WRITING SAMPLE

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Lone Stars on the Medical Frontier: How ClosedLoop.ai Predicts Health Outcomes

By Mary Ann Roser

Imagine a health care system in which physicians use artificial intelligence to predict your next hospitalization, your admission to a nursing home and, even, your death.

Those might not be the happiest things you ever imagined, but what if those predictions could be used to *prevent* the bad health outcomes many of us fear? That's one of the innovative ways AI is being used in health care.

ClosedLoop.ai in Texas recently won a federal government-led challenge to make accurate, actionable health predictions on individual patients. In the competition, spearheaded by the Centers for Medicare & Medicaid Services (CMS), ClosedLoop beat out more than 300 other contenders, including giants like IBM Corp., Merck & Co. and the Mayo Clinic. The Austin-based company not only snagged the $1 million prize, it gained insights into how to further refine its platform, says Carol McCall, the company's chief health analytics officer.

ClosedLoop's platform uses 2,000 features and data points to predict a patient's health outcomes. The data covers information on everything from patient behaviors to how many medications they take to the impact the patient's environment has on health. ClosedLoop's clients include medical groups, government contractors, insurance companies, digital health companies and others. A key goal is to improve health outcomes at a lower cost, the essence of value-based care.

McCall, an innovator who is an actuary and holds a master's degree in public health, spoke with *Lone Star Health News* about her company's innovative platform, winning the CMS competition and the future of health care.

In the competition, what set ClosedLoop apart from other companies that could accurately predict patient outcomes?

It wasn't just an accuracy contest; it was being able to create this comprehensive forecast that spanned a wide range of risks (affecting patient outcomes). They (CMS) wanted something more than predicting disease. They wanted it to be explainable AI that physicians could trust … and would give them focused time with their patients. We think one of our breakthroughs was being able to do that. So, we created these comprehensive risk profiles and this deeply explainable AI that allowed them to see precisely the extent to which a factor contributed to a given health risk.

Does your data come from individuals' medical records and from medical libraries?

For that contest, we had data from CMS that included medical claims (from) physician office visits. We didn't have medication data, lab result data or vital signs. We do get that data from other clients. We're data-hungry all the time. That data is at an individual person level, and the models are generated from that data. Imagine you're a physician and you have this patient health forecast and this high-resolution visualization over time that shows you how their (patients') risk has been changing and all of the factors that have been contributing to it. It would also customize the information to say, what are the next actions that might be best for someone in this particular set of circumstances? You have to get into the mind of the physician and understand what's going to be trustworthy and useful to them. We gave (this information) to a physician, and he was overwhelmed. He said if physicians could spend time with this, it might just reinvigorate their love of medicine.

Do physicians resist this? Do they think it's questioning their judgment?

I have yet to encounter any resistance regarding this particular tool, but I understand that certain providers are wary of AI. A couple of years ago, there was this mental image of a robot pointing at a CT scan and the idea that, somehow, robots would replace all of the physicians. That's not what we do. We're more like augmented intelligence. The insights we surface are incredibly helpful so we don't replace anything that doctors do. What we do, going back to that CMS challenge, is surface things that might otherwise be hidden and help them focus on issues that are very pertinent. I do think physicians can be concerned when a model is like a black box—models that don't explain why they make the predictions they do. It's reasonable to reject that kind of model. The key thing for us was to be trusted and trustworthy. That meant re-imagining the entire concept of patient risk profiling.

Did the contest cause ClosedLoop to change its platform?

The contest was about what ClosedLoop was trying to do every day, but it pushed us at every single step. We had to rethink a lot of things, and it made us question: is it our job to just create a prediction? Do I just create a bunch of numbers and hand them off to someone and say good luck? We decided it needed to be immediately useful.

So, does the company recommend actions to the doctor for a particular patient?

A large part of those (prediction) reports are recommended actions … and they're coming from what experts say.

I've heard your CEO Andrew Eye say that 25% of all costs in health care are wasted. How does your platform reduce costs?

