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ARIA JAVIDAN:
Hello, my name is already a javelin, and I am the project manager for the National Consortium of Telehealth Resource Centers. Welcome to the latest in our webinar series, today's webinar is on 'Leveraging Telemedicine to Eliminate Outcome Disparities for Rural-born Newborns'.

Today's webinar is hosted by the Northeast telehealth resource Center, these webinars are designed to provide information and demonstrations to support and guide the developing of your telehealth programs.

Just to provide a little bit of background on the consortium, located throughout the country, there are many telehealth centers, one focus on telehealth policy and the other on technology, each serve as focal points for affecting the use of telehealth and teleservices in rural and underserved communities.

Just a few tips before we get started. Your audio has been muted for today's webinar, please use the Q&A function on the Zoom platform to ask questions. Questions will be answered at the end of the presentation. Please note that closed caption is available and is available at the bottom of your screen.

Today's webinar is also being recorded and you will be able to access today's empath webinars on the NCTRC YouTube channel. With that, I will pass it over to Danielle Louder.

DANIELLE LOUDER:
Thanks so much, and thanks everyone who is able to join us here today. We have a great session plan. Without further ado, because I want her to have the most time possible to share this amazing program and outcomes with you, I will quickly introduce our colleague, Dr. Alexa Craig, one of the unicorns in our field and we appreciate her passion.

She is a narrow path psychologist, she is the director of the Barbara Bush scholarship Academy, she is originally from New England and we are so think for that she has stayed here with us and brought all of her talents. Attended the University of Vermont College of medicine for her medical degree, followed by two years of pediatric residency at Main Medical Center and a residency in child neurology at Washington University Seattle Children's Hospital.

She did an additional fellowship in neonatal neurology at St. Louis Chilton hospital in 2012, Dr. Craig returned home to Main Medical Center to start her neonatal neurology program and academic career. Following her return to MMC, she was the recipient of a KL 12 grants and obtained a Masters degree include all translation research.

That will lead her into the program she will tell us about today, so I will go ahead and let her describe them. Thank you so much for meeting us here today, Dr. Craig, we can't wait to hear from you.

ALEXA CRAIG:
Thank you, Danielle, I'm a little embarrassed (Laughs) that sounds way too fancy. Audio is good? You guys can hear?

DANIELLE LOUDER:
It's perfect.

ALEXA CRAIG:
I would love to be from main, eventually, but I was born in Vermont so all I can claim as being from the Northeast. As everybody is probably aware, we are pretty rural part of the country. When I made the decision to come home to main and practice here, I was faced with this very large geographic area and wanting to make sure that babies born in rural parts of the state had the same opportunities as babies born of the tertiary care center that I work in.

That is what I have spent the last 10 years trying to work on. Just a couple of disclosures. Some of the projects I'm working on were funded by the northeastern -- northern New England clinical and translational research network, so the earliest grant funding I had. After that, we got a acute-care grant that funded some of these projects will

I also give a shout out to families who have been so generous with their willingness to participate in research so that we can further this telemedicine adventure that we are all on.

Quick objectives for the talk today, I want to talk about optimal care for a problem called neonatal encephalopathy or hypoxic escape make encephalopathy. I'm not expecting this audience to necessarily know what that is, so I will go through that quickly. Then I will tell you about strategies I've implemented, including telemedicine, which allows me to evaluate these conical conditions better, while simultaneously improving the patient experience.

Also, in recent years, we have really taking the tele-ideal of things further with how we are supporting rural hospitals supporting babies that have difficulty in medially following birth. We will talk about that at the end.

I like to start about this fun fact with the human brain, it's the only organ that studies itself, which is a funny thing. The brain, we call it an energy hog, it's only 2% of the body's size but actually utilizes 20% of the body's energy because there is so much electrical activity going on at the time. That high-energy need is wide babies can get in trouble when they are being born.

In a somewhat flawed design, a baby in the womb has one way in for blood flow that has rich oxygen and glucose and all the things that a brain needs to be in a very happy and positive state. So if anything happened so that umbilical cord to occlude the blood flow to the baby, very quickly, blood levels and glucose levels drop quickly and the baby doesn't have enough reserves to tolerate that for

very long.

If that goes on for a certain period of time, it causes injury to the baby's brain. We use the term hypoxic, meaning lack of oxygen, and ischemic, meaning lack of blood flow. Encephalopathy just means this is happening to the head. HIE is the diagnosis of brain injury from lack of blood flow to the brain.

