIME implementation strategies to understand how evidence, context, and facilitation influence the implementation of a stroke dysphagia screening Bundle across EDs within the VA;
3. Provide external facilitation to train site champion dyads—consisting of a nurse and a speech-language pathologist (SLP)—on the application of System Redesign methods for implementing the B-TIME intervention;
4. Establish internal facilitation by site champion dyads to implement the B-TIME intervention; and
5. Perform an annual Budget Impact Analysis (BIA) from the VA's perspective for the pre-implementation, implementation and post-implementation periods of the B-TIME study.

Methods

Hybrid Type II 4-year study using a Step-Wedge design where we will evaluate both the effectiveness of the B-TIME intervention and implementation strategy in VA Emergency Departments (EDs).

Project Impact

The anticipated impacts of this SDP are standardized evidence-based dysphagia screening processes (through the use of a bundle), customized local adaptation of the bundle (through tailored implementation methods), and systemized training for nurses and other frontline clinicians (through eLearning education materials). Findings from this study will contribute new knowledge on the effectiveness of B-TIME for improving evidence-based stroke dysphagia screening processes and for implementation sciences as an approach for local adaptation and training to facilitate effective implementation and sustainability of evidence-based stroke dysphagia screening.

VETS-CARE TBI iOS app

Feasibility and Satisfaction with the VETerans Compensate, Adapt, Reintegrate (VETS-CARE) Intervention

Co-Investigators

Virginia Daggett, PhD, PI, Tamilyn Bakas, PhD, RN, Scott Russell, Andrew Allen, BS, Kyle Maddox, Jennifer Williams, BS, Laura Murray, PhD, CCC-SLP (co-investigators) accepted for oral presentation at 10th World Congress on Brain Injury March 21, 2014, San Francisco, CA

Project Objectives

This study was conducted to determine the feasibility and satisfaction of the theoretically based VETS-CARE intervention with Veterans who sustained a mild traumatic brain injury (mTBI). The VETS-CARE intervention was designed to assist Veterans in self-management skills across six domains: cognitive impairments, physical symptoms, emotions and behaviors, instrumental activities of daily living, interpersonal interactions, and community reintegration. Effect sizes for the Patient Health Questionnaire-9 (PHQ-9), Community Integration Questionnaire (CIQ) and Social Support Questionnaire (SSQ) were also estimated.

Methods

The VETS-CARE intervention was implemented as an Apple (iOS) mobile application (app). Co-investigators who were experts in usability testing and Human Computer Interaction applied iOS-oriented usability heuristics and guided the app development. Veterans were recruited from the Polytrauma Unit at one Midwest VA Medical Center and block-randomized to either the VETS-CARE intervention group or to an attention control (education) group. In Phase I, six Veterans with mTBI were randomized. Veteran feedback was utilized to revise the app. In Phase II, 42 additional Veterans with mTBI were recruited and randomized. Each participant had one study visit that was conducted in a VA research Human Computer Interaction simulation laboratory. Veterans completed a demographic survey, feasibility and satisfaction questionnaire, PHQ-9, CIQ, and SSQ during the visit, and the outcome measures were repeated two weeks later via telephone interview. Data were analyzed using descriptive statistics, independent sample *t*-tests, and Cohen's *d* to estimate effect sizes. Comments from the Veterans were categorized using a predetermined code list that addressed the five feasibility and satisfaction domains: usefulness (content), ease of use, affective aspects, control and efficiency, and typicality of task for mobile device.

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Project Results

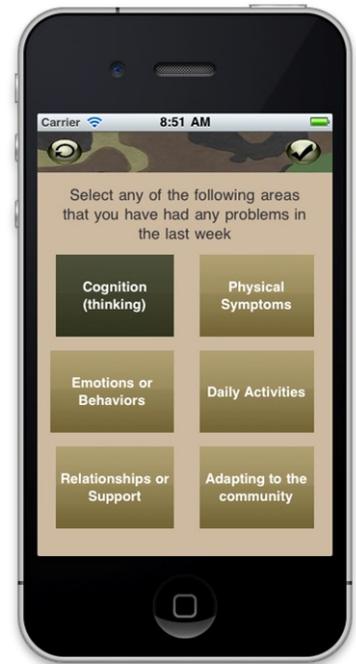
Forty-eight Afghanistan/Iraq Veterans were recruited; 25 Veterans were randomized to the intervention group and 23 Veterans to the attention control group. The Veterans were 33.7 years old, male (91.7%), and their postconcussive symptoms included: PTSD (83.3%), depression (70.8%), chronic pain (77.1%), balance impairments (60.4%), headache (95.8%), fatigue (64.6%), insomnia (81.3%), tinnitus (81.3%), hearing impairment (60.4%), and vision impairment (20.8%). On a scale of 1.0 to 5.0, with 5.0 being strongly agree, Veterans provided moderately high evidence of feasibility and satisfaction for the VETS-CARE intervention iOS app [usefulness 4.19, ease of use 4.39, affective aspects 4.03, control and efficiency 4.17, typical task for mobile device 4.19], with the average overall rating of 4.19. Given that insufficient statistical power and the need for more time with the app moderated treatment effects, small effect sizes were found for the PHQ-9 ($d = .004$), CIQ ($d = .008$), and SSQ ($d = .027$).

Project Impact

Mobile applications may be a practical modality to deliver novel interventions specific to Veterans who have sustained an mTBI and face challenges across multiple domains as they reintegrate. Mobile apps can be tailored and accessible to Veterans in diverse settings.

Future Plans

A live demo was conducted at IU Informatics in Fall 2013. Next steps include partnering with IU Informatics in further development/revision of the app on multiple platforms through student capstone projects. We will then seek pilot funding and larger funding for testing in the "real world," via collaboration with IU Informatics. This initiative will begin Fall 2014. Currently, the algorithms are being edited based on Veteran feedback/recommendations in preparation for the upcoming collaboration.



The Relationship between Nurse and Physician Attitudes towards Collaboration and Actual Collaborative Behaviors in the Acute Care Environment

Co-Investigators

Virginia S. Daggett, PhD, RN, Principal Investigator, Aleksandra Radovanovich, MSN, RN, Nursing Doctoral Student, University of Phoenix

Project Overview

Collaboration is a competence required in today's complex healthcare environment. The Institute of Medicine (IOM) has indicated that collaborative interaction between nurses and physicians is essential for safe patient care. The IOM, Agency for Healthcare Research and Quality (AHRQ), and the Department of Health and Human Service (DHHS) have reported the annual patient death rate from preventable medical errors were 98,000, 100,000, and 180,000, respectively. Additionally, the Joint Commission (TJC) emphasized that 6,782 reported adverse events between 2004 and 2010, with 4,642 of these events resulting in patient deaths. Failure of nurses and physicians to collaborate and communicate continues to be the most commonly cited factor for medical errors.

Project Objectives

The purpose of this study is to examine if there is a relationship between nurse and physician attitudes towards collaboration and actual reported collaborative behaviors used in the clinical environment. Applying a social psychology theory to investigate the attitudes toward collaboration in relation to actual collaboration will help the future development of tailored interventions and improve collaborative relationships between nurses and physicians.

The specific aims of this study are:

1. Determine the relationship between RN and MD attitudes regarding collaboration as measured by the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration (JAPNC) and actual reported collaborative behaviors used by RNs and MDs in the clinical environment as measured by the Collaborative Practice Scale (CPS); and
2. Determine the relationship between RN and MD demographics (age, gender, ethnicity, degree held, and length of clinical experience) on attitudes regarding collaboration in RN and MD interaction.

Design/Methods

Exploratory study, utilizing an intranet SharePoint survey to determine demographics of nurses and physicians who are randomized into the study, their attitudes toward physician-nurse collaboration, and their collaborative practices in one Midwestern VISN.

Project Results

Recruitment of participants is pending University quality board approval.

Project Impact

The knowledge gained through this study of how nurses' and physicians' attitudes towards collaboration and evidence of actual collaborative behavior may contribute to future studies that focus on improving collaboration and patient outcomes in the inpatient clinical environments of VHA.

Effect of Safe Patient Handling on Acute Care Patient Falls with Injury

Co-Investigators

Virginia S. Daggett, PhD, MSN, RN, Principal Investigator, Jane M. Murphy, BSN, Co-Investigator, Nursing Masters Student, Indiana Wesleyan University

Project Overview

Health care staff positions that provide direct patient care in acute, rehabilitation and residential care facilities are among the top ten injury-prone occupations in the United States. Musculoskeletal injuries cost the nation approximately 7.4 billion dollars in Workers Compensation and other claims. To combat these injuries and costs, VA has been implementing Safe Patient Handling (SPH) programs at all U.S. acute care and residential care facilities. These SPH programs have demonstrated an increase in staff safety by preventing musculoskeletal injuries during patient-assisted movement such as standing, ambulating, turning, repositioning in bed, and bed-to-chair transfers. Though the effect of the SPH program has demonstrated improvement on Veterans' activities of daily living outcomes in long-term residential care facilities, there is a lack of evidence that SPH programs have been effective in improving Veteran outcomes in the acute care settings, where Veterans' stays are shorter in duration. Of particular

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interest is the effect on Veteran falls that can be anticipated, and in many cases prevented, if Veterans are assessed properly and timely intervention is implemented. The SPH program utilizes a risk assessment tool to identify the type of equipment the staff requires to safely move the Veteran. The tool includes an assessment of the Veteran's current status related to their level of assistance in ambulating and transferring, level of cooperation and comprehension, and weight-bearing capability. In addition, the Veteran's weight and Body Mass Index (BMI) are noted. These components are applied to an algorithm to determine the equipment options that should be utilized to safely move the Veteran. There are over 20 algorithms that can be utilized and are dependent on the assessment of the Veteran, his (her) BMI and what activity the staff is attempting to complete.

Project Objectives

The purpose of this study was to evaluate whether the implementation of SPH reduced Veteran falls with injury in a VAMC.

The specific aims for this project are:

1. Determine if the implementation of the SPH program at the Richard L. Roudebush VA Medical Center demonstrated a decrease in the rate of Veteran falls per bed days of care in acute care units, with a focus on falls with injury; and
2. Determine if the SPH program was being followed in accordance to the designed algorithms.

Design/Methods

The research design of causal-comparison was utilized to evaluate the potential for the implementation of a SPH program to decrease the rate of falls per bed days of care overall and decrease the rate of falls with injury per bed days of care. Demographic data in pre- and post-SPH groups were compared utilizing the *t* test with a confidence interval of 95%.

Project Results

Comparing the fall rates before and after Safe Patient Handling Program implementation on two inpatient wards, the data showed a statistically significant decrease in the fall rates after the program's initiation. The data did not show statistical significance in the decrease of injuries sustained during a fall.

Project Impact

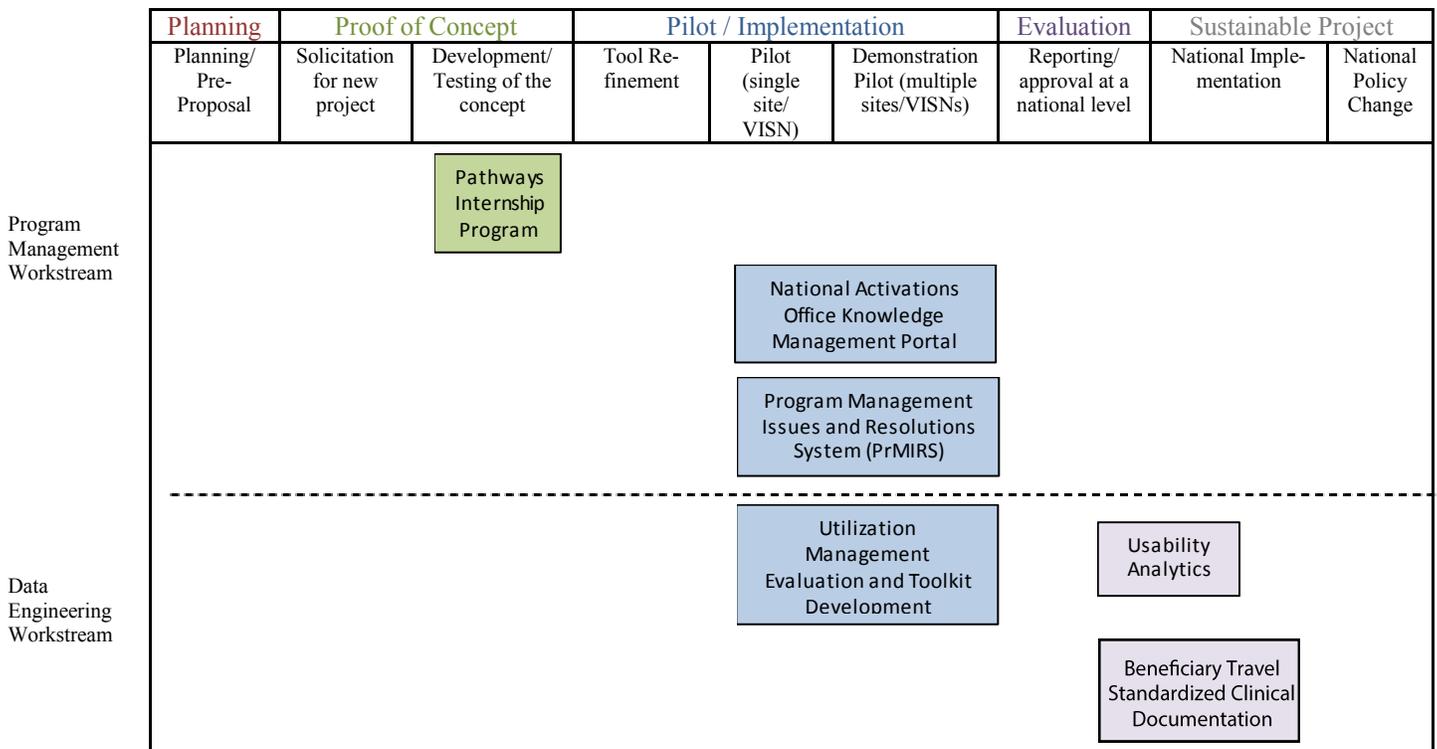
Future research on the implementation of SPH in VHA acute patient care settings needs to be conducted to determine barriers and facilitators and examine site performance to not only improve Veteran outcomes, but also decrease injuries of bedside staff and costs in the delivery of care across the VHA.

Strategic Programs and Data Engineering Resources (SPDER)

In November 2012, a re-organization occurred uniting the VA-CASE program lines of Planning, Strategy, and Innovation (PSI) and VA-CASE Informatics. The newly formed program line is called Strategic Programs and Data Engineering Resources (SPDER), and consists of two specialty units: Strategic Programs and Data Engineering Resources. Strategic Programs includes Planning, Program, and Project Management Services both internal and external to VA-CASE, as well as support for operations integration within VA-CASE. Data Engineering Resources encompasses all of the existing Informatics program duties, including but not limited to Mobile Application Development, Human Computer Interaction and Design, Analytical Sciences and Knowledge Management. Currently, all of the Informatics work to include iOS development, database development, toolkits, and CBO support fall under Data Engineering Resources.

The VA-CASE SPDER budget was approximately \$1,240,918 external, with \$370,000 allocated from VA-CASE core funds. SPDER has 12 VA Staff, three contractors with ten on-going funded projects. They have two major partners—Office of Informatics and Analytics (OIA) and national Activation Office (NAO).

VA-CASE SPDER Project Pipeline



VA-CASE SPDER Project Summaries

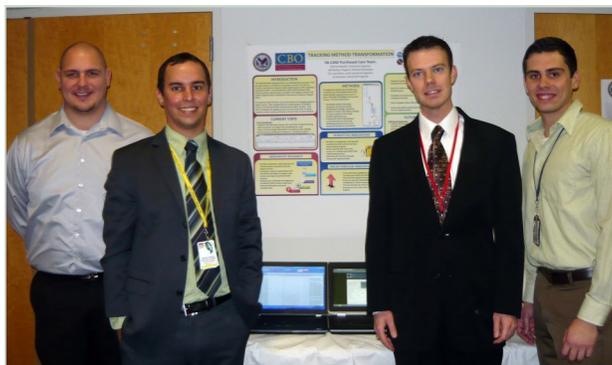
Intern Program

Project Overview

The Intern Mentorship Program was initiated in July 2013. This program was created out of a concern that with the growing numbers of on-boarded Interns, VA-CASE needed a centralized point of contact to organize the Intern process. The Interns or Recent College Graduates (RCGs) hired through the Human Resource's Pathways Program are currently being assigned to services throughout the facility, and not just at VA-CASE. Only approximately 25% of the students brought on board by VA-CASE are currently working with a VA-CASE program line.

Project Objectives

The primary goal for the Mentorship program is to increase the retention rate and transition to full-time employment for all Interns brought on through the pathways program upon graduation. The secondary goal for this program is to develop improved on-boarding processes and mentorship activities designed to keep Interns engaged and provide ample opportunities for learning.



Project Results

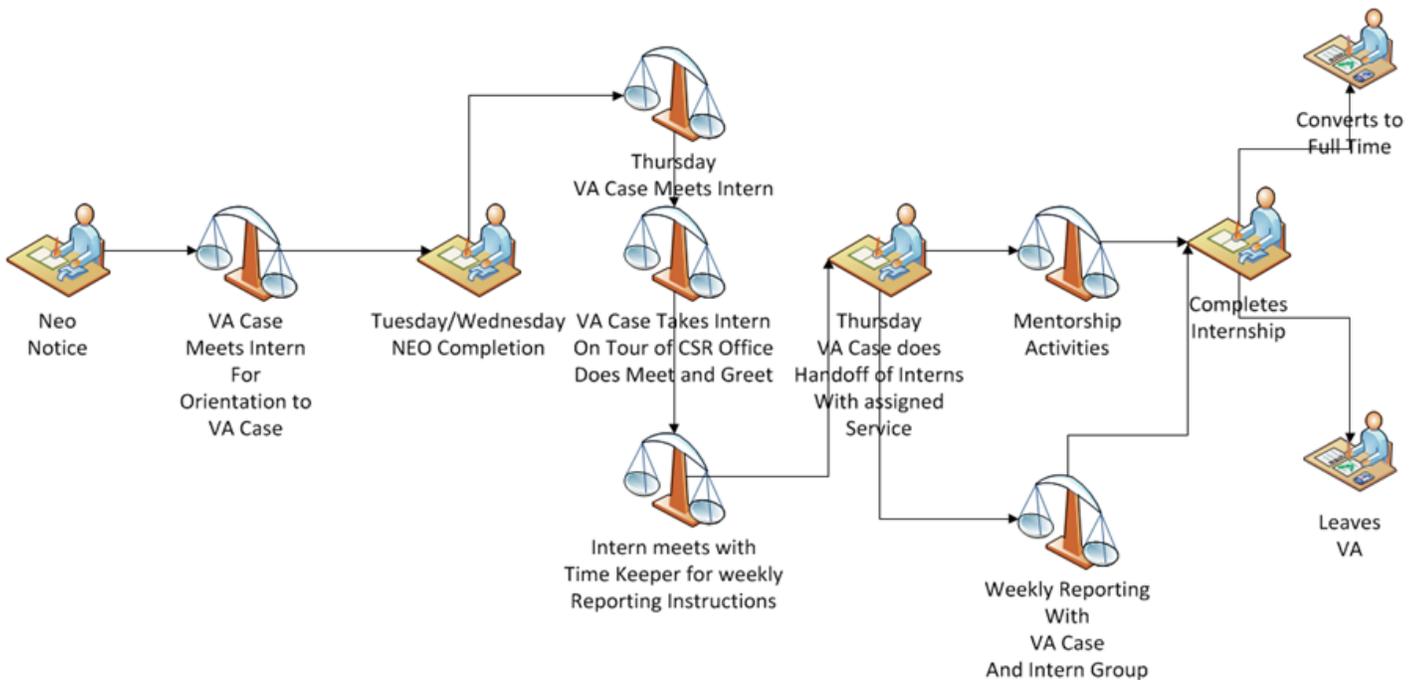
At the inception of this program, there were 8 existing interns assigned to VA-CASE. Our first course of action was to meet with all existing Interns located throughout the facility and host an initial meet and greet. We have worked closely with Human Resource on the Pathways Program to determine how the program works for Interns and RCGs. An HR representative attends Intern meetings to help answer their questions.

Project Impact

At this time in the Program, we have 17 active students, 4 inactive, and 3 that have been moved out (2 of these were funded by the services where they were assigned). Welcome packets with VA-CASE background information and other orientation information have been developed and provided to new Interns. Training on internal procedures is provided, and regular meetings are held with the Interns. A SharePoint site has also been created for the program. We are working with the Administrative Officer (AO) team to integrate the intake and new employee orientation (NEO) processes with the VA-CASE Operations Center project. The SharePoint NEO page follows new hires by tracking all active and inactive Interns, their service assignments, contact information, anticipated graduation dates, and skills inventory. The pages also track Interns' interests and the projects that would expose their skills and attract their interests. Below is a depiction of the on-boarding process we have developed to date.



Future State Process



Future Plans

Requirements and processes are still being gathered and evaluated for further development of the Pathways Program. The initial on-boarding steps have improved. The trial tour of the Cold Springs Road location and an introduction to VA-Case staff members proved successful and had a favorable impression on the new Interns. In October, we began weekly update meetings with the Interns to give them an opportunity to share the projects they have been working on and discuss any issues they might have. These meeting gave Interns an opportunity to hear about other students' projects and available opportunities. The biggest challenge we have found with this new on-boarding process has been communication. We have addressed this issue on the weekly AO team meeting by discussing changes to the schedules and other pertinent information as it develops.

National Activations Office Knowledge Management Portal (NAO KMP)

Project Overview

VA-CASE analyzed the current FY2014 work requirements for the National Activations Office (NAO) between July 2013 and September 2013. We developed a list of work requirements and objectives that contains a primary VA-CASE Strategic Program and Data Engineering Resources (SPDER) service request related to the content development, data engineering and reporting, and usability support of an internal, second iteration Knowledge Management Portal (KMP) for NAO. Enhancement of the KMP will enable the NAO to focus on enterprise customer needs and the design and expansion of internal processes, while simultaneously constructing virtual collaboration, communication, and oversight knowledge portal functions.

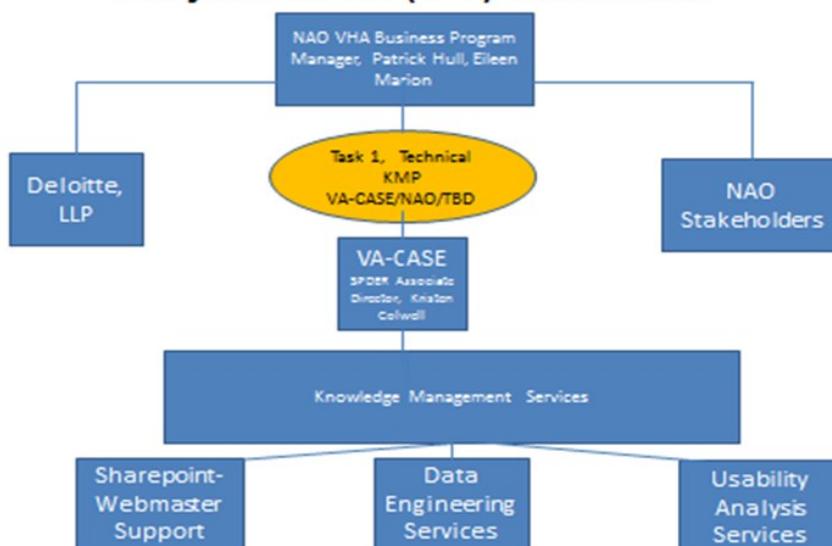
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Project Results

Expected outcomes from this collaborative Statement of Work and associated internal programming support are internal and virtual structures to support essential communication and collaboration within the National Activations Office. Provision of the Task 1 Internal Knowledge Management Portal would provide a platform for internal information sharing, essential for year-end NAO Program updates and briefings already scheduled.

A diagram of the current collaborative inter-program structure, utilizing an Integrated Project Team (IPT) is referenced below, and subject to change as our working relationships become better defined.

VA-CASE and NAO Collaborative Integrative Project Team (IPT) Structure



Project Impact

The SLA for this project has been accepted, pending funding approval. The funding was delayed due to the Federal Government shutdown. The SPDER team has continued to facilitate weekly customer status meetings to review the funding status and enhancements made to the web portal, as well as to solicit feedback from the customer. We have set up a PrMIS site to utilize for this project as well as sub-sites for the different project teams working on this project. At this time, only the web masters have a site, and are waiting to perform remaining site-building work until funding is approved. We had a soft launch of the Portal Site in November 2013, which was ahead of schedule; the customer's anticipated launch date was slated for the end December 2013. NAO is pleased with the progress made to date, noting that that soft launch exceeded their expectations.

Future Plans

The anticipated duration for the Knowledge Management Portal and Reporting Services and SharePoint/SPDER Toolkit support is approximately 12 months, through the end FY2014. Upon the beginning of FY2015, this Statement of Work will be reviewed for any new FY14 NAO needs, and updated accordingly. VA-CASE SPDER will

support the NAO, the NAO Contractor, and other identified stakeholders to provide content support, data engineering, and usability design support for a second-iteration, internal-facing Knowledge Management Portal (KMP) no later than September 30, 2014. The KMP will be used to provide an internal “one-stop shop” of NAO Activation Program information, collaboration platforms, self-directed training and Activation-related problem-solving materials.

Usability Analytics

Project Overview

Due to the changing nature of healthcare both in the VA and across the United States, it is essential for new versions of the Electronic Health Records (EHRs) be able to detect internal program problems. One of the emerging new versions of the EHRs is the VA Health Management Platform (HMP) and its proposed complimentary program, Usability Analytics Platform, which could run alongside HMP to monitor usability problems.

Project Objectives

The hi2 Usability Analytics Project is designed to investigate the feasibility and potential value of creating a Usability Analytics Platform to monitor the efficiency, effectiveness, and satisfaction of using the emerging HMP. The goal of this project is to make a business case for why a usability analytics platform is necessary for the continued improvement of the EHRs and the over healthcare that is provided to our Veterans.

Project Results

In order to create any computer program, it is important to understand the needs of its potential users. In the case of the UAP, users are non-clinical stakeholders who will make changes to the HMP. Therefore, this project is investigating the types of data that non-clinical stakeholders would use to determine when there is a problem, and the ways in which that data could be collected (metrics). However, because the HMP has yet to be built, metrics can only be theorized based on the current EHR system (CPRS). Additionally, due to the nature of an analytics program, it is important to understand where data comes from and what kinds of problems it should monitor. As a result, the hi2 Usability Analytics Project is also studying the needs of the users of the HMP: the clinicians. By studying how the clinicians work, how they would ideally like to work, and the usability issues they are currently experiencing, it is possible to then generalize the kind of usability issues that could potentially be seen in HMP and how best to detect those problems with the UAP. An analysis of these clinical workflows will not only help clarify user needs, but it also help discern the potential limitations of a usability analytics platform.

Project Impact

The hi2 Usability Analytics used multiple methods to collect evidence on the need for a UAP. An RFI was used to learn about industry offerings, which provided information that will be used to conduct a gap analysis. Interviews and observations with both clinical and non-clinical stakeholders provides an understanding of usability issues and the processes used to resolve them.

Future Plans

Based on the usability issues and the processes for resolving them, candidate metrics will be theorized and use cases created in order to show theoretically the kinds of problems a UAP should be able to help detect and solve. All of the

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collected data will be organized into a requirements traceability matrix to show how synthesizing the information can produce a guide for the builders of the HMP and UAP.

Program Management Issues and Resolutions System (PrMIRS)

Project Overview

Program Management Issues and Resolutions System (PrMIRS) is a SharePoint based tool to assist with Program/Project Management.

Project Objectives

PrMIRS aims to develop four major components:

1. Project Management Information Systems (PMISs) is a repository for the project documents, including, but not limited to, drafts of the documents, meeting minutes/notes and officially signed documents. In addition to the repository, the PMIS will offer some automation of key project management lists/logs (i.e. Change Management Requests, Risks, Issues, Opportunities, etc.).
2. Dashboards will offer the project manager, program manager and portfolio manager a place to review the project at a glance. The dashboard will be configurable and customizable to show managers pertinent information (i.e. Are the project deliverables received on time?). The information will be presented using a variety of Graphs, Key Point Indicators, or other WebParts depending on the preferences of the manager. Program Managers will have the ability to view any/all of the projects under their programs. Portfolio managers will also be able to view all of the programs underneath their portfolio.
3. Integration with Microsoft Office Products such as Outlook, Word, Project, and Excel offers ease of use and document transfer.
4. Interfacing with the VA-CASE Operations Center, AO Business Operations Center (BOC) will enable consistent reporting of Portfolios, Programs and Projects. However, interfacing with the BOC will only be available for the interactions of the tools created for use within VA-CASE (Exterior iterations are discussed in the PrMIRS Alpha section below).

Project Results

The first iteration of this project aimed to develop a Minimally Viable PrMIRS (PrMIRS MVP) tool. As explained above, this tool was originally to include Dashboards, a PMIS, and an interface with the BOC. However, due to challenges faced by the PrMIRS leadership and development teams, the project was de-scoped to include a Minimally Viable version of the PMIS and a demo of the Dashboard (demo only, not connected to actual products).

Future Plans

The second iteration of PrMIRS ('PrMIRS Alpha,' currently in progress) will fulfill the original goals of the PrMIRS MVP prior to the de-scoping. This iteration will also provide configurability and options to customize their respective PMISs, giving the user the 'Lotus of control.' Once complete, this iteration will interface/sync with various SPDER SharePoint lists and the BOC.

The SPDER status sheets and timecards now administrated by the AOs will continue to be reviewed and/or tested within the weekly development meetings. Finally, this iteration will begin the development of a PMIS/Dashboard for demonstration with VACO OHRM. As noted above, the PMIS/Dashboard will not interface with BOC.

Beneficiary Travel

Project Overview

The Beneficiary Travel (BT) initiative is a nationwide effort to improve and standardize processes across VHA. The Beneficiary Travel initiative is sponsored by Chief Business Office (CBO) Veteran Travel, and is primarily focused on standardizing documentation processes through the development and deployment of standardized BT clinical CPRS templates. Establishing national templates will satisfy the requirement to show VHA has accurate and consistent criteria for clinicians to document certification and medical necessity for: 1) nearest appropriate facilities (exceptions to facilities other than closest); 2) special mode transportation; and 3) Veterans receiving Aid and Attendance (A&A) or Housebound Benefits (HB).

Project Objectives

- Provide technical expertise in VistA and CPRS for the revision and update of electronic documentation related to the implementation of Beneficiary Travel (BT) such as consults, orders, templates, progress notes, and technical guides;
- Manage the project to ensure timely development and modifications as needed from Clinical Application Coordinator (CAC) on the BT CPRS and VistA technical components;
- Oversee documentation and coordination to comply with national CPRS template/consults approval committees;
- Collaborate on the national implementation deployment (Go-live support) planning with BT; and
- Ensure the BT documentation outlines comply with CPRS consult management guidelines, including closing within a specified timeline.

Project Results

VA-CASE Clinical Application Coordinator (CAC) actively participated with the BT team to design content and programming, create VistA/CPRS template(s), maintain documentation, and present on national training calls. A complete technical installation guide including creation, set-up, settings, access, and step-by-step instructions was created.

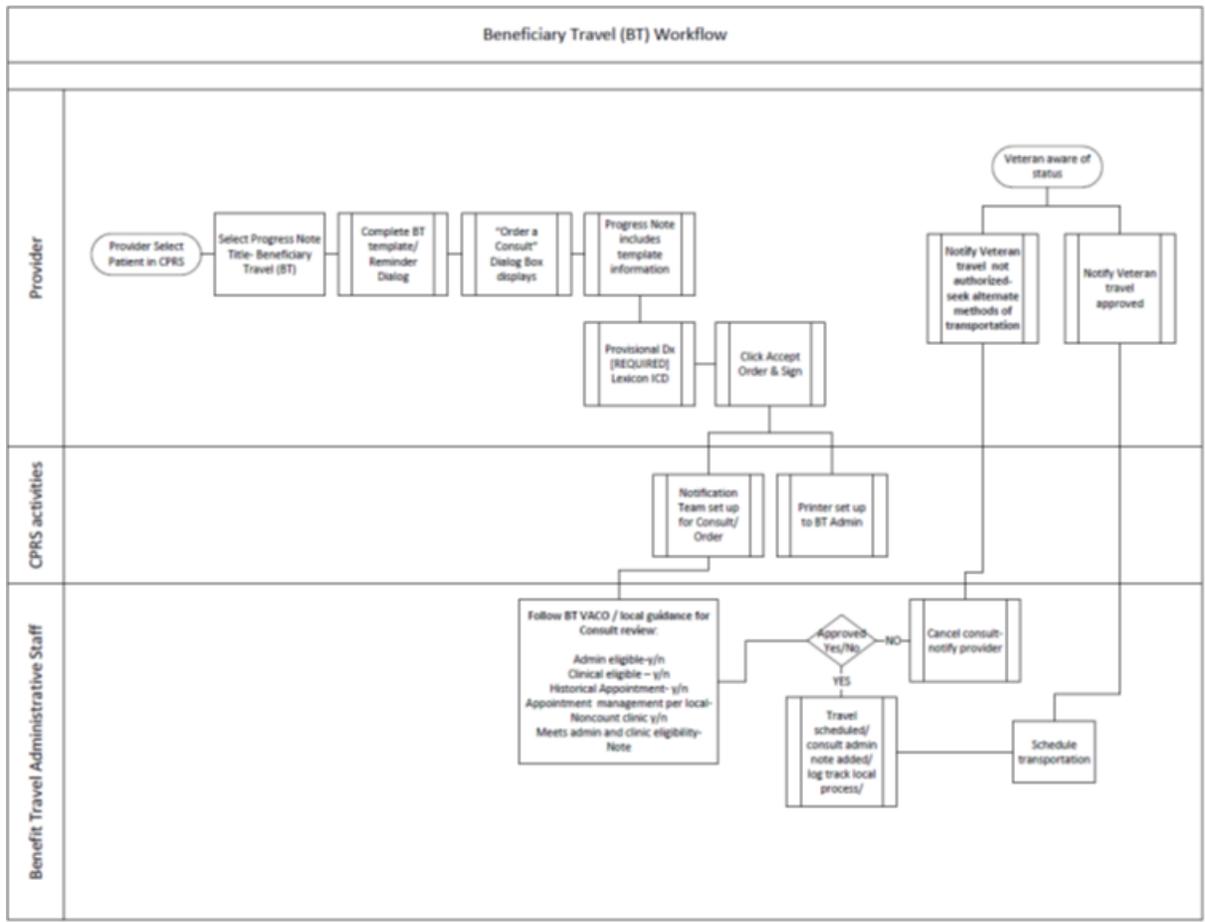
As stated above, a major objective was to create a CPRS template that included criteria for clinicians to document certification and medical necessity for: 1) nearest appropriate facilities (exceptions to facilities other than closest); 2) special mode transportation; and 3) Veterans receiving Aid and Attendance (A&A) or Housebound Benefits (HB). Resulting programming included 116 Groups/Elements, 14 template fields, and 61 Health Factors. The CAC CASE presented on the October 2013 national CAC monthly teleconference call.

Project Impact

Two pilot sites are currently testing and providing feedback. The template has been exchanged with eleven additional facilities and support for the technical installation was provided by VA-CASE. Workflow process mapping

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(shown in the figure below) illustrates the flow from clinician, CPRS, printing, where Beneficiary Travel staff responsibility ends with notification of the patient for travel approval or the exploration of alternate plans. A presentation to the National Informatics Council was completed in November 2013. This enabled the template(s), which were combined into one reminder dialog/consult, to be delivered to the field via CPRS patch. However, project approval, revisions, reports, and further deployment are currently on hold due to staffing changes.



Beneficiary Travel (BT) Workflow Processes

Future Plans

Planning for FY14 is underway, and will include creating VSSC reports, training BT and VISN staff, meeting IC requirements for patch, and conducting additional field testing.

Utilization Management

Project Overview

Sponsored by the Office of Utilization and Efficiency Management (UM), the data collection and toolkit development project will inform future policy, models of care, and an electronic methodology for sharing best practices with the VA. UM is a program that reviews the medical necessity of care and services using evidence-based appropriateness criteria. In 2010, a new UM Program Directive was published, requiring that all VHA days of care in acute medicine, surgery, and mental health be reviewed using the McKesson InterQual® appropriateness criteria, and that the resulting review information be entered into the National Utilization Management Integration (NUMI) application. There are several models of care used for UM review, with a wide variation of continued hospital stays meeting criteria and different alignments of UM Program offices throughout the VA.

VA-CASE will provide qualitative and quantitative data analysis of the UM program, including data elements and patterns in NUMI. This analysis will include the volume of review, review outcomes, criteria selection, as well as the combination of UM and other data from CDW to compare complexity and identify other factors, including Behavioral Health and acute care. The data collection and analysis for this project will be done using a combination of qualitative and quantitative analysis, with an emphasis on qualitative data. Qualitative research involves data-gathering techniques that are focused on the significance of observations made in a study rather than raw numbers alone. Interviews will be scheduled at select sites based upon current performance and improved performance over a period of time. The use of a Developmental Assessment model will enable the creation of recommendations, where interview data can be submitted to the program office for potential future use in influencing policy and planning.

Project Objectives

- Provide qualitative and quantitative analysis methodology to the Utilization Management programs by survey or interview.
- Identify programs and strategies within high-performing facilities to develop models of care that can be implemented across the VA.
- Provide recommendations of models that can be spread across the VA Utilization Management System.
- Compile content for a new online toolkit that will provide resources for the improved delivery of Utilization Management in VA facilities.

Project Results

The VA-CASE team developed (and UM approved) Roles and Responsibilities, Advisory Committee, meeting structure and frequency, initial plans for interview template, recruitment documentation, and facility ranking by complexity.

The team created communication documents to the VISN POCs for sponsor review and approval. The first was a request of data for review, including local policy, UM committee structure, organization charts, and other information to the facilities from the VISN office and business sponsor. The second was a request for site interviews using the ranking provided by the business sponsor to go through the VISN to the facility. The business sponsor was required to go through 10N review of communication prior to sending requests to the VISNs or facilities. 10N approval of the memo was provided and distributed to the VISNs in September 2013, allowing the project to proceed.

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Project Impact

The project has resulted in a number of outcomes and deliverables:

Interviews: In-person interviews vs. use of VTEL was considered, and plans were initiated to schedule travel for in-person interviews, based on UM preference. The VA-CASE team also created interview questions for qualitative analysis, which were reviewed and approved by UM. These interview questions were piloted at two test sites, and feedback was incorporated into the questions. Next, VISNs selected for interviews sent the facility POC names to the team, and VA-CASE submitted frequent updates and follow-ups with individual sites. Interview planning to consolidate visits by location; equipment attainment; logistics; alternate travel arrangements; and communication plans with all facilities were all completed prior to October 2013.

However, due to government sequestration/shutdown, all travel was suspended in the month of October. This halted all activities related to planning, conducting and scheduling interviews. One previously scheduled interview was cancelled. In response, the VA-CASE team created and sent a template email to all UM VISN POCs and Facility POCs to explain the travel restrictions due to shut down, and the team continued to follow-up with POCs until new interviews plans were made. Travel for November required approval of Dr. Jesse; however, the VA-CASE team and UM chose to proceed with interview plans and scheduling using VTEL and telephone interviews beginning in December 2013. Twenty-six staff interviews at one facility were completed by the end of FY13.

Initial data collection entries into SPSS and NVIVO statistical software are ongoing. Pending the completion of interview transcription in December 2013, the statistical analysis is planned for early January 2014.

Literature review: A literature search for UM outside VA and research process information is underway. Existing data from reports, including CDW, assisted the team in assessing sites by ranking to determine interview scheduling. Reports are provided on a routine basis to UM.

Tools: VA-CASE, in partnership with UM, is currently identifying and collecting potentially appropriate tools for inclusion in the UM Toolkit. The team made a presentation to the VISN UM Officers on October 17th. A data call request for supporting documentation to build a toolkit went out to all sites. Interviews (both on-site and via telephone) with VA facilities serve as potential sources for tool submissions, providing insight into day-to-day operations. A tool is any quality improvement innovation that is currently in use at a facility, but not routine within VA. Tools are matched to one or more of the organizing concepts within the UM Toolkit (i.e. Continued Stay, Admission criteria, and Operational criteria). Individual tools are developed by VA colleagues nationwide and are evaluated by VA UM experts for potential usefulness and compliance with existing and future directives. Toolkit submissions continue to be collected and reviewed.

Toolkit website: Initial designs for a toolkit website, and a draft of the website, have been created and work is continuing based on UM feedback. Design for a logo has been reviewed by the business sponsor and UM Officers, with feedback incorporated into revisions and approved. Plans are underway to create a focus group from facility volunteers for design and site review.

Toolkits

Project Objectives

The goal of this project is to produce and nationally disseminate quality improvement resource Toolkits that will help VA facilities improve performance. The toolkits are based on the VA-TAMMCS (Team-Aim-Map-Measure-Change-Sustain) model, the framework of systems redesign and continuous improvement tailored to the structure and needs of the VA Systems taught within our Collaborative (PACT, Cancer Care, Specialty Care, Surgical Flow). Each of the tools undergoes a vetting process by subject matter experts in the area being addressed before it is placed on the electronic toolkit site.

A tool is defined as any quality improvement innovation currently in use at a VA facility, but not routine within VA. Tools are matched to one or more of the organizing concepts for the Toolkit to which they are assigned. The Toolkit is then a collection of tools that may help in the area the toolkit addresses. Individual tools are developed by your VA colleagues nationwide and are evaluated by VA clinical managers and policy makers prior to being posted on the Toolkit site.

Project Results/Impact

The Toolkit Series is a unique partnership between the Office of Patient Care Services, Office of Quality and Performance, Office of Systems Redesign, Quality Enhancement Research Initiative (QUERI) program and VA-Center for Applied Systems Engineering (VA-CASE). Toolkits are SharePoint sites that offer a collection of ready-to-use, concrete innovations, “tools,” that can be implemented in departments and facilities to help improve performance or implement changes in various areas.

In order to help connect the communities of practice and communicate information about the Toolkits, VA-ListServ was created. To date, the Quality Improvement Toolkit Series has 5,286 subscribers, Specialty Care Toolkit has 725, and the PACT Toolkit has 7,126 subscribers. Whenever there are new tools or other innovations to be presented, a listserv message is sent. The ListServ is a primary method for gathering new tools. Often after a ListServ message is sent, the number of visitors to the website increases dramatically and new tool submissions also increase. Visitors to the toolkit sites have the opportunity to self-register for the ListServ.

Toolkit Series schedules are being created since they have not historically been deliverable-orientated. ESW schedule is under review by the team. Flow maps are being designed to outline the work and determine key milestones. Creation of a Responsibility Matrix is underway to support transition of team roles. Quality Improvement Toolkit Series Evaluation Work required leadership approval to verify Non Research Determination. Required signatures obtained and returned to Dr. Asch. Hiring is underway for needed staff for 508 compliance review of existing Toolkit Series, as current staff does not have capacity. Needed support for a Human Computer Interaction (HCI) review of these toolkits was included as narrative in SLA’s, but not as a line item in the budget/staffing.

With SharePoint 2010 obtained in 2013, it is possible to keep a count of the number of visitors to the various Toolkit sites. A report is generated weekly that shows the number of unique visitors at all Toolkits. The Toolkits have had the following number of unique visitors:

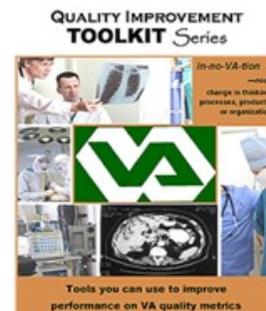
Toolkit	# of Unique Visitors	Start Date
Cancer Toolkit Series	6,400	Nov. 2010
PACT	11,500	Sept. 2011
Specialty Care	552	April 2013

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Quality Improvement Toolkit Series

The original Quality Improvement Toolkit Series is a resource guide offering potential solutions to facilities wanting to improve performance on quality indicators for a number of high-priority clinical conditions. The Cancer Care Toolkit Series currently includes Lung Cancer Care, Colorectal Cancer Care, Prostate Cancer Care, Head and Neck Cancer Care, and Palliative Care.

