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HAPPY 2021!

Written by: **GERRY DICKERSON, ATP, CRTS®**

Happy New Year! Our bizarre 2020 is behind us, and 2021 has just begun. Like you, I am concerned about the beginning of 2021. The pandemic still rages, businesses and people are suffering. Some suffer with the virus; some with the very dim prospect of losing everything. The magnitude of it all is almost incomprehensible. Then there is the chaos in Washington, D.C.

Once again, I must begin my message acknowledging the passing of three members of our Complex Rehab Technology (CRT) community. I am beginning to feel like the Grim Reaper, but it is important to remember those who are no longer with us.

On Nov. 30, 2020, we lost Mal Mixon, the former chairman of Invacare. He was a giant of the industry. HME News published a great tribute to Mixon in the December issue. I reached out to our friend and colleague, Liz Beaulieu at HME News, and she gave me permission to use excerpts from the article. Instead of bits and pieces, please read the whole article at this link www.hmenews.com/article/mal-mixon-master-class-leadership.

The one thing I would add is Mixon was customer driven in more ways than I think was mentioned in the article. Mixon understood his customer. More importantly he understood his customer was not just the supplier issuing the purchase order for Invacare product. He knew his customer was also the prescribing clinician and more importantly his customer was the end user. He was a class act in our profession.

On Dec. 28, 2020, Ernie Brancheau passed away. If you attended the National CRT Conference in the past you would remember Brancheau. He was every bit a character. More importantly, he was a passionate, committed advocate for people with disabilities. Below are a few tributes to Brancheau from the CRT family.

> Brancheau was a dedicated member of our National CRT Conference consumer advocate team. He always brought enthusiasm and passion to his visits and enjoyed sharing the CRT message with those in the Ohio congressional offices. We'll continue to build on the CRT awareness that he helped create.
>
> Donald E. Clayback
> Executive Director | NCART
>
> I was saddened to hear about Brancheau's passing. He was a man who not only spoke boldly on behalf of the people and causes he was passionate about, but he also took determined action whenever he could. He regularly reached out to his Ohio legislators to advocate for CRT access, and it is difficult to think of a National CRT Conference he did not attend. As Don Clayback said, his legacy will be carried on by the CRT community he loved so much. He will be missed.
>
> Mickae E. Lee
> Associate Director
> NCART
>
> Ernie Brancheau was a passionate individual who will be missed at the National CRT Conference. Thoughts and prayers go out to his family and friends as they mourn his loss.
>
> Amy L. Odom
> Director of Marketing and Operations, NRRTS

Finally, on Dec. 29, 2020, R. Scott Powell, a long-time NRRTS Registrant passed away. Powell was employed by Numotion in Georgia. He was a skilled and compassionate ATP, CRTS® who provided care and expertise from his unique perspective. Injured at 18, he was also a user of CRT. Powell's complete obituary can be found here: www.thomaspoteet.com/obituaries/R-Powell/#!/Obituary

> Scott Powell was a brilliant NRRTS Registrant who always put forth his best for his clients. NRRTS extends its condolences to his family, friends and coworkers as they heal from his loss.
>
> Amy L. Odom
> Director of Marketing and Operations, NRRTS

In the coming year, no one knows what will unfold before us. How long the pandemic will rage? What will the impact of the pandemic be on everyone, more personally, how will it impact the CRT community?

One thing for sure, our health care system is broken. The service delivery process for providing CRT to our consumers, even more so. In a few more years, the request for a separate benefit category for CRT will be eligible for a driver's permit. Something must change. What we are doing now is crazy and, to me at least, not sustainable.

How many consumers tried to get a prescription for a repair, new chair or component during the height of the pandemic? In 'normal' times, always very difficult. Now, near impossible. We all have dozens, if not hundreds of examples of this.

One for me was a consumer I have known for a long time. A manual wheelchair user at high risk for pressure wounds. He has used a High Profile ROHO since he was first injured. During the craziest point in the pandemic in New York City, he rolled into clinic with a catastrophic blowout of his ROHO. His expectation was the clinic would just provide him with a replacement since that had been his experience

in the past. The clinic once had been not only the prescribing entity, but also the payer source, driven by taking care of people. Cushions, backs, batteries, bearings, tires, tubes and joysticks had all been part of the clinic inventory. In a case like this, my consumer would have been given a replacement ROHO, on the spot, to ensure his health and function. Imagine that.

The facility no longer operates that way. He needed a prescription, then submission to his insurance for authorization before we could provide the new cushion. I do not need to elaborate on what happened.

Now, think about it. What if most, if not all, of the administrative roadblocks were eliminated? What if we eliminated all the endless documentation, requests for more information, prescription requests, and whatever else inhibits the compassionate, quick, skilled, economically sound, appropriate intervention? What if we could establish "Centers of Excellence" with ATPs and CRTS®s of excellence, which are driven to ethically and carefully care for people who need our services. I know this is sort of a pipe dream, where the specifics are problematic, but you must think about it. It does work. I worked in a program like that for 18 years until the state inexplicitly defunded it.

The Separate Benefit Category (SBC) might be a place to start. It needs more advocacy; it needs YOU to be part of the process. The SBC has been brushed aside for far too long. We lack committed champions. Regardless of your politics, the Bipartisan-Bicameral Omnibus COVID Relief Bill should enrage you. The money spent on pork and pet projects in the Omnibus portion of the bill is mind numbing. We have asked for what amounts to budget dust for the SBC.

For a long time now, the posture has been "persistent but respectful." I think we need to be persistent but much more forceful. Besides the spending, not one member of Congress lost a week's pay, feared losing their home or stood in a food line. Some people in America are barely holding on as a result of the pandemic. People with disabilities have been barely holding on for as long as I can remember. I am going to be respectful but more forceful with my congresswoman when I ask her to support the SBC. I want to know why she supports the spending in the Bipartisan-Bicameral Omnibus COVID Relief Bill and will not support the SBC.

You, we, should be mad as hell that this is happening! Do not storm the Capitol but be willing to make sure our voices are heard to change it.

CONTACT THE AUTHOR

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Gerry Dickerson, ATP, CRTS® is a 40-plus year veteran of the DME and CRT Industry. Dickerson, president of NRRTS, works for National Seating & Mobility in Plainview, New York. Dickerson is the recipient of the NRRTS Simon Margolis fellow award and is also a RESNA fellow. He has presented nationally at the RESNA conference, ISS and the National CRT Conference and is a past board member of NCART.

NO LIMITS!

Written by: **ROSA WALSTON LATIMER**

Ben Huntzinger outside his shop in Ochloknee, Georgia, with Spartan Chariots ready to ship.

Ben Huntzinger (r) delivering an all-terrain wheelchair to Joel, whose goal w as to go "mud bogging" with his friends.

Ben Huntzinger on the river in his kayak.

"My love of the outdoors began with my parents. When I was young, my father and I hunted in South Georgia. The Chattahoochee River was near our home, and my mother and I would run alongside the river. As an adult, I still enjoyed an active life running half marathons, fishing, hunting and kayaking," Ben Huntzinger said. "In 2009, I was involved in an automobile accident that left me paralyzed from the chest down. I needed the peace and calm that I had always experienced from being outdoors more than ever before. Now, many of the activities I loved were no longer available to me because of the limitations of my wheelchair. I soon realized even the best wheelchairs are not designed for extended outdoor use."

Huntzinger was determined to continue with activities that had a positive impact on his quality of life. "I would go to the river to exercise and hook my dog, Rambo, to my wheelchair with a harness. From day one, he thought his job was to pull me, but when my front tires hit gravel or grass, that would bring us to an abrupt stop."

Huntzinger tried different wheelchair sports, including fencing, softball and wheelchair racing. "None of the activities I tried met my need for the unique feeling of being out in nature," Huntzinger said. "Every day, I am active — out in the woods, cutting my grass, rolling wherever and whenever, I want, and that is important to me. I wanted, and needed, more than a few hours of recreation on someone else's schedule."

The frustration with his limitations led Huntzinger to design and build a wheelchair that could function well in almost any type of terrain. However, the final product, Spartan Wheel Chariots, was 10 years in the making.

"I realized no one was offering the type of wheelchair I wanted. That awareness lit a fire in me to create a wheelchair you could take to the river, get some exercise, prevent diabetes and depression — a wheelchair that would help me, and others, live life more fully," Huntzinger said. "We've been to the moon, and we mass-produce mountain bikes and baby strollers. I couldn't understand why no one was building an affordable, all-terrain wheelchair."

With conviction, the paraplegic outdoorsman got to work. "I began by learning about things like mountain bike and downhill skateboard parts and buying nuts and bolts at the home improvement store," Huntzinger said. "It was a process of bolting parts together, figuring out what would and wouldn't work. Eventually, I learned how to weld from watching YouTube using a $100 welder." Huntzinger also revived his talent for drawing. "I realized that I am blessed with a creative way of thinking. I am very good at putting things on paper that are in my mind. I doodled in notebooks for several years, modifying my wheelchair designs."

Eventually, Huntzinger produced and began using a prototype of the all-terrain wheelchair he had envisioned for so long. Huntzinger's passion for finding a resolution for the limitations of his wheelchair kept him focused during this time, but he experienced many dark, unproductive days. "It isn't unusual for someone who has experienced a traumatic accident to struggle," Huntzinger said. "Having a wheelchair that allowed me to be outside and just 'go' got me out of the darkness many times. Making this specially designed wheelchair available to others is something I have dreamed of since the early stages of my recovery. I knew there was a way to provide this type of wheelchair, but I didn't understand why no one was doing it. That was unacceptable to me."

Huntzinger's perseverance paid off in 2019 after he enrolled at Southern Regional Technical College in Thomasville, Georgia. "After doing a lot of research early in this journey, I discovered that often universities and students would use resources and ideas related to their field of study to help people who are disabled," Huntzinger

said. "One day, I rolled into the marketing department at Southern Regional and told them about my idea for an all-terrain wheelchair. I asked if there was any way they could help me and assured them I would give the school all of the credit."

Two months later, the school received notice of a statewide event sponsored by the Georgia Chamber of Commerce. The "InVenture Prize" competition recognizes ambitious and growth-oriented student entrepreneurs with cash prizes. The technical school marketing department folks remembered Huntzinger and his innovative wheelchair and entered him in the competition.

Competing against students from Georgia Tech, the University of Georgia, and other four-year universities in a "Shark Tank" style, live event, Huntzinger placed second in the overall competition and also won the People's Choice Award. "I received $25,000 altogether, and I was ready to get to work," Huntzinger said. He was organized, had suppliers in place and began building wheelchairs from his design. "I've made almost 200 wheelchairs during these two years," Huntzinger said. "I can build a chair from raw materials to 'painted and on a pallet,' ready to ship in four hours. I do all the work except for the upholstery. My mom takes care of that." Custom Spartan Wheel Chariots (www.spartanwheelchariots.com), built for adults or children, sell for $500.

"My chairs are designed and built for a rugged environment with bigger wheels, durable frame and a rear suspension system for comfort and support. I guarantee the chairs for life. If something breaks on your Spartan chair, I'll fix it," Huntzinger said. "My personal experience with the chair and the modifications I've worked through have trained me to know what will and won't work. I've taken my chair out on mile-long pushes in the woods in public hunting areas and never experienced a problem with durability."

Ben Huntzinger in his all-terrain wheelchair.

Huntzinger has invested years improving his wheelchair design, even studying the suspension systems that NASA used in its robots.

Huntzinger is uniquely qualified, possessing the imagination and skills to bring his dream through the necessary steps to reality. Just as there are no limits to where he can go using his Spartan wheelchair, there seem to be no limits to his perseverance and determination, but he isn't shy about asking for help. "I emailed presidents of hospitals, talked to welders and fabricators, visited the Atlanta mayor, and even tried to see the Georgia governor, hoping to convince someone that producing this affordable wheelchair was worth the effort," Huntzinger said. "I did get help and encouragement along the way, but not always from where I expected. For example, during a casual conversation with a group, I shared that I was looking for a material to build these chairs. A guy suggested conduit pipe. That was a major breakthrough! Instead of modifying old wheelchair frames, I began using conduit to bend my frames."

Huntzinger earned his drafting and technology associate degree from Southern Regional Technical College, and later this year, he will receive his bachelor's degree in education from Thomas University in Thomasville, Georgia. "I plan to teach social studies to middle school kids and hope I can be a positive role model, especially for young men," Huntzinger said. "Even though building wheelchairs takes up quite a bit of my time, I enjoy being out on the river, taking in the sight of an old cypress tree from my kayak. With a wheelchair that can go almost anywhere, I can enjoy the many public spaces for recreation and hunting near where I live."

Huntzinger hopes in the future that his wheelchair design will be built on an assembly line with veterans making chairs for veterans and people with disabilities, making chairs for others with disabilities. "After my accident, I felt that I was being told in subtle ways to accept life in a wheelchair and to conform to the equipment available. I was motivated to create a better wheelchair, so I would have the freedom of being outdoors wherever and whenever I wanted." Not only did Huntzinger accomplish that, he also invested a great deal of time and energy to make this freedom attainable by others with disabilities.

Nathan Sanders with Rollin' Wild Outdoor on a successful turkey hunt.

Christina Hurst enjoying a day at the beach in her Spartan Chariot.

CONTACT

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Ben Huntzinger is a consumer advocate who lives in Georgia.

INDUSTRY EVOLUTION FROM REACTIVE TO PROACTIVE

Written by: **ROSA WALSTON LATIMER**

Wayne Grau, director of business development, MK Battery.

A year ago, Wayne Grau brought his 30 years' experience in the HME and complex rehab industry to MK Battery. As director of business development, Grau's responsibilities include marketing, sales for the home medical equipment category, and management of the MK East Coast sales team. "I have partnered with the people at MK for years and have a great respect for the work they do," Grau said. "The variety of responsibilities I have might feel like a juggling act some days, but I like the challenge. MK is still the family-like organization that Mark Wels and Mark Kettler founded in 1983." East Penn Mfg. acquired MK Battery in 1995 and now has 20 distribution centers in the United States. The company also operates sales and distribution branches in Europe and Australia.

YOU HAVE ENJOYED A LONG, DIVERSE CAREER WITHIN OUR INDUSTRY. WOULD YOU GIVE US AN OVERVIEW OF YOUR EXPERIENCE?

I worked 17 years with Pride Mobility, and during that time, I was often out on the road working with our customers. It was a lot of travel, but I made many good friends during that time. At one point in my career with Pride, I took some time away to work with Dan Meuser, the president of Pride at the time, as a consultant with his political campaign. Although Meuser is now a U. S. representative, we didn't win that campaign, and my position with Pride had been filled with an exceptional individual, so I decided to move back home to Texas.

In 2008, I began working for The MED Group, starting in sales and moving into responsibility for vendor relations, marketing and member networks. I continued with Managed Healthcare Associates (MHA) for several years after they bought The MED Group, eventually handling legislative affairs for MHA as well as their medical services and products portfolio. In 2019, I earned an MBA in healthcare from the Baylor University Hankamer School of Business.

HOW DO YOU STAY MOTIVATED?

I draw a great deal of my energy and inspiration from other positive individuals who might be colleagues or customers. The blending of my work and my personal friends is very fulfilling. I can honestly say I've rarely met a person in my work that I didn't like. I might disagree with someone, but I recognize they are good people and value our relationship. Even though my travel is for work, I always see it as an opportunity to be with friends.

I've been fortunate to have started my career with a visionary leader at Pride Mobility, and as I progressed, I seemed to find the right mentor at the right time. Most individuals in the complex rehab industry see it as a higher calling. They want to make a living, but their work goes far beyond that, and their example of compassion and commitment motivates me.

HOW DO YOU MOTIVATE YOUR TEAM?

We always try to remember who we are serving, whether ATPs or the patients who ultimately depend on our product. From early in my career, this is the most decisive motivating factor for me. In the beginning, I didn't fully understand the impact of complex rehab equipment; however, a young girl in a rehab hospital who had lost both of her arms and both of her legs in a fire, and had never walked, showed me how vital this work is. We delivered a power wheelchair to her, which was unusual at the time because the general belief was children didn't have the cognitive ability to maneuver a complex chair. When we put this little girl in the power chair, and she realized she now could get around on her own, her eyes lit up. It was amazing to see her whizzing around that gym. When I left that day, I remember thinking, 'That's what this is about!'

Everyone has good days and bad days, but when my team is having a difficult time, I remind them of patients like that little girl, or the ATP who may drive two hours at night to deliver a chair. If there isn't a good-quality battery such as ours for that chair, there is a good

chance that ATP will have to make a return trip. We must do whatever we can to make the lives of our ATPs better so they can, in turn, make the lives of those they serve better. It is important to remember this connection. We are an essential link in the big picture. I am a firm believer in the principle that if you help others get what they want, you'll get what you want.