In a developed country like ours, the estimated incidences are about 1 to 3000 live births. In Main, where we have about 12,000 babies delivered per year, there is roughly 36 incidences of hypoxic ischemic encephalopathy. The reason we care so much about this disease is that it is associated with profound long-term develop metal consequences, such as cerebral palsy, hearing impairment, vision loss, and seizure disorders amongst other issues.

We know that the lifetime cost of children who have cerebral palsy are somewhere in the order of $16 billion, which are very expensive conditions to have. I'm going to go through a case right now with you and show you what this looks like and how HIE is recognized and what we can do about it.

This is a little guy named Aaron Carroll and his mother and father kindly allowed me to share pictures and his story. Air and has two older brothers, his mom had a completely normal pregnancy and he was delivered around his due date here in main. As she was laboring, her water broke and the umbilical cord came out before the baby was born.

As you can imagine, that sets this baby up for compromise blood flow because the placenta can't push the blood flow through the umbilical cord when it's outside the womb anymore. This poor mother had a stats a Syrian section with general anesthesia. As you can see here, little Erina has bruising on his chest where he was having chest compressions because his heart was not beating when he was born because of the oxygen deprivation.

It took the pediatrician and the committee hospital four times to successfully put a breathing tube into his airway. What we do is we measure the level of acid in the babies blood, we get the blood out of the umbilical cord, and we use that as a sign of how long the baby has been without oxygen. This pH of 6.8 suggest that the baby has been without oxygen for quite a long time. Obviously, not enough time for him to pass away, but enough time for us to be very concerned about him.

What's really exciting about taking care of children with therapeutic hypothermia in this decade, or one decade prior, is that we now have a therapeutic option for them, up until about 2005, there is not a lot you can do for these kids.

Since 2005, there's a treatment called therapeutic hypothermia, which has been a complete game changer in terms of promoting typical neurotypical developing outcomes in kids with stories like Erin. You can see Erin in this picture where he is getting the hypothermia treatment, he is on a cooling blanket.

What that does is it regulates his body temperature and decreases it from normal, which is about 98.6,

two 91°F. And we do that to him for three days to allow the brain, the swelling in the brain and maybe if there are any seizures, to allow that to calm down. You can conceptualize it as like putting ice on an ankle that you sprain. You want to cool it off and let the healing happen.

This is another little friend, this is David. Another picture of a cooling baby where I can go through the bits and pieces of it. We put EEG leads on babies scalps so we can measure brainwave activity and if they are having seizures. We put IVs in their hands so we can draw blood or give them other antibiotics or medications. They also have IVs in their belly buttons to make sure we can measure their blood pressure.

They lay on this cooling like it here, the cooling blanket is regulated by this temperature proof that is in the baby's nose and we measure their heart rate all the time on this treatment. It's a very intensive therapy, as hopefully this picture explains to you.

The good news for Erin is that the e.g. leads that were on his head recorded no seizure activity throughout the three days of cooling, we did an MRI of his brain upon completion of cooling, and it was completely normal. This is what a normal term babies MRI looks like.

He went home one day feeding complete the by mouth, and for all intents and purposes look complete we normal. Here he is at about 818 months or two years, he continued to be a completely normal kid. Of course, we can't go back in time and find out what would happen if he was not recognized as a candidate for this therapeutic hypothermia treatment, but I would like to think that him receiving the treatment had a role to play in this -- typical neurodevelopment outcome.

I thought a lot about Aaron's case over the years and I thought, what was the role of chance? Why did he get a good outcome and other kids arrived in my NICU where they stayed in the committee hospital, the pediatrician did not call us to tell us about this baby they were worried about, and then they start seizing like crazy when they are a day-old. I forgot to mention that the cooling treatment has to start by the time you are six hours old, otherwise, it is not effective.

I thought all lot -- a lot about this idea of chance, and hopefully people on the call have heard about the Swiss cheese model of organizational accidents. The idea being that certain factors have to all aligned perfectly for an accident happened. In this case, I think of it in a similar way.

Certain factors align for air and that allowed him to have a good outcome, whereas that normally wouldn't have happened in my hospital. One of the factors was that he was born first thing in the morning. The pediatrician was able to be at the bedside with him in the first 10 minutes of life. Sometimes, they cannot get there for half an hour or more. Although it was difficult for her to get a breathing tube in him, she was ultimately successful after four attempts, so she was able to get his oxygen levels up fairly quickly.

And most importantly, she knew about therapeutic hypothermia, so she called the tertiary center and we were able to get to Erin very quickly and start him on the hypothermia treatment in the ambulance coming back to our hospital, because we recently purchased, through philanthropy, a device that

allowed us to transport. There are all these benefits that aligned to help Erin have the best treatment at the best time.