Toolkit	# of Tools
Lung Cancer	38
Colorectal Cancer	38
Prostate Cancer	23
Head and Neck Cancer	20
Palliative Care	45
Cancer Survivorship	18



PACT Toolkit

The PACT Toolkit is jointly sponsored by the Office of Systems Redesign, the Office of Quality and Performance, the Quality Enhancement Research Initiative and VA-CASE (Veterans Engineering Resource Center). The PACT Toolkit is a centralized online library offering access to a range of technical and organizational innovations, or tools, that have been developed by VA colleagues nationwide. The PACT tools are organized around the three key components (pillars) of the PACT initiative: Access, Care Coordination, and Management and Practice Redesign.

The mission of the PACT Toolkit is to support the transition of care delivery to the PACT model. VA facilities large and small face similar challenges in redesigning care practices. The Toolkit's goal is to make addressing those challenges easier by sharing helpful innovations that other PACT teams and facilities have already developed. New tools are still being submitted, vetted and added to the site.

Toolkit	# of Tools
PACT	70

Specialty Care Toolkit

Sponsored by the National Systems Redesign office, the Specialty Care Toolkit is focused on gathering tools to address issues related to specialty care in much the same way the PACT Toolkit gathered tools relevant to primary care. The Specialty Care Toolkit was launched to limited audience in April 2013 and presented at Collaborative Learning Session Two in August 2013. Site usage has surpassed the 500 participants of the Collaborative, with the ListServ containing 1,000 VA staff. The website, including design of the Specialty Care Toolkit, was developed; a vetting committee was established; and tools are added on a weekly basis. The Specialty Care Toolkit is organized around the key components of specialty care, and includes pillars for Access, Care Coordination & Management, and

Toolkit	# of Tools
Specialty Care	26

Practice Redesign, with tools linked to one or many pillars. An evaluation of the usage was initiated in December 2013.

Other Toolkits

Emergency Services Women’s Health Toolkit

Project Objectives

Sponsored by the National Women’s Reproductive Health office, in conjunction with Emergency Services and Women’s Program offices, the Emergency Services Women’s Health (ESW) Toolkit is focused on gathering tools to address issues related to the specific needs of Women Veterans receiving Emergency Care. The ESW Toolkit is unique in that actual tools are being created by Clinical Application Coordinators (CAC)/Health Informatics Specialists using CPRS reminder dialogs to enable template data capture and seamless reporting to the providers. Utilizing reminder dialogs in CPRS documentation is a more efficient mechanism to capture quality and performance measures and other data relevant to monitoring the care of Women Veterans. The reminder creates structured data that can be used to assess several Women’s Health quality indicators without the subsequent need for manual data abstraction from the electronic health record.

Toolkit	# of Tools
Emergency Services Women’s Health (ESW)	(2) in development

Project Results/Impact

The website, including design of the ESW Toolkit, is under development; a vetting committee has been established; and initial sessions with an Advisory Board have occurred. The ESW Toolkit will be organized around the key components of Clinical Presentation of Vaginal Bleeding, Vaginal Discharge, Pelvic Pain, and Sexual Trauma. Additional organization will include Clinical Decision Support, VA Policy, Recommended Equipment, Clinical Guidelines, and Redesign & Service Agreement. Tools may be linked to one or multiple organizational areas. The toolkit is planned to launch in early 2014. Over one hundred potential tools have been collected for review and vetting from VA sources, Women’s Health grant participants and Clinical Applications Coordinators.

Future Initiatives: Toolkits

As the reputation of the Toolkits grows, several other groups have made inquiries about the possibilities of developing a Toolkit. Potential future Toolkits include:

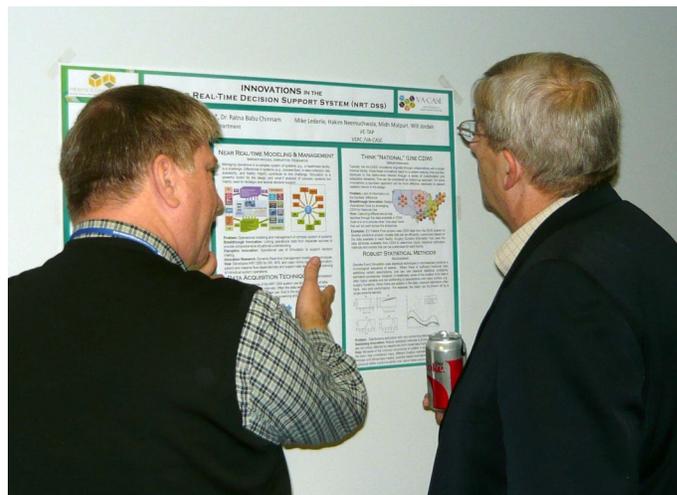
- Surgical Flow Toolkit: In connection with the Surgical Flow Collaborative, a surgical flow toolkit was proposed. The Surgical Flow Collaborative is currently on hold. Discussions about a Surgical Flow Toolkit will continue when the status of the Collaborative is determined
- Transitioning Levels of Care (TLC) Toolkit: Discussions have begun with National Systems Redesign about the possibility of creating a Toolkit for Transitioning Levels of Care, which is a part of the FIX Collaborative. Discussions are at a very preliminary stage for the TLC Toolkit.

VHA Engineering Technical Assistance Program (VE-TAP)

As part of an integrated strategy to provide Veterans with timely access to quality health care services, VE-TAP is the mechanism to provide training, mentoring, facilitation, and implementation in applying OSE rapid deployment strategies and advanced OSE tools within VHA, VISN11, and National Programs. Lessons from VE-TAP projects are applied to future clinical and administrative systems redesign initiatives. The VA-CASE VE-TAP budget was approximately \$4.20M in FY13, with 1% (\$.04M) allocated from VA-CASE core funds. The primary innovation incubation mechanism of VA-CASE is the VE-TAP program.

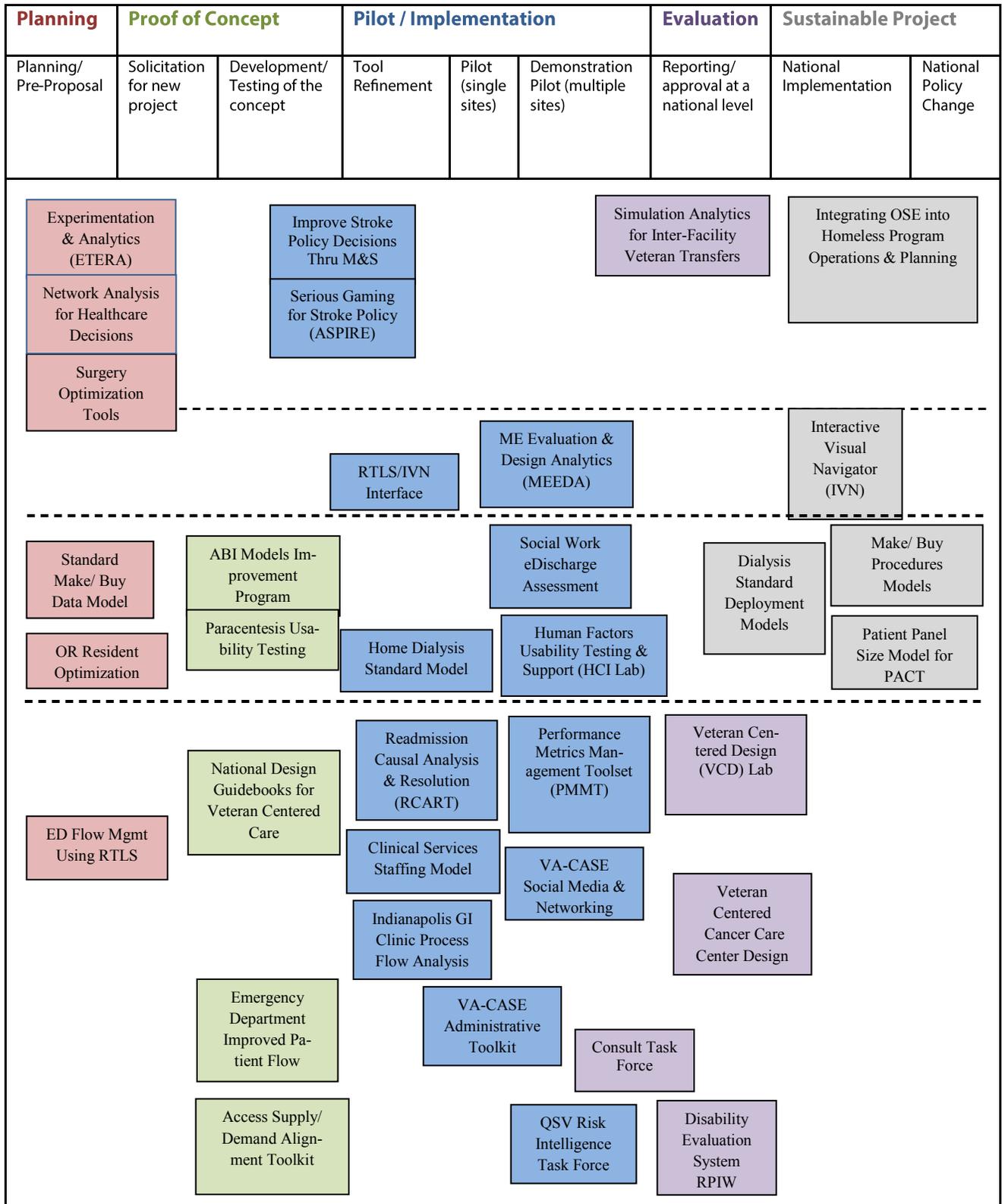
VE-TAP is organized into the following functional OSE Program Lanes:

- Applied Informatics Modeling & Simulation (AIMS) Services Program Lane
- Medical Equipment Services (MES) Program Lane
- Advanced Engineering Assessment Services (AEAS) Program Lane
- Strategic Support Services (S³) Program Lane



Each functional lane is further populated with several Programs, which may have assigned sub-programs. Each program is further populated with projects. Projects are the frontline points of work and direct interface with the Program/Project stakeholders and sponsors. The VE-TAP Project Pipeline, illustrated on the following page, provides a graphic representation of the status of major Programs/Projects in each functional lane in the OSE pipeline.

VA-CASE VHA Technical Assistance Program (VE-TAP) Project Pipeline



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VA-CASE VE-TAP Program Project Summaries

Applied Informatics Modeling & Simulation (AIMS) Services Program Lane Integrating Systems Engineering into Homeless Programs Operational Planning

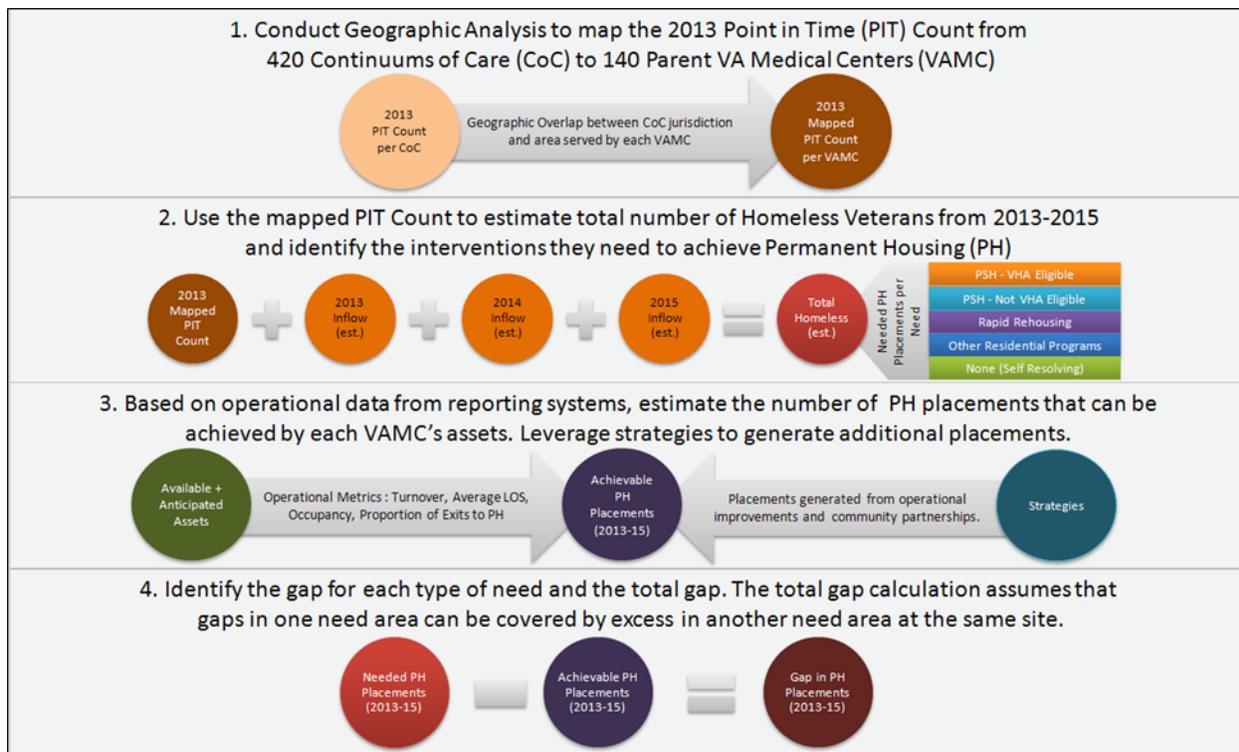
Project Overview/Objectives

The VHA Homeless Program partnered with VA-CASE to complete a gap analysis of VHA Homeless Programs. This analysis utilized a planning scenario that identified the current and projected number of Veterans homeless between 2013 and 2015 by VAMC catchment area. It also identified current and projected VA and community assets available to address the needs of homeless Veterans. Estimated needs and assets were compared to determine whether VA and VAMC catchment areas have sufficient resources to meet the estimated needs of homeless Veterans through the end of 2015.

Project Results

The following figure provides an overview of the gap analysis methodology in four phases:

Overview of Gap Analysis Methodology



Phase 1

The first phase of the gap analysis (depicted first in the figure above) has been completed at all 140 VAMCs. This phase mapped community homeless point-in-time data to VAMC catchment areas for the first time. It used VAMC-specific program data where reliable data were available (e.g. number of assets), and national averages where VAMC

-specific data were unreliable (e.g. utilization metrics). The analysis from the first phase resulted in a summary of potential gaps across all VAMCs. In order to address these gaps, the gap analysis needed to be enhanced via a second phase aimed at leveraging each VAMC’s local knowledge of need, VA assets, and non-VA assets.

Phase 2

The second phase of the gap analysis required each VAMC to review and validate its gap analysis results and use the provided tool to develop operational strategies for closing identified gaps to the maximum extent possible. Operational meetings with local partners were held during this phase. VAMCs and local partners used these meetings to develop a mutual understanding of the data provided in the analysis, and ensure coordination and leveraging of available VA and community resources to achieve permanent housing placements for homeless Veterans in need of interventions. These partnerships helped ensure that program resources are used in the most efficient manner possible—avoiding duplication and securing timely access to resources and appropriate targeting of those resources.

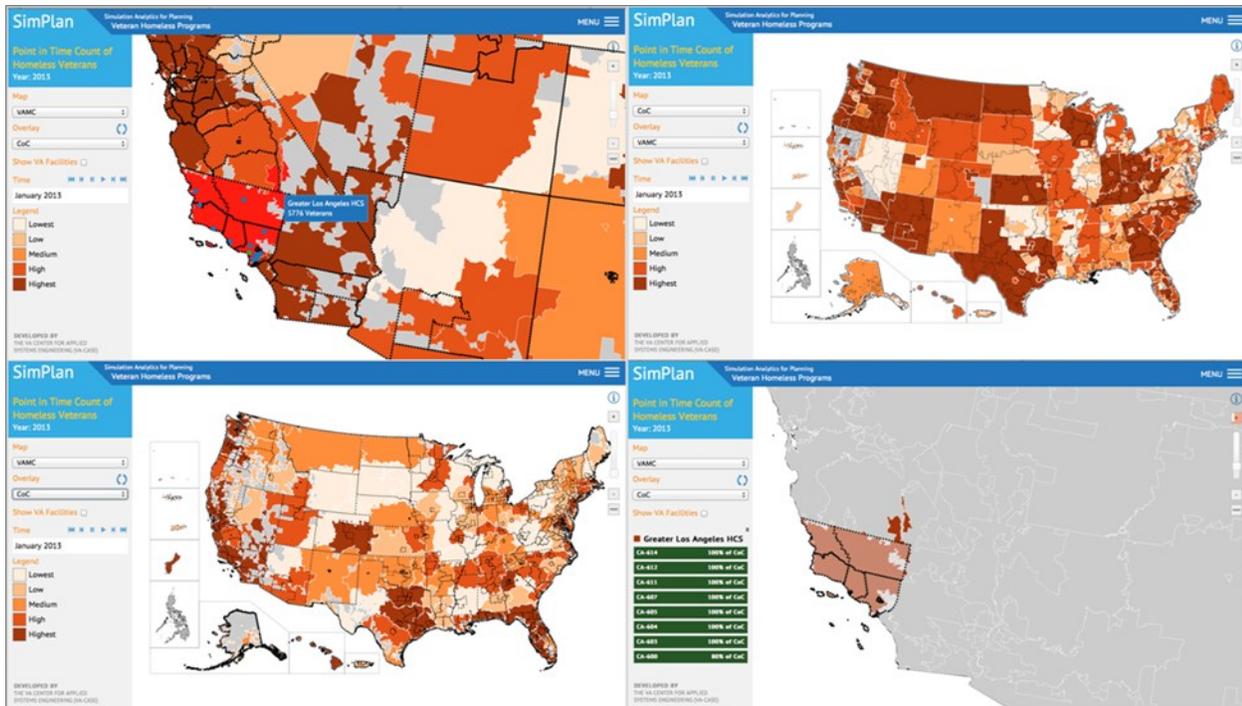
Project Impact

In partnership with VA-CASE, the Homeless Programs were able to complete a nationwide multi-phase, multi-level analysis activity in the course of just a few weeks. In the first phase, VA-CASE leveraged geographic analysis and analytical models to inform the analysis. In the second phase, VA-CASE leveraged existing tools developed under the StratHub and SimPlan initiatives (depicted below), along with newly developed analytical tools. This enabled the rapid deployment of Systems Engineering capabilities to meet the needs of the Homeless Programs.



StratHub-Powered Gap Analysis Tools for Use by VA Medical Centers

SimPlan Visualization Tools to Summarize Geographic Gaps



The Gap Analysis activity enabled the VHA Homeless Programs National Office to understand the gap between the current trajectory and the strategic target of ending Veteran homelessness by 2015. The activity also enabled Homeless Programs at National, VISN and Local levels to develop a shared understanding of the gaps at each level. Further, it enabled VA and community partners to collaborate and address gaps through targeted partnerships and operational strategies.

Future Plans

The VHA Homeless Programs and VA-CASE seek to expand the VHA Homeless Programs partnership in FY14 to provide a suite of Integrated Planning and Analysis Capabilities.

Simulation Analytics for Inter-Facility Transfer Project

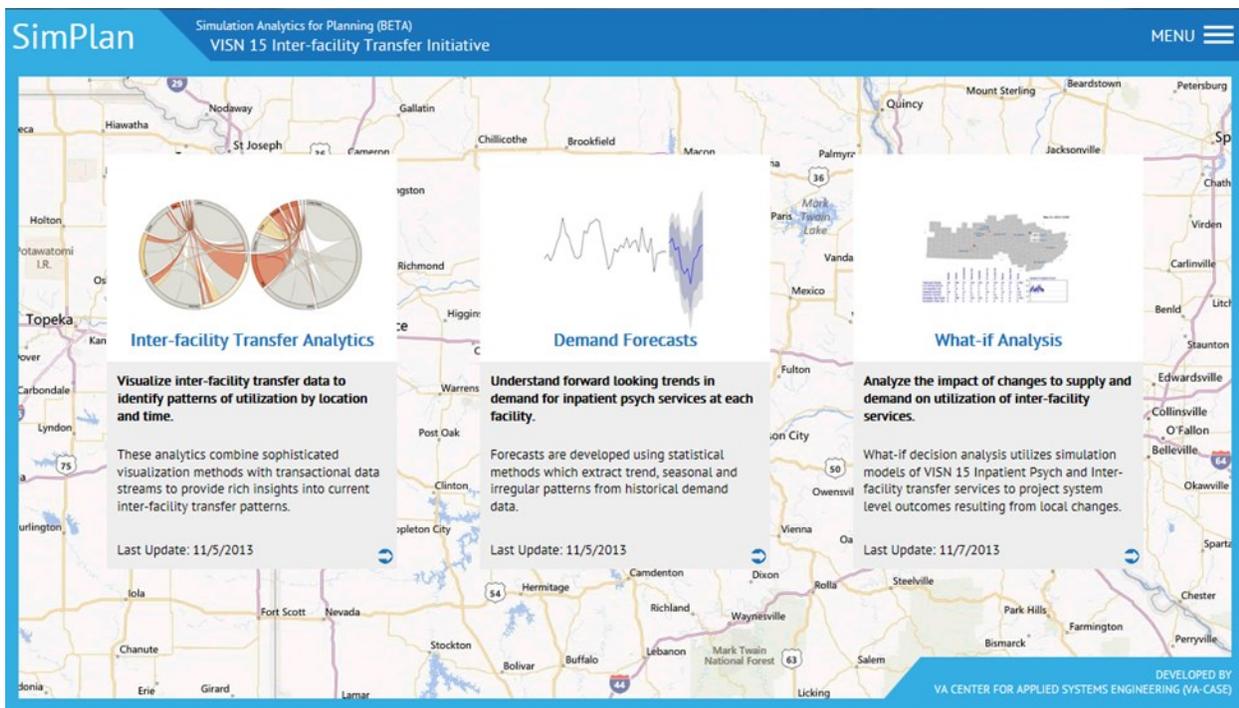
Project Overview

VA-CASE partnered with personnel from the VISN 15 VA Heartland Network to provide a tool-suite to aid policy makers in the development and implementation of inter-facility transfer policies for Mental Health patients. The tool suite provided policy makers and managers a comprehensive understanding of mental health patient flows across the network. These flows represented modes by which patients are transported to facilities, treated, referred, and transferred. The tool-suite utilized data-driven modeling methodologies to inform policy makers of current demands for services. It utilized computer simulation to provide what-if analysis regarding the impact of policy decisions on patient flows. It incorporated visualization methods to display both current and projected patient flows. The tool-suite consisted of three web-based tools that are available securely over the network: Patient Flow

Visualization, Demand Estimation, and What-If Analysis Tools. VA-CASE leveraged its existing product portfolio and realized synergies with ongoing programs in the performance of this work.

Project Results

The first phase of this effort focused on estimating and visualizing demand for Mental Health services. VA-CASE obtained historical utilization data from the national Corporate Data Warehouse (CDW). VA-CASE created a network model of patient flows (treatments, referrals, and transfers) across the network. VA-CASE overlaid the map with a visualization of patient flows across the network. The second phase of this effort focused on understanding the impact of treatment, referral, and transfer policies on patient flow. VA-CASE constructed a computer simulation of patient flows across the VISN network. Policy makers could then input what-ifs regarding the capacity available at each site. The simulation predicts utilization of these services at each site based on historical and estimated demand. It also estimates the need for Inter-facility transfer under these scenarios. In the third phase, VISN 15 personnel were given the ability to use the tool to track implementation of policies. The dashboard provided a visualization of patient flow across the network based on data from CDW.



Overview of Integrated Tool-suite

Project Impact

This effort explored the application of Systems Engineering methods to inform both strategic and operational planning of capacity at the network level. The integrated suite of visualization, forecasting and what-if analysis capabilities provided decision makers with a systems perspective and quantitative insights into capacity planning. VA-CASE leveraged existing tools developed under the StratHub and SimPlan initiatives, along with newly developed

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analytical tools, to support this effort. The tool suite developed under this effort can easily be expanded to serve the needs of other clinical areas and networks.

Improve Stroke Policy Decisions through M&S Project

Project Overview

This project was designed to identify rigorous methods for conducting sensitivity and uncertainty analysis with the existing VA Stroke Strategic Planning Model to provide insight into the implications of adding additional resources; improving the performance of resources allocated to stroke prevention and mitigation; and improving patient safety to mitigate the risk of stroke.

Project Objectives

The project aimed to provide a working model to 1) inform Stroke QUERI strategic planning and VA Operations, and 2) experiment with the model, build an understanding of its dynamics, and create scenarios by varying parameters representing policy.

Project Results

Work to date included replicating the System Dynamics model previously programmed in Vensim as a System Dynamics model programmed in AnyLogic and Ithink; developing a written explanation of the analytical objectives for the sensitivity/uncertainty analysis; reviewing methods in and outside of health care field; and identifying and describing suggested methods.

Project Impact

Results from this project were rolled into a follow-on effort: Serious Gaming for Stroke Policy.

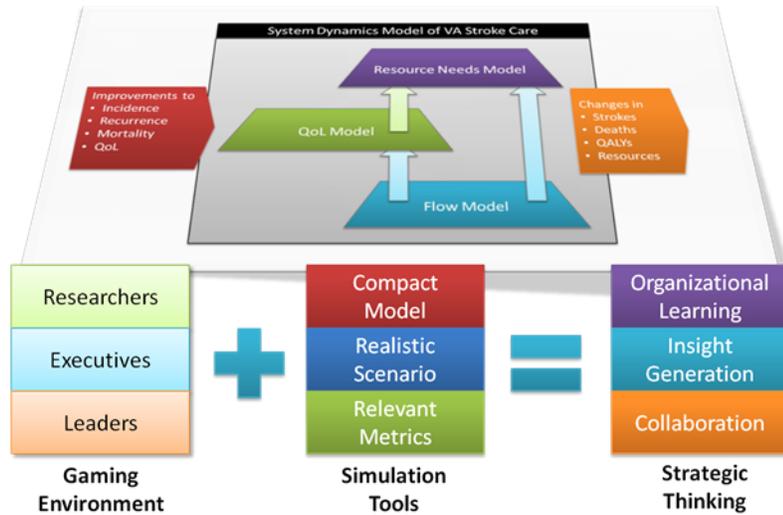
Serious Gaming for Stroke Policy Project

Project Overview/Objectives

The VA Stroke QUERI is actively engaged in identifying opportunities for advancement of Stroke Care to Veterans. VA-CASE developed an experimentation and gaming model to help the Stroke QUERI advance strategic thinking regarding Stroke care.

Project Results

VA-CASE Industrial Engineers collaborated with Faculty to create a compact System Dynamics model of the VA Stroke System of Care (see the figure below). System Dynamics provides an analytic approach to policy analysis and design. It is a powerful method to understand and improve complex systems characterized by interdependence, information feedback, and circular causality.



System Dynamics Model of VA Stroke Care

The Stroke model includes three modules representing patient flow, quality of life, and resources needed for improvements. The model helps users understand how improvements to prevention, acute care, and rehabilitation impact incidence, prevalence, mortality, and quality of life. The gaming component of the tool allows multiple users to have a friendly competition to achieve better outcomes. Serious gaming engages key stakeholders in strategic thinking processes and leads to greater organizational learning and collaboration.

Project Impact

VA-CASE engineers conducted multiple experimentation sessions with the Stroke QUERI. The model documented the VA Stroke System of Care in the form of a compact model that makes it easy for decision-makers to adopt a systems perspective. Users developed intuition regarding the relationship between policy levers and outcomes across the entire VA Stroke System of Care. The tool will be deployed to the broader Stroke community and utilized by Stroke QUERI in their Strategic Planning cycle.

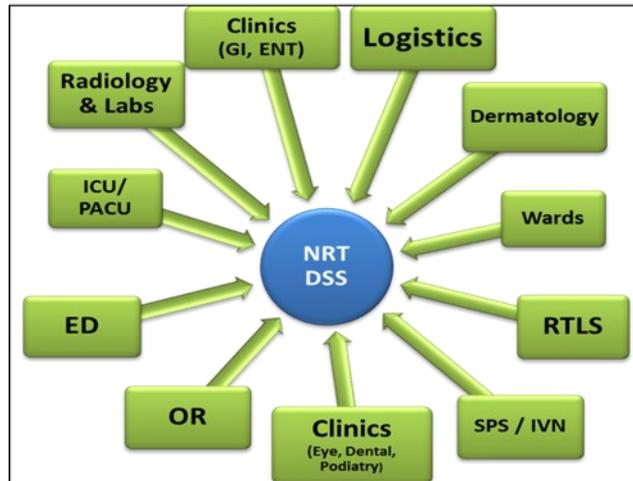
Near Real Time Decision Support System (NRT DSS) Project

Project Overview

Near Real Time Decision Support System (NRT-DSS) is a comprehensive simulation-based toolkit aimed at enabling the proactive management of limited resources in primary services (e.g., Operating Rooms, Sterile Processing Services, Clinics) and auxiliary services (e.g., ICU/PACU) with the goal of increasing utilization and quality of care, reducing and mitigating delays, improving workflow and staff morale through increased predictability, and improving patient experience and satisfaction. This project encompasses the entire sterile processing functional cycle, beginning with the point of use and continuing through transport, decontamination, cleaning and sterilization, preparation and packaging, storage, and sterile transport return to the point of use.

Project Objectives

The overall goal of the RME NRT DSS project is to improve the efficiency and quality outcome of Sterile Processing Services (SPS) processes, including sterility assurance and staff/patient safety. The models are designed to be flexible and configurable to meet different facility needs and workflows.

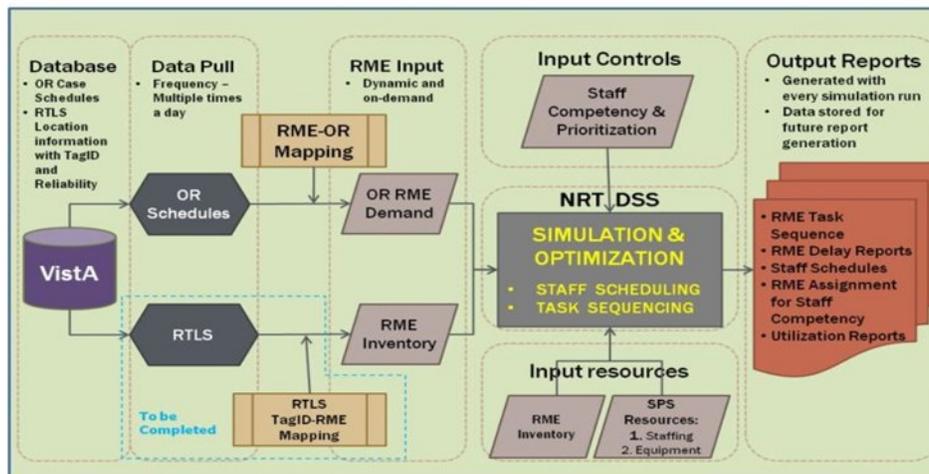


Integrated NRT DSS System

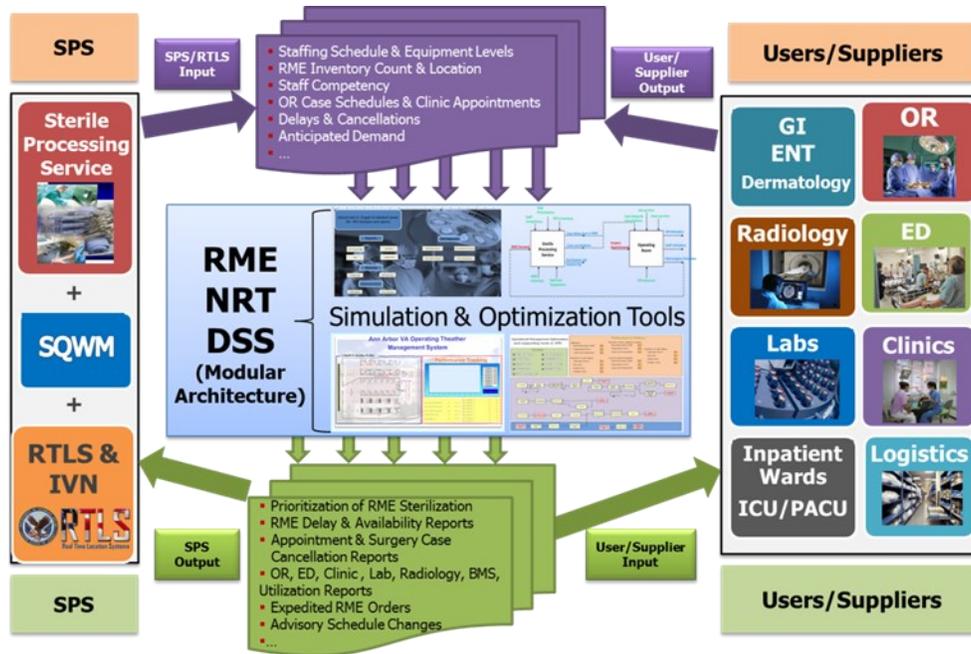
Project Results

The Reusable Medical Equipment Near Real Time Decision Support System (RME NRT DSS) is one of the first prototype subsystems of the NRT DSS portfolio. The RME NRT DSS project uses a System of Systems (SoS) approach to implement a framework for automation of the sterile processing cycle. A modeling and simulation approach was used to develop a system with effective information exchange between the surgical suite and the sterile processing service (SPS). As part of the SoS methodology, the models use inventory and data from the SPS Real Time Locating Systems (RTLS), the Interactive Visual Navigator (IVN), ISO 9001 implementation protocols, and facility modules replicating work flow processes that impact reusable medical equipment (RME) processes. This project encompasses the entire sterile processing functional cycle, beginning with the point of use, continuing through transport, decontamination, cleaning and sterilization, preparation and packaging, storage, and sterile transport return to the point of use.

RME NRT DSS - SPS Module Overview (Completed)



In the integrated system, the SPS model's input from the OR model is the scheduled surgery information. Surgery schedules contain RME-related information regarding surgery start time, surgery duration, and type of surgery, which in turn generates information regarding the equipment requirements for surgery. With this information, the SPS processing model minimizes the surgery delays and cancellations; these delays and cancellations are recorded and provided as input for the OR model. The system provides substantial reporting capability, and critical variables are configurable to provide what-if analysis functionality.



RME NRT DSS

A prototype of the RME NRT DSS interfacing the Operating Room module and SPS module is currently in pilot at Detroit VAMC. The modules constitute a System of Systems (SoS) design that provides plug-n-play module additions to build a virtual, tactical, facility-specific configurable decision support system for mid-level managers to assess current states, build options for future states, and implement solutions to overcome barriers. The FY13 plan is to integrate the current models into a functioning, configurable integrated system for OR-SPS interactions with other clinic interactions, such as ER, Lab and Radiology. This third phase of the project aims to:

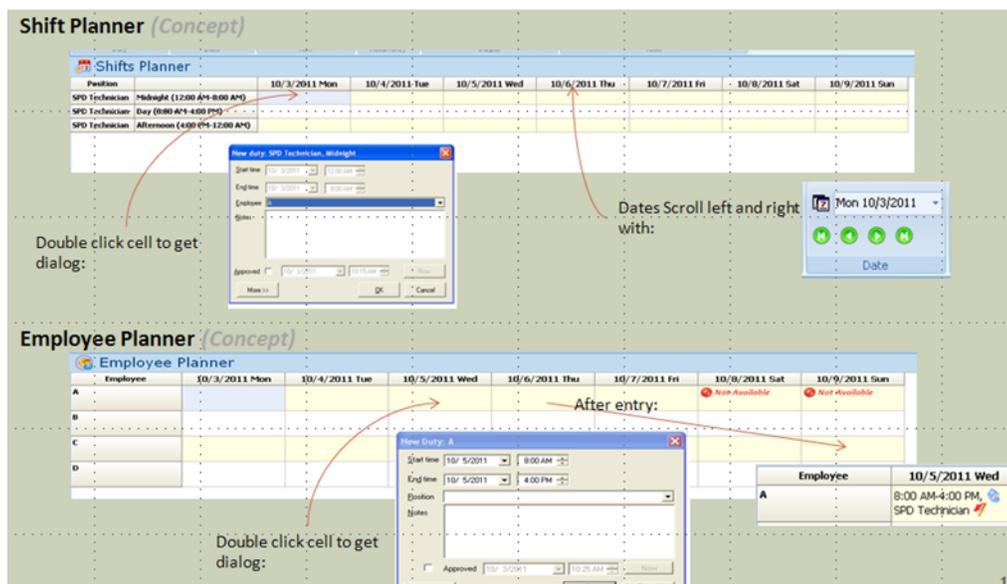
1. Improve the efficiency and quality outcome of SPS processes (including sterility assurance) and achieve improved staff and patient safety;
2. Dynamically interface with other VHA efforts to provide a System of Systems approach to improving SPS processes;
3. Integrate OR case scheduling tool, which provides RME supply-demand information-sharing between SPS and OR;
4. Improve the efficiency of the SPS through staff and equipment capacity planning and short-term (tactical) operational management of SPS workflow and resources; and
5. Increase RME availability and improve sterilization quality by reducing safety incidents through more effective SPS processes, utilization, and load balancing.

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Along with the development and refinement of the integrated NRT DSS system, the project team developed a number of independent systems derived from the parent NRT DSS and piloted at the Detroit VAMC. Two key deliverables included a PACU Management Tool and a Surgery Duration Estimator.

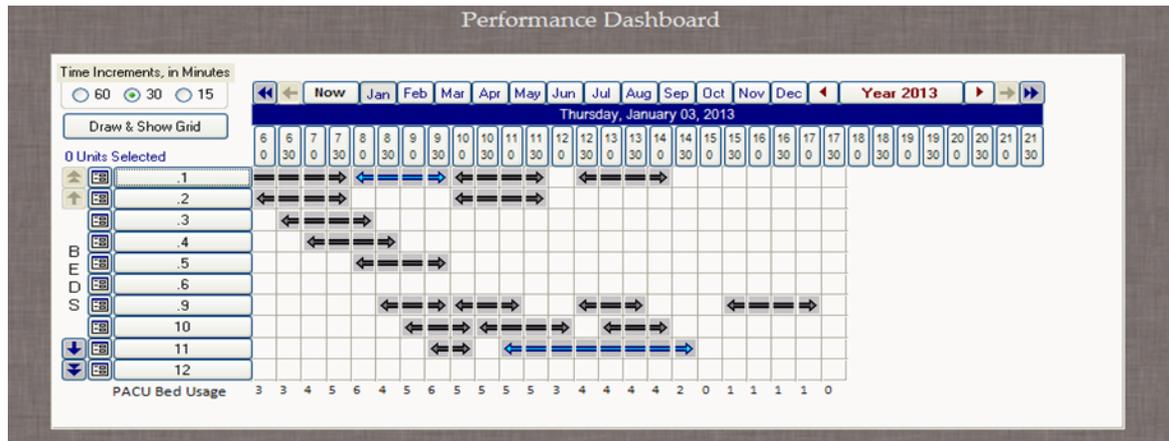
PACU Management Tool

In collaboration with the Detroit VAMC Surgical Service and System Redesign, a Post Anesthesia Care Unit (PACU) Management System, which utilizes a simulation model, was developed. The surgical simulation model from NRT DSS, along with PACU-specific calculations, provide a visual presentation of demand and five day forward utilization forecasts within the PACU unit based on the surgical case load as well as Cardiac Cath and Angio clinics.



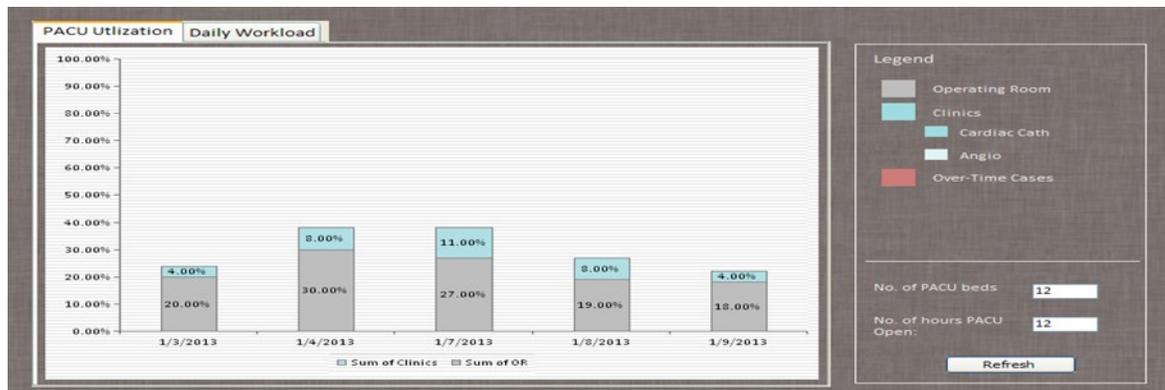
PACU Management System: Shift Planner and Employee Planner

In their efforts to date, the team has further developed and refined the PACU Management Tool and piloted it in Detroit VAMC. The PACU Management Tool is designed to analyze the workload impact of the Operating Room and Clinics on the PACU, and to aid the decisions involving patient schedule changes or add-on cases from the OR and clinics that send patients to the PACU. It is under further refinement for use by Management staff, PACU Managers, nurse managers, and nurse coordinators to plan the work flow in PACU and make staffing and scheduling decisions. The system uses Microsoft Access, as well as Arena as simulation software. Data capture from the VISTA database is automated. The user is provided with the updated information in the schedule every 15 minutes, providing near real-time support. The figure below shows the PACU grid as accessible by the end user. From the user's perspective, the system requires minimum effort.



PACU Grid

Users can also view the utilization chart for the utilization of PACU 5 days into the future. A small control box near the chart allows the user to change the total beds available and total hours PACU is open.



PACU Utilization Chart

Surgery Duration Estimator

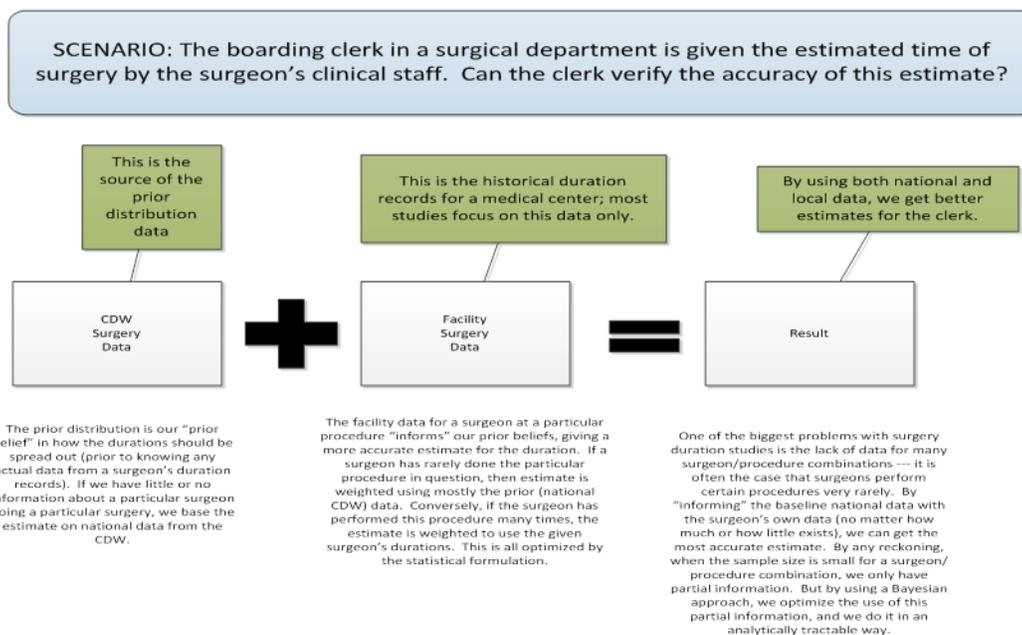
Two other standalone tools were derived from the NRT DSS system: 1) the Surgery Duration Estimator Tool, which provides a best estimate of the time to complete a particular procedure for a particular surgeon, and 2) the Surgical Archive database, which provides a query front-end for administrators seeking information about the facility's past surgical volumes. The Surgery Duration Estimator tool, by which the estimated length of a surgery can be determined, has been proposed and validated by the VE TAP team. This tool enables the OR scheduler in Detroit VAMC to improve the estimate, which provides: a reduction in patient and surgeon waiting times; more accurately prediction of when a patient should be made ready for surgery; an improvement in case sequencing; and a better balance of under- and over-utilization of OR time. Past attempts to estimate the duration of a surgical case have struggled with small sample size, often because a particular surgeon has rarely, if ever, performed the exact procedure that is scheduled. With traditional statistical methods, such small sample sizes result in estimators with

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poor performance. In order to combat the small sample size, the team is using Corporate Data Warehouse (CDW) data from across the nation as a source of prior belief in the duration of a procedure, along with Bayesian statistical methods, which provide an optimal estimate of duration for any given sample size.

