

VHA

STATE OF INNOVATION REPORT

OCTOBER 2019



INNOVATION IS CHANGING AND SAVING VETERAN LIVES



U.S. Department
of Veterans Affairs



Choose **VA**

THE STATE OF VHA INNOVATION IS STRONG

Did you ever imagine that your smartphone would connect you to your health care provider, or that you'd be able to track key health metrics on your wrist? For generations, innovation has been a conduit for imagining a new world, and in health care, redefining excellence. This sentiment has long permeated the Veterans Health Administration (VHA). Innovation enables us to execute our mission and deliver health care to Veterans in exceptional ways. Innovative VHA solutions like 3D Printing are improving the delivery of customized solutions to Veterans and enabling the exploration of future health care solutions like 3D bioprinting to generate living, vascularized tissue.

So, how do we do it? The answer lies in creating a culture that harnesses a willingness to experiment. Innovation enables frontline staff to take calculated risks, fail early and smart, and methodically test assumptions. These principles create a culture of agility and team learning aligned with VHA's goal of becoming a learning organization. By embracing this mindset, we've delivered landmark solutions such as the cardiac pacemaker in 1960s to 3D printed organ models for surgical planning today. Building solutions that meet unique Veteran challenges have not only redefined Veteran-care, but health care around the globe. It is precisely this ability to continually innovate that allows VHA to remain the preferred choice of Veterans.

Throughout this report, you will learn about innovation across VHA today as we showcase our VHA Innovation Community, composed of changemakers, who are relentless in creating new experiences for Veterans. This report is both a celebration of our trailblazers and a call to action to think more boldly. Most of all, it's a testament to the value built when we shed our fear of failure and dare to ask, "What If?"

---- **Richard Stone, MD**
Executive in Charge,
Veterans Health Administration (VHA)

---- **Carolyn Clancy, MD**
Deputy Under Secretary for Discovery,
Education and Affiliate Networks (10X),
Veterans Health Administration (VHA)



ABOUT VHA

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VHA NATIONAL CENTER FOR PATIENT SAFETY

DELIVERING MORE, TOGETHER

VA OFFICE OF INFORMATION & TECHNOLOGY
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04

10

22

34

50

60

“THE TRUE SIGN OF INTELLIGENCE IS NOT KNOWLEDGE BUT IMAGINATION.”

-ALBERT EINSTEIN



AT A GLANCE

VETERANS HEALTH ADMINISTRATION

VHA MISSION: Honor America's Veterans by providing exceptional health care that improves their health and well-being.

VHA has evolved into the largest integrated health care system in the United States, delivering primary care with a lens focused on Veteran specialty care needs, including spinal cord injury, polytrauma, prosthetics and rehabilitation, traumatic brain injury, and PTSD treatment. Frontline staff and clinicians are dedicated to quality care, and continually improve the delivery of care to Veterans through research, partnerships, training, and the application of innovative solutions. VHA continues to be a leader in training. Today, VHA is cultivating dynamic partnerships with federal agencies, nonprofits, and private industries, as well as collaborating with academic affiliates to test innovative solutions through research. These innovations range from virtual reality for the treatment of PTSD, to telehealth, which vastly improves the accessibility of clinical services to Veterans.

Focusing on Veterans and understanding the physical, psychological, and economic determinants contributing to their health uniquely positions VHA to deliver not just health care, but comprehensive Veteran care.

Veterans choose VA for the Veteran-centric model of care and expertise in service-connected health issues. Veterans stay with VHA for the community, resources, and support it builds around them.

9M

ENROLLED VETERANS

>2/3

OF MEDICAL RESIDENTS OBTAIN A PORTION OF THEIR TRAINING AT VA HOSPITALS

1/3

VA STAFF ARE VETERANS

1255

170 VA MEDICAL CENTERS
1074 OUTPATIENT FACILITIES

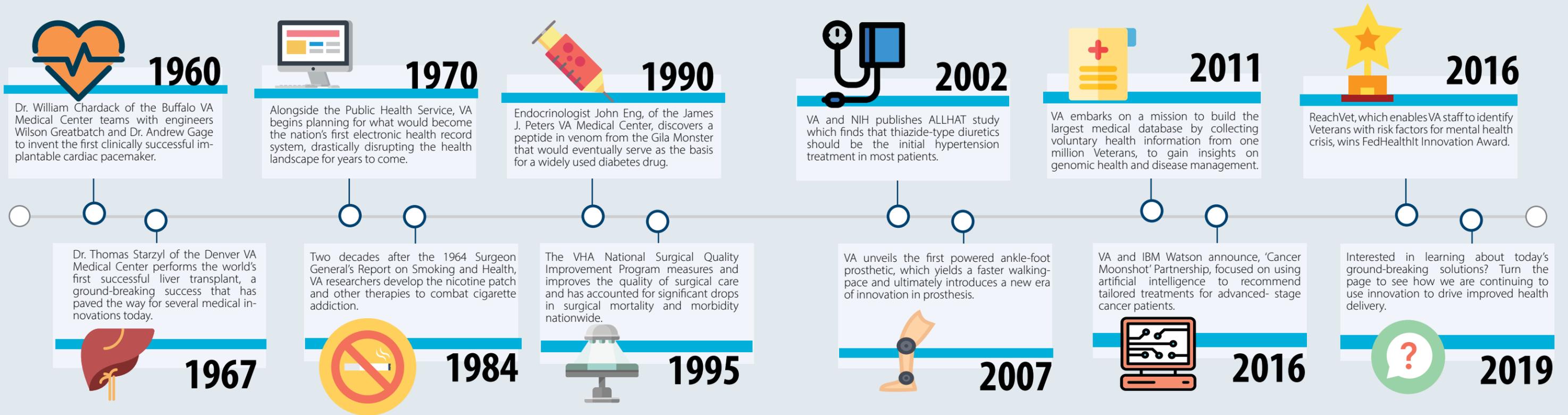
3

NOBEL PRIZE WINNERS

322K

FULL-TIME HEALTH CARE PROFESSIONALS

A BRIEF TIMELINE OF INNOVATION AT VHA



NOBEL PRIZE TRIFECTA



Dr. Rosalyn Yalow, the second woman ever to earn a Nobel Prize, received the Nobel Prize in Physiology or Medicine for her work in discovering the role of radioimmunoassay in insulin production, which led to major advances in diabetes research.



Dr. Andrew V. Schally, the head of the Endocrine, Polypeptide and Cancer Institute, Veterans Affairs Medical Center, in Miami, Florida, received the Nobel Prize in Physiology or Medicine in 1977. His research has more recently helped understand and treat endocrine-related diseases such as breast and prostate cancer.



Dr. Ferid Murad shared the 1998 the Nobel Prize in Physiology or Medicine with Robert F. Furchgott and Louis J. Ignarro, for their discovery regarding the natural production of nitric oxide - helping widen blood vessels to regulate blood pressure, prevent the formation of blood clots, and much more.

DR. ROBERT JESSE

(1952-2017)

“HEALTH CARE SHOULD ALWAYS BE CONSIDERED AS AN “N OF 1” - THE INDIVIDUAL.”

ABOUT ROBERT JESSE, M.D., PH.D.

Principal Deputy Under Secretary for Health, Veterans Health Administration

Dr. Robert Jesse had a clear ‘why’- delivering exceptional care to Veterans. Throughout his roles at the U.S. Department of Veterans Affairs (VA) as Chief of Cardiology at the Hunter Holmes McGuire VA Medical Center, Chief of Academic Affiliations, Principal Deputy Under Secretary for Health, and Acting Under Secretary for Health, Dr. Jesse never lost sight of this purpose and ultimately dedicated over 30 years to advancing health care for Veterans. Known as an early adopter, Dr. Jesse invested in digital technologies in the mid-2000s and advocated for a VA National Simulation Program in 2010, equipped with immersive, simulation-based training for medical professionals. As the son of a Veteran, and life-long learner, Dr. Jesse used his visionary leadership and expertise to advocate for new perspectives and helped set the tone for a culture of innovation where ideas and people can thrive.

HOW TO INNOVATE LIKE DR. ROBERT JESSE

1

EMBRACE POSSIBILITY

Dr. Robert Jesse pursued the “what if?” and pushed for VA to predict and create the future. As part of his many accolades, he pioneered research in cardiac biomarkers, expedited cardiac catheterization for acute heart attack patients, and led the modernization of emergency departments at VA.

2

DON'T GO IT ALONE

Dr. Robert Jesse embodied “delivering more, together.” His advocacy for VHA’s longtime partnership with the nation’s medical schools best showcases his belief that greater value is built when capabilities are shared and integrated.

3

WALK THE WALK

Dr. Robert Jesse understood the power of disrupting the status quo. His legacy at VA is marked by his contributions as a thought-leader, and the establishment of the National Genomic Service, Office of Patient Centered Care, Office of Quality, Safety, and Value, and Office of Health Equity, each of which continues to play a vital role in the Veteran experience today.

DR. ROBERT JESSE AWARD FOR EXCELLENCE IN INNOVATION

In celebration of his leadership and impact on VHA, the VHA Innovation Ecosystem will be dedicating the “Dr. Robert Jesse Award for Excellence in Innovation” to honor an individual that has demonstrated excellence and the promotion of innovation across VHA. Join VHA Innovation Ecosystem in congratulating the inaugural award recipient to be announced at VHA Innovation Experience in October 2019!

CULTURE & CAPACITY FOR CHANGE

**“INNOVATION DISTINGUISHES
BETWEEN A LEADER AND A
FOLLOWER.” - STEVE JOBS**

Our people fuel our mission. A culture of innovation is paramount, as VHA fosters meaningful impact across communities. Investing in our staff, equipping them with the best resources, and encouraging collective imagination helps us deliver new solutions for Veterans every day.

CUSTOMER EXPERIENCE: INCLUDING THE VETERAN IN THE PROCESS OF CREATING VALUABLE SOLUTIONS

Barbara C. Morton, Veterans Experience Office (VEO)

WHY CUSTOMER EXPERIENCE AT THE VA MOVES ME

People always ask me why I would want to work for the VA. I could tell them that it is because I am a shameless patriot who loves her country, or that I find it incredibly fulfilling to serve Veterans, their families, caregivers, and survivors – a special cadre of individuals who have made tremendous sacrifices to serve a cause greater than themselves. But I usually share one special experience to explain my “why”.

One day, I received a phone call from a World War II Veteran. He was understandably concerned about his benefits appeal and was confused about where his case was in the appeals process. I could tell he was very anxious, and I spoke with him for a while to understand how I could help. I started digging into the issue and it turned out that his file had to be rebuilt with important records, a process that took a number of weeks. During this time, I called him each week to check in and give him an update. Once the file was rebuilt, I delivered the good news and let him know that everything was back on track. The Veteran thanked me and gave me the greatest compliment I have ever received: he said that he trusted me because he knew I would take care of him.

Trust is earned and this type of personal experience is what earns it. I want to continue to deliver on that trust for our Nation’s heroes, because they represent the greatest of all of us. This is why I work in the Veterans Experience Office (VEO). Customer Experience is what drives me.

CUSTOMER EXPERIENCE AS A PRACTICE

Customer experience may mean many things to many people, and for me, the cornerstone of any impactful customer experience is something we all have: empathy. We are all empowered to give empathy to anyone at any time, and as demonstrated by my story about the World War II Veteran, empathy makes a true impact, on both the giver and the recipient. We simply need to step outside of ourselves and visualize another’s point of view in order to drive improvements and change. VA has described this opportunity as ‘owning the moment,’ and has created several tools such as human-centered design research and journey mapping to reinforce this culture of service, which have been adopted across VHA. Every one of us can practice great customer experience from anywhere we sit, and it all starts with connecting at an individual to individual level.

While Customer Experience can be implemented at the grassroots level, VHA organizations continue to create opportunities to engage employees to enhance the Veteran Experience.

APPLICATION OF CAPABILITIES + EMPATHY = CUSTOMER EXPERIENCE

A tangible example of how VA has designed with empathy and applied these capabilities to better serve Veterans, their families, caregivers and survivors - by incorporating their perspectives and feedback - is the recent redesign of VA.gov. Beginning with empathy for the customer and their journey, we heard from Veterans and their supporters that VA is difficult to understand and navigate, so we worked with a group of best-in-industry technologists from the White House to rebuild the website around Veteran feedback and the most frequently used VA services. We tested it with Veterans, refined the language - providing easy to follow steps - and launched it in November 2018. Since that time, Veteran satisfaction data with the site has measurably increased by 11 percent – proof positive that when you listen to and design around those you serve, you will produce better results for them.

Below are some initial thoughts on how you can implement customer experience and how VA has already moved the needle. Our mission at VA is never over, and we will always have more opportunities to do more and do better for the those we have the privilege of serving. As public servants, we are here to make government function effectively, in Abraham Lincoln’s words, by the people, for the people, and a relentless focus on the customer experience is the best way to achieve this goal.

CORE CAPABILITIES TO DELIVERING CUSTOMER EXPERIENCE AT SCALE:



DATA - Real-time customer experience data and predictive analytics to provide a granular view of the customer experience at every facility and service line



TOOLS - Tangible customer experience tools, such as Own the Moment training, WECARE leadership rounding practices, Red Coat Ambassador greeter program, toolkits, and other concrete products, to empower employees to deliver outstanding experiences



TECHNOLOGY - Modern and relevant technology that is personalized, intuitive, and integrated for customers and employees to use, to empower employees to deliver outstanding experiences



ENGAGEMENT - Strategic engagement to keep connected with the local community, both as a customer experience listening channel and an information distribution channel



ABOUT BARBARA C. MORTON

Barbara joined the VA in 2006 after completing two clerkships and pursuing a Master of Laws in constitutional law at Georgetown Law. While at VA, Barbara has served in a variety of capacities, to include at the Board of Veterans’ Appeals as a Staff Attorney in the Office of Veterans Law Judges, Special Counsel to the Appellate Group, Special Assistant to the Vice Chairman, Executive Assistant to the Chairman, and Director of Management, Planning & Analysis. She joined the Veterans Experience Office in 2016 as Deputy Chief Veterans Experience Officer.

VHA INNOVATORS NETWORK

FUELING A HEALTH CARE REVOLUTION THROUGH FRONTLINE INNOVATION

In October 2018, VA Pittsburgh Healthcare System (VAPHS) Training Specialist, Michael Boland, responded to a call for assistance from one of the operating room recovery suites. He saw a young Veteran in tears. The nurse and the Veteran's mother explained that, as the Veteran was emerging from anesthesia, he began to see the faces of his friends and fellow soldiers who had died in combat in Afghanistan. He began reaching out for them, yelling their names and crying. This is emergence delirium. A disoriented Veteran can experience significant emotional disturbances or become violent, posing a potential risk to their safety and the safety of the staff. IVs and breathing tubes can get pulled out, bones have been broken. Surgical staff at VAPHS alone have reported emergence delirium occurring at least once a week. After witnessing this, Boland had an idea for how to combat emergence delirium, but he needed the experience and support to make it a reality. Enter VHA Innovators Network (iNET).

