

VA Center for Applied Systems Engineering (VA-CASE)

**Annual Report
February 1st, 2013**



Message from the VA-CASE Director

FY12 was a very exciting year for VA-CASE!



Through the tremendous efforts of our staff, faculty and academic partners, we were successful in expanding our mission towards the goal of becoming the primary resource for Industrial and Operations Systems Engineering expertise within VHA.

VHA Partnership

We were able to leverage our \$1.25M in annual core funding to \$8.5M in FY12 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 Office of Informatics and Analytics.

VHA Engagement

Our staff and faculty supported over 200 on-site engagements across 78 VHA healthcare facilities, 16 VISN offices and 8 National Program Offices in support of VHA transformation efforts to a culture of continuous improvement.

VHA Innovation

Through the use of our *Innovation to Impact* rapid deployment strategy, we were able to deploy over 20 distinct 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'd like 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.

We would also like to express our continued gratitude to our sponsors – the Indianapolis, Ann Arbor and Detroit VAMC Leadership teams, the VISN11 Leadership team and the VHA National Systems Redesign Program Office, led by Dr. Mike Davies.

Our vision for FY13+ is to continue to extend and expand the application of Operational and Systems Engineering in support of the transformation of VHA healthcare.

Heather Woodward-Hagg

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 of Operational Systems Engineering (OSE) faculty with VHA administrative and clinical management and staff. Our center leverages the significant expertise present within VHA medical centers and affiliated academic partners in operational systems engineering, informatics and implementation science to facilitate transformation within VHA healthcare delivery systems.

Within VA-CASE, we strive to be a model for integration of OSE 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 OSE to improve 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 OSE within VHA Healthcare Delivery.

FY12 was a year of significant growth for VA-CASE. In FY12, we more than doubled the number of on-site engagements across the VHA as compared to the prior two years (FY10-FY11) combined. To support these expanded efforts, we added partnerships with two new academic partners (University of North Carolina-Chapel Hill and University of Georgia) and grew our technical and administrative staffing by over 20%, resulting in our current organization of 109 funded VA-CASE staff and faculty.

In FY12, VA-CASE provided over an estimated 9,400 days of Industrial, Systems Engineering and Informatics support across 78 VA facilities, 16 VISN offices and 8 VHA National Program offices with an estimated cost savings of over \$4.5M over externally contracted engineering services. The type of expertise provided ranged from facilitation support for an extensive network of Surgical Flow Rapid Process Improvement Workshops (RPIWs) in 26 VHA facilities to development of interactive simulation models to support evolution of strategic planning in acute stroke care.

We produced several products and programs with significant national impact. The Purchased Care Non-VA Medical Care Coordination, FBCS Optimization and Clinical Program Consulting continue to inform national roll-out of Purchased Care programs. The VA-CASE/Purdue Lean Certification and Training Program engaged over 5700 VA staff during FY12 in Lean/SR/OSE principles, with an estimated cost savings of over \$5.2M when compared to external Lean Training consultant rates. The Interactive Visual Navigator (IVN), developed by our Wayne State Faculty and the Detroit VAMC, continues to provide the basis for an integrated, fully automated, 'systems of systems' approach within Reusable Medical Equipment (RME) Processing.

VA-CASE continued to expand its support and expertise with National Program Offices to include the Office of Informatics and Analytics (OIA) and the National Dialysis Program, through our expanded partnership with the Office of Patient Care Services. In FY12, due to the continued VA-CASE national deployment efforts, VA-CASE began to invest in program management and data engineering resources to support the sustainment of structural, administrative, and communication needs of these large programs and projects, as well as provide resources who can innovatively design communication and reporting platforms to improve VA-CASE program situational awareness. This new VA-CASE Program Office, Strategic Programs and Data Engineering Resources (SPDER), has been tasked with the mission of developing Program Management and Data Engineering structures to support our Rapid Innovation methods and philosophies.

Additionally, we broadened 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 moving forward into FY13+.

FY13+ Plans

Our focus for FY13+ will be to continue efforts to direct our center toward a sustained, customer-oriented Veterans Engineering Resource Center within VHA. Within FY13+, we will leverage existing partnerships to continue development and management of a balanced portfolio of projects (i.e. Project Pipeline) within each of our programs that 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 amongst our staff and faculty, yet insure commitments to customers are fulfilled and projects are supported through to national dissemination.

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Markers denote VA-CASE Industrial Engineer or Informatics on-site support/training or engagement activity. Individual markings may indicate multiple engagements. Click on a marker on the map for more detail related to that site. (See Appendix C for a detailed breakdown by Program.)

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

The US map above indicates the VHA facilities and VISN offices where VA-CASE staff and faculty provided on-site engineering and/or informatics consultation, training or project team support. Note that individual markings may indicate multiple engagements. In FY12, over 200 distinct on-site engagements (engineering and/or informatics consultation, training or project team support) were conducted by VA-CASE staff and faculty across over 78 VA facilities, 16 VISN offices and 8 National VHA program offices.

As shown in Appendix C, the map details the cumulative engagements, FY09-present. In total, VA-CASE has worked across 85% of VHA facilities (120/140 VHA facilities or Heath Care Systems) and VISNs, with over 380 distinct on-site engagements (engineering and/or informatics consultation, training or project team support).

VA-CASE Strategic Goals/Targets FY09-12

Strategic Pillar	Strategic Goals	VERC Annual Objective	Strategic Targets	Goal/Target	Annual Results			
				VA-CASE	FY09/10	FY11	FY12	
Leading People	*Successful Integration of Industrial and Systems Engineers within VHA	*Improve VERC Retention and Student Conversion Rates	- % Retention (IE)	>80%	88%	92%	97%	
			- % Retention (other)	>70%	83%	100%	96%	
	*Support Veteran Workforce of the Future	*Provide Robust Work Environment	- # of VERC Employees	varies	23	38	59	
			- AES Scores	>4	NA	3.9	4.2	
		*Increase % of VERC hires that have veteran status	- % employees with veteran status	>25%	17%	26%	42%	
		- % employees with >30% SC disability	>10%	4%	16%	22%		
Leading Change	*Provide Highest Levels of Customer Service	*Develop/Deploy Robust Program and Project Management Infrastructure	- % on-time project start	>90%	100%	100%	100%	
			- % of project with 100% deliverables met	>80%	95%	81%	92%	
			- % on-time project completion	>70%	95%	86%	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	
				- % of funding non-SR/VERC	>75%	38%	79%	79%
		*Demonstrate/Validate VERC ROI	- % ROI as compared to GSA	>1.5X	1.97	1.90	1.88	
			- % of VERC Admin/Overhead	<15%	8%	7%	9%	
			- % of funding to new products/innovation (vs process redesign)	>25%	23%	34%	35%	
Results Driven	*Enable development, testing and wide-spread deployment of innovative models of care delivery	*Expand External (non-VERC) Partnerships	- Total # of projects		21	37	51	
				- % of projects w/ National Program Office Partnerships	>75%	95%	92%	88%
				- % of projects w/ VISN/Facility partnerships	>50%	62%	57%	51%
			*Demonstrate National Impact of Initiatives	- % of projects in National Deployment	>50%	67%	65%	55%
	*Enable/Facilitate more rapid translation and deployment of research into practice	*Expand HSRD/QUERI Partnerships	- % of projects w/ HSRD/QUERI partnerships	>20%	24%	27%	24%	
		*Increase publications/presentations related to VERC work	- # of presentations	varies	15	26	12	
				- # of publications	varies	9	6	13

FY12 Performance Against Strategic Goals

VA-CASE strives to insure 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 assess and measure this impact.

In FY12, we continued to meet or exceed performance goals for all strategic targets. We improved overall employee retention rates to greater than 95% across our 59 VA-CASE VHA IE and non-IE employees. Through active recruitment and employee development programs, we increased the number of VA-CASE employees with Veteran status from 26% to over 40%, with over 20% 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 7X, resulting in a FY12 budget of \$8.5M. In FY12, that investment returned nearly 1.8X in value as compared to GSA rates for similar services, with over 35% of our funding supporting development of new products and innovations. Over the 51 projects on-going in FY12, nearly 90% were partnerships with VHA National Program Offices and over 50% are currently in national deployment. A complete summary of VA-CASE Strategic goals and targets and performance FY09-FY12 is shown in the table above.

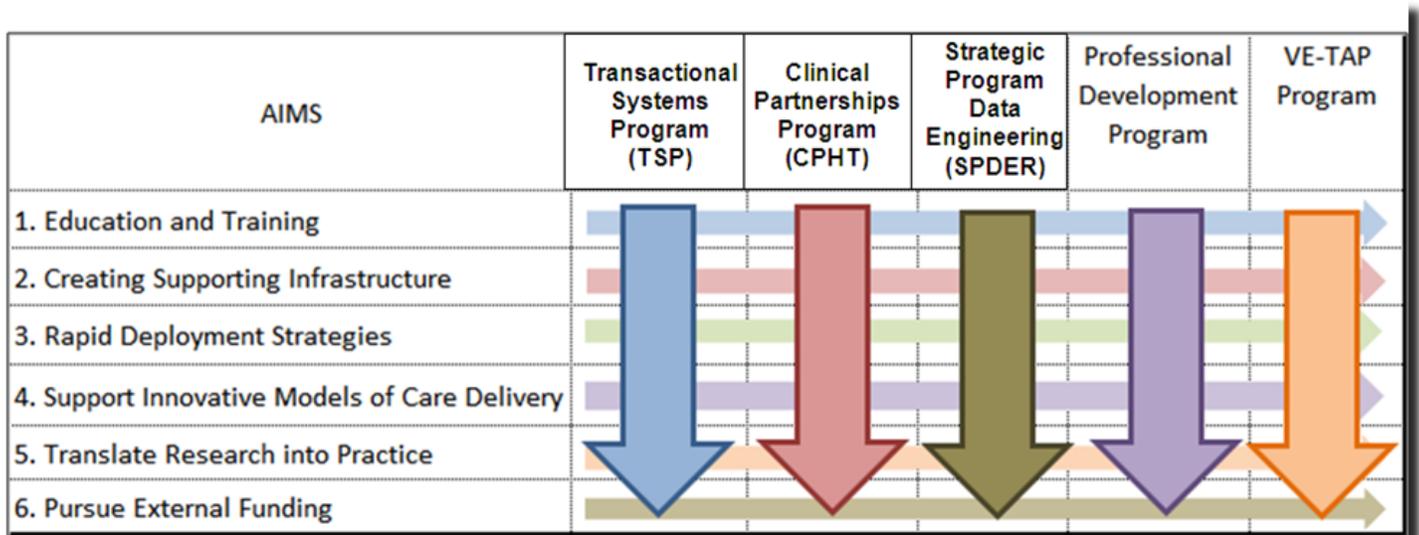
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VA-CASE Mission/Vision

The focus of our center is to integrate OSE within VA healthcare delivery systems in order to promote systems improvement and to support implementation of innovative models of care delivery. The vision for our center is to become a catalyst enabling collaboration among clinical and administrative operations, academic, and research partnerships within VA healthcare at local, regional and national levels.

Specific AIMS

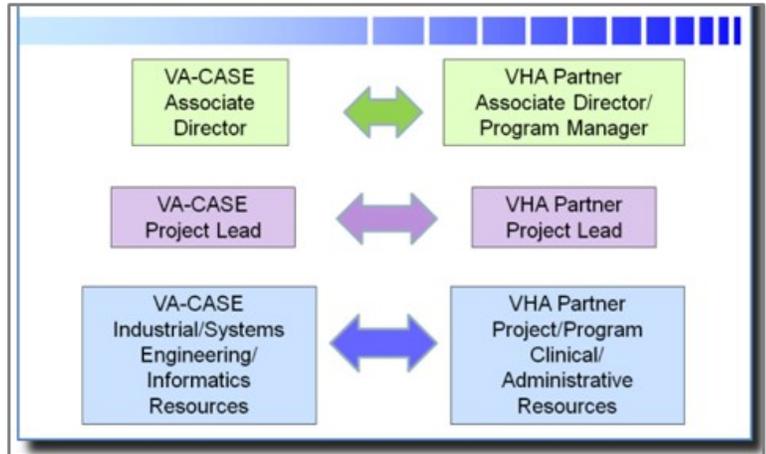
1. Develop and implement training and educational programs based in OSE disciplines, methods and tools.
2. Optimize the VHA administrative infrastructure to allow integration of OSE resources into the executive leadership, operational and clinical management structure of VHA facilities.
3. Deploy rapid implementation strategies, utilizing OSE 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 implementation and research of operations systems engineering (OSE) within VISN11 and the rest of VHA.



VA-CASE Partnerships

VA-CASE staff and faculty consider our on-going partnerships with VHA National Program offices, as well as our academic affiliates, to be integral to the successful integration of OSE within VHA healthcare delivery systems. VA-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 here.

A current outline of VHA and academic and affiliate partners are shown below.



The initial partnerships with VISN11 office and facilities, the VHA CBO Purchased Care Program and the VHA Optimizing Care Committee, as well as with our academic affiliates at Wayne State University (WSU), University of Michigan (UM), and Purdue University, Indiana University, have been expanded to include University of North Carolina – Chapel Hill and University of Georgia. Throughout FY12, we worked to expand both the VHA and academic affiliate relationships to insure a continuous stream of non-core funding as well as Industrial/Systems and Informatics capacity to meet our customer needs.

VHA Partners	Academic/Affiliate Partners
<ul style="list-style-type: none"> • VISN 11 Office • VISN11 Contracting • VHA Office of Patient Care Services • VHA Purchased Care Program Office (CBO) • VHA Business Policy Division (CBO) • VHA Business Integration Service Lines (BISL) • VHA Optimizing Cancer Care Committee • National ISO9000 Compliance Division • National PACT Steering Committee • National Office of Specialty Care • National Surgery Office (NSO) • VHA Office of Sterile Processing • VHA Office of Informatics/Analytics • National Real Time Locating Systems PMO (RTLS PMO) 	
<ul style="list-style-type: none"> • VA Ann Arbor HCS 	<ul style="list-style-type: none"> • University of Michigan (UM) College of Engineering
<ul style="list-style-type: none"> • Detroit VA Medical Center 	<ul style="list-style-type: none"> • Wayne State University
<ul style="list-style-type: none"> • Indianapolis VA Medical Center • VA HSR&D Center • Stroke QUERI • HIV/AIDS QUERI 	<ul style="list-style-type: none"> • 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

VA-CASE Innovation to Impact Deployment Strategy

One of the VA-CASE core strengths is the application of Rapid Cycle Innovation, Implementation and Impact strategies for project deployment within each of our primary programs.

The phases of this strategy are outlined below:

Innovation Phase:

Planning: During the planning phase, initial customer insights lead to problem identification and an initial 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, fully integrating the innovation.

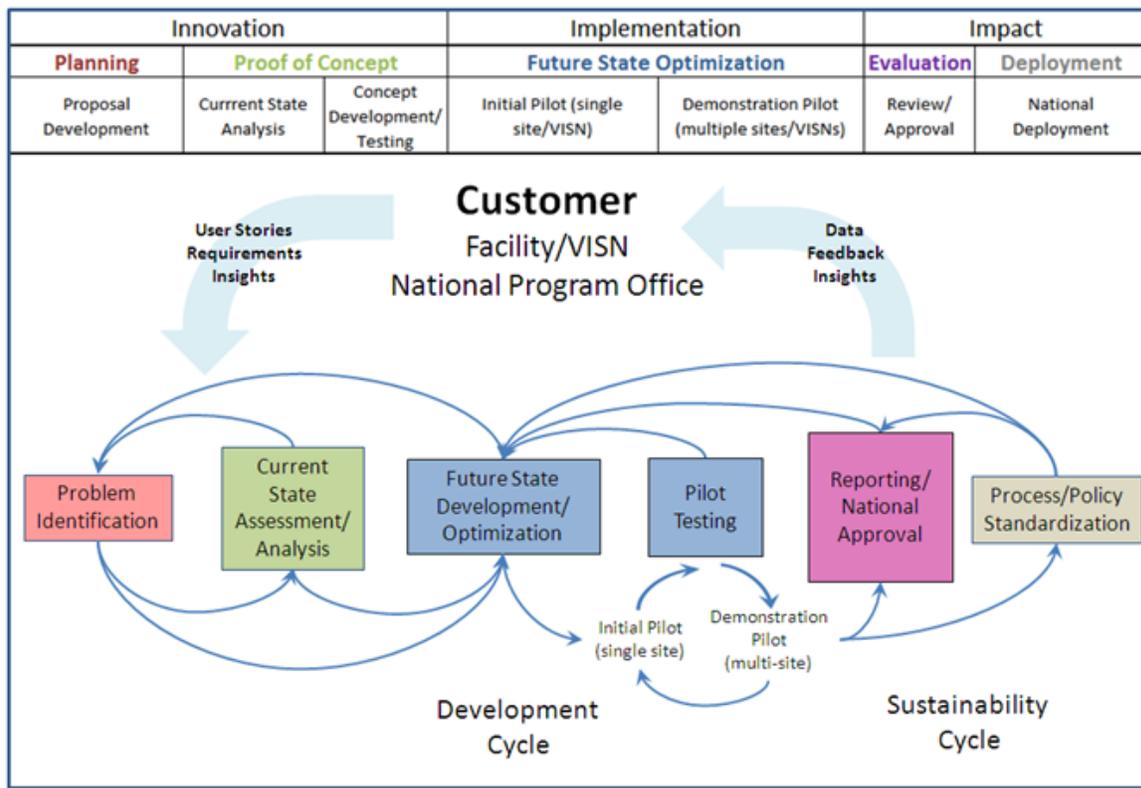
Implementation Phase:

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.

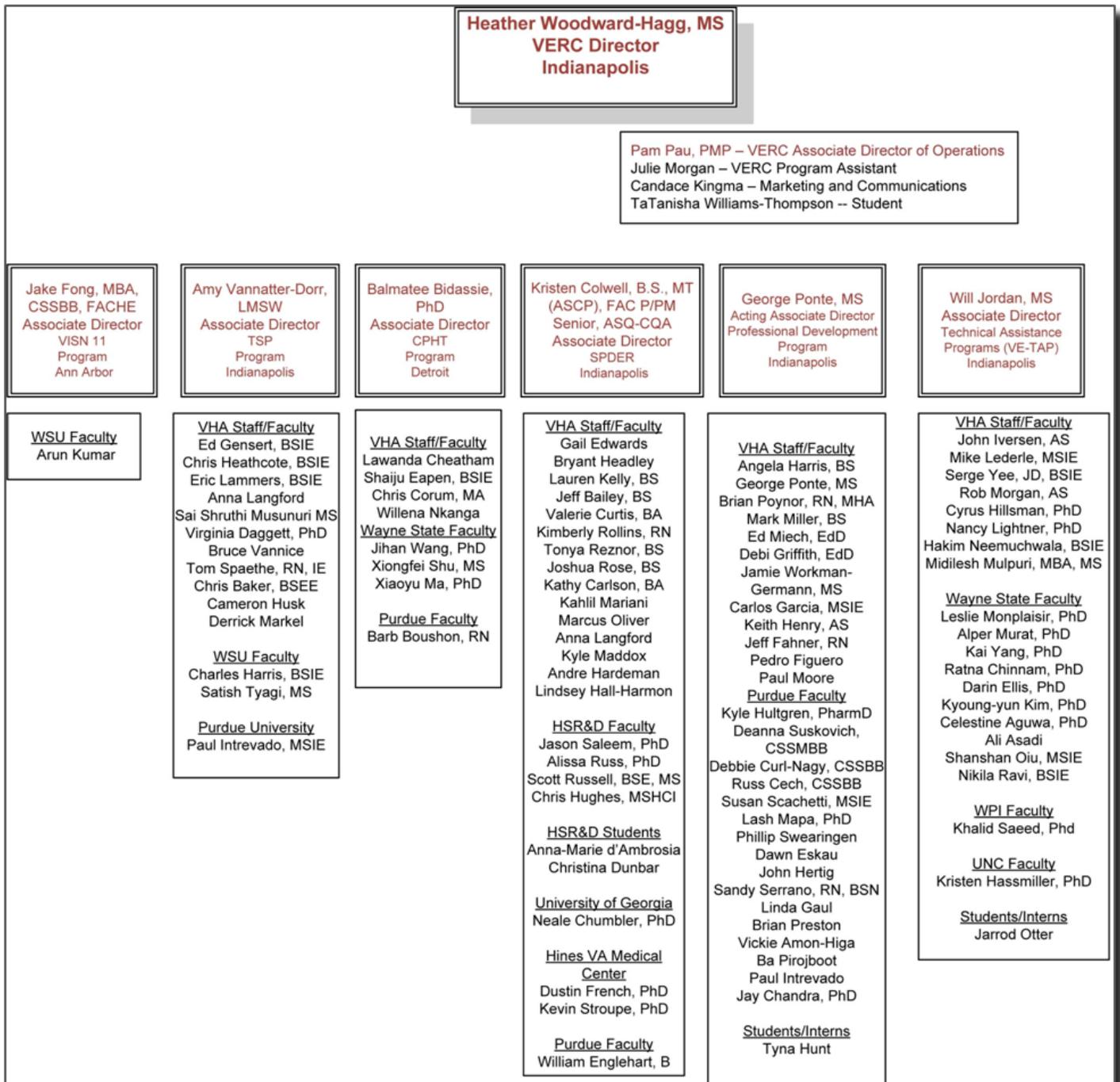
Impact Phase:

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

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



Organizational Chart



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Progress Against AIMS

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

Throughout this time frame, the focus of VA-CASE training and educational programs has been the development, dissemination and evaluation of OSE, 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 include:

- **VHA Lean Training Programs:** The VA-CASE/Purdue Lean Training, Education and Certification Programs have continued in dissemination nationally for the Yellow Belt (Practitioner), Green Belt (Facilitator) and Black Belt (Program Manager) and Senior Executive levels. In FY12, over 5,000 VHA staff and faculty participated in these programs across more than 95 facilities and VISN and national offices.
- **VHA Clinical Informatics Training Programs:** The VA-Informatics Development and Education Academy (VA-IDEA) Program was developed and disseminated to provide training for Clinical Applications Coordinators (CAC) in basic and advanced Clinical Reminder techniques. In FY12, two regional training centers in Indianapolis and Phoenix were deployed. Over 405 clinical applications staff from 125 facilities (21 VISNs) participated in the VA-IDEA clinical applications training programs.
- **Improvement Advisor Academy:** VA-CASE provided primary OSE support for the FY11-12 national SR Improvement Advisor Academy (IAA) programs, providing OSE training and project mentoring to over 40 participants.
- **VHA Lean Six Sigma Training Programs:** VA-CASE partnered with the CBO Purchase Care Program to develop/deploy VHA specific Lean Six Sigma Black Belt Training. 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 Executive, Yellow Belt, Green Belt and Black Belt levels. Up to 10 projects are on-going at each of the seven CPAC sites into FY13 with continued VA-CASE mentoring/coaching support.
- **VA Lean Practitioners Network:** The VA Lean Practitioners Network (VALPN) is an informal forum for social networking for VA practitioner of Lean Healthcare hosted by VA-CASE staff and faculty. To date, this network has over 500 regular participants throughout VHA.
- **VHA Lean Certification:** In FY12, VA-CASE developed and deployed an internal VHA Lean Certification Program at the Yellow Belt, Green Belt and Black Belt Levels. To date, over 400 VHA staff have enrolled in this program.

Impact to VHA:

- FY12: \$5.2M cost savings (as compared to training costs for external programs)
- FY09-present: \$9.3M cost savings (as compared to training costs for external programs)

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

VA-CASE support for optimizing this AIM has focused on three primary areas: 1) building healthcare-based OSE 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 in OSE, 4) initiating and supporting programs that facilitate executive leadership, as well as operations and clinical management, use of OSE.

In support of this AIM, VA-CASE has provided primary OSE support to several high visibility national initiatives, including the Office of Informatics and Analytics (OIA) T-16 HMP/Hi2 Usability Analytics Project and the Expansion of the VA Operated Outpatient Dialysis Clinics Pilot. Significant accomplishments include:

- **IE/OSE Recruitment:** In FY12, VA-CASE successfully recruited and hired an additional 12 BS/MS/ PhD level Industrial Engineers and Informatics staff for a total of 47 BS/MS/PhD level Industrial and Systems Engineers and Informaticists. Of those positions, retention is 88% (42/47).
- **Engineering Intern/Co-op Program:** VA-CASE established an engineering internship program with multiple academic partners, resulting in 7 Industrial Engineering and Informatics student interns in FY12. Four of the five (80%) of the student interns were hired into VHA (VERC and Facility) positions upon graduation.
- **Hi2 Usability Analytics:** In FY12, VA-CASE, in partnership with the HSRD Human Computer Interaction (HCI) Lab, was awarded the contract to provide support for the Office of Informatics and Analytics (OIA) T-16 Health Management Platform (HMP/Hi2) Usability Analytics Project. This project will be conducting usability evaluation for the next generation VHA EMR.
- **VHA Dialysis Clinic Pilot Expansion:** VA-CASE partnered with the Office of Patient Care Services and the VHA National Dialysis Steering Committee to provide technical support for the expansion of the VA Operated, Outpatient Dialysis Clinic Pilot. Within this project, VA-CASE will assist in development of standardized metrics, data collection and reporting systems, make/buy decision models and standardized deployment packages related to the development and deployment for future VA-operated outpatient dialysis clinics.
- **Make/Buy Decision Models:** VA-CASE developed and deployed an expanded portfolio of Make/Buy Decision Models, including models to support make/buy decision-making for Acute Stroke/tPA (in partnership with the Stroke QUERI, GI Clinical Procedures and Polysomnography).
- **Leading Organizational Improvement Workshops:** In FY11, VA-CASE was awarded the contract to provide primary coordination, planning and faculty support for the FY11/FY12 Systems Redesign Executive Workshop entitled "Leading Organizational Improvement." This program provides instruction in effective SR and OSE techniques for all VHA Senior Leaders throughout FY11/12. Throughout FY12, 14 VISN offices participated in this program with over 700 VHA Senior Executive participants.

Impact to VHA:

- Capacity/expertise of additional 12 fully-integrated IE/OSE/Informatics staff
- Over 700 VHA Senior Executives introduced to transformational concepts: A3 Thinking, Continuous Daily Improvement, Strategic Alignment/Deployment, Rapid Improvement, Daily Management
- Expanded evidence of use of OSE for executive, operations and clinical management (Dialysis, Hi2 Usability Analytics, Make/Buy Decision Models)

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

Primary support for this AIM comes from the VA-CASE Professional Development and VHA Engineering Technical Assistance (VE-TAP) Programs. The Professional Development Program provides local and national capacity in coaching interdisciplinary teams in application of rapid implementation strategies, such as Lean and Six Sigma, to improve and optimize current administrative and clinical delivery processes. VA-CASE initiatives supporting this AIM utilize the training and innovative methods developed in AIMS 1-2 to facilitating implementation of transformed delivery processes outlined in AIM4.

- **Lean Management Pilot:** In FY12, VA-CASE successfully launched the Lean Management Pilot across 5 VHA facilities in order to test the translation of transformational Lean Deployment Strategies within VHA. Participating pilot sites will 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.
- **RPIW Facilitation:** VA-CASE faculty provided over 400 days of RPIW coaching and mentoring across 30 facilities/ VISN offices and 2 National Program Offices involving more than 58 project teams and more than 600 VHA staff. Sites/initiatives supported include:
 - Surgical Flow – 26 sites, 52 RPIWs
 - Tuscaloosa, Alabama, January 2012 – Human Resources RPIW
 - Madison, Wisconsin on March 26, 2012 – Pharmacy RPIW
 - Butler, Pennsylvania, April 2012 – Scanning Patient Health Documents RPIW
 - 10N, May, 2012 Tort Claims RPIW – (Central Office)
 - Montana Health Care System, May, 2012 – Colorectal Screening RPIW
- **Knowledge Management:** In FY12, 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 timeliness and reliability improvement of the continuum of Cancer Care. These sites have received over 10,000 unique users since their launch in September 2010.
- **Innovation to Impact Deployment Model:** VA-CASE developed and deployed a hybrid rapid deployment model 'Innovation to Impact'. This deployment model combines strategies from Agile Software Development, Continuous Engineering Development, Extreme Engineering and other rapid prototyping models in order to compress development to deployment cycles to less than 18 months and improve customer satisfaction and engagement.
- **Agile Software Development:** VA-CASE staff and faculty, in partnership with WSU and Purdue, pioneered the use of the Agile Software methodology for clinical applications as part of the iPhone/iPad application development cycle. In FY12, two iPhone apps were developed and tested – Heath4Heroes and Traumatic Brain Injury (TBI).

- **Dissemination/Diffusion Mechanisms:** As outlined in Appendix A, VA-CASE Faculty and Staff produced 12 peer reviewed journal and proceedings publications, 1 Books/Book Chapters and have 16 documented presentations related to VA-CASE initiatives.

Impact to VHA:

- Three distinct Rapid Deployment strategies fully translated, validated and in-use within/across VHA (Rapid Process Improvement Workshops, Innovation to Impact Deployment Model, Agile Software Development)
- Innovative Knowledge Management Strategies fully developed, successfully applied and effectively spread across multiple clinical pathways with over 10,000 unique users (Improvement Resource Guides)
- Organizational Transformation strategy translated, currently in testing/validation within VA across 7 facilities, infrastructure/capacity for future diffusion being developed (Lean Management System)
- Wide-spread recognition of VHA as leader in OSE translation, application and diffusion within healthcare delivery through extensive publication and presentation portfolio

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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.

In 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 FY12 project cycle (Re-Usable Medical Equipment, Fee Basis Claims System Software Optimization, Non-VA Medical Care Coordination, Surgical Flow and Specialty Care) were completed and are in national roll-out. Significant accomplishments associated with this AIM include.

- **Optimizing Cancer Care Collaborative:** VA-CASE successfully partnered with the National VHA Optimizing Cancer Care Collaborative Steering Committee to apply OSE/SR methods to VA Cancer Care Collaboratives. To date there have been three Collaborative Phases – Phase 1: January 2009-January 2010, Phase 2: January 2010 - January 2011, and Phase 3: June 2011-February 2012. VERC engineers provided over 1,200 days of on-site IE support across 61 Phase I/II/III teams. Results from the Phase I/II/III Collaboratives showed that ~66% of AIMS were met with over 50% of teams improving timeliness and quality of care greater than 40% as compared to baseline.
- **Patient Aligned Care Teams (PACT):** Throughout FY11/FY12, VA-CASE provided administrative, coordination, coaching and technical support for the diffusion of the Patient Aligned Care Team (PACT) throughout VHA. In all, over 141 PACT teams were supported across the 18-month collaborative.
- **Specialty Care Collaborative:** In FY12, VA-CASE provided support for 23 facility-based team in the VHA National Specialty Care Collaborative (pilot phase). VA-CASE IE staff provided support in development/deployment of measurement tools and knowledge management to inform the collaborative and further refine the PACT Change Package.
- **Surgical Flow Improvement Initiative:** 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) across 20 participating facilities (40 RPIWs) facilitated by VA-CASE staff/faculty.
- **Fee Basis Claims System (FBCS) Optimization:** VA-CASE, in partnership with Chief Business Office (CBO) Purchased Care 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 processes per day. This project is currently in full national deployment.
- **Non-VA Medical Care Coordination:** VA-CASE provided clinical applications development and coordination support for the FY12 national deployment of the standardized Non-VA Medical Care Coordination (NVCC) processes developed in FY11.

- . **“iPhone/iPad App Development:** In FY12, two iPhone apps were developed and tested – Heath4Heroes and VETS-CARE iOS Intervention. The Health4Heroes App allows Veterans to integrate healthcare information and health goals. The VETS-CARE app is designed to assist Veterans with Traumatic Brain Injury (TBI) in reintegration into communities by providing real-time strategies and resources based on 14 algorithms.
- **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 current in pilot at the Detroit VAMC.