The project team has also made progress in improving the accuracy, scalability, flexibility and robustness of the OR and SPS simulation models. Some of these improvements are:

- Developing and integrating data entry validation and error proofing steps in the simulation environment, and
- Transitioning a universal process, entity, attribute, and variable naming in the databases and simulation models.



Surgery Duration Estimation Process

The NRT DSS models and algorithms were developed over the course of multiple years with input from different developers and adjustments related to changing policy guidelines, process flows, and workflow rules. To ensure consistency and accuracy, and enhance further development efficiency and flexibility, the team also spent considerable effort developing an extensive documentation of the NRT DSS's simulation models and optimization.

Project Impact

The NRT DSS project improves the efficiency and quality outcome of SPS processes, improves the efficiency of the SPS through staff and equipment capacity planning and short-term (tactical) operational management of SPS, and increases RME availability. In addition, new operational management software tools are continually being developed from data provided by the parent system.

Medical Equipment Services (MES) Program Lane Interactive Visual Navigator (IVN) Program

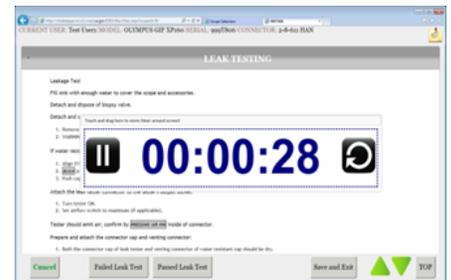
Project Overview

Interactive Visual Navigator (IVN) provides an automated and dynamic work flow process incorporating systems and human factors engineering principles to ease the burden on the technician, reduce error in re-processing, provide automated data collection, support Quality Management requirements and reporting, and provide safer and better care to Veterans. The system development and deployment includes an iterative user-centered design process that relies on user feedback at each stage in the Continuous Engineering Development (CED) cycle.

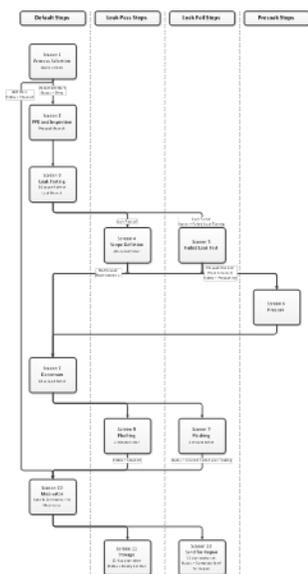


IVN is a Web-based application that presents interactive, multimedia instructions for the Reusable Medical Equipment (RME) reprocessing procedure. IVN captures time and results data to confirm accurate and complete reprocessing. IVN presents work

instructions using touch screen technology in the form of modules. An IVN module is specific to each model of equipment. Manufacturers' instructions are used to construct the Work Instruction Module (WIM), and WIM content is approved by relevant facility managers to ensure WIM conformance with relevant guidelines, standards, and clinical practice.



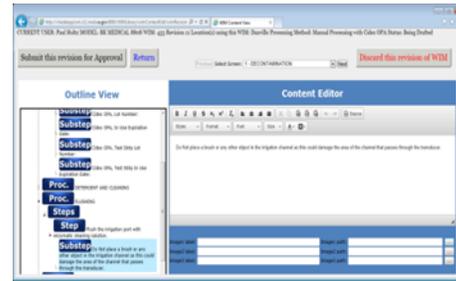
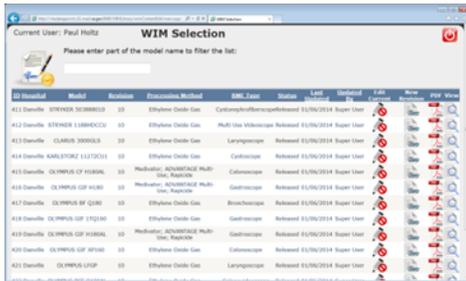
IVN facilitates consistency of practice. IVN also provides standardization and transparency. The project provides an interactive system that can deploy on a stand-alone PC, network connected PC, or as a virtual application on a network. The application uses Human Factors engineering processes in the development of WIMs, designed to ease the workload burden on the technician, automate various protocols, and record data. Since the SOPs are very complex, this process is highly prone to human error. Since the instructional steps are numerous, the omission of steps is very easy. Endoscope reprocessing tasks are also often long and complex, leaving the opportunity for incorrect execution or omissions. The implementation of IVN mitigates these potential errors, improves the work conditions for the technician, and reduces risk to the Veteran.



IVN is currently configured to support endoscope reprocessing; however, IVN can and will support any RME or other equipment with a workflow process procedure. The system is also designed to interface with Near Real Time Modeling & Simulation (NRT M&S) systems, and ISO 9001 conformance systems. Additionally, the system can interface with Real Time Locating Systems (RTLs) to provide a system of systems configurable approach to automate or semi-automate asset tracking and processing, and maintain quality control, education, training, and competency requirements, as appropriate.

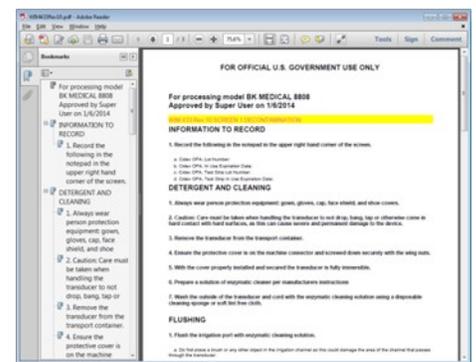
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IVN was incremented to 2.4.1 after intensive development toward document control functions to move RME reprocessing towards ISO 9001 conformance, a goal established by the national RME steering committee. Improvements to Version 2.4.1 include a WIM Library with document revisions, a submission/approval mechanism, and PDF generation. A new administrative configuration page was deployed to enable SPS managers to define how users log in, identify reprocessing locations, and define how alerts are emailed. New to 2.4.1 are process looping and jumping to accommodate new work flows uncovered as IVN deployment efforts continue at new facilities. The IVN team also implemented a back end support page to push requested content updates to production builds at any time, without disruption to live reprocessing sessions. The latest version retains IVN's branch logic, SQL database architecture, comprehensive competency checks, updated GUI, audible alerts, and flexible presentation of instructions. IVN is operational at Detroit, Indianapolis, and Danville VAMCs; in the validation phase (prior to operational use) at Louisville, Saginaw and Miami VAMCs; in WIM build verification phase at Amarillo and Bay Pines VAMCs; and in pre-implementation build phase at 34 facilities in VISNs 1, 5, 8, 9, 10, 11, 12, 15, 16, 18, 22, and 23.



Project Objectives

- Using the facility's approved SOP and manufacturer's procedure, display digitized, human factors-based Work Instructions in a Web App in which the screen appearance, contents, and tasks combinations are optimally designed based on facility requirements and human factors engineering to avoid and reduce human errors.
- Automatically capture each stage's test results and process times for quality control and management (iQMS), scope status updating, process benchmarking, as well as bookkeeping to reduce reprocessing irregularities, non-compliance, and unwanted process variations.
- Incorporate techniques, such as locked timers and picture/video illustrations, to reduce and eliminate error.
- Manage input-output and report information that provides managers with the tools to track reprocessing jobs, equipment, and case histories to improve RME traceability and availability.
- Provide an infrastructure to allow interface capability with RTLS solutions, iQMS solutions, and NRT M&S systems to support ISO 9001 processes.
- Provide a dynamic, configurable tool that is easily adjusted to other work flow processes.



IVN Technical Architecture Summary

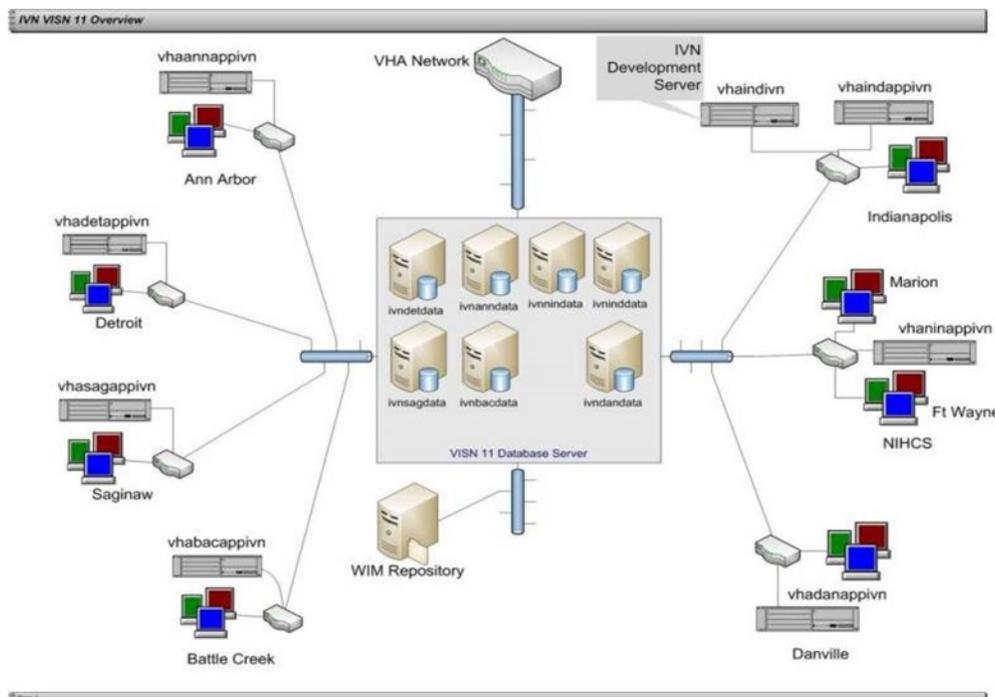
The web application architecture was divided to provide one application for normal daily use and another for administrative functions. This results in:

1. Allowance for Kiosk mode usage for normal daily use without compromising security of administrative functions;
2. Allowance for Active Directory controlled login to administrative functions while using Barcode/PIN/ UserPass logins for technicians; and
3. A clear separation of duties for best practice.

IVN Reports were migrated to SQL Server Reporting Services, providing a modern and polished reporting solution that is both extensible and manageable from a central location. The database was converted to use SQL Server utilizing VA Office of Information & Technology (OI&T) enterprise licensing with Microsoft in place of freeware solutions. The databases are easily managed and made to comply with VA standards on this platform without extra work on the part of OI&T (i.e. Backups, Restores, Mirroring).

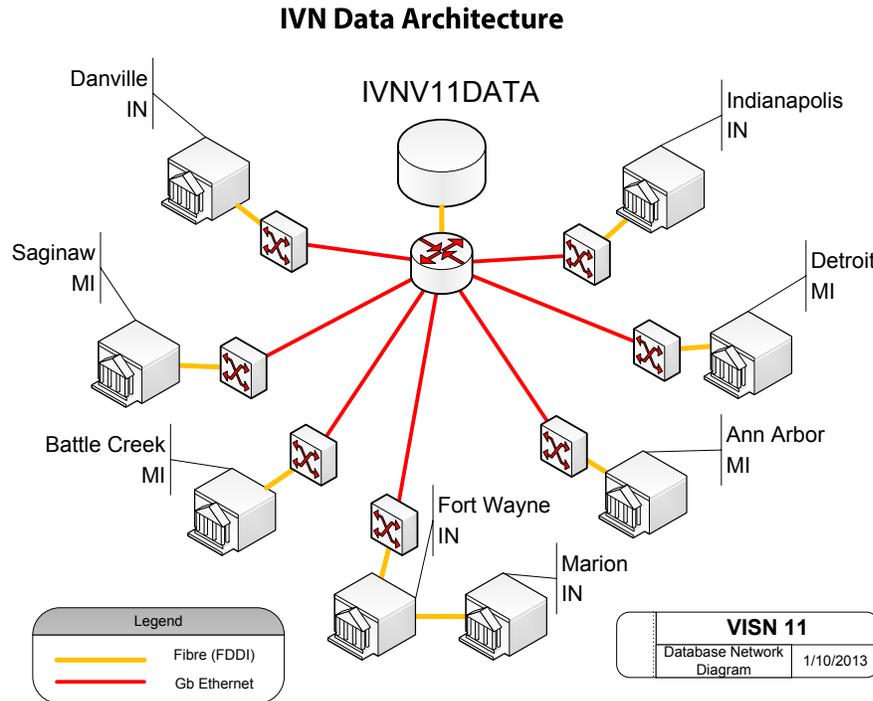
Development efforts were migrated from Java to .NET. This change reduced the application's installed footprint to just over 110 MB from 750+ MB, and reduced the amount of third party software/applications required to serve IVN to the VA network. Work Instruction Modules were removed from the application build process following a content management best practice. Previous versions of IVN required a complete application rebuild when work instructions required editing or new work instructions were needed.

VISN IVN IP Architecture



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Multiple instances of IVN can run on a single server as well as multiple databases without any recoding of the application. This allows for flexibility in deployment based on customer needs. Many features are now configurable through the administrative functions interface, accommodating customer needs that are not always the same across the enterprise.

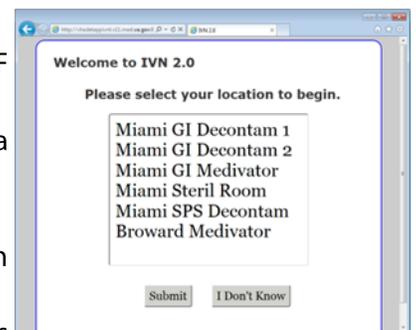


IVN is designed to interface with other technologies and solutions. IVN, as currently designed and built, is complementary with RTLS systems. The interfaced functionality is significantly more capable than each standing alone. The design philosophy for IVN and CED techniques provide an ability to optimize interface and implementation with RTLS. Although IVN deployment is independent of an RTLS deployment within a facility, coordination between the teams is highly desired to optimize the solution and minimize impact on the facility.

Project Results

In FY13, IVN Version 2.4.1 was developed and deployed with improved features. The team has:

- Implemented document control with WIM Library, Editor and PDF generator for greater control at front-end usage.
- Implemented a front-end administrative configuration page and a back-end support page for more instantaneous support to SPS users.
- Formatted work instructions, per the facility's original SOP.
- Determined location identifiers, which can be associated with reprocessing steps as they are performed at a particular workstation.
- Matured deployment strategy in response to feedback from pilot sites in VISN 11.



- Expanded and matured the collection of SQL reports in response to customer requests and feedback.
- Expanded IVN module library for the different scope models used in VHA facilities. Developed modularized work instruction architecture to improve IVN's ability to serve a variety of facilities using the same library of work instructions.
- Continued data collection for ISO9001:2008 pilot sites for IVN implementation in FY13.

Because of the modular IP design methodologies and the CED techniques developed by the IVN Team, deployment of IVN to other VHA facilities can occur concurrently. As a result, the concurrent deployment of IVN technology and integration with other VHA improvement solutions may occur without disruption to VAMC operations.

Project Impact

The following deliverables comprise the IVN Project Support Toolkit:

- **SPS Training and Competency Tool Project:** This tool is part of the Project Support Toolkit and is designed as a stand-alone macro routine or as a functional module integrated with other applications. This tool is currently incorporated into all IVN modules to provide an automatic integration of education and training competencies for the SPS operators with the equipment processes that they are qualified to perform. The tool also provides automatic management updates in either report or dashboard format, and alerts to identify abnormal or unqualified performance of a procedure.
- **ACCESS Profile Project:** This middle-ware software application is part of the Project Support Toolkit and is designed to allow data exchange between systems modules and current VHA legacy software applications, such as VistA and CPRS, while maintaining required security and privacy requirements to data access. Currently, this application is in use with the Missed Opportunities Project team. This application was also used to support the Telephone Care Collaborative projects within VISN11.
- **Integrated Solutions System of Systems (ISSS) Deployment Framework Project:** This project is part of the Project Support Toolkit and consists of a development and deployment framework to provide consistency in design, development, and incorporation of solutions, modules, and tools to interface with other work process control systems, iQMS solutions, RTLS solutions, NRT M&S solutions, and ISO 9001/2008 conformance solutions. Elements of this project were initiated in the IVN Program and incorporated into the other projects associated with IVN.
- **Medical Equipment Evaluation and Decision Analytics (MEEDA) System:** This project is discussed more thoroughly in the following section.

Medical Equipment Evaluation and Decision Analytics (MEEDA) System

Project Overview

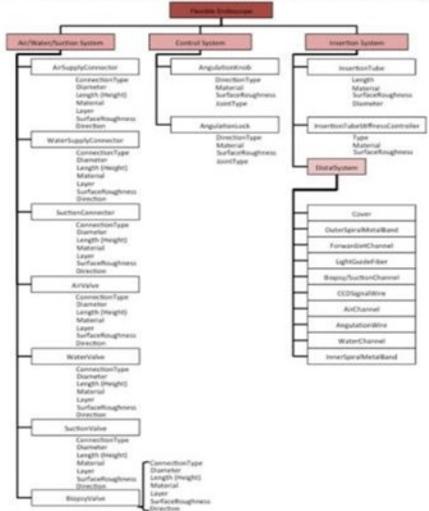
This project will implement a holistic system to monitor, analyze, and evaluate the effectiveness and efficiency of medical equipment from different manufacturers. The scope of the effort will cover the life cycle of equipment, from newly designed equipment to continuous operations and final disposal (see figure below for an analysis of product structure and reprocessing processes).

Project Objectives

The team will 1) develop a combination of methods, including equipment design evaluation, usage history data collection, and analysis; 2) derive effective service and maintenance guidelines for different RME; and 3) derive a performance appraisal system to more effectively select quality equipment and discontinue inferior equipment.

Analysis of product structure and reprocessing processes

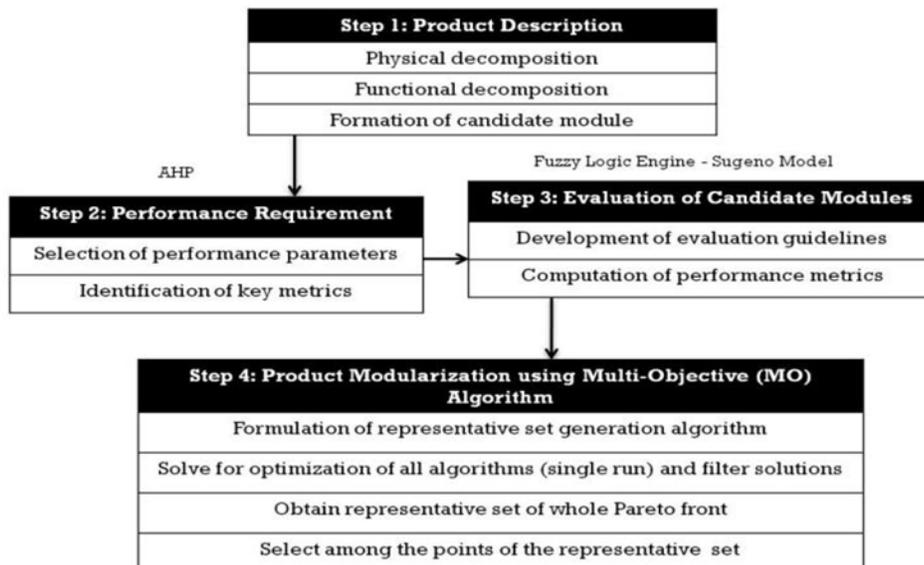
- Product structure analysis of GI endoscope
- Reprocessing process of typical endoscopes



Main Process	Detailed Process
Pre-cleaning	Wipe the insertion tube Aspirate detergent Detach accessories
Leaking Testing	Attach the tester Apply pressure Observe Detach the tester
Manual Cleaning	Brush the channel Aspirate detergent Flush detergent Detach accessories Clean the surface Rinse the endoscope Wipe the surfaces
Disinfection	Flush disinfectant Disinfect the endoscope Inject air
Rinsing	Rinse the surfaces Rinse the channel Aspirate alcohol Wipe the surfaces Wipe the surfaces with alcohol
Drying	Purge all channels with air Remove all channel adapters Dry the exterior of endoscope
Storing	Check all parts detached Hang the endoscope vertically

Medical equipment reprocessing is characterized by complex human involvement, a large number of processing steps, risk of infection due to incorrect execution of reprocessing procedures, and difficulties eliminating sources of infection caused by bio debris. Hundreds of model types for each kind of reusable medical equipment (RME) are currently in use. Different model types of some RME, such as endoscopes, perform similar functions, but vary widely and can be very difficult to reprocess. For certain types of RME, reprocessing can be accomplished much easier—and the risk of infection can be considerably less—if better engineering design is used, with fewer matted surfaces, sharp angles, occluded dead-ends, rough or pitted surfaces, square corners, dead spaces, and complex jaw assemblies, thus reducing risk to trap bio-burden and debris.

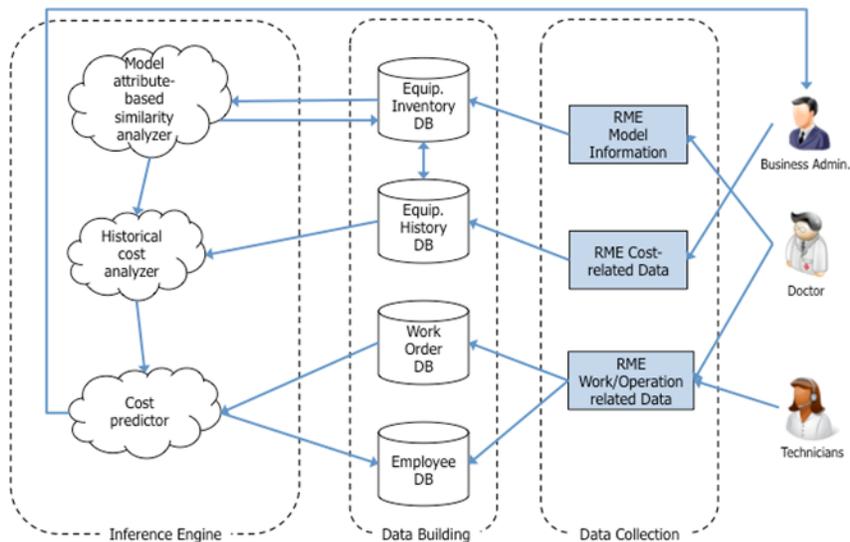
Product Modularization Method



The essential functionalities to properly evaluate the medical equipment include: providing adapted information for various audiences, retrieving the lifetime cost for medical equipment, and extracting cost information from the heterogeneous information systems (as described in the following section). The team conducted analyses of cost and causes for repair and reprocessing practices at the Detroit VAMC, and developed the basis of the historical data analysis of RME (such as endoscopes). The resulting works were implemented into a pilot system.

Cost Extraction: System Architecture

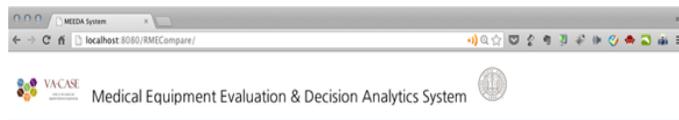
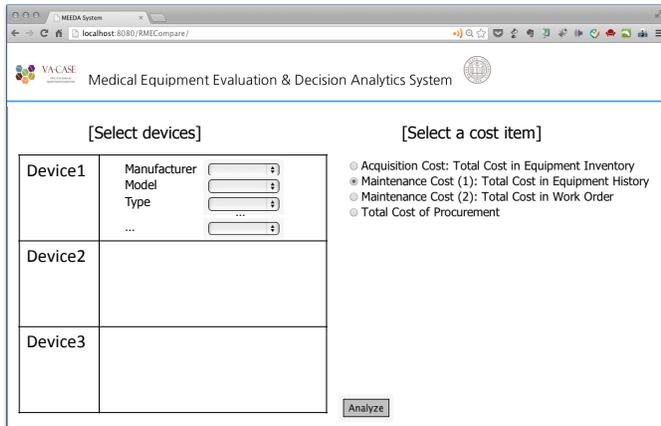
Cost prediction for the purchasing candidates and accurate reporting of results are the emerging issues for medical equipment management. Therefore, in addition to enhancing the cost analysis of the current system, functionality for medical equipment sourcing decision support is vital. However, it is often difficult to systematically decide the amount of information and to properly visualize it to audiences. To achieve those functionalities successfully, computational intelligence methods such as neural networks or support vector machines for cost prediction and data visualization for reporting can be applied. These methods are described in the following sections.



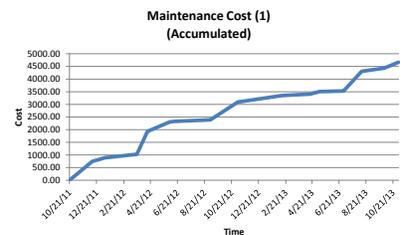
Cost Trace and Prediction

Advanced computational intelligence algorithms are applied to determine and extract cost information, which informs medical equipment cost analysis. Using text analysis techniques, the cost-related data attributes from current databases in VA Detroit are extracted and used in cost analysis (as shown in the figures below). Because the cost-related data include work- and activity-related data as well as financial data, text-based analysis from data descriptions and data types provides information used to analyze costs in VA facilities in greater detail.

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Device	Manufacturer	Model	Type	Serial	...
1					



Lifetime Cost Comparison

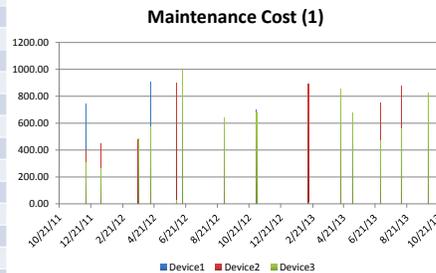
To tackle these requirements, the project team conducted requirement analysis and developed cost management models for the new Medical Equipment Evaluation and Design Analytics (MEEDA) system, as featured in the figures below.



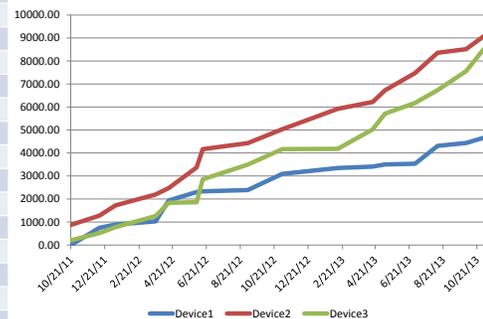
Device	Manufacturer	
1	Model	
	Type	
	Serial	
	...	
	...	



Device	Manufacturer	
1	Model	
	Type	
	Serial	
	...	
	...	
2	Manufacturer	
	Model	
	Type	
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3	Manufacturer	
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Device	Manufacturer	
1	Model	
	Type	
	Serial	
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	...	
2	Manufacturer	
	Model	
	Type	
	Serial	
	...	
3	Manufacturer	
	Model	
	Type	
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Project Results

This project implemented a holistic system for Reusable Medical Equipment (RME) design assessment and evaluation using Design for Reusability (DFR) principles. The team applied advanced computational intelligence algorithms to identify the relationships among design and reprocessing features. Using feature selection techniques, the customized items from the design and reprocessing items are selected and used in the design evaluation. Because unique RME each have their own objectives, usage intentions, and reprocessing procedures, each unique RME is given its own customized design evaluation items. The scope of this effort covers the life cycle of an RME, from newly designed equipment, to continuous operations, and finally to proper disposal.

The team has developed other methods in addition to the design evaluation, including RME usage and repair history tracking (with accompanied analysis), and a Total Cost of Ownership (TCO) estimator that identifies both direct and indirect costs throughout the lifecycle of a RME. The methodology of the MEEDA system derives effective service and maintenance guidelines for different RME. It also constructs a performance appraisal system for RME to more effectively select quality equipment and discontinue inferior equipment.

Future Plans

The web-based MEEDA system is scheduled for deployment in FY14 to the Detroit VAMC as a test-bed prototype. Currently, the team is developing a historical cost analyzer, such as Historical Cost Analyzer, for the Medical Equipment Evaluation and Decision Analytics system. This system is intended to enable the improved cost analyses to support business decisions of medical equipment by identifying cost analysis parameters/metrics.

Advanced Engineering Assessment Services (AEAS) Program Lane Make/Buy Procedures Models

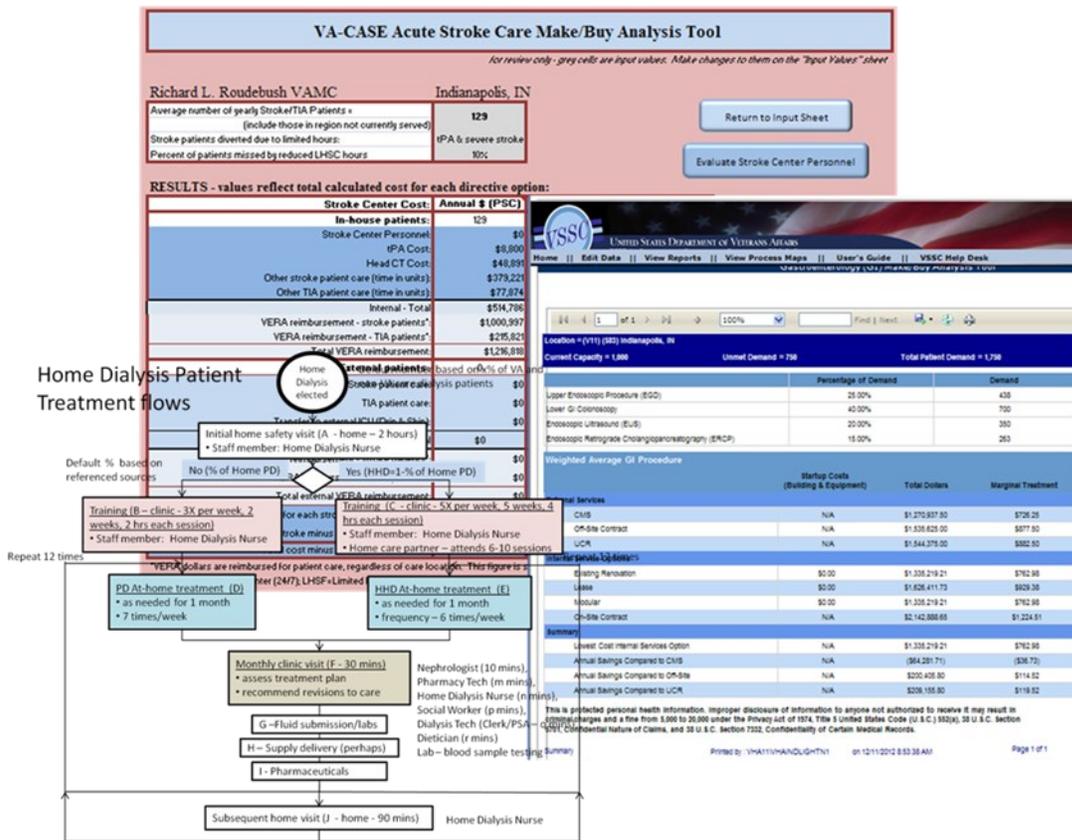
VA-CASE faculty and staff have developed computer-based cost models that allow service-specific and area-specific decisions regarding the internal versus external cost comparison for Specialty Care Services. The goal is to develop computer-based decision models that VA can use to aid decision-making by VA physicians and facilities as care needs are identified.

Each model is developed in two high-level milestones:

- Identification of primary decision model characteristics, including content and critical criteria for make/buy analysis, and
- Development, Implementation, and Evaluation of a Web-Based or Excel® Decision Model.

Previously, GI Clinical Procedures and Polysomnography models were developed and published on a VSSC server. Additionally, VA-CASE partnered with the Stroke QUERI to develop an Acute Stroke/tPA make/buy model. The original Dialysis Make/Buy model was published on a VSSC server. VA-CASE was contracted by the Office of Patient Care Services to revise this Dialysis model and develop a Home Dialysis model. First versions were delivered in FY2013. The Polysomnography model was revised to include sleep studies conducted at home for comparison to other study methods. The results were incorporated into a paper describing the cost-effectiveness of method combinations.

Make/Buy Model User Interface, Process Flow, and Output Example



VA-CASE Acute Stroke Care Make/Buy Analysis Tool
For review only - grey cells are input values. Make changes to them on the "Input Values" sheet

Richard L. Roudebush VAMC Indianapolis, IN

Average number of yearly Stroke/TIA Patients + (include those in region not currently served): **129**

Stroke patients diverted due to limited hours: IPA & severe stroke

Percent of patients missed by reduced LHSC hours: 10%

Return to Input Sheet

Evaluate Stroke Center Personnel

RESULTS - values reflect total calculated cost for each directive option:

Stroke Center Cost:	Annual \$ (PSC)
In-house patients:	129
Stroke Center Personnel:	\$0
IPA Cost:	\$0,000
Head CT Cost:	\$48,895
Other stroke patient care (time in units):	\$279,221
Other TIA patient care (time in units):	\$72,674
Internal - Total:	\$514,796
VERA reimbursement - stroke patients:	\$1,000,907
VERA reimbursement - TIA patients:	\$215,621
Total VERA reimbursement:	\$1,216,528
Net cost:	\$0
Home dialysis patients:	based on 6% of VA
TIA patient care:	\$0
Initial home safety visit (A - home - 2 hours):	\$0
Staff member: Home Dialysis Nurse:	\$0
Training (B - clinic - 3X per week, 2 weeks, 2 hrs each session):	\$0
Staff member: Home Dialysis Nurse:	\$0
Home care partner - attends 6-10 sessions:	\$0
Training (C - clinic - 5X per week, 5 weeks, 4 hrs each session):	\$0
Staff member: Home Dialysis Nurse:	\$0
Home care partner - attends 6-10 sessions:	\$0
PD At-home treatment (D):	\$0
HHD At-home treatment (E):	\$0
Monthly clinic visit (F - 30 mins):	\$0
G - Fluid submission/labs:	\$0
H - Supply delivery (perhaps):	\$0
I - Pharmaceuticals:	\$0
Subsequent home visit (J - home - 90 mins):	\$0

Home Dialysis Patient Treatment flows

Home Dialysis elected

Initial home safety visit (A - home - 2 hours)

Staff member: Home Dialysis Nurse

Default % based on referenced sources

No (% of Home PD) / Yes (HHD)-1-% of Home PD

Training (B - clinic - 3X per week, 2 weeks, 2 hrs each session)

Staff member: Home Dialysis Nurse

Home care partner - attends 6-10 sessions

Repeat 12 times

VERA dollars are reimbursed for patient care, regardless of care location. Therapies are limited to 24/7, LHSC+ Limited

PD At-home treatment (D)

as needed for 1 month

7 times/week

HHD At-home treatment (E)

as needed for 1 month

frequency - 6 times/week

Monthly clinic visit (F - 30 mins)

assess treatment plan

recommend revisions to care

Nephrologist (10 mins)

Pharmacy Tech (m mins)

Home Dialysis Nurse (n mins)

Social Worker (p mins)

Dialysis Tech (Clerk/PSA) (q mins)

Dietician (r mins)

Lab - blood sample testing (s mins)

G - Fluid submission/labs

H - Supply delivery (perhaps)

I - Pharmaceuticals

Subsequent home visit (J - home - 90 mins)

Home Dialysis Nurse

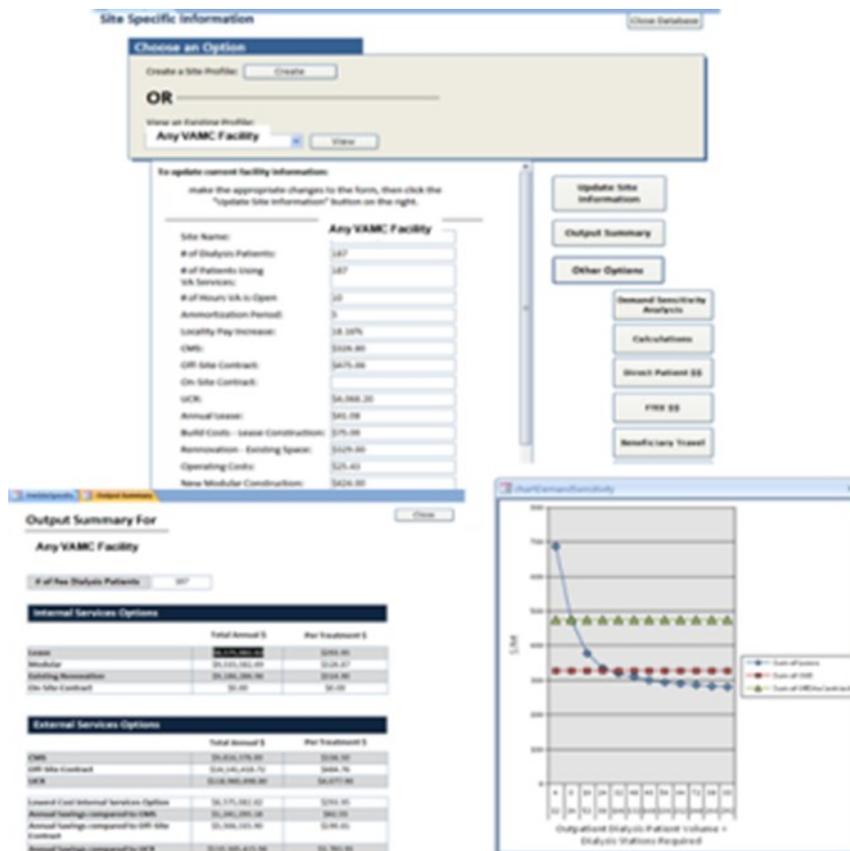
Dialysis Project

Project Overview

VA-CASE has had a relationship with the Office of Patient Care Services since the origination of the Dialysis Make/Buy tool in 2010. An additional contract was signed at the end of 2012 consisting of ten objectives related to the Renal Disease and Dialysis Program. The Dialysis Make/Buy Model was developed as part of these objectives and in partnership with VISN6. This model supported the building of four stand-alone dialysis units at four sites (VISN6/ VISN10). As compared to contract rates, savings across these sites have been estimated at ~\$8M. Two of the sites were activated in June 2011, the third in October 2012, and the fourth in April 2013. Model calibration is part of a continued CBO contract that also includes developing a standardized deployment plan for additional freestanding dialysis clinics.

Successful use of the Dialysis Make/Buy model prompted the contracting of a Home Dialysis Make/Buy model. This model will support decisions regarding expansion of existing dialysis units to include home dialysis capability, or the building of home dialysis freestanding clinics. Roll-out of the Home Dialysis Make/Buy model is expected in FY14.

Dialysis Make/Buy Model User Interface and Output Example



VA currently has 72 medical centers that provide chronic dialysis treatments for around 6,500 Veterans. The Centers for Medicare and Medicaid (CMS) require all dialysis service vendors to submit detailed patient data monthly for reimbursement. This allows for an evaluation of the care received (based on patient outcomes), which is used to determine the amount reimbursed to the vendor. VHA Directive 2007-032 mandates that VAMCs are to send the same data to CMS, for comparison purposes. Beginning June 2013, CMS stopped accepting data via hardcopy and switched to an electronic-only interface called CROWNWeb (Consolidated Renal Operations in a Web-Enabled Network).

Project Objectives

One of VA-CASE's objectives for the Dialysis Project is to recommend metrics related to End Stage Renal Disease (ESRD) patient care, similar to what CMS expects, for display on a dashboard. A team from the Office of Analytics and Business Intelligence (OIA) developed the dashboard containing these metrics. The initial dashboard is in the user testing phase.

Another objective was to assist in the setup for sending VA dialysis data electronically to CROWNWeb. A pilot site in Pittsburgh was selected for this effort. VA representatives are currently navigating the contractual process required for sending VA patient data through the Amazon cloud to CMS.

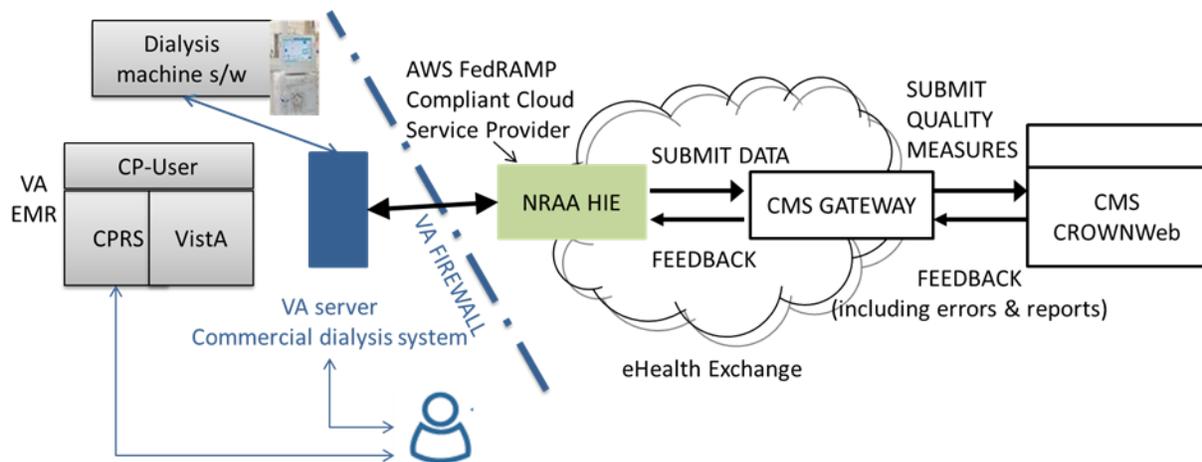
Project Results

VE-TAP developed a Standardized Deployment Package (SDP) that consisted of guidelines to activate a freestanding dialysis center, beginning with project planning through facility and personnel preparation. SDP includes a detailed project plan, templates, and examples of documents needed for this process. VE-TAP also completed a review of the site selection algorithm used to determine the additional 31 geographical locations for freestanding dialysis centers.

Future Plans

All deliverables related to contract objectives were conveyed to the customer. The dialysis dashboard is in user testing phase. The Pittsburgh pilot site for CMS transmittal (see figure below) is undergoing security review.

CMS Transmittal Plan for the Pittsburgh Pilot



Social Work eDischarge: Evaluation of Automated Discharge Implementation Project

Project Overview

VA Social Workers play an essential role in transitioning patients from acute care to post-acute care facilities. They currently use labor intensive, paper-centric processes to coordinate referrals and discharges. The current processes contribute to an increase in lengths of stays, costs, safety risks, and patient dissatisfaction.

Project Objectives

VE-TAP was tasked with understanding the return on investment (ROI) of an automated discharge facilitation service based on a pilot at a selected VAMC. This project consists of three phases. Phase I involved documentation of the current manual process and development of data collection tools for use during pre- and post-automated solution implementation. This phase ended with the selection of quantitative and qualitative data collection tools. Phase II consists of collecting data from the pre-implementation phase. This Phase is ongoing, as the contract was awarded, but yet not finalized. An implementation schedule is also needed. Phase III will consist of post-implementation data collection and data analysis to determine ROI. Finally, VE-TAP will deliver an assessment report detailing the results

The Lab also serves as a centralized location for assessing the optimal display of clinical and operational data for integration into clinical and management decision-making. This Lab is equipped to conduct simulation studies and support research and operation efforts by providing the following capabilities: collection of video scenarios of HCI activities; recording of user screen actions through instrumented software designed to capture user interaction with the software interface; and rapid prototyping of new software designs or changes to existing clinical programs, such as VA's CPRS and My HealthVet.

Project Results

The HCI and Simulation Lab transferred to VE-TAP at the end of FY2013. The Lab now offers review of materials for compliance with Section 508 of the Rehabilitation Act of 1973. The Lab supports internal projects and will provide design, review, test, document, and prototype services to other departments within VA. HCI and Simulation Lab are currently conducting Section 508 compliance reviews for web-based Toolkits. The staff is organizing materials, investigating HCI Lab best practices and preparing to address project needs.

