The Use of AI in Neonatal Care: Is it the Holy grAIl or the third rAIl?
By Tracy Warren

You can't click on an article or pick up a paper today (yes, I'm dating myself) without reading about the future of medicine being driven by artificial intelligence or AI. There seems to be two distinct camps when people consider this future driven by algorithms and potential blackbox solutions. The first see it as the Holy Grail, providing us an opportunity to accurately predict disease or outcomes, efficiently produce personalized care plans, and even optimize utilization of healthcare services thereby meeting the triple aim. The other camp believes that AI could be what I'd like to call the Third Rail, something that could be charged with extensive bias, inaccurate predictions, or replace the elements of human decision-making that have driven healthcare since its inception. No matter on which side of this argument you may find yourself, or if like me you're somewhere in between, there are some fundamental building blocks to the future of machine learning and artificial intelligence that need to be established to give us the best chance of recognizing safe, effective, and successful implementation of these algorithms.

Several artificial intelligence algorithms have made headlines having been tested by academic institutions that have run clinical studies of the algorithm against current standards of care. Many of these trials have shown that the algorithms lack effectiveness. Some sources of that non-performance have included use of claims data versus clinical data, or institutional (racial) bias having made its way into the code. I'm glad to see that we hold these AI algorithms to a standard of rigorous clinical investigation, but it is not lost on me that we don't do the same for human decision-making. One could strongly argue that practice variability exists across medicine and such practice is not subject to comparative studies nor does it see reporting of its performance across many subspecialties.

How Do We Get There From Here?

To accurately predict outcomes and to understand clinical decision-making with an eye towards leveraging artificial intelligence, one needs to have incorporated granular, longitudinal clinical data into the feature set to best match the complexity and heterogeneity of decision-making and patient populations. By incorporating detailed decision-making, clinical observations, and the variety and practice variability that

exist, only then can we accurately institute algorithms that embody the complexity that is modern medicine today.

It's essential to this effort when considering that while electronic medical records have helped to digitize that clinical data, there exists a substantial gap in quality and integrity of data within the EMR. This can be particularly true in intensive care settings or in the emergency departments where you have high pressure, life-or-death encounters, and where documentation may be sub-optimized to simply utilize resources effectively in the time available. It will be futile to develop algorithms based on missing, inaccurate, or inconsistent data. As these data features will be imperative to making predictions, and directing AI-driven care, the quality and consistency of data is paramount.

The Burden of Data Quality

Prior to implementing artificial intelligence solutions, health systems need to invest in data auditing and clinical decision support solutions that not only access this granular, longitudinal data, but provide a feedback loop to best direct process improvements that improve data quality and documentation. Particularly when dealing with highly vulnerable populations, such as preterm infants or children, the quality of the data captured and the attention to detail can very well mean the difference between life or death. To accurately predict a patient's prognosis, an institution must have confidence that the features selected relating to their birth, the treatment and care they receive have been accurately documented and can be relied upon for algorithms which will assume the data to be “clean” and structured.

I strongly believe the future of medicine incorporates some elements of artificial intelligence to support human decision-making. Large integrated, structured, quality datasets can optimize healthcare delivery, reduce healthcare costs, and ease the burden of care that has come to plague so many of our clinical teams. But I am also fearful of the reality that the EMR, while it has created a digital record of healthcare, incorporates much of the bias and inconsistencies that apply to healthcare since the days of paper and pen. The opportunity is that the electronic medical record is software, which can be surveyed with auditing tools and quality checks without creating additional burden on clinical teams, so long as that feedback of data integrity is accurately incorporated into process improvements and quality documentation measures.

Data Integrity for Leveraging AI in Neonatal Care

A Midwest level IV neonatal intensive care unit (NICU) conducted a retrospective data review of its electronic medical record in advance of implementing a clinical decision support platform to direct feeding and nutrition. This retrospective data review identified numerous documentation gaps and inconsistencies that helped to direct the team to improve efforts for data quality going forward. With a shared vision of incorporating artificial intelligence-based solutions to improve neonatal care and personalize feeding and nutrition, the teams were able to reduce documentation gaps and created a feedback loop to dramatically reduce data inconsistencies, creating a foundational toolkit for incorporating novel predictions going forward.

Look Who's Taking Notice

We are pleased to announce that our co-authored abstract "**Digital tool supports Artificial Intelligence that targets improvements in nutrition-related outcomes**" was accepted for the Pediatric Academic Societies 2022 Meeting. If you are attending, please visit our podium session on Monday, April 25 from 11:15-11:30am MT.

Interested in learning more about **NICUtrition®**? Visit our website at or contact sales@astartemedical.com.