Assistive Technology Provides Lifeline
to the Outside World  
By Susan Wentzell

To quote William Shakespeare, “The Eyes are the Windows to the Soul.” Due to advancing ALS—Lou Gehrig’s disease—U.S. Army Veteran Larry Cook, 73, can no longer speak or move his limbs in his VA hospital bed in the long-term care Spinal Cord Injury (SCI) Unit that is now his home. Look deeply in his eyes though, and you get a glimpse of the formidable man beneath the disabilities.

Occupational Therapist Ursula Draper and Speech Pathologist Telina Caudill of the Polytrauma Rehabilitation Center Assistive Technology Program at the James A. Haley Veterans’ Hospital in Tampa, Fla., work with Mr. Cook and similarly disabled Veterans with severe mobility or communication limitations brought on by progressive, incapacitating diseases such as ALS (Amyotrophic Laterals Sclerosis), Cerebral Palsy, Multiple Sclerosis, Muscular Dystrophy or by injuries to the brain or spinal cord.

These therapists’ mission: to give disabled Veterans their lives back by tapping into the abilities they do have with new technologies that help them communicate with their caregivers and interact with the outside world.

“With diseases like ALS, patients can be paralyzed from the neck down and as the disease progresses, one of the last things they are able to do is move their eyes. New patients come to us depressed, despondent, thinking they’ll never be able to do anything again,” Ms. Draper said. “Our first conversation may just be to assure them that whatever they did before—or may want to do again—we’ll find a way to make it happen, often through technology.”

Back in his hospital room, Mr. Cook’s eyes are locked on the screen of the eye gaze system in front of him. He was the project supervisor of a construction company for 15 years before falling ill. He’s a man used to being in charge and he’s clearly focused on the task at hand.

He answers my question, “How does this machine help you?” with great effort—letter by letter, word by word—entering each key stroke in the eye-operated communication and control system with his gaze. On the screen he “writes”—and “says” in a synthesized voice—“It lets me talk to my family and stay connected.”

The Eye Gaze is just one of several speech and communication technology assistive devices the VA has incorporated into the hospital environment for disabled patients at the Tampa VA and other hospitals in the VA Sunshine Healthcare Network.

VA Occupational Therapist Ursula Draper works with U.S. Army Veteran Michael Dawsey who uses Quad Joy, a ‘mouth mouse’ to move chess pieces on a virtual chess board. Paralyzed from the neck down due to an injury, Mr. Dawsey is able to use technology specifically modified for his disabilities to communicate with his VA caregivers and the outside world.

U.S. Army Veteran Michael Dawsey, 56, was injured and diagnosed with Tetraplegia. As a result, he is no longer able to use his hands or move his body from the neck down. From his hospital bed in the Tampa VA’s long-term care SCI unit, he uses a specially configured Quad Joy “mouth mouse” to move, (cont., page 4)
AT Lab Highlights…Gainesville

During the month of September, the Gainesville Speech Pathology staff hosted an AT Open House. Six vendors were present and demonstrated augmentative communication devices (AAC) and environmental controls (ECU) for the hospital based home care, spinal cord injury, and ALS teams. Social work, nursing, primary care physicians, neurologists, occupational therapists, and physical therapists participated in the event and were partnered with staff form the Prosthetics Service to rotate to each room and to experience how a patient would utilize each device. The Open House was followed by interdisciplinary team meetings to share thoughts regarding the best AT options for current homebound cases. For those disciplines familiar with AAC and ECU it was a chance to discuss newer devices and software available. For the medical and prosthetics staff it was an opportunity to learn about the range and complexity of devices available and to better understand the importance of a careful assessment and trial period with the patients and their families.

AT Lab Highlights…Seattle

Seattle is making great progress in developing our Assistive Technology Clinic. We extended our services to a clinic at the American Lake campus in Tacoma. The team there is led by Wendy Woods (SLP) and Mary Graddon (OT).

We presented at the PVA Summit in September, highlighting our success in 2 case presentations. We hosted our first annual Assistive Technology Fair to the Rehab Care Service line to introduce therapists and providers to our services and technology tools.