CULTURE IS KEY TO SUCCESS

As part of VHA Innovation Ecosystem, iNET is a network of 34 VA medical centers (VAMCs) dedicated to building a collaborative environment for VHA frontline employees to incubate, test, and scale innovative ideas. Employees can draw on and learn from each other's diverse experiences within VHA to empower change. iNET allows innovation at these sites to operate in a world outside of the day-to-day, where change and failure are encouraged – a place where disruption is safe. Leading the charge to a build culture of innovation at the iNET sites are Innovation Specialists like Matt Rowley at VAPHS, who is a Veteran himself. Nine years after returning from Iraq and changing career paths to work for VA, Rowley has the pleasure of working as an Innovation Specialist and equips "some of the brightest and most passionate" innovators like Michael Boland with the training, resources, and tools to accelerate and operationalize innovation.

EMPOWERING THE FRONT LINE TO ACCELERATE INNOVATION

How does someone like Michael Boland go from identifying a problem in Pittsburgh, to developing an impactful solution? The answer: the iNET Spark-Seed-Spread Investment Program, VHA Innovation Accelerator, and a little help from their local Innovation Specialist.

iNET engages VHA employees through a three-tiered, innovation investment program, Spark-Seed-Spread (SSS). The SSS Investment Program invests in the ideas of VHA employees at local VAMCs, allowing them to prototype and test their ideas-turned-solutions in an accelerated innovation lifecycle. As part of this lifecycle, investees receive VHA-specific innovation competency training via the VHA Innovation Accelerator to include topics such as problem curation, human centered design (HCD), and prototype evaluation. Through these mechanisms and help from their local Innovation Specialist, iNET identifies VHA employees who are deeply committed to innovation and prepares them for the journey ahead by training them to think differently



Emergence Delirium Team (from left to right): Dave Julian, Amanda Beckstead, Bill Pileggi, Mike Boland

as they develop and implement their solutions.

"When I facilitate training on innovation-related competencies like HCD or idea pitching, I can see the faces of our frontline employees light up as they build the confidence to take on their projects. As an Innovation Specialist, I create an energy and enthusiasm that drives our workforce to action."

– Matt Rowley, Innovation Specialist, VAPHS

IDEA TO IMPACT

With the guidance of his Innovation Specialist, Matt Rowley, the support from the Spark-Seed-Spread Investment Program, and the training provided via the VHA Innovation Accelerator, Michael Boland developed and prototyped his solution to emergence delirium in one year. Utilizing an HCD-approach, Boland and his team developed Project Golden Eagle, a three-part approach to improve the response to emergence delirium events. Since the training has been conducted at VAPHS, 267 staff members have received Michael's emergence delirium training. Since then, zero emergence delirium-related injuries to Veterans or VAPHS staff have been reported.

"VHA Innovators Network and the Spark-Seed-Spread Investment program are proof that VHA continues to move in the right direction in serving our Veterans. It's also comforting to know that some of the VHA's brightest and most dedicated employees (Innovation Specialists), are working tirelessly to make the very best ideas viable within VHA so that Veterans across the country can continue to expect to receive the best treatment available."- Michael Boland, iNET Investee and Emergence Delirium Education Leader.

Without iNET's passionate, well-trained innovation army, VHA would not be able to support the cultural shift towards design-thinking, entrepreneurship, and non-linear innovation that is happening throughout health care. iNET fosters an environment where taking calculated risks and pivoting from failure can result in the redesign of a better solution for Veterans. Empowering employees to design solutions, based on real problems, matters. Teaching them the competencies to innovative change as a whole organization, instead of individually, will have a greater impact.

VHA has always been an innovation leader; iNET not only continues the roll out of innovative solutions but is truly building VHA's workforce of the future through its competency model. Empowered employees = more thoughtfully designed solutions = better outcomes for Veterans.

34 iNET FIELD SITES



- Albany Stratton VA Medical Center
- Atlanta VA Medical Center
- Central Arkansas VA Health Care System
- Central Ohio VA Health Care System
- Charles George VA Medical Center
- Chillicothe VA Medical Center
- Cincinnati VA Medical Center
- Clement J. Zablocki Milwaukee VA Medical Center
- Edward Hines, Jr. VA Hospital
- Gulf Coast Veterans Health Care System
- Hunter Holmes McGuire VA Medical Center
- Lebanon VA Medical Center
- Lexington VA Medical Center
- Martinsburg VA Medical Center
- Memphis VA Medical Center
- Minneapolis VA Health Care System
- New Mexico VA Health Care System
- North Florida/South Georgia Veterans Health System
- Tomah VA Medical Center
- Tuscaloosa VA Medical Center
- VA Boston Health Care System
- VA Central California Health Care System
- VA Central Iowa Health Care System
- VA Loma Linda Health Care System
- VA Northeast Ohio Health Care System
- VA Palo Alto Health Care System
- VA Pittsburgh Health Care System
- VA Puget Sound Health Care System
- VA Salt Lake City Health Care System
- VA San Diego Health Care System
- VA Sierra Nevada Health Care System
- VA St. Louis Health Care System
- VA Western Colorado Health Care System
- White River Junction VA Medical Center



JOHN A. BRANDECKER



John believes innovation starts with investing in your people.

Step 1 – Build Innovative Workforce

Educate your staff so they feel comfortable with what innovation is and what skillsets can be utilized to execute it. I think it is valuable to build an innovative workforce with a diverse set of skills. Human Centered Design, Customer Experience, Entrepreneurship, and Data Science are all great options. Above all of these is empathy! This skill teaches staff how to really listen, find opportunities, and treat Veterans as people, not patients.

Step 2 – Spark Creativity

Create opportunities for staff to embody innovation beyond their day-to-day tasks. I think that everyone should have a chance to innovate. If my staff has an idea, I invite them to talk with me. We review tasks, timeframe, owners, benefits/risks, and most importantly what I can do for them.

Step 3 – Transform Mindsets

Encourage staff to be courageous and reward them continuously to build new innovative habits. I always make sure that people truly feel invited and encouraged to challenge the status quo. By empowering my staff, I help build a culture of innovation.

Step 4 – Lead Change

Be a mentor and supporter to staff as they continue to learn and practice these new skillsets. After the first conversation to empower staff, I continue to invest resources in ideas that are well planned and will result in solutions that truly help Veterans.

DIRECTOR, VA SIERRA PACIFIC NETWORK (VISN 21) IN MARE ISLAND, CALIFORNIA

John A. Brandecker served as the Medical Center Director at the Richmond VA Medical Center in Virginia for five years, where he oversaw health care operations along with four Community Based Outpatient Clinics (CBOC).

Today, John serves as the VISN 21 Director. His position oversees delivery of health care at seven major health care systems in Northern California, Nevada, Hawaii, and the Pacific.

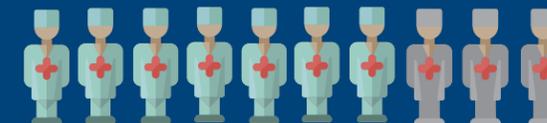
John is known for his extensive leadership experience in the private and public health care sector. During his time in the private sector, John served in roles including Vice President, Director, and Chief Financial Officer at various hospitals across the country. The opportunity to serve Veterans motivated John to join the VA.

your people &
“INVEST IN ^ INNOVATION”

VHA OFFICE OF ACADEMIC AFFILIATIONS

Embracing VA’s mission, “To educate for VA and the Nation,” the VHA Office of Academic Affiliations implements health professions training in coordination with U.S. educational institutions. VA conducts the largest education and training effort for health professionals in the United States. VA is equipping the health care workforce of the future!

>2/3 of US-trained physicians had clinical training in VA



124,000+
CLINICIANS TRAINED

In AY 2018-19 over 124,000 individuals received clinical training in a VA facility

VA’s physician education program is conducted in collaboration with 144 of 152 LCME-accredited allopathic medical schools and all 34 AOA-accredited osteopathic medical schools.



25,000 nursing students completed their clinical training at VA facilities in Academic Year 2018-19



OAA implemented innovative nursing workforce programs to address national shortages by increasing student enrollment at Schools of Nursing and expanding clinical training capacities. OAA pioneered residency programs within VHA to develop clinically-ready nurses who can meet Veteran needs.

As the largest training institution for psychologists in the nation, VA is a leader in establishing postgraduate training for occupations with shortages including physician assistants, physical therapists, and occupational therapists.

VA PROVIDES
20%
OF ALL
PSYCHOLOGY
INTERNSHIPS

A new trainee recruitment initiative fosters direct hiring of trainees into VA through a collaboration with VHA’s Workforce Management. Geo-Mapping identifies Minority Serving Institutions not currently affiliated with a VA facility.



Centers of Excellence in Primary Care Education was a seven-site project focusing on clinical learning transformation, and has spurred influential program design for clinical education, generated multiple publications, and received national recognition for innovation in interprofessional education.

20 Advanced Fellowships

Advanced Fellowships targets health care education, advanced clinical practice, research, and administration/policy initiatives. 24 national Advanced Fellowships span more than 45 VA facilities to offer training stipends for over 450 fellows including physicians, dentists, nurses, psychologists, social workers, pharmacists, and physical therapists. Recent innovations include implementation of robust training in quality, patient safety, mental illness treatment and research, and clinical simulation.

**“THE SECRET OF CHANGE IS TO FOCUS ALL OF YOUR ENERGY, NOT ON FIGHTING THE OLD, BUT ON BUILDING THE NEW.”
-SOCRATES**

BECOMING A LEARNING ORGANIZATION, ONE CONTINUOUS LEARNER AT A TIME

The Office of Systems Redesign and Improvement supports and facilitates VHA's national improvement strategy and initiatives and seeks to develop improvement capacity throughout the organization to reduce variation in care; remove waste from the department's operations; and maximize Veterans' experience with VHA health care.

For VHA employees like Renee Johnson, providing the best care for Veterans means taking opportunities to learn and lead at her VA medical facility. Johnson was selected to participate in the Improvement Advisor Academy (IAA), an Office of Systems Redesign and Improvement training initiative which helps an annual cohort of 40 VHA employees build and hone skills to drive innovative, VHA system-wide change. After participating, Johnson noted:

“I so appreciate the time and effort you and all of the IAA staff gave to all of us last year. And, I fully know that I was a “remedial” student in the class. I just wanted you to know that today I passed the VA Lean Black/Gold Belt exam!”

-Renee Johnson, Boise VA Medical Center

True to VHA's drive to be a learning organization, the IAA provides a collaborative learning environment that pairs knowledge and training to evaluate, lead, and integrate process improvement capabilities with hands-on experience. Participants receive face-to-face training in process improvement-related competencies such as concept development, lean principles, and data-driven analysis, and are encouraged to “learn by doing,” tackling leadership-sponsored improvement projects impacting the delivery of care across VHA. Each cohort shares expertise, successes, and even lessons learned from perceived failures in their projects. Upon completing the program, participants like Denise Rohman are certified improvement advisors who support sites across the nation in launching redesign initiatives. Rohman noted:

“The academy has not only offered me an opportunity to be more active in these changes at my facility, but today I get to advise implementation efforts across VHA. Having this reach and expertise, has been such a joy for me.”

-Denise Rohman, James H. Quillen VA Medical Center

The Academy is an investment in frontline employees like Johnson and Rohman who intimately know the challenges of Veterans and are best equipped to solve them. Through programs like the Improvement Advisor Academy, Office of Systems Redesign and Improvement supports and facilitates VHA's national improvement strategy and push to become a learning organization. Ongoing training and learning opportunities empower VHA employees to think innovatively and encourages more teams to start asking: “how might we?” instead of, “is this even possible?”

IAA Participant Feedback

“Due in part to this program our facility has gone from a 1 star to a 3 star and improving still within a year.”



IAA Participant Feedback

“I want to thank you for your mentorship during my time in IAA. I think it is one of the best programs I have been through in terms of learning and practicing SRD concepts.”

CELEBRATING INNOVATION

VHA INNOVATION EXPERIENCE

THE ANNUAL VHA INNOVATION EXPERIENCE (VHA iEx) IS A TWO-DAY CELEBRATION HIGHLIGHTING VA EMPLOYEES WHO ARE COMMITTED TO TRANSFORMING THE WAY VHA SERVES OUR NATION'S HEROES.



AWARDS & NETWORKING RECEPTION

The culminating event of iEx is the Awards and Networking Reception, where the winner of the Dr. Robert Jesse Award for Excellence in Innovation is announced. The reception provides an opportunity for innovators to celebrate their work, connect, and look forward to the future impact that innovation will have on Veteran-care nationwide.



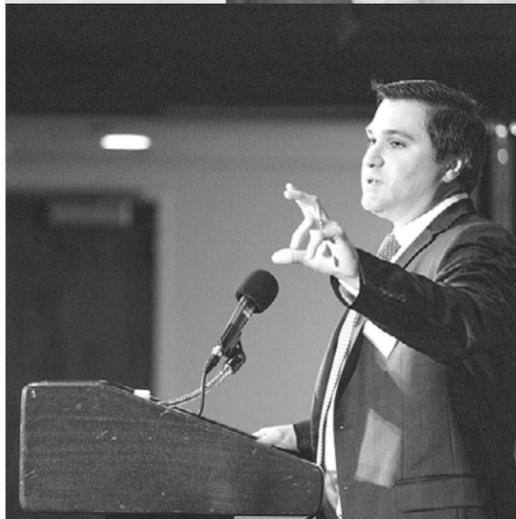
VHA INNOVATION DEMOS

VHA iEx is a celebration of innovation at VHA. Frontline employees discuss their experiences incubating, testing, and scaling their innovative practices and solutions that are driving the delivery of improved health care to Veterans.



VHA iEx TALKS

VHA frontline innovators bring their experiences to life in a series of TED-style talks that highlight innovative solutions that are changing and saving Veteran lives. The event aims to inspire attendees with a sense of empowerment and understanding that every VA employee can make a difference in improving Veteran care.



INTERACTIVE EXHIBIT ROOM

The Exhibit Room provides an interactive opportunity to experience innovative practices and solutions currently being used at VHA facilities.



SHARK TANK!

VHA leadership reviews hundreds of innovative practices being implemented across VHA and selects finalists to compete at iEx. The VHA Shark Tank Competition allows 15 employees to present their solutions to a panel for a chance to replicate and scale their practices and solutions to other VA medical centers.

CATALYZING INNOVATION

**“A GOAL WITHOUT
A PLAN IS JUST A
WISH.”**

-ANTOINE DE SAINT-EXUPÉRY

VHA works hard to connect the dots between innovative efforts. Whether it is re-imagining large-scale processes or transforming local Veteran care, innovation is present across the enterprise. Harnessing these efforts for communal success ensures VHA is constantly redefining expectations.

INNOVATION FOR IMPACT: THE VALUE OF A SCIENCE-DRIVEN AND EVIDENCE-BASED APPROACH TO INNOVATION

Dr. Amy Kilbourne, Quality Enhancement Research Initiative (QUERI)

LESSONS LEARNED THROUGH IMPLEMENTATION SCIENCE

VHA strives to deliver high-quality health care by ensuring that empirically tested and validated innovations get off the research-academic shelf and into the hands of Veterans. Translating research to practice, however, is not a straightforward process. It can take 17 years for interventions to reach frontline care environments, and of those, only one in five will actually be adopted in real-world practice. This research-to-practice gap has the potential to waste millions of dollars invested in research innovations that do not make it into the hands of Veterans.