We deal with a lot of snow here in New England, and it was at midnight and it was in a snowstorm, so we were lucky to get him quickly and bring him back to the medical center. This slide is here to highlight how rural Main is. When you see all these green areas atop the -- across the top of our state, I live down here in this red star area where there are more than 5000 people per square mile. This is where my tertiary care center is.

We have one more tertiary care center appear. My hospital tends to serve this region, and my hospital here where I work serves the top part of the state. We are getting babies in transport from community hospitals, where it is often less than one baby born every single day, so what that means is that the clinicians who work in these hospitals are not getting a lot of babies, and they are not getting a lot of experience making the decision about hypothermia or not.

This is a fun picture to show the ambulance we use, as we transport the babies and get them to the tertiary care center. This is a patient of mine who was treated with hypothermia.

This is a chart of how many babies we have cooled per year, the church is an interesting story. We cooled our first baby at Everett Mae Medical Center in 2008, you can see that the numbers are kind of low, nowhere near the 36 we were expecting based on the birthrate of main. I think the reason is that the most severe babies were being recognized as eligible candidates for this treatment.

When I came to the hospital in 2012 after my last year of fellowship, I went to this educational campaign around the state, and I gave people lots of brochures in information, and the other thing I did is I started this database and recorded the actual clinical data of every baby that had been treated with therapeutic hypothermia so far.

There were a lot of interesting realizations that we had from this database. Not to get to in the weeds with the science, but just looking at deaths from hypoxic ischemic encephalopathy, will be realized is that half of the deaths were coming from that small-volume hospitals, so there were fewer babies coming from those hospitals and the biggest proportion were coming from the small hospitals.

When we look at the characteristics of mothers from the tertiary care center versus the small hospital, or the babies, the size of the babies or the gestational age, the babies born at the tertiary care center were being born to mothers with more active medical problems at a younger gestational age.

That should have been the cohort with a higher rate of death, because they were more competent pregnancies. Instead, we were seeing a high rate of complications, either MRI, injury, seizures, pulmonary hypertension, these are coming from what should be the healthier side of the cohort with older gestational ages, higher weight babies, and less Located mothers.

We felt like this was backwards from the way it should be. I had wonderful help from a statistician who helped me create models and run this. The long and short of it is, if you were born in the small-volume

hospital which we define as a birth rate of less than 500 babies per year, your odds ratio of having a death or severe brain injury were 5.9 times higher than if you were born in a medium or large volume hospital.

We did the stats and adjusted for things like internal age and gestation age, that relationship strengthened and you were five times more likely to have that bad outcome of death or severe brain injury. Going back to what we wanted to do about this, the first idea we had was to educate people.

We put these "Time is brain" Posters all over the state and every newborn nursery. One is for the NICU in this other part of the state, and the others for the NICU in the northern part of the state, so we had different brochures with different phone numbers. To walk you through this quickly, it's like the asthma action plan. If you have a baby that meets the criteria in the redline, call immediately. If you have a baby in the yellow zone, talk to us and we will figure it out together. If you had a baby in the green zone over here, they probably don't need any help from the tertiary care center.

What happened after that educational database got started and after the educational outreach, our numbers skyrocketed. We had 33 babies that we called in 2012, and more in 2016. While I was pleased that we were cooling more babies, it seems like what we were doing now is reflexively cooling babies, if for instance, there was a low pH on blood gas or if the Apgar score was low, if anything was wrong, the answer was to cool.

It's a fairly invasive therapy, so we didn't want to do that unnecessarily on babies. Basically, what was happening is that there would be a family medicine doctor or pediatrician who would stabilize the baby in the community hospital. They would call the NICU for advice and it felt like they were calling on a phone this outdated and antiquated.

The neonatologist would be trying to figure out what time the baby was born, already in the six hour window? Can we get the ambulance quick enough to them to start? This was driving the decision to just cooler, we don't want to miss the window.

The other thing happening as the pediatrician was trying to describe over the phone how the baby was acting, so in his upper left-hand corner here, I'm showing a picture of an -- a baby who didn't have a dramatic birth, this baby is a flex position and moving and he is really normal. This baby in the top right-hand corner is a baby with mild encephalopathy, her eyes are open but she is staring off into space and she's not moving, but a lot of other things are pretty reassuring about her.