Impact to VHA:

- Facilitated successful development, testing and national deployment of innovative models of care delivery across 6 distinct clinical and administrative processes within VHA (Cancer, PACT, Specialty Care, Surgical Flow, Non-VA Medical Care, Claims Processing)
- Over 9,400 days of Industrial Engineering/Informatics support at a cost savings of over \$5.5M as compared to external consulting support

Cost Benefit to VHA: \$5.5M savings (as compared to external consulting support + IVN purchase)

Distribution on Patient-Centered Medical Homes."

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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 FY12, 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:

- The “context matrix” approach, developed by VA-CASE/HSRD faculty member Dr Edward Miech, was piloted as part of the VA Cancer Care Collaborative. This innovative method for capturing, organizing, and analyzing large amounts of unstructured data – both quantitative and qualitative –is part of the FY10 funded QUERI study called “RE-INSPIRE,” a 3-year Service-Directed Project (SDP) with a total budget of \$946K.
- VA-CASE/HSRD faculty members Dr. Edward Miech and Dr. Deborah Griffith developed an innovative evaluation method for Lean Deployment Sites integrating a ‘context matrix’ and realist evaluation approach. The evaluation method is currently in pilot at the Indianapolis VAMC and other Lean Deployment sites.
- VA-CASE co-funded HSRD investigator Allissa Russ Received a Career Development Award titled “Improving Medication Safety through Human Factors and Informatics Research.”
- VA-CASE/R&D faculty member Dr. Virginia Daggett received a 4-year \$1M grant to support her work in testing Telephone Assessment and Skill Building (TASK) for TBI informal caregivers. Interventions will focus on providing information relating to providing care for stroke or TBI as well as self-care strategies.

Impact to VHA:

- Joint HSR&D/VERC funded faculty: 5 Investigators (Edward Miech, Debi Griffith, Allissa Russ, Jason Saleem, Virginia Daggett), 2 Clinical Applications Coordinator (Jeff Fahner, Russell Jacobitz), 3 staff/faculty (Angela Harris, Candace Kingma, Scott Russell)
- Number of HSR&D/QUERI/SDP proposals submitted by VERC faculty: RE-INSPIRE (approved; 3-year SDP with total budget of \$946K, projected started in April 2011), TASK (approved; 4-year \$1M, CDA approved; 5-year, \$563,000).

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).

Dr. Kai Yang and other VA-CASE Affiliate Partners were awarded a \$552,000 National Science Foundation grant to find efficiency models for patient-centered medical homes (PCMH), a model emerging as a way to improve health outcomes by focusing services around primary care. This is our first external (non-VA funded) grant for internal VA work.

Dr. Yang, a professor of industrial and systems engineering at Wayne State University in Detroit, will collaborate with scientists from the University of Michigan and Dr. Neale Chumbler from the University of Georgia. They will study VA's patient-centered medical homes utilizing VA data, health systems engineering, statistics and health services science expertise to innovate PCMH by creating new business rules and operational procedures.

Dr. Yang said they'll study VA health services nationwide, working with VA's office of informatics and analytics. "We're going to use the data they have to analyze the workload for each patient, and we're going to model how to divide workload across team members," Yang said.

The project's aim is create adaptive statistical models that can predict workloads based on patient factors, and to create optimization models that help manage doctors' patient panels and staff levels. Dr. Yang and his team plan to develop algorithms for how the facility allocates work under varying factors and then create an app for administrators and doctors to track and manage their workloads and progress. Looking at the needs throughout a health system, Dr. Yang said, "You can bump up or lower down the patients each team will see." The project is called "An Allocation Model with Dynamic Updates for Balanced Workload Distribution on Patient-Centered Medical Homes."

Impact to VHA: \$552,000 external funding for research directly applicable to VHA

Program Overviews and Highlighted Projects

In FY12, we broadened the focus and scope of our six VA-CASE Program Offices to support future growth moving forward into FY13+:

- **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 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 that result in increased efficiency, effectiveness, accountability, accuracy and standardization of workflow and decision making.
- **VISN11 Program:** This is a new program instituted in late FY12. Information about the work being done by the program is included starting on page 86.

Transactional Systems Program (TSP)

The Transactional Systems Program (TSP), previously known as the Purchased Care Program, is currently a partnership with CBO. The VA-CASE TSP budget for FY12 was \$1.1M with approximately 31% allocated from VA-CASE core funds. The TSP team specializes in the development and delivery of systems redesign/operational systems engineering tools to increase the efficiency, effectiveness, accountability, accuracy and standardization of workflow and decision making within transactional systems. The FY12 VA-CASE Transactional Systems Program budget was approximately \$870,000 per year, with approximately 22% (\$170,000/year) allocated from VA-CASE core funds. During FY12, the project portfolio of the VA-CASE Purchased Care Program expanded beyond non-VA medical care to include other types of transactional systems. The Program's name was changed to Transactional Systems to reflect the diversification of the portfolio. In FY12 TSP worked on the following projects: Fee Basis Claims System Optimization, Clinical Program Consulting, Health Benefits Appeals, Non-VA Medical Care National Standardization, Dialysis Project, VA Intranet Quorum Project, Non-VA Medical Care Coordination, and Network 11 Contracting Systems Redesign Project.



VA- CASE Transactional Systems Project Pipeline

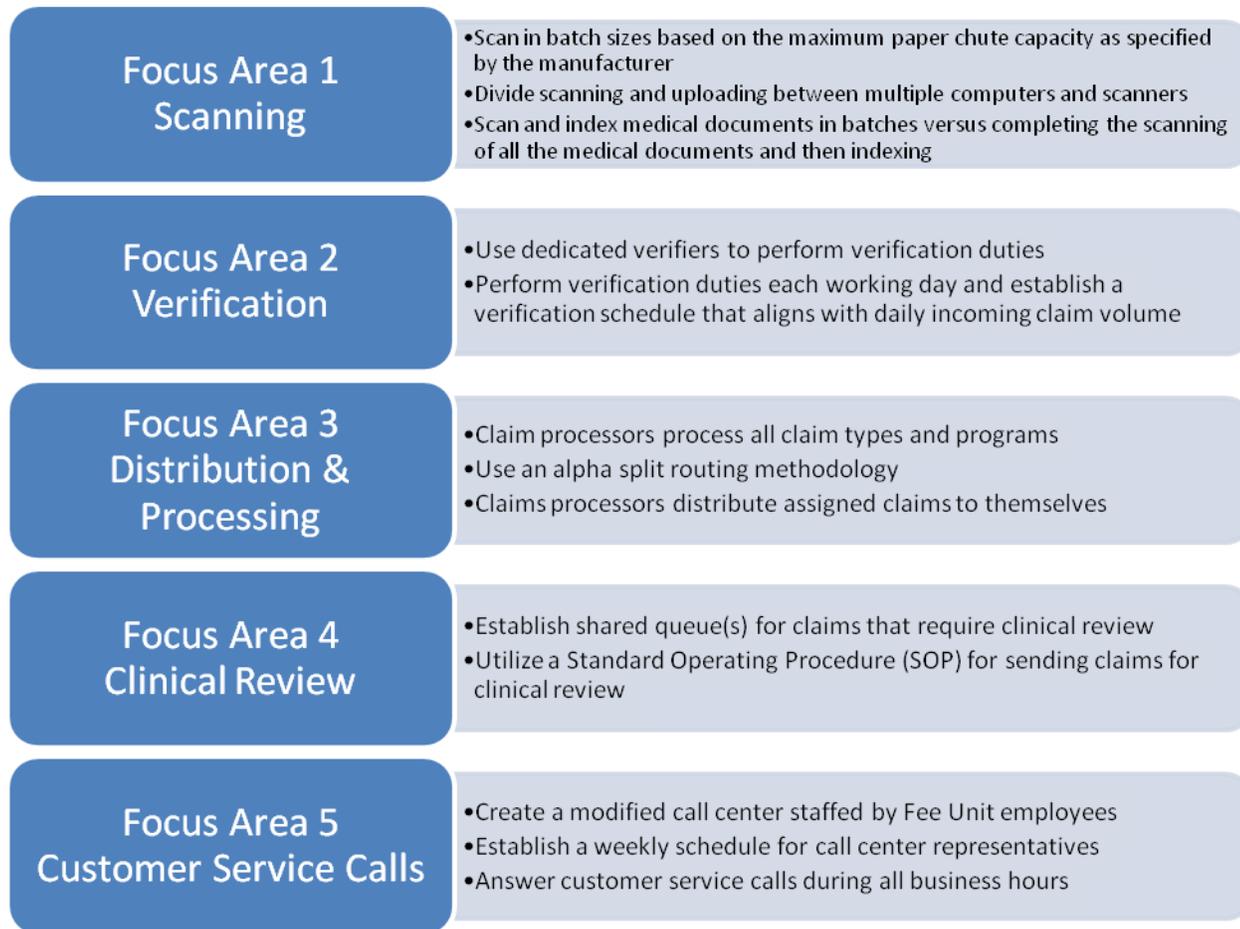
	Innovation		Implementation		Impact			
	Planning	Proof of Concept	Future State Optimization		Evaluation	Deployment		
	Innovation Development	Proposal Solicitation	Concept Development/ Testing	Initial Pilot (single site/VISN)	Demonstration Pilot (multiple sites/VISNs)	National Reporting/ Approval	National Deployment	National Policy Change
CBO Purchased Care		Non-VA Medical Care National Standardization				Clinical Program Consulting	Non-VA Medical Care Coordination (NVCC)	FBCS Optimization
CBO Business Policy				Health Benefits Appeals				
CBO			VA Intranet Quorum					
CBO VISN 11 Contracting	VISN 11 Contracting Systems Redesign							

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VA- CASE Transactional Systems Project Summary

Fee Basis Claims System (FBCS) Optimization

The FBCS Optimization initiative, currently in national deployment, is sponsored by the Chief Business Office Purchased Care (CBO) 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 encompasses the optimization of the processes between the time a claim is received from a non-VA provider until a claim is rejected, denied, or paid. The following FBCS optimized processes were developed within five focus areas:



History: In FY10, CBO and VA-CASE collaborated with subject matter experts (SMEs) from various Fee Units across the country to develop standardized business processes that optimized the use of the FBCS software. Scanning, verification, distribution and processing, clinical review, and customer service calls were targeted as key focus areas for optimization due to being identified as areas in which frequent bottlenecks occurred in the process. In FY11/ FY12, the FBCS optimized processes were piloted at Alpha and Beta test sites. The results from the pilot showed improved timeliness in the processing of claims and an increase in the volume of claims processed per day.

National Deployment Strategy: National deployment of FBCS Optimization began in July 2012 and is ongoing. It is being accomplished primarily through the virtual delivery methods of Live Meeting and teleconferences. During FY12, two deployment strategies were tested: champion site and VISN-wide deployment. With the champion site

strategy, the CBO/VA-CASE team assisted and supported a VISN champion site with the implementation of FBCS Optimization. After a three-month implementation phase, the champion site was then responsible for the deployment of the optimized processes to their remaining VISN Fee Units. The champion site deployment strategy was tested in VISN 15. The VISN-wide deployment strategy was tested in VISN 21 with the CBO/VA-CASE team deploying to all Fee Units within the VISN simultaneously. After assessing the efficacy of each strategy which included the burden level of deployment on the VISNs and Fee Units, CBO opted to utilize a VISN-wide deployment strategy.

Implementation Strategy: VISN-wide deployment consists of three phases: (1) Pre-Implementation (4 weeks); (2) Implementation (3 months); and (3) Post-Implementation (3 months). During the Pre-Implementation phase, the deployment team provides an overview of FBCS Optimization to leadership from the VISN and Fee Units. Each Fee Unit completes a Site Survey from which VA-CASE completes a Readiness Assessment/Gap Analysis and site specific Implementation Plan. Additionally, a two-day on-site FBCS/claims processing training session is conducted by the National Non-VA Medical Care Program Office (NNPO) Field Assistance Team. During the Implementation phase, the CBO/VA-CASE team facilitates weekly calls with each VISN team to provide training on various FBCS Optimization tools, discuss incremental progress towards FBCS Optimization goals, and to discuss any obstacles or questions. During the Post-Implementation phase, the CBO/VA-CASE team facilitates monthly calls with each VISN team to review their performance, ensure sites sustain the process changes, and to address any questions.

Deployment Status: By the end of FY12, 6 Fee Units across 3 VISNs had fully activated the FBCS optimized processes to the greatest extent possible. Between October and December 2012, deployment was initiated at 29 additional Fee Units within 6 VISNs. Deployment is to occur within two VISNs per month with national deployment targeted to be completed in January 2014. The VISN deployment status is illustrated in the table below.

FBCS Optimization Deployment Status (as of December 2012):			
Fee Units Activated	Fee Units In-Process		VISNs Remaining
<ul style="list-style-type: none"> • VISN 08: Miami, FL • VISN 08: Tampa, FL • VISN 15: Marion, IL • VISN 21: Fresno, CA • VISN 21: Palo Alto, CA • VISN 21: Reno, NV 	<ul style="list-style-type: none"> • VISN 01: Bedford, MA • VISN 01: Boston, MA • VISN 01: Manchester, NH • VISN 01: Northampton, MA • VISN 01: Providence, RI • VISN 01: Togus, ME • VISN 01: VA Connecticut HCS, CT • VISN 01: White River Junction, VT • VISN 04: Altoona, PA • VISN 04: Butler, PA • VISN 04: Clarksburg, WV • VISN 04: Coatesville, PA • VISN 04: Erie, PA • VISN 04: Lebanon, PA • VISN 04: Philadelphia, PA • VISN 04: Pittsburgh, PA • VISN 04: Wilkes-Barre, PA • VISN 04: Wilmington, DE 	<ul style="list-style-type: none"> • VISN 10: Cleveland, OH (Consolidated) • VISN 10: Chillicothe, OH • VISN 10: Cincinnati, OH • VISN 10: Cleveland-Wade Park, OH • VISN 10: Dayton, OH • VISN 10: Columbus, OH • VISN 15: Poplar Bluff, MO • VISN 15: St. Louis, MO • VISN 16: Jackson, MS (Consolidated) • VISN 21: N. California, CA • VISN 21: San Francisco, CA 	<ul style="list-style-type: none"> • VISN 02 • VISN 03 • VISN 05 • VISN 07 • VISN 08 • VISN 09 • VISN 11 • VISN 12 • VISN 14 • VISN 17 • VISN 19 • VISN 20 • VISN 22 • VISN 23

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Measurement and Performance Improvement: VA-CASE developed an FBCS Optimization Metrics Dashboard that tracks performance metrics in multiple categories including claim volume, throughput, inventory, and timeliness. The key performance metric is a weighted performance score comprised of three equally weighted factors: (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 which monitors the timeliness of claims processing. VA-CASE developed a monthly weighted performance score report that summarizes each VISN's overall performance. It is presented to the participating VISNs during their FBCS Optimization deployment period. Performance by each VISN/Fee Unit engaged in the deployment process as of November 2012 is displayed below.

VISN/Fee Unit	Current Phase	Baseline Period	FBCS Optimization National Deployment - 2012 Weighted Performance Scores			
			Legend: ● 90-100% ● 80-89.99% ● < 80%			
			Base line	Nov-12	% Improvement Over Baseline	Nov-2012 Fee Unit Comments
VISN 4 (Avg)			96%	100%	4%	
Altoona, PA (503)	Implementation	7/1/12-9/30/12	91%	94%	4%	
Butler, PA (529)	Implementation	7/1/12-9/30/12	94%	103%	9%	
Clarksburg, WV (540)	Implementation	7/1/12-9/30/12	93%	104%	12%	
Coatesville, PA (542)	Implementation	7/1/12-9/30/12	98%	100%	2%	
Erie, PA (562)	Implementation	7/1/12-9/30/12	97%	99%	2%	
Lebanon, PA (595)	Implementation	7/1/12-9/30/12	101%	101%	0%	
Philadelphia, PA (642)	Implementation	7/1/12-9/30/12	98%	97%	-1%	
Pittsburgh, PA (646)	Implementation	7/1/12-9/30/12	99%	101%	2%	
Wilkes-Barre, PA (693)	Implementation	7/1/12-9/30/12	96%	98%	2%	
Wilmington, DE (460)	Implementation	7/1/12-9/30/12	92%	100%	8%	
VISN 15 (Avg)			95%	97%	2%	
Marion, IL (657A5)	Post-Implementation	5/1/12-7/31/12	88%	90%	2%	
St. Louis, MO (657)	Implementation	9/1/12-11/30/12	102%	104%	N/A	
VISN 16 (Avg)			71%	62%	-13%	
VISN 16 CFU	Implementation	8/1/12-10/31/12	71%	62%	-13%	IT issues; Short-staffed
VISN 21 (Avg)			93%	89%	-4%	
Fresno, CA (570)	Post-Implementation	5/1/12-7/31/12	97%	97%	-1%	
N. California, CA (612)	Implementation	5/1/12-7/31/12	90%	85%	-5%	Short-staffed (3 FTEs)
Palo Alto, CA (640)	Post-Implementation	5/1/12-7/31/12	97%	100%	3%	
Reno, NV (654)	Post-Implementation	5/1/12-7/31/12	93%	76%	-18%	Short-staffed (5 FTEs)
San Francisco, CA (662)	Implementation	5/1/12-7/31/12	86%	89%	3%	Short-staffed (1 FTEE)

The deployment team set an overall target of a 10% increase in the weighted performance score over baseline by the end of the Post-Implementation phase. The baseline period is the three-month timeframe immediately prior to the Implementation phase. The VISNs currently undergoing deployment have not had the optimized processes in place for a long enough period to realize a significant positive impact towards their performance. However, in November 2012, 72% of Fee Units (13 out of 18 that reported data) did improve their weighted performance scores when comparing their current month's performance to their baseline performance. These 13 Fee Units averaged an improvement of 4% over their baseline performance. Several sites had issues independent from FBCS Optimization that negatively impacted their scores. The comparison between participating Fee Units' November 2012 and baseline performance is summarized in the table above.

Clinical Program Consulting

Background: In August 2012, CBO Purchased Care - Business Systems Management (BSM) requested VA-CASE provide clinical consulting services through FY13 to support successful enterprise-wide deployment of the Non-VA Medical Care Coordination (NVCC) model; ensure the alignment of clinical business processes between NVCC and

the future VHA non-VA medical care software package, Health Claims Processing (HCP); and assess the clinical business components across the current 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, is currently working with CBO Purchased Care – BSM to achieve these goals.

Key Accomplishments: Dr. Daggett's primary clinical areas of focus are: Geriatric Extended Care (GEC); Community Nursing Home; Bowel & Bladder (B&B) Care; Adult Day Care; Newborn Care; and Dental Care. To date, key accomplishments include the development and facilitation of two subject matter expert workgroups for newborn and dental care. Each workgroup consists of VA national and local experts who are reviewing NVCC processes from the time of consult order to payment disbursements, and the respective Non-VA Medical Care CPRS templates. The clinical experts worked collaboratively with Richard L. Roudebush VAMC Fee Basis experts and CBO Fiscal Office to complete a formal report for certified caregiver billing for bowel and bladder care. Additionally, preliminary discussions were conducted with VA national GEC leaders who currently are vetting enterprise-wide implementation of the Minnesota Case-Mix Model. The Model is a system that classifies nursing home residents into distinct groups based on the resident's condition and the care received. The groups are used to determine the daily rate for the resident's care. If the Minnesota Case-Mix Model is adopted it will impact the GEC NVCC processes used within the VHA. To facilitate the development of these processes, Dr. Daggett joined the national GEC workgroup; she also joined the national Health Claims Processing workgroup that is developing a Non-VA Medical Care CPRS template for newborn care. Lastly, Dr. Daggett synthesized routine newborn care clinical guidelines and is currently aggregating the guidelines into a formal report.

Health Benefits Appeals (HBA)

Background: The HBA project is a collaborative effort between CBO Business Policy and VA-CASE to streamline the processes associated with CBO's oversight of the 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. CBO provides oversight of the appeals program and perfects appeals before certification to the Board of Veterans Appeals (BVA). CBO's current procedure for managing appeals is highly manual. Paper appeals files are routed between VA Medical Centers, the Veteran Benefits Administration (VBA), and BVA. The progress of appeals cases and location of files are monitored through a manual tracking system.

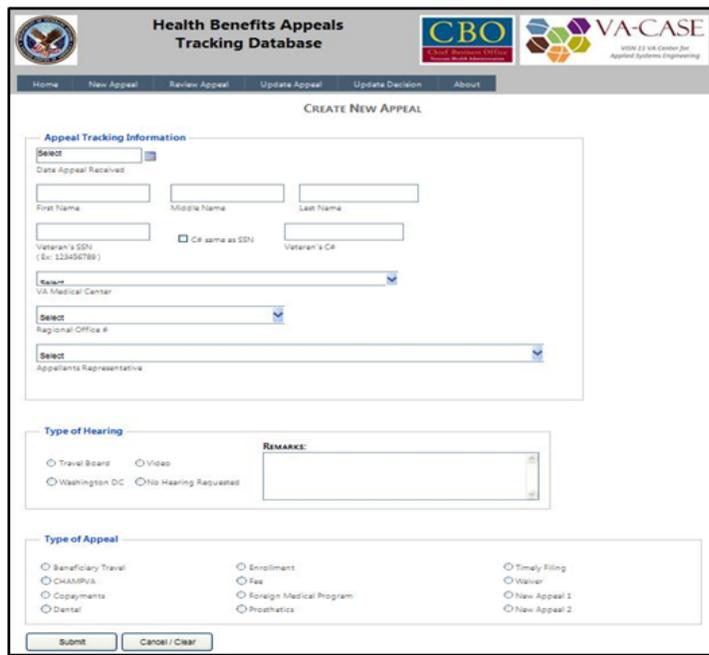


Project Scope: The scope encompasses the processes between the time CBO receives an appeals folder and BVA renders a decision.

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Purpose: The purpose the HBA project was to conduct an analysis of all major tasks and responsibilities performed by CBO when processing a health benefits appeal. VA-CASE collaborated with CBO staff to create a current state flow map and identify potential barriers within the HBA process. 33 different barriers were identified and recommendations for solutions were made by VA-CASE that included the development of a consolidated database to track the appeals process and provide automated reporting capability. Currently, CBO staff maintains three Excel spreadsheets that serve as databases used for tracking the processing of appeals. The proposed solution was to integrate the three spreadsheets into one comprehensive database that tracks all pertinent information. The new database will allow the staff to create/update appeals records simultaneously, as well as automate several functions that are currently being completed manually. Additionally, the new database will track all status information and provide automated reporting functions to provide visibility into the appeals process.

Accomplishments: Phase I of the HBA project is currently in progress and will be completed January 31, 2013. Phase I includes the development of a web-based application used in conjunction with a Structured Query Language (SQL) database to track the following tasks: 1) creating a new appeal; 2) reviewing appeals for completeness; 3) updating appeals; 4) updating decisions; 5) updating remands; 6) process management reporting features; 7) a home page, reflecting CBO mission statement and the appeals team frontline staff; and 8) an "about" page, providing a process flow map for visual reference to the process steps. The "Create New Appeal" page is shown here.

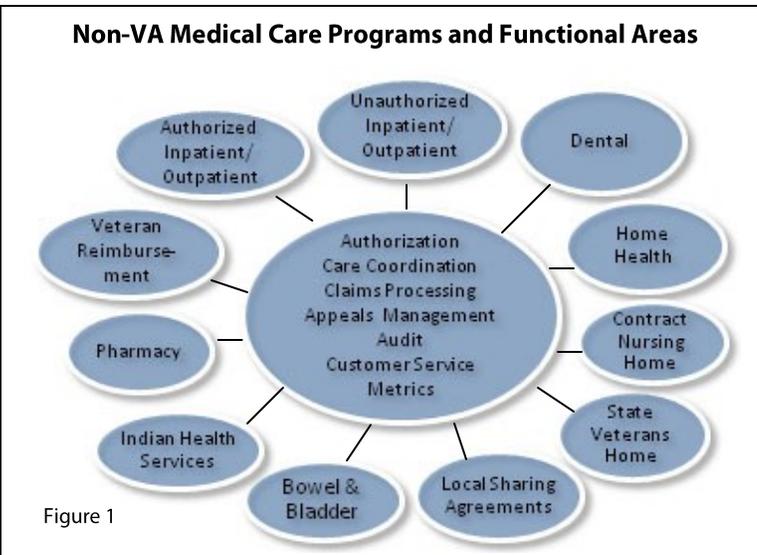


Outcomes Realized: The complexity of the database as requested by CBO significantly increased as the project progressed resulting in a second project phase to begin in approximately March 2013. Within Phase II, VA-CASE will develop increased reporting functionality and the automation of the generation of routing slips. These features will assist CBO leadership with workflow management and task analysis.

Non-VA Medical Care National Standardization (NVNS)

Background: The NVNS project is a collaborative effort between CBO Purchased Care and VA-CASE to standardize business processes associated with the execution, management, and oversight of all Non-VA Medical Care programs and functional areas. (Figure 1) The NVNS team will leverage work being conducted in other non-VA medical care efforts; e.g., Non-VA Medical Care Coordination and FBCS Optimization, and align standardized business processes, whenever possible, with the future state non-VA medical care software, Health Claims Processing, currently under development. The outcomes achieved through NVNS will also serve as the foundation of future Non-VA Medical Care improvement efforts. NVNS project planning activities were conducted in late FY12 and the project officially kicked off in October 2012.

FY13/14 Project Plan: On-site evaluations of current state non-VA medical care business processes will be conducted and staffing configurations and outcome data will be assessed for effectiveness and best practices. The evaluations are targeted to begin in early February 2013 and will focus on Consolidated Fee Units within several different VISNs. The NVNS team is currently in the process of completing and vetting the evaluation plan and various artifacts necessary to complete the site visits. Based on the outcome of the evaluations, non-VA medical care standardized



business processes, metrics, and performance targets will be developed and tested. Following the testing phase, an NVNS deployment plan and implementation/training materials will be developed with national deployment anticipated to begin in FY14.

Anticipated Outcomes: It is anticipated that the development and implementation of standardized non-VA medical care business processes and performance targets will result in a significant reduction in improper payments, as well as operational efficiencies, due to all non-VA medical care activities consistently being performed and measured in the same way across the enterprise.

Additionally, standardization will allow for more efficient and expedient training of non-VA medical care staff and the timely identification and correction of process issues. Lastly, improvement in customer service is expected as Veterans and non-VA providers will no longer encounter variability in the application of non-VA medical care policies and regulations across VA medical centers.

Dialysis Project

Background: In FY10, the Secretary of Veterans Affairs approved a VHA Dialysis Pilot for the treatment of End Stage Renal Disease (ESRD). The pilot consisted of the development and activation by the end of FY12 of four community based, VHA-operated, dialysis outpatient clinics. The goals of the pilot were to improve: 1) quality of care; 2) Veteran access; 3) cost savings; and 4) the expansion of medical research opportunities. The high-volume market locations selected for the clinics were Fayetteville and Raleigh, NC; Philadelphia, PA; and Cleveland, OH. The Fayetteville and Raleigh clinics opened in FY11 and Philadelphia in FY12. The Cleveland clinic is targeted to open in the third quarter of FY13. A Congressional hearing was conducted on the VHA Dialysis Pilot during FY12 that resulted in a United States Government Accountability Office (GAO) report issued in May 2012. The GAO report identified weaknesses in VHA's planning and implementation of the clinics. In June 2012, CBO requested VA-CASE to collaborate with VHA's Office of Specialty Care Services/Patient Care Services to take corrective action to address GAO's concerns, as well as complete preparatory work for the possible expansion of VHA outpatient dialysis clinics.

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Purpose: The purpose of the Dialysis Project is to support and assist with VA's current work in the provision of dialysis care to Veterans and to develop standardized methods, metrics, and artifacts related to the possible development, deployment and operation of future VA-operated outpatient dialysis clinics. The duration of the Project is through the end of FY13.

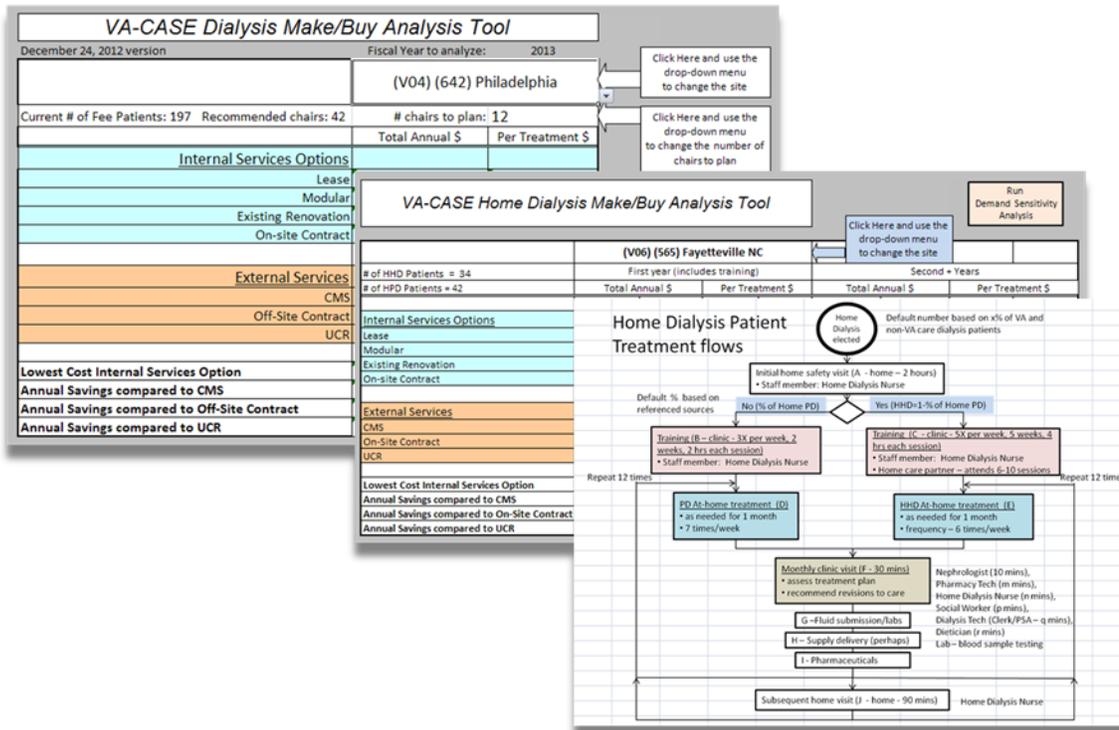
Objectives: The project objectives are:

- Analyze and recommend standardized measures that allow for a comprehensive assessment of the performance of the four Pilot VA-operated outpatient dialysis clinics, and afford comparisons with internal VA and non-VA dialysis units;
- Provide periodic reviews of the progress on the activation of the Cleveland pilot dialysis clinic;
- Develop a make/buy model for home dialysis;
- Complete an Access to Care Evaluation study of the Fayetteville and Raleigh pilot clinics;
- Develop a standardized deployment package, including a deployment dashboard, for the activation and operation of future VA-operated freestanding outpatient dialysis clinics;
- Research, test and recommend technical requirements for an enterprise-wide solution for the collection and reporting of dialysis-specific clinical patient data and for the transmission of required data to the Centers for Medicare & Medicaid Services (CMS);
- Analyze the use of the existing dialysis make/buy model and completion of modifications to the model as needed; and
- Evaluate the site selection algorithm proposed for use in determining locations for future freestanding VA-operated outpatient dialysis clinics.

Anticipated Impact: The four pilot VHA outpatient dialysis clinics were modeled using the VA-CASE original dialysis make/buy tool parameters. Current analysis of the Fayetteville and Raleigh clinics indicate they are operating at a per treatment cost savings over the local contracted rate. As a result, it is anticipated that the Secretary of Veterans Affairs will authorize the activation of additional free-standing dialysis outpatient clinics. The tools being developed by VA-CASE will provide the needed structure and standardization for the development, implementation, and performance evaluation of future clinics.