Of course, the pandemic brings a new set of challenges. Many of us are accustomed to being on the road. We enjoy the connection with those we serve. We are using video conferencing and trying to provide additional support to help everyone stay motivated and focused during this time. We are also doing some strategic work to help us plan for the future and looking forward is also reassuring.

Being a leader is sort of like being a cheerleader as well. I want my team to know when they do something well, I, and those above me, take notice and appreciate their efforts. I work with a great leadership team, and I have a great team of people who work hard, and I want to make sure they know this company will support them. Of course, this is true whether we're dealing with a pandemic or not.

We also try to keep in mind we aren't the only ones stuck at home. The same is true with ATPs, patients and therapists. I am proud for the way we have adapted to the situation and are mindful of the need for additional support by everyone involved.

TELL US SOME OF THE POSITIVE CHANGES YOU HAVE SEEN IN OUR INDUSTRY.

One positive change is the level of legislative and regulatory support available. When I consider how far we've come in the past 15 years, what Don Clayback with NCART, Tom Ryan with AAHomecare and others have done is impressive. Before, we were reactive to legislation. We were reactive to budget cuts and competitive bidding. The industry is now actively trying to get new equipment approved and reimbursed. I believe we have a great story to tell, and we've gotten better at telling it.

The interaction with therapists on legislative issues is impressive, as is the connection with consumer groups. There will always be challenges, but having strong, proactive leaders and a focus on who we serve makes a difference.

The work that NRRTS does is outstanding. The leadership of the organization and its registrants are always bringing new ideas to the game. Through the consistency of the annual conference in Washington, D.C., NRRTS has built a stellar reputation for our industry with legislators.

I was in the first meeting with Connecticut Congressman John Larson in Washington, D.C., and he didn't have much interest in our story because, at that time, he didn't have respect for our industry, mostly because he didn't understand the work we do. Now he is one of our strongest advocates. The forthright contact with legislators year after year eventually led to a connection with the value we bring to their constituents.

CONTINUED ON PAGE 12

Ted Metcalf, Luke Metcalf, and Wayne Grau enjoying a hockey game.

Ed Curley Jr., Shirley Curley, Ed Curley Sr., of Hudson Home Health Care/Rehab Equipment and Wayne Grau

Wayne Grau, Karen Atkins and Brian Fisher

THERE WILL ALWAYS BE CHALLENGES, BUT HAVING STRONG, PROACTIVE LEADERS AND A FOCUS ON WHO WE SERVE MAKES A DIFFERENCE.

Wayne Grau with friends (l to r) Kim Graff, Ethan Dickson and Richard Ferry enjoying dinner in Prague.

INDUSTRY EVOLUTION...
(CONTINUED FROM PAGE 11)

We are now reaping the benefits of many years of growth and change. Some have looked at this industry with an entrepreneurial mind and determined that margins have contracted but, with technology and smart work, it is possible to have a successful organization that can take care of patients and grow profitably.

DO YOU HAVE ANY ADVICE TO SHARE?

I was taught a long time ago, by the first CEO I worked with, to always to be honest, authentic and do the right thing so people know they can trust you. We also need to maintain compassion for those we serve, even when things are difficult.

It is also important to remember to assess each customer or patient's individual needs and add value to your service whenever possible. As suppliers, we need to continuously look for better ways to reach our customers and introduce better ways to care for them.

Our work isn't easy and requires a determination to persistently maintain a positive work ethic. This is a great industry! I'm impressed by the innovative, new equipment available in a competitive marketplace — this creates a winning situation for those we serve.

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Wayne Grau is director of business development for MK Battery. Grau graduated from the University of North Texas and has an MBA from Baylor University Hankamer School of Business

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IMPORTANT, BUT UNEXCITING

Written by: **ROSA WALSTON LATIMER**

A general description of a rehab engineer is an engineer involved with the design, development and application of assistive technology to assist persons with disabilities. Sharon Sonenblum, Ph.D., is a rehab engineer and principal research scientist at the George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology (Georgia Tech) in Atlanta. She specializes in wheeled mobility and seating, pressure ulcer prevention and early detection. "My work is fairly simple and straightforward," Sonenblum said. "I study people's rear ends! And, although my work has been described as 'important, but fundamentally unexciting,' I am willing to tackle a problem that is unexciting. I understand the need for an engineering solution to a physiological problem."

Sharon Sonenblum, Ph.D.

WOULD YOU TELL US WHAT BROUGHT YOU TO THIS ENGINEERING/PHYSIOLOGICAL RESEARCH CONNECTION AS A CAREER?

I don't have that warm, feel-good story that many have about choosing rehab engineering as a career. I had earned a degree in engineering and needed to figure out a career path. Most of the opportunities in orthopedics were very cellular and seemed far removed from something that would interest me. I wanted to do something more tactile; that I understood intuitively. In my search about possible engineering careers, I happened upon information about rehab engineering. I liked what I found. This was work that involved working with people and solving problems that helped individuals. It made sense to me, and I began applying for jobs in that area. My first job was at Georgia Tech and 17 years later, I'm still here.

Once I got started, it was clear I have the ability to do work that helps people with disabilities, and I have an interest in a research question that isn't a hot topic. This is the logical crossroads of my career: I'm an engineer, but I understand the physiology and biology side. I also understand the importance of good communication.

The other niche that I've found is being able to bridge the gap between engineers and clinicians. Sometimes when I give presentations, I am asked what kind of clinical work I do. I tell them I'm not a clinician and would probably not make a very good one, but I can communicate effectively with clinicians and appreciate the work they do. I can present engineering in a way that clinicians can relate to their work. That's not an easy thing to do, and I'm proud of that ability because I believe that is helpful and is often missing. That breakdown in communication is why engineers sometimes develop crappy products and why clinicians sometimes have difficulty explaining their needs to engineers. There is a shortage of people who can find that middle ground or who can help others find that middle ground. When I discovered I could help meet that need, my work became more exciting. Not only could I do this research, designed to help people, but I can share vital information and teach others. After presentations, I have clinicians come to me and say, 'Wow, this is useful. I can take this to my clinic and do something with it.' That is a rewarding experience! I recognize that the work of a clinician is difficult and being able to help them is a motivating factor for me.

I am, by nature, a teacher, and I don't get to teach in a classroom, but I get to go around the country and around the world and teach clinicians in a way that is useful to them. That is the most satisfying part of my work.

IN ADDITION TO YOUR PRESENTATIONS IN A GROUP SETTING, WHAT OTHER WAYS DO YOU CONNECT YOUR RESEARCH ACTIVITIES WITH CLINICIANS IN OUR INDUSTRY?

That varies. Earlier in my career, when I was collecting the clinical data for my trials, I was in a clinic a couple of days a week. During this time, I worked hands-on with the clinicians, which I loved doing. I don't do that

Sharon Sonenblum with her husband, Jason, and children (l to r) Noah, age 10 and twins, Eli and Mira, age 7.

Sharon Sonenblum's commuter bike, Sansa Chimera. "Some people have pets, I have bikes."

as much now as I usually hire people to collect the data. But now I have a close connection with clinicians who are part of a team of collaborators. This gives me the opportunity to meet with them and brainstorm ideas. I also enjoy a relationship with some clinicians that I know well and can call to talk through an idea.

It is a challenge not being a clinician and not working in a health care facility. I try to be very humble when I have a project and I need their help. When I have a project I'm working on, I regularly ask the clinicians on the team to call me out if my assumptions, based on my data, are incorrect. Whenever possible, I engage with clinicians because that is a voice I must have in any project.

TELL US SOMETHING RELATING TO YOUR RESEARCH THAT IS MORE POSITIVE NOW THAN EARLIER IN YOUR CAREER AND A CHALLENGE THAT YOU NOW FACE THAT YOU DIDN'T HAVE BEFORE.

The major positive difference is technology is amazing compared to when I first began. I have another line of work that involves studying how people use assistive technology. When I first began that line of research, I had to design the hardware myself. I made these boxes the size of a cable box that we would stick to wheelchairs. Compared to what we have now, it was ridiculous. Now the same technology fits in a wristwatch. There is so much more opportunity now for me to spend my time working on a research question instead of technology development.

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THERE IS A SHORTAGE OF PEOPLE WHO CAN FIND THAT MIDDLE GROUND OR WHO CAN HELP OTHERS FIND THAT MIDDLE GROUND. WHEN I DISCOVERED THAT I COULD HELP MEET THAT NEED, MY WORK BECAME MORE EXCITING. NOT ONLY COULD I DO THIS RESEARCH, DESIGNED TO HELP PEOPLE, BUT I CAN SHARE VITAL INFORMATION AND TEACH OTHERS.

IMPORTANT, BUT UNEXCITING
(CONTINUED FROM PAGE 15)

One challenge we face now is funding rates from the government haven't increased greatly since I started. Yet, tuition and hiring graduate students have gotten more expensive. It wouldn't be unusual for us to pay a graduate student now twice as much as in past years with funding from a grant that pays the same amount as a few years ago. That is one example of the increased number of barriers to getting our work done. Also, when I first began this work, I didn't have three children, so I had a lot more freedom!

WOULD YOU EXPLAIN YOUR PERSPECTIVE ON EFFECTIVE COMMUNICATION?

I believe some are naturally good at communicating clearly. It requires people skills that may not come naturally to someone who chooses the field of engineering; the rest of us need to work at it. My people skills might not be spectacular, I'm still an engineer, but I am very aware of the importance of relating to others. I was once working with a research participant and his mom said, 'You know, you've got really good people skills for an engineer.' I'll accept that!

Sharon Sonenblum (center) with past and present members of the "REARLab" at the George W. Woodruff School of Mechanical Engineering at Georgia Tech.

Sharon Sonenblum with her children (l to r) Eli, Mira and Noah.

Sharon Sonenblum enthusiastically dressed up for Halloween.

I recently read if you try to be persuasive in the form of a story, you are far more effective than if you state facts. I think I always knew that intuitively. As a child, I was encouraged to tell stories, so I developed that skill early on. You can't just list some facts and expect others to understand, you need to make it a story. That is how I communicate my work, and that's how I teach my students.

Too often, research presentations are very formulaic and dry. I teach students that our data is a story and prompt them to write out a storyboard. Begin with a question. What story does the data tell? As you work your way through the question, you learn something. Presentation of information should have the elements of a story — a question, a middle and a conclusion.

Ten years ago, I began trying to learn what our butts tell us. I studied how tissue responds to load. I began with an MRI and then took measurements. I took information from the measurements and through images and data, I told a story. The conclusion of the story is: people's bodies respond to load in a certain way that is related to their tissue tolerance and their risk for developing pressure ulcers.

Proficient communication is something I focus on during the 14 weeks I have with my students. It is important to impress on them the idea that good communication — written as well as spoken — is fundamental. It is more of

> YOU CAN'T JUST LIST SOME FACTS AND EXPECT OTHERS TO UNDERSTAND, YOU NEED TO MAKE IT A STORY. THAT IS HOW I COMMUNICATE MY WORK, AND THAT'S HOW I TEACH MY STUDENTS.

a life skill than an engineering skill, but it certainly makes you a better engineer.

Also, our lab believes a general appreciation for the world of disabilities makes you a better engineer, and we try to instill this awareness in all our students. Most of these students will not go into a disability field, but if they have respect for people and understand disabilities, it is better for everyone. If we can send them away with that knowledge and understanding, it will serve them well and will likely affect their designs regardless of where they work.

Learn more about the Rehabilitation Engineering and Applied Research (REAR) Lab at rearlab.gatech.edu

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Sharon Sonenblum, Ph.D., is a senior research scientist in the George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology in Atlanta where she studies wheelchair seating and mobility. She also serves on the board of directors of the National Pressure Ulcer Advisory Panel. Her work focuses on two primary areas: the use of assistive technology in everyday life and tissue health and pressure injury prevention. Sonenblum's work on tissue health uses imaging to investigate the tissue's response to loading and positioning and has used other tools to study the role of weight shift behaviors in pressure injury development.

FOUNDATION OF FAITH

Written by: **ROSA WALSTON LATIMER**

Jodi Baumgard, ATP, CRTS®, at Reliable Medical Supply in Minnesota, became a NRRTS Registrant in 2006, early in an enduring career that has proven to be personally fulfilling. "There was no single event that set me on this career path. From an early age I wanted to help improve people's lives and, because of that strong nature of my personality, I was encouraged to pursue a nursing career," Baumgard said. "While I was in high school, I began working at a local nursing home caring for elderly residents. I very much enjoyed working with them and experiencing their wisdom, humor and quirks. From the residents I learned more about myself and my capabilities because, for the most part, they were free with their praise and their criticism."

Baumgard recalls in that setting she learned she could show compassion even during very stressful situations, a lesson still relevant in her work. "I also learned the importance of a supportive family and friends and how they can have a profound, positive affect on an individual's mental capabilities and physical abilities."

Early in her work experience, Baumgard realized she couldn't make the commitment to a career in nursing that would likely mean an irregular work schedule. "I knew I would want to spend weekends with my family and friends, so I began looking for other positions. I wanted to continue to help improve the lives of others but with a more regular schedule," Baumgard said. She worked for a couple of years as a nursing assistant with an on-call agency working in a variety of settings and then moved to a transitional care facility for individuals with spinal cord injuries, congenital disabilities and traumatic brain injuries. Baumgard's responsibilities were to reinforce the strategies the patients had learned from their therapists, such as independent transfers and dressing. "This setting made a big impression on me because the patients were mostly in their early 20s, near my age," Baumgard said. "I grew up in a small town where the only people I had seen in a wheelchair were elderly. It was an education for me to see young people in wheelchairs relearning how to complete their activities of daily living."

I ALSO LEARNED THE IMPORTANCE OF A SUPPORTIVE FAMILY AND FRIENDS AND HOW THEY CAN HAVE A PROFOUND, POSITIVE AFFECT ON AN INDIVIDUAL'S MENTAL CAPABILITIES AND PHYSICAL ABILITIES.

Jodi Baumgard, ATP, CRTS

After a time, Baumgard moved into a position as a physical therapy aide at the facility. "This was my first exposure to more complex rehab and working more with equipment than people, and I very much enjoyed assisting the therapists," Baumgard said. "During this time, I began to realize the importance of the equipment in allowing those patients to improve their function and gain independence. I made the clear connection between a patient having the best possible equipment and having the opportunity to function at their best."

Baumgard and her husband moved to a different city and her longer commute prompted a job change. "I needed to work closer to our home and accepted a position as a paraprofessional with middle school

Jodi Baumgard and her dad, Harry Baumgard.

Jodi Baumgard and her mother, Loni Baumgard.

students with disabilities," Baumgard said. "I enjoyed working with this population and liked encouraging students to become as independent as possible. During the school year, I saw great improvement in the students who previously might not have received this kind of encouragement. I felt I was helping prepare these kids for a more fulfilling future. And, once again, I was in a situation that provided growth for me in skill and knowledge."

Following her year working at the middle school, Baumgard applied for a job with Reliable Medical Supply. "As much as I liked my work with the students, I was ready to return to the medical field in some capacity," Baumgard said. "When I went in for the interview, I told the owner I was not sure what he was looking for, but I was interested in working with patients and their wheelchairs. He said, 'When can you start? That's exactly what we are looking for.' That was 18 years ago, and I'm still here! I work with all ages and in diverse settings — schools, clinics, group homes and private homes. I am privileged to work with a great team of people at Reliable who 'strive to improve the quality of life for individuals.' Each person brings their own dynamic set of skills, and together we 'make it happen.'

"Over the years, after obtaining and then maintaining, the NRRTS CRTS® designation and RESNA ATP certification have helped broaden my knowledge base. The online education courses offered by NRRTS are diverse and have been a very useful resource."

Baumgard's education and training have all been "hands-on" and she believes there was a resolute path to her career. "There is no way I could have had the foresight to plan my journey," Baumgard said. "My experience has provided a great deal of practical knowledge from a variety of perspectives. For example, because of my very first job, I now know not to schedule an appointment with a patient in a nursing home during Bingo."

The same faith that allows Baumgard to see the purpose and direction of her life as a series of divine appointments also keeps her engaged in her service to others. "Burnout is common in this profession so it can be hard to stay motivated, but I find encouragement from the patients and their caregivers, therapists and my co-workers," Baumgard said. "I also find encouragement being active in my local church at St. John's Lutheran Church in Buffalo, Minnesota, attending Bible study group or simply listening to a local radio station. Faith Radio 'that connects faith to life' and KTIS, which plays contemporary Christian music 'that offers hope and encouragement', have been long-time favorites. These activities are uplifting and motivating to me and continually renew my spirit.