The baby on the bottom left has moderate encephalopathy, staring into space, has a breathing tube because he was forgetting to breathe, he is floppy and low tone and not moving. The baby in the right-hand corner has severe encephalopathy, his tone is flaccid, he is not moving at all, and he is on the highest level of intervention we can provide for respiratory support.

What we tend to do is to cool moderate and severe's, because there is really good data behind knowing that moderate and severe encephalopathy server -- respond to therapeutic hypothermia. We try not to cool mild, because there is no data showing it benefits them, and it is a very invasive therapy.

When these pediatricians were making these phone calls, it was difficult to figure out which bucket the kid was in. They are usually not calling you about normals, and with severe's, they cannot transfer those kids fast enough so it was this mild to moderate, bright diagonal axis that was tricky to figure out.

In 2017, getting to the telemedicine part of my talk, I'm proud that we did this pre-COVID. We built this platform where we had one camera in the tertiary care center, where we could do consult with me anywhere where I happen to be. I was the remote consulting neurologist to the tertiary care center, and if I remember correctly, this was the white EIO software, or maybe it was Jabber.

I had the ability to control the camera, there is a window where I could look at the baby and the nurse would be at the bedside and she would help move the baby through the assessment. The IT person was physically over my left shoulder, but they were metaphorically always there to help and make this work. This is what our cards look like with this fancy camera where we can pan and tilt.

We ran the study for a year, it was a quality improvement study and what we found were some very important disparities that we could now quantify. Babies that were born in the tertiary care center, if a neonatologist had a question about them, we were able to do the consult around about 2.1 hours of life, whereas if the baby was born in the committee hospital, it had to be sent to my hospital for the consult. The consult was delayed until 4.7 hours of life.

The other interesting thing, particular for the babies that were transferred, was that only 36% that were transferred actually met criteria for cooling. This meant that the other 64% had a very expensive ambulance ride from wherever they were born to my hospital, they were admitted to the neonatal intensive care unit, which is also very expensive, and most important, they were separated from their parents because the mother is often left at the committee hospital to arrive hopefully the same day, but sometimes not for the next day or two.

The results of this first one-year pilot program were not Germanic, but we surrogacy a decrease in the number of babies we were cooling because we were weeding out some of those mild kids who did not meet criteria for treatment. The next iteration of the program started in 2018 with the NNE CTR funding, and also: -- (unknown term) funding eventually the we were able to put cameras in the committee hospitals, and we need to do a three-way consult between me as a neurologist, this is Dr. Gina as a neonatologist, and the community hospital in the third window.

We use this platform for about two years. We collected data on all of the kids again, those born in the tertiary care center and those born in the committee hospitals. We are very pleased to see that in the tertiary care center, the time to first consult went from 2.1 hours to 66 minutes. In the community hospitals, now that the babies don't have to be transferred further evaluation, the delay went from 4.7 hours to about an hour and 1/2, which is a very substantial provement. -- Improvement.

What is good about getting this consult early is that it allows you to go second or third consult before

the six hour timeframe to get a sense of whether this is an simple apathy and getting worse, or is the score going higher, or is it resolving and the numbers getting lower and they don't need treatment? You can see what's happening in 2018 when we do these community telemedicine consults. Our number really went down to a very appropriate level, because don't forget, there is a second NICU in Maine that is cooling 20 babies a year. Together, we are cooling about 40 and we are really on target for what we know the incidence of HIE to be.

We have done a lot of work with the rural community hospitals to see how we can improve the delivery of the service. This is a project that was done last year, with a college student who worked for me for the summer. What she did is that she interviewed 17 clinicians from all of the different institutions where we have telemedicine cameras, which is now 10 different hospitals around the area.

In those interviews of the physicians which we did this qualitative analysis, we found some interesting and even unexpected findings. It didn't surprise me that a lot of the physicians we talked to really valued the collaboration and the decision-making around to cool or not to cool. They also talked about resource utilization and how wonderful it is to not transfer a baby by ambulance if it didn't meet criteria.

They also talked about how amazing it was to push a button, had the camera turn on, and have not one but two pediatric specialists right there and available to evaluate the baby. Those are things we expected.

What I didn't expect, and now I know this, outside pediatricians were being -- feeling very traumatized when these dramatic deliveries happen, and they were isolated and by themselves in these small community hospitals having to make these high-stakes decisions. The existence of the telemedicine program has resulted in a reduced amount of trauma experience for the clinicians.

I think that is really important, when we think about recruitment and retention into rural areas, and having people feel like they can live there and practice there, but still have the support of specialists who can help when the going gets tough.