We have 4 staff members on our team who are currently/still studying for their ATP and intend on taking the exam by the end of the year: Cathy Covey, MOTR/L; Laura Hardy, MS, CCC-SLP, Wendy Woods, MS, CCC-SLP and Virginia Kudritzki, DPT.
AT Lab Highlights...Tampa

ACCOMPLISHMENTS
- AT was highlighted in a recent article including two patient stories and the positive effects of technology within their lives. The article will be featured in the VISN 8 VOICE e-newsletter, on the VISN 8 2015 Annual Report, on the VISN 8 Internet site as well as the Tampa VAMC Internet site.
- Tampa now has 7 RESNA ATP certified clinicians
- AT was instrumental in the Tampa SCI Program’s receipt of the Leader of Innovation Interactive Patient Care Award at the Get Well Network (GWN) Conference which was featured on the GWN, PVA and JAHVA Facebook pages

COMMUNITY OUTREACH
- AT is presenting in collaboration with colleagues at facilities within VISN 8 for this month’s education series focused on clinical implications of telehealth
- AT has been selected to present at the Assistive Technology Industry Association (ATIA) Orlando 2015
- AT has been selected to present at the Association of Veterans Affairs Speech Language Pathologists (AVASLP) 2016
- AT continually fields emails and phone calls from clinicians nationwide re: various AT questions and concerns

PROFESSIONAL DEVELOPMENT
- AT coordinated an 8-hour seminar by Permobil for the rehab department to increase staff expertise and provide for free CEU opportunities
- AT coordinated vendor demonstrations for the rehab department to include products such as Lingraphica, Autonome, and Hive Home Automation

TELEHEALTH AND PROGRAM EXPANSION
- AT continues to provide CVT-Hm to increase access to services with such data reflected within Speech and OT workload. Additionally, AT assists with access to CVT-Hm by installing Jabber on mobile devices and training patients and caregivers on the procedures for placing a video call.
- We have completed 6 E-consults from within our facility and 24 VISN 8 IFC E-consults
- We have completed 2 VISN 8 IFC CVT consults
- We have completed 1 VISN 8 IFC consult

AT Lab Highlights...Eastern Colorado Health Care System

The Eastern Colorado Healthcare System Assistive Technology Program has put a strong emphasis on collaborating with the SCI-D/ALS program to identify early AT intervention. This has resulted in earlier evaluation and education for Veterans, stakeholders and community partners.

ECHCS welcomed a new Occupational Therapist who is dedicated to the Assistive Technology/Wheelchair team and a new Speech and Language Pathologist to the AT team as well. The hiring of new employees helps to fortify and recognize the value of an outpatient interdisciplinary team of specialists.

The second annual AT Deep Dive was held in Denver, Colorado in May 2015 and went off without a hitch thanks our partnership with the University of Pittsburgh RSTCE! Close to 20 individuals gained valuable hands-on experience with all facets of assistive technology, adaptive recreation, wheeled mobility and adaptive driving.
chess pieces on a touch screen, adding to his enjoyment of playing virtual chess with people from as far away as Italy and Saudi Arabia. Before using the Quad Joy, he hadn’t used a computer in years.

At James A. Haley, this assistive technology is integrated into the GetWellNetwork (GWN), an in-room interactive patient care system that operates from a TV monitor at the patient’s bedside. Using his Quad Joy, Mr. Dawsey can “sip and puff” to control his room lights, call a nurse, adjust his bed and also send e-mail, surf the web, watch movies and TV, listen to music, and of course, his favorite, to play video games.

The GWN system is now in all hospitals in the VA Sunshine Healthcare Network. Besides providing on-line entertainment and internet, the all-in-one system also gives patients customized health education as well as information on hospital services, medications, patient safety and pain management right at their bedside.

“We take communication for granted—greeting someone in the morning, telling someone you love them. But for these Veterans, it’s their one and only way to communicate. Besides socialization, communicating their basic medical needs is really important...when they’re in pain, need to be moved or have difficulty breathing. These devices are also very important to the Veteran and his family to communicate end-of-life desires,” explains Ms. Caudill.

Sometimes people believe Veterans with these kinds of severe disabilities are not ‘there’ anymore, according to Ms. Caudill. Nothing could be further from the truth, she asserts. ALS, for example, does not affect a person’s ability to see, smell, taste, hear or recognize touch. “These devices help a Veteran’s personality show through. They are a lifeline for some of our most severely disabled Veterans.”
The Minneapolis Assistive Technology Program received a full three year accreditation from CARF International.