With respect to clinical measures, there is a current lack of technology within the VHA for dialysis units to electronically extract and submit required patient data to CMS. Dialysis units are either reporting only a portion of patient outcomes or are manually entering the data which is inefficient and resource intensive. The development and implementation of a technical solution to CMS transmission will result in a cost-effective and efficient method to consistently report complete and accurate data. Additionally, it will enable comparison of clinical outcomes between VA and non-VA dialysis clinics.

Project Status/Progress: The internal management and oversight of the Dialysis Project was initiated within the VA-CASE Transactional Systems Program in June 2012. In December 2012, the management and oversight of the Dialysis Project was transferred internally to VA-CASE Strategic Programs and Data Engineering Resources. Progress on the various objectives is ongoing and estimated completion dates remain on target. The development of the standardized deployment package, including pilot site requirements, contract-ready technical specification documents, and staffing requirements is underway with the completion of a draft version by the third quarter of FY13. The first site visit by VA-CASE to evaluate the progress of the activation of the Cleveland dialysis pilot clinic is scheduled for the second quarter of FY13. Based on lessons learned from the activation to-date of the pilot clinics, the original Excel®-based dialysis make/buy tool is the process of being revised and significant progress has been made on the development of a home dialysis make/buy tool to evaluate the cost effectiveness of the implementation of a VA home dialysis program. (See chart below)



Original Dialysis and Home Dialysis Make/Buy Models User Interface and Process Flow Example

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

Background: The NVCC initiative is a nationwide effort sponsored by CBO Purchased Care to improve and standardize primarily the front-end of the non-VA medical care process. The NVCC model is a system of standardized business processes (referral review, appointment management, unauthorized and Millennium Bill claims adjudication, appeals, hospital notification) and tools (standardized referral templates, CPRS Non-VA Medical Care Coordination and Non-VA Medical Care Hospitalization progress note templates, CPRS patient appointment letter 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.

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

Scope: The scope of the work VA-CASE performed during FY12 focused on the provision of Clinical Application Coordinator services to support the successful deployment of NVCC across the enterprise.

Key Accomplishments: VA-CASE Clinical Application Coordinator (CAC) Kim Rollins was an active participant on the CBO NVCC team. Her primary role was to create Vista/CPRS NVCC templates, tools and documents, and to provide

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training and support to each NVCC VISN Champion Facility. Ms. Rollins developed the NVCC Technical Guide for Managers, Consult Guide, CPRS Order and Menu Guide, CPRS TIU Template Guide, and Technical Setup Quick Reference Guide. An example of an NVCC CPRS consult is shown below.

Template: NON VA CARE RADIOLOGY v.5

Specialty Service: Radiology

Sub-Specialty Service: CT Scan

Sub-Specialty Service: MRI

Sub-Specialty Service: PET Scan

Sub-Specialty Service: General

Sub-Specialty Service: Nuclear Medicine

Sub-Specialty Service: Ultrasound

Sub-Specialty Service: Vascular

Dropdown Boxes are the same in all subspecialties as follows:

Care Setting: * Outpatient Inpatient

Justification for Non VA Care:

- VA Facility does not provide the required service
- Veteran cannot safely travel to VA Facility due to medical reason (specify medical reason)
- Veteran cannot travel to facility due to geographical inaccessibility
- VA Facility cannot timely provide the required service
- Other (please specify)

Type of Service: *

(PROCEDURE DESCRIPTION) Evaluation and Recommendations or treatment option

Example of Non-VA Care Coordination Consult in CPRS. Standardized elements for NVCC. Other information such as blood test for CT Scan may vary.

Chief Complaint:

Patient History / Clinical Findings / Diagnosis (Co-Morbidities): (Include Relevant Dx Test and Treatment to Date)

Third Party Liability: (Examples: Motor Vehicle Accident, Work Related Injury, Other) * Yes No

Non VA Care Coordination Required: Yes

Creatinine Results within 30 days: No data available

Creatinine results if available: [dropdown]

If ordering with contrast, and Creatinine results within 30 days are not available, please place an order

History of Renal Impairment: Yes No

Allergies and Medications (Optional):

Non VA Care Coordination Required: Yes

Creatinine Results within 30 days: No data available

Creatinine results if available: **WNL**

If ordering with contrast, and Creatinine results within 30 days are not available, please place an order: **Elevated**

History of Renal Impairment: Yes No

VA Intranet Quorum Project (VAIQ)

VAIQ is a software product used for managing documents and correspondence to internal and external stakeholders. CBO serves as the health benefits advisor to the Under Secretary for Health and, as a part of this responsibility, provides administrative oversight for the tracking and management of correspondence.

CBO requested VA-CASE conduct an evaluation of their processes used in conjunction with the VAIQ system and other administrative tasks performed by their front office staff to:

- determine non-value added steps and other inefficiencies,
- perform a staffing analysis, and
- develop process improvement recommendations.

A written report of the findings and recommendations is targeted to be completed and presented to CBO by mid-February 2013. Depending on the nature of the recommended improvements, CBO anticipates that VA-CASE will be requested to assist with the implementation process.

Network 11 Contracting Systems Redesign Project

The Network 11 Contracting Office (NCO 11) requested VA-CASE complete an evaluation of their internal business processes to:

- assess for existing inefficiencies
- identify process improvement opportunities
- complete a staffing analysis
- develop optimized business processes

The project will be completed in two Phases:

- Phase I -- an evaluation/assessment of the current state business processes and staffing analysis.
- Phase II -- the implementation and testing of the optimized business processes based on the approved recommendations developed in Phase I.

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Clinical Partnerships in Healthcare Transformation (CPHT)

The Veteran’s Administration Center for Applied Systems Engineering (VA-CASE) Clinical Partnerships in Healthcare Transformation (CPHT) Program currently represents a partnership with the National Optimizing Cancer Care Committee, the National PACT Collaborative Steering, VHA Stroke QUERI (INSPIRE), the National Office of Specialty Care, and the National Surgery Office (NSO). The FY12 VA-CASE CPHT Program budget was approximately \$870,000 per year, with approximately 25% (\$220,000/year) allocated from VA-CASE core funds.

The VA-CASE CPHT Program works to partner VERC Industrial Engineering and collaborative coordinator resources with VISN and national collaboratives. This program integrates applied systems redesign (SRD) / operational systems engineering (OSE) principles into the national SR collaborative structure and 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. The CPHT FY12 projects were: National Optimizing Cancer Care Collaborative, Patient Aligned Care team Collaborative, INSPIRE Stroke Collaborative, Patient Aligned Care Team Collaborative, Specialty Care Collaborative, Surgical Flow Improvement Initiatives Collaborative, and Move! Weight Management Program for Veterans.

VA-CASE Collaborative Project Pipeline

Innovation			Implementation		Impact		
Planning	Proof of Concept		Future State Optimization		Evaluation	Deployment	
Innovation Development	Proposal Solicitation	Concept Development/ Testing	Initial Pilot (single site/VISN)	Demonstration Pilot (multiple sites/VISNs)	National Reporting/ Approval	National Deployment	National Policy Change
National Systems Redesign					Specialty Care	Optimizing Cancer Care	
					Surgical Flow Initiatives Collaborative	PACT Collaborative	
MOVE!			MOVE! RPIW				
QUERI/HSRD					INSPIRE – National Stroke Collaborative		

VA- CASE CPHT Project Summary

National Optimizing Cancer Care Collaborative

Beginning in FY09, VA-CASE partnered with the National VHA Optimizing Cancer Care (OCC) National Systems Redesign Committee, as well as the VAPHS VERC and NEHCP VERC, to apply OSE and SRD methods to support and enhance work done by the current collaborative and provide capacity and capability for diffusion and implementation of collaborative strong practices related to the development and implementation of systematic processes for cancer care. To date there have been three Collaborative Phases – Phase 1: January 2009 - January 2010, Phase 2: January 2010 - January 2011 and Phase III: June 2011 - February 2012.

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. Nineteen teams across four Cancer Types (Lung, Breast, CRC and Prostate) participated in the Phase I collaborative, 21 teams across five Cancer Types (Lung, Prostate, HCC, Head and Neck, CRC) participated in the Phase II collaborative and 22 teams across 2 Cancer Types (Lung and Head and Neck) participated in the Phase III collaborative.

Project Objectives: The objectives of this project included:

- Provide Industrial and Systems Engineering training/coaching in OSE/SR 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/Impact:

Industrial Engineering Support: VA-CASE Industrial Engineers have provided over 1200 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. Additionally, the VA-CASE IEs were 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 data analysis.

Cancer Type Measurement Tools: For the phase III 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 “Data Entry Sheet”, “Measurement

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Sheet”, and “Chart Sheet”. The users enter data in the “Data Entry Sheet” and 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.

Overall Project Impact:

Summary of Improvement Achieved by Team in Cancer Care Collaborative, Phase I

Cancer Type	# of Facilities	Total # of AIMS	% of AIMS Met	Average % improvement over baseline	Average of improve >40%
Breast	3	9	89%	55%	67%
CRC	3	9	89%	51%	56%
Lung	9	39	72%	98%	71%
Prostate	3	7	86%	26%	29%
Grand Total	18	64	78%	76%	63%

Summary of Improvement Achieved by Team in Cancer Care Collaborative, Phase II

Cancer Type	#of Facilities	Total # of AIMS	% of Aims Met	Average % improvement over baseline	% of aims showing improvement > 40% of baseline
CRC	3	8	50.00%	63.68%	100%
HCC	3	13	84.62%	64.28%	75%
Head & Neck	5	25	72.00%	56.86%	67%
Lung	8	39	74.36%	50.34%	73%
Prostate	2	9	62.50%	55.41%	88%
Grand Total	21	94	72%	56%	76%

Summary of Improvement Achieved by Team in Cancer Care Collaborative, Phase III

Cancer Type	# of Facilities	Total # of AIMS	% of AIMS Met	Average of % improvement over baseline	% of AIMS showing improvement > 40% of baseline
Lung	8	50	48%	49%	58%
Head & Neck	3	14	43%	29%	43%
Grand Total	11	64	47%	44%	55%

Patient Aligned Care Team Collaborative

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 is 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 is 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:

The objectives of this project include:

- 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.

Industrial Engineering Support: During the collaborative the VA-CASE Industrial Engineers (IEs) work 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 on monthly calls. The VA-CASE IEs also provide expertise in designing spreadsheets to support the measurement and to assist with knowledge mining and management to inform the collaborative and further refine the PACT Change Package.

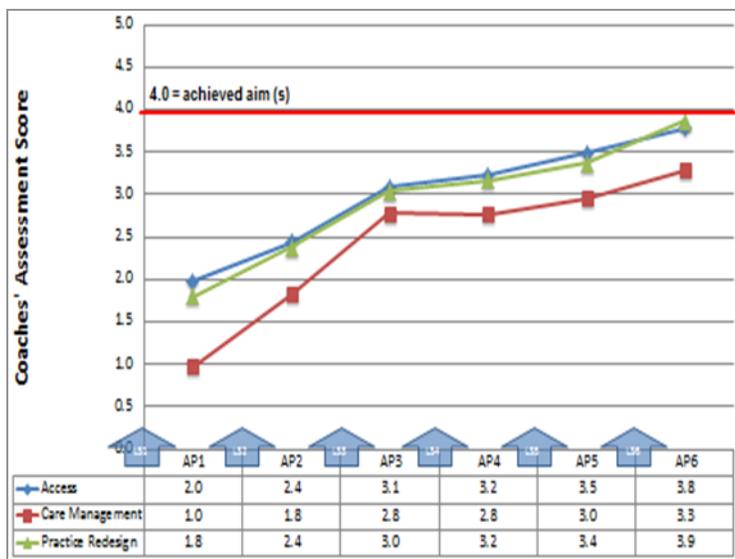
Project Results/Impact:

End of Action Period 6, 141 teams attempted 1591 PDSAs and 1514 were completed (with slightly more focus on Access and Practice Redesign)

- Act: 1291 Standardized PDSAs
- Abandon: 28 Unsuccessful PDSAs
- Amend: 223 PDSAs that were modified or are planned as a new test.
- In Progress: 49 PDSAs were implementing

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Coach Assessment Score increased across each action period indicating that the teams were working towards their goals.



- 0.0 = 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 outcome
- 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

INSPIRE Stroke Collaborative

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

Project Objectives: The aims of this project are to: 1) assess the impact of disseminating the OQP Stroke Special Project data on facility stroke improvement activities, and 2) test an SR based intervention vs. quality indicator feedback alone for improving 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 sustainability of performance 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.

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 initiate working on their aims to improve their rates of dysphagia screening before oral intake and 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.

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 with other intervention sites particularly CPRS admission template models and a dysphagia protocol video developed by the Houston team.
- Thus far, there has been an increase in the quality of stroke care at six of the largest volume VA facilities, which could lead to improved outcomes for Veterans receiving care at the intervention sites. This intervention will also provide 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 and the qualitative data obtained is currently being analyzed. 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.

Specialty Care Collaborative

The Specialty Care Collaborative will explore alternatives to the traditional models of healthcare delivery, which currently are often lacking in coordination among the various settings and providers, such as ECHO project, SCAN and E-Consults.

Project Objectives: The Specialty Care Pilot Collaborative will seek to develop, learn and spread healthcare delivery systems that highlight the patient as the center, coordinate specialty care services needed for the patient with PACT (Care Coordination Agreements), and deliver these services in part via non-traditional means, such as telephonic, secure messaging, video and web-based technologies.

Approach: In FY12, there was a VHA-wide set pilot phase of two Specialty Care Collaboratives – one with focus on surgery specialties of orthopedics and urology, and the other with focus on medicine/general specialty clinic access. Each was organized to accommodate participation of up to 40 teams in a three Learning Session pilot collaborative which spanned roughly 9-10 months from November 2011 through September 2012. Participation was voluntary and teams were selected for participation in the respective Specialty Care Collaborative based on interest, potential for improving access and contributions to the body of knowledge for improving access to specialty care clinics, which will support the larger FY13-FY14 Specialty Care Collaborative. Each team is typically comprised of a minimum of 5-10 members. Thus, this set of pilot Specialty Care Collaboratives will each involve a minimum of approximately 320 team members attending each face-to-face program with potentially additional members of the facility teams that will participate in the improvement work at the facility. This set of Collaborative involves the following elements:

- Three Learning Sessions for each Collaborative – these are face-to-face programs that bring teams from the front line of care together to work on implementation of principles and strategies to improve access to outpatient specialty care.
- Completion of pre-work by the improvement teams, including identifying team members, gathering and analyzing relevant data, developing aim (measurable goal) statements, and potentially other actions related to

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the improvement work such as flow mapping the process, identifying areas of constraint, measuring demand for a service, measuring supply for a service, etc.

- Three Action Periods for FY12, these occur after each Learning Session. During the action periods, the collaborative teams implement changes, test the changes, monitor the impact of their changes, etc.
- Conference calls: During these action periods the respective collaborative directors conduct conferences calls with coaches, the planning and steering groups and the teams during which time the teams report on their progress and obtain guidance on challenges or barriers they are experiencing.
- Team reports will be submitted by the improvement teams to report on their accomplishments and are reviewed by the teams' coaches and the VA-CASE IEs with written feedback provided.
- Plans for sustaining and spreading the Specialty Care Collaborative improvements will be included in the Learning Sessions and Action periods

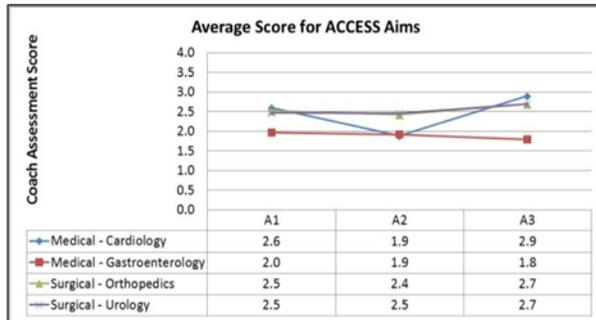
Industrial Engineering Support: During the collaborative the VA-CASE Industrial Engineers (IEs) work with the regional planning committees and site coaches as a resource for questions and guidance related to the VA-TAMMCS model and other improvement approaches. In addition, IEs act as Learning Session Faculty, presenting breakout and plenary sessions, and participating on weekly calls. The VA-CASE IEs also provide expertise in designing spreadsheets to support the measurement tools and to assist with knowledge mining and management to inform the collaborative and further refine the PACT Change Package. Team reports are reviewed by the teams' coaches and the VA-CASE IEs with written feedback provided.

Results: At the end of the collaborative, there were 23 teams. There were 13 Surgical Teams (5 Orthopedics and 8 Urology) and Central Texas team withdrew from the collaborative. There were 10 Medical Teams (7 Cardiology and 3 Gastroenterology) and VISN 16 VA Gulf Coast (Gastroenterology) discontinued participation in collaborative.

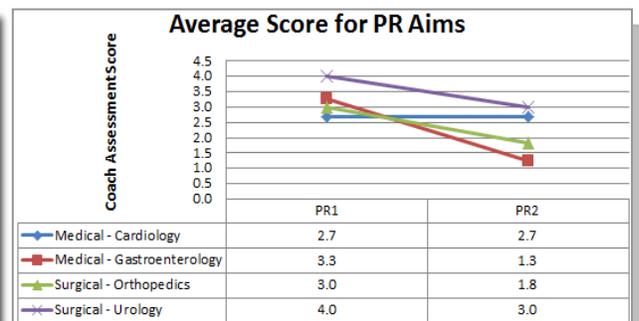
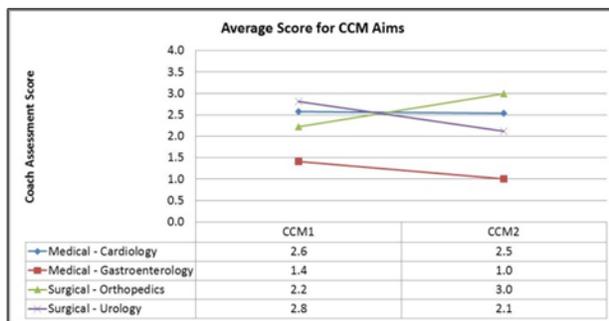
In FY12-FY13, the Phase II of Specialty Care Collaborative will involve surgical and medicine/general specialties. It is anticipated that the specialties are orthopedics, urology from the surgical specialty side, and cardiology and GI on the medicine/general specialty side. Two additional clinical focuses will be selected prior to the start of the collaborative for total of six specialty areas. The virtual collaborative is structured to accommodate participation of up to one team per VA facility in a six Learning Session Collaborative 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, potential for improving access and contributions to the body of knowledge for improving access to specialty care clinics.

This project is in the planning stage and the first learning session is scheduled for May 2013.

Coach Assessment Score



- 0.0 = no effort in this area
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Surgical Flow Improvement Initiatives Collaborative

The Veterans Health Administration (VHA) Office of Systems Redesign (SR) in collaboration with the (VHA) National Surgery Office (NSO) conducted a national Surgical Flow Improvement Initiative (SFII) in FY2012, with several phases. This project involved expertise from VA-CASE engineers with primary resource commitments allocated to the 3rd Phase, which is a series of local Rapid Process Improvement (RPIWs) workshops across 20 VHA facilities nationally.

Project Objectives: To improve VHA operating room flow, efficiency, and operations through improving front line operations/function at selected medical centers, designing and piloting an effective improvement strategy for operating room operations and identifying and documenting specific strong practices that could/should be considered for all VHA operating room teams.

Collaborative Approach: VA-CASE provided project management and implementation support services to the SFII planning Committee and teams at the chosen facilities. VA-CASE faculty and Industrial engineers (IE) conducted a series of 40 local Rapid Process Improvement Workshops (RPIW) over 5 months (April – Aug 2012) in 20 facilities nationwide.

This improvement initiative adopted a hybrid collaborative model with the incorporation of virtual symposia and RPIWs. This hybrid improvement model (Figure 1) overcame the challenges experienced in traditional collaborative models (Figure 2). It encouraged teams to fully prepare for the implementation of changes beforehand to enhance the effectiveness of SFII, supplied teams with continuous support to achieve set aims, and requested senior

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management involvement from both VISN and facility level to ensure the sustainability of achievements. Future improvement initiatives are believed to be able to achieve better performance by monitoring team preparation beforehand, having more leadership buy-in, and utilizing progress tracking.

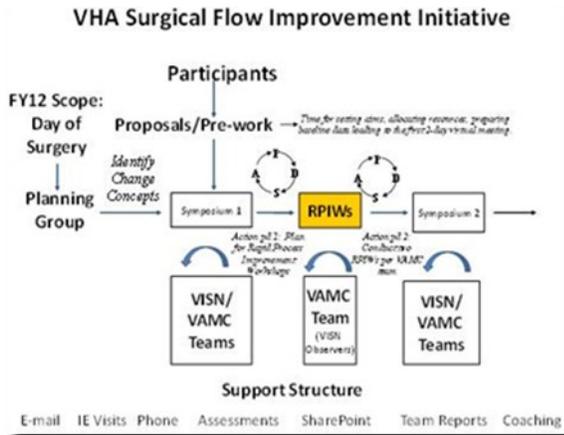


Figure 1

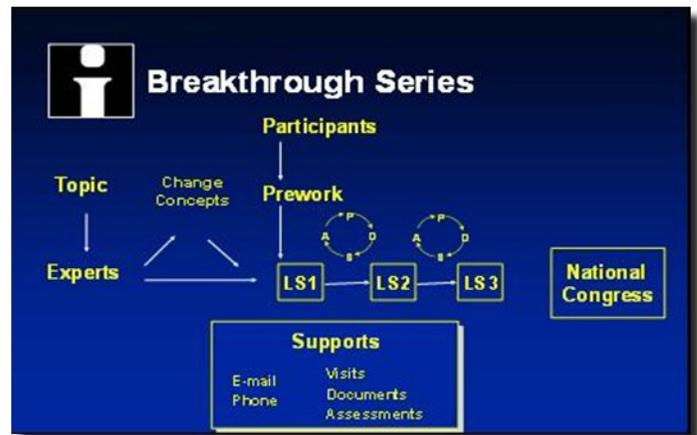


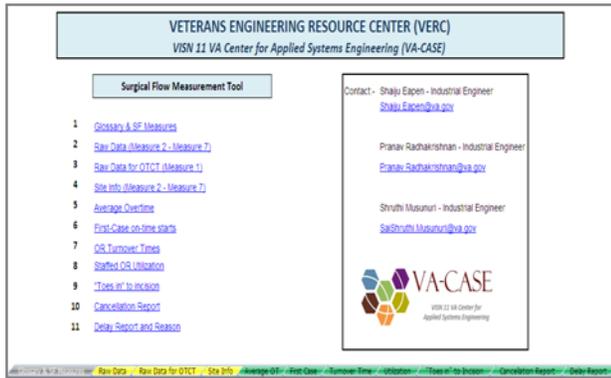
Figure 2

VA-CASE Support team: Balmatee Bidassie served as the program manager, nine (9) Faculty (Balmatee Bidassie, Jamie Workman-Germann, Carlos Garcia, Russell Cech, Sandra Serrano, George Ponte, Deanna Suskovich, Phillip Swearingen, Brian Poyner) and three (3) IEs (Shaiju Eapen, Pranav Radhakrishnan, Shruthi Musunuri). The goal of the VA-CASE team is to effect transformative improvements in healthcare delivery systems through the application of industrial engineering tools and principles.

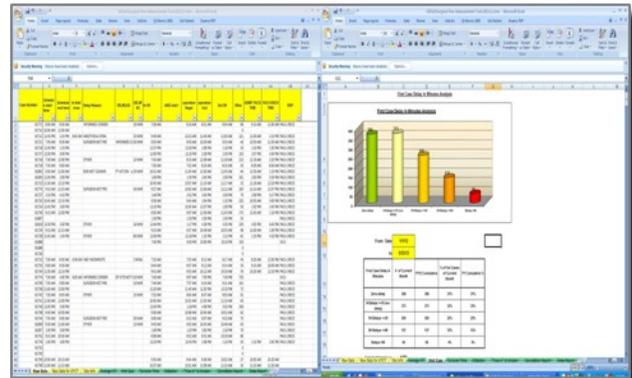


VA-CASE Team (L to R): Shaiju Eapen (IE), Pranav Radhakrishnan (IE), Carlos Garcia (F), Balmatee Bidassie (PM, F), Virginia Daggett (Admin), George Ponte (F), Russell Cech (F), Sandra Serrano (F), Shruthi Musunuri (IE), Jamie Workman-Germann (F), Brian Poyner (F)

Measurement Tools: The 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 developed will help OR teams to establish baseline data and monitor progress towards the goal for seven measures taking into account all moving parts in the OR.



Standardized Measurement Tool



Fileman Data and First Case Delay

Return on Investment Tool: At the start of the project, there was not a standardized Return of Investment Tool (ROI) process or tool to calculate the potential financial savings from SFII at a national level or facility level. VA-CASE staff developed a standardized ROI tool where facilities can follow a standardized method in the ROI tool to evaluate the impact of SFII improvement work. VA-CASE Standardized ROI tool is intended to provide a simplified means for generating a conservative estimate of the financial impact from improvements based on the National measures made during SFII.

RPIW ROI Summary and Roll-up - DO NOT enter information in this worksheet						
	Costs/Expenses		COPQ			Totals
	Project Costs	Implementation Costs	Productivity	Materials, Equipment	Cost/ Revenue	
Costs/Expenses Yr 1	\$ 29,210	\$ 34,560				\$ 63,770
Potential Soft Savings from COPQ			\$ 58,656		\$ 127,296	\$ 185,952
Potential Hard Savings from COPQ				\$ -	\$ 16,560.00	\$ 16,560
Potential Net \$0 Impact First Year						\$ 138,742
ROI (years)						0.46
Roll-up Cell - do not enter data						
Unused cell - do not enter data						
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Standardized Return on Investment Tool

RPIW Costs and Expenses Summary						
RPIW Labor Cost	Time Dedication (hours/wk)	# of Weeks	# of Team Members	Total Team Time in Hours	Average Hourly Rate (incl 30% Benefits)	Total Labor Costs
RPIW Costs - Team Members	40	1	10	400	\$ 30	\$ 12,000.00
Pilot Implementation Costs - Team Members	2	8	8	128	\$ 30	\$ 3,840.00
Other Labor Costs					\$ 30	\$ -
Total Project Labor Costs						\$ 15,840.00
Other RPIW Expenses	Cost	Quantity	Total Other Project Expenses			
Training/Facilitation Support	\$ -	0	\$ -			
Supplies (paper, banners, etc)	\$ 10.00	1	\$ 10.00			
Other (please list)	\$ -	0	\$ -			
Total Other Project Expenses			\$ 10.00			
SUMMARY RPIW COST/EXPENSE			\$ 15,850.00			
Data entry cell						
Calculation cell or unused cell - do not enter data						
Roll-up Cell - do not enter data						

SFII FY12 Results: Overall the project was considered a success across all 20 Participating VISN Facilities. 40 RPIWs were successfully completed in a timely manner (April – August 2012) and 468 PDSA (RPIW1: 195; RPIW2: 273) were completed. The following is a summary of key results:

Leadership and team involvement were high.

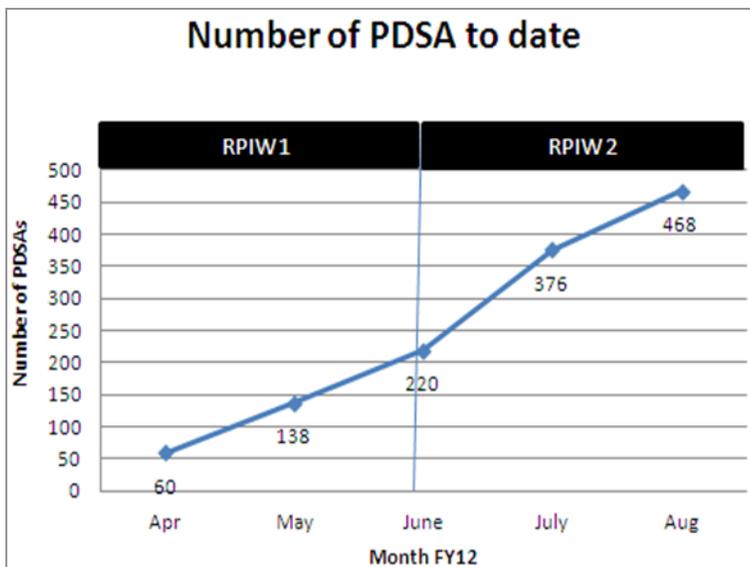
- Leadership and VISN POC level of engagement and involvement were a combination of:
 - in presence during RPIW at the appointed time
 - dialed in during team presentation
 - communicated with the team actively

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- Majority of the "Core Team" was available 40 hours
- Sites with no "Dedicated Facility" System Redesign Staff/department, role were assigned to core team members to partner with IE Support.

PDSA Completed

Measures	Number of PDSA by VISN																							Total
	1	2	4	5	6	7	8	9	10	11	12	15	16	17	18	19	20	21	22	23				
Operating room first case	6	5				12	9	10	37		8	24				9				31	151			
OR Turnover			10	4	21	8		8	8		13	8	6	29				10			125			
Staffed OR	5						14						4		12	7	7		30		79			
Cancellation		5												28			8		7	7	55			
Other			3		6					2					6			10		8	35			
Delay report										13											13			
"Toes in" to				10																	10			
Total	11	10	13	14	27	20	23	18	45	15	21	32	10	57	18	16	15	20	37	46	468			



Month	PDSA
April	59
May	79
June	82
July	156
Aug	79
Total	468

Round	PDSA
RPIW 1	195
RPIW 2	273
Total	468

	RPIW 1		RPIW 2		Total	
	N	%	n	%	N	%
Act	160	82%	180	66%	340	73%
In progress	25	13%	88	32%	113	24%
Abandon	8	4%	2	1%	10	2%
Amend	2	1%	1	0%	3	1%
Pending	0	0%	1	0%	1	0%

Estimated Return on Investment (ROI): VISN-wide there was neither a standardized process nor a tool to calculate the ROI of this project. VA-CASE designed a standardized ROI tool. Based on the data input by the team on these ROI the following annualized ROI was projected (assuming that the teams sustained the improvements from the RPIW).

National Metrics /Other Improvements	ROI Financial Estimate
Staffed OR utilization (%)	\$ 17,432,000
Operating room first case on-time starts (%)	\$ 2,029,173
OR Turnover times (min)	\$ 3,032,467
Cancellation rates (%)	\$ 995,000
Delay report (%)	\$ 710,000
“Toes in” to incision (min)	\$ 391,000
VISN 21: Patient wait time for first case	\$ 174,000
VISN 18: Timely discharge from PACU	\$ 157,000
VISN 4: Patient Transportation	\$ 38,000

Additional Potential Positive Impact (Not included in estimated Financial Impact)

- Improve Patient Safety
- Better Quality of Care
- Enhance Patient Experience
- Positive Impact on T-21 initiatives
- Support and aligns with local PACT initiatives (Access, Coordination of care management)
- Sustain the initiatives to reduce the need for Fee-based Investment
- Positive impact/image on Facility /Leadership Vision, Measures
- I CARE
- The Joint Commission
- OSHA, ISO, OIG, MOCK Survey
- Compliance with VA Security/Regulations
- Other accreditation bodies
- Positive calculated Return on Investment (Value/Cost) to justify on site the commitment of staff time to RPIWs
- Move towards a “Culture of Safety” in the Operating Room

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

VA-CASE - in collaboration with James A. Haley VA Hospital conducted a RPIW for the **MOVE!®** program to achieve **MOVE!®** target goals and serve as a best practice model to showcase optimizing utilization of health care services specifically related to addressing the obesity crisis among Veterans.