The other thing these pediatricians talk to us about a lot is that they value the opportunity to have the access to the ongoing education, so each time we do a telehealth consult together, they are learning skills because there is is repetition created by the consult.

The other stakeholder engagement that we did is to interview parents whose babies had been treated with therapeutic hypothermia, because we really wanted stakeholder engagement from all parties involved. This actually led to five papers I publish from these data sets, this is a super busy slide and I don't want to go through all the themes, but a couple to highlight include the parental experience of trauma.

These, for the most part, are healthy pregnancies, everything is going fine, and that suddenly during the delivery, there's bleeding, rupture, of an umbilical cord or of the uterus, something terrible happens and everything changes. You can understand how that can really cause trauma to the family.

A lot of communication, things are improving telemedicine and decision-making is improvement telemedicine. This is the part where I get to say thank you to Danielle Louder for her incredible help in coaching. I kinda have exhausted what I can do with the telemedicine program that I've built in terms of research, and the truth is that it has change the standard of care here, when we have a consult from a hospital that doesn't have a telemedicine camera, we feel like our hands are tied and we can't appropriately evaluate the baby.

In the setting of that change standard of care, we need to find a programmatic solution to use some kind of alternate funding to have this program exist for several more years as we figure out how to make it a clinical program that is sustainable in terms of its own billing and income. We found this cursor opportunity, or rather, Daniel told me about this opportunity. I would've found this with her help. It is basically a rural health network development program, so with a lot of help and handholding from Danielle amongst other people here at the Maine health grant office, we submitted on October 22, and the goals of the grant were to improve access, which this telehealth program improves that in rural areas.

Expanding the capacity of the grant, we were going to take what we learned in the southern part of the state and expanded to the northern Of the state so that other NICU will have a hub and spoke model similar to what I've built here. Then, enhancing outcomes is a no-brainer, we are saving children having an expensive and unnecessary therapy that they are not likely to benefit from. The sustainability piece is what we will work on over four years of the grant funding in order to try to make the program a freestanding entity of its own.

This is my specific aims for this, I'm not sure when we will find out if we were lucky enough to be selected for this, maybe sometime in early summer, but fingers crossed. Again, this is a slide to show all of the rural hospitals across the state, and how this proposal has one hub up here at Eastern Main Medical Center that would cover all of these northern hospitals and our other hub would be here at Main Medical Center in purple covering these southern hospitals.

The other thing I really pitched in the hearse a grant that we wrote is that there is a band of hospitals in the middle, and if both tertiary care centers are operating on the same program rather than silos and doing their own separate things, this hospital right here in the middle that happens to have the third-highest delivery rate in the states, they can turn the camera on and depending on whose NICU is full and who's has a bed, they can have a consult with whichever hospital.

It can be seamless for the rural user, I think that will be a key to making this successful. So that is the background on hypoxic ischemic encephalopathy, and the cooling and how I have built, I call it my little telemedicine Empire, to serve my community. I have a new problem now, which is that I want to make sure that all of these kids that we are not treating with therapeutic hypothermia, these mild kids, I want to make sure we are making the right clinical decisions.

As I mentioned before, we cool the moderates and the severe's. The mild, especially if they evolve into moderate, we would call them but in my field, it is very uncertain about what is the best management

strategy for these milder kids. In 2020, I was lucky enough to receive funding from the center for biomedical research excellence, so it made medical Center, we have this Acute and Cobre medical disparities.

What we are doing is that we're partnering with two other tertiary medical care centers, in Bangor and the University of Vermont in Burlington, and what the goal of the study is for a baby to be born with mild the simple apathy, to be transferred to the NICU for an encephalopathy exam at anytime of the day or night, vacation or no vacation, done by me for all these years. Then we make a decision depending on how the neurologic exam is.

Either they meet inclusion criteria because they are moderate and they become like this little guy David and they get cooled, or if they are mild and we don't think they would benefit in the therapy, we exclude them and get outcome measures. The outcomes are an MRI and EEG of the brain to ensure we are making the right conical decisions and we are not missing any babies. So far, we have recruited 12 babies at Main Medical Center, no babies at the other two sites but hopefully that will change soon.

The other thing I want to tell you about is the decision to treat with hypothermia is only a part of the story. The other part of this story of how babies do and how that Swiss cheese model lines up is how the pediatrician, who is there hopefully right as the babies being born, what are the skills of that pediatrician to actually resuscitate the baby, the breathing tube in a fit needs it, and how are those skills maintained?