Strategic Support Services (S³) Program Lane

Patient Panel Size Intensity Adjustment Model for Patient Aligned Care

Project Overview

One of the aims of VHA Directive 2004-031, Guidance on Primary Care Panel Size, is to establish a primary care system that balances productivity with quality, access, and patient service. Patients' access to healthcare is measured by the time between the patient's desirable appointment date and the actual appointment date for primary care, which is known as appointment waiting time. One of the important factors influencing appointment waiting time is the size and composition of the patient panel for a particular primary care giver or a Patient Aligned Care Team (PACT team). In current VHA practice, the patient panel size is classified as 1,200 patients for physicians, with adjustments calculated by the following factors:

1. Size of support staff (more supporting staff members, higher the panel size);
2. Clinic room space;
3. Primary care intensity score (scores of 1.0 represent the norm, a higher score indicates a sicker patient; and
4. Newly hired provider (gradual ramp up of panel size for new Providers).

Among these adjustment factors, the primary care intensity score is one of the most important factors, and it has a large impact on the adjustment of panel size. The primary care intensity score is calculated based on VHA's internally developed model. In this model, a regression-based method is used. In this regression model, the dependent variable is the count of primary care visits per patient per year, with independent variables including age, priority, race, marital status, gender, non-primary care visits, registry, insurance status, average distance traveled, and diagnosis (HCC classification). This model is statistically highly significant, and can explain 25% of variance in primary care visits ($R^2 = 25\%$). This version of this model was originally developed in 2002, with modifications made to accommodate the changing healthcare delivery system until 2010.

Project Objectives

VHA's Office of Informatics and Analytics (OIA) desired to modify and improve this model to calculate primary care work intensity scores with the following goals:

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1. Modify the dependent variable to include primary care work besides clinical visits, such as telephone visits.
2. Modify the independent variables to include better predictors of the work, such as severity.

VE-TAP Team examined the existing model and, based on the evaluation, identified opportunities for improvement in the model for prediction accuracy. The proposed version of the model combines patients' health conditions with their demographic information to predict their total demand for Primary Care on a yearly basis. The patient-level data was further aggregated to the provider, division, and station levels to assist in Primary Care management through the assignment of comparative predicted workload panels, which utilize telephone encounters to balance total workloads among providers in the new team-based healthcare system.

Methodology

All patient visits to primary care and women's health (DSS stop codes 323 and 322, respectively), from FY11 Quarter 3 to FY12 Quarter 2, were assembled for a total capture period of 1 year. Visits from other primary care-related clinics, such as Internal Medicine or Geriatric Primary Care, were not included in this model. Model variables for each patient (differentiated by unique SSN) were assembled using a combination of existing SAS databases and SQL Server tables into a single SAS dataset for analysis (see Appendix for more details). In addition, an auxiliary dataset containing all patient visits to non-primary care stop codes (all DSS stop codes excluding 323, 322, 180) were used to calculate the non-primary care workload generated by each unique SSN over the same time period.

Project Results

Model: The dependent variable used in this model was the total RVU (Relative Value Unit) from primary care visits during the entire year for a single unique SSN. The dataset was created using Base SAS. After extraction of all variables, the dataset was exported into SAS Enterprise Miner, which was used for performing linear regression. For variables with high frequencies of missing values, the missing values were imputed. Following this, appropriate transformations of interval variables were considered. Finally, the regression node was utilized to find the final coefficients to be used in the model. It is important to note that within the regression node, variable interactions and exponents were not specified. In addition, it was specified that the model was a linear regression and not logistic.

The model was used to calculate total workload (measured in RVU) for both providers and facilities for the VHA Enterprise.

Mathematical Formulation of Linear Regression Model

$$\begin{aligned}
 PCR\text{VU}_i = & \beta_0 + \sum_{j=1}^{30} \beta_{ij} ACC_j + \sum_{k=1}^6 \beta_{ik} EmpStatus_k + \sum_{l=1}^{258} \beta_{il} Facility_l + \sum_{m=1}^2 \beta_{im} Insurance_m \\
 & + \sum_{n=1}^6 \beta_{in} Marital_n + \sum_{p=1}^2 \beta_{ip} Age_p + \sum_{q=1}^3 \beta_{iq} Distance_q + \sum_{r=1}^3 \beta_{ir} Income_r \\
 & + \sum_{s=1}^3 \beta_{is} InpatDays_s + \sum_{t=1}^2 \beta_{it} ProvChangeCount_t + \sum_{u=1}^3 \beta_{iu} Position_u \\
 & + \sum_{v=1}^2 \beta_{iv} Gender_v + \beta_w ProvYears + \beta_x \sqrt{NonPCR\text{VU}} + \beta_y (CanScore)^2
 \end{aligned}$$

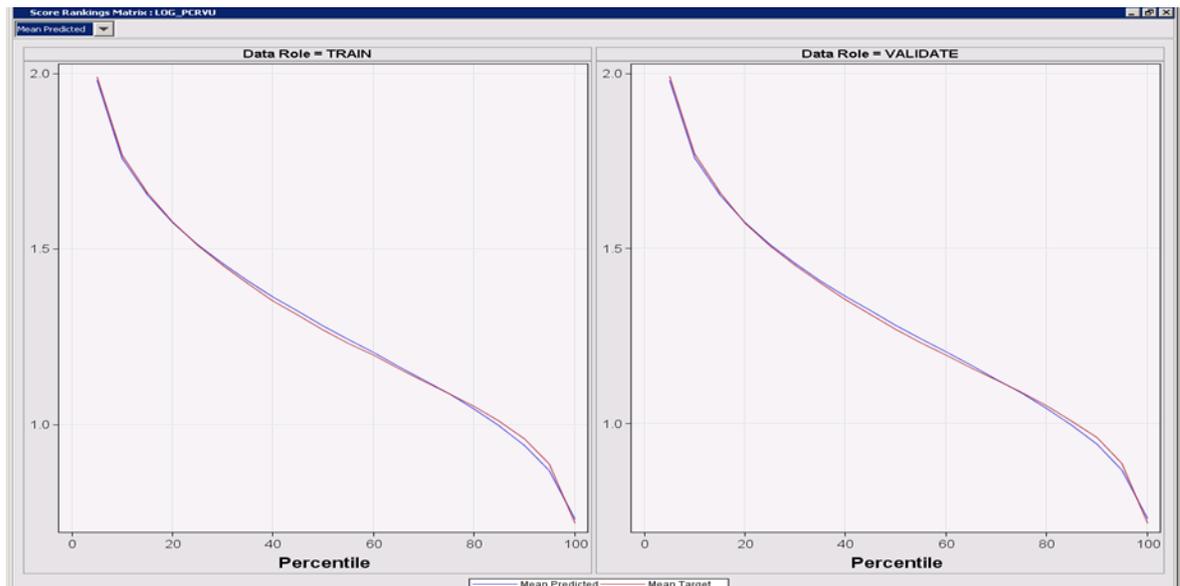
Normalized Intensity Score: An intensity score was calculated at three levels: provider, division (sta6a), and station (sta3n). For each of these scores, the sum of the workload (RVU) generated by each unique SSN assigned to the provider, division, or station was calculated. This sum was then divided by the median workload to give the normalized intensity. The output values from this process were incorporated into PCMM for analysis of current workload distribution.

Project Impact

The result of these efforts is a highly significant linear model that accounts for 40% of the variance within the VHA population. Notably, although the R^2 of the model is only 40%, the explanatory value of the model outputs increase as the workload is aggregated to the provider, division, and station levels. This model accounts for the differences between new and old patient visits as well as the complexity of the patient. In addition, to accommodate the increasing use of telephone encounters in the VHA, this model considers total RVU as the dependent variable as opposed to a simple visit count to differentiate the amount of workload required by each visit type.

The model was presented to the VHA’s Office of Informatics and Analytics. On approval and acceptance of the model and results, the VE-TAP analytic team extracted results and provided the workload values at provider, division, and station level for OIA. OIA populated the VSSC cube and the revised scores are used at the discretion of facility leaders.

Fit of Current Model (R2=39.54%)



Wounded Warrior Project Lead Coordinator Support Project

Project Overview

The Lead Coordinator (LC) Model was created by a joint task force between the Department of Defense and Veterans Affairs for better Wounded Warrior Care Coordination. In previous years, the two Departments were unable to synchronize processes and programs to support ill and injured Service members, Veterans, and their families as they

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transitioned between the two systems of care. To aid in this transition, the Lead Coordinator Model was created. Based on having a single person from each Department appointed to the patient as their guide through each system, this model aims to ensure that all information is properly transferred and considered in the Service member's or Veteran's care. In addition, a checklist document standard to both Department of Defense and Veteran Affairs is used to ensure and account for all care management-related tasks. The overarching purpose of this model is to improve clarity and reduce confusion for patients and their families.

The model was implemented in two phases at two separate pilot sites. In the first phase, the Lead Coordinator Model was rolled out to the VA Medical Centers in Washington, DC and Richmond, Virginia and their Department of Defense counterpart, Walter Reed National Military Medical Center. In the second phase, the Lead Coordinator Model was rolled out to all VA Medical Centers in VISN 17 and their corresponding Department of Defense counterpart, San Antonio Military Medical Center.

To evaluate the success of the model for patients seen at these VA Medical Centers, VE-TAP is assisting the VA with data collection and monitoring of the 4 measures listed below. Data is collected on a weekly basis from the Lead Coordinators at the VA Medical Centers. The intent of this model is to reduce confusion, but not to overburden staff; this balance is monitored through the collection of data. The data collected is focused around four items:

1. Case Load
2. Touch Time for Checklist
3. Issues Checklist Helped Identify and Resolve
4. Frequency of Use of Checklist

The data related to these four items is presented on a weekly basis to the leadership team comprised of both Veteran Affairs and Department of Defense members, and all facility leaders and lead coordinators.

To date, the Phase 1 and Phase 2 sites of Veteran Affairs have fully implemented the Lead Coordinator Model. The implementation of this model for Department of Defense facilities is specific to the service, and for that reason, the model is not yet fully implemented.

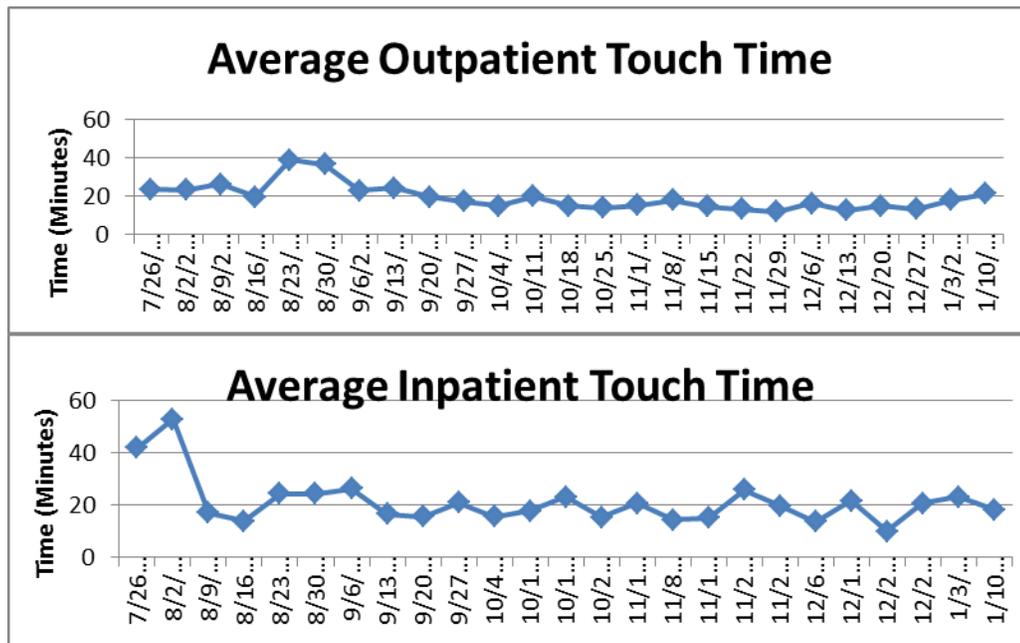
Project Objectives

1. Analysis of survey and process monitoring data based on the need for process monitoring and improvement using data provided by VA and DOD:
 - a. Conduct data cleaning, pre-processing to ensure integrity of the data analysis,
 - b. Identify outliers and marking to provide DOD and VA team with information regarding abnormal observations and possible root causes,
 - c. Collaborate with DOD to develop standard data collection tool to monitor LC model implementation and ensure minimal increase in LC workload,
 - d. Create and maintain process control charts for factors that are accountable for process monitoring and process improvement, and
 - e. Conduct advanced analysis when necessary, such as structured equation model and simulation model.
2. Assist in process performance management and improvement:
 - a. Establish performance target levels for key process elements based on the process capability level and trend,

- b. Develop estimation of process maturity level based on data, and
 - c. Identify key process elements for improvements based on data analysis and criticality of process steps.
3. With data collected, prepare weekly progress presentations to show occurrences during the past week along with trends over the course of Phase 1 and Phase 2.
 4. Collaborate with DOD to compile data from both DOD and VA facilities to evaluate transition of information between the two systems.

Project Results

The VE-TAP Team has successfully established a weekly protocol of data collection and presentation to initiative leadership and participants. The data collection tool was developed with the input of DOD counterparts and is ready for implementation. The data presented also shows the ease of use of the model and successful implementation of the model. For example, both inpatient and outpatient average touch times have been consistently reduced to between the 10-20 minute marks, typically around 15 minutes for outpatients and fluctuating slightly more for inpatients. The graphs below show this trend; the slight rise in the last two weeks is due to the introduction of a Lead Coordinator that is new to the process. In addition, factors such as handoff completion (whether a checklist and phone call were received), case load, frequency of use, and helpfulness of checklist are evaluated and presented.



VA Practical Application of Intimate Relationship Skills (PAIRS) Project

Project Overview

VA National Chaplain Service required a systematic review of the Practical Application of Intimate Relationship Skills (PAIRS) model. This project developed a framework to integrate, sustain, and expand the PAIRS model. PAIRS is an

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educational tool utilizing couples counseling retreats to teach communication skills. The VA-CASE team evaluated the current program to document business processes, track key metrics through the implementation, and develop a national-level sustainment plan for the VA PAIRS program.

Project Objectives

- Document processes employed in local VA PAIRS programs.
- Assess the ability for the National Chaplain Center to solicit outside financial support for VA PAIRS.
- Provide a roadmap for establishing and sustaining a VA PAIRS program nationally.
- Provide a framework for establishing VA PAIRS as a Program of Record.

Project Results/Impact

- The National Chaplain Center will promote VA PAIRS at the VA Voluntary Service National Advisory Committee meeting in April 2014.
- The National Chaplain Center is working with the Office of Patient Centered Care and Cultural Transformation to establish VA PAIRS as an educational service under Mental Health.
- VE-TAP is currently working with the National Chaplain Center to implement the sustainment plan.

This project is complimentary to the extensive evaluation of the PAIRS process currently in progress at the Durham VA Medical Center by the Center for Health Services Research in Primary Care and VA Mental Health and Chaplaincy program. The combination of the present sustainment plan and the long-term assessment in progress by the Durham VAMC evaluation team will provide information for examining the potential of implementing a national VA PAIRS program with on-going funding.

VISN4/VAPHS VERC Missed Opportunity Project

Project Overview

The collaboration between VAPHS VERC, University of Pittsburgh, Wayne State University, and VA-CASE provided tools, RPIW consultation, and process evaluation techniques to assist facilities with improving missed opportunity processes and the Patient Aligned Care Team effort. The development of a no-show model will provide an effective tool to accurately predict the rate of missed opportunities. Teams were trained under the RPIW Training/Co-Facilitation Program to implement these improvements. VA-CASE Professional Development provided services to complement the education program. For FY13, the project supported continued model validation, facility support, and support to VAPHS efforts.

VA-CASE Social Media & Networking Project

Project Overview

A technical blog was developed to introduce VA-CASE employees to technologies not normally in their specific domain. In September 2013, a Blog Project Plan was submitted to the OIT Media Office. The blog was released for development in December 2013 and to the members of the VA-CASE community in January 2014.

Project Results

Initial development posts on the blog have included the following topics: NoSQL, Agile Analytics, Hadoop Server,

Twitter Bootstrap, ISO-9001, Healthcare IE, Quality Videos, Sorting Algorithms, Journal of Rehabilitation, HIMSS conference, Model View, Controller, Google Glass, RAMP learning, Informatics, Behavior Driven Development, Gartner Hype Cycle, Data Mining Competition, Single Page Applications, Big Data, The Wisdom of Crowds, jQuery, Apps Gone Free, Enterprise Decision Management, Evidence Based Design, and WebGL.

The VA-CASE blog has normal blog features, such as recent posts, comments, categories, and tags, along with several RSS feeds. The recent posts, comments, and categories appear in the sidebar of the blog.

These categories are accessed via a link. When users select a category, the blog will filter the results and



only show those in a specific category. The RSS feeds in the footer have two sections. The first section of RSS feeds, which are external to the VA, are selected based upon the programs and mission of VA-CASE. The second section of RSS feeds is based on groups that have their own blogs at the VA.

Future Plans

VA-CASE is always open to ideas that will improve the blog; user input is also needed with respect to blog post length, content, and delivery. Currently, the Blog has a log of about 40 topics, but the BlogMaster is always adapting to the needs of blog readers, and will work with bloggers on appropriate topics that benefit VA-CASE and advance Operational Systems Engineering. Contact blogmaster, Cyrus Hillsman (cyrus.hillsman@va.com) to offer suggestions and insights.

Veteran-Centered Design Lab (VCD Lab) Project

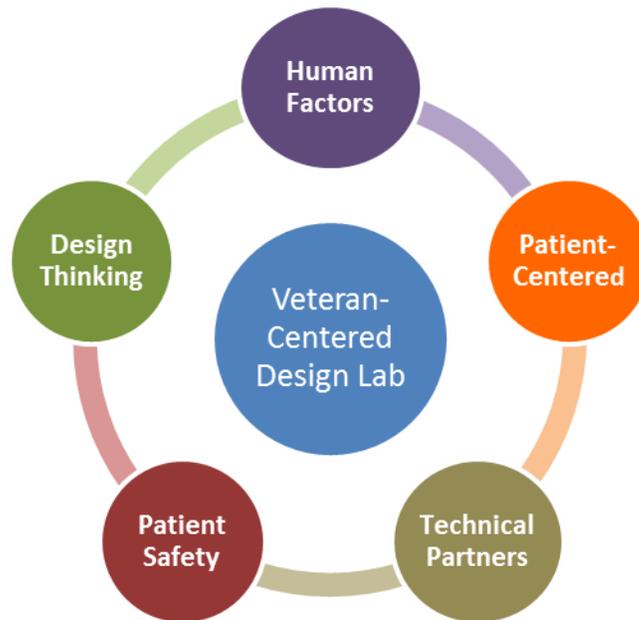
Project Overview

The Veteran-Centered Design Lab (VCD) is an innovative program in VA-CASE that utilizes a multi-disciplinary, human-centered approach to Design Thinking to transform both the delivery and experience of our Veteran's Healthcare. Design Thinking is defined as the ability to combine empathy for the context of a problem, creativity in the generation of insights and solutions, and rationality to analyze and fit solutions to the context. This approach to design is utilized to drive innovation across many industries. Two notable examples of healthcare organizations that have embraced the philosophy of Design Thinking include the Mayo Clinic Center for Innovation, after which the VCD Lab is conceptually modeled, and the Kaiser Permanente Garfield Innovation Center.

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Project Objectives

The vision of the VCD Lab is to 1) inform and facilitate the conceptualization and design of innovative healthcare solutions, and 2) positively transform the delivery of healthcare and the overall experience of our Veterans across the VHA system. The Lab team strives to accomplish this vision by collaborating with Veterans and key Stakeholders in designing state of the art healthcare solutions and experiences.



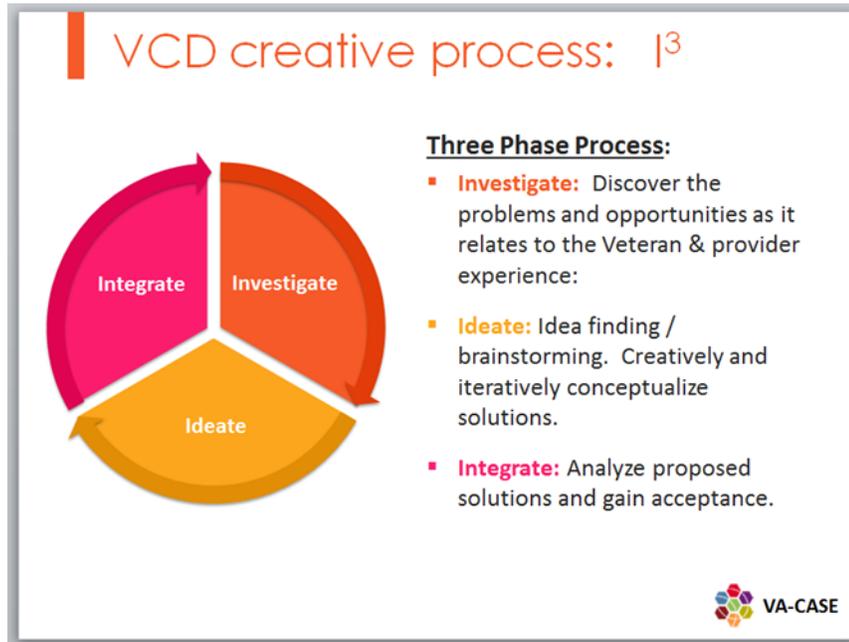
The VCD Lab can lead a creative, iterative, and human-centered process, informed by both Veterans and Staff, that allows collaboration and problem-solving based on unique circumstances, while simultaneously promoting a consistent Veteran-Centric Experience across the VHA through:

- Design Research and Strategy
- Process, Experience, & Environmental design
- Stakeholder facilitation
- Human Factors analysis
- Clinical analysis

Project Results

The VCD Lab three phase Veteran-Centered Design process (illustrated below) provides a method for:

- Investigating state of the art processes and design;
- Facilitating Stakeholder collaboration and consensus-building;
- Conceptualizing functional, process-driven floor plans and space criteria;
- Developing service specific Veteran-Centric design templates; and
- Interfacing conceptual designs with local facilities Engineering Service.



VCD Lab I³ Process

Veteran-Centric Cancer Care Center Project

Project Overview

Cancer care is a complicated process involving coordinated treatments across numerous departments, including: Oncology, Hematology, Radiation, Pharmacy, Nursing, Dietetics, and Social Work. These services are currently dispersed throughout the hospital, which results in extended wait times, patient safety concerns, and a perception of clinic under-utilization. Veteran satisfaction, especially as it relates to very long wait and treatment times, is negatively impacted by these factors.

Traditionally, clinical functions and processes are forced to meet the constraints of the available space. This approach necessarily constrains the optimization of service delivery and is not ideal in the design of health care facilities. The design philosophy pursued by the VCD Lab was to envision the ideal care processes, functions, and environment without limitation. The overarching goal throughout the project was to keep the Veteran's experience as the focal point of the design. In terms of group management, the approach was facilitation, allowing Stakeholders the opportunity to iteratively design an optimal patient-centered care delivery process and floor plan.

Project Objectives

The Richard L. Roudebush VAMC partnered with VE-TAP to facilitate a Stakeholder driven, conceptual design process with the goal of consolidating these various services into an integrated, Veteran-Centered Cancer Care Center.

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The partnership aimed to:

1. Inform stakeholders regarding state of the art and cutting edge practices in Patient Centered Cancer Care Center design.
2. Facilitate the stakeholder ideation process to include state of the art practices in conceptual designs for a Veteran Centered Cancer Care Center.
3. Support iteration of conceptual designs by producing:
 - a. Computer-Aided Design (CAD) drawings of conceptualized iterations of floor plan designs;
 - b. Simulation powered visualization of flow through final floor plan design; and
 - c. Rough order of magnitude estimates of resources needed.



Project Results

Utilizing the VCD Lab ¹³ process, the VCD Lab first investigated and gathered insights on state of the art cancer facilities, processes, and equipment. Through collaboration with Stakeholders, these insights were then translated into site-specific conceptual designs of both the care delivery process and space layout. Finally, the Integration phase utilized the analytic power of Modeling and Simulation to inform further design iterations, while allowing the visualization of stakeholder-preferred concepts and trade-offs.

Project Impact

Design highlights include:

1. Veteran-Centricity:
 - A “Hoteling” concept was introduced, whereby patients check into an exam room and it becomes theirs for the duration of their clinic visit. All activities, such as triage, blood draw, etc., occur in the patient’s exam room—minimizing patient movement. Veterans can use their exam room as a private waiting room for their family or as a place to secure their belongings while visiting the cafeteria. Simulation of the process and floor plan demonstrated the viability of this system.
 - All infusion bays are located on exterior walls and have windows overlooking the river. The importance of windows/natural light for patients receiving long infusions was discovered during our site visits and talks with patients.
2. Critical Adjacencies:
 - This design was incorporated into an in-clinic satellite chemotherapy pharmacy. Co-locating this



satellite pharmacy in the clinic reduced the wait time for chemotherapy medication preparation and delivery. It also facilitated clinical communication between pharmacists, providers, and patients.

- In-clinic work rooms are designated for the Dietician and Social Worker. These ancillary services are particularly important in relation to the unique needs of our Veteran cancer patients. Providing them with in-clinic work areas facilitated Veteran access to these services.

3. Horizontal Flow:

- The two separate chemo-therapy infusion suites (8th floor & 2nd floor) were an ongoing source of confusion for patients, as well as an inconvenience to providers. One key motivation was to improve patient safety through the new design, which consolidated all infusion bays into one suite co-located with the clinic.
- Presently, patients have their blood drawn in the phlebotomy clinic, which is located on a separate floor from the cancer clinic. The new design expanded an existing pneumatic tube system into the cancer clinic, so that patient blood draws are performed in exam rooms, with samples immediately sent to the Pathology Lab. This design feature both reduced patient movement and improved lab result wait time due to a near real time delivery of samples to the Pathology Lab.

4. Veteran Choice:

- Based on feedback from Veterans, three types of infusion bays are incorporated with varying levels of privacy into the design:
- Fully private room (with bed)
- Semi-private bay with adjustable level of privacy (sliding partition, curtains, etc.)
- Communal area for Veterans who want to socialize, play cards, etc.

Pathology & Laboratory Optimization Project

Project Overview

The Pathology & Laboratory Service at the Richard L. Roudebush Veteran Affairs Medical Center is seeking to optimize their specimen work flow processes and space usage in anticipation of:

- Acquiring a new automated track system and analyzer equipment, and
- Centralizing the process of sample intake.

The analyzers are central pieces of equipment around which the work processes in the Lab revolve. Various departments work within the Pathology Lab (Chemistry, Hematology, etc.) and utilize the same equipment, but with potentially different work flow processes.

A major area identified for improvement involves the centralization of sample inputs. Currently, samples are introduced to the Lab for testing using 3 separate methods: dumb waiter, pneumatic tube system, and walk-ups. These 3 different intake areas are physically located in separate areas of the Lab. This physical separation can cause various inefficiencies, such as extra steps to retrieve samples, and staff not realizing samples have arrived in the Lab. The reduction of effort (both physical & cognitive) involved in the processing of samples will reduce turnaround time, mitigate the potential for human-error, and improve customer satisfaction with Pathology & Laboratory services.

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The time to process patient labs and return the results to the provider is especially critical to optimal Veteran-Centered care. Inefficiencies within the Pathology Lab can contribute to long Veteran wait times and repeat Veteran clinic visits due to non-availability of results to providers while the patient is in clinic.

Project Objectives

The Veteran-Centric Design Lab Team is identifying optimization of specimen work flow processes and a more effective utilization of available space in the Pathology & Laboratory areas. The team also aims to:

1. Inform stakeholders concerning state of the art practices currently in process, as well as space utilization from the investigation of identified leading pathology labs;
2. Facilitate stakeholder ideation and consensus with an iterative conceptual design of an optimal work flow process and equipment/personnel floor plan layout; and
3. Support integration of conceptual process and floor plan designs through:
 - a. Review of prior work (System Redesign and Vendors), and
 - b. Observation & Analysis.

VE-TAP Consultative Services Project

Project Overview

VE-TAP provides Subject Matter Expert services and consultation in support of several VHA programs and offices, including:

1. VHA Real Time Locating System Program Management Office (RTLS PMO)
2. VHA Office of Quality, Safety, and Value (QSV)
 - a. ISO Consultative Division – ICD
 - b. Risk Intelligence Task Force
 - c. Health Systems Innovation Planning & Coordination (HSIPC)
3. VHA SPS Summit Equipment Utilization Workgroup
4. VHA Consult Task Force
5. Office of Patient Care Services
6. Office of Patient Centered Care
7. Office of Sterile Processing

Performance Metrics Management Toolset (PMMT) Project

Project Overview

This project is designed to 1) improve performance management effectiveness; 2) improve performance levels for facility leaders; 3) reduce redundancy in reporting requirements; and 4) improve effectiveness of corrective and preventive action planning. The system will integrate with the ACCESS “All In One” dashboard in pilot at the Detroit VAMC, and will use a web-based application structure for high configurability. Work to date includes developing and testing the prototype, validating web-based technology for the dashboard, and interfacing the ACCESS dashboard.

Performance metrics are a set of measures used to determine the efficiency and effectiveness of an organization's activities and performances. In the VHA, a complex array of performance metrics is used to monitor and evaluate the overall performances of every VA Medical Center. The periodic results from these metrics have complicated dynamic

and structural features; many metrics are changed or adjusted every year, and in each medical center a hierarchy of management layers exists whereby performance metrics are assigned to various levels of managers and process owners. For each medical center, if a performance metric fails to meet its target, the relevant process owners should be notified, and based on their responsibility, these owners should analyze and correct the output of the identified failing metric.



In current practices within VHA, effective performance metrics management and improvement are difficult due to the following reasons:

1. Each non-performing performance metric may have many managers/process owners, with different degrees of accountability, responsibility for it. However, in current practice, no effective technical means exists to accurately quantify manager/process owner responsibility and the degree of performance gap for each layer of process owners.
2. Each process owner is usually responsible for several performance metrics; however, in current practice, the ability to identify the performances gaps for lower level process owners is difficult.
3. If some performance metrics are not good for some process owners, and improvement actions are used to improve the metrics, no effective tool exists to monitor and assess the effectiveness of improvement actions, and guide improvement activities.



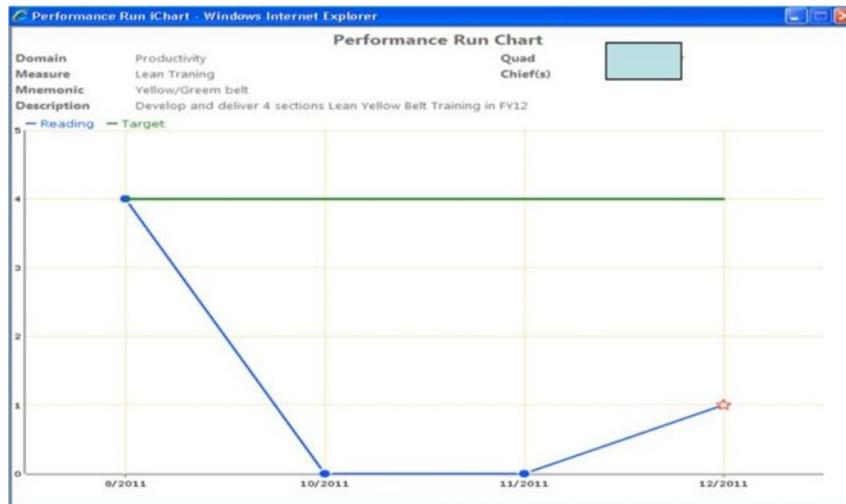
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Project Objectives

A Performance Metric Management Toolset (PMMT) will be developed to:

1. Provide an easy to read, often single page, real-time user interface, showing a graphical presentation of the current status (snapshot) and historical trends of performance metrics allocated to the corresponding process owner.
2. Provide a user-friendly visual representation of performance metrics.
3. Identify and show the trend of performance metrics, and illustrate the effectiveness of improvement actions on performance metrics.
4. Generate detailed reports showing new trends in a timely manner.
5. Provide capability to make more informed decisions based on collected data and gap analysis, and allocate improvement efforts to achieve the best outcomes.
6. Provide total visibility of performance metrics to every level of the organization quickly.
7. Identify data outliers and correlations quickly.

As this project progresses, the Team will enhance and improve the web-based toolset to a more configurable management tool. This tool can identify effective, real-time process gaps and the corresponding, responsible performance metrics owners.



Clinical Services Staffing (Dietary FAC) Project

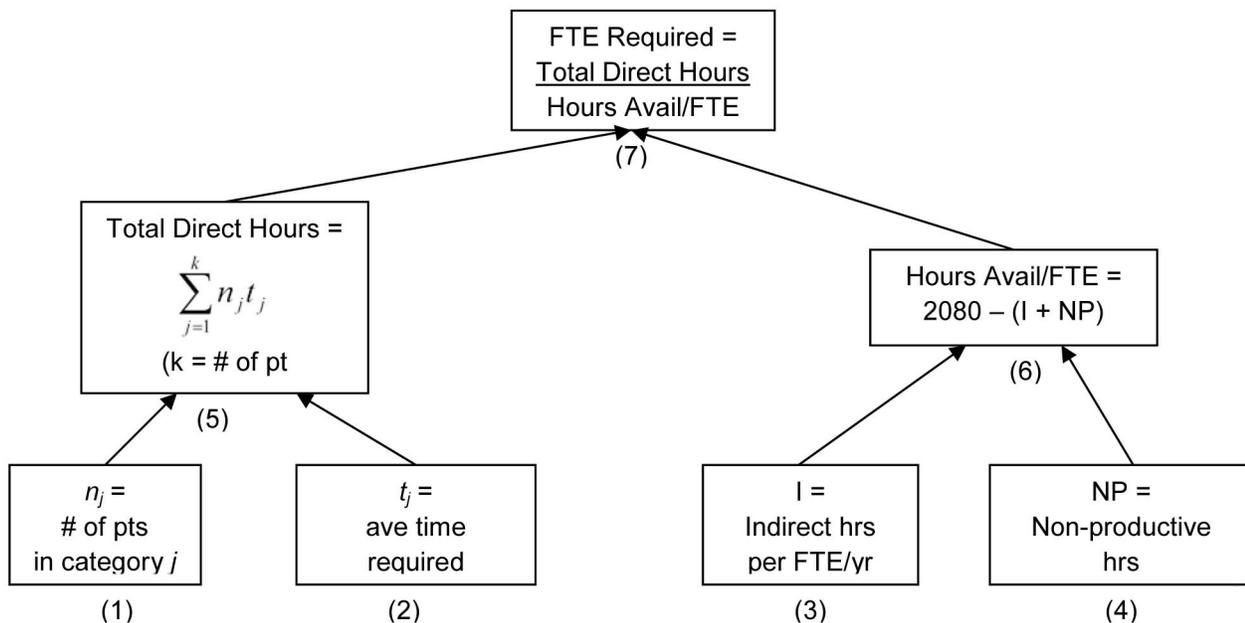
Project Overview

The objective of this proposed project is to develop a web-based toolkit that can help medical centers determine the appropriate staffing levels for clinical service staffs, such as nutritionists, pharmacists, and social workers for the patient population of a medical center. Determination of appropriate staffing levels for clinical service staffs will help to ensure adequate services for patients in a cost-effective manner.

The framework used in the original model and proposed for the updated model (see figure below) is derived from established engineering standards. The model is based on the balance between the expected demand generated by

patients for dietitian services (boxes 1, 2, and 5), and supply of services (boxes 3, 4, and 6). The supply side is determined by head count multiplied by the effective work hours for each professional for each year. The demand generated by each patient is significantly influenced by many factors, such as patient age, weight, diagnosis, nutrition status, etc.

Framework for Staffing Model



The current model used to determine dietary clinical staffing levels was originally developed in 1998 by the staff from the Ann Arbor VA HSR&D Center of Excellence and a national committee of VA clinical dietitians. Since the development of this model, many changes have occurred both in the practice of clinical nutrition and in the collection of related data. An expansion in the education and abilities of many dietitians has also occurred, as well as an increasing demand by facilities to complete the same tasks in less time. In addition, significant improvements in the quality and capture of workload data have developed. Considering these changes, the management of dietary clinicians determined that better tools were needed to assist in decision-making to balance both quality and efficiency of care.

Project Objectives

1. Update the VA's current clinical nutrition staffing model.
2. Estimate demand for services using data from the DSS Event Capture System.
3. Obtain patient-specific health and demographic variables to aid in prediction of workload.
 - a. Incorporate variables that are suggested by clinical nutritionists as being potentially significant predictors of workload.

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4. Determine a set of most significant variables that affect workload.
5. Determine the best modeling strategy, develop the model, and validate.
6. Develop an easy-to-use tool for management to determine their individual service's staffing needs.
7. Develop an easy-to-learn procedure for data-pulling for extension to support staffing of other clinical services.

Project Results

The following results represent the current status of this project:

1. The demand of each patient nationally was estimated for FY2011 and FY2012 using the NU codes recorded by clinical nutritionists during visits. The NU Codes were converted to RVU values in the unit of minutes.
2. All health and demographic variables suggested by Ann Arbor VA HSR&D and clinical nutritionist advisors were pulled into input variable datasets.
 - a. Variables with higher percentage of missing values were considered for elimination.
3. Multiple potential modeling strategies were considered, including:
 - a. Standard linear regression with transformation of individual variables using SAS Enterprise Miner.
 - b. Random Forest Model using R.

Readmission Causal Analysis and Resolution Toolkit (RCART)

Project Overview

This project is designed to evaluate and improve patient re-admission rates by providing methodologies for identifying patients prone to high re-admissibility, and solutions for reducing the factors that lead to their re-admission following in-patient treatment. Hospital readmission is defined as a hospital admission that occurs within a specified time frame (usually 30 days) after discharge from the previous admission. Notably, excessive hospital readmission contributes a significant cost into America's healthcare system. Reducing hospital readmission rates is one of the top priorities for the US healthcare industry and VHA. Identifying Veterans at high risk of hospital readmission, and doing so as early as possible during hospitalization, allows for targeted discharge planning and interventions, which results in reduced readmissions.

The Readmission Causal Analysis and Resolution Toolkit is a set of support tools that allows healthcare professionals to identify readmission of at-risk patients and the significant contributing factors associated with readmissions. Healthcare administrators and providers can then implement targeted interventions for at-risk patients and mitigate possible readmission events.

A literature search revealed that most readmissions are caused by a relatively small number of patients with high or medium readmission risks. Significant variation exists in readmission risks among different doctors and treatment units. If a more focused approach on high/medium risk patients and a focused process improvement for readmission-prone doctors/treatment units is pursued, then a reduction in hospital readmission rate is achievable.

Project Objectives

This web-based toolkit can guide healthcare professionals to obtain a dataset from VA's Decision Support System (DSS), analyze the data, and:

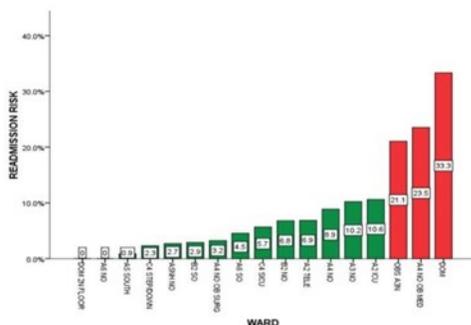
1. Identify the sets of high (>30%) and medium readmission (15-30%) risk patients;
2. Identify the related factors that lead to patients' high readmission (i.e. type of medical diagnosis, type of treatment specialties, etc.); and
3. Identify the list of treatment units and doctors (i.e. wards, primary care provider team, provider, etc.) that have high readmission risk.
4. Based on the above information:
 - a. Design and implement customized discharging/follow up procedures based on patient readmission risk and types of medical diagnosis.
 - b. Design and implement the toolkit to provide an existing template/best practice examples.
 - c. Evaluate the existing processes of treatment units and doctors with high readmission risk and make improvements.

The team, with the help of the Quality Management Department at Detroit VA Medical Center, gathered a large data set relating readmission with 3,109 admission/readmission records relating to 2,449 patients, with 60 selected factors. With this large data set, the team accomplished the following:

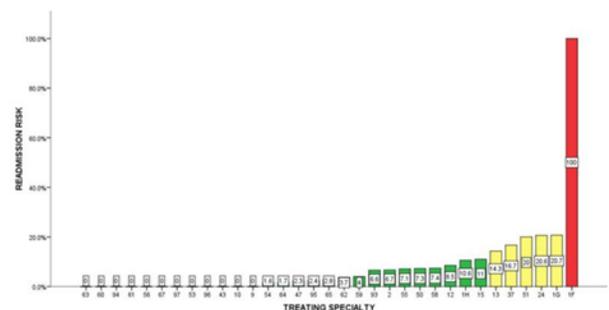
1. Developed a readmission risk prediction model that can predict a patient's readmission risk (probability) with high accuracy;
2. Identified key significant factors that impact the readmission rate (listed in the following figure):

Filed	Significance Level
WARD	0
TREATING SPECIALITY	0
PRINCIPAL DIAGNOSIS	0
SOURCE OF ADMISSION	0.001
DIAGNOSTIC RELATED GROUP (DRG)	0.001
USER ENROLLEE	0.018
PRIMARY WARD PROVIDER	0.018
OBSERVATION PATIENT INDICATOR	0.02
Length of Stay (LOS)	0.02
PRODUCTION DEVISION CODE	0.03
PRIMARY CARE TEAM	0.034
EMPLOYMENT STATUS	0.047
PRIMARY CARE PROVIDER	0.05

Marginal Effect of "Ward" on Patient Readmission Risk



DOM – Mental Health Domiciliary (Offsite) OBS A3N – Acute Medicine (Observation for <24 hours)
 A4 NO OB MED – Acute Medicine (Observation for <24 hours)

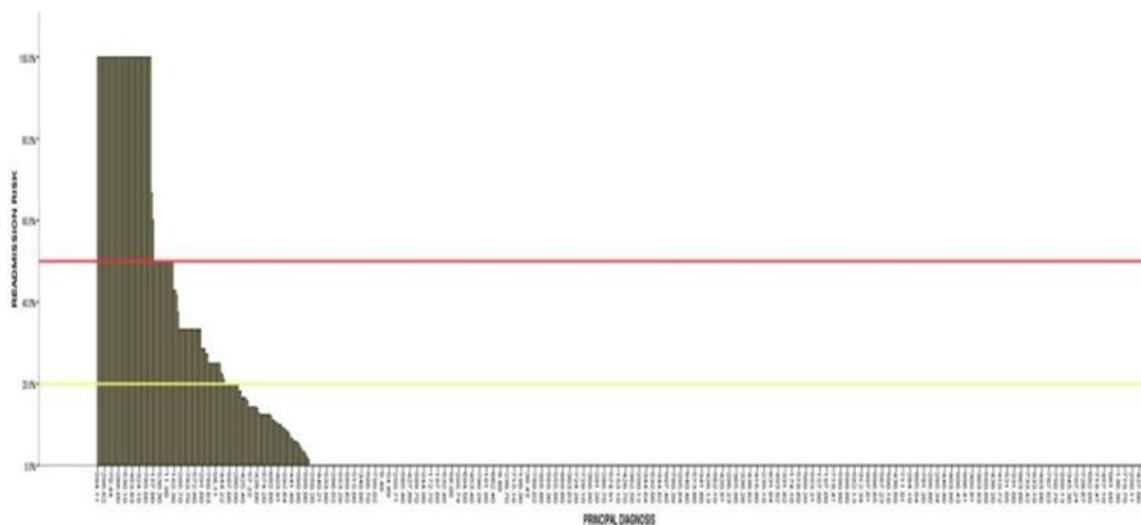


13 – Cardiac Intensive Care Unit
 37 – Domiciliary CHV
 51 – OB/GYN
 24 – Medicine

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These factors were partitioned into two categories:

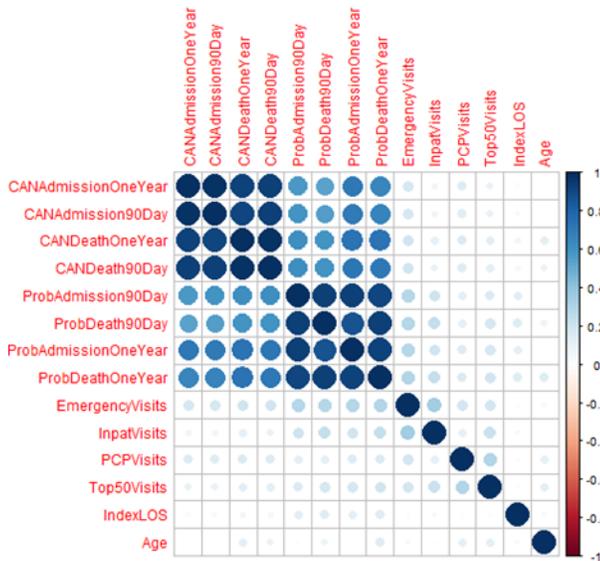
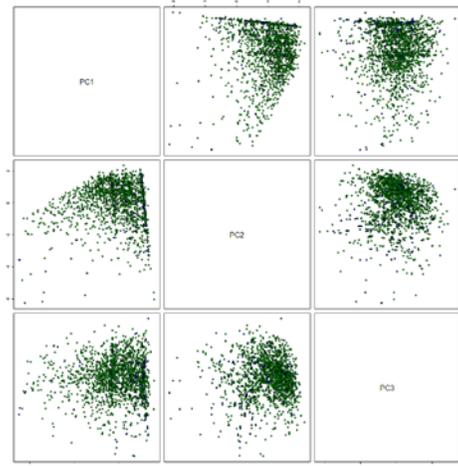
1. Provider/Treatment Unit-Related Factors (Readmission risk is high for these units/providers): WARD, TREATING SPECIALITY, PRIMARY WARD PROVIDER, PRODUCTION DEVISION CODE, PRIMARY CARE TEAM, PRIMARY CARE PROVIDER
2. Patient Specific Factors: PRINCIPAL DIAGNOSIS, DIAGNOSTIC RELATED GROUP (DRG), OBSERVATION PATIENT INDICATOR, LENGTH OF STAY (LOS), EMPLOYMENT STATUS
 - a. Dementia in conditions classified elsewhere with Behavioral disturbance
 - b. Leiomyoma of uterus
 - c. Dysphasia causing late effects in cerebrovascular disease
 - d. Hypovolemia
 - e. Anemia, Hemolytic, Acquired
 - f. Bipolar I Disorder, most Recent episode (or current) mixed, Moderate
 - g. Anemia of other Chronic Disease
 - h. Infection and inflammatory reaction due to internal joint prosthesis
 - i. Mechanical complication due to other implant and/or internal device



Project Results

Data: Data from the VA Corporate Data Warehouse (CDW) was used to construct a cohort of patients admitted to the John D. Dingell VA Medical Center (Detroit) during Fiscal Year 2013. Variables associated with these admissions were gathered into four broad categories: demographics, social support, health condition and utilization. The scripts used to extract the data from the warehouse databases were specific to the Detroit facility, due to the naming of the acute ward locations that are unique to any particular facility; however, these scripts are easily adaptable to allow extraction from any VA facility. Many derived covariates (e.g., number of primary care visits in year prior to admission) were designed and calculated.