Project Objectives: Getting the correct people in the correct program in a timely manner, improving the scheduling process for Veterans into the program and improve structure and content of **MOVE!®** classes.

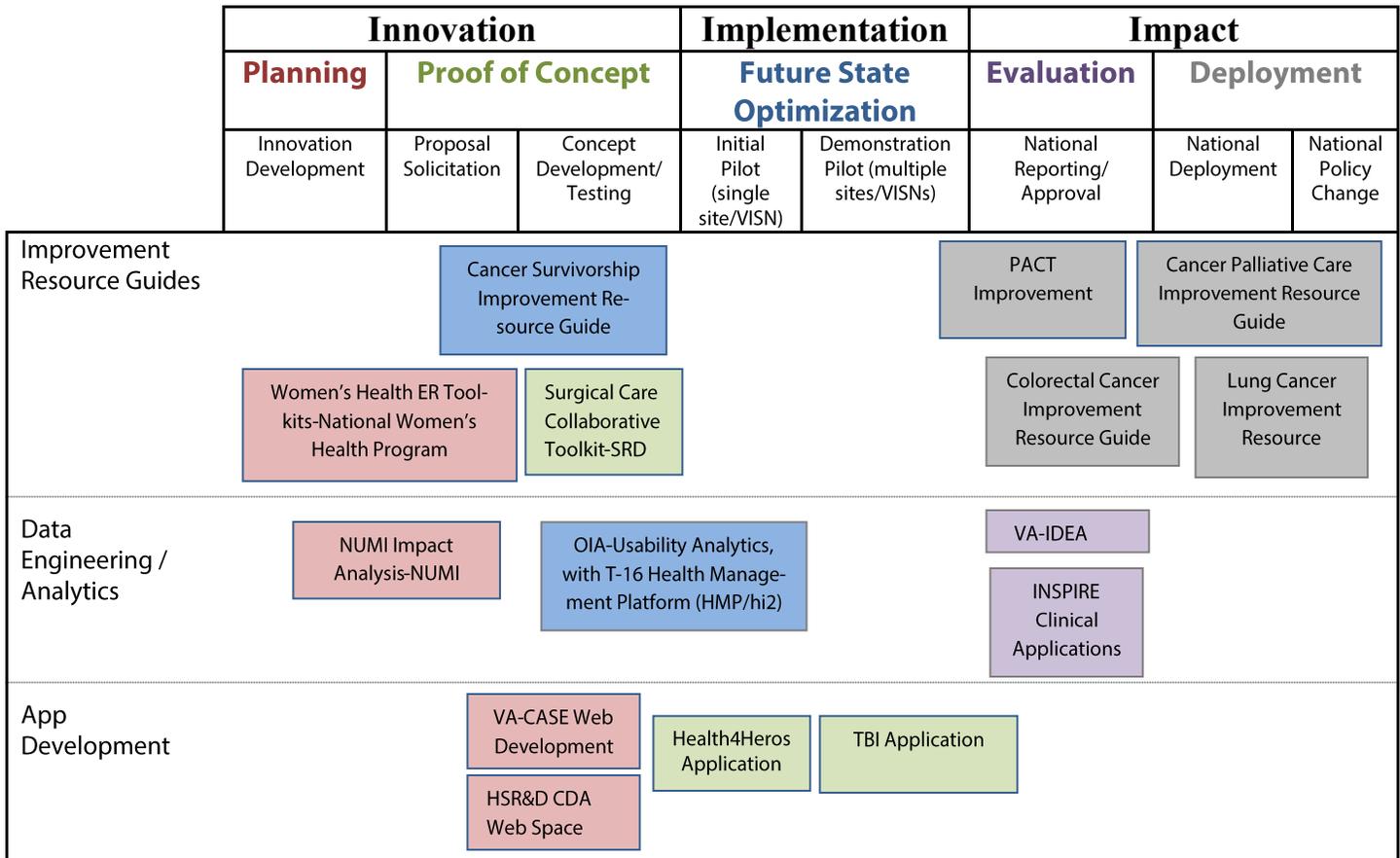
Overall this project was a success with the intended aims. **MOVE!®** National is interested in spreading these implemented process improvements to other **MOVE!®** groups at other facilities. VA-CASE and **MOVE!®** James A. Haley VA Hospital will be making a presentation to the Preventative Committee in February 2013 to share results and discuss potential future collaboration.

Strategic Programs and Data Engineering Resources Program Overview, 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 to include, 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 \$1,450,000/year, with 29% (\$450,000) allocated from VA-CASE core funds.

VA-CASE SPDER Program and Project Pipeline



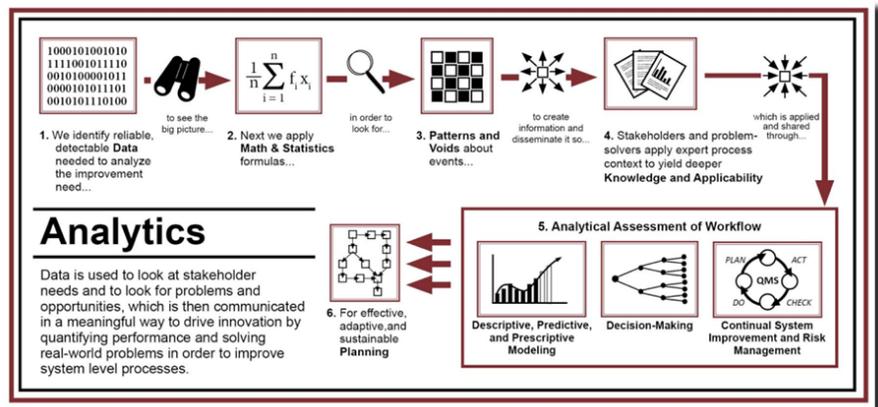
VA-CASE SPDER Program Project Summary

Strategic Program and Project Management Model

Program and Project Managers for SPDER will utilize a variety of program and project management techniques to accomplish their complementary supportive work for the engineering programs, to include using the FAC P/PM course methodology called “EP/PMM” which stands for the Enterprise Program and Project Management Model, The “ER/PMM” encompasses Agile, Scrum and VA-CASE Innovative approaches which are rapid, highly iterative and user-driven. Because of the dynamic and proven rapid engineering innovation model that VA-CASE utilizes, these additional program management approach methodologies will be blended to adapt and support our center’s operational systems engineering. Below is an example of the EP/PMM methodology from the Office of Acquisitions and Logistics (OAL).

Usability Analytics

In August 2012, Data Engineering Resources (formerly known as Informatics) secured a Statement of Work with the Office of Informatics and Analytics. Expected outcomes from this program would include a comprehensive usability analytics study, development of associated recommended performance measures, and requirements and specifications plans for inclusion within the usability analytics design builds or procurements related to providing usability analytics functionality within the new HMP. By intensively gathering health care user-driven needs, desires, and functionalities, future usability analytics projects, procurements, and planning will be better aligned to fulfill and optimize the end user and stakeholder experiences with an HMP. This fulfillment and optimization of the HMP experience will ultimately provide better ease-of-use of the Veteran patient’s medical record, allowing clinicians and providers to better focus on the delivery of care, and less on the mechanics of an EHR during interactions with a patient.



The VA-CASE Usability Analytics Program will provide for program management, usability analysis study performance and design, performance measure recommendations, needs analysis and user functionality-driven requirements specifications reports. In close conjunction with a Usability Analytics Integrated Project Team (IPT) and Integrated Usability Analytics Design Team consisting of a variety of stakeholders supporting hi2, VA-CASE will provide strategic systems and requirements support services following the guiding principles of meeting the existing and future needs of HMP health care clinician and provider users. Completion of this program’s work will directly support the VA’s and OIA’s Health Management Platform/hi2 Team-Facing and System-Facing components of Workstream B (a former national transformational initiative, T-16).

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Web Development

The SPDER Program has developed a VA-CASE intranet site for collaboration with project teams and the VA as a whole. The site is hosted on VISN11 servers and includes seven focus areas: 1) VA-CASE, 2) Collaborative, 3) Informatics (absorbed by SPDER), 4) Professional Development, 5) Purchased Care, 5) VE-TAP 6) VISN 11 Programs and 7) Strategic Programs and Data Engineering Resources (SPDER)

The site can be accessed from within the VA at: <https://vaww.vision11.portal.va.gov/sites/Indianapolis/verc/default.aspx>.

The SPDER Program also developed an external public-facing website located at <http://www.indianapolis.va.gov/VA-CASE>.

Project Objectives: To promote the projects and activities of VA-CASE in a central location. The SharePoint intranet site provides a repository of program communication and administration, Process Improvement Resource Guides (toolkit) and work for future initiatives. In collaboration with the Office of Quality, Safety and Value (QSV); Office of Systems Redesign (SRD); Quality Enhancement Research Initiative (QUERI); and the Center for Implementation Practice and Research Support (CIPRS), VA-CASE supports the design, creation, usability testing, and publishing of an intranet site for the Quality Improvement Toolkit Series as well as for internal/external VA-CASE communications and program services

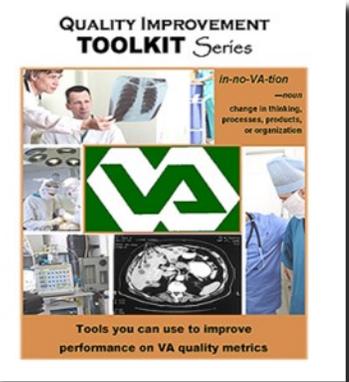
Project Results/Impact: The VA-CASE staff has provided guidance to other facility and VERC staff in development of similar toolkit and program management pages to promote best practice and quality in clinical practice and delivery of operational system engineering services. In partnership with the HIV/AIDS QUERI, VA-CASE staff developed the framework for development and formatting for electronic resource guides (toolkits). VA-CASE is partnering with national Systems Redesign (SRD) and HIV/AIDS QUERI to design, collect tools and use standardized page formatting on the SRD webpage for the PACT electronic toolkit.



Toolkits

The Toolkit Series is a unique partnership between the Office of Patient Care Services, Office of Quality, Safety and Value, 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.

The goal of the Toolkits is to produce and disseminate nationally, 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 in 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 being placed on the electronic toolkit site.



What is a Tool? A tool is any quality improvement innovation that is currently in use at a facility, but is not

Toolkit	# of Unique Visitors	Start Date
Cancer Toolkit Series	5,622	Nov. 2010
PACT	4,785	Sept. 2011

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 VA staff nationwide and are evaluated by VA clinical managers and policy makers prior to being posted on the Toolkit site.

In order to help connect the communities of practice and communicate information about the Toolkits, listservs were created. To date, the Quality Improvement Toolkit Series has 4,688 subscribers and the PACT Toolkit has 2,511 subscribers. Whenever there are new tools or other innovations to be presented, a listserv message is sent. The listservs are also 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.

With SharePoint 2010, 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 the Cancer Care Toolkit and PACT sites. The Toolkits have had the following number of unique visitors:

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 Toolkit

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

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Series currently includes Lung Cancer Care, Colorectal Cancer Care, Prostate Cancer Care, Head and Neck Cancer Care and Palliative Care.

PACT Toolkit

The PACT Toolkit is jointly sponsored by the Office of Systems Redesign, the Office of Quality, Safety and Value, the Quality Enhancement Research Initiative and VA-CASE. 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 staff nationwide. The PACT tools are organized around the three key components (pillars) of the PACT initiative – Access, Care Coordination and Management and Practice Redesign.

Toolkit	# of Tools
PACT	53

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.

Specialty Care Toolkit

Sponsored by the National Systems Redesign office, the Specialty Care Toolkit will be 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 is in the early stages of development. The main page of the Specialty Care Toolkit has been developed and some tools are in the process of being vetted. The initial tools will be placed on the new Specialty Care Toolkit and the Toolkit link will be disseminated within the next few months.

The Specialty Care Toolkit is organized around the key components of specialty care and will be displayed with a similar pillar organization as PACT.

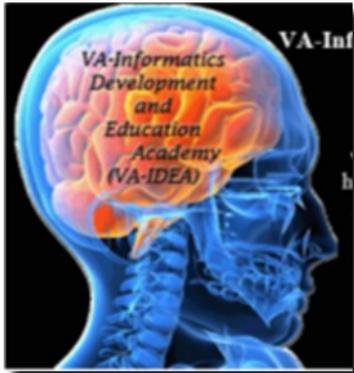
Future Toolkits

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

- Surgical Flow Toolkit – In connection with the Surgical Flow Collaborative, a surgical flow toolkit was proposed. The Surgical Flow Collaborative is currently on hold. The discussions about a Surgical Flow Toolkit will continue when the status of the collaborative is determined.
- Women’s Emergency Health Toolkit – discussions have begun to create a Women’s Emergency Health Toolkit. The work on this Toolkit is proposed for FY 2014.
- Transitioning Levels of Care 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.

VA- Informatics Development and Education Academy

VHA relies on the accuracy, stability, and performance of CPRS and VistA to provide care for our patients. Clinical Application Coordinators and similar health care informaticists are charged with teaching, developing, revising, managing, and supporting VHA's electronic medical record; however, very few receive adequate structured, comprehensive training on the CPRS tools and VistA packages they support. Traditionally, CACs receive informal, ad-hoc, on-demand training to learn their roles, responsibilities, duties, and skills. Relying solely on incidental learning risks embedding incorrect ideas, flawed concepts, and allowing a slow leak of organizational knowledge through experience attrition when veteran CACs retire or leave the position.



In 2012, the VA-Informatics Development and Education Academy (VA-IDEA) provides comprehensive education to VHA's health care informaticists ensuring each learns and maintains a core set of competencies to support, develop, and instruct CPRS\VistA and adjunct applications. The VA-IDEA program develops and

implements a national-focused, multi-faceted, comprehensive health care informatics professional development including, training curriculum, mentoring program and evaluation methodology. The curriculum encourages active learning and employs relevant student exercises as the best method for knowledge construction for adult learners.

Core skills for each of the fundamental CPRS\VistA\AViVA packages and applications are instructed through a variety of methods to ensure the objectives and outcomes are applicable to the broad role-range of VHA health informaticists. Delivery methods include 3-5 day on-site face-to-face application immersion courses, segmented LiveMeeting courses, and self-paced, small learning modules via Adobe Captivate. Each course includes lecture, demonstration, and extensive hands-on student exercises congruent with everyday clinical scenarios. The effectiveness of each course and class is evaluated through classroom assessment techniques, return demonstrations, direct observation, and end-of-course subjective and objective evaluation tools based on course and organizational objectives.



VA-IDEA Courses:

- **CAC 101**
Prepares the clinical informaticist to develop, maintain, and teach several of the VistA packages that informaticists are usually charged with supporting, including TIU, consults, orders, ASU, TIU templates, health summaries, team management, and alerts.
- **Clinical Reminders Session I**
Teaches reminder package basic skills to the clinical informaticist charged with building, maintaining, and deploying products from the clinical reminder package to enhance clinical decision support tools, clinical reminders, reminder reports, and staff documentation for their respective Medical Center. Topics include

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reminder dialogs, basic reminder definitions, findings, reminder test, branching logic, reminder exchange, and human factor engineering principles.

- **Clinical Reminders Session II**

Teaches reminder package advance skills to the clinical informaticist charged with building, maintaining, and deploying products from the clinical reminder package to enhance clinical decision support tools, clinical reminders, reminder reports, and staff documentation for their respective Medical Center. Topics include reminder definition function findings, reminder patient lists, extracts, and human factor engineering principles.

- **FileMan for Informaticists**

This course prepares the informaticist to build and employ FileMan reports and products to mine data from VistA. Topics include the data dictionary, print/sort templates, search/print templates, FileMan inquiry, computed expressions, functions and introduction to the corporate data warehouse and SQL.

- **CAC 201** (under construction for 2013)

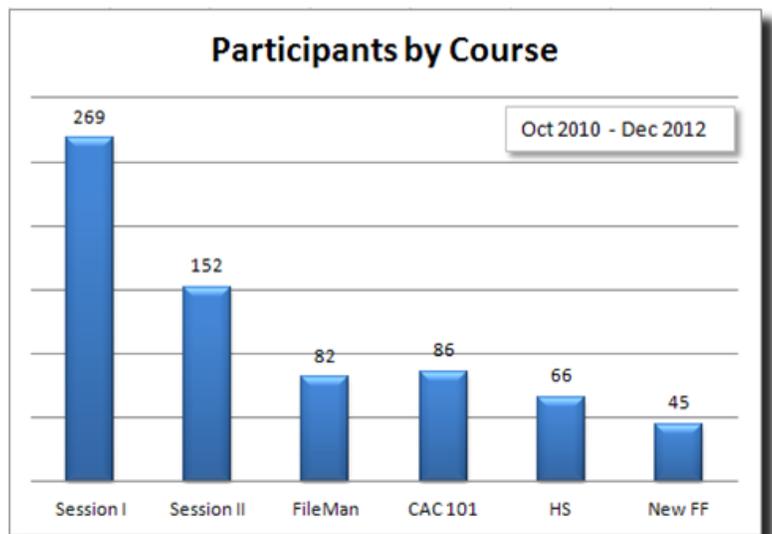
This 40-hour class will prepare the clinical informaticists to develop, maintain, and teach VistA packages not covered in CAC 101. Topics will include VistA Imaging, CLIO flow sheets, Clinical Procedures, order release events, PADPA, CIS/ARK, iMedConsent and others.

Summary of Successes:

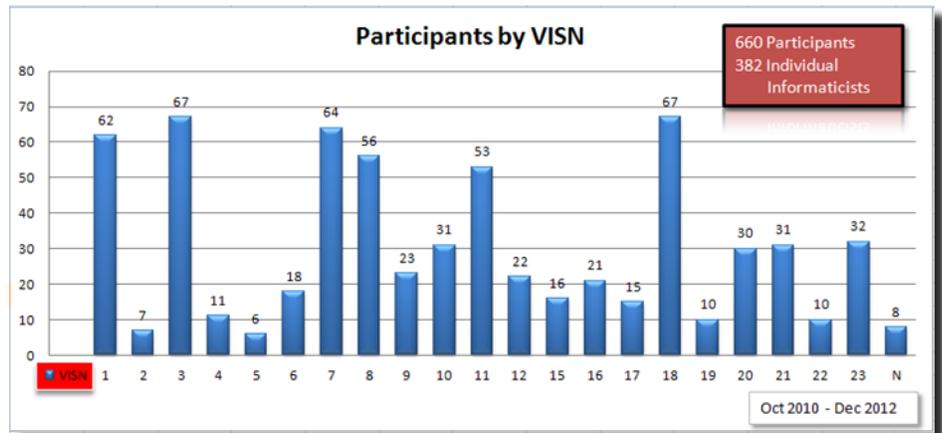
- 37 courses completed since Sep 2010
- More than 1500 participants since Sep 2010
- Completion of 2 Regional Training Centers in Tucson, AZ and Indianapolis, IN. 50% of courses taught in training centers in 2012
- Offered first course targeting Indian Health Services and VHA in September 2012
- Offered first of several LiveMeeting courses in February 2012
- Offered first of several courses in collaboration with the Office of Pharmacy Benefits Management in March 2012
- Chosen and presented two 90-minute courses as pilots for Virtual VeHU 2012 through MyVeHUCampus

Goals for 2013:

- Complete CAC 201 and offer first course in July 2013.
- Continue collaboration with Employee Education Services (EES) to complete migration of Clinical Reminder Sessions I and II to self-learning modules available in several VHA venues.



- Increase collaboration with Indian Health Services (IHS) to develop and offer courses relevant and vital to VHA and IHS.
- Provide at least 50% of courses through a remote-learning option.
- Create a SQL query course targeting the needs to clinical informaticists using CDW and VDW's for reporting services.



Human-Computer Interaction (HCI) & Simulation Lab

The VA Center of Excellence on Implementing Evidence-Based Practice, in collaboration with the Indianapolis VAMC and the VA-CASE, has developed a human-computer interaction (HCI) laboratory to investigate the usability of computerized clinical decision support and other informatics tools toward transforming the VA's information system. Lead by Dr. Jason Saleem and Dr. Alissa Russ, this lab provides an environment to capture usability data, assess user interaction with information systems, and also provide a centralized location for assessing optimal display and integration of clinical and operational data to integrate into clinical and management decision making. This laboratory is equipped to conduct simulation studies and support research and operations 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 HeatheVet.

Through the HCI & Simulation Laboratory, we are able to develop and modify software to improve HCI and usability, furthering the integration of IT into clinical workflow and increasing its acceptance through improved software design. This laboratory also allows evaluation and assessment of these changes to demonstrate and measure the effectiveness of software modifications.



The HCI Laboratory and HSRD group has been an essential stakeholder in the iteration and implementation of program work related to the T-16 Health Management Platform/Health Informatics Initiative (hi2) Usability Analytics program.

Project Results/Impact (to date): Use of human factors and HCI lab led to the VACO Transplant template conversion to a reminder dialog and NVCC Mammography Radiology process being adopted by CBO.

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Health4Heroes iPhone Application Development

VA-CASE is focused on innovative application development using agile development and incorporating human factors engineering principles. Agile software development principles are compared to the Lean thinking by delivering the right thing to the people who want it, in a timely fashion, and in usable form. By incorporating human factors into development, the quality of the development is improved. The Office of Patient Centered Care/Cultural Transformation funded a grant for iPhone application development of Veteran Health Goals in partnership with VISN 11. The innovation grant was used for Health4Heroes, a mobile application. Application development is partnering with the HCI labs in Indianapolis.

Project Objectives: The objective of the Health4Heroes iPhone project is to develop a mobile application that will help Veterans integrate their healthcare information, take an active role in their healthcare, and support their healthcare goals. The application will reach Veteran populations and be rated by the number of stars provided in feedback. Partnering on the project are Wayne State University developers and human factors experts, VA-CASE project managers, HCI lab Indianapolis, VISN11 subject matter experts, and Veteran groups. Integration with the Veterans' medical data is not planned.

Project Results/Impact (to date): Health4Heroes is undergoing national Innovations review for potential release to The Apple store. Significant delays in receiving Apple equipment caused by a moratorium on the devices prevented further HCI evaluation and testing with Veterans. The Health4Heroes application was presented at the VA hiring event in Detroit and received acclaim from many Veterans.



(VETS-CARE) iOS Intervention

Traumatic brain injury (TBI) has emerged as a major cause of morbidity among U.S. soldiers who have served in Iraq and Afghanistan. Mobile technology can provide unique opportunities for early interventions for Veterans with TBI as they reintegrate into their communities. In addition, mobile technology can increase Veterans' acceptability and adoption, mobility for flexibility, and accessibility in both urban and rural settings. In response, the VETS-CARE intervention was developed. VETS-CARE is theoretically-based comprehensive intervention; it organizes strategies and resources across multiple domains of a Veteran's life as he (she) attempts to reintegrate post-deployment with a TBI.

Partnership: In March 2011, Dr. Virginia Daggett received a Young Investigator Award from the Indiana Institute of Medical Research (IIMR) to program the VETS-CARE intervention and test it with Veterans via a mobile mode of delivery. In order to program the VETS-CARE intervention into a mobile application, Dr. Daggett collaborated with VA-CASE for additional funding to secure the knowledge/skills of informatics and usability experts. Throughout fiscal year 2012, the VETS-CARE developmental team worked with Dr. Daggett to ensure that a high quality prototype was developed to test with Veterans with TBI without altering the content of the intervention.

Development of the VETS-CARE iOS Application: The content of the iOS (for use on Apple devices i.e. iPhone, iPad, iPod Touch) application, was derived from 14 algorithms that were based on the needs and concerns of OEF/OIF Veterans with mild TBI and feedback from VA TBI experts. Each algorithm focuses on an aspect of cognitive impairments, physical symptoms, emotions/behaviors, daily activities, relationships and support, or adapting to the community. The initial programming of each algorithm and revision was traced using Medora Trac Software. The iOS app was built using *Agile Development* methods and tools as illustrated in Figure 1. Figure 2 illustrates revisions in the main page of the TBI iOS app through agile development.

Under the guidance of Darin Ellis, PhD, a Human-Computer Interaction (HCI) Specialist at Wayne State University, the VA-CASE development team- Joshua Rose, BS, Jeffrey Bailey, BS, Kyle Maddox, AS, Gail Edwards, BSN, Tonya Reznor, BSIT, Graphic Designer, and Valerie Curtis, the Project Manager- collaborated with Dr. Daggett as they applied HCI methodology in planning and designing the iOS app. Heuristic rules were applied for the visibility of the system status, user control and freedom, and to assist users to recognize, diagnose, and recover from errors.

The VETS-CARE iOS app is specifically designed for a Veteran to select the categories in which he (she) needs strategies and/or resources at the time of use. While the Veteran follows chronological steps, the mobile app was intentionally developed with flexibility for the Veteran to

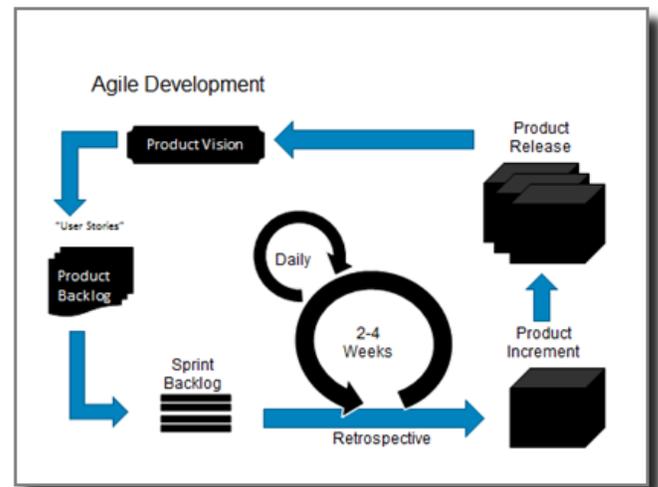


Figure 1



Figure 2. Revisions in the Developmental Process

“Go back” to a previous screen (s) using a back arrow button. This feature was based on Apple’s developmental rules that have been applied to other iOS apps.

Feasibility and Satisfaction of the VETS-CARE iOS App Pilot: The specific aims of this 2-phase pilot were to 1) to determine the feasibility and satisfaction of the VETS-CARE intervention with Veterans with TBI in order to further develop the first mobile prototype of VETS-CARE, and 2) to estimate effect sizes for three potential outcome measures, PHQ-9, Community Integration Questionnaire (CIQ) and Social Support Questionnaire (SSQ) for a future efficacy trial. Veterans with a diagnosis of mild or moderate TBI were recruited at the Richard L. Roudebush VAMC Indianapolis, IN through a collaboration with the Physical Rehabilitation Medicine Service (PMRS) providers and the Polytrauma TBI Coordinator. In Phase I, a convenience

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sample of six Veterans with TBI was randomized to the VETS-CARE iOS intervention (3) or to an attention control (education) group (3). Utilizing the Veterans' feedback, revisions were made to the iOS app by the developmental team prior to initiating Phase II. In Phase II, an additional 42 Veterans were recruited and randomly assigned to the VETS-CARE intervention group (n = 22) using the iOS app delivered on an iPad or the attention control group (n = 20), for a total sample of 48 Veterans. Data analyses is ongoing and the results will be used to determine: 1) the Veterans' feasibility and satisfaction of the VETS-CARE iOS app, 2) areas for further refinement, 3) the need for further research with the VETS-CARE iOS app, or 4) possibly the need for deployment for Veterans with TBI to use in the immediate future. Currently, a mobile app that includes a comprehensive tool to assist Veterans, who have sustained a TBI, with their reintegration does not exist.

Dr. Daggett is a nurse researcher currently working as a Program Manager/Nurse Consultant for the Purchased Care Business Systems Management Clinical Programming Consulting Project. She developed the content for Traumatic Brain Injury (TBI) iOS app and is currently conducting the feasibility and usability study with this app and she is the sole Principal Investigator of the Caregiver Grant.

Geriatric Resources for Assessment and Care of Elders (GRACE)

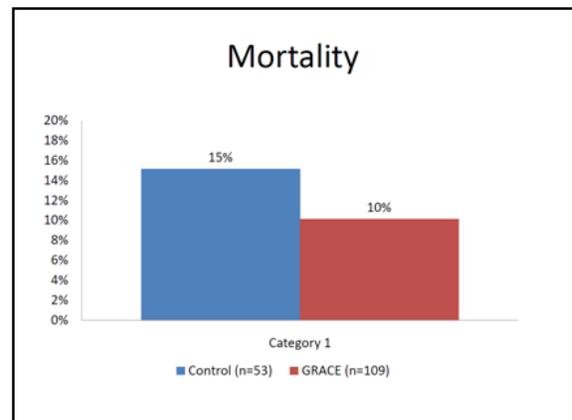
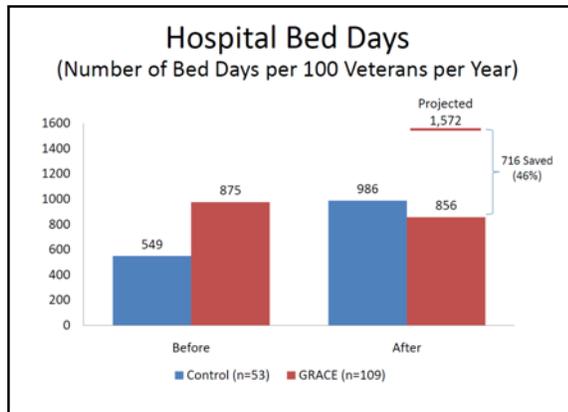
VA-CASE partnered with clinical researchers from the IU School of Medicine in a 2-year program funded by the Office of Geriatrics and Extended Care to disseminate and evaluate the Geriatric Resources for Assessment and Care of Elders (GRACE) model for home based geriatric assessment and care management to the Roudebush VAMC.

Project Objectives: Our goals under the Tech4Impact Diffusion Grants Program are twofold. The first goal is to enhance current activities of care planning, tracking, and communication; the second is to use computer-based technologies to facilitate program evaluation ensuring fidelity to the GRACE model and measuring quality of care indicators. Ensuring fidelity to the GRACE model and demonstrating improvement in quality of care indicators will be critical to the sustainability of GRACE in the Indianapolis VAMC and to the eventual dissemination of GRACE nationally within the VA healthcare system. These functions will also serve to guide and improve overall program quality.

Project Results/Impact (to date): VA-CASE provides program management, analysis and clinical informatics resources to this program. Over 200 patients have been enrolled in this program. Analysis of project data with HSR&D is ongoing to determine effectiveness. Preliminary results indicate ~30% reduction in 30-day readmission and mortality rates as shown in the graphs below.

The GRACE web-based assessment was replicated in clinical reminder format for CPRS and other documents were created specific to the address the needs of geriatric population. Presentations were made to Durham, San Francisco, and Atlanta with all three sites implementing the clinical documentation tools locally as a result.

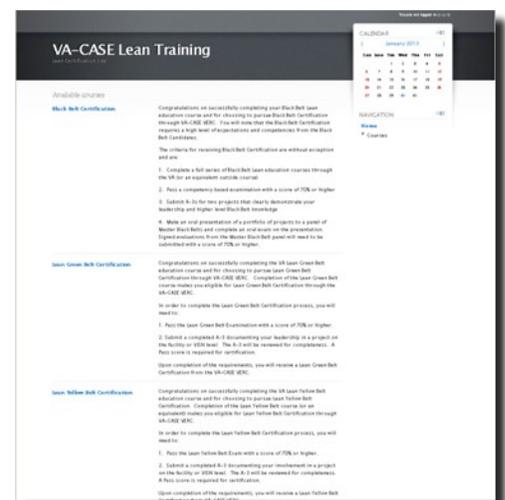
Professional Development Lean Certification Tool



The Informatics Program partnered with the VA-CASE Professional Development program to research and recommend an application for submitting and recording Training Certifications.