I have been working with colleagues here who are neonatologist on using simulation to try and improve those skills, I will show you a little bit more about that here. There is this new thing called the newborn resuscitation program, or NRP. Basically, the program was started by the American Heart Association and the American Academy of Pediatrics, and it is updated and rigorously studied. I'm sure you can see the details of this algorithm, but this is blow-by-blow how to provide the very best up-to-date care for a baby that's born who doesn't start breathing and crying and acting normal. These steps are studied and investigated, and the best practice is to go through the algorithm exactly as outlined here.

What we did is we created an on-site simulation and training event, so what happens is that the team from the NICU go on a road trip, not quite as fun as the pictures make it look, but they take all the stuff to any of these community hospitals for us in the southern part of the state, and the team in Bangor does it for the northern part of the state. They set up skill stations so that all of the pediatricians in that community hospital and all of the nurses who attend deliveries and all of the respiratory therapists were there get to have hands on practice with the therapies they may be giving.

This woman is practicing bag mask methylation, this other one is ventilating a preemie, they are being coached by this expert respiratory therapist who has worked for us for 30 some years. We have also set up the room where the baby is resuscitated but these cameras that are in the ceiling, one camera shows you the lay of the land for the whole room and the other camera looks directly down on the baby.

This is what you can see if you are not physically present at the resuscitation, you can see all the people interacting with the baby, and then you can do crowd management of what is happening in the room. These on-site simulations were recorded using these cameras, and then what we did was we went through and checked to see, did they do things in the right order? Do they forget to do something entirely? How quickly did they do the steps in the NRP algorithm? All of that is converted to something called an NRP adherence score.

The other thing that we did is we measured confidence of these participating pediatricians and nurses and respiratory therapists before the on-site simulation day, and at the end of the on-site simulation day. This is a complicated, we call it a violin chart, but you can see the pre-confidence scores, the pre-simulation day conference scores, are represented in black. You can see that they span anywhere from 1 to 5 to 2 to 5, pretty broad.

After the simulation day, the confidence scores are narrower and higher. They are centering more on number four, whereas before they were lower. We can claim the on-site assimilation training really help the clinicians feel more confident. Sadly, we compare their confidence scores to their actual NRP performance, their performance wasn't improving.

Sorry, I keep getting texts here. The problem with NRP performance not improving is that we've actually made people feel more confident, but their skills aren't improving, so the delivery room resuscitation won't improve. Airway management, how do they feel managing a code, resources and skills of team members, and across the board, it was the same pattern, improve confidence but not demonstrated skills.
It seemed the answer to the problem was not to go on-site more frequent, because that was not economically viable to send a hole transport team out for days at a time to train all these people.

What we started to do was what we called Telus simulation. We left the manikin there, the manikin that does all the stuff, and we left the cameras at the community Hospital. Once a month, the team would log on and run the remote or rural hospital delivery room team through a scenario to see if we could improve their NRP adherent scores over time. This is what it looks like. They are located in Portland, and this is the team doing the simulation in Farmington, over two hours away.

You can see this birds eye view of the baby here, and the room crowd control view to see who is doing what where. What we are so incredibly in six -- and greatly sideshow is that over the course of six assimilation trainings, the group performance went from 32, the low baseline scores at the training, up to a high of 88%. That means that 88% of the time, they were doing all the skills in the right order at the right time frame, the piece that's missing right now is that we don't know how that is translating to performance in a real delivery room resuscitation. This is a simulated resuscitation, so that's the next step to see with the team can do.

It seems like a deliberate practice over time has really dramatically improved the ability to get these scores closer to where they need to be. We also attract efficiency of really specific and important skills,

like putting the EKG leads on the chest to see what the heart radios.

With the on-site baseline, is to take four minutes and 19 seconds for someone to do that. After the simulations, it was down to 49 seconds, 5.3 times faster. Into bating the ethnic baby, that was taking over 11 minutes, now it is time -- down to four minutes 38 seconds, and the epinephrine of the heart rates too low, now it is 9 1/2 minutes. Really substantial improvements in this hospital with multiple delivery routines. We want to do next is find a way to replicate our experience in the one hospital across multiple hospitals.

This is what I have been working on my crazy, this is due May 31, and are 01 Grant, is a technology developed grant to reduce healthcare disparities. What we will pitch to them is this innovation thing we have worked on. Let me see if this can switch over. Danielle, do you see the baby hologram moving?

DANIELLE LOUDER:
It's a white screen right now, Alexa.

ALEXA CRAIG:
Let me stop sharing and share. You see a baby moving now?

DANIELLE LOUDER:
Yes.