I WORK WITH ALL AGES AND IN DIVERSE SETTINGS - SCHOOLS, CLINICS, GROUP HOMES, AND PRIVATE HOMES. I AM PRIVILEGED TO WORK WITH A GREAT TEAM OF PEOPLE AT RELIABLE WHO 'STRIVE TO IMPROVE THE QUALITY OF LIFE FOR INDIVIDUALS.' EACH PERSON BRINGS THEIR OWN DYNAMIC SET OF SKILLS, AND TOGETHER WE 'MAKE IT HAPPEN.'"

"I have called myself a Christian my whole life; however, when a stranger on an airplane, prompted by the cross I was wearing, asked about my faith, I realized my lack

CONTINUED ON PAGE 20

(left to right) Jodi Baumgard, Gavin Elsberry from Rehab Tech, with patients Mazin and Momin; and their mother, Samar. Jodi Baumgard has worked with these brothers for over 15 years.

FOUNDATION OF FAITH
(CONTINUED FROM PAGE 19)

Jodi Baumgard combines her two hobbies, gardening and photography, to create beautiful images.

of understanding about my personal belief. My answer was stumbling and inadequate," Baumgard said. "That encounter convicted me, and I joined a small group for parents of tweens and teens at my church who met weekly to discuss the challenges of raising this age group in something called a 'counterculture.' I had never heard of that before in this context. I always thought 'counterculture' meant people who lived on the fringes of society."

Baumgard found the group study refreshing, and it gave her some tools to teach her son and daughter that what looks and sounds normal is not necessarily the truth. "I realized the importance of discernment and to realize that just because someone says something, or says it in a funny way, doesn't mean it is true. One of my favorite quotes from the meetings was, 'Just because a bad idea knocks on the door, it doesn't mean you have to invite it in for supper.' I say that to my kids often!"

The participation in this group led Baumgard to be more involved in her church. She began to have a deeper understanding of what her faith meant to her on a personal level. "We go through all kinds of seasons — joy, pain, anger, loneliness — and I've learned drawing closer to God gave me a foundation of faith to sustain me through whatever season I'm experiencing — especially when 2020 happened. Instead of fear and panic, there were long periods of time when I could maintain a sense of peace."

Baumgard's foundation of faith did indeed recently prepare her for a difficult time in her life. "I strongly believe the timing of certain things in our lives is intentional, not just coincidence," Baumgard said. "Not long ago I had just finished an eight-week Bible study on forgiveness, when I was thrust into a particularly difficult time personally. Even though there are still unanswered questions, I have chosen to forgive those involved. Although the path of forgiveness has not taken away any pain or uncertainty, I am released of anger

> 'JUST BECAUSE A BAD IDEA KNOCKS ON THE DOOR, IT DOESN'T MEAN YOU HAVE TO INVITE IT IN FOR SUPPER.'

Jodi Baumgard (center) with her daughter, Anna and son, Andy.

or thoughts of revenge and can respond in an attitude of peace and calm. Of course, when I participated in that particular Bible study, I had no idea what was ahead."

While the relationship Baumgard enjoys with other members of her church and in her Bible study groups brings a sense of comfort and peace, she also finds authentic joy in her relationship with her two children. "My son, Andy, is 13 and my daughter, Anna, is 11. They are awesome! We enjoy being together very much," Baumgard said. "Both are kind, gentle and fun to be with. Andy plays the violin and likes baseball, but he is really into computers and has begun planning to build his first one. Anna is artistic and athletic and especially likes basketball, softball and swimming." When Baumgard is not working or spending time with Andy and Anna, she enjoys photography and gardening. "I've been involved with the Hennepin County Horticultural Society for the past 20 years," Baumgard said. "I've always found great peace and satisfaction while spending time out in nature whether it's weeding, spending time with family and friends, or taking photographs."

Baumgard is also a pro-life advocate and supporter. "I strongly believe all lives are precious, and when you know something to be right, you are responsible for doing what is right." This belief is the bedrock of Baumgard's dedication to her patients and continues to provide purpose and energy to her work.

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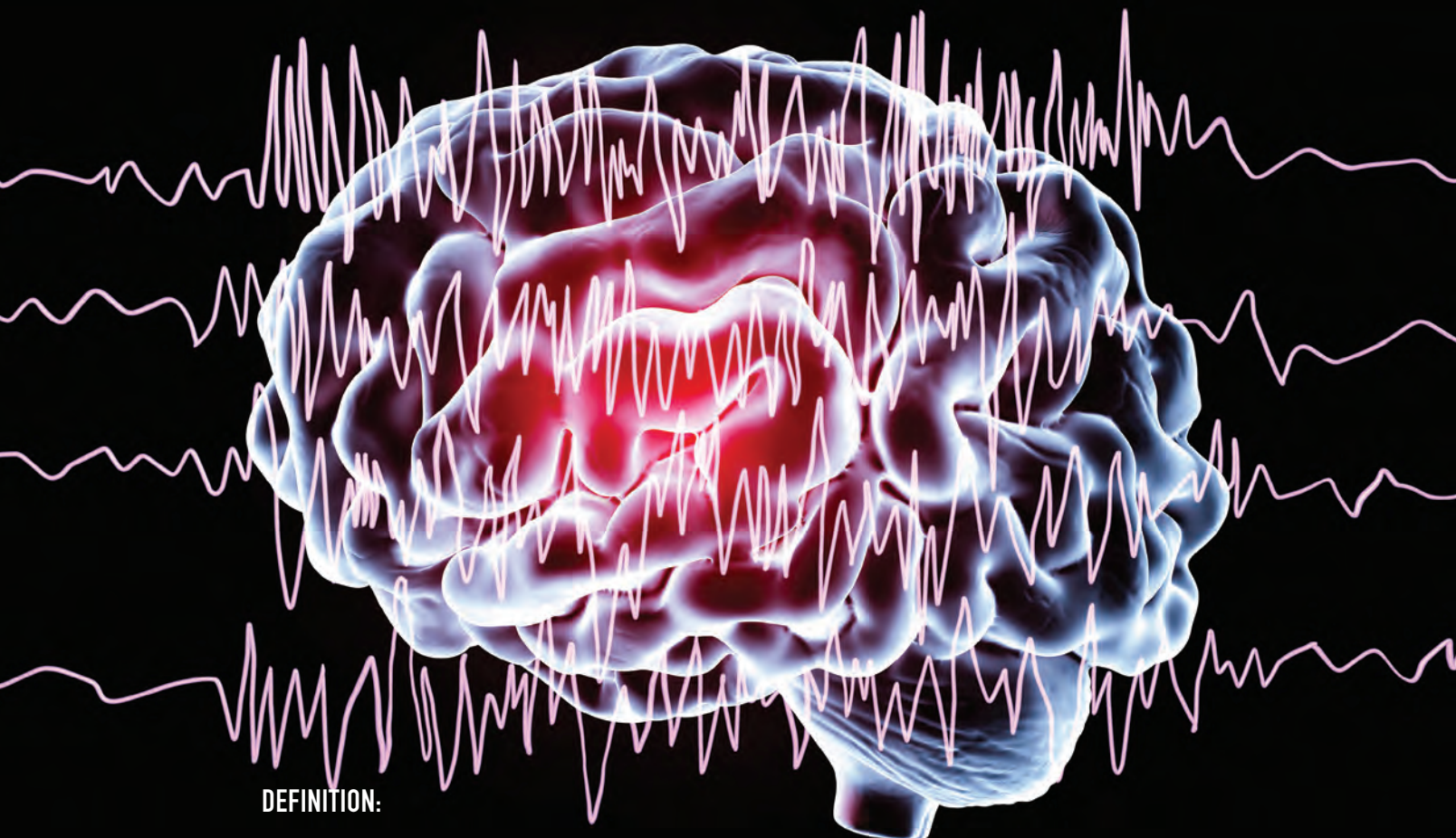
Jodi Baumgard, ATP, CRTS®, is a NRRTS Registrant who works for Reliable Medical Supply and lives in Minnesota.

SEIZURES

Written by: **MICHELLE L. LANGE, OTR/L, ABDA, ATP/SMS**



DEFINITION:

"A seizure is a burst of uncontrolled electrical activity between brain cells (also called neurons or nerve cells) that causes temporary abnormalities in muscle tone or movements (stiffness, twitching or limpness), behaviors, sensations or states of awareness." (Johns Hopkins Medicine, 2020). Epilepsy is recurring seizures. Seizures are diagnosed with an EEG. MRIs and similar tests may be used to provide further information and to determine an underlying cause.

SEIZURE TYPES:

The two main categories of seizures are focal onset and generalized onset. Focal onset seizures begin in one area of the brain and can spread across the brain. Symptoms can be mild to severe. Generalized onset seizures may start as a focal seizure that spreads to both sides of the brain or seizure activity may start simultaneously on both sides of the brain. These latter seizures are more likely to start in childhood.

Focal onset seizures include the following:

- Focal unaware or complex partial seizures: these seizures cause altered awareness.
- Focal aware or simple partial seizures: the person is aware of what is happening and may experience unusual sensations and movements.

Generalized onset seizures include the following:

- Absence seizures: brief staring episodes, though these can develop into tonic-clonic seizures.
- Myoclonic seizures: sudden body or limb jerks, which may include the arms, head and neck. These can occur on both sides of the body in clusters.
- Tonic and atonic seizures:
    - Tonic seizures cause sudden stiffness in the arms and body, which can lead to falls and injuries. Lennox Gastaut syndrome is a type of tonic seizure disorder.
    - Atonic seizures lead to a sudden loss of body tone leading to collapse and possible injury.
    - A brief tonic episode followed by an atonic seizure is called a tonic-atonic seizure.
- Tonic, clonic and tonic-clonic seizures (formerly known as grand mal): these seizures evolve from any of the focal or generalized seizure types. These seizures may be part of another syndrome, such as juvenile myoclonic epilepsy. Tonic-clonic seizures cause loss of consciousness and violent muscle contractions.

ETIOLOGY:

Seizures are often seen in people with other diagnoses where brain injuries have occurred including cerebral palsy, developmental disorders, meningitis, stroke, brain tumors, traumatic brain injury and other brain injury causes (i.e., anoxic or toxins).

TREATMENT:

The most common treatment is medications. If seizures are particularly difficult to control, diet therapy, nerve stimulation or surgery may be recommended. A ketogenic diet sometimes reduces seizure activity. vagus nerve stimulation is an implanted device which, when activated, sends electrical signals along the left vagus nerve to the brainstem, which then sends signals to specific areas of the brain. This is typically used for focal seizures (Mayo Clinic, 2020). Deep brain stimulation can also reduce seizures that are difficult to control — electrodes are implanted in certain areas of the brain, producing electrical impulses to regulate abnormal impulses. The stimulation is regulated by a device placed under the skin.

Some people who experience seizures require wheeled seating and mobility equipment.

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Michelle Lange is an occupational therapist with more than 30 years of experience and has been in private practice, Access to Independence, for over 10 years. She is a well-respected lecturer, both nationally and internationally and has authored numerous texts, chapters, and articles. She is the co-editor of Seating and Wheeled Mobility: a clinical resource guide, editor of Fundamentals in Assistive Technology, 4th ed., NRRTS Continuing Education Curriculum Coordinator and Clinical Editor of DIRECTIONS magazine. Lange is a RESNA Fellow and member of the Clinician Task Force. Lange is a certified ATP, certified SMS and is a senior disability analyst of the ABDA.

GOODBYE 2020 AND HELLO 2021

Written by: **DON CLAYBACK, EXECUTIVE DIRECTOR OF NCART**

Let us start with the often repeated "2020 was a challenging year." It certainly was, and we are proud of how the Complex Rehab Technology (CRT) industry stepped up to meet the needs of people with disabilities. We know this did not come without hard work and sacrifice, and it was great to see everyone's dedication.

During 2020, NCART's energy and resources focused on a wide variety of areas. These included securing and communicating needed COVID-19 solutions (business/staff/customer safety, federal financial assistance, remote and telehealth options, documentation relief, etc.) along with pursuing solutions to multiple CRT coverage and payment issues at the federal and state levels.

It was a busy year for our industry, and we thank our NCART members and all our advocacy partners for the contributions made in the collective efforts to maintain access to CRT. We are looking forward to 2021 with great hope and are ready to join with you to take on the year ahead.

NEW PRESIDENT AND CONGRESS

With the new year comes a new president, a new Congress, and new cabinet members and administration staff. A key factor on the health care policy side is President Biden will be appointing Xavier Becerra as his Health and Human Services (HHS) secretary. Becerra has been the California attorney general since 2017 and previously served 12 terms in the House of Representatives. So he knows his way around Congress and federal policies.

Immediate attention will be a continued focus on COVID-19 relief and assistance, which may take a variety of forms. This will pick up on the legislation passed at year-end that included an extension of the Medicare Sequester COVID-19 Moratorium to delay the 2% sequester cuts for an additional three months until March 31, 2021, $284 billion in additional Paycheck Protection Program loans, individual stimulus payments and unemployment benefit increases.

As the new administration is established, we will be setting up discussions to continue the work on pursuing our CRT initiatives.

STOPPING JULY 1 CUTS TO CRT MANUAL WHEELCHAIR ACCESSORIES

An immediate priority for CRT is to stop the Medicare payment cuts to CRT manual wheelchair accessories that will go into effect on July 1 unless Centers for Medicare and Medicaid Services (CMS) "makes permanent" the suspension of applying inappropriate Competitive Bidding Program pricing information. The current suspension expires on June 30, and CMS action is needed before then.

We had a productive meeting with CMS at year-end to review the status of our request. We highlighted the 41-signature bipartisan House of Representatives letter sent to them requesting a permanent policy change and discussed available CMS options. Additional comments and recommendations were included in our January 4 letter to CMS regarding the DMEPOS Proposed Rule (discussed below).

We will be continuing the dialogue with CMS and our Congressional supporters to finalize a resolution and push for a decision as soon as possible.

SECURING PERMANENT CRT REMOTE AND TELEHEALTH SERVICES

On the legislative front, Congress will be introducing updated telehealth bills in the new session and has asked for public input. With this in mind, CRT stakeholders are encouraged to use the links we have set up at www.protectmymobility.org to email their Members of Congress and request that any new legislation include the provisions that are important to maintain CRT access. Congress needs to hear from their constituents.

NCART and the CRT Remote Services Consortium submitted written comments to Congress stressing the need to give CMS the ability to permanently designate physical and occupational therapists as authorized telehealth practitioners and to include the therapy codes that relate to the evaluation and provision of CRT. The comments provided details on why it is important that this option be made permanently available after the COVID-19 Public Health Emergency. You can view the letter in the NCART Blog at www.ncart.us.

The CRT Remote Services Consortium, through the Clinician Task Force, is in the process of finalizing the "Clinician's Guide for Using Telehealth for CRT" and an

WE HAVE CREATED A STATE BUDGET CRT TOOLKIT THAT IS AVAILABLE FOR USE IN EDUCATION AND ADVOCACY. PLEASE CONTACT US IF YOU ARE SEEING OR HEARING ANYTHING IN YOUR STATE REGARDING BUDGET CUTS IMPACTING ACCESS TO CRT.

updated Decision Tree. It is expected these tools will be available for use in February.

ESTABLISHING COVERAGE OF POWER SEAT ELEVATION AND STANDING SYSTEMS

The ITEM Coalition-led initiative to secure Medicare coverage for power seat elevation and power standing systems continues to make progress. A conference call was recently held with a broad CMS team to review the coverage application request, the supporting documents and the related financial report.

This was a great opportunity to provide the initial overview and begin the detailed discussions that lie ahead as we work with CMS to answer their questions and emphasize the need and basis for new policies allowing coverage of these important technologies.

PREVENTING MEDICAID PAYMENT CUTS TO CRT AT THE STATE LEVEL

Budget deficits are expected in many states due to the financial impacts of COVID-19 and, as a result, state agencies are being asked to review their policies and rates to identify areas where reductions are possible. A top priority for 2021 will be monitoring state budget planning activities, connecting with key state government and agency staff, and updating resources supporting the critical need to prevent any CRT payment reductions.

We have created a State Budget CRT Toolkit that is available for use in education and advocacy. Please contact us if you are seeing or hearing anything in your state regarding budget cuts impacting access to CRT.

SEPARATE BENEFIT CATEGORY FOR CRT

The Separate Benefit Category Steering Committee will be reviewing the legislation from last session and evaluating the new Congressional and regulatory environment. Based on this analysis the planned actions for 2021 will be developed.

CMS MEDICARE DMEPOS PROPOSED RULE

NCART submitted a 22-page comment letter to CMS regarding their Proposed Rule CMS-1738-P "Medicare Program; Durable Medical Equipment, Prosthetics, Orthotics and Supplies (DMEPOS) Policy Issues and Level II of the Healthcare Common Procedure Coding System (HCPCS)".

The proposed rule covered a variety of DME/CRT matters including proposals regarding payment rates, Healthcare Common Procedure Coding System (HCPCS) processes, benefit category determinations, CRT manual wheelchairs and accessories legislation, and other areas.