Project Objectives: The project objectives are to provide a cost efficient tool for creation of the certification program within VA-CASE. Research and consultation with Professional Development resulted in selection of Moodle a freeware software for education. The application has been put into use and course participants are submitting evidence of lean training to the site. Continued support and maintenance is ongoing.

Project Results Impact to date: Students are submitting A3's and other course documentation to the site for grading. Additional support and feedback was provided to hi2 program staff regarding the use of Moodle for the AMIA 10X10 certification program.



Telephone Assessment and Skill-Building (TASK) Intervention for Informal Caregivers

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. An informal caregiver is defined as a family member or a

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friend who assists the survivor with his/her activities of daily living in order for the survivor to remain in his/her home or a family member or a friend who provides complete care to the survivor to meet his or her needs of daily living in a home environment.

Project Objectives: This four-year grant will be testing the Telephone Assessment and Skill-Building (TASK) Kit with caregivers of Veterans with stroke and TBI. The TASK II/TASK-II TBI is a telephone intervention that is delivered by professional nurses who have received intensive training and includes:

- Skill-building that focuses on information about stroke or TBI and the survivor's physical and instrumental care needs, and handling the survivor's emotions and behaviors;
- Skill-building that focuses on the caregiver's own personal responses to care giving;
- Skill-building that empowers caregivers to independently assess their needs in caring for both the survivor and themselves, and addresses these needs over time using the TASK II Resource Guide for Caregivers containing tip sheets and skill-building strategies.

Caregivers will receive 8 weekly calls from the TASK II intervention nurse located in Indianapolis who will conduct a booster call at 12 weeks. At week 5, the caregivers will also receive an additional assessment to identify care-giving-related negative life changes. During the call caregivers will select at least one skill need in order to address areas in their lives that may have deteriorated as a result of providing care.

While this intervention has been tested with caregivers of stroke survivors in the civilian population and has been adapted for family caregivers of civilian TBI patients, the intervention has yet to be tested with caregivers of Veterans with stroke and/or TBI.



The objectives of this study are to conduct a randomized trial to evaluate:

- Efficacy of the TASK II intervention in informal caregivers of Veterans with stroke;
- Estimate effect sizes for the TASK II intervention for informal caregivers of Veterans with TBI

The sample will include informal caregivers of Veterans with stroke or TBI, who have received care at the Michael E. DeBakey VAMC in Houston or at the Richard L. Roudebush VAMC in Indianapolis. Preliminary activities have been initiated and the anticipated start date is March 1, 2013.

Virginia Daggett, PhD, RN is the Principal Investigator and is collaborating with the following co-investigators: Drs. Tamilyn Bakas and Michael Weaver, IUSON, Indianapolis; Dr. Archana Dube', Department of Economics, IU Indianapolis; Dr. Laura Murray, Department of Speech and Hearing Sciences IU Bloomington; Dr. Bonnie Wakefield, VA Nursing and eHealth QUERI; Drs. Teresa Damush and Linda Williams Health Services, Research & Development (HSR&D)/VA Stroke Quality Enhancement Research Initiative (QUERI), Indianapolis; and Dr. Jane Anderson, HSR&D/VA Stroke QUERI, Houston.

Professional Development Programs

Professional Development is primarily focused on educational programs related to OSE disciplines and methods. The program is a leader in developing curriculum and providing facilitation skills in the VA-TAMMCS model of Lean tools and concepts. The FY12 VA-CASE CPHT Program budget was approximately \$870,000 per year, with approximately 25% (\$220,000/year) allocated from VA-CASE core funds. The FY12 VA-CASE Professional Development Program budget was approximately \$3,560,000 per year, with approximately 1% (\$60,000/year) allocated from VA-CASE core funds.

Drawing from expert staff with many years of Lean and Improvement educational experience, the Professional Development Program is able to deliver high quality educational venues that meet the specific needs of our customers. Either prior to or in real time, the faculty's extensive experience allows educational experiences to be adjusted to the wide variety of venues in which we participate, resulting in a high quality personal experience. The projects in FY12 were Lean Training/Certification Program, RPIW Training/Co-Facilitation Program, Leading Organizational Improvement Workshop, Improvement Advisor Academy Program, Access Academy, Purchased Care Lean Six Sigma, Consolidated Patient Accounting Center, Lean Management (Lean Sensei) Program, Indy Excellence 2.0 Evaluation, VA Lean Practitioners Network, and OIF/OEF Program.

VA- CASE Professional Development Program Project Pipeline

Innovation			Implementation		Impact		
Planning	Proof of Concept		Future State Optimization		Evaluation	Deployment	
Innovation Development	Proposal Solicitation	Concept Development/ Testing	Initial Pilot (single site/VISN)	Demonstration Pilot (multiple sites/VISNs)	National Reporting/ Approval	National Deployment	National Policy Change
LEAN Education/ Training			Lean Six Sigma Program		VA Lean Practitioners Network (VALPN)	Lean Education/ Certification Program (YB, GB, BB, SEE)	
					Lean/SR Competency Development	RPIW Training/ Co-Facilitation	
SR Education/ Training			Lean Management Program			OIF/OEF Program	
					Leading Organizational Improvement	Improvement Advisor Academy	
			Virtual Training Programs			Access Academy	

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FY2012 VA-CASE Professional Development Program Project Summary

Lean Training Education/ Certification Program

Developed in partnership with the Mid-West Mountain Region (MWM) VERC, this program aims to provide VA staff with the knowledge, skills, and support to implement and sustain successful Lean healthcare projects within VHA healthcare facilities. The 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 VA. The entire program explicitly aligns Lean healthcare methods, tools and techniques with the national VA Systems Redesign framework of Team/Aim-Map-Measure-Change-Sustain (TAMMCS).

Program Objectives:

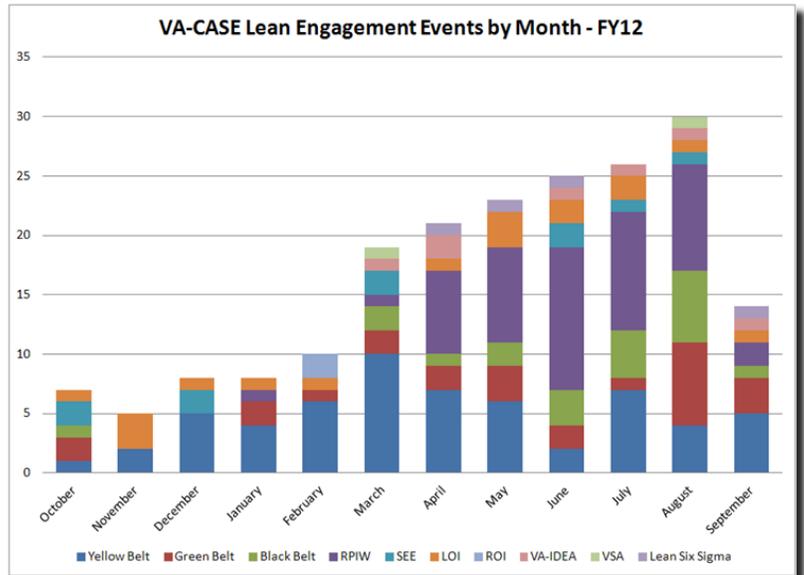
- Provide training and educational programs to develop, evaluate, and spread OSE-based, just-in-time (JIT) Lean training programs for management and front line clinical and administrative staff.
- Build interdisciplinary teams composed of facility systems redesign and VA clinical administration staff to partner with faculty from affiliated academic institutions to 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.
- Partner with the other VERCs to spread standardized Lean training and certification across the VHA enterprise.
- Spread Lean Culture and expand a Community of Practice throughout the VA

Program Results/Impact: 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) level. Since the original course development, VA-CASE has added courses in Leading Organizational Improvement and Return on Investment (ROI) Analysis and has added an offering of facilitation for Rapid Process Improvement Workshops. From FY09-present, the VA-CASE Lean Program has provided over 1500 days of Lean Training/co-facilitation to over 10,000 staff throughout the VHA enterprise. The number of courses/participants for VA-CASE Lean Training Programs for FY2012 as well as the roll-up for FY09-FY12 is shown in the following table:

	FY12		Total FY09-FY12	
	# of Sessions	# of Participants	# of Sessions	# of Participants
Yellow Belt	59	2360	114	4560
Green Belt	25	1000	52	2080
Black Belt	20	300	49	600
Rapid Process Improvement Workshops (RPIWs)	50	750	17	710
Senior Executive Experience (SEE)	10	450	63	1015
Leading Organizational Improvement Workshops (LOI)	17	765	21	895
Return on Investment Analysis (ROI)	2	80	4	160
Value Stream Analysis	2	30	2	30
Lean Six Sigma (GB/BB Cohort over 9 months)	1	20	1	40
Total Lean Training/Co-Facilitation	186	5755	323	10090

Additionally – the chart here indicates the number of Lean Program Events by Month for FY12:

In July 2011, VA-CASE implemented a formal evaluation program for the Lean Education Program. Within this evaluation program, participants are asked to provide feedback on the quality of instruction, course materials and workshop exercises. Results from the evaluation indicate that majority of participants rate the VA-CASE Lean Educational offerings within an excellent rating (≥ 4.0) as indicated in the chart below:



Course	% of participants rating Good to Excellent		
	Instruction	Materials	Exercises
Black Belt	99%	93%	94%
Green Belt	95%	86%	94%
SEE	91%	90%	87%
Yellow Belt	93%	95%	93%
Grand Total	94%	93%	93%

RPIW Training/ Co-Facilitation Program

RPIW workshops are a project-based approach to provide rapid application of the VA-TAMMCS model over a period of 90 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 for the improvement. A Rapid Process Improvement Workshop (RPIW) Facilitator or Coach is also typically involved. The RPIW workshop itself is five days or 40 hours of dedicated front-line team work. Following the RPIW week, the front-line process improvement team will continue 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.

Program Objectives:

- Develop an understanding of techniques used to facilitate systems redesign efforts within clinical micro-systems.
- Understand how RPIWs are used to overcome barriers to creating a culture of continuous improvement.
- Facilitate RPIWs within their own facilities.
- Teach other VA employee’s basic systems redesign concepts and tools.

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Sites supported in FY12 include:

Tuscaloosa, Alabama	Human Resources (DS)
Madison, Wisconsin	Pharmacy RPIW
Butler, Pennsylvania	The focus was to reduce the number of scanned Veteran documents. VA-CASE faculty worked closely with the Systems redesign staff, and was able to redesign scanning processes resulting in a 25% decrease in scanned documents. The work reduced waste and eliminated redundancy.
Central Office	Tort Claims RPIW
Montana Health Care System	Colorectal Screening

Leading Organizational Improvement Workshop

VA-CASE continued to partner with the National SR Leadership Committee and Office of Systems Redesign to provide facilitation, coordination, and implementation support for the roll-out of the Senior Executive Systems Redesign Workshop. VA-CASE is providing implementation support services to the National Systems Redesign (SR) Program Senior Executive Workshop throughout the 2-year Senior Executive Workshop cycle. This support includes pre-work and planning meetings as well as workshops conducted across 23 VISNs nationally through FY11-12.

Workshop Objectives: The objectives of this program include providing:

- Introductory administrative/informational support of VISN/Facility leadership to assist with workshop coordination.
- Pre-assessment support (in partnership with NCOD) of VISN/Facility current use of SR tools, methods and culture.
- Facilitative, administrative and coordination support to the National SR Program in support of each on-site Senior Executive Workshop.
- Facilitation/training/ coaching in highly effective SR methods to National VHA Senior Executives through customized senior executive Systems Redesign workshops.
- Post-assessment support of VISN/Facility use of SR tools, methods and culture following the workshop program.



Evaluation results from the 13 LOIs conducted in FY12 indicate that over 90% of Senior Executive participant's rate the program as Very Good to Excellent. It should also be noted that the travel restrictions that were implemented in FY12 limited the number of participants in the workshops to 50. Prior to the restrictions (FY11) most sites had between 70 and 90 participants per session.

Improvement Advisor Academy Program

VA-CASE has partnered with the Veterans Health Administration (VHA) Office of Systems Redesign (SR) in collaboration with the VHA Employee Education System (EES) to provide primary OSE support for the national SR Improvement Advisor Academy (IAA) in OSE Tools and methods in FY12. This is the third year that VA-CASE has been involved in IAA.

Program Objectives: The objectives of this program include the following:

- Learning by Doing-- During the course of the IAA 12 month period each participant facilitated Improvement projects with three teams: one from each area of Systems Redesign, Inpatient, Outpatient and Business Improvement. Projects were solicited from stations and VISNs.
- Just in Time Learning-- VHA and VA-CASE Subject Matter Experts (SMEs) will serve as faculty and mentors. VA-CASE will also provide core resources for mentoring and coordination of the details of the IAA. This experienced pool of experts was available for consultation and guidance within a relatively short time frame. As participants found the need for consultation in specific areas, SME and IAA faculty were made available on an as-needed basis to provide additional real-time learning experience within the IAA program.

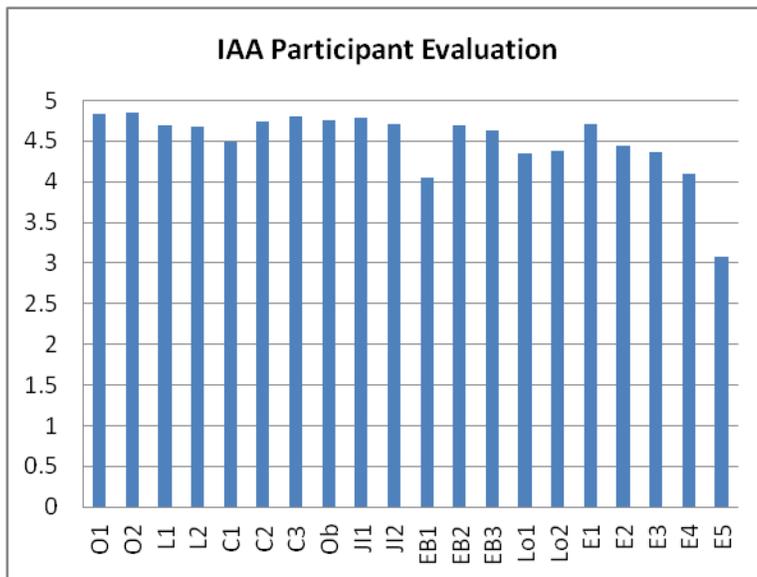


Curriculum Objectives – Within the IAA program participants will:

- Demonstrate skill in leading, coaching and facilitating improvement teams.
- Develop expert knowledge in performance improvement, systems redesign methodologies and systems redesign program management.
- Complete a minimum of three projects, aligned to the local organization's strategic priorities and preapproved by IAA faculty and planning committee, utilizing the skills developed during the course of the academy.
- Serve as experts and coaches to peer networks in support of frontline change.
- Demonstrate and apply the knowledge and skills needed to foster widespread use of systems improvement tools and techniques in addressing every day as well as high priority issues.
- Develop expertise in data capture, data management and data analysis within the context of improvement initiatives.

Project Outcomes: Evaluation of the program developed by VA-CASE in conjunction with EES showed very positive results based on the objective evaluations from the students. Further, a six month follow-up survey of Round 2 of IAA was performed in FY 2012. The purpose of the follow-up survey was to see if learning was retained over time. Participants were asked to indicate the perceived improvement (in percent) that the training had on their ability to perform their job. Overall, respondents indicated a 38.28% improvement in their performance. In other words, as a result of only this training, respondents perceived a strong improvement in their ability to perform in their job. The results of the survey are shown below.

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Overall 1:	Overall, I was satisfied with this learning activity.
Overall 2:	I would recommend this learning activity to others.
Learning 1:	The learning activities and/or materials were effective in helping me learn the content.
Learning 2:	: I learned new knowledge and skills from this learning activity.
Content 1:	The scope of the material was appropriate to my needs..
Content 2:	I found the material in this learning activity to be relevant and up-to-date.
Content3:	The content was relevant to my job-related needs..
Objectives:	The content was relevant to my job-related needs.
Job Impact1:	I will be able to apply the knowledge and skills learned to my job.
Job Impact 2:	This learning activity will help improve my job performance.
Enablers & Barriers 1:	My manager and I set expectations for this learning prior to attending this learning activity.
Enablers & Barriers 2:	I feel competent to apply the skills/knowledge I developed during the learning activity.
Enablers & Barriers 3:	This learning activity aligns with the business priorities and goals identified by my organization.

Access Academy

VA-CASE has partnered with the Office of Systems Redesign (OSR) to develop and present an academy specifically focused on Access. VA-CASE provided curriculum development, agenda development and project review as well as provided faculty and mentors for the nine-month long program. FY12 was the first year of the Access Academy and plans are to continue the Access Academy in future years. George Ponte and Dawn Eskau served as key faculty.

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

- Demonstrate understanding of Access and office efficiency principles, measurement, and when/how to apply it
- Demonstrate understanding of the VA-TAMMCS framework
- Demonstrate understanding and the execution of improving access key principles and strategies under the categories of: FOR an appointment, AT an appointment, and BETWEEN appointments
- Demonstrate understanding the components of Service Agreements and when to utilize them
- Understand the inter-working 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 Impact: The course was presented beginning in January 2012 and ending in August 2012. There were 40 participants in the first Access Academy.

Purchased Care Lean Six Sigma (PCLSS)

VA-CASE partnered with the National VHA Purchased Care Program Office in Denver, Colorado to provide Lean Six Sigma training, mentoring and certification to employees and staff of the VHA Purchased Care Program Office. Because Purchased Care is more focused on business processes than on patient care, the curriculum focused more on business processes. The curriculum was presented in five sessions spread out over FY12. The curriculum was progressive in nature so each of the five sessions had new materials added to the materials from previous classes. Faculty for the PCLSS project included Debbie Curl-Nagy (Project Lead), Jay Chandra and Ken Rennels.

Program Objectives:

- Training following Healthcare Business industry prescribed tools and training methods and aligned with the Lean Six Sigma Body of Knowledge (BoK) as outlined by the American Society for Quality (ASQ)
- On-site, project-based, Lean Six Sigma training at the Green and Black Belt Levels.
 - The primary objective of the Green Belt program is to provide VHA Purchased Care Program staff with the knowledge, skills and support they need to actively participate in and facilitate Lean Six Sigma projects in VHA healthcare facilities and program offices under the direction and supervision of a Lean Six Sigma Black Belt.
 - The primary objective of the Black Belt program is to provide VHA staff with the knowledge, skills and support they need to independently facilitate and lead Lean Six Sigma projects in VHA healthcare facilities and actively participate in strategic oversight, planning and management of enterprise-wide Lean Six Sigma programs.
- VA-CASE will provide mentoring for Lean Six Sigma Black Belt candidates in direct application of LSS methods and tools introduced during the training events within the context of the assigned LSS Black Belt projects.

Project Impact:

- March, 2012 there were 11 projects chartered employing 11 Black Belt course participants and 27 Green Belt course participants.
- From April through October, 2012 there were 5 separate weeks of Lean Six Sigma classroom training. Training involved approximately 15 Black Belt participants and 40 Green Belt participants.

Consolidated Patient Accounting Center (CPAC)

VA-CASE contracted with the Consolidated Patient Accounting Center (CPAC) to provide Lean education to employees and staff. Each of the six CPAC sites was scheduled for Senior Executive Experiences, Yellow Belt, Green Belt, Black Belt and Return on Investment (ROI) courses. Rapid Process Improvement Workshops were also scheduled for each site. Following the training sessions, VA-CASE provided mentoring on the Lean projects developed in the RPIWs. Because CPAC has business processes instead of patient care, a curriculum that used the DMAIC framework instead of the TAMMCS framework was created. The DMAIC framework lends itself more to improvement in business processes. The six sites are North Central CPAC in Middleton Wisconsin, Mid Atlantic CPAC in Asheville North Carolina, Florida Central CPAC in Orlando Florida, West CPAC in Las Vegas Nevada, Central Plains CPAC in Leavenworth Kansas

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and Mid-South CPAC in Smyrna Tennessee. Faculty for this project included Deanna Suskovich (Project Lead), Debbie Curl-Nagy, Russ Cech, Jay Chandra, Dawn Eskau, George Ponte, Ken Rennels and Philip Swearingen.

Project Objectives: The objectives of this program include providing:

- Lean training, mentoring and certification for CPAC employees and staff
- Facilitation/training/coaching in highly effective SR methods to CPAC through customized Yellow Belt, Green Belt and Black Belt courses.

Project Impact: Approximately half of the CPAC courses were presented in FY12. Each site had at least one Yellow Belt and one Green Belt course, with several sites also having their first RPIW. The project will continue in FY13 and conclude in April 2013. CPAC courses presented in FY2012 and planned for FY2013 are:

Lean Management (Lean Sensei) Program

VA-CASE has developed a Lean Management System support process for five pilot sites to offer Master Teacher/

	FY2012	FY2013
SEE (Senior Executive Experience)	2	0
Yellow Belt	4	7
Green Belt	3	8
Black Belt	0	5
RPIW	2	11
ROI (Return on Investment)	0	4

Experts who have extensive experience in Organizational Lean Transformation to aide in VISN 11's Lean Transformation efforts. The purpose of the Lean Sensei partnerships were three-fold, 1) Senseis help to guide transformational change as they coach and mentor today's Senior Leaders to affect organizational change through Lean Transformation, 2) Senseis have a wide array of experiences and expertise that enables them to objectively transfer their learning to others, and 3) Senseis provide the direct and immediate feedback to assist in organizational change. The Lean Sensei Program is an innovative initiative that started in October 2012 with collaboration between VISN 11, V11 Program, and VA-CASE.

The five pilot sites are Palo Alto, New Orleans, Cincinnati, Erie and North Chicago. The Lean Management System is based on the ideas of creating a Lean organization that focuses on improvement, quality and support of staff by leadership every day. VA-CASE will support the five pilot sites in developing a Lean Management System in their facility. Supported efforts will include:

- Large-Scale, System-Level Improvement Efforts managed through leveraging multiple, concurrent Value Streams (inch-wide and mile deep)
- Small-Scale, Unit-Level Improvement Efforts, managed through Continuous Daily Improvement efforts (mile-wide and inch deep)
- Leadership Development conducted through Lean Training and Sensei Programs

- A systematic approach to managing Strategic Deployment efforts throughout the organization, achieved through Hoshin Planning.

Two Lean Senseis will be assigned to each pilot site. The role of the Senseis will be:

- Executive Sensei: Primary focus on Executive role in deployment strategy, Hoshin planning
- Mid-Level Manager/Value Stream Sensei: Primary focus on the mid-level management role in deployment strategy, Value Stream Analysis and RIE/RPIW facilitator support

Support will entail at least one trip a month for each of the Senseis to work with the facility on developing the Lean Management System. Lean Senseis will also be available to each pilot site by phone call and e-mail throughout the Lean Management System development period. Work on the Lean Management System project was begun in late FY12 and will continue in FY13.

Project Objectives:

- Support the development of a Lean/Continuous Improvement culture within each pilot facility
- Provide education and informational support for the development of tools and methods in support of the Lean Management System at each pilot facility
- Provide mentoring support for executive and mid-level managers in making the transition to a Lean Management System

Indy Excellence 2.0 Evaluation

Edward Miech has partnered with the Indianapolis VA Medical Center to develop an assessment plan for evaluating the Indy Excellence 2.0 program. The Indy Excellence 2.0 program is a Continuous Daily Improvement (CDI) program implemented at the Indianapolis VA Medical Center. As a part of the CDI program, the facility has implemented over 20 huddles throughout the facility and will add another 20 huddle areas in the near future. Indy Excellence 2.0 has also begun development of Standard Work procedures.

Evaluation of the huddles associated with CDI is currently underway. Evaluation of other aspects of CDI will be implemented as those portions of the program are developed and implemented. The assessment plan, thus far, for huddles includes:

- Number of huddling areas in the hospital
- Number of participants at huddles
- Number of improvement opportunities suggested and completed
- Pictures of the huddle boards
- Characteristics of successful huddles / characteristics that are less important in the success of huddles

Certification

VA-CASE has developed an in-house certification system that provides certification through the VERC. The development of the VERC certification was done on the Moodle classroom management system software platform. Lean Certifications at the Yellow Belt, Green Belt and Black Belt levels are offered through VA-CASE. The Yellow Belt certification went live on June 1, 2012, Green Belt on July 1, 2012, and Black Belt on August 1, 2012. Certification

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requires project participation, completion of a competency based knowledge assessment and submission of a project summary document (A3). A summary of certification through October 2012 is listed above:

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

Lean Certifications (through VA-CASE)	In Process	Completed
Yellow Belt	241	26
Green Belt	118	10
Black Belt	46	2

Additionally, the courses and certification programs developed are now the baseline curriculum used by all VERCs and are available for VHA facility use in their improvement education programs.

Having Certification through VA-CASE provides the opportunity for individual certifications to also be developed. VA-CASE has been approached by National Systems Redesign to create an individual certification for the Improvement Advisor Academy and has also been approached by the Consolidated Patient Accounting Center to develop a certification process specifically related to Business Management instead of Healthcare.

VA Lean Practitioners Network (VALPN)

The VA Lean Practitioners Network (VALPN) is a national virtual collaborative for VA practitioners of healthcare Lean who are applying this strategy to Systems Redesign and patient-centered care. The group is informal and its purpose is to collaborate and learn from each other. They accomplish this through monthly VANTS conference calls and Live Meetings, where members share Lean application ideas and successes.



In 2007, VA experienced the spread of Systems Redesign (SR) in operations throughout the nation. Many were attempting to incorporate Lean into SR, but there was no simple way to share Lean experiences and best practices. Furthermore, there was little understanding of Lean Thinking and rather limited Lean training resources inside VA. At this time, Carlos Garcia began to develop an idea for a virtual Lean and Six Sigma discussion forum to start a dialogue among many who wanted to apply Lean strategy to problems within their organizations. In early 2009, Mr. Garcia presented the idea at a VISN 22 conference and was encouraged to make it happen. Later that year, after testing a small “practitioners’ network” in the West, he created today’s

organization. The group developed quickly into a national network by simple word of mouth, and became a new and productive discussion forum for those experienced with Lean strategy and for many who wish to learn how it can benefit their organizations and our Veterans.

Today, the network continues to grow and members are from all levels of VA hospital and clinic operations. Beginning in January 2013, the network will have a new home on the Professional Development page of the new VA-CASE Share Point.

OEF/OIF Program

The OEF/OIF program was developed to support the introduction of OEF/OIF Veterans back into the work force. VA-CASE partnered with the OEF/OIF office to identify Veterans that were seeking employment and had a desire to learn about and work in the VA-CASE engineering environment. One OEF/OIF Veteran was hired and is successfully working on improvement projects at the Indianapolis VA Medical Center through the System Redesign office after completing Lean training. Two other OEF/OIF Veterans were hired and have completed Yellow and Green Belt education. They are being integrated into the VA-CASE Professional Development program and assisting with Systems Redesign projects



First VHA Vertical Value Stream Mapping Conducted

In October 2012 Brian Poynor and Ba Pirojboot conducted the first (in the VHA) Vertical Value Stream at the Salem VA Medical Center in Roanoke, VA. A Vertical Value Stream is a Lean tool for project management that helps an organization decide what needs to be changed to meet future business demands. Creating a Value Stream Map explains the organization's current state and helps them decide what needs to be done and in what order it needs to be done to be most effective.



Brian and Ba met with the client to conduct an RPIW for implementing a Comprehensive Sleep Lab Program. They soon discovered that the client was overwhelmed with all of the tasks involved, they did not understand their roles and they did not have a process in place. Brian and Ba suggested that what they really needed was Vertical Value Stream Mapping.



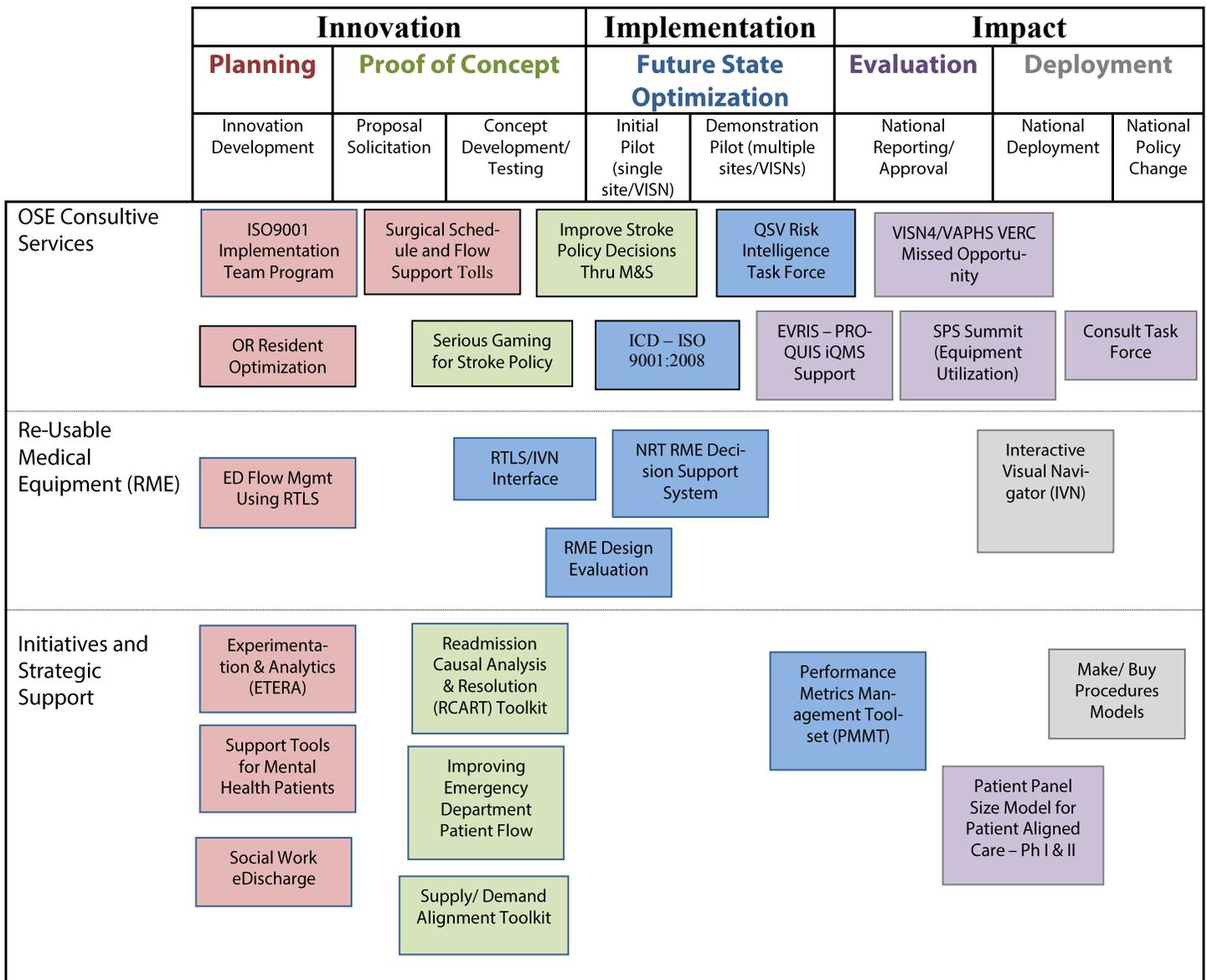
This event did everything a Lean event should do. At the end of the three day event, the 25 leaders involved left with a clear understanding of where they were, a road map on how to get their objective achieved and satisfied, involved stakeholders.