Model Pre-processing: The model design was driven by predictive ability. To maximize the predictive capability, a number of pre-processing techniques were employed. Examples of these transformation results are shown in the figures below.

Correlation Matrix of Numeric Variables

Scatterplot Matrix of 3 Principal Components


Future Plans

A number of models are under construction in FY14. Using only the numeric variables in a random forest classification model, the data was trained and tested to show an AUC value of .742. This is at the upper end of accuracy compared to other readmission prediction models given in the literature, and the team is confident that best-in-class predictions are achievable once other covariates are introduced and specific tuning is applied to modeling methods.

Emergency Department Inpatient Flow Management

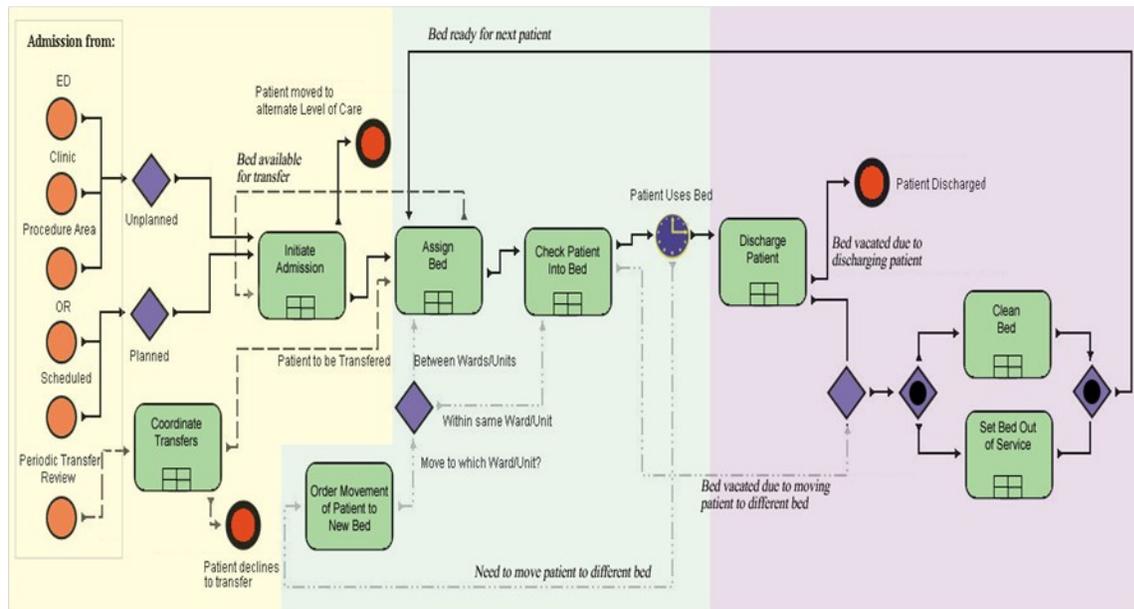
Project Overview

An integral part of VHA defining healthcare delivery excellence in the 21st century for patient satisfaction and managing costs is “Access to VA Care,” which is achievable through improved patient flow. One of the critical factors contributing to patient flow in the Emergency Department (ED) is the availability of inpatient beds. Currently, VHA uses the Bed Management System (BMS), which originated from the Flow Improvement Inpatient Initiative (FIX) redesign efforts at local facilities and began to roll out in 2010 under the Enhance Veteran Experience and Access to Healthcare (EVEAH) Initiative.

Currently, the availability for beds for ED patients is usually subject to asymmetric information, and the transfer of a patient from the ED to the wards is a prolonged process subject to delays. The causes of ED delays are usually partitioned into 3 interdependent components in the literature: input, throughput, and output. A number of studies from several medical hospitals have reported that output factors, such as inability to transfer emergency patients to inpatient beds in a timely fashion, are the main causes of ED crowding and delays. If the hospital admissions of ED

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patients are predictable early and communicated to different departments of a hospital, then staff can take preemptive steps to reduce transfer delays. This project aims to improve the patient flow in the ED through near real-time forecasting of unplanned admissions. For this objective, the project will leverage models developed for estimating the likelihood of ER patient's admission, and models for estimating the target inpatient ward of those admitted, as well as the time when these patients need the ward beds (as depicted in the figure below).



The current BMS streamlines and accelerates the exchange of information between the many players involved (Clinical Nurse Managers, Off-Tour Supervisors, Ward Administration, EMS) for improved bed turnaround time, reduced waiting times and other factors. This system, however, lacks the ability to accurately estimate the discharge times for patients occupying the beds and for unplanned admissions (from ED, Clinics, OR, etc.). These estimations need updating on a continuous and dynamic basis, throughout the day, as any new information becomes available in VistA and BMS, based on pre-operative factors (e.g., gender, age, diagnosis); updates to intra-operative factors (e.g., type of surgery, length of surgery, type of anesthesia); and post-operative factors (e.g., nausea/vomiting, pain, lack of escort).

The proposed forecasting tools will 1) provide forecast information regarding discharge times for individual patients and 2) aggregate predictions (by ward/unit). As for demand, the forecasts will contain both historical predictions with confidence bands over a time axis (e.g., hourly, daily, and weekly horizons), as well as dynamic predictions with confidence intervals based on the most current information.

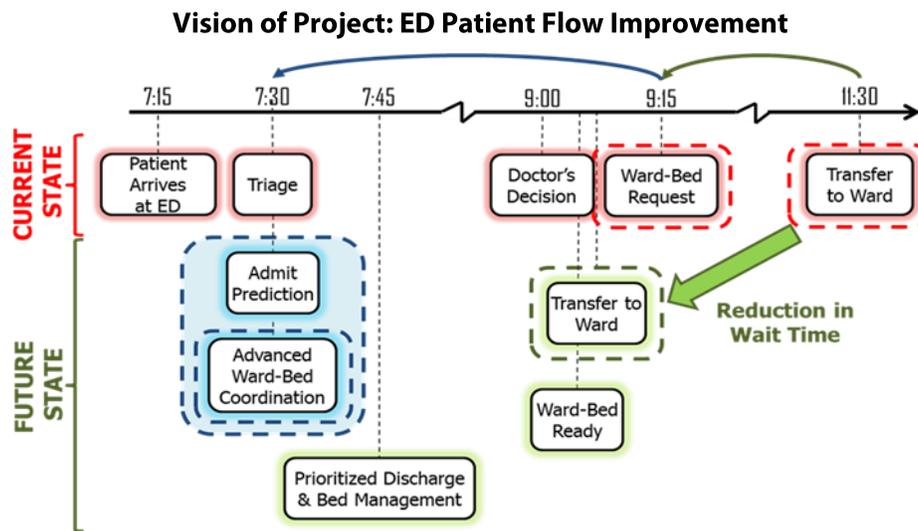
Project Objectives

The vision of this project is outlined in the figures below. Currently, a patient entering an ED is examined for anything needing immediate attention first, and is then seen by a nurse in triage, where basic information and tests are performed and the patient is assigned a priority level. The patient then waits for an ED doctor, and bed requests and preparation to receive the patient are delayed until the admission decision by the doctor is certain. If the early

prediction of hospital admissions is possible when the patient enters the ED, then the staff can pass the information to the inpatient departments, where staff can begin the preparation early, thus reducing transfer delays.

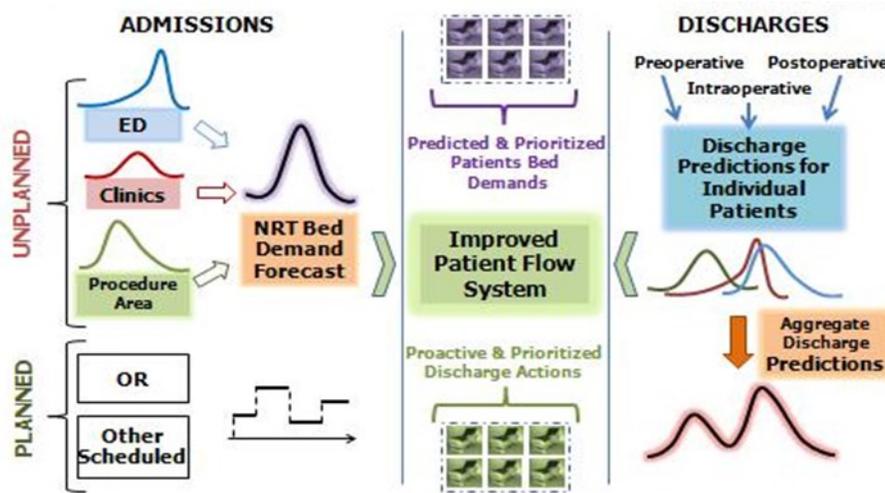
Specific aims include:

1. Forecast Admission probability, identifying target inpatient ward and estimating ED length of stay (LOS) during triage for individual patients.
2. Construct bed demand profiles by aggregating the predicted information for individual patients.
3. Develop an advanced bed preparation coordinating policy to improve ED patient flow.
4. Investigate the role of RFID technology to improve patient flow.



Modeling & Decision-Support Models Allow Proactive Planning

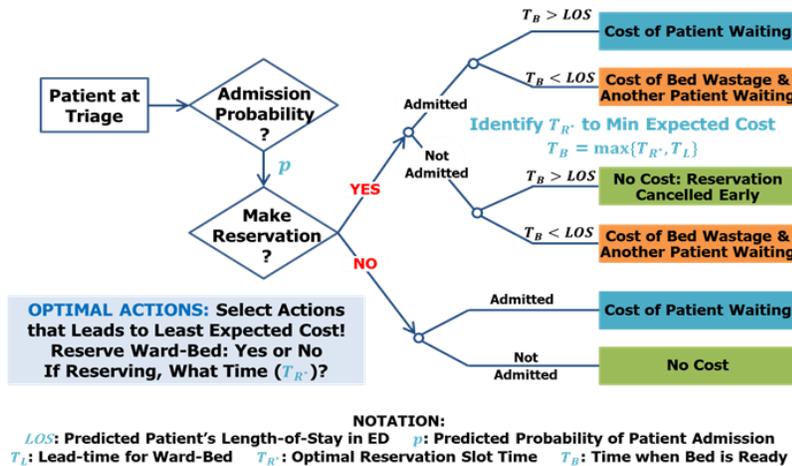
Overall System View



Project Results

1. Cost-Sensitive Inpatient Bed Reservation Framework: A cost-sensitive ward-bed reservation model (depicted below) was developed to initiate coordination during ED triage, reducing patient waiting times and improving patient flow. Relying on the prediction of the patient ED length of stay (LOS) and the admission probability, the model determines whether or not to make the reservation for a bed, the bed reservation time, and the target ward. The model is cost sensitive in that it accounts for costs associated with patient admission prediction misclassification as well as incorrect selection of the reservation time.

Illustration of Cost Sensitive Inpatient Bed Reservation Model



2. Multi-Class Classification Model: A multi-class classification model with a probabilistic output was developed to predict the ED patient disposition or admission to ward. The model was tested using 4,500 patient records from July 25, 2011 to September 21, 2011 from the EDIS system (an ED management system) of Indianapolis, VAMC, and 91.3% accuracy was reached. The model also allows users to adjust the threshold, which indicates the confidence of the classifier in classifying a patient to a specific class. The accuracy of the model with different levels of thresholds was investigated as displayed in the table below.

Multiclass Results with Different Threshold: Multi-class Relevance Vector Machine

Prob. Threshold:	0.2	0.4	0.6	0.8	0.9
Base Volume:	1788	1788	1740	1634	1569
Correct Predictions:	1633	1633	1604	1535	1488
Accuracy:	91.3%	91.3%	92.2%	93.9%	94.8%
Home Volume:	1553	1553	1517	1476	1439
Correct Predictions:	1457	1457	1435	1409	1381
Accuracy:	93.8%	93.8%	94.6%	95.5%	96.0%
Medicine Volume:	221	221	211	153	126
Correct Predictions:	167	167	161	123	105
Accuracy:	75.6%	75.6%	76.3%	80.4%	83.3%
Surgery Volume:	6	6	5	4	3
Correct Predictions:	4	4	3	2	1
Accuracy:	66.7%	66.7%	60.0%	50.0%	33.3%
Psychiatry Volume:	8	8	7	1	1
Correct Predictions:	5	5	5	1	1
Accuracy:	62.5%	62.5%	71.4%	100.0%	100.0%

3. **Hazard Rate Models:** Two types of hazard rate models, namely, semi-parametric proportional hazard (Cox PH) models and parametric hazard rate models (using a Weibull distribution), were developed to estimate ED LOS in the historical data that was pulled from EDIS and CPRS. The historical data of approximately 29,666 patient records from July 25, 2011 to September 30, 2012 of Indianapolis, VAMC were analyzed. The information for the following individual factors (covariates) were used and analyzed: patient demographic information, patient acuity level, the crowding level in ED upon the patient's arrival, patient triage vitals (Pulse, Temperature, Respiration), and information regarding ED-related lab and imaging tests. The imaging/lab covariates include 210 imaging items and 373 lab items. The basic statistics of the ED LOS for patients taking different ordered items (or no item) are summarized in the following table.

The Ordered Items with Top 10 Frequencies and ED LOS (In Min.) of Corresponding Patients

Ordered Item	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	frequency
No Order	0.2	50.93	84.87	109.6	138.2	3816	12164
CBC/5	15.93	185.8	260	325.8	368.9	2155	11569
COMPREHENSIVE METABOLIC PANEL	15.93	191.1	265.7	329.4	376.1	2013	10015
TROPONIN-POC	15.93	171.1	243.7	330.9	370.5	2046	8329
PT W/INR -TOP	15.93	189	267.3	342.5	387.9	2155	5760
MAGNESIUM	15.93	190	271.9	356	401.2	2046	4871
PTT -TOP	15.93	186.5	265.8	340.2	387.1	2155	4501
BLOOD CULTURE	47.08	208.7	279.9	332.8	384.4	1677	3987
CHEST 2 VIEWS PA,LAT	16.33	156.7	225	279.3	328.2	1697	3670
URINALYSIS (REFLEX MICROSCOPIC)	29.57	186.8	262.7	300.5	360	1619	3646

109 out of 591 of the covariates were identified as statistically significant by the parametric hazard model. The Cox PH identified similar covariates as statistically significant. The twelve ordered items with the highest coefficient are summarized in the following table.

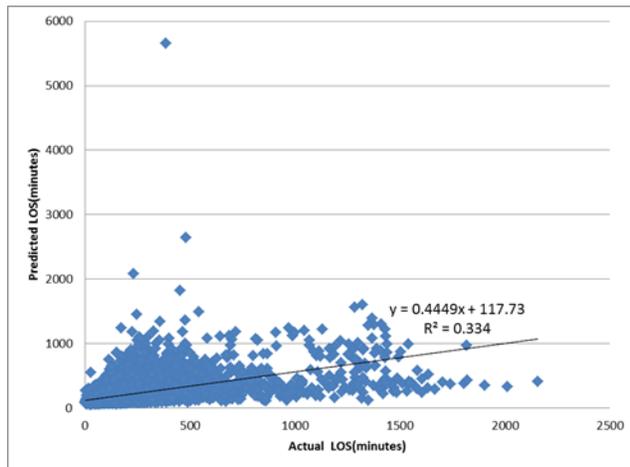
Twelve Ordered Items with Highest Coefficients

Ordered Items	Coefficient	P-value
MRSA SURVL NARES AGAR DISCHARGE	0.99749	9.65E-13
LEGIONELLA ANTIGEN	0.97863	0.000322
VOLATILE SCREEN	0.94045	1.50E-07
MRI LOWER EXTREMITY ANY JOINT	0.74876	0.000458
CT UPPER EXT.W/O CONTRAST	0.72561	7.56E-08
MYOVIEW REST/STRESS	0.70999	3.67E-55
NECK SOFT TISSUE	0.68759	3.67E-08
MRI ABDOMEN W & W/O CONTRAST	0.6518	0.0163
CT UROGRAPHY (PARENT)	0.63893	0.00158
HEPATITIS B SURFACE ANTIGEN	0.63758	0.0774
US ART INFLOW AND VENOUS OUTFLOW LIMITED	0.5158	1.33E-08
MRI CERVICAL SPINE W/O CONTRAST	0.49974	0.000147

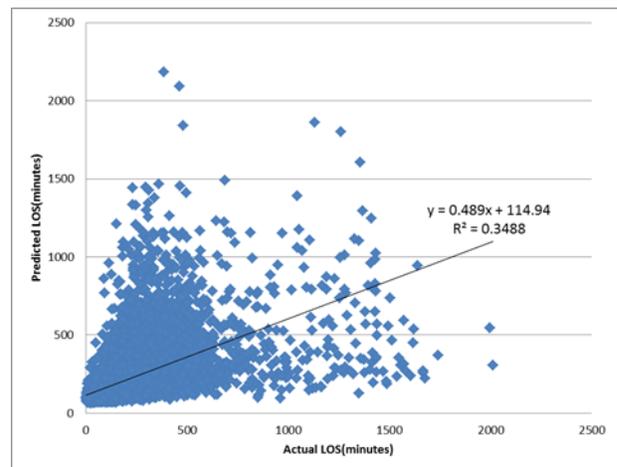
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Goodness-of-fit were checked by scatter plotting the predicted LOS against LOS and linear fitting. The R^2 of parametric hazard model and Cox PH model are 0.334 and 0.3488, respectively.

Scatter plot of predicted LOS against actual LOS



Parametric Hazard Model



COX PH Model

Access Supply/Demand Alignment Toolkit

Project Overview

With the increasing need for a better alignment of supply and demand at VA healthcare facilities, an Excel-based performance evaluation tool was developed around 2008. Input is from information histories in the form of supply slots from providers, demand, no-show data, patient delay data, and case load data to output a variety of performance plots. The tool was easy to use and focused the assessment on providers. However, the tool also required manual collection of information and input of information. Since that time, the functionality was moved to an on-line website, Clinic Access Index (CAI) portal that allows different facilities, clinics, providers, and administrators to monitor the performance of the facilities and their operations across the VA network of hospitals.

This project aims to extend the functionality of the portal in order to 1) learn relational patterns that explain access performance and 2) develop processes and tools to identify recommendations, with some written analysis for individual clinics that can jointly improve access performance while achieving cost efficiency. The project scope is currently limited to Primary Care clinics. Overall, these efforts will lead to effective recommendations to clinics that will yield significant improvements in clinic performance.

The patterns will not only establish correlations between clinic scheduling practices (such as length of slots and provider panel size) and access performance, but also allow investigation of the impact on other performance metric categories, such as quality of care, staff satisfaction, and efficiency. To improve the quality of the project outcomes, the team will exploit data sources outside the VA CAI portal (e.g., health outcome data as well as data regarding the clinic facilities, such as staffing levels, number of consulting rooms, etc.). The tools and sensitivity analysis methods/ outputs will interface with CAI portal integration, ease of use, and modification.

Once the clinics broadly adopt these tools and the resulting recommendations, the team will assess opportunities for developing tools and methods that provide more dynamic recommendations to aid operational planning decisions, such as staff resource planning, appointment (re-)scheduling, and equipment/capacity planning.

Project Objectives

The principle focus of the project is to extend the functionality of the Clinic Access Index (CAI) Portal so that the Access and Clinic Administration Program (ACA-P) can continually mine and analyze the data from thousands of clinics—especially at facilities that are low performers—for ‘early warning’ that their performance metrics are deteriorating so as to engage them early and prevent further decline. In this regard, the following are the objectives for improving performance of Primary Care clinics:

1. Develop and validate statistical models and methods for learning relational patterns that explain various performance outcomes (e.g., access) with confidence limits.
2. Identify essential data elements that will enable the development of models with greater degrees of explanatory power, and make recommendations for their collection.
3. Develop methods for individual clinics to jointly improve access performance while achieving cost efficiency through increased utilization.

The final project deliverable is a comprehensive toolkit that not only improves past performance monitoring and reporting via the VA CAI portal, but also provides tools for effective and proactive management of staffing and other resources for improved alignment of supply and demand.

Project Results

The major effort of the project team was collecting and processing raw data; preliminary identification of the relationships between utilization, access, and other factors affecting facilities, clinics, and providers; visualization of key tradeoffs and correlations through graphical analysis; and development of early stage statistical models through simultaneous equation statistical modeling. These efforts resulted in:

1. Selecting the appropriate statistical modeling approaches given the availability of the data, covariates, relationships between covariates and related assumptions.
2. Identifying further data needs in terms of both data resolution and additional covariates.
3. Identifying and classifying those subsets of facilities, clinics, and providers that are superior performers, under-performers, and outliers.

Future Plans

For FY14, the initial focus is on facility-level data analysis and observations. This is followed with clinic-level data analysis and preliminary observations.

Professional Development Program

The Professional Development Program focuses on education and dissemination of Lean in all venues related to OSE disciplines and methods. The program is a national VA leader in developing Lean curriculum, certifying Lean Managements Systems, and facilitating Improvement events. Professional Development works closely with stations, VISNs, and CO departments and staff members to provide a bridge for integrating Lean and fostering incorporated improvement capacity.

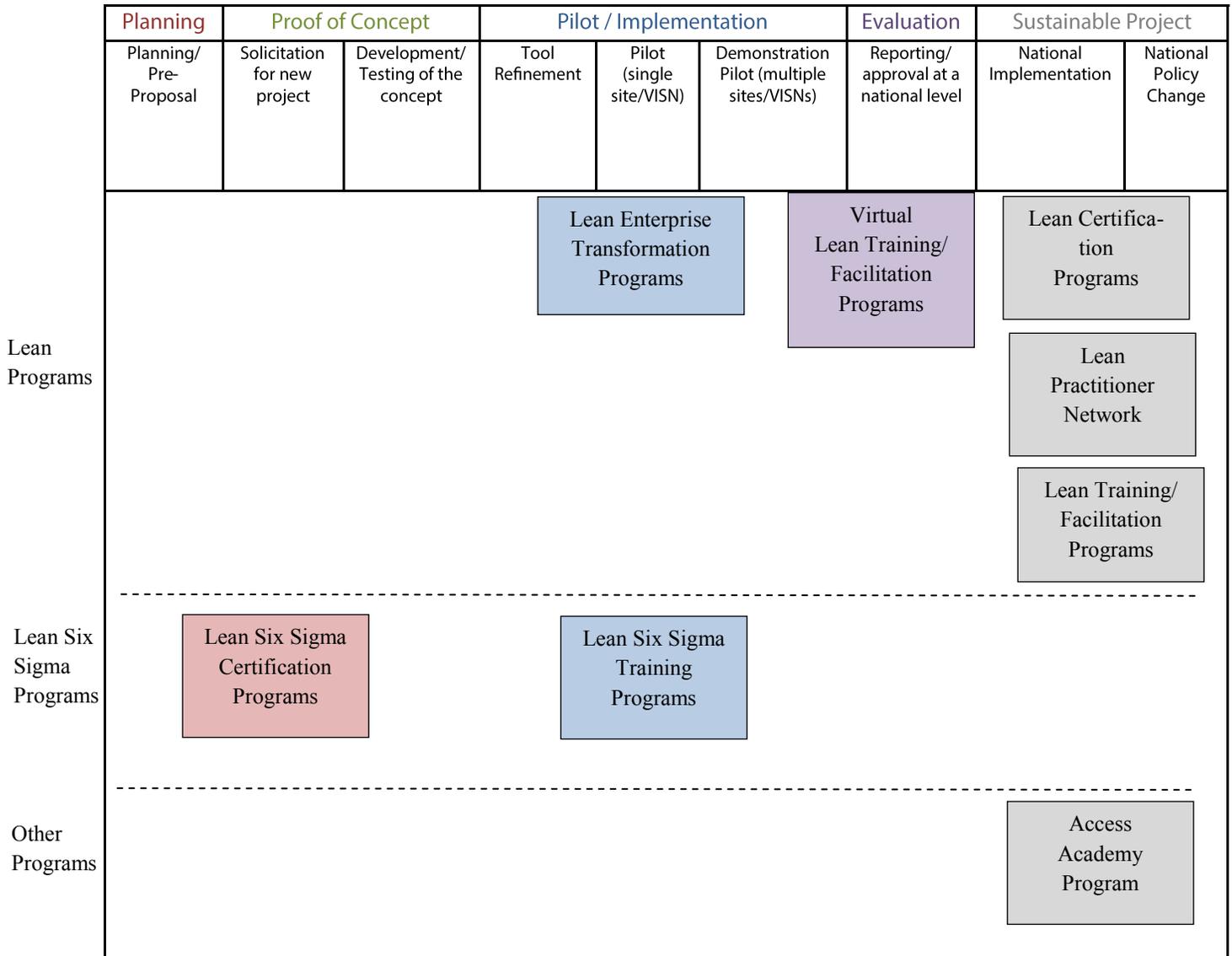
In FY13, Professional Development has successfully lead and participated in work at the National, VISN, Station, and Enterprise levels. The breadth of our work includes:

- Lean Belt Training (Yellow, Green and Black);
 - CPAC (Consolidated Patient Accounts Center) support for the development of internal capacity, including facilitation for Lean Six Sigma Black Belt training;
 - Deployment of a Lean Management System in 6 Pilot Stations;
 - Access Academy support;
 - Coordination of a Lean Certification program;
 - Facilitation of Value Stream Analysis (VSA), TPOC's Transformational Plan of Care (Strategic Deployment Plan at an Enterprise level);
 - DEEDS Initiative for a Qualitative and Quantitative assessment of the deployment of the Lean Management System (LMS);
 - Initiation of a series of Virtual Rapid Improvements (RPIEs) in partnership with the National Systems Redesign Office;
 - Specialty Care Transformation (SCT) to support facilitators in growing internal capacity; and
 - Development of a Lean Social Media group in VA YAMMER to enhance communication and sharing of Lean methods.

Our staff's profound experience, skills, and assets align well with our customer's needs. Our major focus for the coming year is the growth of a national consultative service. Our primary challenge is maintaining high quality standards while balancing rapid growth in areas that play a strategic role in VA performance. To this end, we are committed to developing an internal management system that focuses on supporting staff and clients while fostering innovation, development and quality outcomes. Looking forward, next year we will develop enhancements to our certification program and continue a controlled expansion of our Lean Management System pilot. We will continue to support the CPAC group as they work to increase their internal capacity for Lean improvement work.

Drawing on expert staff with many years of Lean management and leadership experience, the Professional Development Program consistently delivers high quality educational venues that meet the specific needs of our wide variety of customers. The strength of our skilled faculty lies in their ability to make adjustments to program content and meet program deliverables. Evaluation assessments consistently confirm that our faculty maintain a high level of performance. Our evaluation measurements—where our faculty score >4 on scales of 1-5—ensure our customers' satisfaction. Our unwavering focus is on providing our partners (CO, VISNs Stations, CPACs, and others) with methods to improve the quality of care delivered to our Veterans.

VA-CASE Professional Development Program Project Pipeline



VA-CASE Professional Development Program Project Summaries

Lean Training Education

Project Overview

Modeling the behavior of Continuous Quality Improvement (CQI), VA-CASE Professional Development Program continues to develop and provide VA staff with the knowledge, skills, and support to implement and sustain successful Lean Healthcare projects within VHA healthcare facilities. Our formal training sessions incorporate both didactic and hands-on learning experiences in Lean Healthcare methods and techniques. These courses are complemented by a VHA Lean Healthcare Community of Practice established specifically to support the ongoing implementation of SR/Lean projects within the VA.

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Project Objectives

- Provide training and educational programs to develop, evaluate, and spread OSE-based, just-in-time (JIT) Lean training programs for Leadership, management, front line clinical staff, and administrative staff.
- Build interdisciplinary teams composed of facility systems redesign and VA clinical administration staff who, with faculty from affiliated academic institutions, build and test novel methods for JIT instruction of OSE methods and tools within the context of the current VISN11 and National Systems Redesign improvement frameworks.

Program Results

The VA-CASE/Purdue Lean Training, Education, and Certification Programs were developed at the Yellow Belt (Practitioner), Green Belt (Facilitator), Black Belt (Program Manager), and Senior Executive (SEE) levels. VA-CASE has also added courses on Leading Organizational Improvement, Return on Investment (ROI) Analysis, Virtual Rapid Performance Improvement Events (RIE), and A3 thinking.

Project Impact

Since the inception of VA-CASE Lean Training in 2009, our scheduled training and Lean Management System have touched more than 6% of all VHA staff directly. Our philosophy has always been collaboration, integration at all levels, and building capacity within our customers' organizations. We can see a reflection of that philosophy in the decreased number of our introductory Yellow Belt sessions, which are now often facilitated internally by many of our previous customers. Accordingly, we have recently rolled out the next generation of Yellow Belt training. This new product is focused on A3 thinking, creating problem solving capacity in all staff at every level. We anticipate that our new Yellow Belt training will be recognized as cutting edge in the field.

FY13 and Total Number of Lean Training Events FY09-13				
Lean Training/Co-Facilitation	FY13 Only		FY09-13	
	# of Sessions	# of Trainees/Participants	# of Sessions	# of Trainees/Participants
Yellow Belt	42	1680	156	6240
Green Belt	43	1720	95	3800
Black Belt	28	420	77	1020
Senior Executive Experience (SEE)	1	25	34	735
Rapid Process Improvement Workshops (RPIWs)	29	390	92	1405
Leading Organizational Improvement Workshops (LOI)	10	765	31	1660
Return on Investment Analysis (ROI)	9	360	13	520
Value Stream Analysis	5	60	7	90
Lean Six Sigma Black Belt (5-sessions each)	4	140	5	180
LMS Coaching/Mentoring Site Visits	60	1200	60	1200
Total Lean Training/Co-Facilitation FY09-Present	231	6760	570	16850

Future Plans

FY2013 brought the development of new course offerings. Deanna Suskovich developed a Rapid Improvement Event (RIE) workshop that was presented 2 times in FY2013. George Ponte was detailed to QSV Systems Redesign. He

introduced Lean A3 Thinking and developed an ongoing virtual VSA to the Leadership Advisory Group (LAG). George Ponte is leading a group in developing White Belt Training for the VA. This will be a Talent Management System (TMS) product.

RPIE Training/Co-Facilitation Program

Project Overview

RPIE workshops are a project-based approach to providing rapid application of the VA-TAMMCS model over a period of ninety days. Planning is typically six weeks prior to the RPIW workshop. The planning is done by a Management Guidance Team, which is composed of a Senior Leadership sponsor, Service Chiefs, and middle managers from the targeted area of improvement. A Rapid Process Improvement Workshop (RPIW) Facilitator or Coach is also typically involved. The RPIW workshop lasts five days, or 40 hours of dedicated front-line team work. Following this RPIW week, the front-line process improvement team continues to implement identified improvements, working through the pilot implementation plan for a 90 day period. At 90 days post-RPIW, the front-line process improvement team presents the final RPIW team results as well as a transition plan for additionally identified items.

This project has transformed the traditional, face-to-face methodology and delivered in a series of virtual sessions that utilize the same essential elements and deliver them in multiple sessions using virtual technology. The focus of this work has expanded to include a variety of Improvement projects in addition to RPIWS.

Project Objectives

- Develop an understanding of techniques used to facilitate systems redesign efforts within clinical micro-systems.
- Understand how RPIEs are can overcome barriers to creating a culture of continuous improvement.
- Facilitate RPIEs within participants' own facilities.
- Teach other VA employees basic systems redesign concepts and tools.

Project Results

There have been two sessions of the RPIE involving approximately 40 participants per session (80 participants total). This project has reduced travel costs by replacing a twice yearly workshop that required 40 staff to travel to a central location in order to participate. The project is currently under evaluation, assessing the outcomes of individual projects.

Consolidated Patient Accounting Center (CPAC)

VA-CASE has contracted with the Consolidated Patient Accounting Center (CPAC) to provide Lean education to employees and staff within six CPAC sites. The sites are North Central CPAC in Middleton, Wisconsin; Mid-Atlantic CPAC in Ashville, North Carolina; Florida Central CPAC in Orlando, Florida; West CPAC in Las Vegas, Nevada; Central Plains CPAC in Leavenworth, Kansas; and Mid-South CPAC in Smyrna, Tennessee. Each of the six CPAC sites participated in Yellow Belt, Green Belt, Black Belt and Return on Investment (ROI) courses. Rapid Process Improvement Workshops were also scheduled for each site. In addition to these training sessions, VA-CASE provided support and mentoring on Lean projects and follow-up on RPIWs and facilitated events.

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Project Objectives

VA-CASE provides CPAC employees and staff with:

- Lean training, mentoring and certification
- Facilitation/training/coaching in highly effective Lean methods through customized Yellow Belt, Green Belt and Black Belt courses

Project Impact

Our mutual goal of creating capacity within the CPAC organizations has resulted in multiple successful improvement projects (see figure below). The CPAC business processes create an opportunity for Lean Six Sigma training and subsequent projects, while the DMAIC framework lends itself well to improvement in business processes. Our partnership has been extremely successful.

Consolidated Patient Accounting Center (CPAC) Training Class Sessions						
	FY13		FY12		Total FY12-FY13	
	# of Sessions	# of Participants	# of Sessions	# of Participants	# of Sessions	# of Participants
Yellow Belt	17	680	4	160	21	840
Green Belt	17	680	3	120	20	800
Black Belt	10	150	0	0	10	150
Rapid Process Improvement Workshops (RPIWs)	14	210	2	30	16	240
Senior Executive Experience (SEE)	0	0	2	90	2	90
Return on Investment Analysis (ROI)	7	280	0	0	7	280
Lean Six Sigma Black Belt (5-sessions each)	3	120	0	0	16	120
Total CPAC Lean Training	68	2120	11	400	92	2520

We have provided multiple training events delivered Lean Six Sigma LSS (DMAIC) model to our CPAC partners. As with all our work our focus is collaboration, integration and building internal capacity. We have had many successful projects emanating from our training. Our skilled LSS staff provides coaching for individuals within each session.

Future Plans

The success of our program led to a request for additional course development. In FY14, the CPAC group will receive requested courses in Facilitation and Lean Management.

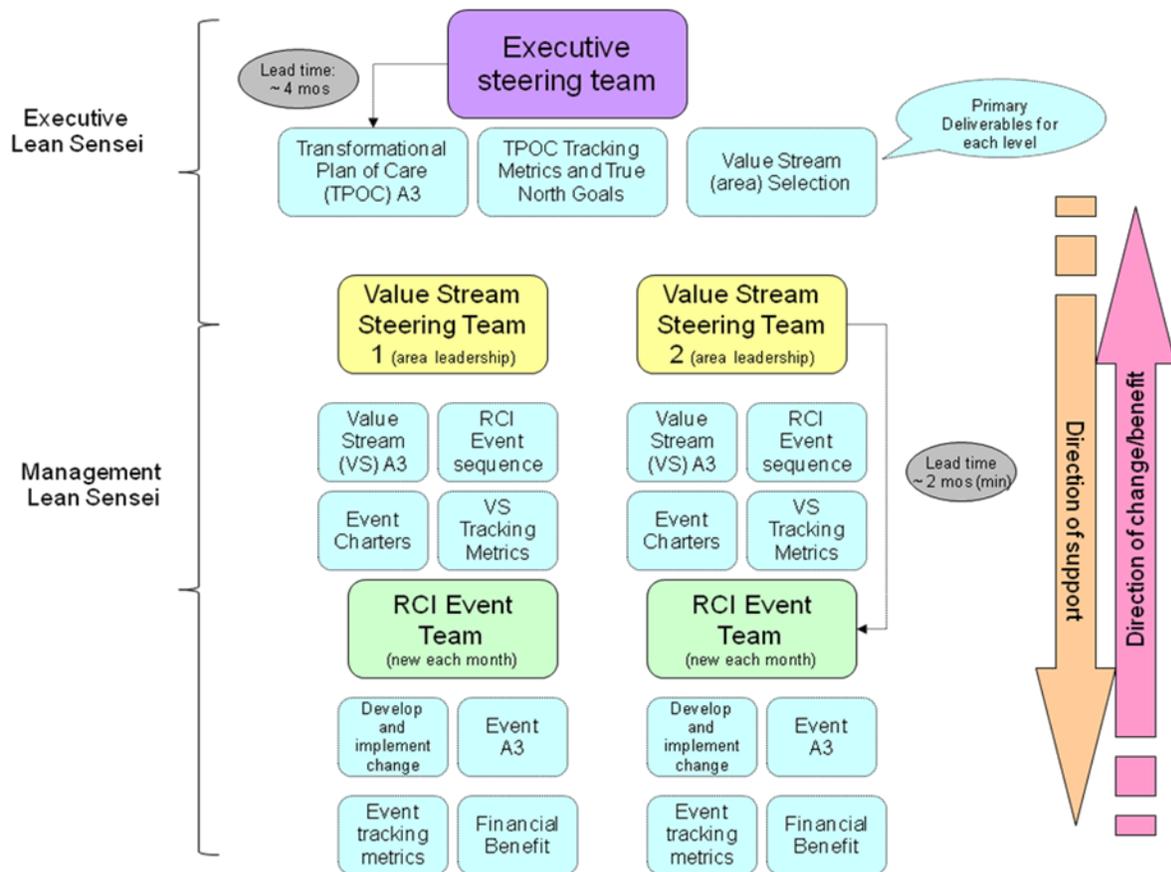
Lean Management System (LMS) Pilot Program

Project Overview

Over the years, Professional Development has evolved from delivering primarily Lean and Six Sigma-based training to VA Medical Centers (VAMC), VISN offices, and National Program Offices to our current consultative model of delivering more sophisticated Lean and Six Sigma support to these customers. The previous LMS model provided a one-time training event to teach a Lean course, followed by a reflection period wherein our facilitators would step back to see if the facilities could apply their Lean training to a meaningful problem in their organizations. Our new consultative model provides a more persistent presence that encourages stronger working relationships between VA-CASE facilitators and pilot sites. We now assist sites with their application of Lean/Six Sigma principles, and support them as they develop Lean Management Systems within their own organizations.

Project Objectives

Through this new consultative model, our LMS pilot program provides customers with more time in “face-to-face” mode with a VA-CASE faculty member. Customers get to utilize the experience of the VA-CASE faculty to help them with their projects, Rapid Process Improvement Workshops (RPIW), value streams, Continuous Daily Improvement (CDI), and strategic planning activities. Because facilities are provided with coaches/mentors along the way, our new model helps facilities avoid some of the bigger pitfalls or failure modes during their Lean journey. Subsequently, we at VA-CASE are utilizing our skills and resources in a dynamic fashion that works beyond classroom training and allows us to hone, advance, and utilize our faculty’s skillset for more demanding and exciting applications. An outline/summary of the overall Enterprise-level Strategic Deployment Strategy is shown in the figure below



Project Results

2013 marked the end of the first year for the LMS pilot program. The LMS program was initially launched at the Richard L. Roudebush VAMC in Indianapolis in 2012. While Indianapolis had ongoing Lean activities prior to and including the 2012 pilot launch, the program really took off during the 2013 timeframe. As part of their Transformational Plan of Care (TPOC) enterprise-level Lean planning event, Indy launched six value streams (VS) hosting a total of 53 RPIWs (Rapid Process Improvement Workshops) in 2013. They also rolled out 40+ new CDI (Continuous Daily Improvement) Huddle areas and taught six Lean “Belt Training” courses. VA-CASE was there to guide and assist this work.

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Project Impact

Throughout 2013, five additional sites began working with VA-CASE to implement or continue their development of a Lean Management System: Palo Alto, CA; Cincinnati, OH; New Orleans, LA; Erie, PA; and two sites in Chicago, IL (FHCC Lovell and Jesse Brown). The support model for the pilot sites includes one VA-CASE faculty who serves as a sensei/mentor/coach for the executive level staff of the pilot organization and one VA-CASE faculty who serves as a sensei/mentor/coach for the mid-level management, Systems Redesign staff, and front-line staff. The executive level coach is there to help guide the facility leaders in the use of Lean tools for strategic planning, strategy deployment, alignment of Lean activities and resources, and establishment of Lean leader standard work. The mid-level coach supports the roll-out of the program by leading and then coaching Value Stream Analysis (VSA) and RPIWs; builds program capability and capacity by teaching and engaging mid-level managers, Systems Redesign, and front line staff; and as such, demonstrates and recognizes initial program successes.

Evaluation Components	Component Definition	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
# of month of LMS Deployment	Cumulative months since in-depth launch of LMS through end of FY13	23	12	12	12	8	8
# of employees	overall # of employees in the facility (headcount and FTEE)	2293	3936	1300	2080	3000	2100
# of Internal Facilitators	# of staff with 100% assignment to SR or	8	8	5	2	2	1
# of Value Streams Opened	# of newly launched value streams for the FY13 (starting Oct 1st 2012)	6	2	3	3	2	2
# of unique front line staff participating on RPIWs	# of front-line staff (no duplicates) who have participated in an RPIW	314	82	302	33	62	34
# of RPIW/RIEs conducted	# of events that were completed across all Value Streams (exclude miscellaneous RPIW as they will be counted in "spread" below)	53	9	17	4	7	6
# of CDI areas initiated	# of new CDI areas that were launched during FY13 (starting Oct 1st 2012)	48	1	0	14	13	2
# of improvements implemented via CDI	# of improvement slips that were completed by the CDI areas, or tracking of improvement opportunities (log) from all CDI combined	1311	Daily Management System focused on stability; no data available on # of improvements.	No Data	150	No Data	6
# of unit based initiatives (A3s)	# of projects/A3 that are completed outside of the Value stream and CDI areas	2	55	4	0	2	0

Future Plans

While the overall elements of the LMS deployment are the same at each of the pilot sites, the level of implementation for each element and the amount of support provided by VA-CASE sometimes varies. Because of the overall "newness" of this model within the VA, and the variation across each site's adoption of LMS, we are currently studying the similarities and differences in sites' deployments to discover generalizations or conclusions that can be made from this initial launch so that future launches can benefit from these learnings.