**RESNA Credentialing**
Dr. Brian Fay received the Seating & Mobility Specialist (SMS) credential from RESNA in April 2015. Dr. Fay serves as the Director of the Minneapolis VA Assistive Technology Program.

**Patient Education**
The Minneapolis AT Program has recruited a group of clinicians including OT, PT, SLP, MD, and SW to begin a year-long effort to develop patient education resources regarding assistive technology commonly prescribed as part of rehabilitation programs for traumatic brain injury (TBI). These resources will be composed of print and online resources.

**Emerging Consciousness (EC) Program Collaboration**
Patients who incur a severe TBI and remain in coma are often enrolled in the EC Program at Minneapolis. These patients currently receive multisensory therapy which may include structured visual, auditory, tactile, vestibular, olfactory, and taste stimulation. Patients are monitored for responses to these stimuli both informally by nursing and therapy staff and formally using standardized measures such as the Disorders of Consciousness Scale and Coma Recovery Scale – Revised. Treatment teams currently target therapy time for when patients appear to be more aware of the surroundings. Assistive Technology used with this population has included EEG and eyegaze controlled communication devices. Previously applied technologies require patients to be partially or fully emerged from coma so that the technology interface can be calibrated relative to the patient. For EEG communication devices, the patient must be able to interact with a display screen by watching for a specific alpha character as all alpha characters flash on the screen. In the case of eyegaze communication devices, the patient must be able to track a 25mm dot with the eyes as it moves about the screen. Both of these tasks are beyond the typical patient who is in coma or a minimally conscious state.

As part of a Quality Improvement (QI) Project, the EC treatment team is introducing new technology and methods when considering EEG and eyegaze systems with EC patients. These technology and methods are more amenable to providing the clinical staff with information about the alertness of the patient emerging from coma.

**EEG:** Rather than employ character recognition to analyze the EEG of patients, EEG is collected during a restful state and during the currently applied multisensory therapy using an Intendix amplifier (Cortech, Wilmington, NC). The data collection procedures to obtain these EEG recordings do not vary from those currently employed. These procedures are non-invasive and involve the patient wearing a skull cap not unlike a shower cap. This EEG focuses on bilateral, bipolar, longitudinal montages. The EEG recordings will be evaluated to determine whether the patient’s EEG is indicative of arousal in response to multisensory therapy.

**Eyegaze:** Eyegaze tracking can now be done without the calibration routine previously described. Previous technologies were not worn by the patient, but mounted to a nearby computer. The new technology from SMI GmbH (Teltow, Germany) is embedded in glasses that are worn by the patient. Small sensors in the glasses enable quantification of pupil direction and cameras facing outward from the glasses record head orientation. These measures allow quantification of eyegaze regardless of head or pupil position. Data output can be viewed as the two-dimensional path of eye fixation and will be used to determine the degree of visual response to stimulation.
Veteran’s Story...Douglas Vitale

Mr. Douglas Vitale, a 28 y/o retired Marine Sergeant, served as an infantry rifleman and leader of his squad. While leading his squad on foot patrol in the fall of 2011 in Afghanistan, Sgt. Vitale stepped on an IED. As a result of this, he suffered catastrophic injuries that included severe TBI, bilateral CVAs, bilateral above the knee amputations, right hemiparesis and neglect as well as left hemiballismus. A testament to his character, this Marine underwent extensive rehabilitation at the James A. Haley Veteran’s Hospital in Tampa before transferring back to his hometown of Pittsburgh in late 2013. He continues his amazing rehabilitation journey at the VA Pittsburgh Healthcare System with his wife, Alexis, and service dog, Partner.

In January of 2014, Mr. Vitale was introduced to his outpatient rehabilitation team, which included Physiatry, PT, OT, SLP, and our PT specialist in mobility, among others. His initial goals included increased sustained attention and endurance, improvement of attention to right visual field, identification of a reliable functional communication system, and increased functional use of his upper extremities for tasks and recreational activities. He began attention work and eye pointing with a plexi-glass board with speech pathology along with passive and active range of motion and targeting activities with PT/OT.