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 Systems Redesign Programs. Lessons from projects are applied to future clinical and administrative systems redesign initiatives. The VA-CASE VE-TAP budget was approximately \$1,350,000/year, with 23% (\$250,000) 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 areas:

- Operational Systems Engineering (OSE) Consultative Services Programs
 - VISN4/VAPHS VERC Missed Opportunity Project
 - Improve Stroke Policy Decisions through M&S
 - VE-TAP Consultative Services
 - VHA Real Time Locating System Program Management Office
 - QSV Services
 - Consult Task Force
- Re-usable Medical Equipment (RME)/Real Time Location Systems (RTLS) Programs
 - Interactive Visual navigator (IVN) Program
 - IVN Program Interface with other RME and RTLS Initiatives within VHA
 - Real Time Locating Systems – IVN Interface Project
 - Integrated Solutions System of Systems Deployment Framework Project
 - SPS
 - ACCESS Profile Project
 - Near Real Time Decision Support Systems Project (NRT DSS)
 - Design Evaluation for RME Project
- Initiatives and Strategic Support Programs
 - Make/Buy Procedure Models
 - Patient Panel Size Intensity Adjustment Model for Patient Aligned Care
 - Performance Metrics Management Toolset (PMMT)
 - Readmission Casual Analysis and Resolution Toolkit (RCART)
 - Clinical Services Staffing
 - Social Work eDischarge
 - Mental Health Interface Transfer
 - Supply/Demand Alignment Toolkit
 - Improving Emergency Department Patient Flow

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


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Operational Systems Engineering Consultative Services Projects

VISN4/VAPHS VERC Missed Opportunity Project

This 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 for use with 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 and Professional Development provided services to complement the education program.

Program Objectives:

- Improve, test, validate, and automate No-Show Prediction Model.
- Educate teams at facilities in SR improvement processes using the RPIW methodology.
- Provide assessment support for the education process.

Project Results/ Impact:

- Provided tools, RPIW consultation, and process evaluation techniques to assist facilities with improving missed opportunity processes and for use with the Patient Aligned Care Team effort.
- Provided data extraction routine to PHCS to assist with UPitt project and provide data for WSU model validation.
- Provided data extraction routine to VISN 11 facilities that are study sites for the WSU model validation and pilot.
- Established Strategic Review Team at VE-TAP to assess potential uses for the No-Show technique in other areas. Team has identified Patient Re-Admittance Improvement Project as one use.
- Continued No-Show model validation.

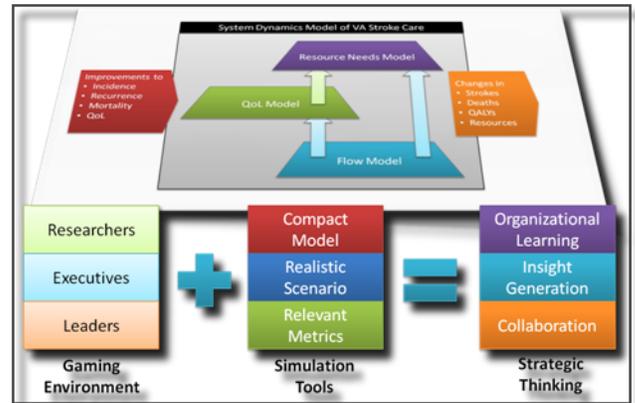
For FY12, the project supported continued model validation, facility support, and support to VAPHS efforts.

Improve Stroke Policy Decisions through M&S

This project was designed to identify rigorous methods to conduct sensitivity and uncertainty analysis with the existing VA Stroke Strategic Planning Model to understand the implications of adding additional resources, improve performance of resources allocated to stroke prevention and mitigation, and improve patient safety to mitigate risk of stroke. The project goal was to provide a working model to inform Stroke QUERI strategic planning and VA Operations, and experiment with the model to understand its dynamics and create scenarios by varying parameters representing policy. 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 to implement. Results from this project were rolled into a follow-on effort – Serious Gaming for Stroke Policy.

Serious Gaming for Stroke Policy

Project 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. VA-CASE created a compact System Dynamics model of the VA Stroke System of Care. 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. The Stroke model includes three modules representing patient flow, quality of life, and resource need 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 for achieving better outcomes. Serious gaming engages key stakeholders in the strategic thinking process and leads to greater organizational learning and collaboration.



Project Results/Impact: Multiple experimentation sessions conducted 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 during FY13.

VE-TAP Consultative Services

VE-TAP provides Subject Matter Expert services and consultation in support of several VHA programs and offices. These include:

- VHA Real Time Locating System Program Management Office (RTLS PMO)
- VHA Office of Quality, Safety, and Value (QSV)
 - ISO 9001 Education, Training, and Certification Effort (ISO Consultative Division – ICD)
 - Integrated Quality Management System (iQMS) PROQUIS Project (Enterprise Value and Risk Intelligence Service – EVRIS)
 - Risk Intelligence Task Force
- VHA SPS Summit Equipment Utilization Workgroup
- VHA Consult Task Force

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VHA Real Time Locating System Program Management Office (RTLS PMO)

This project provided services in support of RTLS program office objectives. The services provided for RTLS PMO involve support to the VHA Enterprise RTLS acquisition project, VERC representation on the RTLS Research and Evaluation Team, the RTLS Steering Committee, the Health Efficiency (T16) Automation Workgroup; and the RTLS-SPS, Patient Elopement and Staff Tracking, Surgery and Clinical Flow, and the NDR sub-workgroups.

QSV Services

The services provided for QSV involve support to the ISO 9001:2008 implementation efforts, the iQMS PROQUIS Project, and support to the Risk Intelligence Task Force. VE-TAP represented the VERCs during the research and evaluation of commercial ISO 9001 training and certification programs and iQMS solutions, and provided individuals to train and certify as Lead Auditors for ISO 9001 implementation. VA-CASE is a charter member in the iQMS Design Group that developed requirements and specifications for a Commercial off the Shelf (COTS) iQMS solution. This effort culminated in a national contract with PROQUIS Inc. Additionally, VA-CASE represented the VERCs in the ICD-SPS Working Group investigating solutions to automate and optimize SPS work flow, and in the QSV Risk Intelligence Task Force.

VA-CASE represents the VERCs in the SPS Summit Group chartered to build the next generation SPS for VHA and specifically serves on the Equipment Utilization workgroup and the Core Business Process Engineering Team.

Consult Task Force

The services provided for VHA involve support to the Consult Task Force. The consult package is the current system that is used to request and track requests for consultation and many outpatient procedural services. A recent review of the data available revealed significant variation in the use, rules, and administrative processes within the consult package.

Project Objectives: At the request of the Under Secretary for Health, a NLC HQVC Consult Task Force was convened. The purpose is to define current uses of the consult package in CPRS/VistA and specify business rules for standard future use.

Project Results/Impact: Recommendations to the Quality and Value committee are due by December 2012. These recommendations will direct the use of the consult package and VSSC reporting of Clinical Consultation data to track the integrity of the consult process.

Re-usable Medical Equipment (RME)/ Real-Time Location Systems (RTLS) Programs

Interactive Visual Navigator (IVN) Program

IVN provides an automated and dynamic work flow process by 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 the



Veteran. 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.

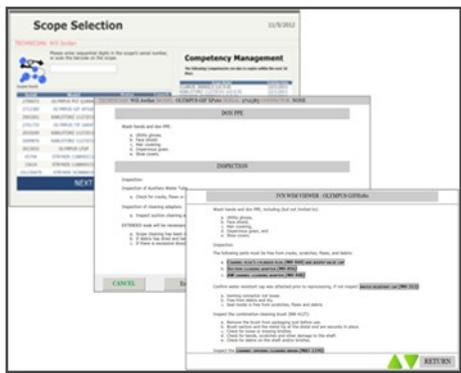
IVN is a Web-based application that presents interactive, multimedia instructions for the RME reprocessing procedure. IVN captures time and results data to confirm accurate and complete reprocessing. IVN presents work instructions in the form of modules using touch screen technology. An IVN module is specific to each model of equipment. Manufacturers' instructions are used in the construction of 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 is designed to interface with Real Time Locating Systems (RTLS) and Proquis document control systems. All efforts are designed to move RME re-processing towards ISO 9001:2008 conformance, a goal established by the national RME steering committee.

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 designed to ease the work-load burden on the technician, automate various protocols, and record data. Since 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. The steps are also often long



and complex, leaving the opportunity for incorrect execution or omissions. The implementation of IVN mitigates these potential errors, improves technician work conditions, and reduces risk to the Veteran.



IVN is currently configured to support endoscope re-processing; however, IVN can and will support any RME or other equipment with a workflow process procedure. The system is designed to interface with Proquis, Near Real Time Modeling & Simulation systems (NRT M&S), and ISO 9001 conformance systems. Additionally, the system can interface with Real Time Locating Systems (RTLS) 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 Version 2 following successive rounds of Voice of Customer feedback, rapid prototyping, and iterative development. Improvements in IVN Version 2 include branch logic, SQL database architecture, comprehensive competency checks, updated GUI, audible alerts, and flexible presentation of instructions. IVN v2 is operational at Detroit, Indianapolis, and Danville VAMCs, in validation phase prior to operational use at Louisville VAMC, in WIM build verification phase at Saginaw VAMC, and in pre-implementation build phase at 30 facilities in other VISNs.

Project Objectives:

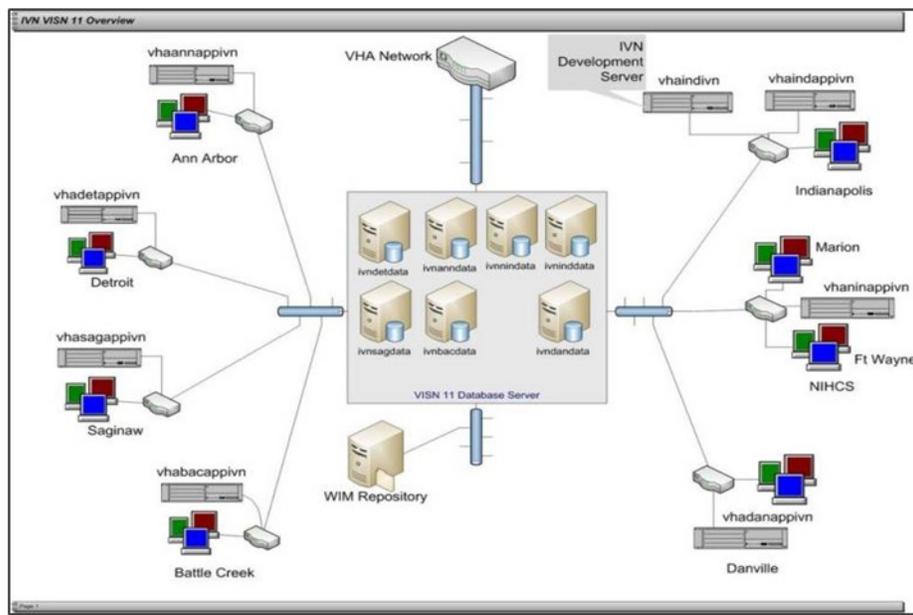
- Display digitized, human factors-based Work Instructions, using the facility's approved SOP and manufacturer's procedure, in a Web App in which the screen appearance, contents, and tasks are optimally designed to avoid and reduce human errors.
- Automatically capture results and process times for each stage for quality control and management (QMS), scope status updating, process benchmarking, and bookkeeping to reduce reprocessing irregularities, non-compliance, and unwanted process variation.
- Incorporate techniques, such as locked timers, picture and video illustrations, to reduce and eliminate error.
- Manage input-output and report information to provide 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 Near Real Time Modeling and Simulation Systems to support ISO 9001 processes.
- Provide a dynamic, configurable tool that is easily adapted to other work flow processes.

Project Results/ Impact:

In FY12, the following was accomplished:

- Generated an IVN module library for the different scope models used in VHA facilities.
- Developed modules for Medivator, Sterrad, Steam Sterilizer, and EtO systems.
- Commenced data collection for ISO9001:2008 and iQMS: PRISM collaboration with PROQUIS web services.
- Developed and deployed IVN Version 2.0 and upgrades.
- Redesigned the GUI User Interface based on user feedback.

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. The Detroit, Danville, and Indianapolis sites provide a test-identify-build-test-improve-deploy (TIBTID) "Sandbox" and validation capability to maintain a parallel and concurrent CED cycle as the team deploys IVN to additional facilities. The concurrent deployment of IVN technology and further technology developments and integration with other VHA improvement solutions can then occur without disruption to VAMC operations.



VISN IVN IP Architecture

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

- Allowance for Kiosk mode usage for normal daily use without compromising security of administrative functions.
- Allowance for Active Directory controlled login to administrative functions while using Barcode/PIN/UserPass logins for technicians.
- Follows a clear separation of duties 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 OI&T enterprise licensing with Microsoft instead of freeware solutions. The databases are easily managed and comply with VA standards without extra work by OI&T. 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 on the VA network. Work Instruction Modules were removed from the application build process following a content management best practice. 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, allowing for customer needs that are not always the same across the enterprise.

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IVN Program Interface with other RME and RTLS Initiatives within VHA

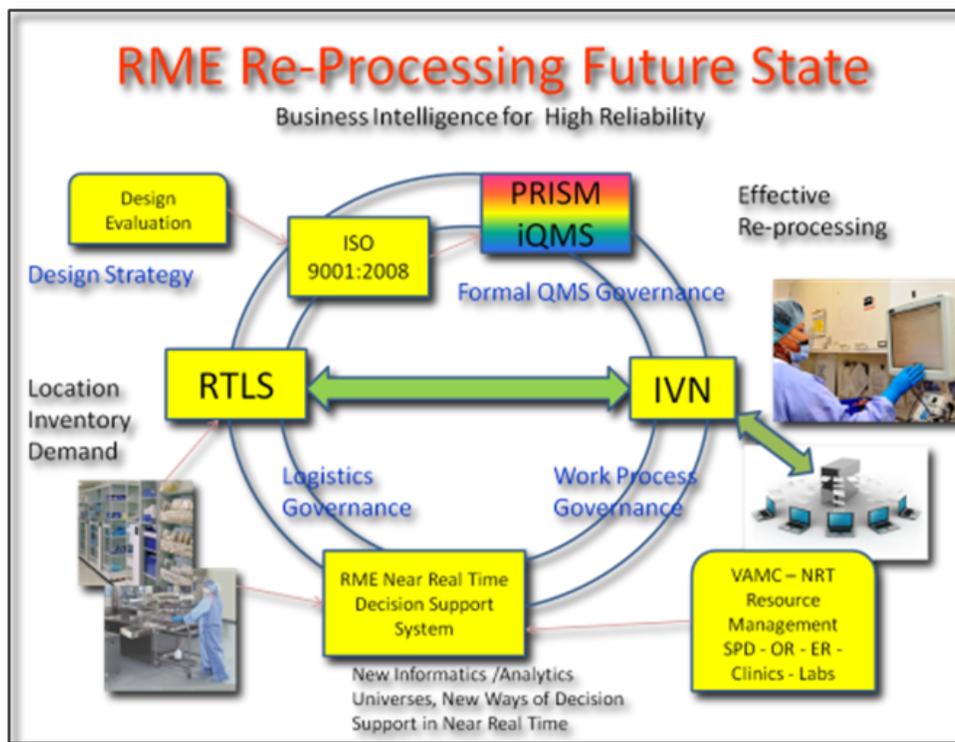
IVN technology supports several initiatives to enhance VHA operations, including the following:

- iQMS initiative – Process for Reliability in an Integrated System for Management (PRISM): IVN can interface with iQMS solutions to provide automated data collection for workflow processes, QI checks and alerts, and network warehousing of the validated, current, and approved IVN modules for document and record control and virtual network distribution.
- ISO 9001: IVN data captures capability, operator training, and quality management and supports the six areas of conformance.
- Real Time RME work planning and optimization: By interfacing automated RTLS and IVN information into a near real time management capability, managers can adapt, flex, and evaluate options to ensure that the proper equipment in the correct amount, and the necessary equipment at the correct location, is available at the required time to support continuous and effective operations.

Real Time Locating Systems (RTLS) – IVN Interface Project

IVN, as designed and as currently 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. IVN deployment is independent of an RTLS deployment within a facility.

Project Results to date: As RTLS is entering VHA facilities, the IVN Team will collaborate with facilities to obtain data field definitions and data base format structures for the appropriate applications.



Integrated Solutions System of Systems (ISSS) Deployment Framework Project

This project consists of a development and deployment framework to provide consistency in design, develop, 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 are in the IVN Program and are incorporated into the other projects.

SPS Training and Competency Tool Project

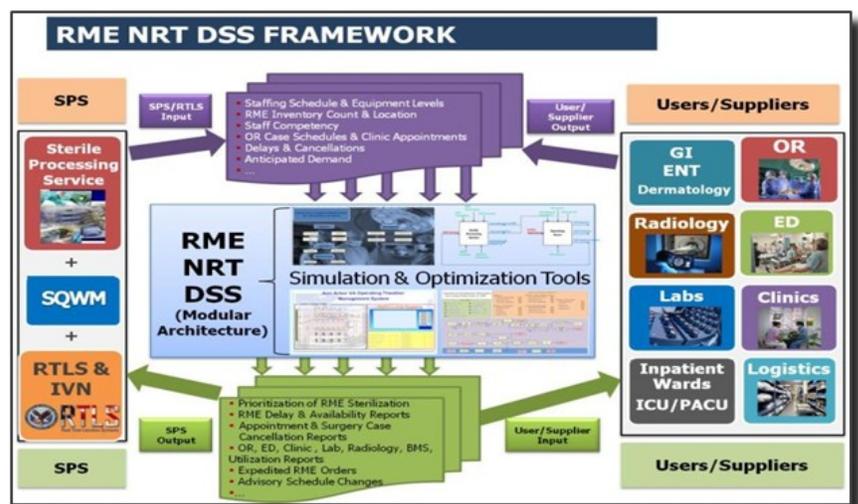
This tool is designed as a stand-alone macro routine or as a functional module integrated with other applications. This tool is incorporated into all IVN modules to provide an automatic integration of education and training competencies of the SPS operators with the equipment processes that they are 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 application 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. Additionally, this application is used in support of the Telephone Care Collaborative projects within VISN11.

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. 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 usage 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.



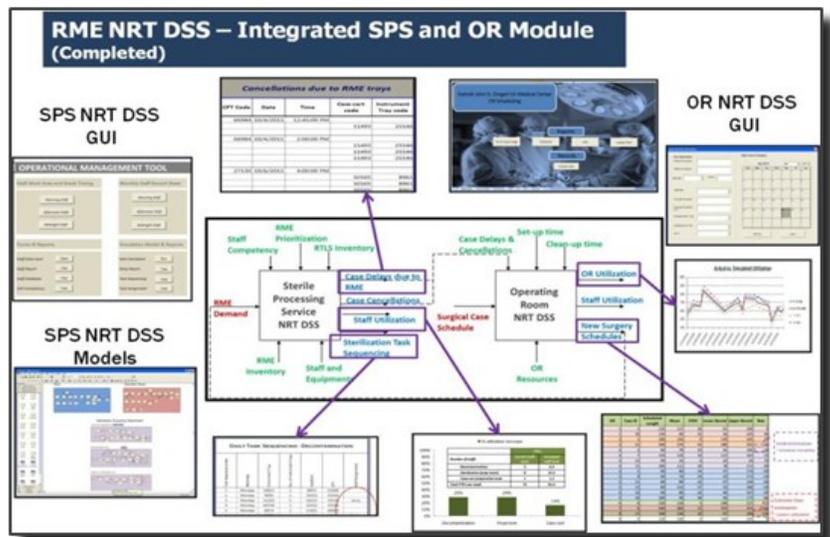
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The overall project goal is to improve the efficiency and quality outcome of SPS processes including sterility assurance and staff and patient safety. The models are flexible and configurable to meet different facility needs and workflows. The models are developed to use both historical and real-time data on RME usage and inventory that affect RME processes. 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 which 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.

Currently, the Operating Room module and SPS module are interfaced and are in pilot at Detroit VAMC. The modules constitute a System of Systems (SoS) design to provide plug-n-play module additions to build a virtual, tactical, facility-specific configurable decision support system for use by mid level managers to assess current state, build options to plan a future state, and implement a solution to overcome barriers. The FY13 plan is to integrate the current models into a functioning configurable system for OR-SPS interactions with other clinics such as ER, Lab and Radiology. This RME near real time work planning and optimization system can improve performance metrics in SPS operation such as cycle time, inventory management, RME availability, staff utilization, and infection risk mitigation.

Project Objectives:

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



Project Results/ Impact:

- Developed, tested, and validated near real time OR and SPS operations management and planning tools
- Created an operational model for scheduling and sequencing of the RME sterilization jobs

- Developed simulation model for OR and SPS to manage staff and equipment capacity planning and “what if” scenarios
- Developed and deployed the PACU Module (operational at Detroit VAMC)
- Designed the Surgical Estimator Module and Surgical Archive Database

As development of the NRT DSS system progressed, many of the components of the NRT DSS system had value on their own as stand-alone tools. A number of independent systems derived from the parent NRT DSS system were developed.

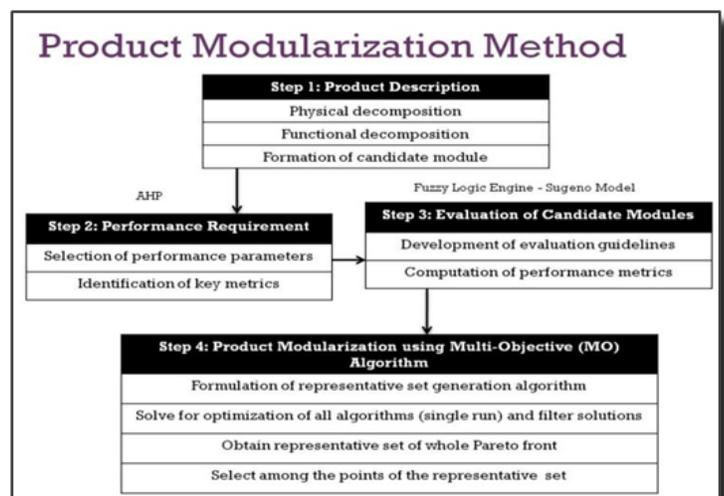
In collaboration with the Detroit VAMC, a Post Anesthesia Care Unit (PACU) simulation model was developed. It uses the surgical simulation model from NRT DSS along with PACU specific calculations to provide a visual presentation of demand and five day forward utilization forecasts within the PACU unit. Other clinical services also use the PACU for recovery, and so these services also have access to the tool to better coordinate demand for the limited PACU resources. Other stand alone tools derived from the NRT DSS system that are under development include a Surgery Duration Estimator, which provides a best estimate of the time to complete a particular procedure for a particular surgeon, and a Surgical Archive database which provides a query front-end for administrators seeking information about past surgical volume for the facility.

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 improves RME availability.

Design Evaluation for RME Project

This project implemented a system for RME design assessment and evaluation using Design for Reusability (DFR) principles. The team has applied advanced computational intelligence algorithms to identify the relationships among design and reprocessing features. Using feature selection techniques, 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 their 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.

RME reprocessing is characterized by complex human involvement, large number of processing steps, risk of infection due to incorrect execution of reprocessing procedures, and difficulties in elimination of infection sources caused by bio-debris. Different model types of RME perform similar functions, but their



ED, ICU, and acute inpatient clinical pathways. It was presented at the HSRD/QUERI conference in July 2012 and is scheduled for the January, 2013 SQUINT meeting.

Project Results/ Impact: The Dialysis Make/Buy Model was developed in partnership with VISN6. This model supported construction of four stand-alone dialysis units. The savings across these sites is estimated at ~\$8M as compared to contract rates. Two of the sites were activated in June 2011 and a third in October 2012. The fourth is scheduled for activation in April 2013.

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 building of home dialysis freestanding clinics.

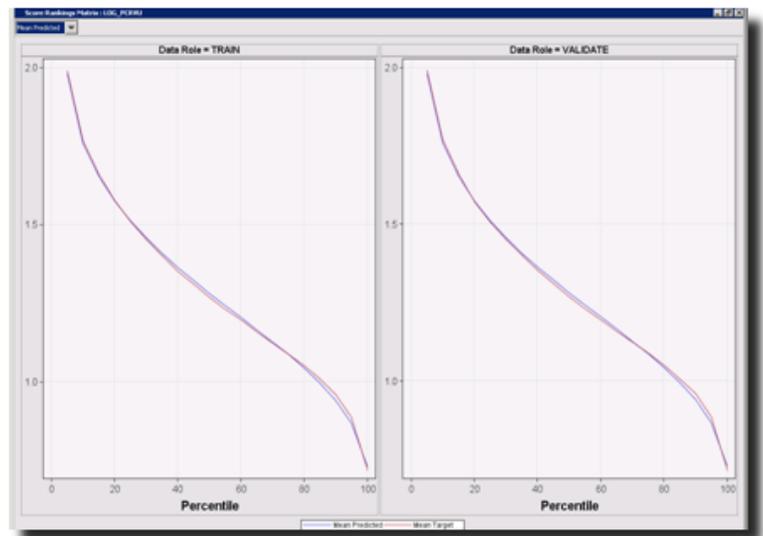
Patient Panel Size Intensity Adjustment Model for Patient Aligned Care (Phase I & II)

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. 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). The patient panel size is calculated and adjusted by several factors. Among these adjustment factors, primary care intensity score is one of the most important factors and it has a large impact in the adjustment of panel size. The primary care intensity score is calculated based on VHA's internally developed regression model. This model is statistically highly significant, and can explain 25% of variance in primary care visits ($R^2 = 25\%$).

The current model has a R^2 of 25%, which means that 75% of the variation is not accounted. For a good prediction model, a R^2 of 80% or higher is desirable. An improved method, called discrete cluster weighted modeling (DCWM), can improve the prediction power of the primary care work intensity estimation model.

For this project, the following approach was used:

- Added more independent variables and more dependent variables.
- Modified and improved the existing primary care workload intensity model.
- Modified and improved the workload intensity prediction model.



Fit of DCWM Model ($R^2=39.54\%$)

By using these approaches, the model R^2 was almost doubled.

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Project Objective (Phase I):

- Collaborate with OIA to obtain data, add new variables such as severity, co-existing conditions, and vital signs; and merge the new data with the current model data.
- Modify and improve the primary work load intensity model.
- Establish the work intensity model to provide the expected level of dependent variables and the variation level.

Project Results/Impact: The VA-CASE Team made significant progress during Phase I. The Team successfully replicated the VHA 2010 model developed by OAI with a comparable R² value. Significant improvement was then achieved using the following approaches:

- Added more independent variables.
- Added nonlinear terms and interaction terms.
- Applied variable transformations, especially for dependent variable.
- Added more dependent variables into the model.

Following Phase I, OIA requested continuation of the work to provide analytical support for revision and expansion of the VA primary care provider workload model during Phase II.

Project Objective (Phase II):

- Update the work intensity model to provide expected level and variation for dependent variables.
- Improve the model quality by applying workable statistical techniques.
- Add more workload variables.
- Develop approaches to estimate provider/team/facility level.
- Develop a more scientifically calculated panel size adjustment model.
- Develop a ready to use computerized primary care work intensity calculation tool kit.

Project Results/Impact:

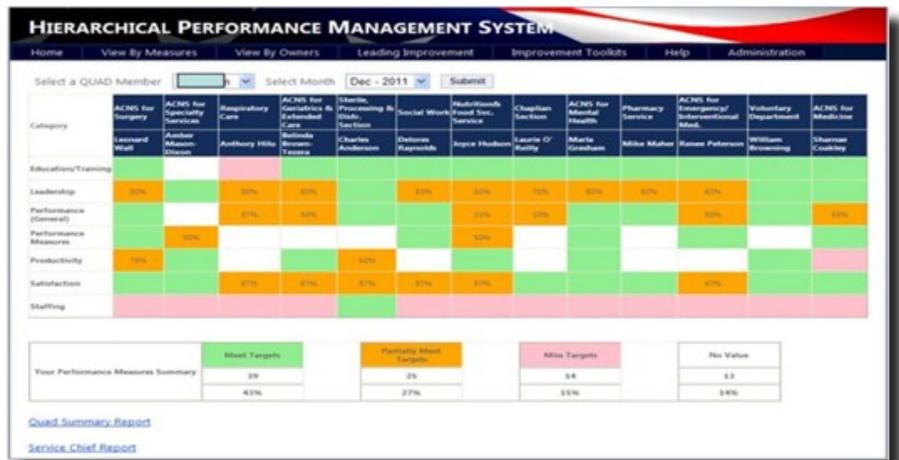
- Aggregated workload (in RVU) calculated at provider and facility level with intensity calculated on a scale relative to median severity.
- R² value of model maintained at 40%.
- Compiled intensity scores sent to OAI for incorporation into VSSC.
- Discussed model with Patient Care committee.
- Conducted offline work to potentially use more advanced approach to improve R² of model.

PMMT – Performance Metrics Management Toolset

This project is designed to improve performance management effectiveness, improve performance levels for facility leaders, reduce redundancy in reporting requirements, and 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 prototype development and testing, validating web-based technology for the dashboard, and interfacing the ACCESS dashboard.

This effort will develop a performance metric management toolset (PMMT) that will have the following features:

- Provide a graphical presentation of the current status (snapshot) and historical trends of performance metrics that are allocated to the corresponding process owner.
- Provide a visual presentation of performance metrics.
- Identify performance metric trends, and illustrate the effectiveness of improvement actions.
- Generate detailed reports.
- Provide a capability for informed decisions based on gap analysis to direct efforts.
- Provide performance metric transparency to every level of organization.
- Quickly identify data outliers and correlations.



The framework of this performance metrics management toolset is already deployed and in pilot at Detroit VAMC.

Readmission Causal Analysis and Resolution Toolkit (RCART)

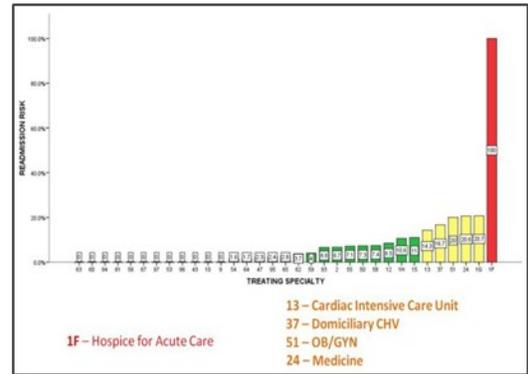
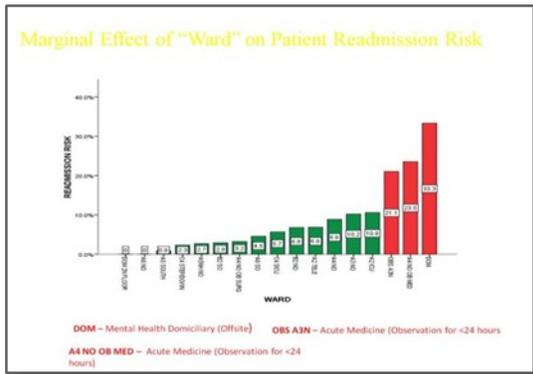
This project is designed to evaluate and improve patient re-admission rates by providing methodologies to identify patients prone to high re-admissibility, and provide solutions to reduce factors that lead to their re-admission following in-patient treatment. Most readmissions are caused by a relatively small number of patients with high or medium readmission risks. Also, significant variation in readmission risks exists among different doctors and treatment units. This project will develop a readmission causal analysis and resolution toolkit. This toolkit will guide healthcare professionals to obtain data from VA's Decision Support System (DSS) and from a medical center facility. This Web based toolkit will analyze the data and:

- Identify high (>30%) and medium readmission (15-30%) risk patients,
- Identify patient related factors that lead to high readmission,
- Identify treatment units and doctors that have high readmission risk,
- Implement discharge/follow up procedures based on patient readmission risk, medical diagnosis types, and
- Evaluate existing processes and make improvements.

Our team, with the help of the Detroit VAMC gathered readmission data. The team has:

- Developed a readmission risk prediction model that will predict a patient's readmission risk (probability) with high accuracy;
- Identified the following key significant factors that impact readmission rate:
 - Provider/Treatment unit related factors

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- Patient Specific factors

For different medical centers, the root causes and key factors for readmission may vary due to different patient population and variation in business processes; however, the decision support system across VA enterprise has the same data types that allow applying the same analysis techniques.

