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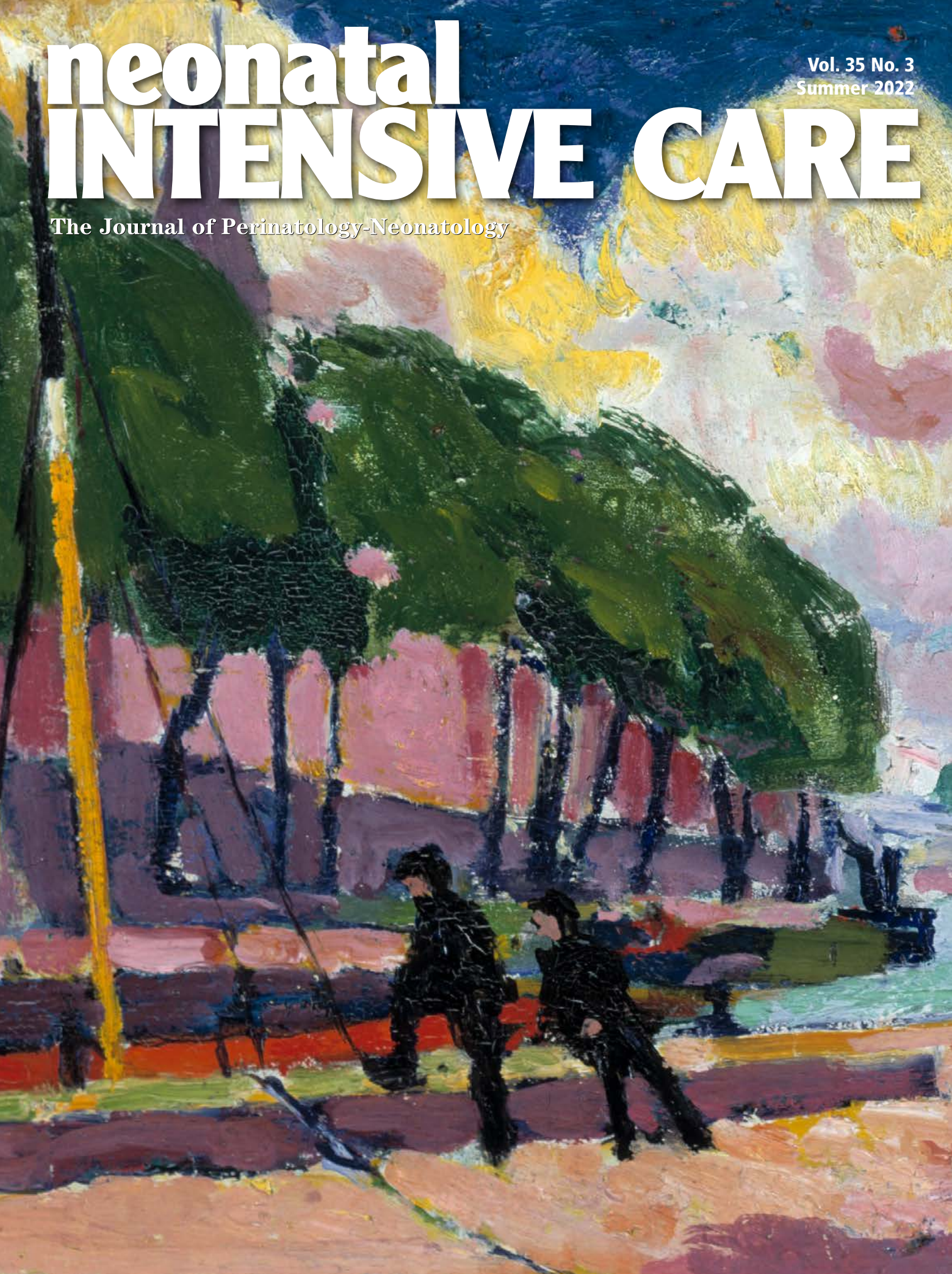

The Benefits of Using AI in Predicting Birth Outcomes

In this feature, Neonatal Intensive Care interviews clinicians and healthcare providers about the actual application of specific products and therapies. This interview is with Robert Bunn, President and Founder of Ultrasound AI, which uses the power of artificial intelligence to advance research in women's health.

Can you give us some background on yourself and what led you to the founding of Ultrasound AI?
I have been a software developer, data scientist, and artificial intelligence researcher for 20 years now. I actually enjoy doing all of these things even in my spare time. I also have four young daughters who keep me on my toes. About five years ago I realized I needed to create my own startup if I really wanted to innovate my way and change the world. So, I then began developing ideas that might be worthwhile to bring to the world.

What made you want to look into creating technology like Preterm AI?
I am well aware of the power AI would likely have when applied to medical problems. I figured I could just start obtaining medical datasets, learn about them, and see if I could do anything valuable with them.