Experience has taught me that innovation is not about implementing something without a reason. There is an actual science to implementing new innovations and practices. At the VHA Quality Enhancement Research Initiative (QUERI), we pair an understanding of the preferences and needs of Veterans with research and evidence-based practices (EBP) to improve the quality and safety of care delivered to Veterans. Through my experience advising others to implement, scale, and spread evidence-based innovations, I have developed implementation science lessons learned that help

facilitate the transformation of new ideas to powerful agents of change.

The best innovative treatments to implement are those supported by evidence. Evidence should come from high-quality research studies, such as randomized controlled trials, and should demonstrate results that signify a great impact on health care. It is important to set a plan to use evidence before implementation so that you can understand the baseline and compare after implementation.

Multi-level stakeholders play crucial roles in practice implementation. Effective implementation includes both top-down engagement by local and national leadership, as well as bottom-up participation by providers, administrators, and Veterans and family members. It is important to connect with these individuals, create avenues for them to connect with each other, and to train them on how to best communicate and play a role.

Evaluation of EBP's impact is essential for successful implementation. Effective practice evaluation plans include measurement of multiple impact outcomes valued by different stakeholders (leadership, providers, Veterans) to demonstrate the value and return-on-

investment of the practice. Evaluation helps you make strategic decisions and receive buy-in.

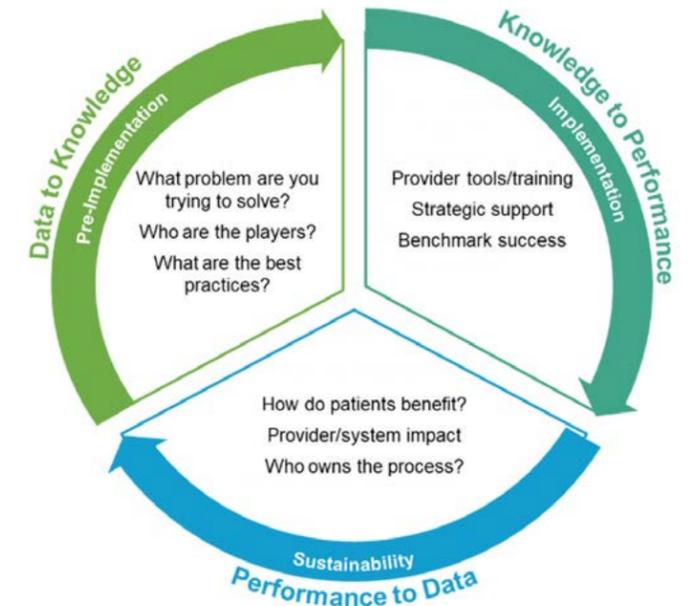
Steps should be taken to plan for ongoing sustainment of EBP. There are many factors that influence whether a practice will be fully adopted. These can include monitoring of impact, designation of staff responsible for the practice, adapting to the changing needs of Veterans and the organization, and drafting of policies and budgets to support the practice.

HOW IMPLEMENTATION SCIENCE HELPS VHA IMPROVE CARE

I use evidence. Data-driven evidence helps me empower my team, change mindsets at VHA, and research how to best implement, integrate, and scale innovations. One of the tools QUERI has developed to help reduce the "research-to-practice" gap is the QUERI Implementation Roadmap. The Roadmap provides guidance on how to tailor evidence-based interventions and select appropriate implementation strategies. Based on my research on several implementation theories and frameworks, such as Learning Health System's Knowledge to Action Loop, the Roadmap was created. It consists of three phases:

Pre-Implementation involves selection of innovative evidence-based treatments aligned with stakeholder needs and priorities. The goal is to identify a problem and solution, engage key stakeholders, and develop measures and data to baseline performance

Implementation entails deploying strategies to



improve the clinical and administrative processes that facilitate uptake of the innovative treatment among frontline providers. The goal is to plan and implement an intervention, activate implementation teams, gain stakeholder feedback, and monitor progress against baseline

Sustainment includes evaluation of return-on-investment and hand-off to stakeholders to ensure ongoing maintenance over time. The goal is to sustain an intervention, transition ownership to maintain tasks and budget, and complete ongoing evaluation to always improve

See the model for more information of what the phase includes and what questions to ask yourself.



ABOUT AMY KILBOURNE

Amy is the Director of the VHA QUERI national program, which accelerates implementation of evidence-based practices (EBP) into routine care. Amy is a national expert in implementation science, partnered-oriented research, and translation of clinical quality improvement intervention findings into actionable policy and practice. She also has a strong role in VA research initiatives.

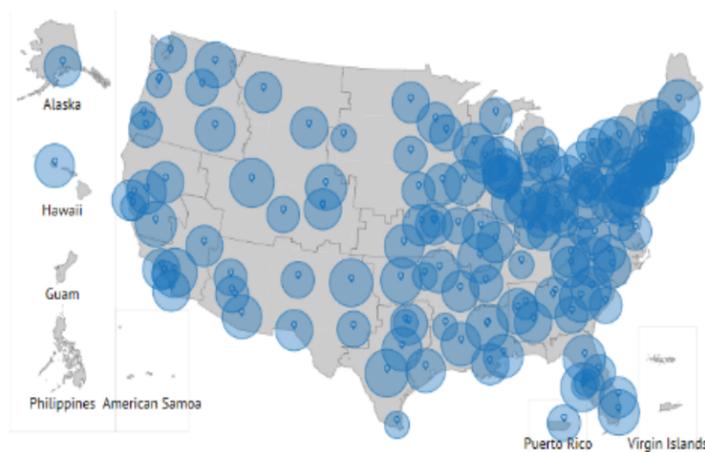
VHA DIFFUSION OF EXCELLENCE

A MODEL FOR DIFFUSING INNOVATION ACROSS THE NATION'S LARGEST INTEGRATED HEALTH CARE SYSTEM

To improve outcomes for Veterans, VHA took a unique approach to designing and deploying a model to incubate, test, and scale promising practices across VHA—Diffusion of Excellence (DoE). As part of VHA Innovation Ecosystem, the DoE portfolio is developing a culture of continuous improvement that delivers consistent and high-quality care throughout VHA.

DoE consists of specialized teams of implementation experts focused on identifying innovative, promising practices through a national “Shark Tank” style competition. The goal is to diffuse these promising practices more broadly across the enterprise through a repeatable process for scaling innovation. Each “Shark Tank” competition is followed by a DoE Base Camp where champions receive support in building an implementation plan for their promising practice. Once a practice proves to be replicable and consistent, DoE identifies strategies for widespread deployment to meet the needs of local Veterans and employees.

VHA has replicated **400+** practices at over **150** facilities nationwide to impact more than **100,000** Veterans



VHA incubates, tests, and scales health care innovations while:

- Empowering employees** to promote innovation knowledge sharing and a supportive culture of continuous improvement and high-quality care
- Minimizing negative variation and standardizing promising practices** by diffusing innovative and industry-recognized solutions across the enterprise
- Institutionalizing processes** and mechanisms for systematically diffusing and implementing promising practices



PROJECT HIGHLIGHTS

REVERSING OPIOID OVERDOSE AND SAVING VETERAN LIVES THROUGH RAPID NALOXONE ADMINISTRATION

Initiated by Pamela Bellino, Patient Safety Manager at the VA Boston Healthcare System, the Opioid Overdose Reversal Program is a practice to increase the availability of naloxone to prevent overdose fatalities among Veterans at VA facilities. During an overdose, every second counts due to the dangers of respiratory arrest. Increased naloxone availability decreases the time between a Veteran overdose and naloxone administration. The program helps prevent overdoses by equipping AED cabinets, VA police officers, and at-risk patients with naloxone.

To date, over 100 lives have been saved through rapid naloxone administration.



“Your VA” Boston Neighborhood Network show featured the impact of this project for combating the opioid epidemic.

FLOW3 REVOLUTIONIZES LIMB LOSS CARE

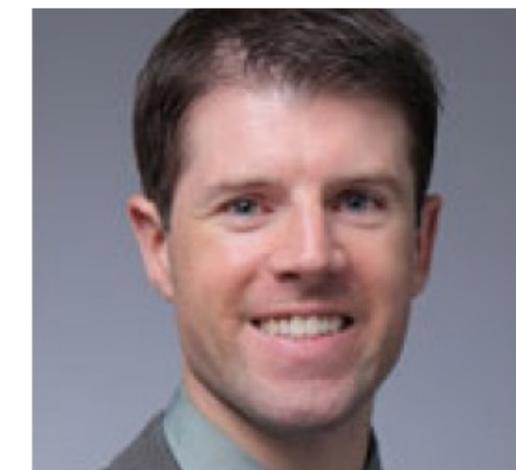
With recent advancements in prosthetic limb technology, Veterans with limb loss have greater promise of increased quality of life, independence, and mobility than ever before. However, the long wait between being prescribed and fitted for a prosthetic limb and finally receiving the limb—in some cases as many as six to twelve months—has compounded the many challenges of limb loss. Dr. Jeffrey Heckman, a physician in the VA Puget Sound Health Care System gathered a team to overhaul and automate the prosthetic limb acquisition process. The result was a system of three interrelated software platforms, known as FLOW3, that streamlines and provides transparency into the acquisition flow. With FLOW3 fully implemented at Puget Sound and across VISN-12, the following benefits have been realized:

A faster process from prescription (Rx) to purchase order (PO) to limb delivery:

- Rx to PO authorization reduced from 21.3 to 10.3 days (non-VA providers)
- Variability in timelines reduced 57%
- Rx to limb delivery reduced 39-50%

Greater data transparency and accuracy with data mining related to

- Prosthetics
- Veterans with limb loss
- Current VA services and need for new services



“With patients lacking mobility and independence due to limb loss at greater risk for depression, PTSD, substance abuse, adjustment disorder, and suicide, reducing wait time for limbs can have a huge impact on Veterans’ quality of life, with potential correlations in suicide prevention.” — Dr. Jeff Heckman



ANGELA GANT-CURTIS

IT Program Manager,
VA Office of Information and
Technology (OI&T), Austin, Texas

FROM A FRONTLINE INNOVATOR TO A NATIONAL IT TRAILBLAZER

Through this experience interacting with Veterans on the frontline, she recognized a number of opportunities to improve the care experience with Veterans. Now 33 years later, she has transitioned into a role within the Office of the Chief Technology Officer (OCTO) where her passion drives the national delivery of modern technology health care solutions to Veterans.

Angela has been instrumental to the success of various health-technology solutions. Notably, she has managed solutions that provide Veterans the ability to remotely adjust their hearing aid (HearAssist) and has built systems that allow Veterans to prove their military service more easily (Veteran Identification Card, OI&T Pathways). Angela is also managing a mobile technology that allows Veterans to complete clinical screening (eScreening).

INSIGHTS ON DRIVING INNOVATION:

“Don’t take no for an answer”

Be persistent in delivering value to Veterans. If your idea does not receive immediate buy-in, continue to be a strong advocate if you know that your idea will provide value.

“Always remember why we are here”

Veterans are at the center of what we do and what services we provide. Veterans sacrifice so much for our country, and we should aim to support them where we can.

“Team work makes the dream work”

Creating teams with diverse skillsets strengthens the ability to tackle new problems.

“Innovation begins on the frontline”

Staff and clinicians interact with Veterans every day and are positioned to challenge the status quo by improving processes and creating new solutions.

“Value now is better than no value”

Focus on getting solutions to the Veteran as quickly as possible. Don’t let perfection get in the way of progress.

VHA DIFFUSION MARKETPLACE

FUELING THE SUPPLY & DEMAND OF INNOVATION

THE MISSION OF VHA DIFFUSION MARKETPLACE

VHA Diffusion Marketplace is an intuitive, consumer-focused technology tool created by VHA Innovation Ecosystem’s Diffusion of Excellence portfolio. This tool facilitates and enables VHA’s goal of evolving into a learning health system that continues to build solutions, transform care, and integrate proven promising practices at VA medical centers across the country. The Marketplace aims to achieve this by allowing new ways of browsing, reviewing, and spreading promising practices across VA.

FIND PROMISING PRACTICES

Seamlessly Search for Solutions

Marketplace practices have their own landing pages that describe the problem, solution, implementation approach, and point of contact. Users can search by priority area, keyword, originating facility, implementation difficulty, and other parameters to find practices that best suit their specific needs.

REVIEW PROMISING PRACTICES

Check Ratings to Make More Informed Decisions

Each practice is ranked based on the resources required to implement, its degree of complexity, and anticipated cost avoidance and Veteran satisfaction. This will empower VHA to make better-informed decisions.

SPREAD PROMISING PRACTICES

Share your Experience

As VHA employees implement Marketplace practices, the spread and growth of the practice is visually depicted based on self-reported adoption. These employees are also able to provide reviews based on their experience of implementing the practice.

Best return on investment



Vione

Sponsor

Deprescribing medications keeps Veterans health, satisfaction scores up, and saves over \$400 per patient...

Created in 2015 by the Eugene J. Townhin Healthcare Center

DRIVING MEDICAL FACILITY LEADERSHIP WITH DIGITAL VA SUPPORT NETWORKS

Since 2015, the Office of Reporting, Analytics, Performance, Improvement and Deployment (RAPID) has been executing improvement events for VA's medical centers in need of focused improvement actions in specific areas of measure. Principles of Lean, Performance Excellence, and Change Management have been uniquely tailored to meet medical center needs and goals in an amount of time affordable to them.

In 2018, the high demand for RAPID's services, combined with an interest in reducing travel costs to the government and travel burden on the staff, necessitated a strategy for meeting the need with a different modality. The same tried and true approach would be utilized but virtually instead of on-site. In 2019 the Virtual Improvement Program (VIP) was kicked off with a small cohort of medical centers having similarities in data performance and in facility complexity level. A multi-faceted series of telephone and web-based interactions included a line up of subject matter experts from VA Medical Centers and VHA program offices, real-time data reviews, facilitator-led discussions of opportunities revealed by the data, peer-to-peer discussion on lessons learned and strong practices, facility team presentations on local improvement strategies, session-to-session homework, and other components. The series was topped off with a presentation for local leadership by each facility's team workgroup.

The interactive and relational nature of the VIP sets it apart from other virtual learning and improvement programs. At the conclusion of the seven sessions, facilities made new connections with peers from other facilities, built relationships with VHA program office data and clinical subject matter experts, and had the opportunity to strengthen their own local team around a set of clinical measures important to the health of the Veterans they serve. The majority of participant feedback emphasized the helpfulness of interacting with other facilities, learning from their mistakes, successes, and their strong practices. Participants also reported that by the end of the sessions, they had better understanding of the measures and options for improvement. While implementing and sustaining improvements will be ongoing, data from quarter 1 to quarter 2 showed that all but one of the facilities (83%) had some improvement in the measure.

RAPID's improvement teams will remain available to each of these facilities individually for consultation and improvement work when needed, and can connect the local teams with important resources as their improvement work unfolds and reveals new challenges.



RAPID'S IMPROVEMENT MODEL LEVERAGES 3 DISTINCT EXPERTS



BEHIND EVERY HEALTH SYSTEM IS A TEAM OF PEOPLE DO YOU KNOW YOURS?

IMPROVE THE USABILITY OF YOUR FACILITY'S HEALTH INFORMATION SYSTEM!

The UX Guide can help you design more usable systems. This guide provides the tools and techniques for delivering applications that users find efficient, effective, and satisfying to use.