You can view our submitted comments and recommendations at the NCART Blog at www.ncart.us.

CONSIDER NCART MEMBERSHIP

We respectfully suggest that NCART Membership is a critical investment for all CRT providers and manufacturers. NCART is the organization solely focused on delivering the CRT message with the mission of protecting YOUR business and the ability to serve YOUR customers.

Our industry needs a strong national association and that requires everyone's support to help fight the negative trends impacting CRT coverage and payment. For information on becoming an NCART member, please check out the membership area at www.ncart.us or email me to set up a conversation.

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Don Clayback is executive director of the National Coalition for Assistive and Rehab Technology (NCART). NCART is national organization of Complex Rehab Technology providers and manufacturers focused on ensuring individuals with disabilities have appropriate access to these products and services. In this role, he has responsibility for monitoring, analyzing, reporting, and influencing legislative and regulatory activities. Clayback has more than 30 years of experience in the Complex Rehab Technology and Home Medical Equipment industry as a provider, consultant and advocate. He is actively involved in industry issues and a frequent speaker at state and national conferences.

GOVERNMENT RECYCLING PROGRAMS IN CANADA

Written by: **LINDA NORTON, B.SC.OT, M.SC.CH, PH.D., OT REG. (ONT); MICHELLE HARVEY, BSC HONS OT; JASON KELLN, ATP/CRTS®; DON CLARKSON and MIKE LONGO**

Recycling is often explored by funding agencies as a way of attempting to reduce costs and to prevent equipment from being thrown out before the end of its useful lifespan. In Canada, mobility device government funding programs differ between provinces, some of which include a recycling component. The intent of this article is to provide an overview of several government programs that include recycling mobility devices as a component and to describe several different approaches to recycling. A brief description of each program, eligibility criteria and key features has been provided along with links to additional resources

BRITISH COLUMBIA

MEDICAL EQUIPMENT PROVISION PROGRAM (MEPP)

http://vchdesign.ca/mepp/index.html

https://hrsurveys.vch.ca/ViewContent.aspx?contentID=1107

Funded through the Vancouver Coastal, Fraser Health and Vancouver Island Health Authorities, MEPP is a formal equipment rental program for clients who need equipment at home and have no other source of funding. The available equipment includes wheelchairs, hospital beds, floor lifts, overhead lifts, bathroom safety and other durable medical equipment. The intention of the program is to ensure that access to equipment is not a barrier to discharge home and enables the client to remain safe at home. Recycling occurs through the Canadian Red Cross and approved vendors such as HMEBC, NSM and BC Mediquip.

This program is in its infancy, but speed of delivery is key allowing for faster discharges from hospitals. During the installation of lifts and floor to ceiling poles, a clinician is required to be present.

CHILDREN'S MEDICAL EQUIPMENT DISTRIBUTION SERVICE (CMEDS)

https://find.healthlinkbc.ca/ResourceView2.aspx?org=53965&agencynum=17666957

www2.gov.bc.ca/assets/gov/family-and-social-supports/children-teens-with-special-needs/at_home_program_guide.pdf

www.hmebc.com/corporate-programs/cmeds/cmeds-program/

Funded by the British Colombia Ministry of Children and Family Development (MCFD) through the At Home Program, the CMEDS is a pediatric equipment recycling pool. Established in 2017, the CMEDS recycles manual and tilt wheelchairs, power chairs, hospital beds, mobility equipment (such as walkers and standers), patient lifts, bathroom safety equipment, slings, therapy positioning devices and biomedical equipment. This provincial program is available to families with children, under the age of 18, who qualify for the At Home Program. An online resource center has been developed to assist families and clients with information on the program.

A vendor, HMEBC recycles the equipment. Key to the success of this program is to only keep product within the pool that is within the product liability guidelines to ensure the safety of the equipment. Some products such as transport vests, car seats, etc., cannot be recycled to the Canadian Safety standards, and are therefore not part of the recycling program. Custom products or products with various foams and certain material are tricky to recycle and require a wheelchair washer, as well as industrial steam and heat cleaners to prevent infection.

ALBERTA

ALBERTA AIDS TO DAILY LIVING (AADL) PROGRAM

www.alberta.ca/aadl-program-manual-and-product-lists.aspx

Funded through the Alberta government, the AADL program was established to assist Alberta residents with a long-term disability, chronic illness or terminal illness to maintain independence in their community by providing basic mobility devices. Clients must accept a recycled manual or power wheelchair if there is one available in the pool. Although seating is included in AADL benefits, seating is not recycled. AADL contracts with mobility device vendors to recycle the equipment. The AADL recycle pool is stored at various vendors

locations. This means that recycled wheelchairs may be transferred from one vendor who stored the equipment, to the client's vendor of choice. Vendors can submit a work order to AADL for refurbishing costs. When wheelchairs are no longer economical to repair or refurbish, they are used for parts or declared surplus.

SASKATCHEWAN

SASKATCHEWAN ABILITIES COUNCIL — SPECIAL NEEDS EQUIPMENT

www.saskabilities.ca/programs-services/daily-living-rehabilitation-services/special-needs-equipment

Funded through the Ministry of Health of the Government of Saskatchewan, this program provides residents, with a valid health card, access to a variety of medical devices. Medical devices available for loan include mobility devices (wheelchairs, walkers, cushions back supports, etc.) and environmental equipment (hospital beds, commodes, transfer poles, etc.). A health care provider requisitions the equipment on behalf of the client. Equipment is recycled through Five depots throughout the province by the Special Needs Equipment Branch. Note that the client, not the depot, is responsible for the installation of the device. Mobility devices available are listed in their manual and are limited to primarily two manufacturers.

MANITOBA

MANITOBA WHEELCHAIR PROGRAM

www.manitobapossible.ca/wheelchair-services

Funded through the Winnipeg Regional Health Authority, the focus of the program is to meet the basic mobility needs of Manitobans who are active and living independently in the community. Administered through the Winnipeg Regional Health Authority and a nonprofit agency called Manitoba Possible (on behalf of all Manitoba Regional Health Authorities), both new and recycled manual and power wheelchairs are provided. A recycled wheelchair is always the first option considered. Devices are prescribed by an occupational therapist or a physical therapist; however, a physician, nurse practitioner or registered nurse can prescribe a category 1 chair (basic folding wheelchair).

A listing of available equipment is provided and is limited to primarily two manufacturers. Seating components such as cushions and back supports are not covered by this program, and the client is responsible for any costs associated with these items.

ONTARIO

ONTARIO: ASSISTIVE DEVICES PROGRAM, CENTRAL EQUIPMENT POOL (CEP) FOR HIGH TECHNOLOGY WHEELCHAIRS

www.health.gov.on.ca/en/pro/programs/adp/policies_procedures_manuals/docs/mobility_devices_man.pdf

www.ontario.ca/page/mobility-aids

motioncares.ca/funding/ON/adp

Through the Assistive Devices Program, the Ontario Ministry of Health provides funding for people with physical disabilities to increase their independence through access to various assistive devices including manual wheelchairs, power wheelchairs and seating. A complete list of products available can be found here: www.health.gov.on.ca/en/pro/programs/adp/product_manuals/product_manuals.aspx.

Within this program is the Central Equipment Pool operated by Motion (a vendor), which provides both new and recycled power wheelchairs where power tilt and/or power recline is a component. Recycled bases and power dynamic positioning components are always considered as the first option where they meet the prescription of the ADP authorizer (usually an occupational therapist or physical therapist). Prescribed seating components provided through the pool are always new. Equipment through the pool is provided at discounted prices, and a rebate is provided on the client portion when the equipment is returned to the pool for recycling.

Critical to this program is ensuring equipment is in recyclable condition prior to accepting it back into the pool. Skilled technicians who can refurbish high technology equipment and install new componentry ensures that the recycled equipment matches the authorizer's prescription.

CONTINUED ON PAGE 28

GOVERNMENT RECYCLING PROGRAMS IN CANADA
(CONTINUED FROM PAGE 27)

QUEBEC

RÉGIE DE L'ASSURANCE MALADIE DU QUÉBEC (RAMQ)

www.ramq.gouv.qc.ca/en

www.ramq.gouv.qc.ca/sites/default/files/documents/brochure-fauteuil-roulant-en.pdf

Funded through the Quebec Ministry of Health and Social Services, the RAMQ program is an overarching medical health insurance plan that monitors the remuneration of health professionals and facilitates access to health care for the citizens of the province of Quebec.

The mobility arm of the program funds manual and powered wheelchairs as well as scooters and pediatric strollers. Ambulation aids such as fixed and rolling walkers are funded as long as the client will use them for a one-year period. A full list of funded products covered by the program can be found at www.ramq.gouv.qc.ca/sites/default/files/documents/liste-at-appareils-def-mot-mod-2020-07-13-en.pdf.

To access funding, the client must be insured under the Health Insurance Plan and have a physical impairment. There are additional eligibility criteria listed by device type.

In the province of Quebec with the RAMQ program, the role of the manufacturer is different than other areas of the country. The manufacturer representative works directly with the clinician and the client on the prescription and fit and finish to the mobility assessment.

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Linda Norton, B.Sc.OT, M.Sc.CH, Ph.D., OT Reg.(ONT) is an occupational therapist who is passionate about the provision of appropriate seating and mobility equipment. Her diverse experience in various settings including hospital, community and industry and experience in various roles including clinician, educator, manager and researcher give Norton a unique perspective. She teaches at two Ontario universities, is the manager of learning and development at Motion and has delivered workshops across North America.

Michelle Harvey, BSc Hons OT, has more than 16 years in the Mobility and Accessibility Industry. With a background in occupational therapy, Harvey has been a speaker at the International Seating Symposium, the European Seating Symposium and the Canadian Seating and Mobility Conference. Additionally, she is also certified in Ride's Custom Seating.

Jason Kelln, ATP, CRTS®, has been employed by PrairieHeart Mobility in Saskatchewan for 22 years. Kelln been a certified RESNA ATP for 17 years and became a Certified Complex Rehabilitation Technology Supplier® in 2018, becoming the first NRRTS Registrant in Canada. He has attended product and technical courses from every manufacturer in Canada and ensures his clients have all options available to them. For the last 10 years, Kelln has been in the position of sales manager. He is a director at large for NRRTS and sits on the RESNA Professional Standards Board. Kelln received the CAOT/SSOT Citation Award Recipient in 2020.

Don Clarkson has been the Tterritory business manager for Invacare Canada in Manitoba and Saskatchewan since 1993. He represents the full Invacare product line.

Mike Longo is the senior director of commercial operations for Sunrise Medical Canada. Longo has been with the company for 19 years. His primary focus is on all departments who work closely with clients and clinicians on the prescription of their innovative complex rehab mobility and seating products. These would include marketing, sales, customer service and clinical education. Longo also sits on the executive of the Canadian Assisted Devices Association and works closely with industry stakeholders on client advocacy and awareness of the important role that we play in improving peoples lives.

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RESNA: BIG PLANS FOR 2021

Written by: **ANDREA VAN HOOK, EXECUTIVE DIRECTOR, RESNA**

Like everyone else, all of us at RESNA are delighted to turn the page on 2020 and move on to 2021. While the pandemic rages on, the vaccines give us hope there is now a light at the end of the tunnel.

So what does that mean for the RESNA Annual Conference, scheduled for July 7 – 10 in Washington, D.C.? Well, unfortunately, July may be just a bit too early to gather in person this year. In addition, with the economy struggling and the continuing social disruption of the pandemic, it is understandable most would prefer to focus on their jobs and their families. As a result, RESNA's board of directors has decided to hold a virtual conference during the same dates.

By the time this magazine is published, we will have announced the program and registration will be open, or opening soon. While it is sad not to be in person, we feel positive about this decision. RESNA's 2020 Virtual Conference last September was a huge success. We heard from many people who loved the affordable registration price and enjoyed not paying additional dollars for travel and hotel. The program content was excellent, and conference attendees are still enjoying accessing the virtual platform, watching the videos of those sessions they were not able to attend live, and earning the continuing education (CEU). In addition, many attendees expressed surprise and delight that they still were able to network and meet new colleagues through the virtual coffee chats and other events, despite the virtual environment.

WITH THE THEME RESNA 2021: WELCOME HOME, WE ARE GOING TO BUILD (NO PUN INTENDED) ON WHAT WE LEARNED LAST YEAR AND PROVIDE AN EXCELLENT CONFERENCE EXPERIENCE FOR THE ENTIRE ASSISTIVE TECHNOLOGY PROFESSION. GET READY FOR EVEN MORE CE OPPORTUNITIES, NETWORKING EVENTS, INSPIRATIONAL KEYNOTES, INTERNATIONAL SESSIONS AND THE LATEST IN ASSISTIVE TECHNOLOGY RESEARCH!

With the theme RESNA 2021: Welcome Home, we are going to build (no pun intended) on what we learned last year and provide an excellent conference experience for the entire assistive technology profession. Get ready for even more CEU opportunities, networking events, inspirational keynotes, international sessions and the latest in assistive technology research!

Please join us for RESNA 2021 from the comfort of your own home! Visit the website at www.resna.org for more information.

ANNOUNCING NEW POSITION PAPER ON DYNAMIC SEATING

A new RESNA position paper is now available for free downloading on the RESNA website, under the "Resources" section. The "RESNA Position on the Application of Dynamic Seating" discusses typical clinical applications as well as the evidence supporting the application of dynamic seating. "Dynamic seating" is defined as movement that occurs within the seating system and/or wheelchair frame in response to intentional or unintentional force generated by the client. Dynamic components absorb force. When client force ceases, the stored energy is returned through the dynamic component, which in turn assists the client back to a starting position.

RECERTIFICATION RENEWALS: EMAIL DON'T SNAIL MAIL

Due to delays in the postage service, and the fact staff is continuing to work remotely, we strongly recommend that ATPs renewing their certification scan and e-mail their paperwork to info@resna.org. Staff will then place an invoice in your account, and you can either pay online securely with a credit card or mail a check to the address provided on the invoice. We also recommend you send your renewal paperwork at least three weeks prior to your certification expiration date. Thank you!

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Andrea Van Hook is executive director of RESNA. She has over 20 years of experience in nonprofit association management. She lives and works in the Washington, D.C., area.

APPLYING THE HAAT MODEL TO TACKLE EQUIPMENT ABANDONMENT

Written by: **LESLIE JACKSON, OTR/L, OTD, ATP, CEASIII; PENNY J. POWERS, PT, MS, ATP AND AMBER L. WARD, MS, OTR/L, BCPR, ATP/SMS, FAOTA**

INTRODUCTION

Discovering a client would not or could not use equipment and discards or abandons the equipment is a disheartening experience for a clinician or supplier. While various reasons may exist, equipment use is ultimately based on meeting clients' and caregivers' real and perceived needs. Such needs may be related to comfort, size, control, environment, support and/or function. However, equipment abandonment is more likely to occur when there is a mismatch between the client and the technology.

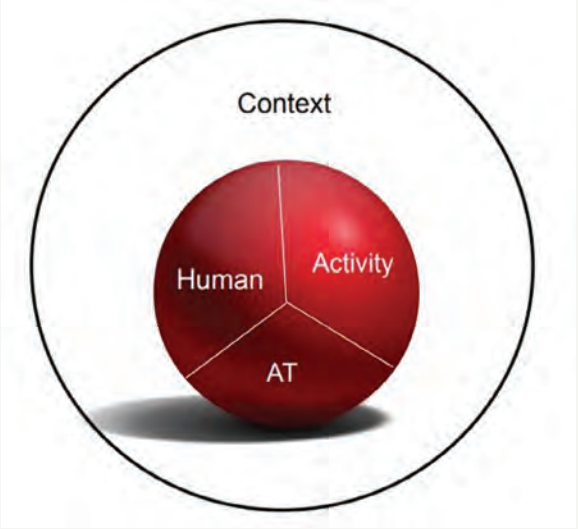
EQUIPMENT ABANDONMENT

According to a study by Phillips and Zhao (1993), nearly one-third of all devices were found to be completely abandoned, and mobility devices were more frequently abandoned than any other type of equipment. Furthermore, abandonment occurred most frequently within the first year and after five years of use. Reasons for abandonment included: poor device performance, change in user needs or priorities, issues related to device procurement and lack of consideration of user opinion in selection (Phillips & Zhao, 1993). In a recent study conducted in a particular geographical area, nearly 20% of assistive devices were deemed abandoned (Sugawara, Ramos, Alfieri & Battistella, 2018). These statistics lead clinicians and suppliers to consider the causes and consequences of equipment abandonment. Abandoning equipment can affect one's functional independence and safety and, ultimately, impacts stewardship of precious financial resources and time.

ABANDONING EQUIPMENT CAN AFFECT ONE'S FUNCTIONAL INDEPENDENCE AND SAFETY AND, ULTIMATELY, IMPACTS STEWARDSHIP OF PRECIOUS FINANCIAL RESOURCES AND TIME.