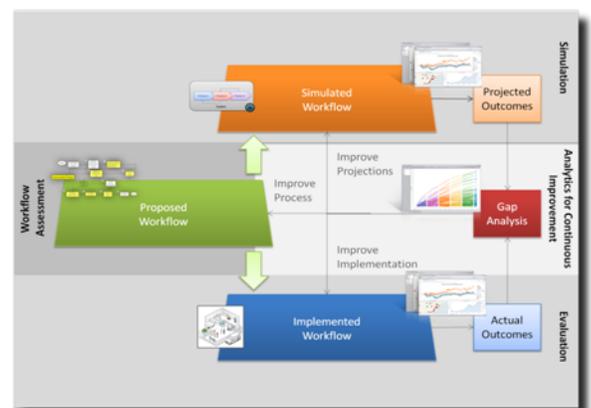
Clinical Services Staffing

The objective of this 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. 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, is derived from established engineering standards. The model is based on the balance between the expected demand generated by patients for dietitian services and supply of services. The demand generated by each patient is significantly influenced by many factors such as patient age, weight, diagnosis, and nutrition status.

Social Work eDischarge - Evaluation of Automated Discharge Implementation

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 increased length of stay, costs, safety risks, and patient dissatisfaction. This project will utilize workflow assessment tools to fully understand and document the processes developed in the pilot. It will use a simulation tool to project the impact on these processes on key metrics such as Length of Stay, Productivity, Costs, and Stakeholder Interactions. It will continuously measure



Tool suite for evaluating Automated Discharge Implementation

metrics to evaluate the actual implementation. Gap analysis between benchmarks and actual metrics will be performed to improve process design, implementation, and projections.

The simulation tool will also be used to project key metrics for Automated Discharge adoption. The workflows identified during this effort will be utilized to prioritize requirements for comparing Automated Discharge tools. Finally, this project will create a final report that will include prioritized requirements for Automated Discharge tools, suggested workflows for Automated Discharge, financial analysis, and impact analysis. Hence, this project will also inform future Automated Discharge adoption decisions.

MH Interface Transfer - Policy Development and Implementation Support Tools for Mental Health Patients

This effort seeks 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 will provide policy makers and managers a comprehensive understanding of mental health patient flows across the network. These flows represent modes by which patients are transported to facilities and where they are treated, referred, and transferred. The tool-suite will inform policy makers of current demand for services by utilizing data driven modeling technologies. It will utilize computer simulation to provide what-if analysis regarding the impact of policy decisions on patient flows. It will incorporate visualization technologies to display both current and projected patient flows. The tool-suite will consist of three web based tools: Demand Estimation, Patient Flow Visualization, and What-If Analysis Tools.

Supply/Demand Alignment Toolkit

Project Background: 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. This project will improve and update the tool. 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 is easy to use and focuses the assessment on providers.

Project Objective: The proposed toolkit will continue to provide measurements of past performance and leverage the historical data to proactively manage staffing and other resources to improve alignment of supply and demand.

In particular, the toolkit will have the following functionality:

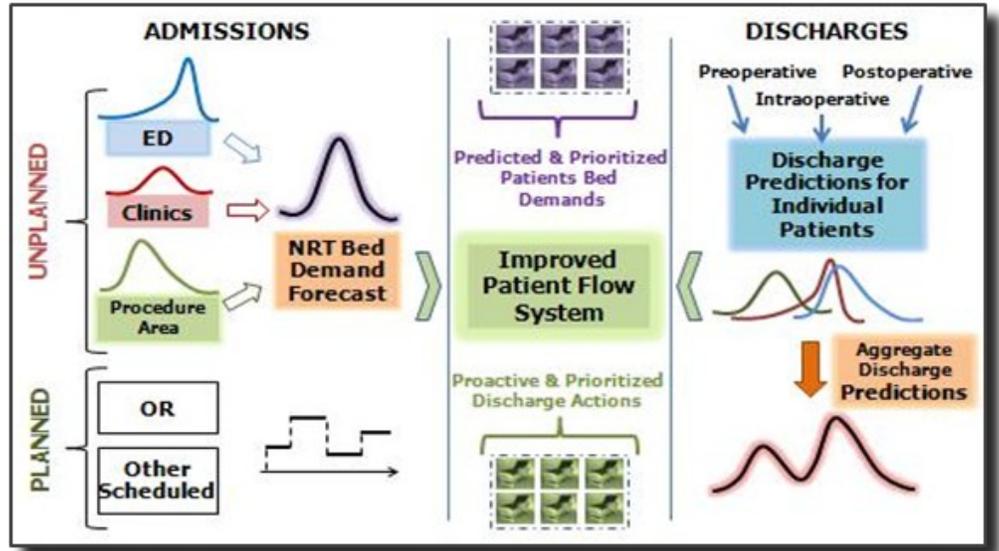
- Extend the functionality of the current tool to go beyond appointment based care provider clinics to open access labs and other areas that involve multiple-stages and/or resources.
- Automate procedures to characterize demand and supply efficiencies for forecasting and planning.
- Offer functionality to facilitate future scenario planning, analysis and optimization of resources.
- Provide comprehensive evaluation based on established performance metrics.
- Automate data entry processes to the extent possible.

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- Collect and automate demand and supply data.
- Automate the process of generating regular reports.

Improving Emergency Department Patient Flow

Project Background: 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 can be achieved through improved patient flow. One of the critical factors contributing to the patient flow in ER 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 deployment in 2010 under the Enhance Veteran Experience and Access to Healthcare (EVEAH) Initiative.



The proposed forecasting tools will interface into the current bed management system. The tool will provide forecast information regarding discharge times for individual patients as well as aggregate predictions (by ward/unit). For demand, the forecasts will contain both historical predictions with confidence bands over a time axis (e.g., hourly, day, weekly horizons) as well as dynamic predictions with confidence intervals based on the most current information.

Project Objectives:

- Improve patient flow in ER by predicting discharge times for individual patients. As new information becomes available, the models will dynamically update the forecasts.
- Forecast Near real-time bed supply capacity profiles
- Construct bed demand profiles by aggregating known scheduled demand with unscheduled demand. Develop Time-series models using historical data to forecast unscheduled demand from clinics/procedure areas.
- Investigate role of RFID technology to improve patient flow.

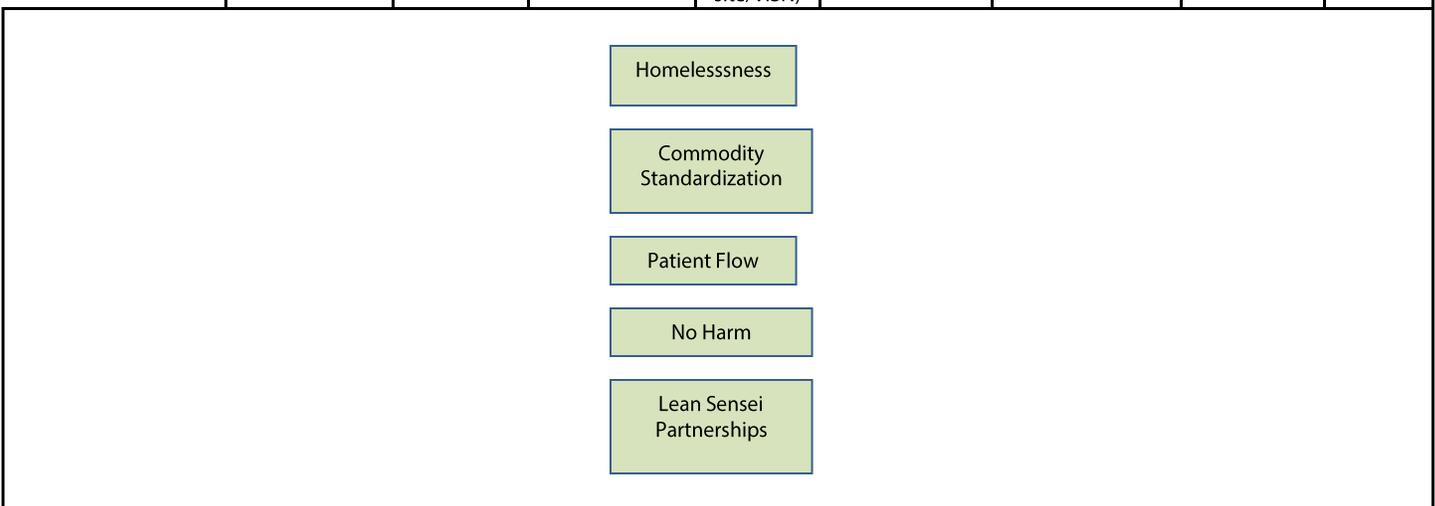
VA-CASE VISN 11 Program

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 Veterans Integrated Service Network (VISN 11). This program works to integrate Systems Redesign principles and methodology coupled with the expertise of experienced Industrial Engineers to execute improvement initiatives across the Network. In FY 2012, the VISN 11 Program assisted with five major VISN 11 initiatives for improvement including:

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

VA- CASE VISN 11 Project Pipeline

Innovation			Implementation		Impact		
Planning	Proof of Concept		Future State Optimization		Evaluation	Deployment	
Innovation Development	Proposal Solicitation	Concept Development/ Testing	Initial Pilot (single site/VISN)	Demonstration Pilot (multiple sites/VISNs)	National Reporting/ Approval	National Deployment	National Policy Change



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VA-CASE VISN 11 Program Project Summary

Homelessness

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 which contributed to improvements in the organization’s ability to carry out the mission of preventing and ending Veterans’ 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 in Illinois, Indiana, Michigan, and Ohio. During his VA tenure, he has improved financial performance by enhancing internal controls and revenue cycles which allows VISN 11 to take proactive actions in supporting the five year initiative to end homelessness as well as encouraging innovation.

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. The average national rate at which an eligible homeless Veteran is able to secure permanent housing through HUD/VASH is 130 days. The average in VISN is 158.89 days.

The Goal of the VISN 11 HUD/VASH Improvement Project was to reduce the time it takes for a homeless Veteran to secure permanent housing through HUD/VASH to 75 days by the end of FY 2012.

Project Results/Impact:

- VISN 11 has 1895 HUD-VASH vouchers, of which 94% are issued.
- A VISN-wide Systems Redesign effort focused on streamlining the HUD-VASH housing process was launched in FY 2012. Currently, the VISN average of days from admission to lease is 74.39 days, surpassing the baseline goal of 75 days. See drill down of project results in Table 1:
- Process Flow Mapping and Kickoff meeting took place in each of facilities with basic lean training. Detroit participated in a Community Solutions national Boot Camp in May, resulting in the creation of a “onestop shop” where the VA, Public Housing Authorities and community providers come together in one location to drastically reduce the time it takes to house a Veteran with a HUD/VASH voucher. The Network Director has sanctioned an SOP of this project to be developed and adapted throughout the VISN, to enhance the effectiveness and efficiency of the HUD-VASH program, VISN 11 developed an advisory and assistance contract with the Center for Social Innovation. Each medical center’s HUD-VASH program identified a team to undergo eight weeks training in the Critical Time Intervention (CTI) model with three

Facility	# of Cases admitted in FY12	FY12 Average(days)
Facility A	81	69.68
Facility B	118	51.75
Facility C	51	58.94
Facility D	135	102.8
Facility E	40	105.82
Facility F	92	66.91
Facility G	32	56.12
Northern Tier	366	74.93
Southern Tier	183	73.2
VISN	549	74.35

Table 1: Facility drill-down of average days from admission to lease

months implementation coaching. CTI is an evidenced based practice designed for homeless service settings that is time limited and designed to support people who are transitioning from homelessness into housing.

- VISN 11 developed a three year advisory and assistance contract with the Corporation for Supported Housing (CHS) to convene four one-day summits a year to review and maximize the success of efforts to end homelessness among Veterans in the four states in the VISN 11 catchment area. The goal of each of the summits was to increase collaboration among VA and local homeless service systems; identify services, gaps, develop strategies for targeting interventions and for build coordinated systems between the VA and local players and begin to further reduce Veteran homelessness in 2012.
- The Indiana Department of Correction, in collaboration with the VISN 11 Health Care for Re-entry Veterans Program (HCRV), expanded the nationally recognized Indiana Veterans Education and Transition (INNET) Prison Unit from 50 to 100 beds in 2012. Collaborations on the unit have grown to include DWD, VBA, the Indianapolis VA, community partners and volunteers. Housing Veterans together on a single unit promotes a more focused and comprehensive re-entry plan. Service providers are able to assess needs and link Veterans to services directly upon release, preventing them from falling into homelessness.

Patient Flow

The Patient Flow Improvement Initiative was initiated in October 2011 with the aim to “Reduce authorized non-VA admissions by 75% by September 30, 2012.” This VISN-wide collaborative comprised of a) Systems Redesign-led improvement teams from each medical center, b) coaching and technical assistance offered by V11 Program Industrial Engineers, c) project facilitation by the VISN Utilization Manager, and d) led by an Executive Sponsor/Director from the VA Ann Arbor Healthcare System. The initiative was completed in January 2013.

Project Objective: The overarching objective and aim for the Patient Flow initiative was to reduce authorized non-VA admission by 75% by the end of FY 12 – an ambitious stretch goal. Strategies to address this stretch goal included the development of a database for near real-time information on authorized non-VA admissions and utilizing the VA-TAMMCS improvement framework for understanding efficiencies.

Database Development - Development of the new VISN 11 database of authorized non-VA admissions was the primary deliverable for the Patient Flow initiative in FY12, and will continue to serve VISN 11’s improvement work in FY13 and beyond. The life cycle for the database development included several iterative process improvement cycles with first involving the design of the database, followed by the development of it, then the pilot of it across one, two and three facilities, and lastly, final implementation across all VISN 11 facilities. Success of the database development was highly dependent on the partnerships between the V11 Program industrial engineers, the VISN Utilization Manager, the Facilities who volunteered to pilot the database and the experts from the VISN 11 Data Warehouse team. On November 1, 2012, all VISN 11 VAMCs began data upload onto the new VISN 11 Database and successfully created a near real-time database of authorized non-VA admissions and a report to provide the following information:

- Number of authorized non-VA admissions by chosen date range
- Reasons for admission to non-VA hospital
- Specialties required for admission to non-VA hospital
- Names of non-VA hospitals providing inpatient care
- The capability to export the database to Excel for custom reporting

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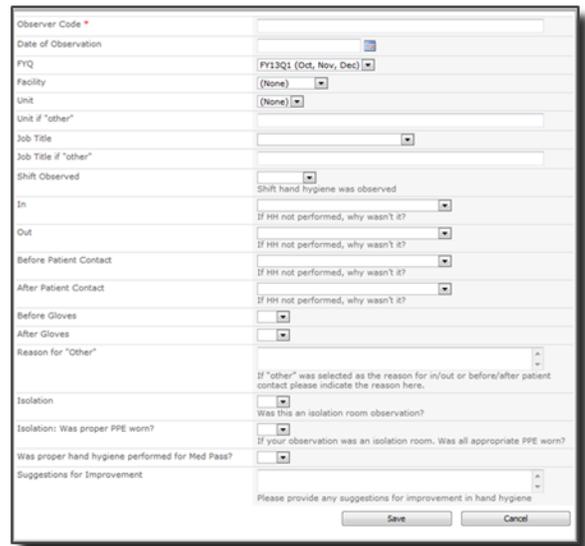
In addition to the VISN database development, the medical centers' improvement teams worked concurrently using the VA-TAMMCS framework to improve patient flow and efficiency internally and between VA and non-VA facilities. Each medical center selected improvement work specific to meet their needs and objectives, and this work not only continues today but has also expanded.

No Harm

The VISN 11 No Preventable Harm campaign was initiated in FY11 in efforts to improve patient safety, quality and efficiency, with an overarching goal to eliminate 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 as a mechanism to reduce and prevent harmful events associated with hospital acquired infections.

Project Objective: The objectives of this project were to increase hand hygiene compliance and decrease hospital acquired infections among VISN 11 Facilities to help achieve the overarching goal of eliminating preventable harmful events. To start, a hand hygiene workgroup was convened to trial a contracted hand hygiene compliance program and based on the premise that VISN 11 had high self-reported compliance data, the workgroup recommended the development of an internal self-initiated hand hygiene program. The hand hygiene program includes standardized definitions of hand hygiene observations and a SharePoint site for uniform data collection, calculation, and comparison. The SharePoint site was recently launched to help collect hand hygiene data including the shift when hand hygiene was observed, entering and exiting patient rooms, before and after patient contact, and before and after wearing gloves.

The No Harm workgroup is currently evaluating and analyzing the data collected from the SharePoint tool and will then develop appropriate recommendations and interventions to increase hand hygiene. The workgroup is looking forward to implementing solutions to improve hand hygiene for FY13 and beyond.

A screenshot of a web-based data collection form. The form is titled "Observer Code" and contains several sections with dropdown menus and checkboxes. The sections include: "Date of Observation" (with a calendar icon), "FYQ" (set to "FY13Q1 (Oct, Nov, Dec)"), "Facility" (set to "(None)"), "Unit" (set to "(None)"), "Unit if 'other'", "Job Title", "Job Title if 'other'", "Shift Observed" (with a dropdown menu), "In" (with a dropdown menu and a sub-question "If HH not performed, why wasn't it?"), "Out" (with a dropdown menu and a sub-question "If HH not performed, why wasn't it?"), "Before Patient Contact" (with a dropdown menu and a sub-question "If HH not performed, why wasn't it?"), "After Patient Contact" (with a dropdown menu and a sub-question "If HH not performed, why wasn't it?"), "Before Gloves" (with a dropdown menu), "After Gloves" (with a dropdown menu), "Reason for 'Other'" (with a dropdown menu and a sub-question "If 'other' was selected as the reason for in/out or before/after patient contact please indicate the reason here."), "Isolation" (with a dropdown menu and a sub-question "Was this an isolation room observation?"), "Isolation: Was proper PPE worn?" (with a dropdown menu and a sub-question "If your observation was an isolation room. Was all appropriate PPE worn?"), "Was proper hand hygiene performed for Med Pass?" (with a dropdown menu), and "Suggestions for Improvement" (with a text input field and a sub-question "Please provide any suggestions for improvement in hand hygiene"). At the bottom right, there are "Save" and "Cancel" buttons.

SharePoint data collection tool

Project Results/Impact: Will be determined based on appropriate recommendations and interventions from data analysis.

Commodity Standardization

The VISN 11 Commodity Standardization initiative is a long-term project that started in FY12 and will be ongoing for FY13 and beyond. The objective of this project is to standardize commodities across VISN 11 Network with goals to realize \$14 Million in cost savings and/or avoidance through commodity standardization efforts, which include lowering operational costs. There are multiple standardization initiatives and each one will focus on three objectives:

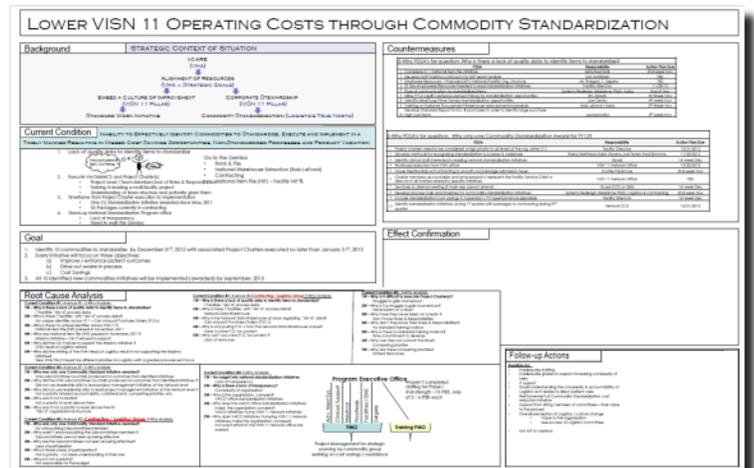
- Improve/enhance patient care

- Drive out waste in process
- Realizing cost savings

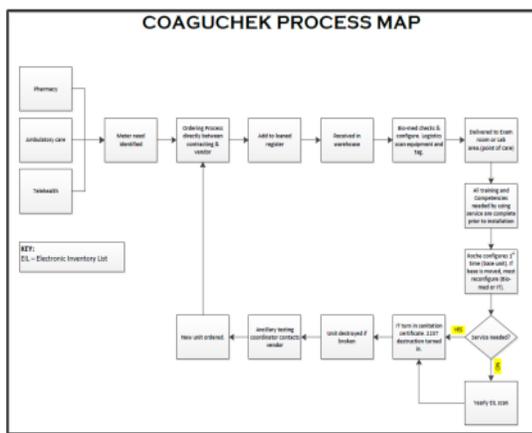
Understanding the large scope and magnitude of the Commodity Standardization efforts, VISN 11 and VISN 11 Program in partnership with VA-CASE will be offering additional Lean resources including a Lean professional to help strategically develop and deploy resources to achieve the anticipated savings. The partnership will begin in January 2013 and preparation has already begun with the development of strategic and tactical A3's with sample illustration shown above.

Among the 40+ projects as part of the VISN 11 Commodity Standardization initiative, efforts are underway with teams process mapping various activities to gain a better understanding of the current processes. For example, the figures below reflect the coaguchek and therapy surface process maps.

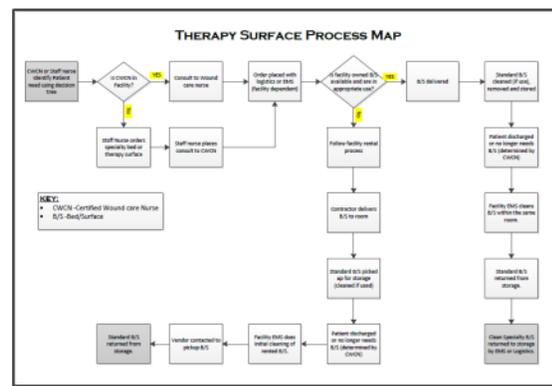
The VISN 11 Commodity Standardization Teams along with the VISN 11 Program Industrial Engineer and Lean Professional will continue working together to help achieve the anticipated goals and savings for FY 13 and beyond.



Commodity Standardization A3



Coaguchek Process Map



Therapy Surface Process Map

Project Results/Impact: Ongoing development for FY 2013.

Lean Sensei Partnerships

The Lean Sensei Partnerships is an innovative initiative that started in October 2012 with collaboration between VISN 11, V11 Program, and VA-CASE to offer Master Teacher/Experts who have extensive experience in Organizational Lean Transformation to aide in VISN 11's Lean Transformation efforts. See Professional Development for more details.

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Budget Overview

Budget Summary

In FY09-present (*FY13 estimated), VA-CASE received \$26,453,000 of funding from multiple sources as shown 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
CBO Matching Funds	\$ 500,000	\$ 500,000	\$ 709,360	\$ -	\$ 1,709,360
Other Non-Core Funds	\$ 500,000	\$ 3,273,000	\$ 6,540,640	\$ 9,330,000	\$ 10,313,640
Totals	\$ 2,600,000	\$ 4,773,000	\$ 8,500,000	\$ 10,580,000	\$ 26,453,000

VA-CASE expenditures by Program are shown the table below. Note that we have worked to considerably diversify our funding allocations in FY13. The Transactional Systems Program (TSP) and VE-TAP will account for ~20% of funding during FY12 each, with the other programs accounting for an approximately 10% contribution from each program.

Expenditures 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 Prog	\$ 500,000	\$ 500,000	\$500,000	\$ 690,000	\$ 170,000	\$ 700,000	\$ 45,000	\$ 2,800,000
Clinical Partnerships in Health Transformation	\$ 200,000	\$ 300,000	\$200,000	\$ 1,030,000	\$ 220,000	\$ 650,000	\$ 85,000	\$ 720,000
Informatics/SPDR Program	\$ -	\$ 100,000	\$300,000	\$ -	\$ 450,000	\$ 1,100,000	\$ 370,000	\$ 980,000
Professional Development		NA	\$100,000	\$ 750,000	\$ 60,000	\$ 3,500,000	\$ 50,000	\$ 1,740,000
VE-TAP	\$ 300,000	\$ 500,000	\$103,000	\$ 900,000	\$ 250,000	\$ 1,100,000	\$ 50,000	\$ 2,680,000
VISN11							\$ 80,000	\$ 410,000
VA-CASE Admin Staff	\$ 200,000		\$200,000		\$ 300,000		\$ 570,000	
Totals	\$2,600,000		\$4,773,000		\$8,500,000		\$10,580,000	

VA-CASE expenditures by type of expense are shown in the table below. Note that in FY12, approximately, 50% of VA -CASE funding was allocated to staff and faculty salaries and 44% allocated to contract/IPA mechanisms with academic affiliates. Of the remaining funds –1% of funds were allocated to student programs and 8% to travel expenses.

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%	\$ 5,900,000	56%	\$ 13,570,000	51%
Salaries - Contracts/IPAs	\$ 900,000	35%	\$1,400,000	29%	\$ 3,400,000	40%	\$ 3,700,000	35%	\$ 9,400,000	36%
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%	\$ 300,000	3%	\$ 660,000	2%
Lean Certification	\$ 50,000	2%	\$ 33,000	1%	\$ -		\$ -		\$ 83,000	0%
Travel	\$ 270,000	10%	\$ 390,000	8%	\$ 700,000	8%	\$ 580,000	5%	\$ 1,940,000	7%
Totals	\$2,600,000		\$4,773,000		\$8,500,000		\$10,580,000		\$26,453,000.00	

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 FY09-12 (*FY13 estimated) was \$803.15. GSA rates for equivalent support (Sr. Engineering and Sr. Scientist Support for this same period) are approximately \$1500/day. Through the 28,600 days of support provided to date, this results in an estimated cost savings as compared to external services of \$19.919M.

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	\$ 5,900,000	\$ 13,570,000
Salaries - Contracts/IPAs	\$ 900,000	\$ 1,400,000	\$ 3,400,000	\$ 3,700,000	\$ 9,400,000
# of days of Engineering/Informatics Support Provided	2500	5000	9400	11700	28600
VA-CASE Engineering/Informatics Cost/Day	\$760.00	\$790.00	\$800.00	\$820.51	\$803.15
GSA Rates - Sr. Engineering Support (\$180/hour)					\$1,440.00
GSA Rates - Sr. Scientist (PhD) Support (\$210/hour)					\$1,680.00
GSA Rates for 28600 days of Engineering/ Informatics Support (\$1500/day)					\$42,900,000
VA-CASE Rates for 28600 days of Engineering/Informatics Support (\$803.15/day)					\$22,970,000
FY09-Present Savings for VA-CASE vs GSA Industrial Engineering/Informatics Support					\$19,930,000

2. Through comparison of published external consultant rates for Lean Training to VA-CASE cost per participant, we can determine an estimated cost savings of \$9.3M for Lean training to date.

Lean Training/Co-Facilitation	FY09-present		Participant Costs	
	# of Sessions	# of Trainees/ Participants	VA-CASE	External Consultants (Published Rates*)
Yellow Belt	114	4560	\$250.00	\$1,195.00
Green Belt	52	2080	\$250.00	\$1,195.00
Black Belt	49	600	\$350.00	\$1,995.00
Senior Executive Experience (SEE)	17	710	\$250.00	\$1,295.00
Rapid Process Improvement Workshops (RPIWs)	63	1015	\$500.00	\$1,250.00
Leading Organizational Improvement Workshops (LOI)	21	895	\$875.00	\$1,295.00
Return on Investment Analysis (ROI)	4	160	\$250.00	\$795.00
Value Stream Analysis	2	30	\$425.00	\$1,295.00
Lean Six Sigma (GB/BB Corhort over 9 months)	1	40	\$2,500.00	\$4,750.00
Total Lean Training/Co-Facilitation FY09-Present	320	10020	\$ 3,490,875	\$ 12,835,075
Estimated Cost Savings (VA-CASE vs External Lean Training)				\$ 9,344,200

*All rates based on American Society for Quality off-site training programs, except for RPIW/VSA co-facilitation, based on Simplar on-site consulting rates

*FY13 Expenses estimated

The resultant total VA-CASE cost savings to VHA from FY09-present can be estimated at \$29.2M.

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FY13+ Plans

Moving forward from FY12+, we will continue Center efforts to migrate from the 'start-up' phase of development to create a sustained, customer-oriented VERC within VHA.

Within each of our program areas, we 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. Additionally, we will continue to create and facilitate the development of a culture that will foster innovation amongst our staff and faculty, yet insure commitments to customers are fulfilled and projects are supported through to national dissemination.

Leading into FY13, we have added nearly \$2M in non-core funded projects, bringing the total amount of funding to nearly \$10.5M. This funding will be utilized to facilitate continue expansion of existing programs and to embed increased programmatic and project management support.

FY13 Specific Goals

AIM1: Education and Training: Our Professional Development programs continue to expand at a rapid rate. FY13 will see a 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 5 FTEE of Industrial, Operations Engineering and Informatics support with at least 2 technical positions filled from 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 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 Dialysis Pilot Clinic Site Program, National Office of Specialty Care Collaborative, and Hi2/HMP Usability Analytics project.

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 of VA-CASE work through publications and presentation in VHA and non-VHA forums.

AIM6: Pursue External Funding We will continue to pursue external funding mechanisms and to 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 FY13.

Appendix A: Relevant VA-CASE Publications and Presentations

Referred Journal Publications

Bidassie, B., McGlothlin, J.D., 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.

Ma, X.Y., Yang, K., Brayley, K., (2011) "RTLS-based ubiquitous healthcare system design and implementation". *White Paper RFID Journal*, .August, 2011

Ma, X.Y., Yang, K., Reeves, P., Yu, S., (2012) "Transforming the Sterile Processing Department through RFID-based healthcare Workflow Technologies", To be submitted to *International Journal of Medical Informatics*.2012

Ma, X.Y., Yang, K., (2012) "Design of a medical rule engine for healthcare workflow management in Sterile Processing Department", To be submitted to *International Journal of Medical Informatics*.

Ma, X.Y., Yang, K. *Transforming Sterile Processing Departments by Service-Oriented Business Process Management and Healthcare Workflows*, *International Journal of Business Process Integration and Management*. In review.

Wang, J., Murat, E.A., Neemuchwala, H., and Yang, K. (2011). Proactive Management of Operating Room by Using Simulation. Under Review: *Health Services Research* , 2011

Referred Conference Proceedings

Lightner, N., Keyhani, S. Developing Tools to Assist VA Policymakers in Decisions on "Making" or "Buying" Care, National HSR&D/QUERI Conference, Washington DC, 19 July 2012.

Ma, X.Y., Lu, S.Y., Yang, K. Service-Oriented Architecture for SPDFLOW: A Healthcare Workflow System for Sterile Processing Departments, IEEE International Conference on Services Computing, 2012. (The acceptance rate is 17%)

Ma, X.Y., Yang, K., Reeves, P., Yu, S., (2012) "RFID-based healthcare workflow management in Sterile Processing Department", Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida.

Presentations

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.

Ellis, R., Fard, Yank, K., M., Jordan, W., Lightner, N., Yee, S., Management of medical equipment reprocessing procedures: A human factors/system reliability perspective, AHFE International 2012, 4th International Conference on Applied Human Factors and Ergonomics, San Francisco, CA, 21-25 July 2012.

Ellis, R., Yee, S., Lightner, N., Yang, K., Jordan, W., Human factors evaluation of medical equipment reprocessing instructions, AHFE International 2012, 4th International Conference on Applied Human Factors and Ergonomics, San Francisco, CA, 21-25 July 2012.

Fahner, J., Jacobitz, R., Walker, J., Presentation, National Veterans electronic Health University (VeHU) virtual event

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Keyhani, S., Lightner, N., "Developing Tools to Assist VA Policymakers in Decisions on "Making" or "Buying" Care". Invited workshop: HSR&D/QUERI National Conference in National Harbor, Maryland, July 19, 2012.