EVALUATE USABILITY

Select the usability assessment techniques best suited for your project's phase of design: concept, wireframe, functional prototype, or implementation-ready



DESCRIBE USERS

Create descriptions of various users and their differing needs or access a library of Veteran, clinician, and caregiver personas

CREATE SCENARIOS

Discover data-driven scenarios that describe various user-system interactions and contexts

TRANSFORMING IDEAS INTO PATENTED PRODUCTS FOR VETERANS

Catherine Abee thinks a lot about oximetry and the balanced oxygen levels needed in her patients' blood. As a VHA respiratory therapist, she has spent the past decade caring for Veterans and developing her idea of a device that warms an area on a patient's body prior to measuring the amount of oxygen in the bloodstream. With the help of VA's Technology Transfer Program (TTP) and Human Engineering Research Laboratories (HERL) over the past two years, Abee was able to both secure a patent and develop a second-generation prototype of her heat-enhanced pulse oximeter.

TTAP LAUNCHED TO SUPPORT VA INVENTORS

VHA Office of Research and Development is improving the lives of Veterans and all Americans through health care discovery and innovation with programs like TTP. TTP is helping VA employees bring their inventions to life through initiatives like the Technology Transfer Assistance Project (TTAP), launched in 2018. The VA initiative helps inventors develop their promising ideas and early prototype inventions to make them more marketable and attractive for licensing. To accomplish this, TTP, led by Dr. John Kaplan and his team based out of Washington D.C., have partnered with HERL, a large VA facility that has the resources and manufacturing capability to help employees like Catherine Abee build and iterate on working prototypes of their ideas. The initiative helps drive exposure for VA and its inventors. Patent applications are submitted with the VA employee as the inventor, and VA can receive royalties on the sales and preferred pricing if the product is licensed to a company.

HARNESSING EXPERTISE FROM HERL

HERL benefits from having both an outstanding fabrication and standards testing facility and the expertise of seasoned research scientists and engineers, like Army Veteran and HERL Director, Dr. Rory Cooper. Cooper was the latest inventor to become part of a collectible trading card series published by the U.S. Patent and Trademark Office, alongside famous inventors like Thomas Edison. His trading card reads, "Rory Cooper is a distinguished professor of rehabilitation engineering at the University of Pittsburgh and a senior career scientist for the U.S. Department of Veterans Affairs. His team has developed over 100 inventions and hold multiple patents related to wheelchairs, robotics, and wearable instruments designed to improve the lives of people with disabilities and military veterans."

CELEBRATING EARLY TTAP SUCCESS

Three of the seven first year TTAP projects have received a patent: Abee's oximeter, a cord caddy that prevents tangling of a patient's multiple IV (intravenous) lines, and the RX-1 label applicator, which expedites labeling of pharmaceutical packages. Patent applications are pending on three of the other technologies. Two of these were developed by Dr. Cooper and his team: a prosthetic hook mouse making it easier for people with an upper-limb prosthesis to navigate a computer, and a hand pedal for people with lower-limb impairment.

Inventions like these further distinguish VA as a provider of cutting-edge care for Veterans. The Office of Research and Development believes that the TTAP-HERL partnership will empower VA inventors like Catherine Abee to help solve health challenges that clinicians, Veterans, and the public face, now and in the future.



VHA CENTER FOR COMPASSIONATE CARE INNOVATION

COULD A 5-MINUTE PROCEDURE FOR PAIN RELIEF, HELP TREAT THE DEBILITATING SYMPTOMS OF PTSD?

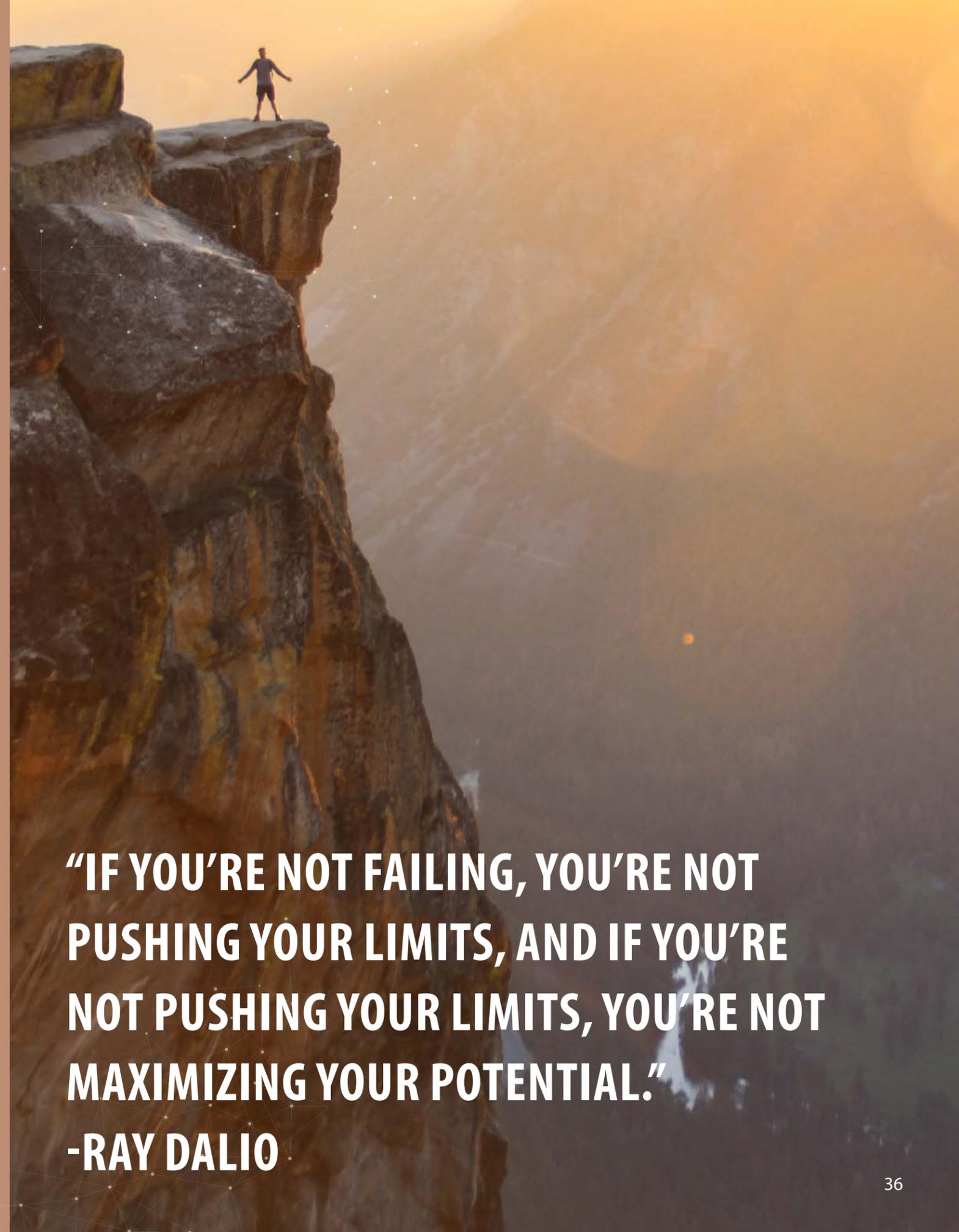
Could a 5-minute procedure for pain relief, help treat the debilitating symptoms of PTSD? Championed by Center for Compassionate Care Innovation (CCI) and VA Long Beach Healthcare System, emerging research suggests promising results for Veterans diagnosed with PTSD. The procedure entails injecting a local anesthetic into the SGB, located in the neck. As a result, the procedure has been shown to block pain signals and reduce symptoms such as anxiety and hypervigilance among Veterans who have tried first line treatments. In one instance, a Veteran commented "It's like a big weight has been lifted off my shoulders and my chest. And I can actually relax." Through CCI, VA can continue to and introduce emerging therapies such as SGB to ensure every avenue is explored to deliver exceptional Veteran-care.

CCI explores emerging therapies that are safe and ethical to enhance Veteran lives. With a prioritized focus on chronic pain, post-traumatic stress disorder, suicidality, and traumatic brain injury, CCI evaluates and prioritizes innovative treatment approaches to improve Veteran wellness. Through a rigorous review process, subject matter experts examine proposals that offer hope to Veterans who have not responded to standard treatments. If your team has a solution, we want to hear it. We encourage you to collaborate with VA and CCI on your cutting-edge therapy.

SOLUTIONS THAT DELIVER VETERAN VALUE

INVESTMENT TO IMPACT

Veterans are at the heart of every innovation. It is this unwavering devotion to improve their care experience that motivates each idea, effort, and solution. VHA is dedicated to translating ideas into action and will never stop striving for the greatest Veteran outcomes.



**“IF YOU’RE NOT FAILING, YOU’RE NOT
PUSHING YOUR LIMITS, AND IF YOU’RE
NOT PUSHING YOUR LIMITS, YOU’RE NOT
MAXIMIZING YOUR POTENTIAL.”**

-RAY DALIO

ARE WE THERE YET? PLANNING THE INNOVATION ROAD MAP

Dr. Thomas Klobucar
Executive Director of the VHA Office of Rural Health

“We need to innovate.” Few phrases cause such equal parts excitement and apprehension. And with good reason. Too often, “innovation” is a hollow buzz word – a concept that is poorly defined, poorly executed, and even more poorly measured. The results are as predictable as they are discouraging: frustrated staff, lackluster results, and wasted resources.

At the Office of Rural Health, innovation is a part of everything we do. But our decentralized approach to program development and execution poses unique challenges. We rely on our field teams to identify, develop, and manage a nationwide portfolio of programs, trusting them to make smart decisions and report accurate results. Doing so requires an operational philosophy that focuses as much on people as it does on process.

To keep our programs on schedule, on target, and on budget, we follow a proven approach that empowers real innovation to deliver lasting results:

UNDERSTAND WHAT INNOVATION ISN'T

Before you start down the road to innovation, every member of your team should understand a cardinal rule – innovation is not more of the same. That may sound like a given, but a surprising number of organizations dedicate too much time to “innovating” their way into larger budgets and bigger allocations. Hiring additional staff, throwing more money at a problem, or simply expanding current efforts rarely achieve meaningful results.

Some of ORH's most successful programs began by asking a simple question: how can we do more with the same? The end results are cost-effective, impactful initiatives that serve as force multipliers – such as training existing clinicians to treat elderly and women rural Veterans.

SET THE TONE

Creating a truly innovative environment requires more than a flow chart and a great idea. It requires a culture shift that empowers managers to develop concepts, holds them accountable for performance, and allows them to fail. Under our model, ORH field-based resource center directors are given the responsibility, authority, and judgment needed to develop programs, manage their execution, and offer suggestions for improvement. We set the rules of the game, but we allow them to explore the path to success.

MAKE THE CASE

In a world of finite resources, not every challenge is a funding priority. Before we allocate a single dollar to a program, we make sure the scope and scale of the problem is both significant and surmountable. Pursuing initiatives that are backed by evidence-based research helps us reserve our time, money, and effort for solving the biggest – and most feasible – challenges.

DEFINE SUCCESS

One of the most critical components of successful innovation is defining performance measures from the outset. Ideally, these metrics need to be measurable,

such as an increase in number of Veteran patient encounters or decrease in readmissions, and should be a direct reflection of the challenge at hand. We use a standardized paradigm to measure the impact of an innovation based on the following value components:

VETERAN – expressed as an improvement in satisfaction or customer experience for Veterans (example: an innovation that makes receiving care easier for Veterans such as less travel time, remote care, easier to schedule appointments)

CLINICAL – expressed as an improvement in health outcomes (example: an innovation that accelerates the diagnosis of a condition leading to earlier treatment)

FINANCIAL – expressed as a cost savings/avoidance and/or return on investment from innovation initiatives (example: an innovation that can promote cost avoidance or savings through decreased hospital readmissions, personalized medicine)

OPERATIONAL – expressed as a measure of increased efficiency or productivity in operational activities (example: an innovation that digitizes a manual process allowing a provider to focus on a patient instead of paperwork)

More importantly, everyone involved should be aware of and agree to these expectations from day one – including roles and responsibilities for capturing and communicating outcomes.

But despite smart planning, focused metrics, and solid execution, sometimes even the best ideas need to be tweaked. Some need to be abandoned entirely. Which is why it's important to...

FAIL FAST

The waste bins of the world's most successful companies are littered with past failures (Apple Newton, anyone?) The difference between industry titans and spectacular flameouts isn't that the former never make mistakes – it's that they learn from them. Fast.

Creating a culture and process which allows program managers the ability and safety to flag emerging problems helps organizations avoid sunk costs. This is sometimes easier said than done, especially in an environment where employees fear that every mistake or missed objective carries dire consequences.

Managers need to be rewarded for highlighting risks and offering solutions. Sometimes pilot programs can't be scaled. Sometimes circumstances change. Sometimes metrics can't be captured. Regardless of the reason, it's critical for innovators to identify and respond to looming threats to change processes, implement improvements, or scrap a concept entirely.

Innovation isn't easy. It's time-consuming. It's resource-intensive. And doing it successfully will present your organization with challenges it's never faced.

But the rewards – for your staff, your programs, and our nation's Veterans – make it worth the journey.



ABOUT THOMAS KLOBUCAR

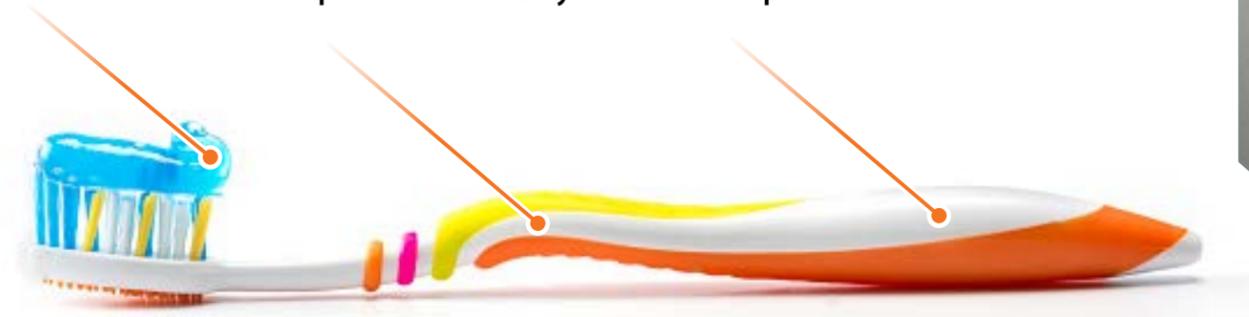
As Executive Director of the VHA Office of Rural Health, Dr. Thomas Klobucar manages a broad portfolio of partnerships, research initiatives, and 70 programs designed to increase access to care for hundreds of thousands of rural Veterans. A retired Air Force Senior Master Sergeant, Dr. Klobucar's research spans the academic and private sectors, including faculty appointments at The University of Iowa College of Public Health and The Iowa State University Department of Political Science.

HOW TOOTHBRUSHING IS SAVING VETERAN LIVES

Estimated 45
Veteran lives
saved

Predicted cost avoidance
of \$9.98 million across the
8 pilot sites as of July 2019

40 VA hospitals are
in various stages of
implementation



ONE SIMPLE INNOVATION IS TAKING VA BY STORM: A TOOTHBRUSH

Project HAPPEN equips hospitalized Veterans and their caregivers with the information and assistance they need to reduce the risk of developing hospital acquired pneumonia (HAP).