One of the datasets I obtained contained fetal ultrasounds along with corresponding information about preterm birth. I mentioned to more than one doctor that I was trying to create an AI that could look at ultrasounds and predict if a baby would be born preterm or not. I was advised that such a thing would likely not be possible (for the general population anyhow) because they had been looking at ultrasounds for a long time and if such information were present, they would have noticed it already. There are some specific circumstances currently known, such as a short cervix, that have some predictive capability, but they are not highly accurate.

I see it as a challenge when people tell me something is impossible. So I immediately set out to prove them wrong and, in the process, revolutionize the field of Obstetrics—having zero knowledge about the field of Obstetrics! It took two years to learn the basics of this field and to figure out how to solve this problem, but it was an amazing feeling to see something work after spending so much time on it.

Robert Bunn has over 20 years of experience working in software development, data science, and artificial intelligence. As founder & president of Ultrasound AI, he leads the development of revolutionary artificial intelligence technologies for women's health. Bunn is deeply passionate about creating lifesaving and accessible products that help women live longer and healthier lives. If you would like to participate in this feature, as a company or healthcare provider, please contact Steve Goldstein at s.gold4@verizon.net.

What was the inspiration for this undertaking?
Preterm birth is the #1 cause of death for children under 5 worldwide, at 1 million deaths per year. As a parent, I feel that the death of a child must be the worst possible thing that could ever happen. I considered giving up on more than one occasion, but simply couldn't bring myself to stop trying. The problem was too important to give up on, and I didn't.

Can you describe/explain the Preterm AI technology and what it does exactly/how it functions?
The type of AI used is called deep learning. In this scenario, images are fed into a large neural network which then learns to identify patterns of pixels in the image, resulting in a prediction of whether the baby will be born preterm or not. This description is a huge simplification of the actual process necessary, but conveys the important concepts.

What sets the Preterm AI technology apart from other Ultrasound technologies?
There are many other algorithms that identify conditions that can be seen in ultrasound images. However, our technology doesn't only tell us what is true now, but also makes a prediction about a future medical event ie, preterm birth. We can make predictions up to six months in advance for this particular type of event. However, our technology is not limited to predicting when a preterm birth will happen. We can also predict when other medical events may happen in the future. One example would be Preeclampsia which is a serious blood pressure condition that develops during pregnancy. We look forward to revealing our research around other conditions in the near future.

What data/testing was done/used in developing Preterm AI?
We started with a dataset containing about 400,000 fetal ultrasounds, and we're currently working on a university partnership to obtain millions more to increase accuracy even further. The partnership will allow us our first independent validation opportunity, which we believe will go a long way toward convincing the obstetrics community about the capabilities of this technology.

What do you envision for the future of the Preterm AI technology and its usability as a MedTech device?
I believe that Preterm AI can become a universal diagnostic test available to every pregnant woman. Access to this technology would help them identify which pregnancies are at risk of

preterm birth, along with relevant clinical information, which would then allow doctors to create customized interventions to improve the eventual outcome.

How about the future of Ultrasound AI?
We believe our technology can extend far beyond premature births. Developing partnerships with researchers will allow us to extend this technology to a wide variety of other medical conditions. I look forward to exploring future collaborations on innovative research. I'm confident we haven't even scratched the surface of what this technology has to offer.

Why do you think this technology is life-changing/ revolutionary?
Right now, there is no way to predict the actual number of days early a baby will be born. There are techniques to estimate the risk of a preterm birth, but the output doesn't reveal the severity of the situation. For an obstetrician to have a tool that indicates a baby will be born 100 days early instead of 30 has enormous implications in the field of Obstetrics. The AI can also show the doctor what anatomical areas are driving adverse predictions so they can develop customized interventions. It should also be noted that having a quantitative prediction during each scan allows the obstetrician to have an objective measurement of improvement.

Now that you have secured a patent what are the next steps to get Preterm AI approved and ready for the MedTech market?
We are currently working on the FDA approval process which will take some time, obviously. We are also working on public and private partnerships to validate the technology and optimize the clinical effectiveness.

How do you think this technology is going to make an impact and pave the way for the future of Ultrasound medical devices and technology?
This application shows that combining AI with ultrasound can create technology with enormous lifesaving potential. Preterm birth costs the United States $30 billion dollars a year and we believe having an accurate and accessible method to predict it will allow a significant reduction in NICU stays and other lifelong health effects. Once the medical community is able to see the profound capabilities that AI applied to ultrasound can deliver to them it should encourage even more collaborations in the future.

Why is it important to detect preterm birth?
All unborn babies deserve a fighting chance for a healthy life. Losing a child due to prematurity is an enormous tragedy for the parents — in some cases, a tragedy that can be avoided. Being able to predict preterm birth allows doctors and patients to take steps to prevent this from happening. It's hard to imagine anything more important than this.

More information about Ultrasound AI can be found on the website https://www.ultrasound.ai.