We're reaching a tipping point in this country where the cost of health care is reaching unsustainable levels. And employers are getting fed up, too. Something's got to give. Commercial carriers and large employers definitely want in on this thing. So, to be successful, what does a payor or provider have to do? They have to be able to produce better outcomes with greater certainty. But the people delivering care have to have the ability to do that in a systematic way. That's where we step in (with tools to accomplish the following four steps). They have to define the patient-centered outcome. For example, is the patient having unplanned hospital visits? Are they at risk of falling … or getting sepsis? Then you have to engage the individual who is at high risk so you can promote health and prevent that thing from happening. You have to have a way to partner with other parts of the health care system and you have to learn to share and exchange information. That's how the waste gets removed—by generating better outcomes. We step in and create these capabilities.

Can you give an example of how this predictive part works?

The predictions help you see several things. One of them is, how high is the risk? Where is that person relative to other people like them? What are the factors affecting their health? If 25% of their risk is caused by high blood pressure, then I'll focus on controlling their blood pressure.

Does the provider feed this information into an algorithm? How does your system get the data?

We do a data inventory to see what kind of data they (doctors and other clients) have. It would come from EHR (electronic health record) data, claims data, remote patient monitoring … and publicly available data sets that are built into the platform. These capture important factors around the social determinants of health—factors at the county level and neighborhood level that talk about income, social deprivation and other vulnerabilities. These are related to access to care, how many physicians are in that area, prevalence of drinking, smoking and availability for exercise. The doctors don't ever have to touch anything (for the data to be captured).

To play devil's advocate, let me ask: When you have more people surviving serious illnesses and living longer, how does that save money in the system?

Most of the money is spent at the beginning and end of life. Yet research is very clear that most people don't want to die in the hospital. They want a fundamentally different kind of death, yet fewer than 20% are able to make that come true. You want those end-of-life conversations to

start early so if you can begin to see the trajectory, you can have these discussions, and decisions are made with their concordance. You can begin to guide those conversations so they're not a phone call in the middle of the night. If we're successful in getting rid of the 25% of waste, which is $1 trillion, that pays for a lot of extended life expectancy.

Can doctors use your platform to make diagnoses?

It's not on our roadmap right now. An interesting question is the extent to which the best AI in the world can make a diagnosis. What are we actually asking physicians to do? We're asking them to pattern recognize. Over the course of time, they can say I've seen enough of these, I know what's going on. I think it's going to be quite a while (before AI aids in diagnosis) and let me tell you why: It's not that the math isn't ready, it's that the data is missing. When people go to the doctor, they present with some of the most ambiguous, odd signs and symptoms that are not captured in a standardized, digitized way. Who's the teacher of AI? Data. And so, we can only learn from the data we have. Once the data starts to get digitized, then I think AI can be helpful.

There's so much data out there; we haven't figured out how to make sense of it all.

We're reaching a point in health care where you have to use AI to make sense of it all. What we're trying to do is create this precision health intelligence capability and let the machines do what the machines do well. Predictions are one thing, but predictions never saved anybody. We predict the future so you can change it. We predict the future so you can act on it. We can use AI to learn which actions are leading to the outcomes we want. We need to close the loop, in other words, and learn. What we're really talking about is a learning health system.

How do you deal with the bias of AI?

Bias in health care is pervasive, but the good news is, even if it's pervasive it's not inevitable. Part of the CMS competition was our approach to algorithmic bias and fairness. What we said was, the reason it's not inevitable is, if you have the right processes in place, you can find out where bias can come from. Then, having data science tools, you need a platform that can accurately assess and measure for bias. And you continuously monitor them because they can drift. What you need is a platform that allows you to quickly and easily test algorithms and endpoints and labels. If there's some unfairness in something they're about to implement, they would know that in advance.

What do you predict is the future of health care?

Health care is clearly at a tipping point (because of soaring costs). We're reaching a crisis level … but now we have the tools—and the technologies are mature enough—that we can be successful (at providing better, more cost-effective care). We're at the beginning of something. I'm incredibly excited. I've been doing this almost 30 years, and I think the industry is finally

ready to embrace AI. It needs to be embraced. There's a lot of work to do, and we're ready to take it on. It's going to be really exciting.