It was just after 10 a.m. when a World War II Veteran announced to the unit nurse manager: "I have to brush my teeth so that I don't get pneumonia." The Veteran's abrupt departure highlights the effectiveness of a VA nurse-led intervention: brushing teeth and cleaning dentures to prevent HAP. How does a toothbrush help prevent such a fatal infection? Without regular oral care, dental plaque begins to build and serves as a reservoir for germs that can multiply and be aspirated (swallowed) into the lungs during sleep. Consistent toothbrushing 2-3 times a day and denture cleaning before sleep is effective in reducing the number of germs and significantly lowers the risk of pneumonia.

In years past, prevention efforts have solely focused on ventilated patients due to their increased risk of contracting pneumonia, leaving non-ventilated patients overlooked. This changed when VA Nurse Practitioner and Researcher, Dr. Shannon Munro, learned about the potential dramatic reduction in HAP with oral care. She recruited fellow nurses and other health care professionals, developed training materials, and began her mission to disrupt the status quo at VA.



"Toothbrushing and denture cleaning was considered a low priority by many before we started this journey. Now we are seeing hospitalized Veterans and staff paying more attention to this life-saving two-minute intervention. Veterans have been open to assistance with their oral hygiene and feel better with clean teeth. Most just need a gentle reminder to complete oral care after meals and before bedtime." -Shannon Munro, PhD, NP

This VA nurse-led initiative began as a pilot in the Salem VA Medical Center in 2016. Today, its impact has resulted in more than 45 Veteran lives saved, 250 cases avoided, and immediate drops in HAP rates as of July 2019. Through the VHA Diffusion of Excellence, Dr. Munro is scaling this clinical practice, which costs around \$3.00 in supplies and two minutes per patient. Introducing this new standard of care has saved lives and provided Veterans a new sense of involvement in their care.

"When hospitalized, patients often feel a lack of involvement with their care. That's what makes Project HAPPEN so great. It's such a simple innovation -that not only saves lives- but puts Veterans and their caretakers at the forefront of doing so." - Sheila Sullivan, PhD, RN

Among many benefits, this innovation reminds us that the best solutions may be simple.

VHA OFFICE OF RURAL HEALTH

A DIGITAL SOLUTION FOR VETERANS WITH MULTIPLE SCLEROSIS

VHA's Office of Rural Health strives to connect America's nearly five million rural Veterans with quality health care.



ISSUES FACING RURAL VETERANS WITH MULTIPLE SCLEROSIS (MS)

Rural Veterans traveling long distances to visit MS clinics often face fatigue, heat, and environmental factors affecting levels of muscular strength and other clinical symptoms. This causes difficulties in properly evaluating patients' functional status once at the clinic and raises concerns over errors in prescribing appropriate medication dosages. One Rural Promising Practice is targeting MS and expanding rural treatment and rehabilitation through a Clinical Video Telehealth (CVT)-neurology follow-up program.

CLINICAL VIDEO TELEHEALTH

CVT helps Veterans avoid excessive travel times by facilitating care through Community Based Outpatient Clinics (CBOCs) and in Veteran homes for neurology follow-up care and telerehabilitation. Telepartners at CBOCs can provide remote physical and neurological exams guided by a patient's physician. Telerehabilitation devices in patients' homes allow for continuous rehabilitation and exercise that helps Veterans maintain and build walking ability, balance, coordination, muscular strength, endurance, and delay disease progression. Early success in the implementation of telehealth strategies for MS has resulted in increased access to care for Veterans, a decrease in missed appointments, increased patient and clinician satisfaction, and improvements in walking speed, distance, and quality of life.

With the success of the program to date, ORH hopes to expand CVT to include opportunities for group rehabilitation sessions and even VHA-wide expansion of telehealth strategies for treating MS and other complex and progressive neurological disorders, including Parkinson's disease, ALS, spinal cord injury, and polytrauma.

60,000+
Veterans
suffer
from MS

Veterans
with MS are
among the
highest users
of health care

33% of
MS patients
live in rural
America

RURAL PROMISING PRACTICES

To support rural Veterans, ORH identifies and provides seed funding for local projects that address rural Veterans' health care and access issues. Projects that demonstrate significant impact are disseminated across VHA as Rural Promising Practices and meet six ORH Promising Practice Criteria.



**INCREASE
ACCESS**



**STRONG
PARTNERSHIPS**



**CLINICAL
IMPACT**



**RETURN ON
INVESTMENT**



**OPERATIONAL
FEASIBILITY**



**CUSTOMER
SATISFACTION**

SAVING LIVES WITH DATA

An average of 17 Veterans die by suicide each day. Six of the 17 are users of VHA health services. The rate of suicide in male Veterans is 1.3 times higher and, for female Veterans, 2.2 times higher than their U.S. civilian counterparts.

Take Yasmeen, for instance, who shares her story of recovery on Make the Connection, an online resource designed to connect Veterans, their family members and friends, and other supporters with information, resources, and solutions to issues affecting their lives. Yasmeen served in the U.S. Navy from 2005 to 2011. While working on a ship during her deployment, she witnessed a tragic event. She knew there was no time to process, she still had to go out there and do the job at hand.

Surviving was only part of her battle. Suppressing those emotions and traumatic experiences from her deployment took a toll. After returning home, she found that she struggled with anxiety, emptiness, hopelessness, and guilt. She recalls, "I didn't smile, I didn't show emotions, I didn't trust nobody, I was secluded, I was...numb, I just didn't care. I didn't want my kids to suffer with me."

Yasmeen finally hit a breaking point and thought about taking her own life. She realized during that dark hour that this was not how she wanted things to end. She had to take a step forward to make a change – she had to ask for help. She turned to VHA for help and has worked with psychologists to cope with her experiences, grief, guilt, and emotions. Yasmeen has slowly and surely come back to feeling like herself and even her son has recognized the changes. She has since taken on new challenges, like going back to school and connecting with a community of Veterans on campus.

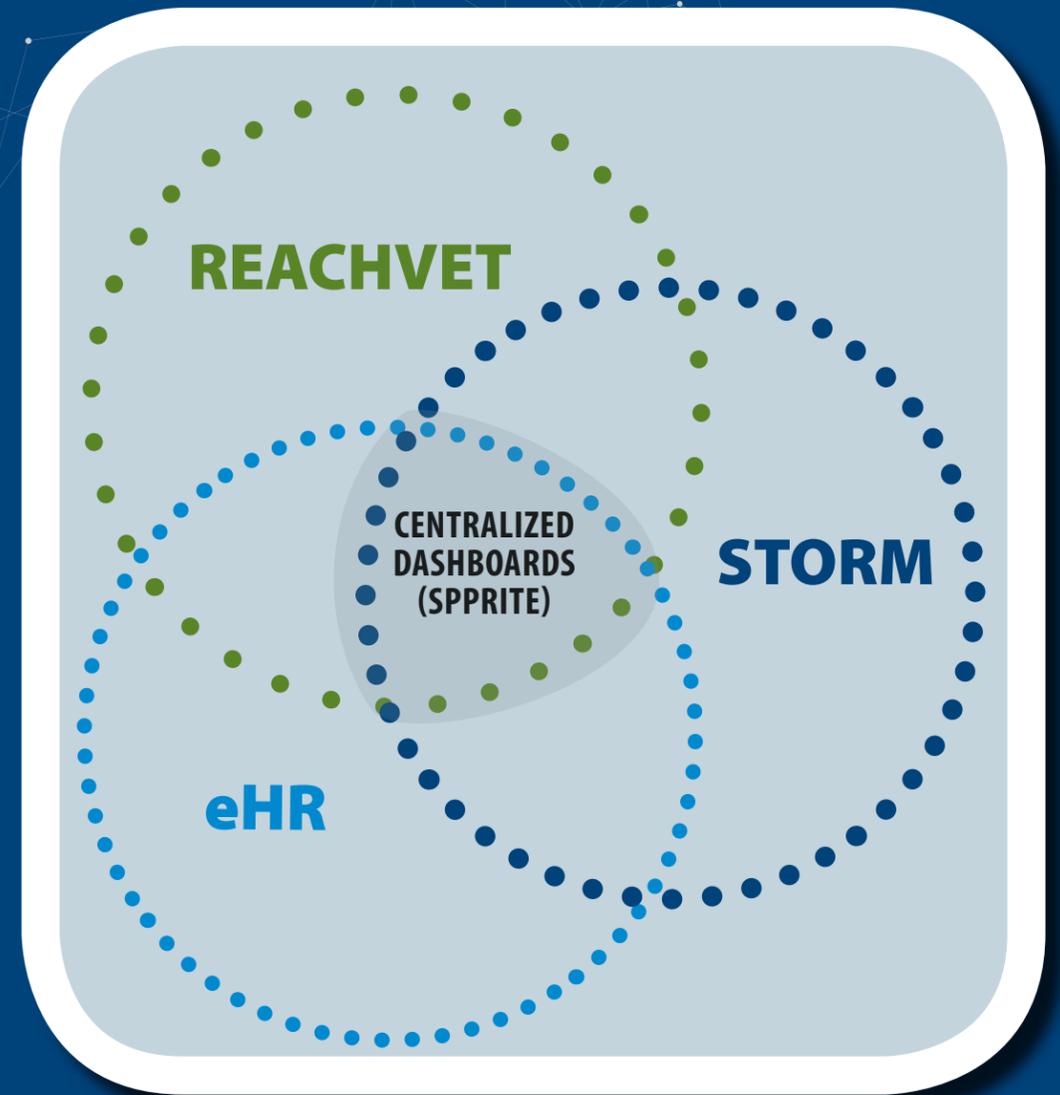
Yasmeen recognized on her own that she needed to make a change, that she could be vulnerable and ask for help. What about the other Veterans – the ones that do not change their mind, do not seek help, or do not



use VHA services? VHA believes that one Veteran suicide is too many. We must actively reach out to Veterans at high-risk for suicide.

The Office of Mental Health and Suicide Prevention has taken many steps to support Veterans with suicidal thoughts. One of the most innovative solutions is Suicide Prevention Population Risk Identification and Tracking for Exigencies (SPPRITE), a centralized provider-facing dashboard that displays multiple populations of Veterans, and their risks, together, to identify suicide risk and prevent Veterans, like Yasmeen, from falling through the cracks.

SPPRITE enhances existing databases by identifying and tracking Veterans' suicide risk levels comprehensively across existing databases, providing informative details on risks, behaviors, and care. SPPRITE is designed to allow clinicians to review and address suicide risk across their patient populations, enabling them to proactively address needs of the patients they treat, rather than wait for the patient to come to them seeking care.



SPPRITE helps VHA reach more vulnerable Veterans, faster. It increases their reach to:

- Veterans recently discharged from active duty
- Veterans without an assigned medical provider
- Veterans in care at other facilities that might not have mental health services

SO HOW DOES SPPRITE DO IT?

SPPRITE critically identifies and tracks data for populations of Veterans identified at high-risk for suicide to better visualize information and make decisions. It combines the following data:

- REACHVET** - Predictive modeling identifies Veterans at high statistical risk for suicide and other adverse outcomes and provides caring outreach
- Electronic Patient Medical Record (eHR)** - National data on risk screening and evaluation, suicide behaviors, and treatment engagement guides decision-making on suicide-related preventative

interventions

- STORM** - Predictive modeling estimates risk of adverse Veteran outcomes relating to opioid use and provides information for decision-making. This helps estimate risk of adverse Veteran outcomes relating to opioid use.

As use of SPPRITE spreads, clinicians are finding new and creative ways to engage specific populations of high-risk Veterans in care. The data enables VHA clinicians and staff members to spend less time identifying Veterans who need care, and more time finding at-risk patients and proactively reaching out to Veterans when they need it.

If you are a Veteran in crisis — or you're concerned about one — free, confidential support is available 24/7. Call the Veterans Crisis Line at 1-800-273-8255 and Press 1, send a text message to 838255.

VETERANS SIGNALS

VSignals captures Veteran Experience in real time to measure moments that matter, including deploying advanced analytics techniques using Artificial Intelligence (AI) to identify at-risk Veterans.

Do Veterans trust VA to fulfill the nation's promise to them? What moments matter most to Veterans? Can we predict the needs of Veterans five years from now? Two years ago, the answers to these questions were nearly impossible to analyze. It is this relentless curiosity to learn more about Veterans' experiences that inspired VSignals.

VSignals is a customer experience measurement (CxM) capability that combines human insights, measurement, and machine intelligence to analyze Veterans' experiences, at-scale and in real-time. This platform is used to deploy, collect, and analyze insights from Veterans, Caregivers, Family Members, and Survivors to inform opportunities for short-term service recovery and long-term systems improvement. Through artificial intelligence (AI), VSignals categorizes VA patient feedback and allows VHA stakeholders to immediately identify in real-time (1) concerns, (2) compliments, (3) recommendations, and (4) emerging trends (predictive analytics using AI). The platform also uses artificial intelligence to identify those who may be at-risk of suicide or homelessness from free-text comments in the surveys. These comments are reviewed by VA staff and routed to the National Call Center for Homeless Veterans or Veterans Crisis Line for resolution.

This highly analytical tool is powered by an unexpected ingredient: empathy. The process begins with design thinking, which takes a people-first approach to designing solutions. Techniques, such as face-to-face interviews, help identify moments that matter most to Veterans when receiving care at VA and informs survey design. As these surveys are completed, VSignals uses this data to provide insight at the local, Veterans Integrated Service Networks (VISN), and national level. VSignals, in many ways, embodies putting the voice of the Veteran at the forefront.