Six months into his outpatient therapy, Doug was practicing eye control and tracking with a TobiiDynavox i15 and beginning to specify preferences in simple functional page sets, limited to a field of 4 pictures and orientation of items on the left of the screen. He was sitting on the plinth with support from a therapy ball and therapist to remain upright. By September 2014, PT/OT utilized the Arjo MaxiSky 600 ceiling lift with walking jacket allowing Doug to stand with his bilateral above knee prosthetics. Less than three months later, Doug, with maximal team assistance, took ten steps.

Now, four years after his catastrophic event, Doug is using his i15 to practice resisting salient distractions and reduce perseveration in his left visual field while using it functionally for specification of some preferences such as the music he would like to hear or the exercises he would like to complete in PT/OT. His need for cueing while using the device has decreased such that he is able to cross midline with his gaze when provided with verbal encouragement or directional cues in selection fields up to 16 pictures/words. He is generalizing his skills to cue himself to orient right when salient stimuli are present. He is now able to stand, aided only by the ceiling lift, in the parallel bars for up to 30 minutes, benefitting from encouragement and some assistance with repositioning after 5 minutes.

As Doug remains non-verbal, I asked a key member of his rehabilitation team, his wife Alexis, a few questions about how assistive technology has impacted their lives.

How do you feel assistive technology has enhanced Doug’s recovery?

His wheelchair has provided him the ability to practice functional tasks, such as standing, before he had the opportunity to do it. His action track chair gives him the chance to participate in outdoor activities with friends and family, and the in-home ceiling lift now allows me to care for him independently. Since we are able to connect his Tobii to his chair, we can use it in multiple places. His Tobii has given him the ability to have some say in his life…we can know that he means certain things, not just assume. He was a poet prior to his injury and now with use of the Tobii (and his personal page sets), is able to read/recite his work. You can see his pride when he “reads” his work and when he is able to stand on his legs. The team working together has enhanced his interactions, strength, endurance, monitoring of his position in space, and pride.

What functional improvements have you seen in his daily interactions as a result of his rehabilitation?

Doug’s attention is longer. He is able to engage with everyone (regardless of where they are in the room) and be a part of the conversation. He responds (with facial expression) and his moods are great! When I wake up in the morning, he is staring at me, and I’m on his right! He never used to do that!

As with any case of someone who has suffered severe brain injury, Doug has good days and bad, but he is able to shake it off, coming back better each time. The character and determination of this Devil Dog challenges us, as therapists, to think outside the box and each day bring our best to the veterans we serve. As for the progress Doug can make, I suspect that it is only in our wildest dreams.
Live Changing Event impacting Veterans and the Community as a Whole...Melissa Oliver, MS OTR/L

On July 28-29, 2015 at McGuire VA Medical Center in Richmond, Virginia, the Assistive Technology Program partnered with the VA Office of Innovation to bring together innovators...inventors...problem solvers to create solutions for challenges our Veterans face every day. I could not have imagined the lasting impact the VA Innovation Challenge Make-A-Thon would have on all of those involved.

The Make-A-Thon began with several Veterans sharing their challenges through their story...

- Veteran Eric Young had the participants envision a road running through the mountains of Colorado and how it would feel as you drove your motorcycle down that road...then imagine not being able to do it because of the loss of your arm. Mr. Young, "I want and will ride my motorcycle on that road through the mountains of Colorado."

- Veteran Kim Matthews spoke about how everyday things that women do to get ready in the morning are taken for granted but is a challenge for her because of her hand tremors. The tremors make it more difficult to put on make-up, fix her hair and button her blouse to the point that she does not go out as much anymore. It is isolating.

These are just a few of the stories that were shared which touched participants so much that those that came as spectators decided to jump in and attempt to solve the problem and others who came as participants it added to the inspiration. We had about a dozen challenges that needed solutions.

21 teams formed with 1 focus to create the solution for that individual which would impact their quality of life. What a Powerful Mission!! The synergy in the room as the team emerged and ideas were developing was so intense that it is difficult to describe other than to say it like the "Energizer Bunny times 1,000." Teams range in age to expertise with a team member being 10 years old to a team member with 30 years of professional expertise in engineering. The diversity on the team and the collaboration was incredible as they worked towards that one goal.