Failing to consider user opinion in device selection warrants further discussion. These findings reiterate the importance of listening to user opinion when selecting assistive devices, including seating and wheelchair equipment. While initially intended as a way to guide assessment of assistive technology (AT) use, the Human Activity Assistive Technology (HAAT) Model has evolved with outlined factors that may potentially explain or point to outcomes (Giesbrecht, 2013). The aim of this article is to provide a brief overview of the HAAT Model and explore how this framework can support client-centered service provision and may reduce equipment abandonment.

FIGURE 1 Visual representation of the Human Activity Assistive Technology Model [Adapted from Cook, Polgar, & Encarnaç o (2020)]



THE HUMAN ACTIVITY ASSISTIVE TECHNOLOGY (HAAT) MODEL

Identified by Cook and Hussey in 1995, the HAAT Model highlights interactions of key components involved with AT use. The HAAT Model fundamentally explains how four components interact and influence each other in participation — human, activity, assistive technology and context (Cook, Polgar, & Encarnação, 2020). Figure 1 provides a visual representation of the

model's components. The underlying premise is to ensure technology appropriately meets end users' needs with consideration to their activities. Based on this model, the activity or need is identified first, and then human factors are considered based on how these impact client abilities to participate or engage in the identified activity. The next step is to discern contextual influences, specifically the physical, social, cultural and institutional factors (Cook, Polgar, & Encarnação, 2020). The latter phase includes evaluating AT design and determining equipment, with greater emphasis on the human rather than the technology (Cook, Polgar, & Encarnação, 2020).

ASSESSING THE "ACTIVITY" COMPONENT REQUIRES MORE THAN SIMPLY IDENTIFYING THE ACTIVITY OR THE TYPE OF ACTIVITY (E.G., SELF-CARE, PRODUCTIVITY OR LEISURE ACTIVITIES). RATHER, CLINICIANS MUST DISCERN THE PERSONAL MEANING THAT A CLIENT ASCRIBES TO AN ACTIVITY AND ITS ASSOCIATED TASKS.

Assessing the model's "activity" component requires more than simply identifying the activity or the type of activity (e.g., self-care, productivity or leisure activities). Rather, clinicians must discern the personal meaning that a client ascribes to an activity and its associated tasks. To obtain a richer and more holistic perspective, clinicians should explore why and how the activity is performed as well as time-related factors such as frequency (Cook, Polgar, & Encarnação, 2020). The equipment may foster participation and be less likely to be abandoned if clients experience and perceive that AT professionals truly listen to and value their input to guide service provision.

According to the HAAT Model, the "human" component encompasses the physical, cognitive, somatosensory and attitudinal abilities of an individual (Cook, Polgar, & Encarnação, 2020). Evaluation of these abilities taps into the clinical observation, assessment and documentation skills of clinicians. Each individual has unique goals, abilities and preferences, including their interface with equipment. When evaluating AT equipment, clinicians and suppliers must assess one or a combination of these factors: human/technology interface, processor, environmental sensor, and/or activity output (Cook, Polgar, & Encarnação, 2020).

Let's apply the HAAT Model's deliberate process to an example. A client explains to a clinician that one of their goals and needs is to safely move between rooms within the home to perform activities of daily living. To reflect a client-centered approach, AT professionals must pose questions and intently listen to clients explain their goals and needs. Active listening can help ensure clients feel listened to - rather than feeling as if they have been talked into a device. The clinician should proceed with assessing the client's abilities (e.g., physical, cognitive, emotional and attitudinal) that potentially impact this goal or activity. The clinician must also understand temporal factors, such as how and when the activity occurs, to support the client's needs.

In this example, the clinician must also understand various contexts. Questions reflecting social context help the clinician to understand what individuals or groups (e.g., peers, caregivers, transportation providers) will be interacting with the end user on a regular, or perhaps infrequent, basis. For example, will a caregiver be involved with using and maintaining the equipment? Equally important is the need to understand cultural context. Cultural influences can provide information about readiness or equipment acceptance, such as beliefs about disabilities and willingness to accept technology use and assistance from others (Cook, Polgar, & Encarnação, 2020). If a clinician persuades an individual to obtain equipment that is not valued or acceptable within the individual's culture, the equipment is likely to be discarded and abandoned. Considering institutional influences requires clinicians to identify and understand the legislative, policy and funding mechanisms that can influence equipment provision (Cook, Polgar, & Encarnação, 2020). If the client's funding source has specific documentation requirements and processes, the clinicians must identify and adhere to these procedures.

CONTINUED ON PAGE 34

APPLYING THE HAAT MODEL...
(CONTINUED FROM PAGE 33)

CONCLUSION

Intentionally assessing factors within the HAAT components assists clinicians with providing client-centered services and helping clients to perceive they are valued members of multidisciplinary teams. Clinicians should not underestimate the power of attentive listening and asking effective questions. AT professionals can proactively ensure clients feel valued and listened to. Applying the HAAT Model to assessment and service provision has potential to foster client's activity participation with equipment and reduce equipment abandonment. Efforts on all fronts seek to improve customer satisfaction with their seating and wheeled mobility devices. Clinicians and suppliers should consider evidenced-based interventions and the authors propose that the HAAT model contains elements that may facilitate practice and the community support of engaged end users.

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10.1080/17483107.2018.1425748

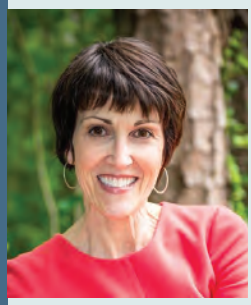
Leslie Jackson has been serving as a treating occupational therapist for over 20 years. Her clinical experience spans acute care, home health, school-based, long-term care and outpatient settings. She earned her post-professional occupational therapy doctoral degree from Creighton University. In addition to her current practice for a seating and wheelchair clinic, she serves as associate professor at the Occupational Therapy Doctoral Program at Indiana Wesleyan University, where she teaches content about assistive technology, adult intervention and assessments, orthotic fabrication, clinical documentation, and health systems management and policy. Jackson is recognized as a Certified Ergonomics Assessment Specialist and is also LSVT BIG® Certified. She earned RESNA's Assistive Technology Professional certification in 2008. In 2013, she co-authored a chapter about spinal cord injuries and the brachial plexus in "Hand and Upper Extremity Rehabilitation: A Quick Reference Guide and Review (Second Edition)". She has presented at the American Occupational Therapy Association's Annual Conference and continues to be involved in research and grant-related projects.

Penny J. Powers, MS, PT, ATP, is a Level IV physical therapist at Pi Beta Rehabilitation Institute at Vanderbilt University Medical Center. Powers is the lead physical therapist for the Adult Seating and Mobility Clinic. Her practices involves specialty seating for a diverse adult population. She has had presentations accepted at national conferences including RESNA and APTA Combined Sections meetings as well as the International Seating Symposium. She serves as adjunct faculty at Belmont University DPT program. She has had IRB approved research projects in collaboration with Belmont University for the past seven years. Powers sustains membership in APTA including the Neuro Section and RESNA. She currently serves on the executive board of the Clinician Task Force.

Amber Ward has been a treating occupational therapist for 23 years — 10 years in inpatient rehabilitation and 13 years as full time occupational therapy coordinator with persons with amyotrophic lateral sclerosis (ALS) and muscular dystrophies. She has treated a wide variety of patients, of all ages and functional levels. She currently is an adjunct professor at the occupational therapy assistant program at Cabarrus College of Health Sciences in addition to working in the clinic. She received the RESNA Assistive Technology Professional certification in 2004, the Seating and Wheeled Mobility certification in 2014, and became AOTA board certified in physical rehabilitation in 2010. She runs the seating clinic at the Neurosciences Institute Neurology in Charlotte, North Carolina. She is involved with multiple research projects and is the author of two peer-reviewed journal articles about power wheelchairs with persons with ALS.

NRRTS|CE

CONTINUING EDUCATION *WORTH THE INVESTMENT*



TUESDAY, FEBRUARY 9, 2021, AT 7 PM ET

Medicare Regulation and Policies; insidious ways access to CRT is denied

Speaker: Rita Stanley

Funding and Public Policy, Beginner Level

This course will highlight Medicare regulation and policies related to Complex Rehab Technology (CRT) that impact the ability for people with mobility limitations to receive CRT items and services that would improve their health outcomes, daily function and quality of life. Specifically, the course will cover recent rules and policies related to CRT mobility, wheelchair seating, and wheelchair options and accessories. The course will discuss and assess strategies to bring about needed change. This course will also inform participants regarding ways they can be involved in ushering in meaningful change.

LEARNING OUTCOMES:

- The participant will be able to describe three rules or policies that prevent access to CRT.
- The participant will be able to describe scenarios where Medicare policies have a negative impact on non-Medicare beneficiaries.
- Participants will be able to describe Medicare rules or policies that must not or are not required to be applied to Medicaid.

WEDNESDAY, FEBRUARY 10, 2021, AT 7 PM ET

ADA Basics and Enforcement

Speaker: Kelly Narowski, MA, ADAC

Funding and Public Policy, Beginner Level

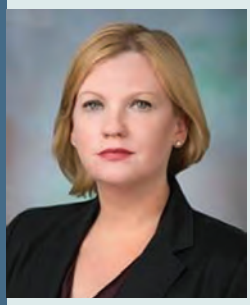
This course explores the legal requirements of the Americans with Disabilities Act (ADA) from a civil rights framework and is designed to help increase your knowledge and understanding of the basic principles and core concepts in the ADA. The five titles of the ADA will be explained and real-life situations of discrimination shared. Further, disability advocacy and ADA enforcement measures will be discussed.

LEARNING OUTCOMES:

- The participant will be able to identify and discuss the five titles of the ADA.
- The participant will be able to define the general nondiscrimination requirements of the ADA and learn real-life examples.
- The participant will be able to describe both ADA advocacy and its enforcement measures.

For more information, visit the website www.nrrts.org

NRRTS CE



THURSDAY, FEBRUARY 11, 2021, AT 5 PM ET

Post-Election Analysis: Impact on CRT Access

Speaker: Amy Cunniffe, B.A., Political Science

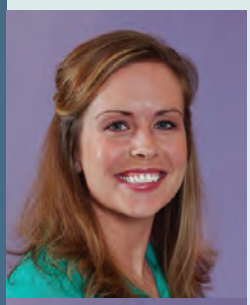
Sponsored by Numotion

ATP Prep Content, Funding and Public Policy, Beginner Level

The political winds are changing in our nation's capital. Course participants will learn more about the changes likely to occur in health care policy due to the 2020 election results. These policy changes could mean a significant shift in the direction of health care policy. The specific needs of the disability community will also be impacted. The course will outline what changes are likely to occur in federal policy including Medicare and Medicaid policy, insurance coverage, health reform and anticipated coverage changes for those who rely on Complex Rehab Technology (CRT). In addition, the course will outline key areas of controversy and anticipated hurdles that must be overcome to achieve better policy changes to improve CRT access.

LEARNING OUTCOMES:

- The participant will be able to describe the key health care issues debated in the 2020 election campaign and how these issues impact the final election outcome and share of power in federal policy making.
- The participant will be able to describe the policy views and perspectives of newly elected health care leaders.
- The participant will be able to describe how health care leaders work together to find common ground and where are they likely to fall short of finding compromise.



TUESDAY, FEBRUARY 17, 2021, AT 3 PM ET

Making Lemons into Lemonade: Telehealth's Place in Complex Wheelchair Prescription

Erin Michael, PT, DPT, ATP/SMS and Meredith Linden, PT, DPT, ATP/SMS

ATP Prep Content, Best Business Practice, Intermediate Level

The COVID-19 pandemic has adversely impacted access to health care, including complex wheelchair prescription. Swift action had to be taken to ensure that current wheelchair and seating equipment was meeting the end users' needs or to complete evaluations for new equipment, pushing providers to integrate telehealth and remote services into wheelchair provision. This course will highlight how remote services can be utilized throughout the wheelchair delivery process, identify potential pros and cons of the remote services model, as compared to in person, and clarify best practices to practice remotely. Our course will address the question of whether telehealth and remote services can be used to successfully meet client needs when in-person assessment is not possible.

LEARNING OUTCOMES:

- Participants will be able to define telehealth (or remote service) and describe the primary differences between this and in-person service.
- Participants will identify three challenges associated with remote wheelchair service provision and how to mitigate them.
- Participants will identify three benefits associated with remote wheelchair service provision.

For more information, visit the website www.nrrts.org

2021

WEDNESDAY, MARCH 3, 2021, AT 11 AM ET

What Do I Do Now? CRT Decision Making Process and Problem Solving

Speaker: Weesie Walker, ATP/SMS, NRRTS Executive Director, NRRTS Fellow

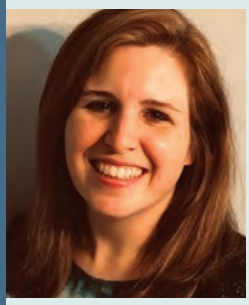
Sponsored by NRRTS

Ethics, Beginner Level

Complex Rehab Technology (CRT) suppliers are responsible for guiding decisions on equipment choices for consumers and clinicians. When the best technology choice is not funded or underfunded, what happens next? This is a common issue in today's coverage environment. Providing clear information to the consumer and clinician allows for the best solution.

LEARNING OUTCOMES:

- The participant will be able to describe the priorities of the client's needs, goals and activities in the context of a wheelchair seating and mobility evaluation.
- The participant will be able to describe the importance of offering of the full range of products options objectively.
- The participant will be able to describe three ways to obtain additional funding for equipment that otherwise is not reimbursed.



WEDNESDAY, MARCH 10, 2021, AT 7 PM ET - WEDNESDAY

The "T" in Team: How to Engage Therapists Who Are New to the Seating Team

Speaker: Allison Baird, MS, OT, ATP

Best Business Practice, Beginner Level

The Seating team is essential for wheelchair service provision. Team dynamics can be challenging as personalities work together towards a common goal. A layer of complexity is added when a therapist, who is new to seating, joins the team. How do we maintain team collaboration with a member who is developing new skills?

This presentation will explore the challenges of working as a team with members who have various levels of knowledge, skills and experiences. It will also identify areas of expertise that therapists bring to the seating team. Lastly, the presentation will outline strategies for successful team collaboration.

LEARNING OUTCOMES:

- The participant will be able to describe three areas of expertise that occupational and physical therapists bring to the seating process.
- The participant will be able to identify three strategies to engage all team members in the wheelchair process.
- The participant will be able to identify three qualities of a successful team.

NRRTS CE

WEDNESDAY, APRIL 7, 2021, AT 11 AM ET

Independence Meets Autonomy: Environmental Control Options for Complex Rehab Equipment Users

Speakers: Jay Doherty, OTR, ATP/SMS, and JB Radabaugh, CTRS®, ATP/SMS

Sponsored by Quantum Rehab

ATP/SMS Prep Content, Best Business Practice, Intermediate Level

As the world's dependency upon electronics and environmental control devices has increased over recent years, it is important to meet the needs of Complex Rehab Technology (CRT) end users to enable independence and autonomy within their environments. We must furnish end users the opportunity to participate in, as well as control, their home environments by providing the ability to utilize their electronic smart devices to not only communicate with friends, family and caregivers but also control their home environments to maximize safety, health and independence. This readily available technology can figuratively and literally open doors for a greater level of independence every day. In this course we will be presenting a myriad of options available for end users to enable and increase independence and autonomy when it comes to controlling their own lives and home access through the use of power wheelchair electronics in combination with smart technology available today.

LEARNING OUTCOMES:

- Participants will be able to compare three types of environmental control options.
- Participants will be able to describe how wheelchair electronics can most benefit the individual through control of readily available technology.
- Participants will be able to distinguish three potential positive outcomes from independent environmental control access.

WEDNESDAY, APRIL 14, 2021, AT 11 AM

It's Personal! Programmable Power Wheelchair Driving Controls

Speaker: Lisa Rotelli, Director, Adaptive Switch Labs

Sponsored by ASL

ATP/SMS Prep Content, Seating and Positioning, Advanced Level

Advancements in power wheelchair technology have taken a giant leap forward in the last few years, but when we are in this fast-paced electronic world, not all customizations can be made through the wheelchair electronics alone. This course will discuss some options available to further your user experience and access through power wheelchair driving methods. We will talk about the added benefit of several of the drive controls and their programmability.

LEARNING OUTCOMES:

- The participant will be able to describe the need of programmable drive controls
- The participant will be able to identify types of drive controls that can be programmed.
- The participant will be able to describe reasons why programming the drive control and the wheelchair would benefit a user.