Access Academy Program

Project Overview

VA-CASE VERC has partnered with the Office of Systems Redesign (OSR) to develop and present a virtual academy specifically focused on Access. VA-CASE has provided curriculum development, agenda development, project review, and faculty and mentors for the nine-month long program. FY14 will mark the first year of the virtual Access Academy.

Project Objectives

In collaboration with SR, our goal is to develop curriculum and facilitate learning that meets curriculum goals. Upon completion of the course, participants will be able to:

- Demonstrate understanding of Access and office efficiency principles and measurements, including when/how to apply them
- Demonstrate understanding of the VA-TAMMCS framework
- Demonstrate understanding and execution of Improving Access key principles and strategies under the categories of: FOR an appointment, AT an appointment, and BETWEEN appointments
- Demonstrate understanding of the components of Service Agreements and when to utilize them
- Understand the inter-workings of the Patient Care Aligned Team (PACT) and Clinic Access
- Understand the inter-workings of Specialty Care and the role of specialty access venues
- Coach and/or teach Access improvement principles to VHA Medical Center staff, incorporating accelerated and experiential learning techniques
- Serve as the facility outpatient clinical access systems improvement expert

Project Results

The transition from three face-to-face learning sessions to virtual delivery is enhanced by the development of Learning modules for the many aspects of access.

Project Impact

Overall, this project is another important step in improving access to care for our Veteran patients.

Future Plans

In FY14, we will learn from our initial efforts, applying those lessons to the project's future.

Specialty Care Transformation (SCT)

Project Overview

The Professional Development department has partnered with CHPT in developing a plan for the National Specialty Care Transformation (SCT) work. In conjunction with this work, George Ponte facilitated a VSA for the VISN 12 Post Transplant coordination of Care. This high-performing team developed a strategic deployment plan that encompasses all stations in VISN 12. A key element of their plan is to create stand work for processes that are

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involved in the coordination of post-transplant care.

Project Objectives

This project aims to improve potentially unsafe, non patient-centric, inefficient care in a high-risk patient population. This includes: inadequate management of medicines, lack of screening for complications, poor coordination, and inadequate resources. This patient-centric model of care, realized by a common entry point for rapid access to expertise, may improve care quality and safety, including increased provider accountability and responsibility, as well as increased outside lab monitoring. The project will also result in cost savings via reduced redundant lab ordering and reduced travel for patients.

Future Plans

Professional Development will provide facilitators for the multiple RPIWS planned for the next fiscal year.

Certification

Project Overview

VA-CASE launched an internal certification program in June 2012. Yellow Belt certification was quickly followed by Green and Black Belt. The development of the VERC certification was done on the Moodle classroom management system software platform. Our certification at each level requires project participation, completion of a competency-based knowledge assessment, and submission of a project summary document (A3). A summary of certification accumulative totals from June 2012 through October 2012 is listed below:

Lean Training Education/ Certification Program Accumulative Totals, June-October 2012

<i>Certification</i>	<i>Enrolled</i>	<i>Certified Total</i>
<i>YB</i>	<i>809</i>	<i>196</i>
<i>CPAC YB</i>	<i>14</i>	<i>2</i>
<i>GB</i>	<i>351</i>	<i>69</i>
<i>CPAC GB</i>	<i>15</i>	<i>0</i>
<i>BB</i>	<i>105</i>	<i>11</i>
<i>CPAC BB</i>	<i>4</i>	<i>0</i>
<i>Total</i>	<i>1298</i>	<i>278</i>

Lean Certifications at the Yellow Belt, Green Belt, and Black Belt levels are still available through Purdue. Certifications through Purdue also require project participation, completion of a competency-based knowledge assessment, and submission of a project summary document (A3).

Project Objectives

Certification through VA-CASE provides our VA partners with the opportunity to gain individual recognition as Lean participants and leaders. Although we recognize the personal sense of accomplishment for these individuals, we also understand that Lean projects inspire broader implications, like enhanced integration and increased capacity,

for our customer organizations. The primary value for our partners is the completion of multiple quality improvement projects that ultimately impact the care delivered to our Veterans.

Project Impact

Each of our training binders includes a Certification Sheet. Our instruction sheets cover both Purdue and VA-CASE. Our Certification exam is an Open Book exam. We do not expect every single question to be pulled from the book or covered in class, although the majority should be. Our open-book exam model is structured to provide yet another learning opportunity for our partners. We expect students to research and read other content in search of answers.

Our training and certification are intended to be progressive: YB, GB and BB. There are exceptions from this progressive training model, primarily for individuals with extensive Improvement or Lean experience.

Only 4 members of an improvement project may submit the same A3. We encourage independent creation of each A3, but will accept up to 4 similar submissions from the same project. Similar to the open-book exam model, we consider students' construction of the A3 part of the learning experience.

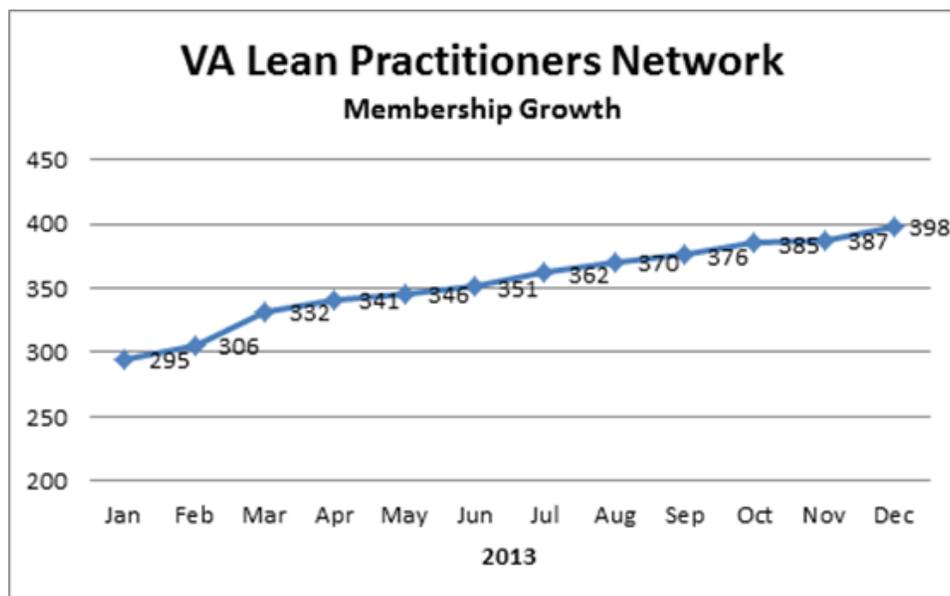
Social Media: VA Lean Practitioners Network (VALPN)

Project Overview

The VA Lean Practitioners Network (VALPN) is a national virtual collaborative for VA practitioners of Lean who are applying this strategy to Systems Redesign and patient-centered care. The network was formed in 2009 to fill a communication gap that existed between VA Systems Redesign staff and others who were attempting to use Lean strategy in our healthcare operations.

Project Impact

Current membership is over three-hundred, and has increased steadily throughout 2013 (see figure below). Monthly conference calls are scheduled to share best practices in the application of Lean thinking. Carlos Garcia, a VA-CASE Staff/Faculty member, is the developer and continues to moderate the network.



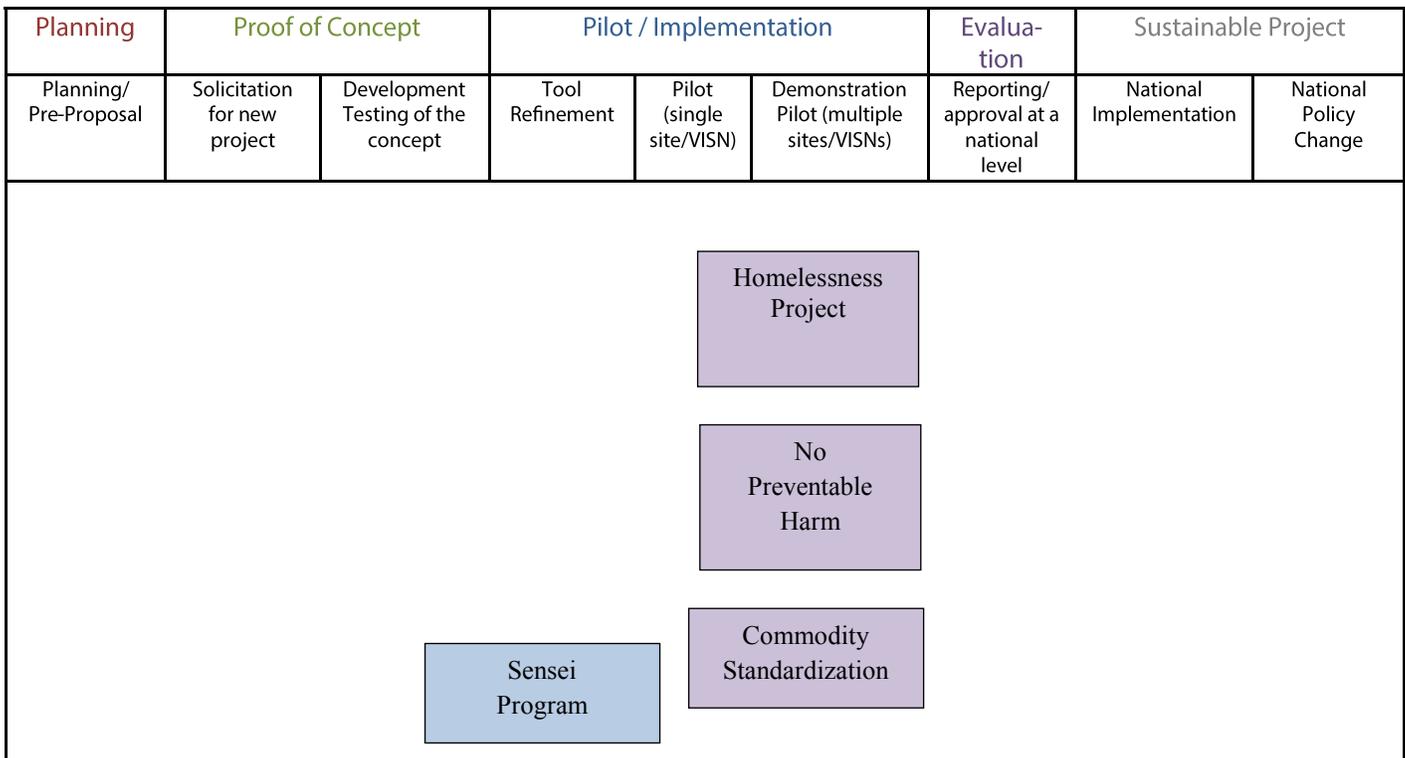
VA-CASE VISN 11 Program

The VISN 11 Program works in partnership with the Veterans Administration Center for Applied Systems Engineering (VA-CASE) to design, develop, pilot and implement improvement initiatives across the VA Veterans in Partnership Healthcare Network (VISN 11). This program integrates Systems Redesign principles and methodology with the expertise of experienced Industrial Engineers to execute improvement initiatives across the Network. In FY 2013, the

VISN 11 Program assisted with four major VISN 11 initiatives for improvement, including:

- Homelessness
- No Harm
- Commodity Standardization
- Lean Sensei Partnerships

VA-CASE VISN 11 Program Project Pipeline



VA-CASE VISN 11 Program Project Summary

Homelessness Project

Project Overview

Michael S. Finegan, former VISN 11 Network Director, served as the National Operational Sponsor of the Department of Veterans Affairs (VA) initiative to eliminate Veterans' homelessness by 2015. In this role, Mr. Finegan provided sustained and progressive leadership contributing to improvements in the organization's ability to carry out the mission of preventing and ending Veteran homelessness. In particular, he provided executive leadership and consultation to Secretary Shinseki, VA Central Office's Homeless Program, and a health care network of eight VA medical centers and 27 outpatient clinics covering more than 90,000 square miles across Illinois, Indiana, Michigan, and Ohio. During his VA tenure, Mr. Finegan has improved financial performance by enhancing internal controls and revenue cycles, which allows VISN 11 to proactively support the five year initiative to end homelessness, as well as encourage innovations in Veteran care.

Project Objective

The U.S. Department of Housing and Urban Development—Veterans Affairs Supportive Housing (HUD/VASH) program plays a critical role in the 5 year plan to end Veteran Homelessness. However, internal and external processes within the VA, HUD, and Public Housing Authorities can create complex interagency barriers to efficiently housing Veterans. In FY11, the average national rate at which an eligible homeless Veteran is able to secure permanent housing through HUD/VASH was 130 days, and the average in VISN 11 was 158.89 days. Similarly, the national and VISN 11 percentage of Veterans admitted to HUD/VASH who meet the criteria of 'chronically homelessness' was 53.75% and 51.62% for FY12, respectively.

The goals of the VISN 11 HUD/VASH Improvement Project were:

- To reduce the time it take to house a Veteran (from HUD/VASH admission to lease) to 75 days or less by the end of FY13, while implementing Housing First philosophy.
- By the end of FY13, 65% of those admitted to HUD/VASH will meet the criteria of chronically homeless.

Project Results/Impact

A VISN-wide systems redesign effort to streamline the HUD/VASH housing process was launched in FY12 & FY13. By the end FY13, the VISN average of days from admission to lease was 67.45 days, surpassing the baseline goal of 75 days. See drill down of project results in the table below:

Facility Drill-Down of Average Days from Admission to Lease

Facility	Target (days)	FY13 (days)
Facility A	75	68.99
Facility B	75	46.23
Facility C	75	48.56
Facility D	75	84.84
Facility E	75	70.62
Facility F	75	68.17
Facility G	75	62.85
VISN	75	67.45

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VISN 11 also exceeded FY13 performance measures of chronically Homelessness to 69.96 %.

Facility Drill-Down of Chronically Homelessness %

Facility	Baseline FY12	Target	FY13
Facility A	62.50%	65%	70.59%
Facility B	69.38%	65%	81.88%
Facility C	56.63%	65%	80.77%
Facility D	34.13%	65%	66.42%
Facility E	53.21%	65%	50.38%
Facility F	45.65%	65%	76.71%
Facility G	30.19%	65%	72.88%
VISN	51.62%	65%	69.96%

No Preventable Harm Campaign

Project Overview

The VISN 11 No Preventable Harm campaign was initiated in FY11 in an effort to improve patient safety, quality, and efficiency, with an overarching goal of eliminating preventable harm events in the Network. This project is comprised of experts from VISN 11 facilities and VHA National Program offices. The groups have partnered together in working toward a hand hygiene initiative and efforts to improve hand hygiene in order to reduce and prevent harmful events associated with hospital-acquired infections.

Project Objective

A main objective of this project was to develop a data collection tool to help track hand hygiene compliance.

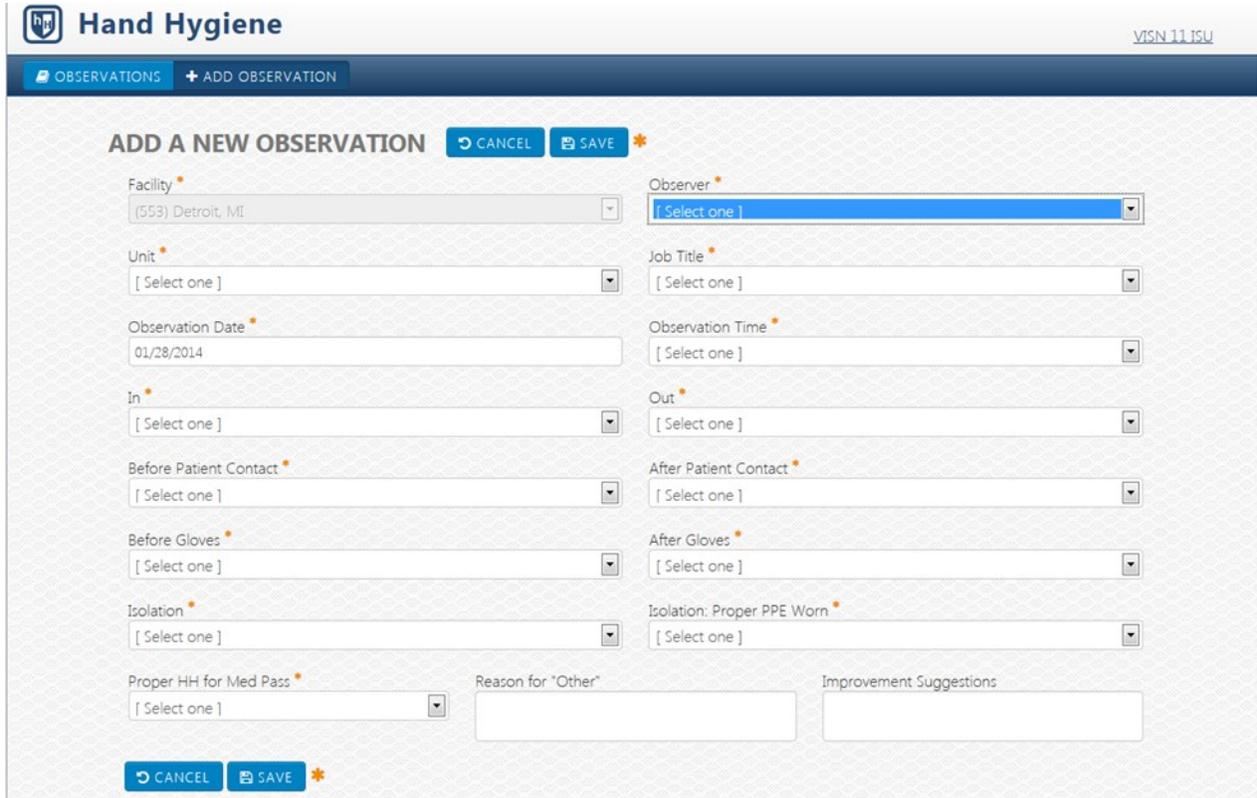
Project Results/Impact

In FY12, a temporary SharePoint data collection tool was built for data collection. At the beginning of FY13, VISN 11 Program and VISN Data Warehouse collaborated to develop an improved version of the tool that can be accessed from both desktop computers and tablet devices. The desktop version was tested with 4 facilities and further enhancements were made based on requests from facilities.

Future Plans

Tablet devices were received at the end of 1st quarter FY14. The teams plans to implement the new tool by the end of 2nd quarter FY14. The figure below illustrates the desktop version of the hand hygiene data collection tool that will be implemented onto tablet devices.

Desktop Version of Hand Hygiene Data Collection Tool



Hand Hygiene VISN 11 ISU

OBSERVATIONS + ADD OBSERVATION

ADD A NEW OBSERVATION CANCEL SAVE

Facility* (553) Detroit, MI

Unit* [Select one]

Observation Date* 01/28/2014

In* [Select one]

Before Patient Contact* [Select one]

Before Gloves* [Select one]

Isolation* [Select one]

Proper HH for Med Pass* [Select one]

Observer* [Select one]

Job Title* [Select one]

Observation Time* [Select one]

Out* [Select one]

After Patient Contact* [Select one]

After Gloves* [Select one]

Isolation: Proper PPE Worn* [Select one]

Reason for "Other"

Improvement Suggestions

CANCEL SAVE

Commodity Standardization

Project Overview

The VISN 11 Commodity Standardization initiative is a long-term project that started in FY12 and was ongoing through FY13 and beyond. The Commodity Standardization group is a model cell of the VISN 11 Standard Work Collaborative. Commodity Standardization group will implement business performance system methodology and lean tools in their program, such as Area Improvement Center, Stat Sheet, Huddle board, Scorecard and Monthly performance reports.

Project Objectives

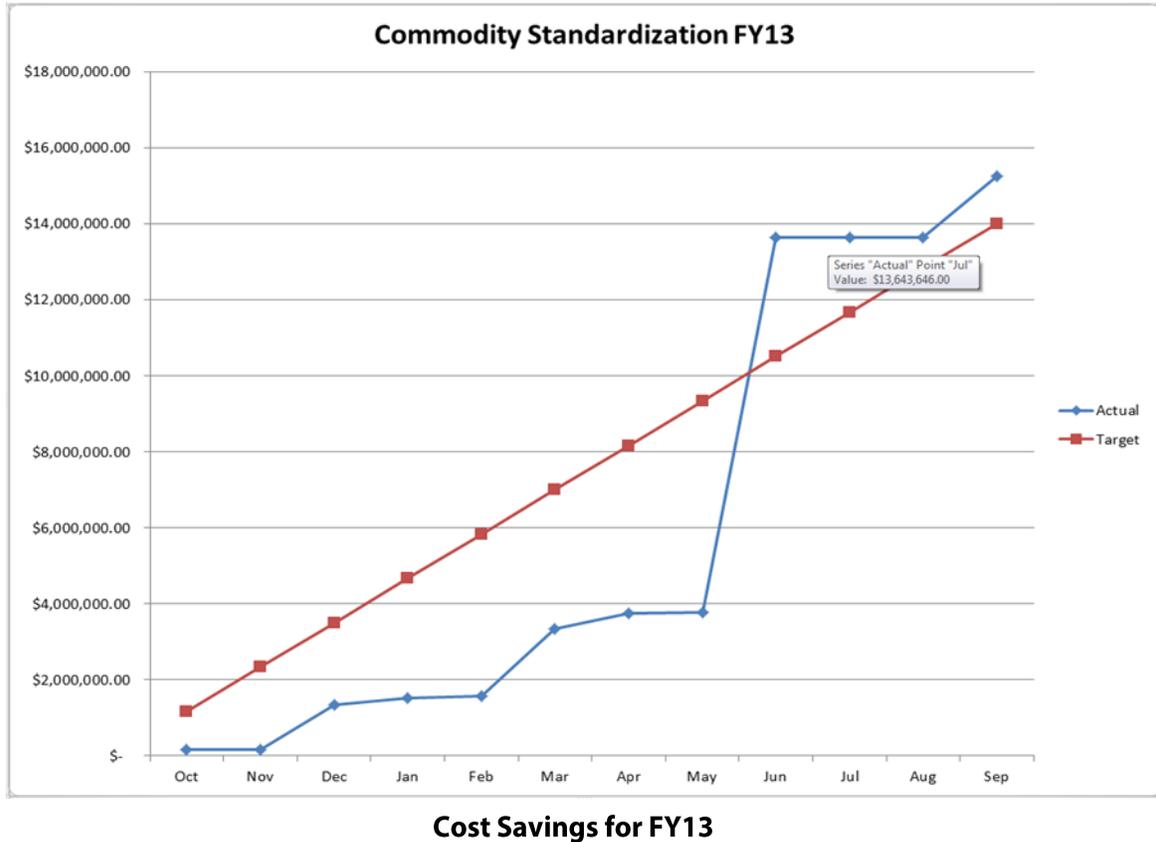
The objective of this project is to standardize commodities across VISN 11 Network in order to realize \$14 Million in cost savings and/or avoidance through commodity standardization efforts before the end of FY13. There are multiple standardization initiatives and each one will focus on three objectives:

- Improve/enhance patient care
- Drive out waste in processes
- Cost savings

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Project Results/Impact

This project resulted in \$15.25 Million in cost savings and/or avoidance through Commodity Standardization efforts, as depicted in the figure below.



Lean Sensei Partnerships

Project Overview

The Lean Sensei Partnerships was a collaborative initiative between VISN 11 and VA-CASE to offer Senior Consultants/Consultants with extensive experience in Organizational Lean Transformation with VISN 11's Lean Transformation efforts. The initiative started in October 2012.

Project Objectives

The purpose of the Lean Sensei partnerships were three-fold:

1. Senior Consultants help guide transformational change as they coach and mentor today's Senior Leaders to affect organizational change through Lean Transformation;
2. Senior Consultants project a wide array of experiences and expertise that enable them to objectively transfer their learning to others; and
3. Senior Consultants provide the direct and immediate feedback to assist in organizational change.

Project Results

Facility and VISN Leadership have been paired and matched with expert-trained VA-CASE Senior Consultants to assist their respective Senior Leaders in Organizational transformation. Senior Consultants have initiated contact with their matched/paired facilities starting in January 2013 and have begun the year-long relationship and organizational transformation process. Facility Systems Redesign Coordinators, being integral to the transformation process, serve as the liaison between the Senior Consultant and Facility Leadership. As part of transformation efforts, several Facilities have developed their Strategic A3, Lean Transformation Plan of Care to include Value Stream Analyses and associated cadence of rapid improvement events, projects, just-do-its, and Lean Management System elements.

Senior Consultants are also working with VISN and Facility Leadership to fundamentally change and improve upon the annual Strategic Planning process through a focused approach on Strategy Deployment and Oversight. Lean methodology and tools such as A3 Thinking / root cause problem-solving, when coupled with visual management for effective oversight, are now incorporated into the annual VISN 11 Strategic Planning Summit. Continuous cycles of improvement are conducted to ensure we continually strive for better processes and ultimately improve the services we provide to our Nation's Heroes and Veterans.

Appendix A: Relevant VA-CASE Publications and Presentations

Publications

Woodward-Hagg, H., & Bar-On, I., (2013) "Large System Transformation within Healthcare Organizations utilizing Lean Deployment Strategies," Proceedings from the 31st International Conference of the System Dynamics Society, Cambridge, MA.

Bidassie, B., Davies, ML., Stark, R., Boushon, B. (in review) VA Experience in Implementing Patient-Centered Medical Home Using a Breakthrough Collaborative. *Journal of General Internal Medicine*.

Bidassie, B., Barany, J.W., McCabe, G.P., Duffy, V.G., Witz, S.M. (in review). *Development of a Predictive Model for Low Back Musculoskeletal Disorders based on Occupational and Lifestyle Risk Factors*. Manuscript submitted for review.

Bidassie, B., McGlothlin, J.D., Goh, A., Feyen, R., Barany, J.W. (2010). *Limited Economic Evaluation to Assess the Effectiveness of a University-Wide Office Ergonomics Program*. *Applied Ergonomics*. 41(3), 417-427.

Bidassie, B., McGlothlin, J.D., Mena, I., Duffy, V., Barany, J.W., (2010). *Evaluation of Lifestyle Risk Factors and Job Status Associated with Back Injuries among Employees at a Mid-Western University*. *Applied Ergonomics* 41(1), 106-114.

Qiu, S., Chinnam, R., Murat, A., B. Batarse, Neemuchwala, H., Jordan, W. "A Cost Sensitive Inpatient Bed Reservation Approach to Reduce Emergency Department Boarding Times", *Health Care Management Science* (under revision), September, 2013.

Hillsman, C., Wang, Y., Nazzal, D. *A Semi-Automatic Mold Cost Estimation Framework Based Upon Geometry Similarity*; *International Journal of Advanced Manufacturing Technology*, vol.66, numbers 5-8, 2013; Springer Pub., March 2013

Hassmiller, K., Wheeler, S., Mayorga, M., Wickramage, N., "Perspective Matters: Choosing a Simulation Study Design for Optimizing Colorectal Cancer Outcomes"

We present the problem statement and motivation for developing a North Carolina-based agent-based model to support research and translation priority setting around colorectal cancer screening. After introducing the model, we will discuss the decision we faced about simulation study design and the advantages and disadvantages of alternate approaches including cohort based, multiple cohort, or population based designs.

Qiu, S., Chinnam, R., Murat, A., "Improving ED Patient Flow: Multi-Class Admit Prediction Models at Triage"

To predict inpatient bed demand from ED, we propose a multi-class classification model that predicts the target admit ward for the patient using information readily available right at triage. It overcomes the shortcomings of extant binary prediction models that lack the ability to predict the target admission ward to facilitate timely coordination and reduces patient waiting times and boarding.

Toolkit Team, "Crowd Sourcing Metric-Driven Quality Improvement: The Veterans Administration (VA) Example", Article based on toolkits approved for publication in *The Joint Commission Journal on Quality and Patient Safety*

Mixed Methods Evaluation of a Medical Home Toolkit – under review for *JGIM Special Issue on VA PACT*.

Online Toolkits for Metrics-Driven Quality Improvement – accepted by the Joint Commission Journal on Quality and Patient Safety (anticipated pub Oct 2013).

Dunbar, C., “Connecting to Patients via Social Media: A Hype or A Reality?”, Journal of Medical Marketing.

York, L., Brude, B., Luck, J., Bowman, C., Midboe, A., Smith, N., Elened, M., Girard, J., Griffith., D., Edwards, G., Ahluwalia, S., Zisser, A., Asch, S., “Online Toolkits for Metric-Driven Quality Improvement: The Veterans Health Administration Managed Grassroots Approach” The Joint Commission Journal on Quality and Patient Safety, Published December 2013, vol 39, no. 12: 561-569

Luck,J., Bowman, C., Yorks, L., Midboe, A., Taylor, T., Gale, R., Asch, S., “Multimethod Evaluation of the VA’s Peer-to-Peer Toolkit for Patient-Centered Medical Home Implementation”, Journal of General Internal Medicine, December 2013.

Luck, J., York, L., Bowman, C., Gale, R., Smit, N., Asch, S., “Implementation of a User-Driven Online Quality Improvement Toolkit for Cancer Care” Journal of the American Informatics Association
Under review as of December 2013.

Toolkit Team “Mixed Methods Evaluation of a Medical Home Toolkit” – under review for JGIM Special Issue on VA PACT. Online Toolkits for Metrics-Driven Quality Improvement – accepted by the Joint Commission Journal on Quality and Patient Safety (anticipated pub Oct 2013).

Presentations

Kim, J., Junheung, P., Kim, K., Jordan, W. Lederle, M., “*Development of Hidden Cost Factor Extraction System (HiCoFES) for Reusable Medical Equipment*”, INFORMS HealthCare 2013, Chicago, IL

Bidassie, B. PACT Leadership Virtual Conference Series VeHU on Thursday, November 14th 2014. Leadership VA PACT: How to Build the Goldmine: Tools and Resources for Practice Redesign

Bidassie, B. Improve Surgical Flow through a Hybrid Collaborative Model IIE Annual Conference and Expo. San Juan, Puerto Rico (2013).

Wang, J. and Yang, K. Estimation of the probability of surgery lists over- and under-run. Industrial and Systems Engineering Research Conference (ISERC 2013). San Juan, Puerto Rico.

Ma, X.Y., Yang, K., Bidassie, B. Bridging primary and specialty care by collaborative healthcare workflow, Industrial and Systems Engineering Research Conference (ISERC 2013), San Juan, Puerto Rico.

Eapen, SM and Bidassie, B. Optimizing Cancer Care through Collaborative Approach . IIE Annual Conference and Expo. San Juan, Puerto Rico. Annual Conference and Expo. San Juan, Puerto Rico (2013).

Bidassie, B. Improve Surgical Flow through a Hybrid Collaborative Model, Industrial and Systems Engineering Research Conference (ISERC 2013), San Juan, Puerto Rico.

Chumbler, N; Sternke, E; Sahay, A.; Bidassie, B., Daggett, V.; (2012) Designing, Implementing, and Evaluating Successful Toolkits in VA. Health Services Research & Development Service (HSR&D)/QUERI National Conference, Maryland, American Industrial Hygiene Conference & Expo (AIHce) in Denver, July 18, 2012.

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Eapen, S.; Bidassie, B. Optimizing Cancer Care through Collaborative Approach, Industrial and Systems Engineering Research Conference (ISERC 2013), San Juan, Puerto Rico.

Ma, X.Y., Ma, X.Yang, K., Bidassie, B. Bridging primary and specialty care by collaborative healthcare workflow, Industrial and Systems Engineering Research Conference (ISERC 2013), San Juan, Puerto Rico.

Qiu, S., Chinnam, R., Murat, A., "Improving patient Flow Through Enhanced Visibility and Modeling for Bed Supply & Demand Alignment", INFORMS Annual Meeting, Phoenix, October, 2012

Qiu, S., Chinnam, R., Murat, A., "Improving Patient Flow: Models for ED", Wayne State University ISE Department Graduate Research Symposium, November, 2012

Qiu, S., Chinnam, R., Murat, A., "Improving Patient Flow: Models for ED", VA-CASE F2F, Indianapolis, November 7th, 2012 (poster)

Qiu, S., Chinnam, R., Murat, A., "Streamlining Patient Flow: Models for ED", POMS Annual Conference, Denver, May, 2013.

Qiu, S., Chinnam, R., Murat, A., "Streamlining Patient Flow: Models for ED", INFORMS Healthcare, Chicago, 2013, INFORMS HEALTH CARE National Meeting, Chicago, June, 2013.

Qiu, S., Chinnam, R., Murat, A., "Improving Patient Flow: Models for ED", Presentation to Chief of ED of Detroit VAMC Dr. Batarse, Detroit, April, 2013

Qiu, S., Chinnam, R., Murat, A., "Improving Patient Flow: Models for ED", Presentation to Detroit VAMC Director Dr. Reeves, Detroit, May, 2013

Qiu, S., Chinnam, R., Murat, A., "Improving emergency department patient flow through analytics, Wuhan University of Technology, August, 2013, China

Musunuri, S., "Spreading Access to Health Care Quality Improvement Lean Tools", Institute of Industrial Engineers Annual Expo, May 2013, San Juan, Puerto Rico.

Kyoung-yun, K., "Design Evaluation for Reusable Medical Equipment", Interview with Bio-Engineering Team & Repair Facility Staff, October, 2012, Detroit, MI.

Kyoung-yun, K., "Design Evaluation for Reusable Medical Equipment", Interview with Bio-Engineering Team & Repair Facility Staff, November, 2012, Indianapolis, IN.

Kyoung-yun, K., "RME Design Evaluation System - TCO Analyzer Development and VISN 11 Deployment", December 2012, Wayne State Staff, Detroit, MI.

Kyoung-yun, K., "RME Design Evaluation System - TCO Analyzer Development and VISN 11 Deployment", march, 2013, Wayne State Staff, Detroit, MI.

Kyoung-yun, K., "System demonstration and new requirement analysis", May, 2013, Detroit, MI.

Kyoung-yun, K., "Medical Equipment Evaluation Decision Analytic System", June, 2013, Wayne State University, Detroit, MI.

Kyoung-yun, K., "Development of Hidden Cost Factor Extraction System (HiCoFES) for Reusable Medical Equipment". June 2013, INFORMS 2013 Healthcare Conference, Chicago, IL.

Dunbar,C., "Connecting to Patients via Social Media: A Hype or A Reality?", February, 2013, Association for Marketing and Health Care Research, Montana.

Dunbar, C., D'Ambrosio, A., "Usability Analytics Platform: Leveraging a Patient-Centered Model of Care" COMPLEX Adaptive Systems Conference, November, 2013, Baltimore, MD.

Dunbar, C., D'Ambrosio, A., "Usability Analytics Platform: Leveraging a Patient-Centered Model of Care" HIMSS Government Health IT Conference.

Appendix B: Faculty, Staff and Consultants Listing and Bios

Directors Office/Staff Support

Heather Woodward-Hagg, PhD, is currently the Director of the VA Center for Applied Systems Engineering (VA-CASE). Dr. Woodward-Hagg is also the Chief of the Systems Redesign Service at the Roudebush VA Medical Center in Indianapolis, IN. Prior to joining VA, Heather was a Research Scientist at the VA Center for Implementing Evidence Based Practice (VA-CIEBP) in Indianapolis as well as the director of Performance Improvement Programs for the Regenstrief Center for Healthcare Engineering (RCHE). Dr. Hagg has directed a statewide collaborative of Purdue School of Engineering and Technology faculty partnering with Indiana hospital and healthcare providers in translation of quality engineering methodologies. Dr. Hagg holds BS degrees in Ceramic Engineering and Mechanical Engineering from University of Missouri-Rolla, a MS degree in Materials Science and Engineering and a PhD in Manufacturing Engineering (Health Systems emphasis) from Worcester Polytechnic Institute. Prior to her work in healthcare, Dr. Hagg spent nine years at Intel as a process and quality engineer within semiconductor manufacturing.

Pamela A. Pau, PMP, is currently the VA-CASE Associate Director of Operations. Ms. Pau works at the John D. Dingell VA Medical Center in Detroit, MI. Pam oversees budget and contracts for VA-CASE and supervises all administration for the Detroit team. Prior to joining the VA, Pam was a Global Program Manager for Electronic Data Systems (EDS) working at the General Motors World Headquarters in Detroit, MI supporting GMAC. As an experienced Program Manager with Fortune 500 and international experience, Pam has proven success in Information Technology program management, sales, marketing, qualitative and quantitative analysis and

reporting, contracting and financial reporting, vendor management, human resources, customer service and multicultural team building. Pam's global team was comprised of system engineers, database administrators, and project management personnel, located in Germany, South Africa, Argentina, Brazil, Canada, and the U.S.

Julie Morgan completed her Associates degree at Indiana University and is currently the Administrative Assistant for VA-CASE. Julie has previous experience as the administrative assistant for the plant manager at Daimler Chrysler and also served as an administrative assistant for the 432nd Reconnaissance Wing Group Commander at Misawa Air Base, Japan and the 52nd Fighter Wing Commander at Beale AFB, California where she managed daily office operations and supervised and trained administrative staff of subordinate units. Julie's military awards include the Air Force Achievement Medal, Meritorious Service Medal, Airman and NCO of the Quarter, and she was a distinguished graduate from both the Airman Leadership Academy and the Non-Commissioned Officer Academy. In her current position she is focusing on scheduling and coordinating Lean training.

Candace Kingma, JD, is the Public Affairs Specialist for VA-CASE. She previously served as the Public Affairs Specialist for the Center of Excellence on Implementing Evidence-Based Practice, Health Services Research and Development Service in Indianapolis. Prior to her service with VA, she was the Director of Marketing for RCI's military leisure travel division. Her duties with VA-CASE include producing and implementing internal and external

communications, designing and developing communications initiatives, producing marketing materials, and planning for communication dissemination. She prepares and disseminates news releases, feature articles, and accompanying photographs to the media. She will ensure marketing and communications efforts reach the widest possible audience through the internet, email, written communications, journals, and other media outlets.

Shedarra Hill, MBA, is the HR Liaison for VA-CASE where she coordinates and manages the hiring of new employees. Employed at the Indianapolis VAMC since 2009, her previous roles included coordinating and managing the planning cycle for the Systems Redesign Leading Organizational Improvement Training for senior leadership in all the VISNs and serving as program support for the Systems Redesign Service. She attended Kentucky State University where she received her BA in Business Administration. She also received an MBA at the Indiana Institute of Technology with a specialization in HR.

Kathryn Trauth Taylor is a Ph.D. candidate in Rhetoric and Composition at Purdue University who serves as a technical writer for VA-CASE and CBO. She has taught writing at Purdue and the University of Cincinnati for six years, and will join the professional writing faculty at Miami University of Ohio in August 2014. She holds expertise in composition, document design, editing and publishing, academic research, public rhetoric, and technical communication.

Joan Savage is a program analyst working on special projects. She graduated from IUPUI in May of 2012 with a Master's in Informatics – Media Arts & Science/Human-Computer Interaction (HCI). She also holds Bachelor's degrees in Communications and Psychology. Joan is a United States Navy Veteran and a small business owner, Virtual Fireflies, LLC (VF). VF designs and develops interactive simulations in health education and analyzes

the effects. She received an IUPUI grant to build an interactive simulation teaching students/Veterans about suicide prevention and published, as well as presented the results, at several conferences. Joan spent the spring semester of 2012 in Beijing, China as an HCI intern for Microsoft Research Asia (MSRA). The project was accepted, published and presented in Paris, France at CHI 2013.

Clinical Partnerships in Healthcare Transformation (CPHT)

Balmatee Bidassie, PhD, serves as the VA-CASE Patient Aligned Care Team (PACT) Master Co-coordinator and Associate Director for Clinical Partnerships in Healthcare Transformation Program (CPHT). Balmatee Bidassie's broad-based experience encompasses computer science, electrical engineering, industrial engineering, academics, statistics, research, project management, and operations. Dr. Bidassie's industrial experience at Eaton Corporation allowed her to work with various global functional groups and in various leadership positions. Recently, she was the manager of Global Engineering/IT programs where she formulated Engineering-IT strategies and implemented global product life cycle management applications. She also served as a global Certified LEAN Six Sigma Black Belt responsible for developing, leading, coaching, and facilitating Design for Six Sigma (Product Development), Lean Manufacturing, Lean Six Sigma projects as well as mentoring 100+ candidates, including senior executive staff, toward certification. Balmatee Bidassie received her Bachelor of Engineering degree in Electrical Engineering from City University of New York, two Master Degrees from Columbia University of New York: Master of Arts (Statistics), Master of Science

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(Electrical Engineer with a concentration in Telecommunication) and doctorate from Purdue University (Industrial Engineering).

Christine L. Corum, MSIE, is an Industrial Engineer with CPHT where she supports both PACT and Specialty/Surgical national collaboratives. Prior to joining VA-CASE she was an Associate Professor of Mechanical Engineering Technology at Purdue University, where she taught undergraduate courses related to engineering materials, manufacturing, and quality systems for over 17 years. She received a B.S. in Metallurgical Engineering from the University of Missouri-Rolla, now Missouri S&T, and an M.S. in Industrial Engineering from Purdue University in 1995. Her interest areas include healthcare quality systems and education. She is a senior member of the American Society for Quality (ASQ) and a Certified Quality Engineer.

Marissa A. Vallette, Ph.D., is an Industrial Engineer for VA-CASE working in the CPHT program. Dr. Vallette received her Ph.D. from Purdue University in Industrial Engineering, specializing in human factors in healthcare. Her dissertation examined interface and information flow within and between two of the most widely deployed electronic health record (EHR) systems. Other research interests include expertise, team and task coordination, and healthcare public policy. Her research has been published and presented at conferences including the Winter Simulation Conference, the Industrial and Systems Engineering Research Conference, and the International Symposium on Human Factors and Ergonomics in Health Care.

Dr. Vallette has worked for Fortune 500 companies including Caterpillar and United Parcel Service (UPS) and worked in both inpatient and outpatient healthcare settings. While being an industrial engineer in a wide range of industries, she has experience in human factors, lean manufacturing, project management, logistics, data analytics, and healthcare consulting. Dr. Vallette has a Master of Science in Industrial and Systems Engineering

from Northern Illinois University and a Bachelor of Arts in Mathematics and Spanish from Lawrence University.

Elaine McCracken, MBA is an industrial engineer in CPHT. She received a Bachelor of Science degree in Biology and a Bachelor of Science degree in Industrial Engineering from Purdue University. She completed Medical Technology School at Loyola University Medical Center, and received a master's degree in Business Administration from Indiana University. She has worked in various healthcare settings including large teaching hospitals, small community based hospitals and multi facility healthcare systems.

Willena Nkanga, MSIE, has been working for the Department of Veterans Affairs since 2009 and has been involved in various Lean projects. She earned her Bachelor of Science and Master of Science degrees from Wayne State University in Industrial Engineering with a specialization in Lean Operations Management. She is also a certified Six Sigma Green belt. She is currently working as an Industrial Engineer for the Clinical Partnerships in Healthcare Transformation program on the Specialty and Surgical Care Collaborative, the Specialty Care Transformation Hybrid Project, and is the Liaison for the Specialty and Surgical Care Toolkit Committee. Through these projects, she is guiding VA facilities on how to adopt quality patient healthcare practices via data collection, analysis, process improvement cycles, and sustain and spread initiatives.

Laura Wright, BS received her Bachelor of Science in Neuroscience from Indiana University and will graduate with a Master of Health Administration degree from Indiana University in Indianapolis in May, 2014. Prior to joining VA-CASE, Laura worked in the Indianapolis Roubidoux VA Systems Redesign Department,. She is working on the Clinical

Partnerships in Healthcare Transformation (CPHT) as a project manager for the Mental Health and Chaplain Service Integration and as a project manager and lead on projects in the Specialty Care Transformation. Laura has gained invaluable experience at the VA facilitating projects and working with data, so she hopes to continue learning and contributing as much as she can to improve processes and operations to ultimately deliver the best care possible.