16.5M

SURVEYS SENT TO VETERANS

3M

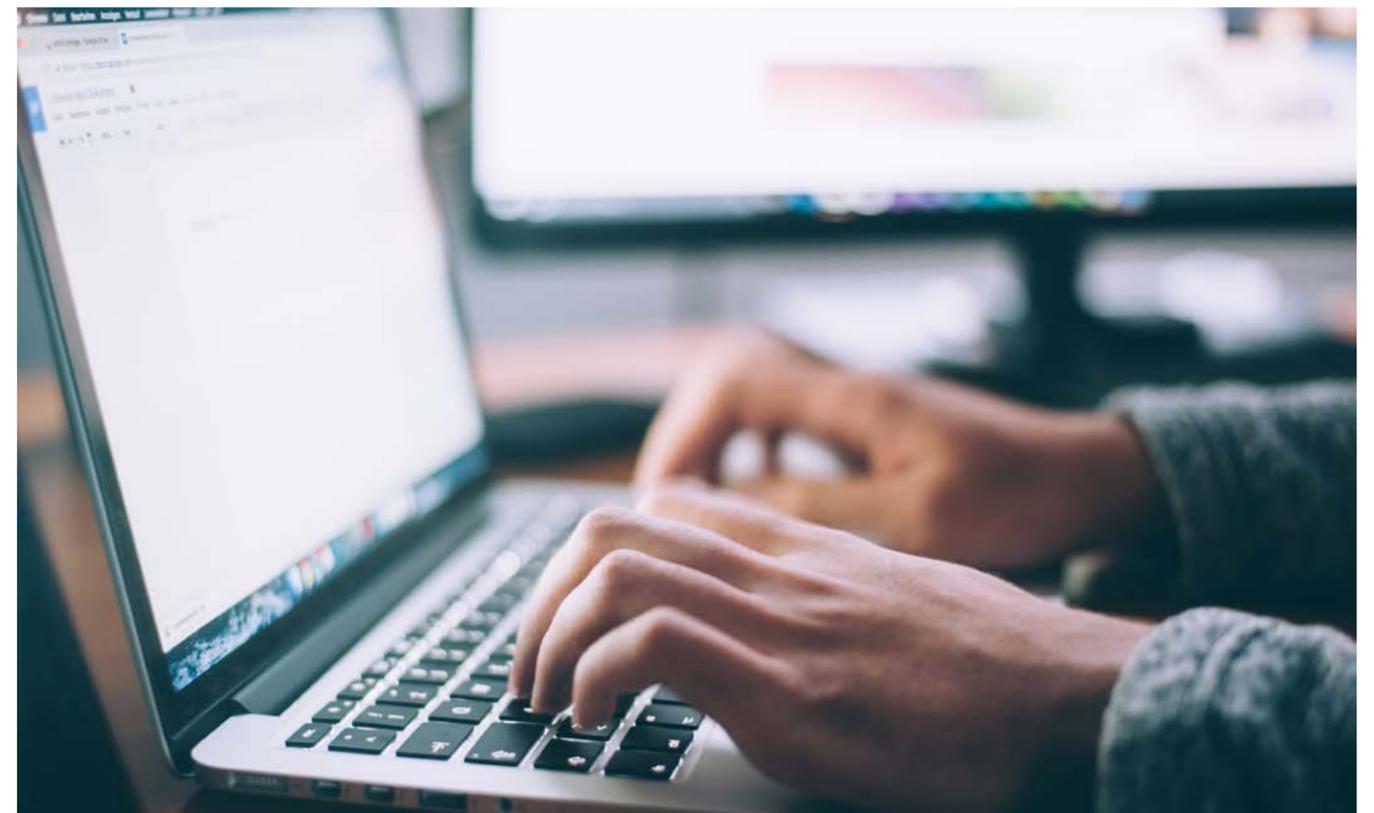
SURVEYS RETURNED, INCLUDING 1.5M WITH FREE TEXT

72%

REPORTED TRUSTING VA, UP FROM 58% THREE YEARS PRIOR

GOOD NEWS STORY:

In May 2018, comments such as "I actually had to miss an appointment once because all [parking] lots were full" appeared in Veteran Signals, in reference to a VAMC's parking system. After reviewing this data in VSignals, the VAMC was alerted about issues regarding parking availability and accessibility and implemented the necessary enhancements. Soon after, comments such as "I like the new parking, makes less traffic and easier to get in and out" and "They took care of the parking issues, thank you!" appeared in the survey responses. By aggregating patient experience data 150 days prior to and after implementation of parking improvements, overall trust scores were increased by 8% among Veterans who commented on parking issues. This is one of many examples that demonstrates how actionable feedback can transform how Veterans interact with VA, in both big and small ways. Because all [parking] lots were full" appeared in Veteran Signals, in reference to a VAMC's parking system.



VHA OFFICE OF PATIENT CENTERED CARE AND CULTURAL TRANSFORMATION

“GO ON. WE PROMISE WE ARE LISTENING...”

VHA’s implementation of Whole Health provides Veterans care is personalized, proactive, and centered on what matters.

Judy Thedford served in the Air Force from 1979 to 1992. After many years of active duty experiencing and seeing the effect of war on herself, her friends, and her family, Judy was extremely depressed and anxious after retirement. Judy felt on edge when meeting new people, stayed away from constrained areas such as hallways, dim light, and corners and did not even feel comfortable walking to her bathroom to get a cup of water at night. The compounded fear, anxiety, and depression were so paralyzing that Judy attempted to take her own life.

Realizing she needed help, Judy came to VA for help with severe, chronic migraines and was later diagnosed with post-traumatic stress disorder.

For Judy, the road to healing was not centered around a trial and error approach to prescriptions but rather began with a Whole Health approach, where questions such as “What matters most to you?” took center stage. Together, Judy and her care team created a health plan with her values at the forefront. This included registering Judy in a whole health course via telehealth, and certifying her dog, Sadie, as a service dog to help manage anxiety.

What does Judy’s life look like today? Judy wakes up in the morning, feels comfortable in her own house

and skin, and continues her journey to recovery with a community of supporters that understand her needs and emotions. She credits her healing to the whole health program and expressive writing therapies she participated in.

Success stories like this - no matter how big or small - matter. They show that VHA is committed to providing Veterans with the best care, which means providing care that is personalized, patient driven, and empowering. As seen in the image, Whole Health is centered around you and integrates Whole Health with Community, Self-care, and Professional Care. We aim to encourage Veterans to take initiative in planning and executing their health goals with the support of their care team. For Judy, her care began with a conversation about her goals versus her symptoms, as in a traditional medical model. Through the Office of Patient Centered Care and Cultural Transformation (OPCC&CT). This is an innovative approach to caring the whole person instead of addressing one symptom at a time.

Because of these efforts, Veterans now have access to alternative health therapies such as tai-chi, acupuncture, yoga, and art therapy to treat both their physical and invisible wounds in their health plan.



PARTNERSHIPS IN ACTION:

In 2012, OPCC&CT explored this uncharted model by setting up Centers for Innovation across the enterprise and crowd-sourced research proposals from the field. Today, OPCC&CT has established a replicable whole-health clinical care model, robust training programs, mobile applications, outreach opportunities, and 18 Whole Health Flagship sites practicing this model. The program identified 37 new sites and are actively engaged in the next wave of facilities to participate in the Learning Collaborative model to advance Whole Health implementation.



YMCA: Partnerships throughout the nation to provide local Whole Health resources for Veterans via an established Memorandum of Agreement (MOA).



Americans for the Arts: MOA to expand community partnerships that support Veteran participation in the Arts and Humanities. A national training event is planned in collaboration with Americans for the Arts.

KEEPING VETERANS SAFE BY IDENTIFYING THE “WHY”

From the recall of children’s toys due to choking hazards, to deaths attributed to vaping, safety and the risk of inadvertent harm is an issue that permeates every sector. In the same way, patients can face risks outside of their health conditions. VHA National Center for Patient Safety (NCPS), part of the VHA Office of Quality, Safety, and Value, aims to reduce and prevent inadvertent harm to patients as a result of their care. NCPS researches and deploys specific tools, strategies, practices, and toolkits that can be adopted to substantially reduce risks for Veterans.

To help illustrate what can go wrong in a hospital setting, NCPS cites the example of a routine procedure where a

nurse needs to flush a patient’s catheter with a blood thinner, heparin.

Heparin is stored in a cabinet with multiple medications and vials, including a relatively weak heparin solution and one that is considerably stronger. While the vials are labeled and the concentrations are listed, other factors may cause errors, including similar labeling and packaging, fatigue, urgency, volume of patients, distractions, the list goes on. Rather than focusing on those responsible for mistakes, NCPS employs an approach that reviews the chain of events and current systems and addresses where and why an error occurred. NCPS has deployed three innovations to help identify the



‘why’ and ensure risks and issues like this are addressed: Patient Safety Centers of Inquiry (PSCIs), NCPS High Reliability Hospital of the Future Project, and the Alerts and Recall Closed Loop Communication System.

PATIENT SAFETY CENTERS OF INQUIRY (PSCIS)

PSCIs, currently at 10 VA Medical Centers, research, develop, disseminate, and implement clinically relevant innovations that improve patient safety at hospitals across VHA. PSCI implements innovative initiatives that have led to key improvements in staff simulation trainings, suicide prevention strategies, safe patient handling and movement, proper use of medical devices such as catheters, falls prevention and management, and the prevention of prolonged use of opioids following surgery.

HIGH RELIABILITY HOSPITAL OF THE FUTURE PROJECT

In January 2019, NCPS completed the three-year implementation of the High Reliability Hospital of the Future project at the Harry S. Truman Memorial Veterans’ Hospital in Columbia, MO. The project brings an innovative approach to patient safety that focuses on leadership engagement, frontline staff training and awareness, and the implementation of Just Culture principles, encouraging staff to continuously analyze, report, understand, and better serve Veterans.

ALERTS & RECALL CLOSED LOOP COMMUNICATION SYSTEM

NCPS’ Alerts & Recall Closed Loop Communication System is an innovative dashboard that integrates the capabilities of four web-based reporting applications to increase safety and mitigate risks for Veterans. The dashboard is operational across all VA Medical Centers, impacting patient safety for over 5.85 million Veterans to date, a scale unrivaled in the private sector. The system allows VHA to learn about, investigate, analyze root causes, communicate actions, and issue the removal of items capable of causing harm to Veterans from unsafe medical devices, products, pharmaceuticals and food in VHA healthcare facilities.

NCPS recognizes that while the rates of adverse events may never reach zero, there are specific tools, strategies and practices that if adopted will substantially reduce risk for Veterans. In implementing these and other innovations, NCPS is taking clear and specific steps to infuse high reliability practices and persistent mindfulness that results in the best and safest care for Veterans.

ACCOMPLISHMENTS

Decreased rate of suicide completion by inpatients at VHA mental health facilities decreased by 82%

Mental Health Environment of Care Checklist

NCPS removed 2,973,035 defective or recalled medical products from VHA facilities shelves

National Center For Patient Safety 2018

NCPS posted 750+ recalls for devices, drugs, food, software, and other products

National Center For Patient Safety 2018

**“YOU CAN INVENT
ALONE BUT YOU
CAN’T INNOVATE
ALONE.”**

- GIJS VAN WULFEN

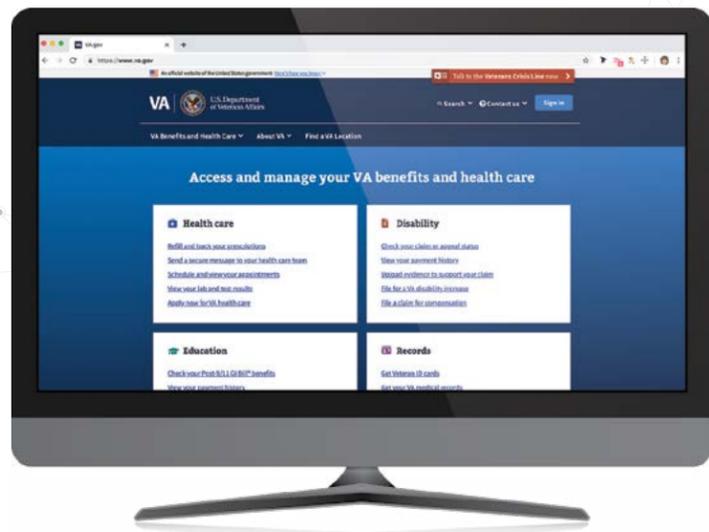


INNOVATION THROUGH PARTNERSHIP

DELIVERING MORE TOGETHER

Innovation through partnership promotes health care ingenuity and VHA embraces Veteran care as a team sport. Collaboration ensures diverse capabilities, integrated technology, and interdisciplinary thinking continually inform each Veteran solution.

MAKING THE LATEST TECH MORE ACCESSIBLE TO VETERANS



The Office of Information and Technology (OI&T), Veterans Experience Office (VEO) and United States Digital Services at VA (USDS) partnered to revamp VA.gov to centralize the functionality mostly commonly used by Veterans.

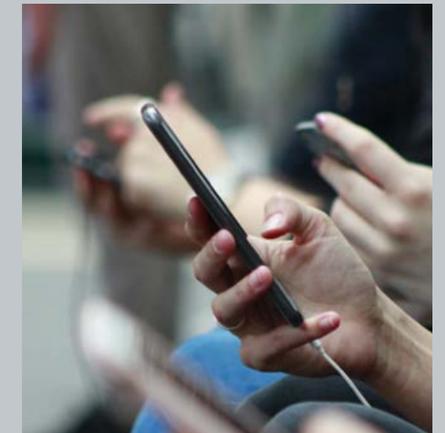
VA is continually evolving to deliver high quality, technologically advanced health care to Veterans. The process began when OI&T, VEO, and U.S. Digital Services at VA joined forces, implemented design thinking practices, and gathered user-feedback from over 5,000 Veterans, their families, and caregivers. The team leveraged this data to target common pain-points and ultimately create a personalized digital experience for Veterans. The new website homepage prioritizes the top 20 tasks of 80% of its Veteran users and provides Veterans with a personalized dashboard that summarizes the medical services they are currently receiving.

The 2018 relaunch of VA.gov was a triumphant modernization effort to ensure VA's digital experience aligned with the services Veterans needed to readily access. Solving for Veteran pain points and vastly improving the user experience of their medical dashboard, this redesign enables Veterans to easily navigate to the most used functions, such as scheduling an appointment, messaging a provider, or filing a claim.

PUTTING VA DATA TO WORK

Between smart watches, smart phone applications, and electronic health portals, many technologies enable individuals to better monitor their health. Through external partnerships, Veterans can access these same groundbreaking health technology solutions.

Application Programming Interfaces (APIs) developed by OI&T, allow technical innovations to be co-designed with external partners and implemented throughout the VA enterprise at increased speed. Imagine sitting at a table with a menu of choices from which to order. The API is the messenger that takes your order or request and tells the system—the kitchen—what to do. The API then delivers the response back to you, just as wait-staff delivers food from a kitchen. APIs allow VA internal systems to communicate with approved, external technical solutions.



iOS INTEGRATION

VA teamed up with Apple to make Health Records available for over 9 million Veterans through the iPhone Health app by late 2019



ANDROID INTEGRATION

VA is working closely with Samsung to enable Veterans access to their health records



MADE POSSIBLE BY VA LIGHTHOUSE INITIATIVE

VA Lighthouse Initiative organizes a library of APIs. Through this library, external partners can ensure their solutions will communicate correctly with VA informational systems. The main goal Lighthouse is to improve Veterans' lives by granting them access to VA and Veteran data and control how that data shared with third parties.

In the last year, VA launched a developer portal and APIs for: benefits submission and tracking; navigation to and information on VA facilities; electronic verification of Veteran status on commerce, job and third-party benefit websites; and better access to and visibility of Veterans' health information, ranging from allergies, diagnostic reports and lab results to medications, procedures and more.

FedHealthIT Innovation Awards recognized Lighthouse as a top information technology innovation in the Federal government.

VHA CARE & TRANSFORMATIONAL INITIATIVES



Care & Transformational Initiatives (CTI) seeks to build a collaborative innovation community external to VA with academic, industry, non-profit, and other government partners to co-develop innovative solutions. CTI is focused on testing and refining innovative care models and transformational initiatives that can meaningfully scale to impact Veterans. CTI has six priority areas, and the examples below detail portfolio active efforts in each of these areas.



PRIORITY AREA: CARE MODELS **PROJECT: LINK HF**

VA is committed to reducing Heart failure (HF) readmissions, as HF is a major health burden for Veterans and 80% of HF costs result from hospitalizations. In a pilot study at multiple VA medical centers, telemetry with a small wearable sensor accurately detected impending readmission for HF. LINK HF integrates remote cardiac monitoring with a predictive analytics algorithm to collect patient data and generate clinical alerts. A clinical response algorithm will suggest follow up actions including medication changes and outpatient assessments for the Veteran. VHA hopes to implement LINK HF, as this technology shows tremendous potential in VA environments and offers exciting opportunities to improve HF care and additional chronic conditions.