ALEXA CRAIG:
This is hollow baby, this is a trademark simulation. This is projected onto a low fidelity in expensive manikin, so rather than spending $50,000 on a manikin for every hospital, which is cost prohibitive, what we do is spend $6000 on a simple manikin and then people where hollow lenses like Microsoft headsets, and they are looking at the manikin but they are seeing this hologram.

The way the hologram moves, you can scale how it's eyes are open or closed or its muscle tone so you can make it stop moving and lay their flat as a pancake. That gives it a much more realistic experience than the superexpensive manikin that has heart rate sounds, but it doesn't like it's eyes like this. Let me go back to the talk here.

So that's what the hollow baby is. Danielle commented that switchback?

DANIELLE LOUDER:
Yes, it did.

ALEXA CRAIG:
Awesome, I love it when technology works. (Laughs) what we are proposing to do for this are all one study is a randomized noninferiority cluster trial, we will take eight hospitals in our area, for will be randomized to the high fidelity, the old simulation we did at the hospital to show the improved adherence rates, and then for hospitals look at the hollow baby experience.

We will compare to see, the hope is that the people doing hollow baby have the same or better performance than those who have the high fidelity. We will also measure aspects of how the team works in the communication and secondary outcomes. The second aim of the grant is about implementation science, and making sure the way this is rolled out at each hospital is very standardized so that we are sure that if the hollow baby is it working well, it's not because we did something different at one hospital or some kind of incidental thing affected the rollout of it rather than the actual technology.

Just and with the picture, this is my hospital here at Main Medical Center. My NICU is on this level here. I am often at my office in a little corner, I'm not near a window but I think of this as the epicenter of Maine. The hub of all of this. These are all the community hospitals that I have existing relationships with through telemedicine, and when we get this are all one, all of these relationships with Main Medical Center. Through research, I have a relationship with the University of Vermont, where hopefully soon building relationship with the Elliott hospital and with Dartmouth.

Pretty soon, we have this whole attachment area of Maine, New Hampshire, and Vermont, the top tier of New England. Ultimately, our goal is to improve the care delivered to babies so that nobody misses an opportunity to have the best therapies possible.

I often end technology talks with this slide because it cracks me up every time. And I think open questions.

DANIELLE LOUDER:
Oh my gosh, can you guys see why I call her a unicorn? What a phenomenal use case, both from a clinical and leveraging that for the educational pieces and now the new innovation, the hollow baby, it's just such an amazing program. We are so appreciative of your passion and we hope you get the opportunity to expand access to that service.

We do have at least one question in the Q&A. Aria, do we read them out loud or do we want to unmute folks?

ARIA JAVIDAN:
We just typically read them out loud.

DANIELLE LOUDER:
Elise asks, this is a great question, "We are in a rural community with a high rate of homebirth. If homebirth or common in your area, how you can make it with those providers or do you wait until the baby is seen at the rural hospital following the problematic birth?"

ALEXA CRAIG:
That's an interesting question, our practice here is that if the baby hits the ER, and basically get sent straight to the NICU, that's when the tele-consult happens. I think to open it up to midwives delivering home births is more medical legal responsibility than I'm going to take on.

Just because you don't have the pieces of the decision-making, sometimes you don't have Apgar's, you definitely don't have Couric acids, from the home births I've taken care of in this situation, we often wind up cooling the baby simply because we really don't have information that we feel we can trust around the time of the delivery. Hopefully, that's a decent answer. Tricky.

DANIELLE LOUDER:
For sure. Second question from Caroline, "Is there a gestational age limit/start point for hypothermia treatment currently?"

ALEXA CRAIG:
The rules are, according to the conical trials published in the early 2000's, 36 weeks and above. Our guideline at Main Medical Center is 35 weeks, except when you're 34, because I cooled 334 Uighurs and I cooled one 31 weaker. When I cool off protocol, it's in a slamdunk case we know that something definitely happened like a uterine rupture, for instance, was the 33 weaker.

The baby has to be bigger than 2.2 kg tolerated therapy, and we only deal with conformed consent from the family -- informed consent from the family, that we are off protocol and it is not studied but we believe it is safe and in the best interest of the baby. Knock on wood, I have had no complications that were a problem at all for those families.

All four have had normal outcomes, so it's interesting but by the book, the answer is 35 to 36 weeks.

DANIELLE LOUDER:
Great. Other questions, we got everything in the Q&A so far. Is there anything else that you would love to share with our audience here?

ALEXA CRAIG:
I think there were not many good things that came out of the pandemic, but the expansion of telemedicine has been tremendous, I think what has not kept pace with the ability to use telemedicine is the compensation for telemedicine. That's part of the advocacy that we are applying for in the hearse a grant.