Teams were problem solving, mentors were guiding, veterans were consulting and prototypes were printing. And the expertise in the room was AMAZING...mentors from Toyota, GE, 3D Systems, Stratasys, CAD program experts, the Assistive Technology Program, McGuire VA Medical Center's therapy and prosthetics staff, software engineers and physicians.

The designs were then sent to one of the fourteen 3D Printers for the prototypes to print overnight – you could hear the humming of the machines as they worked hard to create the different teams' visions turning them into possible solutions.

Day 2 brought just as much energy if not more, as the teams' only had a few hours to finalize their creations...it was a rush to the very last minute with team members running around trying to find tools, consult with mentor and create the final presentation.

As part of the judging criteria, all of the teams had to upload their designs to the NIH 3D Print Exchange where the designs are open source meaning that anyone, Veteran or non-Veteran, would have access to their designs that could potentially impact their everyday which in turns improves their quality of life. How Cool is that! The Make-A-Thon not only changed our Veterans' lives but the public as a whole.

Now it was time for the teams to present their solutions in 3 minutes...talk about time crutch. I was not presenting but I could feel the pressure to say everything they wanted and showcase their design in such a short amount of time. After 21 presentations and almost 2 hours, the judges had the Huge Undertaking of deciding the ultimate winning design.

And the winner is, drum roll please...Team Spline with their coupler design for Veteran Lisa Marie Wiley who lost her leg below the knee from a bomb blast. They won $20,000 from Google.com. There were six other winners of prize money as well.

Everyone's lives were impacted and changed. There is nothing more I can say but Thank you to everyone involved.

"Thank you for this opportunity"
- A Participant
As technology has continued to grow and expand for assistive technology, so have the options for connecting with our veterans, their families/caregivers, and fellow VA staff. The “Connected Care Corner” will be a series of articles describing ways to utilize technology to assure a smooth continuum of care for some of our most complex cases. This AT Lab issue will focus on a case utilizing video conferencing and clinical video telehealth tools for a dependent in a rural setting.

The Speech Pathology Clinic received a consultation to evaluate a veteran’s daughter (dependent) for an augmentative communication device. The 38 year old female presented with severe spastic dysarthria and moderate cognitive communication problems secondary to anoxia at birth. She had had speech pathology and occupational therapy services during her elementary, junior and senior high school years but, no further treatment or technology options have been explored during the past 20 years. The dependent lives at home with her mother. The mother has physical limitations due to progressive visual losses and a recent hip fracture. The father, a career Air force pilot, had passed away approximately six months ago and the mother was very concerned about her daughter’s ability to communicate in the event she may not be available. The Social Worker thought that the dependent would benefit from a device to assist with communication. The dependent and the mother live 2 ½ hours away from the closest VA medical center and 20 minutes from the closest community outpatient clinic (CBOC). The mother did not drive and because the dependent was not eligible for travel pay, they relied upon friends to provide transportation. The Primary Care Team requested that services be provided during a Telehealth visit.

Pat Ryan, retired Assistant Director, Office of Telehealth, taught us not to focus on the telehealth technology available but, to clearly define “Who, What, When, Where, and Why” you want to utilize the telehealth technology. After defining the task you want to do, then select the appropriate telehealth for visit. This has been a guiding principle for development of many telehealth programs. Here is an example of how the interdisciplinary team answered questions for the teleconsultation and follow-up home telehealth visit.

**Who will be involved in the teleconsultation?**
1. 38 yr. old female, severe dysarthria with cognitive deficits
2. mother
3. and don’t forget the staff at the CBOC (telepresenter, nurse, primary care)
4. vendors (at least 2 vendors to trial devices)

**What do you want to accomplish during the visits?**
1. Interdisciplinary meeting and education for the CBOC staff prior to the teleconsultation
2. interview with the mother
3. teleconsultation visit (2 hours) a) clinical exam and b) trial with devices including vendors
4. home visit

**When do you want to complete the visit (s)?**
- Interdisciplinary team meeting with the CBOC staff followed by an interview with the mother/daughter within the next two weeks (Note: 1 hour difference between the medical center and the CBOC)
- Teleconsultation within two weeks after the interview. Note: dependent, mother, telepresenter, and vendor(s) will need to be in the room.
- Home visit for assessment and follow-up to be determined after the interview and purchase of a device.