PRIORITY AREA: PRECISION MEDICINE **PROJECT: GENOMIC LABORATORY INFORMATION MANAGEMENT SYSTEM (GLIMS)**

Integrating GLIMS and Cerner's PathNet/Helix software solution allows VA laboratories to study mutations in genes and expand molecular testing within VA Medical Centers (VAMCs). Connecting VA laboratories to the Cerner Reference Laboratory Network (RLN) allows VAMCs to order and report complex test results electronically as structured data. This investment in a GLIMS will improve the quality of cancer care for Veterans by expanding access to genomics testing and capturing data that can be analyzed and measured. The end result will enable oncologists to recommend targeted therapy designed to attack specific mutations within a Veteran's tumor.

PRIORITY AREA: IMMERSIVE TECHNOLOGY **PROJECT: STRONGMIND**

SoldierStrong is a non-profit dedicated to improving the lives of our nation's heroes. CTI is partnering with SoliderStrong to make their StrongMind technology available in select VA Medical Centers to improve Veteran mental health. With this virtual reality-based PTSD treatment, Veterans wear headsets where providers recreate traumatic scenes to place them in the driver's seat of a vehicle, generate explosions, or make helicopters fly overhead. StrongMind has the potential to improve clinical outcomes, reduce stigma surrounding PTSD, and empower Veterans to face experienced traumas with medical providers. A provider recounted an experience with former Marine Chris Merkle who stated, "You're completely immersed in that moment...You don't get that normally unless you're in a really, really deep therapy session," when using StrongMind after serving in Iraq and Afghanistan.

PRIORITY AREA: ARTIFICIAL INTELLIGENCE **PROJECT: HEALTHGOV.AI**

CTI convened VA, Defense Health Agency, Defense Innovation Unit, Department of Health and Human Services, and Food and Drug Administration for an inaugural healthGov.AI Roundtable on interagency Artificial Intelligence (AI) health care efforts. The group will crowdsource impactful clinical use cases from DHA and VA for an AI challenge to generate targeted solutions for critical Veteran medical needs. The AI Roundtable served valuable in scoping and prioritizing chronic conditions to pursue in a future AI Challenge. The end state goal is to design and execute an AI Challenge that galvanizes academia and industry in support of solutions that are innovative, scalable, and able to integrate into the downstream clinical workflow. These solutions will benefit both Active Duty Military and Veterans in support of the longitudinal health record.

PRIORITY AREA: VETERAN-FACING SOLUTIONS **PROJECT: OPTIMAL PSYCHOLOGICAL TREATMENT INTERVENTION**

"They haven't been through what I've been through, or seen what I have seen," one Veteran said. Optimal Psychological Treatment Intervention is an evidence-based behavioral technology to promote and protect mental health through 5-10 minutes of daily activity. VHA developed this solution and is organizing a pilot study. The e-learning platform offers mental health exercises and connects Veterans with their most trusted resource, each other, to privately share experiences, ask questions, and receive support. Optimal Psychological Treatment Intervention customizes terminology for Veterans and continually adapts content to individual preferences through its Intelligence Engine.

PRIORITY AREA: 3D PRINTING **PROJECT: VHA 3D PRINTING NETWORK**

See page 64 for more information on the VHA 3D Printing Network.





SHANE ELLIOTT

Associate Director, VA Loma Linda Healthcare System

Shane Elliott is the Associate Director for Administration at the VA Loma Linda Healthcare System, where he provides executive leadership to multiple services to ensure safe and efficient operations. Shane has always looked for better, more inclusive ways to innovate for Veterans. With his passion and extensive background in information technology, as a former VA Chief Information Officer (CIO), he has led several innovation projects to modernize VA systems. Currently, he is leading the VEText program that brought text message appointment reminders to all VA medical centers in FY 19. The program is now working to implement Open Slot Management (OSM) to offer earlier appointments to Veterans scheduled in the future.

SHANE'S INGREDIENTS FOR A GREAT TEAM:

Trust
Creating trust and respect in the team is important. It helps everyone be open and honest about what ideas will best lead the team to success.

Accountability
Set clear responsibilities for each task and hold individuals accountable to putting their best foot forward.

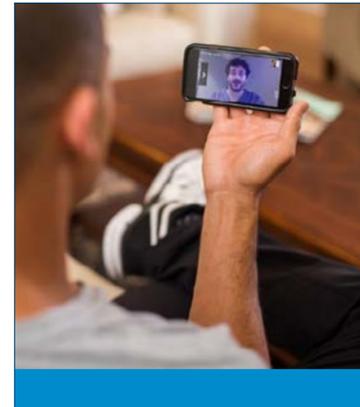
Equality
Successful teams lead together. Encourage all to participate and value these contributions.

Courage
Depending on how the project evolves, be willing to try new ideas, take calculated risks, fail or be told no, and start all over again.

Advocacy
We must be dedicated to the mission of VA in alignment with leadership priorities and Veterans' needs.

Diversity
Bring in a variety of subject matter experts, front line employees, and Veterans to ensure the solutions provide desired impact and value.

TELEHEALTH SOLUTIONS



VHA Video Connect links Veterans with their health care team from anywhere using any mobile or web-based device. This innovation has paved the way for expansion of video telehealth services into Veterans' homes. Committed to mitigating the digital divide, VHA Telehealth's ATLAS (Advancing Telehealth through Local Access Stations) initiative offers care options for Veterans without broadband connectivity or a device at home. ATLAS partnerships with Walmart, VFW, and American Legion are in their initial phase of providing space, equipment, and connectivity into Veterans' home communities.

The application of telehealth in the context of an emergency or disaster has also leveraged the VHA Video Connect app. In 2017, VHA organized emergency outpatient clinics in response to Hurricane Harvey, facilitating virtual health care appointments for Veterans. An Army Veteran found himself without his antibiotics, wading through the muddy, waist-high waters of Hurricane Harvey, with an infected foot ulcer. The Veteran needed to speak with a clinician who could analyze his wound and prescribe appropriate treatment. VHA's mobile telehealth technologies enabled Dr. Leonie Heyworth in San Diego, California, to provide the Veteran with the real time medical attention and empathetic support he needed.



Thanks to the Office of Connected Care, telehealth solutions such as the app, VHA Video Connect, are extending access to care beyond the traditional office visit. Rural Veterans, and those facing long commutes, geographical barriers, natural disasters, and traumatic injuries or health conditions restricting travel can receive clinical consultations on their mobile devices. VHA currently provides telehealth services at more than 900 sites across the country in over 50 areas of specialty care. VHA Video Connect connects Veterans to their providers in real time using encryption to ensure a secure session and a camera on a phone, tablet, or computer. Veterans with conditions restricting travel can receive clinical consultations on their mobile devices. For Veterans without their own device, VHA has a loaned tablet program which has supported Veterans like Marine Sergeant Bruce Grammar, a Purple Heart recipient who lives over 70 miles away from his closest VA Medical Center, and has difficulty traveling due to his limited mobility.

PARTNERSHIPS IN ACTION

The Office of Connected Care is working to facilitate partnerships that will further enhance Veteran access to virtual care and shape the future of health care. Major telecom providers Sprint, T-Mobile, and Verizon have partnered with VHA Video Connect to allow Veterans and their caregivers to use the app without incurring data charges. VHA is also partnering with organizations like Philips and Walmart through ATLAS, part of VHA's Anywhere to Anywhere Telehealth initiative, to increase the availability of rural telehealth access points for Veterans.



THIS IS HOW WE DO IT: THE SECRET SAUCE TO INNOVATION SUCCESS

Kristopher “Kit” Teague
Deputy Director, VHA Innovation Ecosystem

Innovation is not for the faint of heart. It’s downright tough, especially in a dynamic field such as health care where clinical practice, technology, and the intersection of the two are in a seemingly constant state of flux. Couple that with the unique rigors of the Federal Government bureaucracy and you have found the sweet spot in which VHA attempts to innovate. Easy right?

Day in, day out, our employees work tirelessly to deliver the best possible care to our nation’s Veterans in the United States’ largest integrated health system. All the while, attempting to take a step back from the day-to-day to ask, “How can we deliver innovation that will change and save Veteran lives?”

Like I said, innovation is tough, but for us in VHA, it’s so worth it. VA has the most noble mission, and I’m so fortunate to have the opportunity to give back to those men and women who have given so much for their country and their communities, to serve those who served. I feel the work I do with VHA Innovation Ecosystem is absolutely critical to the bottom line of changing and saving Veteran lives. Whether it’s a data scanning algorithm like ReachVET that helps us better identify Veterans at risk of suicide, a self-leveling walker that provides new mobility for Veterans, or the Rapid Naloxone Initiative that has saved over 100 Veteran lives to date, innovation in VHA is very much possible, but it’s not a given. It takes persistence, it takes resourcefulness, it takes grit, and most importantly, it takes a zealous adherence to a set of shared principles and a simple framework for innovation success. Let me share with you VHA’s secret sauce to innovation success.

SHARED PRINCIPLES FOR INNOVATION SUCCESS

1. EMPOWER THE FRONTLINE: It is no secret VHA’s best and most innovative ideas most often come from our frontline employees. They are on the ground at VA medical centers throughout the country serving

Veterans on a daily basis. The frontline knows what Veterans want and need, they know the VHA system, and it’s with this unique perspective that they are best positioned to identify innovative solutions to some of VHA’s most pressing challenges. To empower this frontline army, we provide a transparent outlet for employees to share their ideas with VHA leadership, the resources (time/funding/support) to pursue solutions, and the competency (mentorship/training) to deliver results. These innovation leaders and workforce of the future are empowered to challenge the status quo and truly transform Veteran care.

2. BUILD A NETWORK: It was John Donne who coined the phrase, “No man is an island.” This truth is evident when it comes to innovation. We can’t do it alone, and if we can, the result is almost certainly not as good as what we could have collectively delivered together. Therefore, it’s important to build a strong, diverse network of kindred spirits in innovation. To build this network, we encourage employees to cast their net wide to include innovation champions both internal and external to VA. Collaborations and partnership with academia, industry, nonprofits, and other government agencies can serve as force multipliers and will help build both the culture and capacity for innovation. We can truly deliver more, together.

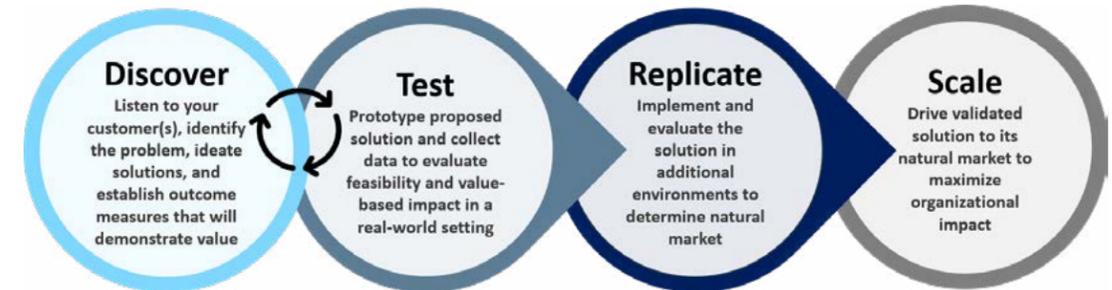
3. FAIL FORWARD: Test small, fail small and scale big is the innovation mantra to live by. In the early stages of innovation, failure is healthy and should be celebrated as a rite of passage for pushing the boundaries of the possible. It is how we learn what works, and what doesn’t, before we invest a sizable amount of resources into scaling a solution. Failure should not be treated as a dirty word as it’s those low cost, early stage failures that help us avoid multi-million-dollar boondoggles that waste taxpayer dollars and deliver little to no value to Veterans. In this vein, we provide safe harbor environments that encourages innovators to take calculated risks and explore their passion for truly innovative Veteran-centric

solutions that change the face of health care.

4. LET THE NORTHSTAR BE YOUR GUIDE: I can’t stress how important it is to know, and follow, the Northstar. For innovation in VHA, the Northstar is **Changing and Saving Veteran Lives**. It is why we are here and guides every innovative opportunity we pursue. Innovation for the sake of innovation is not helpful and wastes already finite resources. We continue to remain focused on mission-driven innovation that improves the Veteran experience through advancements in care delivery and services. This is the only way we can truly enable the discovery and spread of health care innovation that exceeds expectations, restores hope, and builds trust within the Veteran community.

FRAMEWORK FOR INNOVATION SUCCESS

This next part is a bit more on the practical side of innovation. Although it may not be as exciting as some of the other things I have discussed in this piece, it’s no less important. I know many of you may have heard Stephen Covey’s imperative, “Begin with the end in mind.” To successfully scale innovation, no words could be more true. First things first, you’ve got to know where you’re at in the innovation lifecycle, and next, you’ve got to know where you’re going and what it takes to get there. To this end, VHA Innovation Ecosystem developed a common framework by which innovators from across VHA could understand and successfully scale innovation. We refer to it as the **VHA Innovation Operational Model**.



Developed in collaboration with both internal and external thought leaders in the field of health care innovation and informed by lessons learned, the model allows VHA to enable grassroots and strategic innovation to advance through the organization by following a structured, repeatable, outcomes-driven process. The model illustrates innovation as a lifecycle with 4 distinct phases, Discover, Test, Replicate and Scale. Each idea in the pipeline can enter and exit through any phase and may not always move through in a linear fashion. The model is flexible enough to allow for iteration while still providing a standardized way to measure the impact of each innovation. We believe it provides just the right amount of structure without stifling agility or creativity. Give it a shot. We think you will agree. Now, go out there and innovate.



ABOUT KIT TEAGUE

Kristopher “Kit” Teague is the Deputy Director for VHA Innovation Ecosystem aligned under the Office of Discovery, Education, and Affiliate Networks (DEAN), in the Veterans Health Administration within the U.S. Department of Veterans Affairs. He is responsible for overseeing operations for VHA Innovation Ecosystem to include the innovation activities of four (4) distinct portfolios: Innovators Network, Diffusion of Excellence, Care and Transformational Initiatives, and VHA Innovation Community. Kit has proudly worked at all levels of VA (local, regional, national) over the past 16 years and has over 19 years of experience in the health care industry between his time in the private sector and VA.

THE FUTURE IS NOW

**“THE BEST WAY
TO PREDICT
THE FUTURE IS
TO CREATE IT.”
- DR. ALAN KAY**

Innovation never sleeps because there is always more we can do to serve our Veterans. VHA is at the cutting-edge of health care and is building novel technologies to ensure Veterans receive tomorrow's solutions today.

BETH RIPLEY

Radiologist, Puget Sound VA Medical Center
Chair of VHA 3D Printing Advisory Committee
Senior Innovation Fellow, VHA Innovation Ecosystem

JOURNEY WITH 3D PRINTING

Below are key milestones for the 3D Printing Network Initiative. See more on page 64 for more information.

APRIL 2017

Partnered with Stratasys to place 3D printers in 5 hospitals, for a total of 8 hospitals with 3D printing technology; Launched the VHA 3D Printing Network, the first and largest integrated hospital-based 3D printing network in the country

NOVEMBER 2017

Chartered the VHA 3D Printing Advisory Committee which advises central office on 3D printing best practices, policies, and strategies for implementation.