Kristen Tingley, BS is pursuing her Masters of Health Administration at Indiana University Fairbanks School of Public Health, Indianapolis and is expected to graduate in May 2014. She works for the Clinical Partnership for Healthcare Transformation Program (CPHT). Her role is to serve as industrial engineering support and project management for Surgical Flow Improvement, National Activations Office and Specialty Care projects. She would like to continue to pursue projects and positions that optimize care for patients within the VHA.

Ryan Dendinger, BA received his Bachelor of Arts in Criminal Justice from Indiana University in 2012. He is currently working on his Master's Degree in Criminal Justice and Public Safety at IUPUI, with an anticipated graduation date of May 2014. Ryan is a Program Analyst/Industrial Engineer for the Clinical Partnership for Healthcare Transformation Program (CPHT). Before accepting this position, Ryan was a Systems Redesign Coordinator Trainee at the Richard L. Roudebush VA Medical Center in Indianapolis. During his time at VA, he coordinated and facilitated Rapid Process Improvement Workshops (RPIW) using LEAN six sigma techniques to improve access, satisfaction, and workflow in numerous departments within the facility. In his current position, Ryan is providing support as a back-up Industrial Engineer for the San Francisco/Northern California Specialty Care Transformation project. Ryan is also responsible for collecting tools and working cohesively with the Toolkit Committee for the Specialty and Surgical Care Collaborative. He provides additional

support for the Mental Health Collaborative and Access Academy.

Thea James, BS is pursuing her Masters in Business Administration with a concentration in Healthcare Administration at Franklin University in Columbus Ohio and expects to graduate in December, 2014. She currently works for the Clinical Partnerships in Healthcare Transformation Program (CPHT) as the Lead Industrial Engineer for the Specialty Care Transformation's palliative care project in San Francisco. She also works as a Program Analyst for Access Academy (a program that demonstrates understanding of Access and office efficiency principles, measurement, and when/how to apply it and demonstrates understanding of the VA TAMMCS Framework) and with the mental health collaborative and specialty care collaborative.

Barbara S. Boushon, RN, BSN, serves in multiple roles to improve healthcare. Through Mark Murray and Associates, she currently works with large and small healthcare organizations across the United States and Canada to improve access to primary and specialty care, medical office flow and efficiency, and hospital flow. With the Veterans Administration, she is co-director of the National Transitioning Levels of Care Collaborative and the Patient Aligned Care Team Regional Collaboratives. Before becoming involved in these quality and process improvement activities, Barbara worked at Dean Health Systems in Madison, Wisconsin in multiple clinical and administrative roles including RN and RN Coordinator of sub-specialties, Director of Patient Care Services, Director of Software Development and Telecommunications, and Services Initiatives Administrator. In this last role, she led initiatives to improve both access to care and customer service throughout the health system.

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Xiongfei Shu, BE, MSIE, is currently working as an Industrial Engineer for VA-CASE at John D. Dingell Veterans Affairs Medical Center in Detroit, MI. He obtained his bachelor's degree in Engineering at Jilin Teacher's Institute of Engineering and Technology (China, 2006) and acquired his master's degree in Industrial Engineering at Wayne State University (U.S. 2012). Xiongfei joined the Systems Redesign group of Detroit VAMC in August 2011 where he was involved in several projects including discharge and readmission, access patient waiting time improvement, surgical flow improvement, Provider profile dashboard development, and Patient satisfaction data analysis. Currently, Xiongfei is working on Specialty Care data screen template development, presentation updating, and Surgical Flow Measurement project training. Xiongfei has three years Industrial engineering project management and leadership experience regarding data collection, analysis, determination, and executive in UNISITS Technology Co., Ltd China from 2006 to 2008.

Strategic Programs and Data Engineering Resources (SPDER)

Jeffrey Bailey, BS is a Health Systems Specialist with the SPDER Program acting as a Senior Program Manager. He is the Program Manager for the NAO Project and the Project Manager for the Health Benefits Project where he created the back-end database and the Health benefits web application. Jeff also serves as the lead for the VA-CASE Pathways Mentorship Program. Prior to joining VA, Jeff was a Materials Manager for a manufacturing company in Indianapolis before deciding to return to school to obtain his degree in Computer Information and Technology.

Pearl Howard, BS, is the Administrative Officer for the SPDER Program. In that position she supports the analytical infrastructure and the data needs of internal

and external customers, develops and maintains departmental line-of-business databases; provides technical support to customers; develops ad hoc and standardized reports, dashboards, and data visualizations; and identifies and implements continuous improvement in the efficient use of SPDER's data assets. Prior joining VA-CASE she was the Program Support Assistant for the Stroke QUERI Program at Roudebush VA Medical Center. Prior to that she was a document Control Specialist for Eli Lilly. She received her bachelor of arts degree in Business Administrations from Marian College in 2009.

Gail Edwards, RN, is currently a Program Manager in SPDER. Gail has been involved in many aspects of health care throughout her career as a Registered Nurse. In her current role, she is working with the Office of Systems Redesign, Office of Utilization and Efficiency Management, HIV/AIDS QUERY program, and Office of Women's Health Services on projects. Gail serves as informatics and clinical resource to the project teams. Gail has been a champion of electronic medical records and worked in informatics for over sixteen years in healthcare environments. Gail has a special interest in quality of healthcare using shared best practices optimizing workflow using informatics. Gail earned a BSN from Southern IL University of Edwardsville and ASN from IL Eastern Community College. Gail is currently working on a graduate degree in Nursing Informatics, is certified by American Medical Informatics Association AMIA 10X10, and VA FAC-P/PM Mid level certification.

Glenn Woodson is an industrial engineer with over 18 years in engineering and program management. Most recently Glenn worked as the Senior Operations Manager (PMO) for a Regional HMO in Central California. He has also worked as a consultant and project manager in heavy

construction, utilities and IT. Glenn is an Army Reservist who spent extensive time on active duty after 9/11. In this role he served in multiple positions from mobilization to strategic plans and operations. Glenn has a master's of science degree in Defense Analysis from the Naval Postgraduate School and spent three years on faculty. He is working with SPDER and supporting the Emergency Services Women's (ESW) Health Toolkit project.

Joshua Rose, BS, is a program analyst and application developer. He graduated from IUPUI in August of 2012 with a degree in Computer Information Technology (CIT). Within VA-CASE, Joshua has contributed to a variety of projects. He was the primary developer for the VETSCARE TBI iOS app (Traumatic Brain Injury application for the iPhone or iPad). He is also the Technical Administrator of the VA-CASE Lean Certification Site. He has also assisted with many projects including: SharePoint utilization, Web Analytics, Section 508 compliance, and the External Website.

Anna-Maria d'Ambrosio, MS, is the Project Manager for the Hi2 project. Her duties include overseeing the project, managing the RoH reports and scheduling recruiters, interviews and observations for the study. Prior to joining VA-CASE she worked for a market research company SmartRevenue as an ethnographer, she joins us to work on the health informatics initiative (hi2) project as interviewer and observer. She completed her master's degree in Visual Communication at IUPUI and is now working towards a Master's certificate in Health Informatics. When not working on hi2, she created data and concept visualizations for VA-CASE publications.

Tonya Reznor, BSIT, is the VA-CASE Webmaster. She holds a BSIT in Visual Communications & Multimedia.



Recent Capstone Graduates: Josh Rose, Gail Edwards, Jeff Bailey, Anna Langford

She specializes in Web and Graphic Design and is an expert in SharePoint architecture, development, and implementation for the VA Center for Applied Systems Engineering. Her most recent successes are the PACT and Specialty Care Toolkits and the Rapid Process Improvement Events Workshop.

Anna Langford, BS, is a Project Manager on the SPDER team currently working on the Emergency Women's Health Toolkit, Utilization Management Toolkit, and the Network 11 Contracting Systems Redesign project. She has a bachelor's degree in Health Administration, a bachelor's degree in Dietetics and a master's certificate as a Healthcare Program Analyst where she learned statistics and Lean Six Sigma. She earned mid-level FAC P/PM certification in October 2013. She has been with VA-CASE since January 2013. She previously worked in the Credentialing department at Roudebush VA Medical Center as a Credentialing Coordinator.

Kyle Maddox, BS, is a Program Analyst currently working as the Data Collection Lead for the Health

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Informatics Initiative project as well as the Human-Computer Interaction and Design Team Lead. He is also a member of the Women's Health Toolkit team and a contributor to the PrMIRS project where he provides usability analysis and is a content manager for the VA-CASE SharePoint site. He co-authored a paper that is being published by the peer-reviewed journal, *Brain Injury*. Kyle is attending IUPUI, majoring in Informatics with an area of specialization in Human Computer Interaction (HCI). His intention is to become an expert in user centered design and usability as well as mobile application development. Kyle is a Petty Officer First Class in the U.S. Navy Reserve. Previous work includes: assisting with the development of the Traumatic Brain Injury (TBI) Application and collaborating on the usability and artwork design of the Health 4 Hero's (H4H) Application.

Gabriel Christy, BS, is an engineering intern with the SPDER Program. He has a bachelor's degree in Aerospace Administration from Indiana State University and is pursuing a second bachelor's degree in Mechanical Engineering at IUPUI. He is a member of the Indiana National Guard and is currently deployed to Kuwait as an air traffic controller.

Jamie M. Ringer, Psy.D. HSPP, is a project analyst on the SPDER team, currently working on the Health Informatics Initiative. Dr. Ringer received her Masters and Doctorate degrees in Clinical Psychology from the University of Indianapolis. She has been a Clinical Research Psychologist within the Research and Development Service since 2009, and is an Assistant Professor of Clinical Psychology at the Indiana University School of Medicine. She has served as the study coordinator and co-investigator for federally funded studies on the use of Cognitive Behavioral Therapy for persons with schizophrenia. Dr. Ringer was awarded the VA Young Investigator Award for her research on overcoming adversity related to chronic medical illness. Dr. Ringer has been with VA-CASE since November 2013

and brings her experience in data collection, manuscript preparation, and quantitative and qualitative data analysis to Hi2.

Alissa L. Russ, PhD, is a human factors engineering specialist with the Roudebush VA Health Services Research and Development Center on Implementing Evidence-Based Practice. She also holds appointments with Regenstrief Institute and the Purdue University College of Pharmacy. Dr. Russ completed her graduate work at Purdue University and brings a unique interdisciplinary perspective, with a background in both engineering and clinical sciences, which translates into expertise in the design of tools to enhance medical care. Her primary research focuses on computerized medication order checks (e.g., drug-drug interaction alerts) and how their design influences clinical workflow, prescriber decision-making, and medication safety. She has provided basic human factors training to local and national VA informatics leaders as part of the VA-Informatics Development and Education Academy courses. Dr. Russ has several peer-reviewed publications as well as ongoing collaborations with experts in medicine, pharmacy, and VA informatics, and is committed to improving healthcare delivery systems.

Jonathan Smith, BA, graduated from California State University with a Bachelor's Degree in Historical Research. Currently Jonathan is a pathways intern for SPDER pursuing a Masters of Social Science Degree from California State University with a regional focus in American studies; and has an expected graduation date in March of 2015. His ultimate goal as a pathways trainee is to obtain a permanent fulltime position within the Department of Veteran Affairs' program needs.

VHA Engineering Technical Assistance Program (VE-TAP)

Will Henry Jordan, CAPT USN (Ret), is the Associate Director for the Veterans Engineering – Technical Assistance Program (VE-TAP). He manages four technology program lines with numerous projects involving Reusable Medical Equipment, Advanced Engineering Services (Modeling & Simulation), Engineering Assessment Services, and Strategic Support Services. Will is involved in all aspects of launching and supporting VA-CASE initiatives. He represents VA-CASE in national, VISN, and local conferences and meetings. He joined the VA team in November, 2009.

Will is a Navy Veteran, with over 35 years of experience in program development, operational systems integration, and applied engineering. Prior to joining the VA, Will was the Vice-President of Operations, Senior Analyst, and Technology Security Officer for Simulex, Inc.; a software research, design, systems integration, and services company located in the Purdue University Research Park in West Lafayette, IN. His Navy experience includes tours of duty as the Commanding Officer of two nuclear powered fast attack submarines and a shore-based naval education facility. Additionally, he was the Inspector General for Naval Region Midwest and Naval Education Training Command; the Assistant Chief of Staff, Pacific Submarine Force; Director of Intelligence and Director of Special Operations in the Pacific and Indian Ocean theaters of operation; and the Professor of Naval Science at Purdue University. Mr. Jordan has a Bachelor of Science in Physics from the University of Missouri – Columbia, a Master of Science with Distinction in Systems Technology from the Naval Post Graduate School, and is certified as a Naval Nuclear Propulsion Engineer.

John Iversen, AS, is the Operations Officer for the VE-TAP program. John specializes in Logistical planning,

operational organization, and process standardization. He is currently working in the VE-TAP program in standardizing and tracking of administrative and operational processes. Prior to joining the VA in December 2010, John spent eight years as a Forward Reconnaissance Specialist assigned to the 10th US Cavalry, United States Army, where he acquired many diverse skills to include supporting, managing, educating, and implementing systems and methodologies. A combat veteran, he received an Honorable Discharge as a Non Commissioned Officer in 2007. He received his Associates degree in Applied Systems Management from the Wyoming Technical Institute in 2008.

Midh Mulpuri, MBA, BS, is the Program Manager for Modeling and Simulation (M&S) and the Deputy Associate Director in VE-TAP at VA-CASE. He has over a decade of experience in applying M&S to a diverse set of problems in Defense, Homeland Security, Education and Healthcare. Midh is passionate about informing decision-making by utilizing the right simulation methods, engaging user interfaces, and advanced computing technologies. He graduated from Purdue University, West Lafayette, IN with a Bachelor's in Computer Engineering in May 2002 and from Arizona State University, Tempe, AZ with a Master's in Business Administration in 2010. He comes to VA-CASE from the Regenstrief Institute where he was an Implementation Lead in Clinical Informatics. Previously, he was the Tech Lead for Modeling and Simulation (M&S) at Simulex Inc.

Nancy J. Lightner, PhD, is an Industrial Engineer working in decision support and Human-Computer Interaction and the Deputy Associate Director of VE-TAP. She is developing and supporting tools to assist in the decision to provide specific care to Veterans (home dialysis, polysomnography and others) or to outsource the care to non-VA facilities. She recently

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was named Director of the VA-CASE HCI and Simulation Lab where she will oversee design and usability testing of interfaces and medical devices. Prior to joining VA in September 2011, Dr. Lightner spent ten years in higher education, teaching software development principles and publishing articles related to human factors in software design and the software engineering profession. She has also worked as a software engineer and project manager in various industries, including defense, healthcare, and insurance. Dr. Lightner holds a BS degree in Computer Science from the Indiana University of Pennsylvania and an MBA from Pennsylvania State University. She also earned an MS in the Human Factors area of Industrial Engineering and a PhD in Management Information Systems from Purdue University. She is active in several international conferences that integrate research with applications in industry.

Hakimuddin Neemuchwala, BSIE, is the Deputy Associate Director of Operations for VA-CASE and serves as technical lead for Veterans Engineering – Technology Assistance Program (VE-TAP). Hakimuddin has over seven years of professional experience in manufacturing and healthcare. He is currently involved with Near Real Time Decision Support System; Wounded Warrior Project in collaboration with DOD, Supply/Demand Alignment Toolkit, and ED Inpatient Flow Management.



Lauren Ausra, Nancy Lightner, Kathy Carlson

He was also involved in Patient Panel Size Model for Patient Aligned Care Phase 1 and 2, deployment and sustainment of IVN, Cancer Care Collaborative, Pharmacy Pending Order Reduction, Hemodialysis, and Reusable Medical Equipment projects at Detroit VAMC. Hakimuddin has experience in simulation, operation research, process analysis, and optimization. He has also helped teams and organizations with developing and implementation of processes and provides expertise in lean six sigma principles. Hakimuddin graduated with a Bachelor's degree in Industrial Engineering from Wayne State University in 2008 and currently he is pursuing his Master's in Lean Operations from Wayne State University. He is a Six Sigma Green Belt Certified, Lean Black Belt Certified and is a member of the Institute of Industrial Engineering.

Kai Yang, PhD, is a Professor in the department of Industrial and Manufacturing, Wayne State University. His areas of expertise include Six Sigma, statistical methods in quality and reliability engineering, Lean product development, Lean healthcare, and engineering design methodologies. He is a well known world-wide expert in the area of Six Sigma, Design for Six Sigma and quality for service and an author of five books in the areas of Design for Six Sigma, Six Sigma, and multivariate statistical methods. Prof. Yang's book, *Design for Six Sigma* is an influential book that provides a framework to integrate both innovation methods and traditional statistical quality assurance methods into the product development process. Dr. Yang has also published over 70 research papers. He has been awarded over 40 research contracts from such institutions as US National Science Foundation, US Department of Veteran Affairs, General Motors Corporation, Ford Motor Company, Chrysler Corporation, and Siemens Corporation.

Dr. Yang is also a well known trainer in the area of Six

Sigma, Lean, he has conducted numerous training for many companies, such as Apple Computer Inc. and Siemens. Dr. Yang is the leading faculty member for VA-CASE and ICG of VA representing Wayne State University and led many projects to success. Dr. Yang obtained both his MS and PhD degrees from the University of Michigan.

Paul Holtz, BSN, MBA comes to VA-CASE after completing VA's Interdisciplinary Patient Safety Fellowship at the Lexington, Kentucky VAMC. A second-career nurse, he completed the University of Michigan's 2nd degree BSN program in 2007. He has staffed in UM's nursing float pool, UM's Cardiothoracic ICU and the Ann Arbor VAMC telemetry floor. More recently, while staffing with Michigan Visiting Nurses, he was awarded a FIGs grant to develop a cognitive aid for home IV antibiotics infusion. Before nursing, Paul was an industrial engineer at Unisys in Plymouth Michigan providing manufacturing floor support and process design. While an active member of the Society of Manufacturing Engineers, he earned certifications in Flow Manufacturing, TOC, TQM and Lean as well an MBA from Eastern Michigan University.

Naomi Conn, MPA, received her undergraduate degree in Aerospace Engineering from the University of Colorado in Boulder and has a master's degree in Public Administration from San Francisco State University. She served in the active duty Air Force for six years as a C-17 pilot and continues to serve in the Air Force Reserve as an executive officer and program assistant. She has held various public and nonprofit positions including program auditor at the Government Accountability Office and Program Associate at Northern California Grantmakers. She is currently working as an Industrial Engineer in VE-TAP.

James Hundt, MBA, MSSI, is an Industrial Engineer for the VA-CASE Veterans Engineering Technical Assistance Programs. He is a former Army (mustang) officer. He

most recently served in the Executive Office of the President as a Program Examiner of the National Security Division of the Office of Management and Budget. James earned his Bachelor's in Systems Engineering from the U.S. Military Academy at West Point, a finance MBA from Northwestern University's Kellogg School of Management and a Master's in Strategic Intelligence from the National Intelligence University.

Serge Yee, BSE, JD, is currently a project manager in the VA Engineering – Technical Assistance Program (VE-TAP) at the Richard L. Roudebush VA Medical Center in Indianapolis, IN. Mr. Yee manages deployment of the Interactive Visual Navigator (IVN) web application and provides business analyst support for development, and will support IVN's extension to 10 new VHA facilities and deployment of upgraded versions to 5 existing facilities. Prior to joining VA, Serge was a subcontractor working through Wayne State University, also in Detroit. Mr. Yee holds a BSE degree in Industrial and Operations Engineering from University of Michigan – Ann Arbor, and a JD degree from Wayne State University Law School.

Robert Morgan, BS, is a Programmer/Developer for VA-CASE. Rob has a bachelor's degree in PC Support and Administration and holds certifications from CompTIA and Microsoft including A+, Network+, SharePoint, Windows Server, and Windows Client OS. Rob's previous experience before joining VA includes thirteen years in the manufacturing sector as Quality and IT Manager focusing on the implementation of Lean principles and implementing document control systems through SharePoint services. Rob's primary duties at VA-CASE include designing administering SharePoint sites and managing technical infrastructure and design for the Interactive Visual Navigator (IVN) project. He

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is currently working on a bachelor's degree in Informatics from IUPUI and an associate's degree in PC Support and Administration. Rob is a Veteran of the US Army.

Christopher Baker, BSEE, received his bachelor's degree in Electrical Engineering from Pensacola Christian College and is currently working on a master's degree in Electrical and Computer Engineering at IUPUI. Previously, he worked with Dr. Jason Saleem in the HSR&D Human Computer Interaction (HCI) lab using human factors and informatics principles to help improve various systems including the Dialysis Make-Buy Tool and Palliative Care Template. He is currently working in VA-TAP as an industrial engineer.

Kathy Carlson, BA, is a Program Manager with the SPDER Program. Kathy is a certified clinical research coordinator with over 20 years of experience in clinical trials and investigator initiated studies in Radiology, Cardiology and Evidence-based Practice. Recently, she was the coordinating center manager of a stroke telerehabilitation study which took place at three VA Medical Centers.

Trish Stokes-Pham, BS, MS received her BS in Mathematics and Physics and her MS in Mechanical Engineering from IUPUI. She is working with the VE-TAP simulation and modeling team. Prior to joining the VA she was a research assistant at the IUPUI Integrated Nanosystems Development Institute research laboratory where she worked on designing micro-fluidic devices to manufacture CIGS nanoparticles for use in solar cells.

Lauren Kelly, BS, received her bachelor's degree from Indiana University in May of 2011 from the school of Informatics with a cognate in Health Science. She is a Program Analyst working on the Homelessness Project and the Inter-facility Transfers Project.

Cyrus Hillsman, PhD, runs the technology blog for VA-CASE and works on the Integrated Visual Navigator

project. His dissertation research was in early cost estimation in engineering design. This work included elements of pattern recognition, signal processing, image processing, wavelets, and statistics. He holds a Master's degree in industrial engineering with a specialty in simulation modeling and graduate coursework in data mining. He holds two bachelor's degrees, one in management information systems and the other in finance. His technical degrees are in machine tool technology.

Jarrold Otter, BS, is an Industrial Engineer working with VA-CASE and is currently assisting with the implementation of the IVN system in selected VHA facilities, conducting validation checks of the Work Instruction Modules (WIM), and assisting the WIM Librarian. Jarrold also collaborated in the gathering of information and the creation of the SRD Website. Jarrold graduated from IUPUI with a BS in Mechanical Engineering Technology and a Motorsports Engineering Technology Certificate.

Stephen Sargent, BSCE, received a bachelor's degree in Computer Engineering from IUPUI, and plans to pursue a master's degree in Electrical and Computer Engineering at IUPUI. Previously, he worked with Dr. Matt Bair in the HSR&D to further research for projects such as CAMEO and ESCAPE. He is currently working with the Systems Redesign as a Program Analyst.

William "Ed" Englehart, BS, is a retired Department of Veteran Affairs facility Chief Engineer. As Chief Engineer for ten years, Ed was responsible for the Engineering Service department at a 1.2 million square ft. tertiary care 1A rated Medical Center which included Biomedical Engineering, Engineering Design and Construction, and Facility Maintenance and Operation. Past experience/positions include VAMC Assistant Chief Engineer, VHA Resident Engineer, and US Army Corps of Engineer Resident

and Project Engineer. At VA-CASE he is working on the National VHA Outpatient Dialysis Clinic project, the Indianapolis VAMC Cancer Center Care Clinic and Infusion Suite project, the Indianapolis VAMC Pathology Lab Centralization project and is also working with the VCDHCI Lab team on multiple potential VHA Office of Patient Care Services (PCS) and VHA Patient Centered Care and Cultural Transformation (OPC&CT) initiatives.

Ratna Babu Chinnam, PhD, is a Research Professor for the VA Center for Applied Systems Engineering (VA-CASE). He received his BS degree in Mechanical Engineering from Mangalore University (India) in 1988 and the MS and PhD degrees in Industrial Engineering from Texas Tech University (U.S.A.) in 1990 and 1994, respectively. He is also currently an Associate Professor in the Industrial & Manufacturing Engineering Department at Wayne State University. Prior to that, he was an Assistant Professor with the Industrial & Manufacturing Engineering Department at North Dakota State University from fall of 1994 to summer of 2000.

Don Lindbergh, BS, AS, recently joined the VA System Redesign Service and the VA Center for Applied Systems Engineering (VA-CASE) on contract. Don is providing technical consultative services that support infrastructure development of the IVN system and human-computer interaction related projects at the VA. Formerly with Regenstrief Institute Center for Biomedical Informatics, Don was a core member of the group that designed, developed, tested and implemented the computerized physician order entry system (CPOE) that is internationally recognized in the medical informatics community. Don graduated from Indiana University with a BA in Literature and Modern Music, an individualized major in the College of Arts and Sciences and an AS in Audio Technology from the School of Music.

Daoping Xu (Diane), PhD, is working on contract from Regenstrief Institute and is working in VE-TAP designing the HCI Lab website, the eDischarge project and on Interactive Visual Navigator (IVN). She has a master's degree and a PhD from Indiana University in Mathematics and a master's degree in Computer Science also from IU. At Regenstrief she was responsible for the migration of data from Regenstrief's legacy system which includes all Medical Orders, Lab Results, Text Reports and Master Encounters to Oracle database for more than 15 Hospitals/institutions in Indiana and developed an interface for the Radiology Department and hospital to transfer doctor's orders and patient ADT data in real time and update the patient medical and billing information in a central repository.



**Andrew Carlstrom and Chris Hughes,
Veteran-Centered Design Lab**

Chris Hughes, MS, is the Program Manager of User Experience and Service Design Strategy for the Veteran-Centered-Design Lab, which is a new initiative within the VA Center for Applied Systems Engineering (VA-CASE). Chris has over 10 years of experience collaborating with interdisciplinary teams and clients, translating user insights into meaningful products, services & human-centered experiences. He facilitates teams and clients through discovery, ideation and synthesis of user research, helping to distill the most important stakeholder

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insights and link them together in frameworks, principles, and implications for design. Chris graduated from IUPUI in 2012 with a Master of Science in Informatics with a dual focus on Human-Computer Interaction and Design Thinking Leadership.

Andrew Carlstrom, MS, is the Program Manager Veteran-Centered Design Lab, a new initiative within the Veterans Administration Center for Applied Systems Engineering (VA-CASE). Andrew works with interdisciplinary teams and collaborates with clients to inform the design and development of innovative processes, interactions, environments, and experiences. Andrew is passionate about utilizing a patient-centered approach to improve the delivery of healthcare to our nations Veterans. Prior to joining VA-CASE, Andrew worked as a corporate injury prevention consultant, providing ergonomic expertise, training, and job analysis skills to a wide variety of clients. Andrew also completed a Patient Safety Fellowship at the Indianapolis VAMC. Andrew graduated from IU-Bloomington in 2008 with dual Master of Science degrees in Ergonomics & Safety Management. He also holds a BA in Psychology.

Nikila Ravi is currently an undergraduate student at the University of Michigan working towards her B.S.E. in Industrial and Operations Engineering. She has been working with the Veteran's Engineering Resource Center since October, 2011. The focus of Nikila's most recent project was to develop a prediction model of provider workload to aid in the balancing of workload among providers. This project was completed in collaboration with the Office of Information and Analytics. Before working at the VA, Nikila worked as a Site Continuous Improvements Intern at GKN Sinter Metals. There she created standard work documents and standard processes for equipment operation saving the company \$5,000-\$50,000 per equipment breakdown plus the cost of lost revenue or delayed delivery. In addition, Nikila participated in a number of independent projects

including the conceptualization and development of an inventory and procurement tracking software to better track and predict needs and the development of a hospital scheduling model to minimize hospital costs related to patient hospitalizations. Nikila has experience with Visual Basic programming, SQL Server querying, SAS data mining, and the Microsoft Office Suite Programs. She is proficient in linear programming, statistical modeling, and statistical quality control.

Kristen Hassmiller Lich, MHSA, PhD, is an Assistant Professor in the Department of Health Policy and Management at the University of North Carolina at Chapel Hill. She received her Master's in Health Services Administration and PhD in Health Services Organization and Policy from the University of Michigan, School of Public Health. In ongoing work, she is refining a quantitative multi-level simulation model to support decision-making about how to allocate limited resources to translate evidence into real-world practice around stroke care in VA, working on the research side with the Stroke QUERI as well as on the operations side with VA-CASE. She is also applying similar methods to improve both crisis service systems for individuals living with severe mental illness as well as colorectal cancer screening programs serving vulnerable populations in North Carolina. Dr. Lich's research passion is to advance the way we use models (both quantitative and qualitative) and local data to improve policy-decision making, and to engage system stakeholders in the process. She has been invited to talk about the use of models to inform policy and the dissemination and implementation of evidence-informed practice in a variety of settings, including the Centers for Disease Control and Prevention, the National Institutes of Health, and numerous meetings and workshops.

Kyoung-Yun Kim, PhD is an associate professor in the Department of Industrial and Systems Engineering at Wayne State University, where he directs the Computational Intelligence and Design Informatics (CInDI) Laboratory. Dr. Kim is a Site Director for the NSF Industry and University Cooperative Research Center (I/UCRC) for e-Design. Dr. Kim's research focuses on Design Science; Design Informatics; Semantic Assembly Design; Transformative Product Design; Product Life-cycle Modeling; Design and Manufacturing of Soft Products. Dr. Kim has received over \$6M by external funding from several U.S. federal agencies including NSF, NIDRR, VA-CASE, DOD, and DOE, the Korean Ministry of Knowledge Economy, and industries including Ford and GM. With the funding from the Department of Veterans Affairs, Dr. Kim's team has developed a design evaluation system for reusable medical equipment, which can conduct decision analysis with lifecycle information. This work was invited by an AAAI Spring Symposium. He has published over 30 top journal papers and over 35 conference papers in proceedings and numerous technical reports and presentations. Dr. Kim is an editorial board member of Journal of Integrated Design and Process Science. Dr. Kim received top cited article award (2005-2010) from Journal CAD and 2003 IIE Transactions Best Paper Award. Dr. Kim's education includes a Ph.D. in Industrial Engineering from University of Pittsburgh, and a B.S. and M.S. in Industrial Engineering from Chonbuk National University, South Korea. Dr. Kim is a member of IIE, AAAI, ASME, & ATA.

Darin Ellis, PhD, serves as Associate Dean of Academic Affairs at the College of Engineering and has extensive experience in the field of human factors and ergonomics, specializing in reducing human error in human-computer interaction. Dr. Ellis has supervised academic projects in hospital settings, consulted on clinical process improvement teams at health centers and with Fortune 100 medical equipment vendors. His experience includes human factors engineering and human-robot interaction including application of

augmented reality to robotic interfaces, user-centered design, evaluation of robot controls, displays operator mental workload assessment, and operator-in-the-loop system performance measurement. Applications of this work include robotic assisted surgery and automated surgical skills assessment.

Dr. Ellis is also a member of the WSU Systems Engineering initiative's leadership team, who successfully gained WSU consortium member status in the Department of Defense-funded Systems Engineering Research Center, the first University Affiliated Research Center (UARC) in the United States to focus on Systems Engineering Research

Celestine Aguwa, PhD, is currently a visiting assistant professor in the department of Industrial and Systems Engineering, Wayne State University (WSU), Detroit, MI, and adjunct professor at University of Michigan, Dearborn, MI. Before joining WSU, he spent eight years at Ford Motor Company working on advanced manufacturing research activities. Dr. Aguwa received his PhD in Industrial Engineering, at University of Pittsburgh, PA, his MSIE, Industrial Engineering and Operations Research, University of Massachusetts, Amherst, MA; and B.Arch., (Architecture), University of Nigeria. He is a certified Green Belt Six Sigma and Associate Value Specialist. His research interests are in advanced manufacturing and product development modeling and application for healthcare and automotive fields. His work on modular architecture in product development is being applied to VA's Design Evaluation Method of Reusable Medical Equipment. Dr. Aguwa has developed a novel idea for analyzing voice of the customer especially in the manufacturing and healthcare sectors. These have resulted in several publications in prominent referred journals. He teaches classes such as flexible manufacturing, facilities design, Lean and value

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engineering, and applied statistics at both undergraduate and graduate levels.

Michael Lederle, MSIE, is an Industrial Engineer for the VA-CASE. He has worked with clients to address their data acquisition and manipulation needs, provided expertise and guidance in Lean Six Sigma principles, and served as a liaison between the VA-CASE and research groups in Detroit working to improve the care of Veterans within the VHA system. Michael has received degrees in Mathematics and Industrial Engineering from Wayne State University, and is currently pursuing graduate work with the Statistics department at Texas A&M University.

Leslie Monplaisir, PhD, is a Department Chair of Industrial and Systems Engineering at Wayne State University. He received his BS in Engineering from University of the West Indies in 1987 and his MS in Computer Integrated Manufacturing from the University of Birmingham England in 1991. He completed his PhD degree in Engineering Management from the University of Missouri-Rolla in 1995.

Dr. Alper Murat, Ph.D., is an Associate Professor of Industrial and Systems Engineering at Wayne State University. Dr. Murat's research and teaching expertise include application of optimization modeling and simulation techniques and data mining in the fields of supply chain management, logistics and transportation, product development, quality, reliability and healthcare. He has led multiple projects with Ford Motor Company, General Dynamics, Henry Ford Health Care Systems and Veterans Engineering Resource Center (VERC) on various applications of operations research and simulation tools and techniques. He is the principal investigator of research projects funded by VA, VAVERC VISN-11, US Department of Transportation, Department of Homeland Security, General Dynamics, and Ford Motor Company. His students and research received best paper and dissertation awards from IIE, INFORMS, Intelligent

Transportation Society in Michigan. He is the chair of SAE's Global Supply Chains and Manufacturing Cluster and has served on the organizing committees of SAE World Congress, IEEE Conference on Technologies for Homeland Security, Land and Maritime Border Security, Complex Adaptive Systems conferences, among others. Dr. Murat has authored numerous peer-reviewed journal articles which appeared in such journals as Transportation Research Part E: Logistics and Transportation, European Journal of Operations Research, Computers and Operations Research, Int. Journal of Production Economics, and Information Sciences. Dr. Murat received his BS in Mechanical Engineering and his MS in Industrial Engineering both from Bogazici University/Turkey in 1998 and 2000. He completed his PhD in Management Science/Operations Research from the McGill University/Canada in 2006.

Shanshan Qiu, BS, MS, received her BS and MS degrees in Applied Mathematics from Huazhong Normal University (China) in 2002 and 2005, respectively, and her MA degree in Mathematical Statistics from Wayne State University in 2009. She is currently a PhD student and research assistant in the Industrial & Systems Engineering Department at Wayne State University. She was a summer research assistant for the U.S. Army TARDEC-NAC Terrain Characterization Project conducted by the Department of Mathematics at Wayne State University from May 2008 to December 2009; she investigated statistical approaches to terrain characterization and conducted time series modeling of terrain profiles in this project. She was a project coordinator of the U.S. Department of Energy Electric-Drive Vehicle Engineering Program of Wayne State University from January 2010 to August 2010; she was in charge of data analysis, organizing national wide conference, project website development, coordinating inter-department, and

inter-institute collaborating events for this project. Her research interests include healthcare analytics and informatics, predictive statistical development via supervised and unsupervised machine learning, time series modeling, and supply chain management.

Khalid Saeed, PhD, is Professor of Economics and System Dynamics at the Worcester Polytechnic Institute, where he directs undergraduate and graduate programs in system dynamics. He has previously held faculty positions at Asian Institute of Technology, Bangkok; Curtin University, Australia; Dartmouth College, NH; Northeastern University, Boston; Lulea Technical University, Sweden; and Lahore University of Management Sciences, Pakistan. He has worked as a consultant, among other organizations, with US Health Resources and Services Administration, United Nations, Asian Development Bank, World Business Council for Sustainable Development, Booz Alan Hamilton, and McKinsey & Company. Khalid holds a PhD in System Dynamics and Economic Development from MIT. He has written two books and numerous articles on economic development, management and environmental agendas using system dynamics modeling. He received Jay Wright Forrester Award for his work on sustainable economic development in 1995 and has served as President of System Dynamics Society and Associate Editor of *System Dynamics Review*.

Neale R. Chumbler, PhD, is a Professor and Department Head in the Department of Health Policy and Management in the College of Public Health at the University of Georgia. Previously, he served as Professor and Chair of the Sociology Department, the Director of the Survey Research Center, and Director of the Institute for Research on Social Issues at the Indiana University School of Liberal Arts at Indiana University Purdue University-Indianapolis (IUPUI). For over 12 years, he also served as a Health Science Specialist and Core Investigator at the Department of Veterans Affairs (VA)

Health Services Research & Development Research Center of Excellences in facilities in Indiana and Florida. Dr. Chumbler has extensive experience developing, implementing, and evaluating questionnaire surveys and in program evaluation of community-based health interventions.

Professional Development Program

George Ponte is currently a Health Systems Specialist, Lean facilitator for VA CASE and Associate Director for the Professional Development Program. He is a Registered Respiratory Therapist and former Department Chair for Respiratory Care at Springfield College (1974-1989). In this role he led curriculum development and educational assessment efforts. George has been involved as a leader in the Advanced Clinic Access, (ACA) initiative since 1999. He has facilitated Station, VISN and National Advanced Clinical Access improvements. He has coordinated and participated in 13 Collaborative applying Lean and Improvement principles in areas ranging from Primary Care, Specialty Care, Mental Health, Inpatient Flow, Sensory and Rehabilitation Services, and Cancer Care. He has been a member of the National Systems Redesign Educational Committee since its beginning. He is a facilitator for the Yellow Belt, Green Belt, and Black Belt Trainings and facilitates RPIW's. He is a graduate of the IHI Improvement Advisor Program and Managing Hospital Operations. He was the VISN 1 Systems Redesign Coordinator from 2005 to 2011. He is a member of the National Cancer Care Planning Committee. He co-chaired the Committee that developed the Improvement Advisor Academy program and curriculum. He is presently a Lean Executive sensei in the VA CASE Lean Management system.

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Jamie Workman Germann, MSME, is the Deputy Associate Director of Professional Development. She has been implementing Lean and Six Sigma programs in healthcare since 2005. As a tenured professor of Mechanical Engineering Technology at Indiana University Purdue University – Indianapolis (IUPUI), in addition to her teaching role, she worked with faculty/colleagues from multiple disciplines on applied research related to the hospital implementation of Lean and Six Sigma programs. Since leaving the university, she has most recently served as Manager of Performance Improvement for a large acute-care hospital where she was responsible for the roll-out and implementation of a hospital-wide Lean program.

Jenna Ramsey, AS, began a student internship with VERC in November of 2013. After completing her associates degree in Mechanical Engineering Technology at Purdue University, Jenna is now pursuing a bachelor's degree in Accounting at Western Governor's University. She plans to graduate in September of 2014 and continue her work as the Administrative Officer for the VA-CASE Professional Development Program.

Brian Poynor RN, MSM, CLSSBB, is a Healthcare Specialist with VA-CASE. Prior to coming to the VA, he worked for Delnor Hospital Cadence Health System as a Lean Facilitator and Sensei. In this



capacity, he led a Lean transformation using the ThedaCare Improvement System and has spent three and half years being trained by Sensei's in the Toyota Production System. His accomplishment includes being certified as an operating room nurse, certificate in Lean Six Sigma from Villanova University, and holds the rank of Lieutenant Colonel in the Army Reserves where he is

currently the Assistant Regional Emergency Preparedness Liaison Officer for FEMA Region V.

Mr. Poynor's educational background includes a Bachelor of Science in Nursing from Northern Illinois University. He holds a Master's in Management from National Louis University with an emphasis in leadership and organizational development. He has progressed in his military leadership courses and is a graduate of the Combined Services Staff School. He is presently enrolled in the Command and General Staff School. He holds advanced certifications as an operating room nurse, ACLS certified, and Trauma Nurse Specialist. He is currently a member of The Society of Manufacturing Engineers.

Paul Moore is an Army Veteran having served in Afghanistan and Iraq. Paul attended Lincoln College of Technology and majored in Automotive Technology with a minor in High Performance. He most recently worked as an automotive repair technician for Toyota. While the career was a rewarding one, Paul knew that he had more to offer. So when the opportunity came up to get a career helping fellow Veterans, he took it. Paul is an assistant to the Materials Coordinator for the Professional Development Program. Paul plans on beginning school spring of 2013 to begin work on an Engineering degree to help further his career.

Matt Beck, BA is a Recent Graduate Pathways intern in Professional Development working on DEED as a program analyst. After 14 years of service in the Army and Army National Guard, Matt joined the VA in 2012 as a Program Support Assistant with Health Services Research and Development. He graduated from IUPUI in May of 2013 with a BA in General Studies with a minor in Geography and a certificate in Geographic Information Systems (GIS).

Lillian Barrios, BS received a Bachelor's of Science in Community Health Education, a graduate certificate

in emergency management, and a master's of public health from Florida State University. Her previous experiences include assisting with state substance abuse prevention efforts and improving healthcare access for residents of underserved communities. She has also provided product training for visually impaired assistive technology users. She is a Program Analyst with Professional Development assisting with the creation of a developmental evaluation of the lean management implementation process.

Carlos M. Garcia, BSAE, MBA, CM, CLSSGB, is a quality and performance improvement expert, project leader, and has been a teacher of Lean Thinking in various industries including aerospace and consumer electronics, in the US and abroad. Carlos worked in the VA San Diego Healthcare System, San Diego, California, for over eleven years. There, he contributed to major service quality and performance improvements. Carlos is an expert in systems redesign and in the sustainability and spread of system improvements; in his work, he is a Lean facilitator and coach. Carlos is a certified Malcolm Baldrige Examiner and past member of the California Awards for Excellence Board of Examiners. He has been a frequent presenter and coach at ACA-FIX and PACT collaboratives. In 2009, Carlos created the growing national VA Lean Practitioners Network and serves in the faculty at the University of Phoenix-San Diego campus. Carlos has a BS in Aerospace Engineering from West Virginia University, an MBA from the University of Phoenix, Lean Green Belt certification from the University of Iowa, Certified Manager diploma from the Institute for Certified Professional Managers (ICPM), and holds certificates in leadership and project management from the University of San Diego.

Angela J. Harris, BS, is a Project Manager with the Professional Development Program. Angie has served as Project Manager in VA Health Service Research & Development (HSR&D) since August of 2007. She has 11 years of experience as a project manager including

working as a Research Compliance Coordinator for the Indiana University IRB, recruiting patients, assisting with grant writing, performing extensive literature searches, implementing survey research, and data collection.

Ken Rennels, PE, has undergraduate and graduate degrees in Industrial Engineering from Purdue University and a Master of Science in Business Administration from Indiana University. Ken is a registered Professional Engineer and his background includes 11 years of industrial experience in the aerospace industry including six years in management positions. Professor Rennels has been on the Faculty of the Purdue University School of Engineering and Technology at IUPUI for 27 years. Professor Rennels has held administrative appointments at IUPUI including Chair, Department of Mechanical Engineering Technology; Associate Dean for Industry Relations; and Associate Dean for Undergraduate Programs, School of Engineering and Technology. Nationally, Professor Rennels, PE is on the Executive Committee for the Conference for Industry and Education Collaboration and Tau Alpha Pi, Engineering Technology Honorary Society. He is also Treasurer for the Engineering Technology Division of the American Society for Engineering Education. He is a member of American Society for Engineering Education, American Society of Mechanical Engineers, Society of Automotive Engineers, and Society of Manufacturing Engineers.

Jay Chandra, PhD, is a technical leader, practitioner, and educator in the field of modern Quality Engineering, specializing particularly in Lean and statistical methods for process improvement. In over 16 years Jay has provided extensive training and project guidance to professionals employing Lean and Six Sigma methods to improve performance of industrial processes and services. He is highly proficient in statistical diagnostic methods and

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statistical experimentation/modeling employing ANOVA, Hypothesis Testing, Regression, Design of Experiments, Multivariate Analysis, Time Series Analysis, Process Reliability, Survival Analysis, and Monte Carlo Simulation. He has trained 5,000 degreed engineers and project leaders worldwide in Six Sigma and facilitated about 25 Lean training sessions in VA hospitals nationwide. As an adjunct faculty in 2010, he received *Outstanding Faculty Award* from Wayne State University.