When I make the decision, and I take a tremendous risk with the decision on my shoulders, I feel like the insurance companies are the ones that benefit. They are no longer responsible for the indolence ride, the neonatal hospitalization, and we may, if we are lucky, get hundred bucks for the telemedicine consult.

That's really not fair, because I'm working nights and weekends for free to keep this program running, for the good of patients which is really important. Insurance companies are, in my opinion, laughing all the way to the bank because their dispensers are going down with somebody else assuming the risk. I need help with this, and certainly, Danielle, if we get the grant, we will be banging on your door at the state level.

This is a national talk, so at the state level, there are lots and lots of small hospitals, rural community

hospitals that are sending babies, and there's a lot of money to be saved if there are other places like my network cooling babies unnecessarily, but there has to be a competition model to make it worth it to run a telemedicine program.

DANIELLE LOUDER:
Actually, for traditional reimbursement or more innovative reimbursement models, or certainly we know that there is such a huge issue with healthcare workforce across all sectors. You think about those rural communities, regardless of whether we are Maine or across the country, a lot have one ambulance so keeping it on the road this baby is detrimental to the rest of community.

If you don't have to do that, it's this a snowball effect that can have a positive impact. It's really meaningful. Meaningful to have these programs and resources.

ALEXA CRAIG:
I said that I have all this data and I don't know how to analyze it on an economics, do you know what I mean? If anybody on this call knows about that, I can put my email in the chat here. Will people see that?

DANIELLE LOUDER:
Yes, as long as you change it to showing everyone.

ALEXA CRAIG:
I don't have that option.

DANIELLE LOUDER:
If you're comfortable with us sharing your email, we can do that.

ALEXA CRAIG:
I don't have that option. But if anybody has any experience with how to create those arguments, I would be all years. It looks like Elyse has another question. Meet much resistance in initiating rural partnerships? I would say absolutely the opposite. People that I work with have been desperate to help with

This. The neonatologist in my hospital are more risk-averse than I am. There were more risks about leaving the baby in the community hospital if it doesn't meet criteria, and if it changes, how will we get there fast enough to start the treatment? What we initially did is that we brought every baby that we had a telehealth consult on. We would then leave the babies in the community hospital because it became clearer over time how babies fell into each of those categories, mild, moderate, and severe.

Things have transformed from 2018 10 now so significant that the neonatology group here at Main Medical Center has their own program using the same cameras I built, and they are providing telehealth services for other newborn services. They transition from not wanting to do this, you do all the talking and do all the risk, to running a parallel program.

I just think that's amazing, and in a rural community, they are thrilled because it's another way that they are having backup of common problems and things they need help with but didn't mess -- necessarily wanted to send the ambience for.

DANIELLE LOUDER:
We have another Elise, very common on this webinar. How do you staff this program to ensure you have coverage if a call comes in?

ALEXA CRAIG:
(Laughs) this is the staffing model, this is my iPhone. I have been on call continuously since 2017 for this research project. I am in the process right now of training my Ford neurology, pediatric neurology partners to take these calls, and to start to shoulder the burden with me.

As it transitions from research to a clinical program, it's obviously ridiculous for one person to have done as long as I did, but as you can tell, I'm very passionate about the babies. That's going to be the new model and in conjunction with the neonatologist, they are the folks were actually taking the call. The call from the Trinity Hospital comes to the Maine hospital from the call center, and the call center goes to the neonatologist who then contacts us.

It isn't necessarily feeling phone calls from the community hospital all the time, it's mostly getting a call from a neonatologist saying that we need do a tele-consult. I call them and give them the consult and then log on and do it. That is what's made it sustainable as a one-woman show for this long.

DANIELLE LOUDER:
One final comment, because I think I need to turn over to Already at a rapid supple stop they said, this is so exciting, thank you for your work and insight and time and energy. We are lucky to have Dr. Craig in our region and sharing with everybody today. Thank you all for joining us, we appreciate your time we will turn it back over to you, Aria.

ARIA JAVIDAN:
Thank you, Danielle, I will bring up the closing slides here. So just a reminder that our next webinar will be held on Thursday, April 20, and that will be on social determinants of health and value-based pay. Lastly, we do ask that you take a few short mystically the survey that will pop up at the conclusion of this webinar, your feedback is very valuable to us.

Thank you to Dr. Craig for presented today, to the northeast telehealth resource Center for presenting this webinar for having good day, everyone.

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