NOVEMBER 2018

Partnered with GE Healthcare to accelerate use of 3D printing in health care through integrated software solutions; Expanded capabilities to 20 hospitals through investments from the VHA Innovators Network and field-level leadership.

APRIL 2019

Convened a VHA 3D Printing Advisory Committee off-site, resulting in recommendations for a growth and sustainment strategy to support a comprehensive 3D printing infrastructure.

Beth Ripley MD, PhD is both a radiologist and a technologist. When she is not serving Veterans, she is translating medical imaging into virtual and 3D printed models with the goal of changing the way doctors and Veterans understand and treat disease. This has led Beth into the role of Chair of the VHA 3D Printing Advisory Committee and is the national lead for the VHA 3D Printing Network Initiative as a Senior Innovation Fellow with the VHA Innovation Ecosystem.

In these roles, Beth strives to be a change agent for medical centers and infuse 3D printing technology into Veteran-care. With multiple disciplines of clinicians working together, medical centers can improve how medical imaging data is visualized, communicated, and used to provide better care. These methods improve the safety and quality of diagnosis and interventions such as surgery and minimally invasive procedures.



THIS JOURNEY DOES NOT END IN 2019.

Within 10 years, Beth believes that 3D printing will be an integrated part of how VA provides care to Veterans and will touch most aspects of medical practice. Today's 3D printing innovations are centered on routine care. Tomorrow's innovations will include bioprinting of vascularized bone, titanium metal printing, and other forms of printing we have yet to imagine!

HOW TO EMBODY BETH'S INNOVATION SUPERPOWER: AGILITY

BE AGILE WITH USERS

When developing a solution, you cannot assume what a user needs. I always try to first understand the user's requirements and expectations for the solution. This enables me to create the right solution. User-needs often change, and I must be flexible with how I pivot the solution.

My Lesson Learned: I learned the hard way. I once opened an imaging study and right away saw a mass in the kidney that I naturally assumed was what the surgeon was planning to operate on. I meticulously segmented and printed the kidney, only to realize during the handoff to the surgeon that he wasn't interested in the kidney - he was interested in a lesion in the liver. This was a very important lesson to not assume and clarify with the user what he or she expects.

BE AGILE WITH YOUR SOLUTIONS

A big part of solution development is creating an iterative process to rapidly build and gain feedback. My favorite mantra is "Share early and share often". The earlier you share your ideas, the more insight you can receive from others on creating a better solution.

My Lesson Learned: This concept is very different from my research background. For decades, I did work with basic science when pursuing my PhD in Neuroscience. At that time, researchers, including myself, would spend months individually working on projects. If we had shared ideas sooner, we could have iterated and come to the right solution faster.

BE AGILE WITH ROAD BLOCKS

No matter how much you plan there are always things you can't control and can't anticipate. What you can control is how you respond to these hurdles. Don't give up! Don't make excuses! See these moments as opportunities to be creative.

My Lesson Learned: I have seen this a lot. From printers crashing overnight to missed production deadlines and models breaking last minute; I hit road blocks. In these cases, I recognize the hurdle, assess the impact it will have for the user, and tread forward with enthusiasm.

"...you can't control [everything].
WHAT YOU CAN CONTROL IS HOW YOU RESPOND TO THESE HURDLES."



PROVIDING VETERAN-CENTRIC SOLUTIONS THROUGH CUTTING-EDGE TECHNOLOGY

Imagine a Veteran who notices a bump and pain in their jaw that worsens over time, making it increasingly difficult to chew. Imagine the Veteran's dismay, concern, fear, and questions when a clinician confirms it is a tumor and that the removal of the tumor may require a reconstructive jaw surgery. VHA staff and clinicians are looking to the future, embracing emerging technologies to improve the way that surgeons prepare for, inform patients about, and execute complex procedures. To alleviate some of stressors associated with this and other daunting surgical processes and health issues for Veterans, VHA innovators are turning to the cutting-edge capabilities and applications of 3D printing technologies.

WHAT IS 3D PRINTING?

Additive manufacturing, better known as 3D printing, is a manufacturing technology that allows you to make unique graspable items, adding to the object layer by layer. This type of manufacturing is used across industries including aerospace, automotive, and increasingly, in health care. VHA's 3D printing technologies allow clinicians and surgeons to layer 3D scans of a patient to create an intricate, anatomically accurate 3D printed model of a patient's heart, lung, spine, aortic valve...the possibilities are nearly endless.

3D PRINTING IMPLEMENTATION AT VHA

VHA is using 3D printing to respond to Veterans' health care needs on an individual level. Emerging 3D printing technology places a customized 3D model of a patient's jawbone in both the hands of a surgeon planning for an upcoming reconstructive surgery, and the Veteran, so they can better grasp and visualize their upcoming procedure. VHA clinicians are exploring a range of applications including customized same-day custom manufactured orthotics and prosthetics, custom insoles for diabetic patients, dental implant guides, and model organs and bones for pre-surgical planning. Clinicians are using model kidneys for patients with renal cancer, for example, allowing surgeons to better assess the patient's organ ahead of a surgery. Giving Veterans access to 3D printed replicas of their organs makes them more informed and in control of their health care. The ability for patients and surgeons to think about and plan for surgical cases is not only practical, it can help save doctors up to two hours in surgical time, which can equate to \$9,600 in cost avoidance for a hospital per case. Veterans also benefit from a decreased amount of



VHA Rehabilitation and Prosthetic Services are leveraging 3D printing capabilities to address Veterans' individual health care needs. Veteran, prosthetist, and 3D printing enthusiast, Gordon Bosker, and his team at the Audie L. Murphy VA Hospital in San Antonio, are using 3D printing equipment and software to print, test, break, and rebuild stronger prototypes of lower extremity prostheses, which can bear the weight and activities of patients. VHA clinicians and technical experts are working to ensure 3D printed lower extremity prostheses will be safe and high performing for Veterans once they are adopted into clinical practice. The team is adapting prosthetic prototypes as improvements in technology and techniques arise, incorporating higher performance materials with variable properties in strength, weight, and flexibility. As part of the research and development process, Veterans have been able to test-fit the customized 3D printed prosthetics. Veteran Arnold Garcia was able to successfully test out his prototype limb on a seven-mile hike at Government Canyon in San Antonio.



Patients like Army Veteran, Mark Gehrke, have one more reason to smile. Mark, who was missing his teeth and suffered from significant bone problems in his upper jaw, received four dental implants thanks in part to 3D printing technologies. His dentist at the Minneapolis VA Healthcare System, Dr. Christopher French, used an oral scan and a 3D printed model of Gehrke's upper jaw to plan the placement of the implants. The addition of 3D printing and scanning technologies in dentistry have allowed for an increase in surgical guides, casts, and medical models, delivering faster, more efficient dental care to Veterans.

3D PRINTING AT VHA

time under anesthesia, and an increased availability in operating rooms.

3D PRINTING OF TODAY AND THE FUTURE AT VHA

VHA 3D printing innovators have an ambitious goal: for every VHA medical facility to have access to 3D printing services. The road to this reality is already underway, with the organization of an integrated VHA 3D Printing Network comprised of facilities with 3D printing capabilities that can share expertise and ideas, solve problems, implement and diffuse innovations, and pool resources. VHA 3D printing leaders have also established a 3D Printing Advisory Committee to ensure best practices and safety of 3D printing applications across VHA. In looking towards the future, VHA is also currently

exploring bioprinting, to fabricate vascularized, living bone. VHA Innovators have a vision to bring a bioprinting program to the enterprise, capable of fabricating a variety of patient-specific tissues and organs.

From the simple to the complex, 3D Printing innovations are enhancing VHA's ability to serve and create impactful solutions for Veterans. What started with VHA innovators questioning and exploring the possibilities of 3D printing, has now evolved into VHA as a leader in the implementation of 3D printing technologies as a means of delivering customized health care solutions, with much more on the horizon for the future.

When a Veteran named Newton started getting pangs of pain and muscle spasms in his fingers six years after his pinky finger was amputated for complications from combat injuries, he turned to his VHA for help and a 3D printed hand orthotic. Occupational therapist Mary Matthews-Brownell at the Puget Sound Healthcare System bends, shapes, and creates custom orthotics to help Veterans do what they love, even after injuries, health conditions such as diabetes, and amputations. Veterans like Bob Crouch, whose thumb was amputated in a household accident, can work with occupational therapists to co-create a 3D printed solution that can get him back to his favorite hobby, playing video games. Thanks to 3D printing, VHA occupational therapists can use 3D scans and printers to manufacture custom-orthotics with same-day fitting and delivery, saving time and avoiding long travel distances.



"It's whatever Veterans are passionate about, that's what it is all about. Whatever it is they want to do, I want to help them do it." - Mary Matthews-Brownell

The next frontier for VHA is bioprinting, the creation of 3D printed structures that can support living cells. VHA surgeons identified a need for the creation of living bone, which could be used in the future to replace a piece of a patient's bone that is lost to trauma, infection or a tumor. Take, for example, the patient who needs reconstructive jaw surgery after a tumor is removed. Bone grafts from a patient's ribs or fibula are currently used for these surgeries. Bioprinting can dramatically alter this process in the future. While still in the research and development stage, the VHA bioprinting team has successfully printed a segment of the jaw out of bone material. The next steps are to demonstrate that the printed bone can join up with living bone and to ensure that the process is safe and effective.



The Assistive Technology (AT) Center at the Hunter Holmes McGuire VA Medical Center in Richmond, Virginia, works to create customized solutions for Veterans, many of which incorporate 3D printing technologies. The AT Center develops solutions that restore independence and allow Veterans to engage in everyday tasks, ranging from participating in adaptive sports to gripping and eating hearty hamburgers. Malik Jones, who suffered a traumatic head injury that left him paralyzed on the left side of his body, is once again able to play pool thanks to a 3D printed pool bridge. Brenda Guevara, who suffered a spinal cord injury leaving her paralyzed from the chest down, can apply her makeup independently thanks to customized 3D printed makeup brush holders.

NATIONAL CENTER FOR COLLABORATIVE HEALTHCARE INNOVATION

@VA PALO ALTO HEALTH CARE SYSTEM

COMBATING HEALTH CARE COMPLEXITIES THROUGH COLLABORATIVE INNOVATION

Health care is faced with three profound interrelated challenges. 1) Our rapidly growing older adult population is living with multiple comorbidities requiring complex resource-intensive care; 2) healthcare spending in the US is growing at an extraordinary rate, surpassing \$3 trillion a year; and 3) at the same time, there is a growing deficit in the number of available providers and caregivers. Consequently, it has become apparent that the traditional approaches to care will not meet the expanding demands even if we could afford it.

The collision of these three dramatic forces will not only profoundly impact the Veteran community, but also society as a whole. As a result, we are at a critical inflection-point requiring innovative and scalable solutions to tackle these challenges. This will require the organized collaboration of experts from diverse disciplines within academia, industry, and government to deliver timely, co-developed solutions.

In partnership between VHA Innovation Ecosystem and VA Palo Alto Healthcare System located in Palo Alto, CA, the **NATIONAL CENTER FOR COLLABORATIVE HEALTHCARE INNOVATION (NCCHI)** was specifically designed by VA to foster the creation of vital health care solutions for Veterans. Strategically located in Silicon Valley, an area internationally known for groundbreaking innovations, NCCHI is building on a foundation of existing collaborations between VA Palo Alto Healthcare System, VHA Innovation Ecosystem, leading technology companies, and other government agencies.

Immediate priorities for the center include continuing the collaborative work being done in machine learning, clinical decision support, and workflow efficiencies. Important examples of current collaborations include:

Exploring collaboration with **GOOGLE HEALTH** to clinically validate the integration of prediction tools into the clinical workflow to identify Veterans suffering from time-dependent conditions such as Acute Kidney Injury

Collaborating with **VERILY LIFE SCIENCES** to enhance the quality and efficiency of Veteran care for high priority conditions such as total knee arthroplasty, acute myocardial infarction, and alcohol withdrawal care.



In parallel with these collaborations, an infrastructure is being built for efficient cross-functional communication, collaboration, and engagement to support current and future development work throughout the organization. The future-state vision is that the processes, procedures, and operational tools developed at the center will provide an infrastructure for similar work to be done efficiently throughout VA.

The transformation of health care requires exceptional partners with extraordinary diligence, expertise, and passion. NCCHI is ready to work with those who have these qualities and share our passion to reimagine what is possible.



“This is a critically important time in medical history. The work we do at VA has the potential for broad positive impact that will not only dramatically benefit our Veterans, but also the world. As a result, we have both the opportunity and responsibility to be leaders in health care innovation,”

– Dr. Thomas Osborne, Director for NCCHI



Throughout this report, you have read about a small cross-section of the innovative solutions, services, and technologies developed within VA. This report serves not only as a celebration of our employees and all they are doing to transform care for our nations Veterans, but also as a call to action. The Department's role as researcher, health care provider, and educator create the ideal environment for innovation; allowing VA to trailblaze new pathways to improve health care innovation and build upon the Department's history of innovation. However, we need everyone to be a part of this journey.

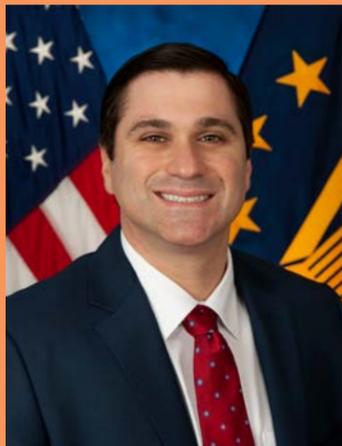
As the Executive Director of the Veterans Health Administration Innovation Ecosystem, my job is to promote innovation within every level of the organization, and to empower our employees and our partners to innovate with us. Innovation is a team sport, and as health care challenges become more complex, VA needs "all hands on deck". You may ask how you can help.

As a Veteran, engage with us, tell us what is important to you. What can we be doing better? If you're an employee, what can we do to make you feel better supported in your innovation efforts? For external partners, how can we better collaborate? Our approach to innovation is rooted in the principles of human centered design- a process that starts with the people we are designing for and ends with new solutions that are tailor made to suit those needs. If we aren't doing this, then we are not delivering on our promise.

I invite you to partner with us and join our integrated ecosystem. An ecosystem that fosters employees to identify solutions to everyday Veteran challenges; whether it be a toothbrush to prevent against hospital-acquired pneumonia or having easy access to a lifesaving opioid reversal drug. We have a multitude of resources to help develop your solutions: access to world-class clinical subject matter experts, longitudinal data from a large and unique patient population, infrastructure to test and pilot health care technology solutions, and feedback from Veterans. The solution you identify can CHANGE LIVES and SAVE LIVES.

Will you be a part of this journey?

---- **Ryan Vega, MD**
Executive Director of VHA Innovation Ecosystem



On behalf of the VHA Innovation Community, we would like to say **THANK YOU** to the following colleagues who work tirelessly behind the scenes to enable the amazing innovation that VHA delivers to Veterans everyday. Without their support day in, day out, none of this would be possible. Again,

THANK YOU!

VA Office of General Counsel
VA Strategic Acquisition Center
VA Technical Acquisition Center
VA Regional Procurement Office East Network Contracting Office 5
VA Office of Public and Intergovernmental Affairs
VHA Communications
Local VA Medical Centers Public Affairs
VA Financial Services Center
VHA Office of Finance
VHA Workforce Management Consulting