Phillip A. Swearingen, MBA, has held various leadership roles ranging from an Engineering Manager, Operations Manager and Business Unit Manager of a Fortune 500 company to the executive offices of privately owned enterprises. By employing Lean principles, he engages organizations to create cultures driven to continually improve. Invited speaker at a national summit on innovation sponsored by the Society of Manufacturing Engineers. A strategic Advisory Board Member to Purdue University-Calumet School of Management. A strategic Advisory Board Member to Purdue University-Calumet School of Engineering's "Center for Innovation through Visualization and Simulation". An Adjunct Faculty member of Purdue University Calumet School of Management and the School of Engineering Technology for Managerial Statistics, Operations Management and Production



Paul Moore and Jamie Workman-Germann

Planning. Past lecturer on Managerial Statistics for Indiana University Northwest School of Management Executive MBA program. President of the Lean Operations Consulting Group LLC which specializes in assisting clients to develop more agile organizations through the implementation of Total Quality principles including Lean Manufacturing techniques and self-directed work teams.

Debbie Curl-Nagy, MSSW, is an independent consultant and trainer with over 15 years of experience developing and providing training, consultation, and technical assistance in evaluation, continuous improvement, and action planning to a variety of audiences. She brings a wealth of experience from her work in state government, education, and non-profit organizations. Most recently, Debbie was employed as Director of Collaboration and Continuous Improvement for a national nonprofit organization focused on improving urban education. In her role as director, Debbie developed curriculum and provided training and technical assistance in the application of an adapted model of Lean Six Sigma to community partnerships. Debbie is a Lean Six Sigma Black Belt; has a Master's degree in Social Work; and has completed 35 hours toward her PhD in Social Work Education. Debbie is currently contracted by Purdue University to provide Lean Process Improvement training and project facilitation to the VA.

Jeff Fahner, RN, has been a Clinical Applications Coordinator at the Roudebush VAMC in Indianapolis, IN since 2006. He received a Bachelor in Science in Nursing from Tennessee State University. Before coming to VA, Jeff worked several years as a pediatric medical-surgical nurse and pediatric intensive care nurse at Vanderbilt Children's Hospital. After moving to Indiana as a travel nurse Jeff spent time as a pediatric burn nurse, a pediatric case manager, and a nurse on an adult medical-

surgical floor. Jeff recently graduated from the University of Phoenix with a Masters in Nursing and a Masters in Health Administration. Before becoming a nurse, Jeff spent 12 years in the U.S. Army and Army National Guard as an Armored Cavalry Officer serving as a tank platoon leader, scout platoon leader, and a Cavalry troop executive officer. Jeff is co-founder and co-director of the VA-IDEA.

Russell Cech, BSysE, MBA is a Lean Sensei Consultant for VA-CASE. His current responsibilities include Leading and Coaching Continuous Improvement (CI) teams, Rapid Process Improvement (RPIW) teams, and formal training of Lean Certification Courses. Prior to joining VA, Mr. Cech applied Lean Six Sigma methods to improve healthcare system Safety, Quality, Effectiveness, and Efficiency in both non-profit and for profit hospitals as well as in a primary care facility.

Prior to his work in healthcare, Russell worked as an Engineering Manager, CI Manager, and Certified Lean Six Sigma Black Belt in several industries and was a founding member of Honda's Lean Network. He has benchmarked Lean Six Sigma methods internationally and presented Lean Six Sigma / Quality Circle projects at international conferences. Russell introduced and directed an enterprise wide Operational Excellence/ Rapid Improvement initiative that was adopted by 55 global facilities and allowed best practices to be shared/ leveraged across all facilities. Russell received a MBA from Purdue University and a BS in Systems Engineering from Wright State University.

Dawn Eskau, RN, is a Registered Nurse with 35 years of VA service. In her current role as a consulting contractor with Purdue University she is responsible for yellow and green belt training, and RPIW facilitation. She has been involved in many national initiatives including coordinator for national collaboratives (Telephone,

Patient Aligned Care Teams), coach for numerous teams (HR, PACT, SPD, Surgery), faculty and planning committee member for the Access Academy.

Lash Mapa, PhD, is a Professor in Industrial Engineering Technology at Purdue University Calumet (PUC). His undergraduate and graduate degrees are in Chemical Engineering. He has several years' experience as a Chemical Engineer and a Process and Project manager with European, and U.S. manufacturing organizations. Currently, he is involved in the MS Technology program at PUC and has managed over thirty Lean Six Sigma projects with manufacturing, service industry, and educational institutions. He teaches undergraduate courses in Statistical Process Control, Project Management, graduate level Enterprise Quality Management, and Quality Systems. He is an ASQ Certified Black Belt.

Kyle Hultgren, PharmD, is currently the Managing Director for the Center for Medication Safety Advancement within the Purdue University College of Pharmacy in Indianapolis, Indiana. He also serves as an Adjunct Assistant Professor of Pharmacy Practice at Purdue where he pursues the development of innovative safe medication use practices as well as engaging methods to educate healthcare practitioners and student pharmacists. Dr. Hultgren is a co-author of a certification program in partnership with Purdue University and the Veterans Health Administration on Lean Healthcare and Systems Redesign that he is currently providing to health systems nationwide. He also serves as Chairman of the Rx-SafeNet Practice Based Research Network Advisory Board for community pharmacy based medication safety research in Indiana and serves on additional boards pertaining to patient and medication safety. Dr. Hultgren received his Doctor of Pharmacy from Purdue University College

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of Pharmacy in West Lafayette, Indiana.

Edward Miech, EdD, is a core investigator of the HSR&D Center for Health Information & Communication at the Roudebush VA Medical Center in Indianapolis, the Implementation Research Co-Coordinator for the national VA Stroke QUERI, and a faculty member of VA-CASE. Dr. Miech has a doctorate in education from Harvard and expertise in program evaluation, assessment, educational theory, and mixed methods.

Susan Scachitti, MBA, CSSBB, is a Professor of Industrial Engineering Technology at Purdue University Calumet. Professor Scachitti consults and teaches in traditional areas of Industrial Engineering which include Total Quality Management techniques and organizational change, methods engineering (including Lean methods), facility layout, process improvement, and ergonomics. Her accomplishments include implementation of Total Quality principles including Lean Manufacturing concepts, Demand Flow Technology, self-directed work teams, and various other techniques that improve overall process efficiencies within the organization. Also she held key roles in successfully attaining ISO9001 certification, establishing a benchmark for a self-directed workforce, conducting economic analysis, and cost justifications for new manufacturing technologies as well as utilizing various other industrial engineering concepts to reduce cycle times and increase production efficiencies. Since 2004 Professor Scachitti has focused her efforts towards applying Industrial Engineering concepts to improve Healthcare and other non-traditional service environments using Lean and Six Sigma methods. She is a staff member of the Indiana Center of Evidence Based Nursing Practice (EBNP), a collaborating center of the Joanna Briggs Institute. She has participated in system-wide implementation of Lean Six Sigma (LSS) practices within a large Indiana-based healthcare system. She has conducted sponsored research to integrate LSS practices as an implementation approach of EBNP to

reduce UTIs, as well as various other research involving simulation modeling, work flow analysis, and process improvement techniques.

Sandra Serrano, RN, BSN, CPHQ, CLNC, and LSSBB, has been a contract Faculty for VA-CASE for the past several years, specializing in facilitation of on-sight RPIWs, both for National Initiatives and VISN specific projects. Prior to joining VA-Case, Ms. Serrano was an RN at the Minneapolis VA Health Care System (VAHCS), and retired after 35 years of federal service. The last eight years of her VA service was in the Quality Management department. Duties included coaching and facilitating National System Redesign (SR) Collaborative teams both at Minneapolis and at sites throughout the VA system, serving as the National SR Coaches' Coach for the Cancer Collaborative- 3rd Generation, and being the Minneapolis VAHCS National EPRP Liaison. Her QM role responsibilities included oversight and data aggregation of the Minneapolis VA Performance Measures, IPEC data, the facility mortality programs, and first line involvement during accreditation visits by The Joint Commission, and the OIG. She is a Certified Professional in Healthcare Quality (CPHQ). Her clinical experience included 27 years in Surgical/Medical/Cardiac ICUs, Cardiac Catheterization Lab and Cardiac Research, the Emergency Department, and Manager for the Invasive Monitoring Lines department (ICUs/OR). This clinical experience adds extra in-sight and understanding of the clinical elements of System Redesign in the healthcare setting.

Deanna Suskovich, CSSMBB, is a Master Black Belt in Six Sigma and Lean Management and VA-CASE faculty member. She has extensive experience in application of Lean and Six Sigma within healthcare and is currently providing mentorship and coaching support for facilities participating in the VISN11 Telephone Care Collaborative, the AHRQ funded

National MRSA Collaborative as well as VHA ICG sites conducting RPIWs.

Chris Tucker, BS, is currently working for VA_CASE as a Program Analyst. He has a bachelor's degree in Telecommunications with a minor in Business and Criminal Justice from Indiana University. At this time he is pursuing a master's degree in Business Administration. Chris is a veteran of Operation Iraqi Freedom and has served six years in the Indiana National Guard. Before joining the VA, he worked as a Program Coordinator in Volunteer Services.

Kyle Hultgren, PharmD, is Director of the College of Pharmacy's Center for Medication Safety Advancement and holds a courtesy appointment as Clinical Assistant Professor of Pharmacy Practice. In his role at CMSA he pursues the development of innovative safe medication use practices as well as engaging methods to educate healthcare practitioners and student pharmacists. Dr. Hultgren is a co-author of a certification program in partnership with Purdue University and the Veterans Health Administration on Lean Healthcare and Systems Redesign that has been provided to over 8,000 professionals in health systems nationwide. His current work includes predictive analytics for adverse drug events and utilizing simulation methodologies for training medical professionals on safe medication use practices. He also serves as Chairman of the Rx-SafeNet Practice Based Research Network Advisory Board for community pharmacy based medication safety research in Indiana. In 2013, he received the Indiana Society of Health-System Pharmacists "Glen Sperandio Hospital Pharmacist of the Year" Award. Dr. Hultgren received his Doctor of Pharmacy from Purdue University College of Pharmacy in West Lafayette, Indiana.

Kimberly E. Johnson, PsyD, MA, received her Doctor of Psychology, PsyD – Clinical Psychology at John F. Kennedy University, Pleasant Hill, CA in 2006 and a

Master's degree in Clinical Psychology, from John F. Kennedy University in 2005. She also has a bachelor's degree in Computer Science from the University of Idaho and a master's certificate Executive Program for Scientists and Engineers from the University of California, San Diego. As an engineer, she worked as an R&D Firmware Engineer and a Senior Marketing Manager and Director of Consumer Imaging at Hewlett Packard. She also worked at Adobe, Inc. As a Senior Business Development Manager. After obtaining her doctorate in Clinical Psychology, she worked in several clinical inpatient and outpatient settings, had her own provayre practice and worked as a Primary Care Psychologist within VA. She is now responsible for the Certification of Lean Yellow and Green Belt applicants, helped to revise the Yellow and Green Belt Lean training course and is working with the Sierra Nevada VAMC to provide Lean training and project facilitation.

Transactional Systems Program (TSP)

Amy Vannatter-Dorr, LMSW, is a Health Systems Specialist and currently serves as the VA-CASE Associate Director for the Transactional Systems Program (TSP). She earned her Master's in Social Work from Michigan State University and worked in healthcare in the private sector before starting with VA in 2003. Amy worked for the VISN11 Network Office since June 2010 and joined the VA-CASE team in July 2011. She has extensive experience in a variety of healthcare settings as a clinical social worker, program manager, and in program development. Amy recently completed the VHA Graduate Health Administration Training Program in Health Systems Management through which she received first place in the Individual Presentation Competition for her work on the Non-VA Medical Care Coordination Project.

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Eric Lammers, BSIE, is the Deputy Associate Director for the Transactional Systems Program (TSP). In his current role, Eric serves in both a technical and supervisory capacity by functioning as a technical consultant for all TSP projects and supervising engineering staff within TSP. Prior to his current role, Eric was the VA-CASE Program Manager and Lead Engineer for the FBCS Optimization national deployment project. Since joining VA-CASE in 2010, Eric has had involvement on a variety of projects including the Consolidated Patient Accounts Centers (CPACs) Current State Assessment, Non-VA Medical Care Claims Standing Inventory Elimination Tool (SIET), Network 11 Contracting Office (NCO11) Systems Redesign, Health Benefits Appeals (HBA), Fee Basis Claims System (FBCS) Optimization, Non-VA Medical Care Coordination (NVCC), and various simulation and capacity planning projects. Prior to joining VA-CASE, Eric spent 4 years at Production Modeling Corporation (PMC), a Dearborn, Michigan based Industrial Engineering consulting company, where he acquired diverse consulting experience by supporting and managing various Industrial Engineering projects across multiple industries in the private sector (including manufacturing, health care, insurance, pharmaceutical, retail, and service). Eric received a Bachelor of Science degree in Industrial & Systems Engineering from the University of Michigan in 2006 and obtained Lean Healthcare Black Belt certification from Purdue University in 2011. Eric is currently pursuing a Master of Science in Engineering Management at the University of Michigan.

Stacie Bergman, BS is a transfer employee from the Department of Defense with 14 years of cumulative service, both as an active duty Army soldier and Army civilian. Stacie has a Bachelor's degree in Public Administration from the University of Hawaii. Prior to Stacie's arrival at VA-CASE in November, 2013, she worked for the US Army Financial Management Command performing office management, financial,

and administrative support for the US Army E-Commerce Directorate and Army Banking Programs. She is currently the administrative Officer for the Transactional Systems Program (TSP).



**VA CASE TSP Project Team:
Shaiju Eapen, Ed Gensert, and Eric Lammers**

Edward Gensert, BSIE, is an Industrial Engineer for the Transactional Systems Program Project Team. In 2010, Edward received his Bachelor's in Industrial Engineering with a minor in Business Administration from Bradley University in Peoria, IL. While in school, Edward was an active member and president of Alpha Pi Mu (Industrial Engineering Honor Society). He worked as a student trainee for VA-CASE from June-December 2010. In January 2011, Edward joined VA-CASE in Indianapolis, IN to work on the FBCS Optimization Project. Edward's areas of focus are Discrete-Event Simulation, Process Improvement/Standardization, Time Studies, and Statistical Data Analysis.

Chris Heathcote, BSIE, holds a Bachelor of Science degree in Industrial Engineering and a minor in Management from Purdue University. Graduating in 2004, Chris worked as an industrial/process engineering consultant for four years in the pharmaceutical and automotive industries. Typical projects included updating job designs and standard operating procedures to optimize labor and equipment utilization. After consulting, Chris worked as an inventory analyst in pharmaceuticals. He

developed a database to optimize inventories of 180 pharmacies across the United States by generating automatic replenishment orders based on forecasting. Chris' work on the VA-CASE Transactional Systems Program focuses on the FBCS Optimization Project.

Shruthi Musunuri, MS, is currently working with the Transactional Systems Program of the VA-CASE as a lead engineer for the Non-VA Medical Care National Standardization project. She has a Bachelor of Science in Computer Engineering from Purdue University and a Master of Science in Biomedical Engineering from Purdue University, Indianapolis. She obtained Lean Healthcare Black Belt certification from Purdue University. Since joining VA-CASE in August 2010, Shruthi's major projects included IE Coach for the National Cancer Care Collaborative Generations II & III, National PACT collaborative, and National Surgical Flow Improvement Initiative. Shruthi was the lead in redesigning the Head and Neck Cancer Care data tool. She was also a project co-leader in building the Head and Neck Cancer Toolkit series for VA and the IE representative for the PACT toolkit series. Shruthi's work skills range from engineering design, process analysis, systems redesign, and biomedical research and development. Her career included opportunities and work experiences from various Health Care Organizations and Universities in Denmark and USA.

Ming Hsu, BS is an Industrial Engineer for the Transactional Systems/VISN 11 Project Team. He received a Bachelor of Science degree in Civil Engineering from Georgia Tech and started his career with the Federal Aviation Administration. He worked on several fast paced airspace facility construction projects before joining the VA-CASE TSP team where he serves as an industrial engineer in improving the transactional systems of the VA Medical Centers.

Virginia "Ginger" Daggett, PhD, received her Doctorate degree in the Science of Clinical Nursing at IU School of Nursing Indianapolis, and her Master's degree

in Nursing Administration at Bradley University Peoria, IL. In VA, Ginger has been directly involved in the Telehealth/Care Coordination Program and served as an Associate Chief Nurse in the Central Illinois and West Lafayette Community-based Outpatient Centers. Over the last five years, Ginger has served as a Co-Implementation Research Coordinator for the Stroke QUERI which has allowed her opportunities to collaborate with Systems Redesign on local, regional, and national levels, and she continues to collaborate with the Stroke QUERI on national projects. Her research focus centers on novel nursing interventions for Veterans with traumatic brain injury (TBI)/stroke and their Caregivers, and use of mobile apps/devices in the delivery of these interventions. Presently, Ginger is the PI for a four-year, multi-site VA Nursing Research Initiative (NRI) Award for Caregivers of Veterans who have sustained a TBI and/or stroke. She continues to develop and test her **VETeranS Compensate, Adapt, REintegrate** iOS app to assist Veterans with TBI in their reintegration. Ginger serves as the facilitator for the Polytrauma QUERI Family Care Practice Advisory Committee and is currently leading initiatives to improve the engagement of Veterans and their families in their care. Ginger also serves on our National Office of Nursing (ONS) Nursing Research Advisory Board and co-chairs a national workgroup to enhance the infrastructure of nursing research. Locally, Ginger is partnering with our Research & Development Services to develop local research pathways and educational opportunities to facilitate nursing students and novice nurse researchers as they initiate local research. She also serves as a PI/mentor for both masters and doctorate students.

Derrick Markel, BSIE, joined the VA Center for Applied Systems Engineering (VA-CASE) in November of 2011 as an Industrial Engineer. Derrick graduated from the University of Michigan in 2011 with a degree in Industrial and Operations

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Engineering focusing on healthcare optimization, quality engineering, operations, human factors, and simulation and modeling. Prior to completing his education, Derrick served in the United States Navy for 6 years as an Electronics Technician stationed onboard the USS Abraham Lincoln, an aircraft carrier home ported in Everett, WA. Derrick is currently assigned to the Transactional Systems Program (TSP) under VA-CASE and is serving as the Program Manager for the Non-VA Medical Care National Standardization (NVNS) project. NVNS is a collaborative effort between Chief Business Office for Purchased Care and VA-CASE, with the overarching goal of developing standardized business processes for all Non-VA Medical Care programs and functional areas.

Celeste Wallace, BS, is an Industrial Engineer in the Recent College Graduates Program at the VERC. She graduated from the University of Illinois at Chicago in May 2103 with a Bachelor of Science degree in Computer Science. Celeste joined the VA-CASE team in November 2013, and she is currently working in the Transactional Systems Program on the CPAC Assessment Project.

Lincoln Ridge, BSCIMT, is an Industrial Engineer for the VA-CASE Transactional Systems Program and is currently assigned to the FBCS Optimization project team. Lincoln graduated in 2003 from Indiana University/Purdue University in Indianapolis, IN, with a bachelor's degree in Computer Integrated Manufacturing Technology and a minor in Military Science. For the past five years Lincoln has been a mobilized reservist, serving as an Assistant Detachment Officer in Charge (OIC) for a one year tour in Iraq. Upon his return, he served in multiple capacities, while being mobilized at Camp Atterbury, IN, training all branches of service as well as civilians, to include Team OIC, Company Commander, Battalion Intelligence Officer, and Assistant Battalion Training Officer. Lincoln is currently serving as a traditional drilling reservist as

the Battalion Signal (Communications) Officer, in Terre Haute, IN.

Anthony Pak, BSIE, is currently working with the Transactional Systems Program of the VA-CASE as an Industrial Engineer for the Non-VA Care National Standardization project. He is an Army National Guard veteran having served one tour in Iraq. Anthony earned a Bachelor of Science degree in Industrial and Systems Engineering from The Ohio State University. He recently worked for the Department of Defense – Navy as a Process Improvement Engineer, where he received a Lean Six Sigma Black Belt certification. Some of Anthony's major work with the Navy included leading Lean initiatives to improve transactional and manufacturing processes, improving facilities through 5S events, and leading strategic planning sessions. His latest assignment was as the embedded Black Belt on a ballistic missile submarine overhaul project team.

Charlie Harris III, BSIE, is an Industrial Engineer supporting Non-VA Medical Care Standardization. Charlie first joined VA-CASE in 2009 as a Program Analyst for System Redesign and as an Industrial Engineering coach for the First Generation Cancer Care Collaborative project at the Detroit VA. Prior to this, Charlie applied various skills in Industrial Engineering, Vehicle Operations Manufacturing, and Material Handling and Logistics at Ford Motor Company in Michigan. He also spent 2 years as an Industrial Engineer for Raytheon Missile Systems. There he became a Six-Sigma Specialist and supported several Land and Air Combat programs in 7S Facilities Design, Factory Layout Planning, Labor Performance Analysis, Visual Factory, and Capital Coordination. Charlie holds a BS in Industrial & Manufacturing Engineering from Wayne State University.

Satish Tyagi, MS, is currently pursuing a PhD in the Department of Industrial and Systems Engineering at Wayne State University, MI. He is working on the Non-VA Medical Care National Standardization (NVNS) project as an Industrial Engineer. Before joining VA, Satish completed an internship at Siemens Energy Inc. where he was involved in process standardization, quality management, value stream mapping sessions, development of Lean games, and conceptual development of visual management tools like Scrum and Obeya. Satish received his Master of Science degree in Mechanical Engineering from the University of Louisiana at Lafayette in 2010.

Cameron Husk, BSME, is an Industrial Engineer working for the Transactional Systems Program/VISN 11 VERC Project Team. His previous private sector experience includes quality engineering in manufacturing, research in aerospace design, and quality assurance in logistics and medical device assembly. He served a combat tour with the US Army as a combat engineer in Northern Afghanistan during OEF 10-11, and continues serving with the Indiana National Guard. Cameron earned a Bachelor of Science degree in Mechanical Engineering from the Rose-Hulman Institute of Technology in 2007.

Cameron's present assignments include working on NVNS, "Non-VA Medical Care National Standardization", which seeks to identify best practices in all functional areas within Non-VA medical care and develop a standardized process for consistency and optimization. He is also working on the Network 11 Contracting Office's Process Improvement Project, which utilizes Lean methodologies to identify and implement optimized business practices within the NCO.

Shaiju Eapen, BSIE, CSSGB, has over three years of professional experience in both manufacturing and healthcare. He earned his Bachelor of Science in Industrial Engineering at Wayne State University and is currently pursuing his master's degree in Business

Administration at Florida Tech University. His healthcare experience includes emergency department and operating room optimization, registered nurse flow, and standardization of patient units. He has also facilitated various Lean Kaizen projects. Shaiju has been working at VA since September, 2009. He has been involved in various facility projects in Detroit and conducted analysis on primary care scheduling grid, parking structure, etc. He is currently involved in the Cancer Care Collaborative and the PACT Collaborative. In addition to his professional background he is an active member in Institute of Industrial Engineers.

Lindsay Hall, MHA, joined the VA Center for Applied Systems Engineering (VA-CASE) in February 2013 as a Project Manager. Previously, Lindsay worked with the Systems Redesign office at the Lexington VA Medical Center, serving as a Lean Black Belt for multiple process improvement teams. Prior to working with the Systems Redesign office, Lindsay was the Program Manager for a four component, multi-phase Systems Improvement Capability Grant, which included integration of Lean Engineering principles into the Lexington VA Medical Center and designing and implementing a national Disclosure Training Program to be delivered to VA medical centers across the country. Currently, Lindsay serves as the Project Manager for the Non-VA Medical Care National Standardization (NVNS) project, a collaborative effort between Chief Business Office for Purchased Care and VA-CASE. The overarching goal of NVNS is to develop standardized business processes for all Non-VA Medical Care programs and functional areas, thus achieving a consistent service experience for the Veteran and Non-VA Provider in addition to decreasing variability in processes and improper payments. Lindsay holds a Bachelor of Science degree in Dietetics, as well as a Masters in Health Administration, both from the University of Kentucky.

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Geoff Black, MBA, is a recent graduate of the Moore School of Business at the University of South Carolina. He joined the VA-CASE in December 2013 as an Industrial Engineer, and is assigned to the Transactional Systems Program. He holds bachelors' degrees in Civil Engineering and Environmental Engineering, and is a licensed Professional Engineer in the State of California. He spent his early career working on highway improvement projects in downtown Los Angeles. He has also spent significant time in Asia working as a corporate language trainer. As part of his graduate studies, he spent a semester at Waseda University in Tokyo, and is certified as a level N2 in Japanese Language Proficiency. In 2011, he interned at Michelin Tire Corporation in Tokyo, focusing on process improvement for their Asia Supply Chain. In 2012 he earned his six-sigma greenbelt while working on a student consulting project with Eaton Corporation in Greenwood, SC.

Valerie L. Curtis is a Health Systems Specialist who works with Strategic Program and Data Engineering Resources (SPDER) program. Valerie is very proud to be a contributing partner involved with improving the quality and reliability of healthcare delivery for our nation's heroes. Prior to joining the VA, Valerie was an IT Project Manager for Blue Cross Blue Shield of Arizona (BCBSAZ). Valerie has 16 years of industry experience and a proven track record in IT Project Management, Data Management, and Software Quality Management in Healthcare. One of her greatest accomplishments at BCBSAZ was managing the design, development, and deployment of a new claims processing and payment system, which included the migration of three years of historical claims data and a mid-project conversion from SSN's to non-identifiable patient id's.

Christopher Carmichael graduated from Virginia State University with a bachelor's degree in manufacturing engineering and a minor in mathematics in December 2013. Prior to working for VA-CASE, he interned for both

the Commonwealth Center for Advanced Manufacturing (CCAM) and the Department of Homeland Security. While at the Department of Homeland Security he worked on analyzing and

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improving various system databases. Currently he is working with the Transactional Systems Program (TSP) as an industrial engineer.

Jake Fong, MBA, FACHE, CSSBB, is the VA-CASE Associate Director of VISN 11 Programs. Jake joined VA Veterans in Partnership Healthcare Network (VISN 11) in May 2012 as the VISN Systems Redesign Program Manager. Jake is responsible for the creation and management of Systems Redesign initiatives and other programs impacting process improvement within VISN 11. Prior to joining VISN 11, Jake served in several prior VA positions including a) as the Systems Redesign Program Manager for VA Southwest Healthcare Network (VISN 18) where he helped develop a Systems Redesign foundation and process improvement infrastructure with a strong focus on Lean Management System, b) as the Health Systems Specialist for VA Health Care Upstate New York (VISN 2) where he assisted with information analysis, strategic planning and deployment, and application for the Malcolm Baldrige National Quality Award, and VA Carey and Kizer award applications, and c) as the Financial Manager for the Samuel S. Stratton VA Medical Center in Albany NY where he managed and oversaw the Facility budget and associated financial activities. Jake received his Masters in Business Administration in Health Systems Administration from the Graduate College of Union University in June 2004 and his Bachelors of Science from Cornell

University in May 2000. Jake is a Certified Six Sigma Black Belt and is a Fellow of the American Colleges of Healthcare Executives.

Arun Deepak Sampath Kumar, MSIE, has a master's degree in Industrial & Systems Engineering from Wayne State University and a bachelor's degree in Mechanical Engineering from Anna University in Chennai, India. He worked as a Lean Production Engineer at the Acetech Pct., Ltd. in Coimbatore, India through where he gained experience in logistics and Lean concepts. Arun completed an internship in 2011 as a Process Improvement Engineer at Henry Ford Health Systems in the Department of Pathology. He joined VA-CASE Purchased Care/VISN 11 Project Team in December 2011 and works in the VISN 11 office in Ann Arbor, MI. Arun provides engineering assistance on the FY12 VISN11 Process Improvement Initiatives in the areas of commodities standardization, patient flow, homelessness, and patient safety ("No Harm"). Arun is Six Sigma Green Belt Certified.

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Appendix C: VHA Facility/VISN Office Engagement Sites FY13 only

VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformatio n Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Albany, NY VAMC	X		X	X	X
Albuquerque, NM VAMC			X		X
Altoona, PA VAMC					X
Amarillo, TX VAHC					X
Anchorage, AK VAMC					X
Ann Arbor, MI VAMC	X		X		X
Asheville, NC VAMC			X		
Atlanta, GA VAMC					X
Baltimore, MD VAMC	X		X		
Bath, NY VAMC	X		X		
Battle Creek, MI VAMC		X			X
Bay Pines, FL VAHC					X
Bedford, MA VAMC					X
Big Spring, TX VAMC					X
Birmingham, AL VAMC	X				X
Boise, ID VAMC					X
Boston, MA VAMC			X		X
Bronx, NY VAMC			X	X	X
Broward, FL VAMC		X			
Buffalo, NY VAMC	X				
Butler, PA VAMC					X
Canandaigua, NY VAMC	X				
CBO - Wash DC					X
CBO Denver, CO	X				
CDW Austin, TX		X			
Charleston, SC VAMC				X	X
Cheyenne, WY VAMC	X			X	
Chicago, IL Hines VAMC					X
Chicago, IL VAMC	X				X
Chillicothe, OH VAMC			X		
Cincinnati, OH VAMC	X				

VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformati on Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Clarksburg, WV VAMC					X
Cleveland, OH VAMC				X	X
Coatesville, PA VAMC					X
Columbia, MO VAMC					X
Columbia, SC VAMC					X
CPAC (Lebanon, PA)	X				
CPAC (Orlando, FL)	X				
CPCPAC (Leavenworth, KS)	X				
Dallas, TX VAMC				X	X
Danville, IL VAMC	X	X			X
Dayton, OH VAMC		X			
Decatur, GA VAMC				X	
Denver, CO VAMC				X	
Detroit, MI VAMC	X	X	X	X	X
Dublin, GA VAMC					X
Durham, NC VAMC				X	
East Orange, NJ VAMC					X
El Paso, TX VAMC					X
Erie, PA VAMC	X		X	X	X
Fargo, ND VAMC	X		X	X	
Fayetteville, AR VAMC	X		X		
Fayetteville, NC VAMC	X				
FCCPAC (Orlando, FL)	X				
Fort Wayne, IN VAMC	X				
Fresno, CA VAMC					X
Ft Wayne, IN VAMC		X			X
Ft. Meade, SD VAMC			X		
Gainesville, FL VAMC				X	X
Grand Junction, CO VAMC			X		
HAC Denver, CO					X
Helena, MT VAMC					X

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VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformatio n Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Honolulu, HI VAMC	X		X		
Houston, TX VAMC		X		X	
Hudson, NY VAMC					X
Huntington, WV VAMC					X
Indianapolis, IN VAMC	X	X	X	X	X
Iowa City, IA VAMC				X	
Iron Mountain, MI VAMC					X
Jackson, MS VAMC					X
Kansas City, MO VAMC					X
Lakewood, WA					X
Las Vegas, NV VAMC	X		X	X	X
Lebanon, PA VAMC				X	X
Lexington, KY VAMC	X				X
Little Rock, AR VAMC	X		X		
Loma Linda, CA VAMC	X	X		X	X
Long Beach, CA VAMC					X
Los Angeles, CA VAMC	X			X	X
Louisville, KY VAMC	X	X		X	X
MACPAC (Asheville, NC)	X				
Madison, WI VAMC	X		X		X
Manchester, NH VAMC					X
Marion, IL VAMC	X				X
Marion, IN VAMC		X			X
Martinsburg, WV VAMC					X
Mather, CA VAMC					X
Memphis, TN VAMC			X	X	X
Miami, FL VAMC		X			X
Milwaukee, WI VAMC	X				X
Minneapolis, MN VAMC		X		X	X
Montgomery, AL VAMC					X
Mountain Home, TN VAMC					X

VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformation Program	Strategic Programs and Data Engineering Resources Program	Transactiona l Systems Program
MSCPAC (Nashville, TN)	X				
MSCPAC (Smyrna, TN)	X				
Muskogee, OK VAMC			X		
Nashville, TN VAMC	X				X
NCCPAC (Middleton, WI)	X				
NECPAC (Lebanon, PA)	X				
New Orleans, LA VAMC	X			X	
New York Harbor, NY VAMC				X	X
North Chicago, IL FHCC	X				
Northampton, MA VAMC					X
Northport, NY VAMC					X
OCCC Wash DC		X			
OHI Salt Lake City, UT		X			
Oklahoma City, OK VAMC	X				
Orlando, FL VAMC	X		X	X	X
Palo Alto, CA VAMC	X	X		X	X
Perry Point, MD VAMC					X
Pheonix, AZ VAMC					X
Philadelphia, PA VAMC				X	X
Phoenix, AZ VAMC	X			X	
Pittsburgh, PA VAMC					X
Poplar Bluff, MO VAMC					X
Portland, OR VAMC					X
Prescott, AZ VAMC					X
Providence, RI VAMC				X	X
Puget Sound, WA VAMC					X
Reno, NV VAMC	X		X	X	X
Roseburg, OR VAMC					X
RTLS PMO Wash DC		X			
Sacramento, CA VAMC	X				
Saginaw, MI VAMC	X	X			X
Salem, VA VAMC	X				X

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VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformati on Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Salt Lake City, UT VAMC	X		X		
San Diego, CA VAMC	X			X	X
San Francisco, CA VAMC	X		X	X	X
San Juan, PR VAMC			X		X
SAO Murfreesboro, TN					X
Shreveport, LA VAMC			X		
Spokane, WA VAMC				X	X
St. Louis, MO VAMC	X	X		X	X
Syracuse, NY VAMC	X				
Tampa, FL VAMC				X	X
Temple, TX VAMC			X	X	
Togus, ME VAMC					X
Tomah, WI VAMC					X
Topeka, KS VAMC					X
Tucson, AZ VAMC					X
Tuscaloosa, AL VAMC					X
VACO (Washington, DC)	X			X	
VAHC Fort Harrison, MT					X
Vancouver, WA VAMC					X
Walla Walla, WA VMAC					X
Washington, DC VAMC					X
WCPAC (Las Vegas, NV)	X				
West Haven, CT VAMC			X		X
West Palm Beach, FL VAMC			X		X
White City, OR VAMC					X
White River Junction, VT VAMC					X
Wichita, KS VAMC					X
Wilkes-Barre, PA VAMC			X		X
Wilmington, DE VAMC					X
VISN 3 (Bronx, NY)	X				
VISN 6 (Hampton VA)	X				

VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformation Program	Strategic Programs and Data Engineering Resources Program	Transactiona l Systems Program
VISN 7 (Augusta, GA)	X				
VISN 10 (Cincinnati, OH)		X	X		
VISN 11 (Ann Arbor, MI)	X	X			
VISN 12 (Chicago, IL)	X				
VISN 19 (Denver, CO)	X				
VISN 21 (San Francisco, CA)	X				
VISN 22 (Long Beach, CA)	X				

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Appendix D: VHA Facility/VISN Office Engagement Sites FY09 to FY13

VHA Facility/ VISN/ Program Office	VA-CASE Program Office				
	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformati on Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Albany, NY VAMC	X		X	X	X
Albuquerque, NM VAMC			X	X	X
Alexandria, VA VAMC			X		
Altoona, PA VAMC			X		X
Amarillo, TX VAHC		X			X
Anchorage, AK VAMC	X				X
Ann Arbor, MI VAMC	X	X	X		X
Arlington, TX VAMC	X				
Asheville, NC VAMC	X		X		
Atlanta, GA VAMC	X			X	X
Augusta, ME VAHC			X		X
Austin, TX CDW		X			
Austin, TX Vet		X			
Baltimore, MD VAMC	X		X		
Bath, NY VAMC	X		X		
Battle Creek, MI VAMC	X	X			X
Bay Pines, FL VAHC	X		X		X
Bedford, MA VAMC	X				X
Big Spring, TX VAMC					X
Birmingham, AL VAMC	X				X
Boise, ID VAMC				X	X
Boston, MA VAMC	X		X		X
Brockton, MA VAMC	X				
Bronx, NY VAMC	X		X	X	X
Broward, FL VAMC		X			
Buffalo, NY VAMC	X				
Butler, PA VAMC	X				X
Canandaigua, NY VAMC	X				
CBO - Wash DC					X
CBO Denver, CO	X				
CDW Austin, TX		X			

VA-CASE Program Office					
VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformation Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Charleston, SC VAMC				X	X
Cheyenne, WY VAMC	X		X	X	
Chicago, IL Hines VAMC					X
Chicago, IL VAMC	X	X			X
Chillicothe, OH VAMC	X		X		
Cincinnati, OH VAMC	X		X		
Clarksburg, WV VAMC					X
Cleveland, OH VAMC	X			X	X
Coatesville, PA VAMC					X
Columbia, MO VAMC				X	X
Columbia, SC VAMC	X				X
Columbus, OH VAMC	X				
Connecticut HCS VAMC	X		X		X
CPAC (Lebanon, PA)	X				
CPAC (Orlando, FL)	X				
CPCPAC (Leavenworth, KS)	X				
Dallas, TX VAMC				X	X
Danville, IL VAMC	X	X			X
Dayton, OH VAMC	X	X			
Daytona, FL VAMC				X	
Decatur, GA VAMC				X	
Denver, CO VAMC	X		X	X	
Detroit, MI VAMC	X	X	X	X	X
Dublin, GA VAMC					X
Durham, NC VAMC	X			X	
East Orange, NJ VAMC					X
El Paso, TX VAMC	X			X	X
Erie, PA VAMC	X		X	X	X
Fargo, ND VAMC	X		X	X	
Fayetteville, AR VAMC	X		X		
Fayetteville, NC VAMC	X			X	
FCCPAC (Orlando, FL)	X				
Fesno, CA VAMC			X		
Fort Harrison, MT VAHC	X				

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VHA Facility/ VISN/ Program Office	VA-CASE Program Office				
	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformatio n Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Fort Wayne, IN VAMC	X				
Fresno, CA VAMC			X		X
Ft Wayne, IN VAMC	X	X	X		X
Ft. Meade, SD VAMC			X		
Gainesville, FL VAMC				X	X
Glendale, CO	X		X		
Grand Junction, CO VAMC			X		
HAC Denver, CO					X
Hampton, VA VAMC	X				
Helena, MT VAMC	X				X
Hines VAMC			X		
Honolulu, HI VAMC	X		X		
Houston, TX VAMC	X	X	X		
Houston,TX VAMC		X		X	
Hudson, NY VAMC			X		X
Huntington, WV VAMC					X
Indianapolis, IN VAMC	X	X	X	X	X
Iowa City, IA VAMC			X	X	
Iron Mountain, MI VAMC					X
Jackson, MS VAMC	X				X
Kansas City, MO VAMC		X	X		X
Lakewood, WA					X
Las Vegas, NV VAMC	X		X	X	X
Leavenworth, KS VAMC	X				
Lebanon, PA VAMC			X	X	X
Lexington, KY VAMC	X				X
Little Rock, AR VAMC	X		X	X	
Loma Linda, CA VAMC	X	X	X	X	X
Long Beach, CA VAMC					X
Los Angeles, CA VAMC	X			X	X
Louisville, KY VAMC	X	X		X	X
MACPAC (Asheville, NC)	X				

VHA Facility/ VISN/ Program Office	VA-CASE Program Office				
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Madison, WI VAMC	X		X		X
Manchester, NH VAMC	X				X
Mare Island, CA			X		
Marion, IL VAMC	X				X
Marion, IN VAMC	X	X			X
Martinsburg, WV VAMC					X
Maryland VAMC			X		
Mather, CA VAMC					X
Memphis, TN VAMC	X		X	X	X
Miami, FL VAMC		X			X
Milwaukee, WI VAMC	X		X	X	X
Minneapolis, MN VAMC		X	X	X	X
Montgomery, AL VAMC	X				X
Mountain Home, TN VAMC	X				X
MSCPAC (Nashville, TN)	X				
MSCPAC (Smyrna, TN)	X				
Murfreesboro, TN VAHC	X				
Muskogee, OK VAMC			X		
Nashville, TN VAMC	X				X
NCCPAC (Middleton, WI)	X				
NECPAC (Lebanon, PA)	X				
New Orleans, LA VAMC	X			X	
New York Harbor, NY VAMC	X		X	X	X
North Chicago, IL FHCC	X				
Northampton, MA VAMC	X				X
Northport, NY VAMC					X
OCCC Wash DC		X			
OHI Salt Lake City, UT		X			
Oklahoma City, OK VAMC	X		X		
Omaha, NE VAMC			X		
Orlando, FL VAMC	X		X	X	X
Palo Alto, CA VAMC	X	X	X	X	X
Perry Point, MD VAMC					X
Pheonix, AZ VAMC	X		X		X

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VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformation Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Philadelphia, PA VAMC	X			X	X
Phoenix, AZ VAMC	X			X	
Pittsburgh, PA VAMC	X		X		X
Poplar Bluff, MO VAMC					X
Portland, OR VAMC				X	X
Prescott, AZ VAMC					X
Providence, RI VAMC	X			X	X
Puget Sound, WA VAMC			X		X
Reno, NV VAMC	X		X	X	X
Richmond, VA VAMC	X		X		
Roseburg, OR VAMC					X
RTLS PMO Wash DC		X			
S. Texas VAMC			X		
Sacramento, CA VAMC	X				
Saginaw, MI VAMC	X	X			X
Salem, VA VAMC	X				X
Salisbury VAMC			X		
Salt Lake City, UT OHI		X			
Salt Lake City, UT VAHC	X		X		
Salt Lake City, UT VAMC	X		X		
San Diego, CA VAMC	X			X	X
San Francisco, CA VAMC	X	X	X	X	X
San Juan, PR VAHC			X		
San Juan, PR VAMC			X		X
SAO Murfreesboro, TN					X
Sheridan, WY VAMC	X				
Shreveport, LA VAMC			X		
Spokane, WA VAMC			X	X	X
St. Cloud, MN VAMC			X		
St. Louis, MO VAMC	X	X	X	X	X
Syracuse, NY VAMC	X		X		
Tampa, FL VAMC	X			X	X
Temple, TX VAHC			X		
Temple, TX VAMC			X	X	

VA-CASE Program Office					
VHA Facility/ VISN/ Program Office	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformation Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
Tomah, WI VAMC	X				X
Topeka, KS VAMC	X		X		X
Tucson, AZ VAHC				X	
Tucson, AZ VAMC	X			X	X
Tuscaloosa, AL VAMC					X
VA Boston HCS (Jamaica Plain)	X				
VACO (Washington, DC)	X			X	
VAHC Fort Harrison, MT					X
Vancouver, WA VAMC					X
Walla Walla, WA VMAC	X				X
Wash DC OCCC		X			
Wash DC RTLS PMO		X			
Washington, DC VAMC	X	X	X		X
WCPAC (Las Vegas, NV)	X				
West Haven, CT VAMC			X		X
West Palm Beach VAMC			X		
West Palm Beach, FL VAMC			X		X
White City, OR VAMC					X
White River Junction, VT VAMC	X		X		X
Wichita, KS VAMC					X
Wilkes-Barre, PA VAMC			X		X
Wilmington, DE VAMC					X
VISN 1 (Bedford, MA)	X				
VISN 2 (Albany, NY)	X				
VISN 3 (Bronx, NY)	X				
VISN 4 (Pittsburgh, PA)	X				
VISN 5 (Linthicum, MD)	X		X		
VISN 6 (Salisbury, NC)	X				
VISN 7 (Duluth, GA)	X		X		
VISN 8 (St. Petersburg, FL)	X				
VISN 9 (Nashville, TN)	X				
VISN 10 (Cincinnati, OH)	X	X	X		
VISN 11 (Ann Arbor, MI)	X	X			

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VHA Facility/ VISN/ Program Office	VA-CASE Program Office				
	Professional Development Program	VHA Engineering - Technical Assistance Program	Clinical Partnerships in Healthcare Transformation Program	Strategic Programs and Data Engineering Resources Program	Transactional Systems Program
VISN12 (Chicago, IL)	X				
VISN 15 (Kansas City, MO)	X				
VISN16 (Ridgeland, MS)	X		X		
VISN 17 (Arlington, TX)	X				
VISN 18 (Meza, AZ)	X				
VISN 19 (Denver, CO)	X				
VISN 20 (Vancouver, WA)	X		X		
VISN 21 (Mare Island, CA)	X				
VISN 22 (Long Beach, CA)	X		X		
VISN 23 (Eagan, MN)	X		X		

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