For more information, visit the website www.nrrts.org

2021

WEDNESDAY, APRIL 21, 2021, AT 11 AM ET

Features that Foster Functional Independence: Seating Decisions that Impact ADL task performance

Speaker: Alex Chesney, OTR, ATP

Sponsored by Quantum Rehab

ATP/SMS Prep Content, Seating and Positioning, Beginner Level

This course will present seating and wheeled mobility features that have a direct impact on functional independence specifically related to dressing, as well as bowel and bladder management. Many options and selections are made when it comes to manual and power wheelchair frames, bases and seating components, but is consideration being taken on how features help or hinder functional tasks? With length of stays being shorter and limited time frames in outpatient seating clinics, functional considerations for these tasks may not always be assessed in clinic. This course will specifically demonstrate through case studies and experience ways in which a seating and mobility system can assist with increased independence in these daily tasks from a wheelchair level.

LEARNING OUTCOMES:

- Participants will be able to discuss differences in manual wheelchair frame design as it relates to improved independence in positioning for ADL task performance.
- Participants will be able to apply power seating functions with the goal of increasing independence in dressing and positioning related to ADL performance from a power wheelchair.
- Participants will be able to recognize accessory items or positioning components of wheelchair and seating systems that allow for improved functional task performance as it relates to performing activities of daily living from the wheelchair level.

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VIBRATION AND THE MANUAL WHEELCHAIR USER

Written by: **CURT PREWITT, MS, PT, ATP**

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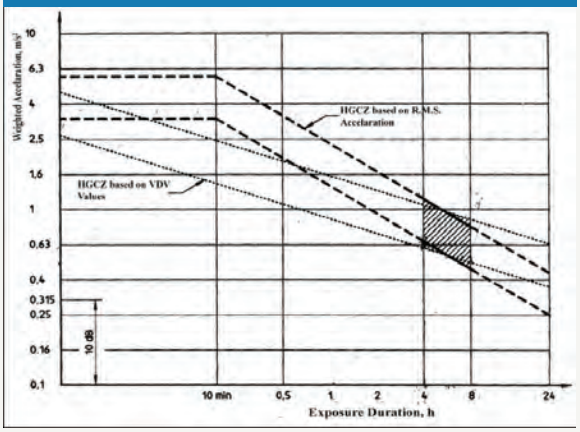
INTRODUCTION

Significant exposure to whole body vibration (WBV) has been linked to a variety of adverse health conditions and secondary injuries in able bodied workers exposed to WBV during occupation, especially in a seated posture. This includes workers in industries such as trucking, airflight (aircraft and helicopter), maritime, agriculture and construction. The International Standards Organization (ISO) has described WBV as "applicable to motions transmitted to the human body as a whole through the supporting surfaces: the feet of a standing person, the buttocks, back and feet of a seated person, or the supporting area of a recumbent person. This type of vibration is found in vehicles, machinery, buildings and in the vicinity of working machinery" (ISO 2631; 1997). ISO has also established some guidelines for individuals regarding exposure to WBV. Among them, the organization has described a zone of exposure levels in which caution is indicated with respect to potential health risks, and above which health risks are likely (see Figure 1).

FIGURE 1 ISO 2631-1 Health Guidance Caution Zones



WHAT IS VIBRATION?

It is important at this point to distinguish between vibration and shock — another term that is often included in a discussion of the topic yet refers to a different phenomenon. Vibration can be described as a periodic motion resulting in acceleration in alternately opposite directions. It can be caused, for example, by the striking of a tuning fork in the tuning of a musical instrument or by wheeled movement over discontinuous or rough surfaces. It is that familiar tingling, buzzing sensation from your smartphone when the vibrate setting is enabled for calls and alerts. In contrast, shock is a nonperiodic motion resulting in a sudden acceleration. It can be caused, for example, by an impact or drop. Shock is a transient physical excitation.

To a certain extent, we can think of the difference between vibration and shock as characterized by regularity (periodic and repeated, or not) and magnitude. To illustrate that difference, think of a roadway. If you are driving along a road that has rumble strips on the shoulder or centerline and your wheels roll over these, you will sense the vibration imparted to your vehicle through your hands on the steering wheel and through your body's contact with the seat cushion and seat back, as well as through your feet on the floorboard and accelerator pedal. That rumble strip is a discontinuous surface that produces accelerations on the wheels of the vehicle up and down in very regular and repeated intervals (periodic motion). These bumps are relatively small and do not cause you or your vehicle to accelerate very far vertically (magnitude). On that same roadway, however, one of your wheels may suddenly encounter a deep pothole. That pothole will create a very sudden vertical acceleration/deceleration as the wheel drops into it. Your car and your body will feel that shock. It will happen once (hopefully) and be over as this is a transient event. It will be of significant magnitude compared to the rumble strip and will not be periodic (regular and repeated).

Much of the literature that addresses WBV uses both the terms vibration and shock, so it's important to recognize this distinction with respect to periodicity and magnitude.

WHAT ARE THE EFFECTS OF VIBRATION ON HUMANS?

WBV and its effects are phenomena that may be experienced by all individuals. Automobile manufacturers have endeavored to design seats to enhance comfort by manipulating shape and materials, acknowledging that vibration is a factor to consider.

Investigations into automobile seat technology have examined the correlated factors of comfort related to seat design (static factors), long-term discomfort (fatigue factors associated with duration of the seated posture) and dynamics (vibration factors). Researchers have stated that "discomfort accrues with time [of being in the automobile seat], but that more discomfort is experienced when subjects are also exposed to whole-body vibration. Exposure to whole-body vibration accelerates development of discomfort" (Mansfield et al.; 2014).

Beyond simple discomfort, a wide array of workers are exposed to WBV with well-documented results. Obvious suspects include construction equipment like bulldozers and other earth moving equipment, and agricultural equipment such as tractors and harvesters. However, WBV exposure sources also include transportation vehicles ranging from taxis and delivery trucks to over-the-road trucks and aircraft.

Many studies have acknowledged that WBV can lead to acute and chronic effects on health. Acute effects may include muscle fatigue; discomfort; effects on motor performance, cognitive functions involving demanding tasks, speech and vision; as well as difficulties reading instruments and performing visual searches. Long-term exposure has been linked to degenerative disorders of the spine, spinal disc disease and failure, low back pain, nausea and dizziness. In a book titled "The Effects of Whole Body Vibration," the authors describe a variety of changes associated with WBV in physiological functions, including muscle activity, heart-circulatory function, sensory function, acoustic perception, equilibrium regulation, visual perception and sensorimotor performance. The authors recommend that, when constructing technical equipment, those vibration frequencies at which body resonance can be expected should be avoided, particularly when vibration transmission to humans cannot be avoided (Dupuis and Zerlett; 1986).

Much as it is for many able-bodied workers, WBV sustained by individuals in wheelchairs can not only have an adverse effect on comfort, ride quality and energy expenditure, but also, on a long-term basis, can contribute to pain, degenerative conditions, interference with ADLs, increased spasticity and even cause motion sickness. Maeda et al. (2003) distributed questionnaires to 33 wheelchair users to identify causes of complaints related to wheelchair vibrations. Participants reported the vibration from the wheelchair affected psychological comfort and that vibration was perceived on the neck, lower back and buttocks. Garcia-Mendez et al. (2013) stated, "There is evidence that seated WBV exposure is a risk factor for spinal disorders, excessive muscle fatigue and damage to the connecting nerves" and additionally that "vibration's cumulative effect plays an important role in WBV association with low back pain (LBP)." Pope et al. (1998) noted, "After exposure to whole body vibration, the muscles are fatigued, and the discs compressed (less capable of absorbing and distributing load). In this condition, the spine is in a poorer condition to sustain larger loads."

It is relevant to point out here that specific vibration frequencies, or ranges of frequencies, are of particular significance in this context; certain frequency ranges can potentially be more detrimental to humans than others. All objects have a frequency at which they naturally vibrate, known as the resonance frequency (RF). The RF is dependent on the physical characteristics of the object, such as mass and density. In humans, various tissues and parts of the body with differing physical characteristics tend to vibrate at different frequencies and thus each organ or part of the body may have a unique RF. The various unique RFs of all these body areas will also contribute to an overall RF for the body as a whole.

Various sources may state this range a little differently, but a range of vibrations between 0.5 Hz and 80 Hz is generally considered to have significant effects on the human body. For vertical vibration, the most important RF appears to be between 4 and 12 Hz, as noted by numerous sources, including ISO 2631-1. Several have stated as Cooper et al. (2003) have, "The greatest risk for injury due to shock and vibration exposure is when the frequency is near the natural frequency of seated humans. The natural frequency of seated humans is between 4 and 12 Hz. At the natural frequency, the shock and vibration induced in the body are amplified, thus increasing the risk of injury."

Garcia-Mendez and colleagues (2013) did a study looking at 37 individuals in manual wheelchairs, some of whom had suspension components, and the vibration loads to which they were exposed. In the study, four of 13 subjects in folding wheelchairs had suspension (three suspension casters, one casters and frame) and four of 24 rigid users had suspension (two casters, two casters and frame). The authors stated, "Our results indicate that 100% of the subjects were exposed to vibration loads at the seat surface that were either within or above the health-caution zone established by the ISO 2631-1 standards." Requejo et al. (2009) investigated hand rim wheelchairs with rear suspension and the forces involved in curb descent landings. They also stated, "Exposure to shock (infrequent high loads) and vibration (low–magnitude repeated loads) has been linked to muscle fatigue, back injury and neck pain. Consequently, shock and vibration experienced during daily wheelchair riding can decrease an individual's comfort, increase their rate of fatigue and limit their functional activity and community participation."

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FIGURE 2 Common path for vibrational energy to travel from ground to user via footrest

(CONTINUED FROM PAGE 41)

ASIDE:

While the purpose of this article is to highlight the potential harmful effects of WBV, it is interesting that many have investigated the use of WBV as a therapeutic intervention. Indeed, it is being used therapeutically in some settings. It has been postulated that in appropriate 'dosage' (duration, frequency and magnitude), WBV may have a beneficial effect on neuromuscular performance (possibly in terms of improving muscular performance during specific tasks) or possibly with managing or decreasing spasticity. It is beyond the scope of this article to explore this thoroughly, but it should be acknowledged that WBV not only has reported harmful effects, but with attention to proper dosage, may also have some beneficial effects.

HOW IS VIBRATION TRANSMITTED?

Vibration can be transmitted to a wheelchair through the elements of the chair in contact with the rolling surface, namely the caster wheels and the rear wheels. As those wheels roll across a surface, irregularities in that surface can impart perturbances to the wheels, disrupting smooth rolling and imparting movement and energy into the wheel (accelerations). Those perturbations can then be transmitted through the tire material, through the spokes and hub and, in turn, to the frame. The frame, of course, can then transmit much of that vibrational energy input through to the user in the wheelchair, even with a cushion in place (Garcia-Mendez, 2013) [see discussion on cushions below for more information]. It is worth noting that one of the areas of a wheelchair where vibration may be sensed the most is the footrest. The small diameter caster wheels at the front end of manual wheelchairs are sustaining the vibrational energy from the discontinuous surface, transmitting that energy right up through the caster stem, caster wing and through the connection to the footrest nearby. In short, the vibrational energy does not have very far to travel to get from the casters to the footrests, and from there directly into the lower extremities of the wheelchair user (see Figure 2).

Many common surfaces which are traversed during normal wheeled mobility have physical characteristics that impart small oscillatory movements in multiple planes. The perturbance imparted to a wheelchair is commonly measured in terms of acceleration, with vertical acceleration as potentially the most significant. These surfaces may have rough texture, such as brushed concrete or exposed aggregate (e.g., asphalt) and may contain seams and edges such as found on cobblestones, paver bricks and sidewalks. Many indoor surfaces such as indoor tile, paver bricks and carpeted surfaces also impart vibrational energy into wheeled mobility devices (see Figures 3 and 4). All of this contributes to the amount of exposure to WBV for the wheelchair user wheeling about in common environments.

WHAT HAS BEEN DONE TO MITIGATE THE EFFECTS OF VIBRATION?

Able-bodied workers have developed strategies to limit the adverse effects of WBV from occupation by limiting exposure time, such as rotating through alternate tasks that do not involve vibration and ensuring an adequate recovery time between exposures. Additionally, vibration damping technology can minimize WBV exposure for those workers. For example, the seats in many over-the-road trucks have incorporated vibration damping mechanisms into their design to mitigate the harmful effects transmitted to the drivers. Those strategies, however, may not be feasible or practical for the person seated in a wheelchair. Wolf et al. (2007) noted, "The harmful effects of WBV can be negated by an eight-hour rest period; however, this is extremely rare during an ordinary day of a manual or power wheelchair user, and through days, months and years, cumulative exposure to WBV could result in secondary injuries."

Wheelchair manufacturers have attempted to mitigate the detrimental effects of WBV through a variety of approaches in the past. Claims have been made regarding materials, frame design or specialized components. For example, many have long thought that titanium, as a wheelchair frame material, is better than aluminum at damping vibration. Chenier and Aissaoui (2014) looked at work required and vibration transmissibility (VT) during propulsion of six folding chairs (one carbon, one titanium and four aluminum). They observed that the titanium wheelchair in their study was not found to absorb vibration better than aluminum wheelchairs, noting that it contradicted current belief as well as their hypothesis.

FIGURE 3 Common surface that can impart vibrational energy to a wheelchair user - aggregate

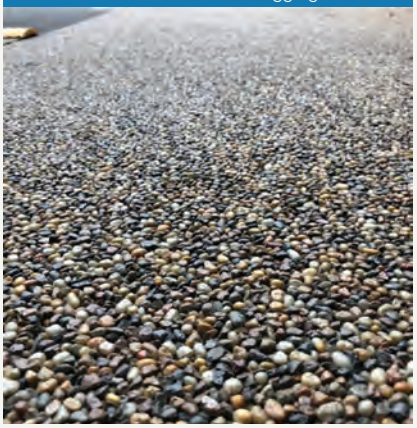
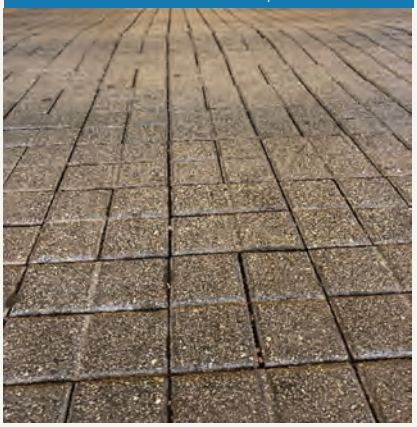


FIGURE 4 Common surface that can impart vibrational energy to a wheelchair user – paver bricks



WHEELCHAIR MANUFACTURERS HAVE ATTEMPTED TO MITIGATE THE DETRIMENTAL EFFECTS OF WBV THROUGH A VARIETY OF APPROACHES IN THE PAST. CLAIMS HAVE BEEN MADE REGARDING MATERIALS, FRAME DESIGN OR SPECIALIZED COMPONENTS.

A metallurgical analysis by Cochran (2011) of the properties of titanium and aluminum used in the fabrication of ultralight manual wheelchairs does not support the belief that titanium dampens vibration better than aluminum. In this technical report on the properties and characteristics of alloys commonly used in the manufacture of manual wheelchair frames, Cochran found that titanium alloys do not dampen better than the 6000 or 7000 series aluminum alloys used for that same purpose. In his investigation he noticed that "the best damping titanium alloy was slightly inferior to the two aluminum alloys of interest." Additionally, "All of the alloys (Ti, 6000 Al and 7000 Al) studied in this investigation have loss factors [damping capabilities] that are very low compared to the loss factors of other materials that go into the construction of a wheelchair." He concluded, "When considering (aluminum versus titanium) alloys, the material used to construct the frame of a wheelchair is of minimal importance to vibration damping when compared to the design of the wheelchair and/or the cushioning materials employed."

It is important to understand two points from Cochran's research. First, regarding the physical properties of the metal alloys used in the manufacture of wheelchair frames, his investigation found that titanium does not dampen vibration better than aluminum. Secondly, he states that whichever alloy is used is relatively inconsequential with regard to vibration damping when compared to how that alloy may be used in the design of the chair, or what other components may be utilized. In other words, it is likely the design of the chair and choice of secondary components, not the frame material, is responsible for how well a wheelchair dampens vibration. This is the only research this author is aware of that specifically analyzes the properties of these alloys with regard to how they respond to vibration.

Some of these other materials mentioned by Cochran include tires and tire materials. Generally speaking, tire choices come down to three broad categories: solid tires, using materials such as polyurethane, pneumatic tires inflated with air and composed of various rubber compounds, and pneumatic tires that contain solid inserts instead of air, thus behaving more as a solid tire. The example of an inflated tire serves this discussion: We intuitively know that a pneumatic tire that is underinflated will absorb more vibrational input, and therefore transmit less of it. Conversely, we know that a very firmly inflated tire will 'sense' and transmit more vibration than the underinflated one. We also intuitively know, however, that the underinflated tire will require more energy to propel than the properly inflated one.