**Where do you want to complete the visit (s)?**
- CBOC
- Dependent’s home

**Why or what is the purpose of telehealth visits?**
To select assistive technology, communication device, in the absence of a caregiver and for independence and to provide follow.

Then review possible telephone or telehealth options for visits.
<table>
<thead>
<tr>
<th>Technology Considered</th>
<th>Considerations</th>
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<tbody>
<tr>
<td>Plain old telephone (POTS)</td>
<td>Land line in the home</td>
</tr>
<tr>
<td>Videophone to POTS</td>
<td>Patient may purchase for use in the home.</td>
</tr>
<tr>
<td>Mobile telephone</td>
<td>Mother has a mobile phone, android with a limited data plan, and does currently utilize any apps.</td>
</tr>
<tr>
<td>Patient Device/Jabber Software (CVTHm)</td>
<td>Old desktop apple computer in the home, no webcam, no high speed internet</td>
</tr>
<tr>
<td>Videoconferencing at the CBOC</td>
<td>CBOC has one medium size conference room with a large screen monitor</td>
</tr>
<tr>
<td>Clinical Video Telehealth (CVT Clinic Based)</td>
<td>Telepresenter has a global med cart with an exam camera in an exam room</td>
</tr>
<tr>
<td>Clinical Video Telehealth Patient Tablet</td>
<td>Telepresenter has a mobile education cart with a document reader</td>
</tr>
<tr>
<td>TES</td>
<td>PACT provider has desktop (EX90) in a small exam</td>
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<tr>
<td></td>
<td>Dependent would not be utilizing for long term chronic care management, mother has visual problems, Verizon connection limited due to metal roof and trees surrounding the home.</td>
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<td></td>
<td>Home Care staff utilized this technology for home visits with specialists at the medical center. It may be utilized for real time video (CVT) and still pictures. Laptop may be removed and the provider may walk around the home to provide additional observations. An exam camera may be attached for close up or two video observations at the same time.</td>
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Assistive Technology Program

Mission
To enhance the ability of Veterans and Active Duty members with disabilities to fulfill life goals through the coordination and provision of appropriate interdisciplinary assistive technology services.

To serve as an expert resource to support the application of assistive technology within the VA health care system

Rod Goode, VA Employee on the Winning Team

“I liked that the purpose was to help people and I felt like I had something to offer.”

- Rod Goode

This summer at the end of July, McGuire Veterans Hospital hosted the 1st ever VA run Make-a-Thon as part of the VA Innovation Creation Series. Rod Goode, an IT computer assistant at McGuire was the only VA employee to participate in the challenge. He joined 125 other participants from across the US that came from the public.

How did you hear about the Make-a-thon?
I saw an all employee email from the McGuire PR department announcing the event. I asked my boss and he said it was OK to participate but to keep my Blackberry on me in case he needed me for something.

Why did you want to participate?
It seemed cool to me. I liked that the purpose was to help people and I felt like I had something to offer.

Had you heard of a make-a-thon before participating in this one?
No, I hadn’t but I have heard of Maker Fairs before and how they give people that make anything a place to show it off. I’ve never been to one before though.

How or why did you decide to join Team Spline?
So there was this group of us standing around listening to LisaMarie describe and demonstrate her need for a quick-release coupler for her prosthetic legs. We began to chat together and brainstorming ideas. Then we all decided to just form a team together.

What did you bring to the team?
Well, at the beginning of the design process, I provided some starting ideas from my experience working on cars. There were some car part designs that I thought might be useful. The other team members took my idea and began to modify it.

What did you learn from this experience?
I learned stuff about prosthetics I never knew. It seemed like some prosthetic part designs have been updated a lot over the years and some haven’t changed for a long time.

What will happen now with the prosthetic coupler Team Spline developed?
We’ve all emailed together some but at this point, I don’t know of any efforts to keep working on the design. I was kind of expecting there to be more follow up from the VA Center for Innovation that sponsored the event to provide mentorship to something.

Do you think the VA should host future events like this? Why?
Yes. It helps to get lots of perspectives on a problem to come up with new ideas that people close to the problem may not think of. It gives people a chance to learn about and provide input in an area they aren’t necessarily experts at.