Lightner, N., Ellis, R. D., Yee, S., Yang, K., Jordan, W. (2012) "Human Factors Considerations for a Reusable Medical Equipment Reprocessing Support System". *Proceedings of the 2nd International Conference on Human Factors and Ergonomics in Healthcare*, San Francisco, California, USA, July 21-15, 2012.

Ma, X.Y., Yang, K., Reeves, P., Yu, S., (2012) "Real-time Operation Room Workflow Management. Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida, May 19-23, 2012

Ma, X.Y., Yang, K., (2011) "RFID-based Design of Smart Inventory for Medical Supply. Institute for Operations Research and the Management Sciences (INFORMS 2011), Charlotte, NC.

Ma, X.Y., Yang, K., (2011) "RTLS-based ubiquitous healthcare system design and implementation", Institute for Operations Research and the Management Sciences (INFORMS 2011), Charlotte, NC.

Ma, X.Y., Yang, K., (2011) "RTLS-based ubiquitous management of medical supply". Industrial Engineering Research Conference (IERC), Reno, Nevada.

Ma, X.Y., Murat, A., Yang, K., (2011) "Allocation of Perishable Medical Inventory with Return and Transshipment Policy". Industrial Engineering Research Conference (IERC), Reno, Nevada.

Wang, J., Murat, E.A., Neemuchwala, H., and Yang, K. (2012). Proactive Management of Operating Room by Using Simulation. Presented at ISERC Annual Conference, Orlando FL.

Wang, J., and Yang, K. (2013). Predict under- and over-run probability of lists of cases by Type IV Pearson Distribution. To be Presented at ISERC Annual Conference, San Juan, Puerto Rico.

Wang, J., Murat, E.A., Neemuchwala, H., and Yang, K. (2012). Proactive Management of Operating Room by Using Simulation. Presented at ISERC Annual Conference, Orlando FL.

Yang, K., Lightner, N., Yee, S., Fard, M., Jordan, W., Using computerized technician competency validation to improve reusable medical equipment reprocessing system reliability, AHFE International 2012, 4th International Conference on Applied Human Factors and Ergonomics, San Francisco, CA, 21-25 July 2012.

HIMSS published article on WSU receiving NSF grant to study Efficiency models in VA patient centered Medical Homes. <http://www.govhealthit.com/news/nsf-funded-study-find-efficiency-models-va-patient-centered-medical-homes>

Manuscripts in Preparation

Bidassie, B., McGlothlin, J.D., 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.

Wang, J, Murat, A., "Multi-facility OR Case Scheduling", in preparation for submission to Health Care Management Science, Last updated October 2011.

Hassmiller Lich, K., Beadles, C., Homer, J., Cheng, E., Bosworth, H., Bravata, D., Williams, L, Kramer, E., Matchar, D. "A Dynamic Computational Model of Stroke to Support Identification of Policy and Research Priorities in the Department of Veterans Affairs" submitted for review to *Health Care Management Science*, November 19, 2012.

Book/Book Chapters

Bidassie, B (2012) "Microergonomics: Healthy Workplace and Healthy Lifestyles". Occupational Ergonomics – Principles and Applications (2nd Edition). Editor Bhattacharya A. & McGlothlin J. Taylor and Francis Chapter 39, 1041-1064.

Appendix B: Faculty Listing and Bios

Directors/Staff Support

Heather Woodward-Hagg, MS, is currently the Director of the VA Center for Applied Systems Engineering (VA-CASE). Ms. 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). Ms. 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. Ms. Hagg holds BS degrees in Ceramic Engineering and Mechanical Engineering from University of Missouri-Rolla and a MS degree in Materials Science and Engineering from Worcester Polytechnic Institute. Prior to her work in healthcare, Ms. 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. 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. Pam was recognized with the General Motors CIO Award for Excellence and she has her Project Management (PMP) certificate.

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.

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TaTanisha L. Williams-Thompson works as a student trainee in VA-CASE as an administrative assistant to Pamela Pau. She also assists the Cancer Care teams with their projects and maintains reports on their SharePoint site. Ms. Williams-Thompson is currently pursuing two degrees from Wayne State University - Business Management and Information Systems, as well as, Marketing, Logistics and Supply Chain Management. She has spent the majority of her professional career in the private sector in the areas of healthcare management, project management, and account management.

VISN 11 Program

Jake Fong, MBA, CSSBB, is the VA-CASE Associate Director of VISN11 Projects. Jake joined VA Veterans in Partnership Healthcare Network (VISN11) 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 VISN11. Prior to joining VISN 11, Jake was 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. 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 the 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.

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

Jihan Wang, PhD, received her bachelor and master's degrees from Wayne State in Industrial and Manufacturing Engineering. She earned her Ph.D. degree in industrial engineering in 2012 on a research topic of operating room management, focusing on operating room (OR) utilization and turnover behavior study. Jihan received her certified Six Sigma Green Belt certificate in 2008 and has been on the Dean's Honor Roll since she joined Wayne State. She also received the High Scholastic Average Award for her outstanding academic excellence performance. Her past work experience includes working as an intern in Henry Ford Healthcare System and has been working at the John D. Dingell VA Medical Center in Detroit, Michigan since January 2009. She also worked for Ford Motor Company as a quality analyst to predict warranty costs for vehicles. Currently, she is focusing on operating room management by studying improving surgical suites utilization, cost efficiency, and case scheduling.

Xiaoyu Ma is a PhD in the Industrial & System Engineering Department of Wayne State University. She has a master's in Computer Science, a bachelor's in Electronic Engineering and 7 years of experience developing the structure of business-IT systems. Her main interests include operational decision support for RFID-based visualization management, smarter facility design, and real-time healthcare workflow management. Ms. Ma played a key role in developing the strategy and roadmap for implementing real-time locating systems (RTLS) into VA pilot facilities, including customers' requirement discovery, clinical process optimization, technology selection, and Return-On Investment (ROI) evaluation.

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.

Christine L. Corum, MSIE, is an Industrial Engineer with Clinical Partnerships in Healthcare Transformation where she has supported 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.

Willena Nkanga, BSIE, has been working for the Department of Veterans Affairs since 2009 and has been involved in various Lean projects. She has served as a Systems Redesign Program Analyst at the John D. Dingell VA Medical Center in Detroit, Michigan and is a certified Six Sigma Green Belt. She earned her Bachelor's of Science from Wayne State University and is currently pursuing her Master's in Industrial Engineering with a specialization in Lean Operations Management. She facilitated performance improvement in the Surgery Service Line by streamlining their processes to ensure patient clearance and optimization. She assisted the Specialty Care Services by performing data analysis and tracking of their access performance measures, which helped these services to meet their performance measure for 9 consecutive months. She is currently working as an Industrial Engineer for VA-CASE.

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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.

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.

Pranav Radhakrishnan, MSIE, is currently an Industrial Engineer at VA-CASE where his experiences include serving as an Industrial Engineering coach for the collaborative, supporting various teams by providing engineering support, and Lean education in a RPIW setting. His prior work experience as an Industrial Engineer in the Systems Redesign Department of the Detroit VA Medical Center include serving as a coach in the Discharge Improvement project with the goal to achieve an equal number of discharges through-out the day and evenly distributed through-out the week. He was also a coach supporting projects involved to reduce response time of pharmacists, Implementation of the Bed Management System, developing a nursing scheduling and staffing tool, and reducing patient falls. He has also worked on various projects in Primary Care, Social Work, Human Resources, and Environmental Services. Additionally, he has experience in data analysis, Six Sigma, process improvement, and value stream mapping. Pranav holds a Bachelor of Engineering degree in Mechatronics Engineering from Anna University and a Master of Science degree in Industrial Engineering from Wayne State University. Pranav's Master's thesis was focused on predicting the performance of medication reconciliation done by physicians using CogTool in Human Factors Engineering.

Strategic Programs and Data Engineering Resources (SPDER)

Kristen Colwell, BS, MT, is the Associate Director for the newly formed Strategic Programs and Data Engineering Resources (SPDER) program within VA-CASE. Prior to her current position with VA-CASE she was the Chief of Informatics for the ISO 9001:2008 Consultative Division and leader of the Enterprise Value and Risk Intelligence service technical group. Since 2007 within VHA she has been instrumental in procuring and implementing enterprise (national), VISN, and facility level integrated quality management systems and designing enterprise and VISN-level online transactional and analytical processing data and knowledge management structures, enabling organizational situational awareness. Ms. Colwell has been with the VA since 2003, and is a Senior Federal Acquisition Center Program and Project Manager (Senior FAC P/PM certified).

Ms. Colwell is also a licensed Medical Technologist, Supervisor, in the State of Tennessee since 1996 and is board certified by the American Society for Clinical Pathology as a Medical Technologist, Generalist since

1996. Additionally, Ms. Colwell holds certification as a Certified Quality Auditor (CQA) with the American Society for Quality.

Kristen has more than 18 years of experience in healthcare, biological product manufacturing, information technology industries, holding versatile positions in the areas of clinical laboratory management, quality systems design and engineering, network administration, and business intelligence architecture and design for management review and awareness. Her professional passions are effective management systems that improve organizational cultures and awareness and the use of analytical sciences in support of business strategy.

Gail Edwards, RN, is currently the Program Manager for the Strategic Program and Data Engineering Resources (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 National Cancer Care Collaborative and CBO Fee Referral projects. Gail acts as a liaison between the clinical staff and information technology at the VA Medical Center. Gail has been a champion of electronic medical records and worked in informatics for eleven years in healthcare environments. She is familiar with all aspects of the electronic medical record and modifies or creates documentation templates or orders keeping in mind data retrieval and standardization. Gail has created systems for data management in clinical drug trials. 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.

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. Valerie is a fan of technology and gadgets – demonstrated by the portable wireless network and latest sampling of mobile devices she carries with her everywhere she goes. Valerie was fortunate to attend VA-CASE's Lean Six Sigma Yellow, Green, and Black Belt training courses which were so effective, she now employs techniques not only in her work life, but in many facets of everyday life: from facilitating the brainstorming, affinity diagramming, and multi-voting the family's vacation plans, to mini-projects on weekends, to "5-S" the pantry and mudroom in her family's home. When she's not spending time with her Software Engineer husband and two little girls, ages 4 and 5, Valerie is working on completing her Project Management certification at Stanford University and is pursuing her Black Belt certification at Purdue University.

Jeffrey Bailey, is a Program Analyst. Prior to joining the 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. Jeff is currently working with the MakeBuy team developing the web applications and recently began working with the iOS team to develop iPhone/iPad applications.

Jason J. Saleem, PhD, is a Research Scientist at the VA Health Services Research & Development (HSR&D) Center on Implementing Evidence-Based Practice (CIEBP), at the Roudebush VA Medical Center, as well as the Indiana University Center for Health Services & Outcomes Research, Regenstrief Institute. He is also an Assistant Research Professor with the Department of Electrical and Computer Engineering, Indiana University-Purdue University at Indianapolis (IUPUI). Dr. Saleem is a member of the Human Factors and Ergonomics Society (HFES) and American Medical Informatics Association (AMIA).

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Dr. Saleem received his PhD from the Department of Industrial and Systems Engineering (ISE) at Virginia Tech in 2003, specializing in human factors. Dr. Saleem's current research involves application of human factors engineering to enhance clinical information systems, including electronic decision support, as well as redesign of healthcare processes for improved safety.

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. Lauren started as a student at the Roudebush VA Medical Center in November 2009 working with BCMA in the Clinical Informatics side of Systems Redesign. In the spring of 2011, she transferred to VA-CASE. as a Program Analyst.

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 .

Christina Dunbar is the program manager for the Health Informatics Initiative (hi2) Project Team managed by the VA-CASE SPDER Program. Since joining VA-CASE in October of 2012, Christina has facilitated process improvement of data collection for hi2. Christina specializes in usability evaluation of user interfaces, user research and testing, documentation of findings, and interaction design. Prior to joining VA-CASE, Christina worked as a user experience researcher at Pearson North America, conducting user testing sessions and applying a variety of usability inspection methods to evaluate user interface designs. She has administered contextual interviews in local healthcare facilities to improve patient scheduling and patient education. Christina enjoys data analysis, facilitating project team sessions, and healthcare research. She will present her recent paper, *Connecting to Patients via Social Media: A Hype or A Reality?* at the Association for Marketing & Health Care Research (AMCHR) conference in February. She is currently a master's student focusing in human-computer interaction at the IU School of Informatics and Computing on the IUPUI campus. Christina is based at the Indianapolis VA Medical Center.

Anna-Maria d'Ambrosio is a student intern in SPDER. After working 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. Anna-Maria hopes in the future to focus on human-centered research, which is about understanding the needs and wants of the stakeholders. She is currently taking a statistics course in order to learn basic data analysis principles and tools.

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.

Joan Savage is a program analyst and researcher. 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. Within VA-CASE, Joan is working on VA Health Informatics Initiative (hi2) and serves as a usability specialist in the VA HSR&D's Human-Computer Interaction (HCI) & Simulation Lab. The HCI

laboratory investigates the usability of computerized clinical decision support and other informatics tools toward transforming the VA's information system. Joan coordinated data collection and lead preparation of the relevant portions of the broad investigation report. She provided specific instructions for the site's Interviewer/Observers and Recruiters. She coordinated the efforts of all the assigned site's Interviewer/Observers and was responsible to ensure that all deliverables were on schedule. She helps capture usability data, through interviewing and observing user interaction with information systems, and also transcribes the data. Joan is involved with integration of clinical and operational data to integrate into clinical and management decision making.

Tonya Reznor, BSIT, is the VA-CASE Webmaster. She holds a BSIT in Visual Communications & Multimedia. She specializes in Web and Graphic Design and is an expert in SharePoint architecture, development, and implementation for the Indianapolis VAMC. Her most recent successes are the eROC (Electronic Report of Contact), the VA-CASE websites including the Community of Practice/Quality Improvement Toolkit Series.

Kimberly Rollins, BSN, MBA, is a Clinical Applications Coordinator for VA CASE. Prior to coming to SD, she was a Clinical Staff Nurse working in the Psychiatry Department, Inpatient unit. She also owned a nursing agency that supplied care giver services for Senior Citizens in the Indianapolis area. Prior to coming to VA, she worked in the Medicare Fraud and Abuse Department, conducting provider audits for medical necessity of services. She is currently the National CAC consultant on the NVCC (Non VA Care Coordination) project. She provides education and technical support on a national basis for Champion sites around the United States. She holds a bachelor's degree from Indiana Wesleyan, a bachelor's degree from Indiana State University and a master's degree in Business from Indiana University.

William "Ed" Englegart, BS, is a retired Department of Veteran Affairs facility Chief Engineer. As Chief Engineer for the past 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.

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.

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 also provides 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.

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Kyle Maddox is a Program Analyst currently 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. He is also a content manager for the VA-CASE SharePoint site. 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. Hi2 project

VHA Engineering Technical Assistance Program (VE-TAP)

Will Henry Jordan, Capt USN (Ret), is the Associate Director for the Veterans Engineering – Technology Assistance Program (VE-TAP). He manages three technology program lines with numerous projects involving Reusable Medical Equipment, Operational Systems Engineering Services, and Strategic Technology Projects of interest to VA. 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.

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.

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.

John Iversen 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.

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 and the Product Development and System Engineering Consortium (PDSEC). Dr. Kim's research focuses on design informatics; design science; sustainable design; collaborative product development; and design and manufacturing of soft products. Dr. Kim has received external funding from several U.S. federal agencies including NSF, NIDRR, VA, DOD, and Department of Energy, the Korean Ministry of Knowledge Economy, and industries including Ford and GM. He has published over 50 journal papers and conference papers in proceedings and numerous technical reports and presentations. Currently, Dr. Kim is a planning site director for the NSF Industry and University Cooperative Research Center (I/UCRC) for e-Design. Dr. Kim's education includes a PhD in Industrial Engineering from University of Pittsburgh.

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.

Serge Yee, BSE, JD, is currently a project manager in the VA Engineering – Technical Assistance Program (VE-TAP). Mr. Yee manages the Interactive Visual Navigator (IVN) project at the John D. Dingell VA Medical Center in Detroit, MI, and will continue to manage development as IVN is extended to 20 VHA 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.

Celestine Aguwa, PhD, is currently a visiting assistant professor in the department of Industrial and Systems Engineering, Wayne State University (WSU), Detroit, 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

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

Cyrus Hillsman, PhD, is currently working 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. In his spare time he enjoys flying model airplanes, independent film, and travel.

Midh Mulpuri, MBA, MS, is the Tech Lead for Modeling and Simulation (M&S) in VE-TAP at VA-CASE. He has over a decade of experience in Modeling and Simulation (M&S) and has applied 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.

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.

Nancy J. Lightner, PhD, is an Industrial Engineer working in the Patient Care Make/Buy area. She is developing and supporting tools to assist in the decision to provide specific care to Veterans (dialysis, gastroenterology services, polysomnography, and stroke care) or to outsource the care to non-VA facilities. 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.

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.

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 the Indianapolis VA include designing SharePoint sites for the facility and technical support for the Interactive Visual Navigator (IVN) project. Rob is a Veteran of the US Army .

Alper Murat, PhD, is an Assistant Professor at Wayne State University and 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. His research interests 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 worked with Ford Motor Company, General Dynamics, Henry Ford Health Care Systems, and VA-CASE on various applications of operations research and simulation tools and techniques.

Hakimuddin Neemuchwala, BSIE, is an Industrial Engineer with VA-CASE in Detroit, Michigan and has over four year of professional experience in manufacturing and healthcare. He is currently involved with the Operating Room Utilization Simulation, Cancer Care Collaborative and SPD projects. He was also involved in 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. 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 and is a member of the Institute of Industrial Engineering.

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.

Jarrod Otter, BS, is a student intern 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. Jarrod also collaborated in the gathering of information and the creation of the SRD Website. Jarrod recently graduated from IUPUI with a BS in Mechanical Engineering Technology and a Motorsports Engineering Technology Certificate.

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,

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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*.

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.

Shyamprasad Velumani, MS, is a Wayne State University graduate with a Master's Degree in Industrial Engineering and a Bachelor's Degree in Mechanical Engineering from Anna University. Shyamprasad is currently working as an Industrial Engineer with Six Sigma Green Belt with VA-CASE. He is involved with the Operational Management Optimization and Supporting Tools in Supply, Processing and Distribution (SPD). Previously while working for the Detroit VA medical center he developed a simulation model to improve the patient flow in the Emergency Department. He has been working as an Industrial Engineer Intern for two years at Goodwill Industries of Greater Detroit and ASW Global (Sam's Club Distribution Center) and gained experience in the field of manufacturing and logistics.

Professional Development Program

George Ponte is currently a Health Systems Specialist, Lean facilitator for VA CASE and acting 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 lead 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 Collaboratives applying Advanced Clinical Access 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.

Deborah A. Griffith, EdD, received her doctorate in Education from Peabody College of Vanderbilt University in 1989. Debi has been an educator in various venues for over 30 years from Elementary School through Senior Citizens, including learners with disabilities. Most recently, Debi was the Director of Curriculum Development for the Department of Psychiatry and OSCE Director for the Simulation Center of Indiana University School of Medicine. Debi's educational experience includes curriculum development, assessment, and research as well as teaching.

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 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.

Keith Henry is a 30 year old 2 time Iraq war veteran who was formerly in the Texas Army National Guard. After high school Keith attended Stephen F. Austin State University where he majored in Criminal Justice. In the fall of 2008 the conclusion was made that a re-evaluation of his life was needed and so he proceeded to withdraw from school to do so. He lived in Texas from 1996 until the summer of 2009 when he decided to move back to Indiana to be closer to his family. Keith recently graduated from Ivy Tech with an Associate of Applied Science in IT. He has recently become Professional Developments Administrative Officer. He also plans to continue to expand on his education to grow and build on his career in the VA.

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 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.

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.

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Pedro Figueroa, BA, received his BA in Humanities with a minor in biology from Daemen College in Amherst NY. He moved to Indiana in 1999 where he worked for the Indiana Blood Center and Mid America Clinical Lab processing blood and other fluids. He is an Army Veteran who served in Iraq as a computer information specialist and a supply specialist. He works for the Professional Development Program as a materials handler. He hopes to complete his MS in Forensics in the near future.

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.

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 30 years of VA service. In her current role as Deputy Director of Essential System Redesign for the Midwest Mountain VERC she is responsible for developing, teaching, and analyzing the Yellow and Green Belt classes. She is also a Rapid Process Improvement Workshop, (RPIW) trainer. 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, and RPIW training.

Sandra Serrano, RN, BSN, CPHQ, CLNC, and LSSBB, has been a staff member at the Minneapolis VA Health Care System (VAHCS) for the past 35 years. Her position the last eight years 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. In this role she was responsible for overseeing Minneapolis VA Performance Measures, IPEC data, additional various national measures, managing the mortality data program for the facility, and first line involvement during accreditation visits by The Joint Commission, and the OIG. During her time in Quality Management, she became a Certified Professional in Healthcare Quality. Her years in the clinical realm included 27 years experience in Surgical/ Medical/ Cardiac ICUs, Cardiac Catheterization Lab and Cardiac Research, the Emergency Department, and Manager for the Invasive Lines department which functioned in the ICUs and the Operating Room.

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 24 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 a member of ABET, Inc. Board of Directors and is 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.

Carlos M. Garcia, BSAE, MBA, is a quality and performance improvement expert, project leader, and sensei in various industries including aerospace and consumer electronics, in the US and abroad. Carlos has 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 sustainability of compliance with regulatory agencies, a healthcare Lean facilitator and coach, and a certified Malcolm Baldrige Examiner. 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 at San Diego. Carlos has a BS in Aerospace Engineering from West Virginia University, an MBA from the University of Phoenix, a Lean Green Belt certificate from the University of Iowa, and holds certificates in leadership and project management from the University of San Diego. Carlos believes strongly in the transformation of VA Healthcare into a modern Lean enterprise.

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

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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.

Shedarra Hill, MBA, is a Project Manager for VA-CASE. Employed at the Indianapolis VAMC since 2009, her roles include coordinating and managing the planning cycle for the Systems Redesign Leading Organizational Improvement Training for senior leadership in all the VISNs. She also serves 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.

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 of Pharmacy in West Lafayette, Indiana.

Tyna Hunt attended Ivy Tech for 5 ½ years before transferring to Indiana Wesleyan. She finished up her associates degree in Business Management and started her bachelor's degree in May of 2012 at Indiana Wesleyan. She is currently a Student Intern for VA-CASE and has helped complete the NVCC Project. Tyna is currently working on a project for Radiation Oncology.

Edward Miech, EdD, is a core investigator of the HSR&D Center of Excellence on Implementing Evidence-Based Practice (CIEBP) at the Roudebush VA Medical Center in Indianapolis and a faculty member of VA-CASE. Dr. Miech has a doctorate in education from Harvard and has expertise in program evaluation, assessment, educational theory, and mixed methods. In addition to HSR&D research, Dr. Miech conducts program evaluation for VA Systems Redesign initiatives – including collaboratives – at the local, regional, and national levels.

Mark Miller, BS, is a Project Manager for VA-CASE. Prior to joining VA-CASE Mark returned from his second tour of duty in the Middle East in 2008. He is in his 20th year in the Navy and is currently the Senior Enlisted Leader (SEL) and Chief Boatswains Mate for two companies in Navy Cargo Handling Battalion 7 (NCHB 7). Mark received his BS in 1990 from Murray State University. After graduation he moved to Indianapolis where he worked for the Indianapolis Public School System as a Teacher and a Coordinator and later as a Territory Sales Representative for two major Steel manufacturers. Mark manages the Lean Health Care Management Program for Purdue University. He assists students with enrollment and questions regarding the Yellow, Green and Black Belt Certification program. He also works closely with the Purdue staff to notify and assist with any issues resulting from the certification process or the computerized exam.

Brian Poynor RN, MSM, LSSBB, 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 Emergency Preparedness Liaison Officer for the State of Indiana.

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.

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.

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.

Jamie Workman Germann, MSME, 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.

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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.

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.

Eric Lammers, BSIE, is an Industrial Engineer for the Transactional Systems Program Team. Since joining VA-CASE in 2010, Eric has worked on a variety of projects including the FBCS Optimization Project, Non-VA Medical Care Coordination Project, and various simulation and capacity planning projects. Eric specializes in Discrete-Event Simulation, Statistical Data Analysis, Process Improvement, and Process Standardization. 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 enjoys providing technical leadership and training to others, as well as publishing and presenting his team's work at national conferences. He 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 based at the Detroit VA.

Bruce Vannice, BS, is an Administrative Officer (AO) for the Transactional Systems Program (TSP). Bruce earned his bachelor's degree in Information Technology Management from American Military University in 2011. Bruce has an extensive background in computers, electronics, and management. He is also a United States Marine Corps Veteran. He deployed to both Iraq and Afghanistan.

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.

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. Currently, Ginger is collaborating with Systems Redesign on a 12-site Service Directed Project, INSPIRE, to assist VAMC emergency and acute front line staff in implementing processes/tools to improve JC acute stroke care performance indicators. In the development of her research program, Ginger received an Indiana Institute for Medical Research *Young Investigator Award* for a pilot study that will conduct a usability test and nursing intervention to assist our Veterans who have traumatic brain injury in their community reintegration. This project is also supported through collaborative efforts with VA-CASE in the development of an Apple app. Ginger is planning future collaborations as she extends her research in the area of interventions for Caregivers of Veterans with traumatic brain injuries.

Derrick Markel, BSIE, graduated from the University of Michigan in 2011 with a degree in Industrial and Operations Engineering focusing on healthcare optimization, quality engineering, operations simulation and modeling, and human factors. Prior to his education Derrick served in the United States Navy for six years as an Electronics Technician stationed onboard the USS Abraham Lincoln, an aircraft carrier home ported in Everett, WA. Derrick works on various projects at VA-CASE.

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.

**Appendix C:
List of VHA Facility/VISN Office Sites**

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
Albany, NY VAMC	X		X		
Albuquerque, NM VAMC			X	X	
Alexandria VAMC			X		
Altoona, PA VAMC			X		X
Amarillo, TX VAHC		X			
Anchorage, AK VAMC	X				
Ann Arbor VAMC	X	X	X		X
Arlington, TX VAMC	X				
Asheville, NC VAMC	X				
Atlanta, GA VAMC	X			X	
Augusta, GA VAMC	X				
Augusta, ME VAHC			X		X
Austin, TX CDW		X			
Austin, TX Vet		X			
Battle Creek, MI VAMC	X	X			
Bay Pines, FL VAHC	X				
Bay Pines, FL VAMC			X		
Bedford, MA VAMC	X				X
Birmingham, AL VAMC	X				
Boise, ID VAMC				X	
Boston, MA VAMC	X		X		X
Brockton, MA VAMC	X				
Bronx, NY VAMC	X		X	X	
Broward, FL VAMC		X			
Butler, PA VAMC	X				X
Canandaigua, NY VAMC	X				
Cheyenne, WY VAMC			X		
Chicago, IL VAMC	X	X			
Chillicothe, OH VAMC	X				
Cincinnati, OH VAMC	X		X		
Clarksburg, WV VAMC					X
Cleveland, OH VAMC	X			X	
Coatesville, PA VAMC					X
Columbia, MO VAMC				X	
Columbia, SC VAMC	X				
Columbus, OH VAMC	X				
Connecticut HCS VAMC	X		X		X
Danville, IL VAMC	X	X			
Dayton, OH VAMC	X	X			
Daytona, FL VAMC				X	
Denver, CO VAMC	X		X		

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
Detroit, MI VAMC	X	X	X		
Durham, NC VAMC	X				
El Paso, TX VAMC	X			X	X
Erie, PA VAMC					X
Fargo VAMC			X		
Fayetteville, NC VAMC				X	
Fesno, CA VAMC			X		
Fort Harrison, MT VAHC	X				
Fresno, CA VAMC			X		X
Ft Wayne, IN VAMC	X	X	X		
Glendale, CO	X		X		
Hampton, VA VAMC	X				
Health Administration Center (HAC), Denver Colorado					X
Helena, MT VAMC	X				
Hines VAMC			X		
Houston, TX VAMC	X	X	X		
Hudson, NY VAMC			X		
Indianapolis, IN VAMC	X	X	X	X	X
Iowa City VAMC			X		
Jackson, MS VAMC	X				X
Kansas City, MO VAMC		X	X		
Las Vegas, NV VAMC	X				
Leavenworth, KS VAMC	X				
Lebanon, PA VAMC			X		X
Lexington, KY VAMC	X				
Little Rock, AR VAMC	X		X	X	
Loma Linda, CA VAMC		X	X		
Louisville, KY VAMC	X	X			
Madison, WI VAMC	X		X		
Manchester, NH VAMC	X				X
Mare Island, CA			X		
Marion, IL VAMC	X				X
Marion, IN VAMC	X	X			
Maryland VAMC			X		
Mather, CA VAMC					X
Memphis, TN VAMC	X		X		
Miami, FL VAMC		X			X
Milwaukee, WI VAMC			X	X	
Minneapolis, MN VAMC		X	X		
Montgomery, AL VAMC	X				
Mountain Home, TN VAMC	X				
Murfreesboro, TN VAHC	X				
Nashville, TN VAMC	X				
New Orleans, LA VAMC	X				
New York Harbor VAMC	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
Northampton, MA VAMC	X				X
Oklahoma City, OK VAMC	X		X		
Omaha, NE VAMC			X		
Orlando, FL VAMC	X		X	X	
Palo Alto, CA VAMC	X	X	X		X
Pheonix, AZ VAMC	X		X		
Philadelphia, PA VAMC	X				X
Pittsburgh, PA VAMC	X		X		X
Poplar Bluff, MO VAMC					X
Portland, OR VAMC				X	
Providence, RI VAMC	X			X	X
Puget Sound, WA VAMC			X		
Reno, NV VAMC					X
Richmond, VA VAMC	X		X		
S. Texas VAMC			X		
Saginaw, MI VAMC	X	X			X
Salem, VA VAMC	X				
Salisbury VAMC			X		
Salt Lake City, UT OHI		X			
Salt Lake City, UT VAHC	X		X		
San Diego, CA VAMC	X				
San Francisco, CA VAMC		X			X
San Juan, PR VAHC			X		
Sheridan, WY VAMC	X				
Spokane, WA VAMC			X		
St. Cloud, MN VAMC			X		
St. Louis, MO VAMC	X	X	X		X
Syracuse, NY VAMC	X		X		
Tampa, FL VAMC	X				X
Temple, TX VAHC			X		
Togus, ME VAMC	X				
Tomah, WI VAMC	X				
Topeka, KS VAMC	X		X		
Tucson, AZ VAHC				X	
Tucson, AZ VAMC	X			X	
VA Boston HCS (Jamaica Plain)	X				

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
VISN 1 (Bedford, MA)	X				
VISN 10 (Cincinnati, OH)	X	X			
VISN 11 (Ann Arbor, MI)	X	X			
VISN 12 (Chicago, IL)	X				
VISN 15 (Kansas City, MO)	X				
VISN 16 (Ridgeland, MS)	X		X		
VISN 17 (Arlington, TX)	X				
VISN 18 (Meza, AZ)	X				
VISN 19 (Glendale, CO)	X				
VISN 2 (Albany, NY)	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		
VISN 3 (Bronx, NY)	X				
VISN 4 (Pittsburgh, PA)	X				
VISN 5 (Linthicum, MD)	X		X		
VISN 6 (Durham, NC)	X				
VISN 7 (Duluth, GA)	X		X		
VISN 8 (St. Petersburg, FL)	X				
VISN 9 (Nashville, TN)	X				
Walla Walla, WA VAMC	X				
Wash DC OCCC		X			
Wash DC RTLS PMO		X			
Washington, DC VAMC	X	X	X		
West Palm Beach VAMC			X		
White River Junction, VT VAMC	X		X		X
Wilkes-Barre, PA VAMC					X
Wilmington, DE VAMC					X