Some rear wheels have incorporated mechanisms purported to absorb shock and lessen vibration, as well. Information on these wheels is primarily from the manufacturers of the products themselves and seems to convey characteristics that demonstrate reasonable mitigation of shock and vibration, but also tend to come at an appreciable energy cost. For example, wheels which contain mechanisms to manage WBV weigh more. The fact that the weight is in the wheel itself and represents rolling mass and the inertial properties and challenges that come with that, commonly equates to more mechanical work in propulsion.

Although technically not a component in frame design, the seat cushion may also dampen vibration. Many have thought that the wheelchair cushion must do a good job of dampening or 'cushioning' the user and protecting them from the vibration that continues to travel beyond the footrest and further up the frame.

Garcia-Mendez et al. (2012) investigated wheelchair cushions and acknowledged that the selection of a cushion is based primarily on the pressure-relieving properties, weight, thermal properties and ability to be cleaned. However, they went on to state, "In this study, we demonstrated that transmissibility (of vibration) is another important characteristic to consider, as most cushions amplify vibrations. Air-based cushions outperformed the gel- and foam-based cushions and should be considered when selecting a cushion to help reduce vibration exposure or as a precaution against spinal pain." Their results, and others, demonstrated that many wheelchair cushions appear to amplify cyclic

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VIBRATION AND THE...
(CONTINUED FROM PAGE 43)

vibrations in the same frequency range as the natural frequencies of the human body which are described as harmful to humans as defined by ISO 2631-1.

Wheelchair manufacturers have indeed used a variety of frame design concepts that have included various piston style shock absorbers (such as found on automobiles and mountain bikes), coil springs cantilevered torsion bars with elastomer dampeners and suspension caster forks to assist in preventing the transmission of vibration or shock to the user. Kwarciak, et al. (2008) described that placement and orientation of shock absorbing elements in frame designs seems to be of importance: "During this process, the benefit of the suspension system may be compromised because of the orientation of the wheelchair." In this context, the authors were describing that piston style shock absorbers are unidirectional and if forces imparting shock are not aligned in that direction, their effectiveness may be lessened. We have seen this in a few wheelchairs that were designed with one of these shock absorbers mounted to the frame under the seat and inclined at an angle forward. This may absorb a sudden shock (high amplitude, transient, not periodic) of a wheelchair user performing a curb drop. When the user is preparing to drop from a curb, he will typically pop-up into a wheelie, thus aligning that forward inclined shock absorber to a more vertical alignment, and effectively manage that sudden high amplitude shock. This same system, however, may not be optimally aligned when the chair is being propelled across a horizontal surface and sustaining smaller amplitude vertical oscillations that are not in line with that shock absorber inclined forward.

Cooper et al. (2003) looked at seat and footrest shocks and vibrations in manual wheelchairs with and without suspension. The authors noted that while there was a frequency octave relative to the seated human where the power [energy input as a result of vibration transmission] was not significantly reduced, "Given its effects on vibration and shock transmission, suspension caster forks, such as frog legs should be considered for active clients or individuals who have chronic pain."

It is important to recognize that incorporating an element to dampen vibration or make for a 'softer' and 'plusher' ride often comes with a trade-off of requiring more energy to propel and maneuver a wheelchair. Finding the optimal combination of vibration dampening without sacrificing energy expenditure has been the Holy Grail in this endeavor. One example of this is found in the previously mentioned research done by Chenier and Aissaoui (2014). Prior to their investigation, vibration and mechanical work had not been studied simultaneously. Their research supported the hypothesis that a wheelchair that transmits less vibration requires more mechanical work to traverse the same distance (on the same surface). The researchers concluded that the carbon chair in their study had the lowest vibration transmissibility. They grouped the six folding wheelchairs in their study by cross brace design. Half of these were designated as single cross brace and the other half were designated as tri, dual and two single cross brace. Results using the four aluminum chairs (same material, different folding design) was similar to the results using three chairs of differing frame materials: titanium, carbon and aluminum (different material, same folding design). The group determined that folding (cross brace) design may be as important as the frame material when optimizing mechanical work and vibration transmissibility and suggested that further research may be indicated to determine whether the frame material or the folding design is more impactful.

Whether it is suspension incorporated into frame design or specialized add-on or replacement options such as caster forks or rear wheels, much of the technology to date has largely been shown to be insufficient to meaningfully dampen the WBV sustained by a manual wheelchair user. Wolf, et al. (2007) noted, "Wheelchair companies have attempted to address this problem by adding suspension to manual and power wheelchairs; however, studies have demonstrated that these additions do not necessarily reduce the amount of oscillatory and shock WBV."

Garcia-Mendez, et al. (2013) observed: "The results of these studies demonstrated that suspension casters can significantly reduce peak [emphasis added] accelerations transmitted to users (at the seat and footrest) and that rear-wheel suspension systems do reduce some of these vibrations, although they do not outperform traditional frame designs and still transmit vibration in the frequency range most harmful to humans."

The challenge continues to be how to isolate the user in a manual wheelchair from the harmful vibrations and shocks that the chair receives through contact with supporting surfaces. Most of the design examples above can either be described as unidirectional or having a solid connection to the wheelchair frame which could allow vibratory energy to bypass that suspension element. Construction practices utilize concepts, wherein buildings and bridges, for example, are isolated from vibration and shock using polymers or viscoelastics that are placed in between the object being protected, and the source of possible vibration or shock. These structures are essentially 'floating' on these polymers or elastomers. In their research looking at curb descent testing of suspension manual wheelchairs, Kwarciak, et al. (2008) observed, "Elastomer-based suspension

systems provided good low-level vibration control; however, they became relatively ineffective at reducing higher magnitude shock vibrations." The authors postulated that, "Though elastomer suspension systems do not appear useful for suppressing high-load shock vibrations, they should be considered for their ability to suppress low frequency oscillations. Perhaps elastomers could be used to couple sections of the wheelchairs where vibrations are greatest." This ties back to the distinction we made earlier between shock and vibration being largely a matter of regularity and magnitude.

CONCLUSION

WBV can impact the health of able-bodied individuals and wheelchair users. For the wheelchair user, many strategies have been tried to mitigate the adverse effects of WBV, including frame design, materials, and components such as caster forks, wheels, and cushion selection. Many of the results of these strategies have had some positive effect but would still seem to be lacking or not differentiated enough. Maybe the next wheelchair manufacturers' design could draw on the real-world examples in bridges and buildings and maybe pursue Kwarciak's suggestion of coupling sections of wheelchairs with elastomers. As always, and especially with the rate of technological advancements over recent years, there is more research to be done.

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ANALYSIS OF VIBRATIONS AND SHOCKS INDUCED DURING WHEELCHAIR PROPULSION.

Written by: **OLGA FOMINA, EMT, ATP, CRTS®**

NRRTS THANKS KI MOBILITY FOR SPONSORING THIS ARTICLE.

INTRODUCTION

Every wheelchair user experiences shocks and vibrations transferred from the ground to the rider's body multiple times throughout the day. Thresholds, doorways, curbs, uneven terrain, grass, gravel, random cracks and other obstacles affect the smoothness and effort requirements of wheelchair propulsion. Shock and vibrations experienced by typical manual wheelchair users can decrease a rider's comfort, increase the rate of fatigue, cause spasticity, decrease propulsion distance and momentum, and consequently limit endurance, mobility and independence.

Let's first look at the essential differences between shock and vibration. Vibration is low-magnitude repeated loads. Vibrations are most frequently experienced when riding over uneven surfaces such as tactile paving and gravel. Shock is infrequent high loads. In a wheelchair, this is a sudden and singular vertical descent. Wheelchair users experience shocks when wheeling off the curb or crossing a threshold or speed bump.

PREVIOUS RESEARCH OBSERVATION AND FINDINGS

The number of people using a wheelchair is estimated at 2.2 million in the United States and 750,000 in the United Kingdom (Vorrink, Van der Woude, Messenberg, Cripton, Hughes, Sawatzky, 2008); however, little is known about how vibration affects rider comfort and seat forces. In one study, vibration was studied in conjunction with acceleration force and momentum (VanSickle, Cooper, Boninger, DiGiovine, 2001). Other studies have focused on physiological parameters. The initiative to study whole-body vibration (WBV is the vibration transmitted by supporting surfaces to the entire human body), and its effect on spasticity was taken in 2008 with a study of different types of wheels (Spinergy versus traditional steel-spoked wheelchair wheels) and spasticity reduction (Vorrink, Van der Woude, Messenberg, Cripton, Hughes, Sawatzky, 2008). Researchers concluded that under the current standardized conditions, the Spinergy wheelchair wheels, as compared with the standard steel-spoked wheelchair wheels, neither absorb more vibration at the footplate or the axle nor reduce perceived spasticity or improve comfort in individuals wheeling over rough surfaces and obstacles. Prolonged exposure to seated whole-body vibration (WBV) is also considered a risk factor for neck pain and low back pain (LBP) (Nagai, Bansbach, Faherty, Abt, Sell; 2016).

UNDERSTANDING VIBRATION

The complex rehab manual wheelchair is engineered and specified to accommodate the needs of most users. The vibrations experienced by the rider can originate from multiple sources:

- Wheelchair components: the cross brace, caster forks, swing-away legrests, footplates, back posts, armrests, axles and more (see Figure 1).
- The terrain that wheelchairs travel on: sidewalks, streets, curb-cuts, hiking trails, gravel, grass, asphalt, etc. (see Figure 2).
- A moving vehicle when a rider is transported in the wheelchair. In this scenario, the wheelchair is in a static position, but the rider is still experiencing vibrations transferred to the body through the wheelchair frame (see Figure 3).

Optimizing propulsion performance is a major goal in the rehabilitation of the client with paraplegia due to spinal cord injury (SCI). The wheelchair user puts an intense load upon the muscles and joints of the upper trunk and extremities during wheelchair propulsion and in almost every other daily activity such as transfers, driving, and household activities. This upper extremity loading leads to musculoskeletal pain. The majority of users with paraplegia also experience spasticity and LBP, which effect independence and wheelchair maneuvering efficiency. Many active wheelchair users report that whole-body vibration triggers spasticity and LBP.

FIGURE 1 The cross brace, axile and footrest hangers can all translate vibration to the client.

FIGURE 2 The terrain can lead to WBV in a wheelchair user.

FIGURE 3 Vibration from a moving vehicle can be translated through the wheelchair to the rider.

Manufacturers have designed wheelchairs and components to improve the effectiveness and comfort of the ride. Examples include innovative casters, anatomically supportive frames and suspension systems to reduce shocks and vibration. The consequences of whole-body vibration, such as LBP and spasticity, in active wheelchair users are also well-known and well-defined in the Complex Rehab Technology (CRT) industry. Design to reduce vibration is also targeted at reducing these issues.

The vibration and shocks individuals encounter on a daily basis while propelling their wheelchair may be sufficient to cause injury. Therefore, knowledge of the forces and accelerations experienced by the rider is important for successful wheelchair design which reduces vibration and shocks.

CASE STUDY

In this case study, we are focusing on vibrations experienced by people with low level spinal cord injuries who have good trunk balance and full function of their upper extremities.

In 2019, a new innovative frame concept (Ki Mobility Ethos) was introduced to eliminate or significantly reduce spasticity by reducing vibration. Being a new design, this requires in-depth research and observation to understand to which degree spasticity and LBP can be reduced. The frame is separated, and four ISO tech polymers are added in between the seat frame and the base frame of the wheelchair. The purpose of this case study is to evaluate whole-body vibration exposure on manual wheelchair users in their communities and to determine if use of this new frame design reduces vibration and subsequent user impact.

Three active manual wheelchair users agreed to participate in the case study. We conducted our research under typical propulsion conditions, including urban streets, parks, apartments and work environments. Subjects also performed curb descents of various heights (1, 2.5 and 5 inches) and propulsion over various terrains including grass, gravel, street, tactile paving and hardwood floors on a created course in three different manual wheelchairs. Questionnaires were administered after each wheelchair trial, and time measurements were taken during each obstacle course wheelchair trial. Results were compared to report findings. This study utilized a mixed-method design — direct observation, interview and secondary data analysis. We hypothesized that the wheelchair design would reduce vibration experienced by individuals during propulsion.

SPECIFIC AIM:

To test different wheelchair frame designs to determine if addition of ISO tech polymers with separation of the wheelchair frame (specifically the Ki Mobility Ethos frame design) will reduce user spasticity and musculoskeletal pain.

CONTINUED ON PAGE 48

TABLE 1

	PARTICIPANT 1			PARTICIPANT 2			PARTICIPANT 3		
	Own wheelchair trial	Titanium rigid wheelchair with frog legs	Ethos Ki Mobility Trial	Own wheelchair trial	Titanium rigid wheelchair with frog legs	Ethos Ki Mobility Trial	Own wheelchair trial	Titanium rigid wheelchair with frog legs	Ethos Ki Mobility Trial
Appearance	5	4	4	4	4	5	3	5	5
Function on smooth surface	5	5	5	5	5	5	4	5	4
Function on uneven surface	2	3	4	1	3	4	3	3	4
Mechanical performance	3	4	4	4	4	3	5	4	3
Vibration damping	1	2	4	3	1	4	2	2	4
Low back pain (5 - no LBP, 1 -high level of LBP)	4	3	4	3	4	4	4	2	4
Spasticity (5 - no spasticiy triggered, 1 - high level of spasticity)	3	3	4	3	2	4	2	2	4
Overall impression	4	4	4	4	3	5	4	3	4
Mean per trial	3.375	3.5	4.1	3.375	3.25	4.25	3.375	3.25	4

Mean for own wheelchair trial	3.375
Mean for titanium rigid wheelchair with frog legs trial	3.333
Mean for Ethos Ki Mobility trial	4.13

ANALYSIS OF VIBRATIONS...
(CONTINUED FROM PAGE 47)

PHASE 1 — INTERVIEW AND DISCUSSION

Participants identified the types of surfaces and obstacles traversed when using their manual wheelchair. The Human, Activity, Assistive Technology, and Context (HAAT) model was utilized (Cook & Polgar, 2008). Specifically, the discussion focused on when the obstacles occur, how often they occur, what propulsion strategy is used to traverse obstacles, and the amount of vibration and spasticity experienced when negotiating the obstacles.

PHASE 2 — COURSE CREATION

Participants identified, in their opinion, the objectives, constraints and metrics of a device that could decrease the transmission of vibration, shock and motion to individuals using a manual wheelchair.

An obstacle course was created for the subjects that required propulsion throughout curb descents of various heights (1, 2.5 and 5 inches) and various terrains (grass, gravel, street, tactile paving and hardwood floor).

Participant 1 has been using a titanium rigid frame TiLite wheelchair with Roho Nexus seat cushion and reported a significant increase in LBP level while riding over uneven surfaces.

Participant 2 has been using an aluminum rigid TiLite wheelchair with suspension caster forks and Roho Quadro seat cushion and reported spasticity while riding over tactile paving and uneven surfaces.

Participant 3 has been using an aluminum rigid Quickie wheelchair with suspension caster forks and Ride Designs Custom seat cushion and reports LBP when riding over uneven terrain.

All three participants were similar in physical presentation, ability level, and seating and positioning needs.

PHASE 3 — OBSERVATION

All three participants completed the obstacle course and filled out a questionnaire three times in total: 1) in their own optimally configured wheelchair, 2) in an optimally configured titanium rigid wheelchair with suspension caster forks frog legs, and 3) in an optimally configured Ki Mobility Ethos wheelchair.

PHASE 4 - DATA ANALYSIS

The Wheelchair Satisfaction Questionnaire (WSQ) is a valid method to assess the overall wheelchair user's level of performance and satisfaction with their wheelchair. The WSQ is comprised of 16 visual analogue scale questions; each question includes a qualitative explanatory comment. High mean satisfaction scores on the follow-up questionnaire support face and content validity of the WSQ. The results support the WSQ as a reliable measure, confirming the WSQ as a reliable tool for user feedback on wheelchair function. The WSQ is designed to provide user feedback with enough granularity to give data on particular aspects of wheelchair structure and function (Bane, 2019). The questionnaire used to obtain data for our study was a modified version of the WSQ with both forced-choice and open-ended questions, focusing on the aims of our research. Participants were asked to rate eight wheelchair characteristics on a 5-point Likert scale in which 1 = poor and 5 = excellent. The six factors were appearance, function on a smooth surface, function on an uneven surface, mechanical performance, level of vibration transferred through the user's body, low back pain, spasticity and overall impression. The average of the eight scores represents the overall level of satisfaction.

Each participant completed and submitted a questionnaire after each wheelchair trial (see Table 1).

RESULTS:

Based on the results of the questionnaires and observations, we can exclude the optimally configured Titanium rigid wheelchair with frog legs from our case study and simply compare results of the users own optimally configured wheelchair trial against the trail in the Ethos wheelchair. SCI wheelchair users who participated in our case study reported an over 18.3% decrease in spasticity and musculoskeletal pain triggered by whole-body vibration while propelling the Ethos frame design. The study used a small sample size and did not use objective vibration measures. However, this study does demonstrate the significance and importance of vibration damping in pain and spasticity reduction.

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RESOURCES

THE WHEELCHAIR SATISFACTION QUESTIONNAIRE: WWW.LETU.EDU/GLOBAL-INITIATIVES/WHEELS/FILES/WSQ-QUESTIONNAIRE.PDF

Olga Fomina, EMT, ATP, CRTS®, has a Master of Arts in journalism from Moscow University and earned her EMT certification from City College of San Francisco. She started as a journalist more than 10 years ago with in-depth research of clinical experience, primarily in mental health, in a variety of settings including inpatient hospitals, outpatient partial hospitalization programs, public schools and community-based settings. She additionally received her EMT license and worked in variety of EMS agencies. Dealing with many acute cases, Fomina eventually decided to pursue rehabilitation and assistive technologies application in long-term care. Fomina worked abroad in Brazil, Poland and Russia as a consultant and is currently employed by National Seating & Mobility Inc.

IT'S NOT JUST ABOUT MEDICARE

Written by: **CLAUDIA AMORTEGUI, PRESIDENT, THE ORION CONSULTING GROUP, INC.**

For many years, I consistently heard how bad Medicare was in relation to DME claims, and how things consistently changed. Even today, people say there is no way to stay up-to-date with policies when they will just change again. Being in my shoes, I clearly hear everyone and understand where they are coming from, but I do not always agree.

The lack of the Separate Benefit Category can make the funding of Complex Rehab Technology (CRT) rather frustrating. What is more maddening to me is the fact that some end users are affected by Medicare policies when they are not even Medicare beneficiaries. How could that be you ask? Unfortunately, some funding sources will take Medicare policies and make them their own. This obviously makes sense for Medicare Managed Care programs, but not necessarily for others.

I understand the use of the same HCPC coding structures for the ease of claims processing, especially when a person has multiple insurance plans; however, the policies should not automatically be the same. This is where the Separate Benefit Category would certainly help, not only for coverage policy but also in allowing for the creation of more appropriate codes for specific CRT items.

In my opinion, the hard part is that all insurance plans see Medicare as the patriarch of funding. Sadly, many of them forget that they are responsible for a vastly different population of beneficiaries. What makes things even worse is the limitations of many of the HCPC code definitions. Most people do not realize that the "new" power wheelchair codes are about to be 15 years old, and many of the other codes were developed in the 1990's. Not only were the code definitions based on technology that in many cases, no longer exists, but so were the allowables. It's crazy to think that the medical world has experienced incredible advances in technology including CRT, but we are still looking at policies that do not necessarily relate to the prescribed products, let alone real life.

ON THE FLIP OF ALL OF THIS, MEDICARE NEEDS TO UNDERSTAND THAT THEIR ACTIONS CAN AFFECT MANY OTHERS. CODING IS KEY IN THIS ARGUMENT.

I know this is not news to most of you, but what we all tend to forget is that these Medicare policies and codes are then used by the other funding sources. Again, the code usage makes sense, but not when the codes are not sufficient for many of today's products. As for policies, we need the other funding sources to focus on three key areas. First, they must properly interpret the Medicare policies and truly understand the meaning and intention. Second, they must understand the coding definitions. Lastly, if they use Medicare coverage policies, they must then adapt them to their specific program. For example, Medicaid reviewers need to look at the medical need both within the home and in the community; some seem to forget. Funding sources should not simply mimic Medicare policies as their own overall coverage guidelines are typically more expansive.

On the flip of all of this, Medicare needs to understand that their actions can affect many others. Coding is key in this argument. The PDAC is responsible for individual code verifications. As noted above, Medicare is not the only funding source to use these codes; most funding sources do as well. The issue is when certain

items are coded based on Medicare policy (in the home need/use) but should be coded for all insurance types. This issue, along with old code definitions, wreaks havoc on not only the reimbursement of certain items, but also just the processing of a claim.

There are similar issues when it comes to Medicare policy. Just as we have seen in normal life, our words mean something. The words within a Medicare policy mean something too — even to all the other funding sources. I am not saying that Medicare policies need to accommodate all insurance companies, but they should be more "descriptive," or more "clear," or more "something." Meaning, when their policy reads an item is flat out not reasonable or necessary, I understand what they mean under Medicare regulations — that's a given. However, not all funding sources read such statements in the same way. Things like this then cause a provider and/or end user to fight their way through their own funding source just trying to explain the Medicare intention and/or reason of their words.

What does all this mean? First and foremost, we desperately need the Separate Benefit Category as this could make life easier in both the coding and policy world. Even without the Separate Benefit Category, we need coding to updated. At this point providers are expected to "force" products into existing codes. This is not fair to anyone, not the provider, the manufacturer, or the end-user. This would be like me saying I should pay the price of a Honda when I am getting the BMW — they both drive me from point A to point B. There also needs to be an open dialogue between Medicare and the other funding sources to ensure the proper understanding of the policy. We just need to be certain that those having the conversation understand not only policy, but products — the current products. If the pieces don't come together, access to the best and/or most current technology greatly diminishes. End-users deserve much better than this.

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Claudia Amortegui has a Master of Business Administration and more than 20 years of experience in the DMEPOS industry. Her experience comes from having worked on all sides of the industry, including the DMEPOS Medicare contractor, supplier, manufacturer and consultant. For many of these years, Amortegui has focused on the rehab side of the industry. Her work has allowed her to understand the different nuances of complex rehab versus standard DME. This rare combination of industry experiences enables Amortegui and her team at The Orion Group to assist ATPs, referrals, reimbursement staff and funding sources in understanding the reimbursement process as it relates to complex rehab.

NAVIGATING A NEW LANDSCAPE

Written by: **KYLE WALKER, MHA, ATP**

"If you look back over the last four to six months and ask if I would have ever expected to be where we are with telehealth, I would have said no way," says Greg Packer president of US Rehab VGM Group. I believe that would have been a very common response to that question from all corners of the U.S., but here we are.

UNPRECEDENTED TIMES OF TURMOIL, HEARTACHE AND LOSS HAVE SWEPT THE WORLD. AS A COUNTRY AND REHAB COMMUNITY, WE HAVE BEEN WITNESS TO ALMOST UNIMAGINABLE THINGS. AND YET MAYBE THERE'S HOPE, OPPORTUNITIES.

Unprecedented times of turmoil, heartache and loss have swept the world. As a country and rehab community, we have been witness to almost unimaginable things. And yet maybe there's hope, opportunities. Leading through change and times of great uncertainty may be one of the hardest things leaders in health care may have to face, but through these times greatness has a chance to prevail. To challenge the way things have always been done, to ask if there is a better way to do something that is more efficient, cost effective and can produce the same, if not better results?

Many stakeholders from clinicians and suppliers, to industry coalitions like U.S. Rehab, NRRTS, NCART and the CTF have been involved and led conversations to help us navigate the current landscape, and we believe that is what it is going to take.

I am sure we can all agree there is nothing (at least with the technology today, somewhat jokingly) that can replace the ability to be in-person, face-to-face, and hands-on with our clients. Science tells us that human beings thrive in social settings, we long for interaction and nothing quite replaces a handshake. We need to be around others in our normal lives, especially to address complex mobility needs of the end user. But if, just if we were able to accommodate a need that in-person contact was not requested, wanted or needed, is there a way? Yes.

Telehealth in the form of virtual technology is here, and I believe we would all agree that it is here to stay. Richard Schein, Ph.D., MPH, research scientist in the School of Health and Rehabilitation Sciences at the University of Pittsburgh, along with other associates conducted research in telehealth before it was popular. Their work has been published in peer-reviewed journals in the early 2000s. The studies indicated telehealth wheelchair services are a viable option especially for people who have challenges with access to specialty clinics and there is mutual satisfaction with consumers and providers with the ability to assess function in a more natural setting (the home) versus a clinic.

The opportunities that virtual platforms like Microsoft Teams, Zoom and others provide to perform telehealth services are nearly limitless, but there lies the hurdle. When is it appropriate to utilize telehealth to address the needs of our customers? There is not a straightforward answer, and in fact "its complex" because nothing worthwhile is ever easy. There are many variables to consider from compliance to effectiveness, but we know we must not sacrifice the outcomes of our patients for the sake of convenience. It is prudent that we maintain the highest level of expectations no matter the delivery mode.

Schein believes "professionals need to be guided by existing discipline and national clinical practice guidelines. Individuals will need to have appropriate education, training and ongoing continuing professional development to ensure necessary competencies for the safe provision of quality health services."

We have been developing educational courses for clinicians and Complex Rehab Technology providers alike to help them navigate these situations. "The COVID-19 pandemic has changed the entire health care continuum, and we have to figure out how to operate to deliver the same level of service and

> "THE COVID-19 PANDEMIC HAS CHANGED THE ENTIRE HEALTHCARE CONTINUUM AND WE HAVE TO FIGURE OUT HOW TO OPERATE TO DELIVER THE SAME LEVEL OF SERVICE AND POTENTIALLY INCREASE THE HEALTHY DAYS FOR EACH PATIENT"

potentially increase the healthy days for each patient," Packer said. I couldn't agree more. As our health care systems continues to shift toward toward value-based care, all associated parties will continually be challenged to think holistically and to provide more effective and efficient care. Telehealth may just be a part of that.

We are all in this together, and I implore you to challenge the status quo.

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"SOMEONE WITH STRONG VISION OF THE FUTURE ..."
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Written by: **WEESIE WALKER, ATP/SMS, EXECUTIVE DIRECTOR OF NRRTS**

CRT SUPPLIER CERTIFICATE PROGRAM

Over the past two years, NRRTS has been working on a CRT (Complex Rehab Technology) Supplier Certificate Program that will not only offer a pathway to the profession, but, more importantly, also establish the role of the supplier. This program will be offered to any willing participant. Completion of this course will provide understanding of who uses CRT, how the team evaluation is conducted, what the responsibilities of the supplier are and best practices.

The benefits of this program are far reaching. There is a critical shortage of qualified people entering this profession. Program participants will understand the job duties. Employers will know the knowledge level of the certificate holder. People who rely on CRT will receive better outcomes and service. Manufacturers will see better application of products. Clinicians will get better feedback on technology applications.

THE BENEFITS OF THIS PROGRAM ARE FAR REACHING. THERE IS A CRITICAL SHORTAGE OF QUALIFIED PEOPLE ENTERING THIS PROFESSION.

The certificate program provides the foundation for advancement of skills such as molded seating, specialty controls and integration of assistive technology. As Jean Minkel stated, "They will know what they don't know."

Course 1, Intro to CRT Supplier, is finished. This course is being offered as a stand-alone course. The content is relevant for anyone working in CRT or someone exploring this field.

To fund this project, NRRTS is seeking Visionaries who recognize the vital need of this program. To learn more about this program, visit www.nrrts.org

Be a Visionary by investing in the future of the CRT industry!

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Weesie Walker, ATP/SMS is the executive director of NRRTS. She has more than 25 years of experience as a CRT Supplier. She has served on the board of directors for NRRTS and GAMES and RESNA's professional standards board. Throughout her career, Walker has worked to advocate for professional suppliers and the consumers they serve. She has presented at the Canadian Seating Symposium, RESNA Conference, AOTA Conference, Medtrade, ISS and the NSM Symposium. Walker is a NRRTS Fellow.

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Adapt Mobility
1023 Trans Canada Way SE
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T1B1H9
Telephone: 405-529-6020
Registration Date: 01/06/2021

Katherine Rhodes, OTR/L, ATP, CRTS®
National Seating & Mobility, Inc.
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Telephone: 502-523-5525
Registration Date: 01/14/2021

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Registration Date: 01/01/2021

Les Mollon, RRTS®
Harding Medical
1158 Grand Lake Rd
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Telephone: 902-567-1144
Registration Date: 12/18/2020

Malcolm Kirkpatrick, RRTS®
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Registration Date: 01/15/2021

Marcus Parris, RRTS®
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Registration Date: 12/10/2020

Pat Molloy, RRTS®
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Telephone: 306-242-9060
Registration Date: 12/15/2020

Patrick Tremblay, RRTS®
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Telephone: 705-360-1941
Registration Date: 12/01/2020

Patrick Pearson, ATP, RRTS®
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107 E Washington St
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Telephone: 662-456-4630
Registration Date: 12/08/2020

Piers Davidge, RRTS®
Access Abilities
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Telephone: 905-825-5335
Registration Date: 12/22/2020

Randall Keith, RRTS®
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Registration Date: 12/09/2020

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Registration Date: 12/14/2020

Stephane Robichaud, RRTS®
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Registration Date: 01/19/2021

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Registration Date: 01/18/2021

Trevor Eichelbaum, RRTS®
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1023 Trans Canada Way SE
Medicine Hat, Alberta T1B1H9
Telephone: 403-529-6020
Registration Date: 12/15/2020

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Congratulations to NRRTS Registrants recently awarded the CRTS® credential. A CRTS® receives a lapel pin signifying CRTS® or Certified Rehabilitation echnology Supplier® status and guidelines about the correct use of the credential. NAMES INCLUDED ARE FROM NOV. 7, 2020, THROUGH JAN. 19, 2021.

Carol Gilligan-Chack, ATP, CRTS®
Health Aid of Ohio
Cleveland, OH

Jeffrey Alan Tutor, ATP, CRTS®
National Seating & Mobility, Inc.
Bailey, NC

Colin Coyle, ATP, CRTS®
Herron & Smith, Inc.
Hookset, NH

Katherine Rhodes, ATP, CRTS®
National Seating & Mobility, Inc.
Louisville, KY

FORMER NRRTS REGISTRANTS

The NRRTS Board determined RRTS® and CRTS® should know who has maintained his/her registration in NRRTS, and who has not.
NAMES INCLUDED ARE FROM NOV. 7, 2020, THROUGH JAN. 19, 2021.
FOR AN UP-TO-DATE VERIFICATION ON REGISTRANTS, VISIT WWW.NRRTS.ORG, UPDATED DAILY.

Charles Cole, ATP
Shaun Davis, ATP
Sammy Rizzotto, ATP

RENEWED NRRTS REGISTRANTS

The following individuals renewed their registry with NRRTS between Nov. 7, 2020 ,through Jan. 19, 2021.

PLEASE NOTE **IF YOU RENEWED AFTER JAN. 19, 2020,** YOUR NAME WILL APPEAR IN A FUTURE ISSUE OF DIRECTIONS.
IF YOU RENEWED PRIOR TO NOV. 7, 2020, YOUR NAME IS IN A PREVIOUS ISSUE OF DIRECTIONS.

FOR AN UP-TO-DATE VERIFICATION ON REGISTRANTS, PLEASE VISIT WWW.NRRTS.ORG, WHICH IS UPDATED DAILY.

Alicia Correa, RN, BSN, ATP, CRTS®
Alisa K Adams, ATP, CRTS®
Allen McNiece, ATP, CRTS®
Anacleto Gutierrez, ATP, CRTS®
Andrea J Madsen, ATP, CRTS®
Andrew Gilberti, ATP, CRTS®
Angela Smith, ATP, CRTS®
Benjamin Douglas Burton, ATP, CRTS®
Brenda L. Roehl, ATP, CRTS®
Brian Matthews, ATP, CRTS®
Brian M. Edwards, ATP, CRTS®
Carey Britton, ATP/SMS, CRTS®
Charles Winston, RRTS®
Charles B. Fontenot, ATP, CRTS®
Christian R. Galietta, ATP, CRTS®
Christopher Harwell, ATP, CRTS®
Christopher Jay Pickelman, RRTS®
Christopher L. Mayo, ATP, CRTS®
Cody Murphy, ATP/SMS, CRTS®
Colin Coyle, ATP, CRTS®
Courtney A. Thompson, ATP, CRTS®
Cyglenda Abbott, ATP, CRTS®
Daniel Phillips, ATP, CRTS®
Darven Miller, RRTS®
David Charette, RRTS®
David Lobato, ATP, CRTS®
David Rowland, MBA, ATP, CRTS®
David Butcher, ATP, CRTS®
David Nix, ATP, CRTS®
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John Boswell, RRTS®
Josh Lyon, RRTS®
Justin Hardee, ATP, CRTS®
Justin Walker, ATP, CRTS®
Kenneth Bridge, ATP/SMS, CRTS®
Kenneth H. Goff, ATP, CRTS®
Lester Miller, ATP, CRTS®
Luis Gonzalez, ATP, CRTS®
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Mala Aaronson, OTR/L, ATP, CRTS®
Marvelena Green, RRTS®
Matthew Edward Convery, ATP, CRTS®
Michael Barner, ATP, CRTS®
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