

Using Predictive Analytics in Healthcare: Technology Hype vs. Reality

By David Crockett

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The recent posting of 3 Reasons Why Comparative Analytics, Predictive Analytics and NLP Won't Solve Healthcare's Problems (<http://www.healthcatalyst.com/3-reasons-why-comparative-analytics-predictive-analytics-and-nlp-wont-solve-healthcares-problems/>) reminds me that popular buzzwords and hot topics always come and go. Like the latest Hollywood fads rising and falling, technically sexy topics such as **big data**, **bioinformatics**, **predictive analytics** or **genomic medicine** are tossed in and about sales calls, funding proposals, journal articles and blogs for a few years and then folks move on to the next big thing. Why is this? Much of this "smoke and mirrors" may arise from our seeming love affair with new technology.

Worldwide, there is currently more information generated in a single day than we could possibly absorb in an entire lifetime. Those of us with more than a decade or two under our belts however, might remember the first time we pointed a remote control at a TV, pushed the button and the channel actually changed! Can you remember your first time flying in a passenger jet? Or the first time using a microwave? Do you remember your first conversation on a cell phone or first text message? How about the first time you sent an email or did a Google search? Indeed, we live in a remarkable the age of technology!

Some months ago, I had the chance to analyze my own DNA using next-generation sequencing. This is another remarkable new technology that can map and identify base nucleotide changes in the entire human genome in a single analysis. I crunched all that **big data with bioinformatics** and found certain genes in my DNA that had interesting changes.

So what's your point, David?

IS NEW HEALTHCARE TECHNOLOGY REALLY USEFUL IF IT CAN'T BE USED ?

The sometimes not-so-obvious irony is that without having the proper technology framework in place, with context and metadata for *meaningful use*, new technology is really not very useful. In fact, it is often a waste of time and money.

To sequence the entire DNA of a patient may prove to be an incredible advancement in *genomic medicine*. Yet when changes in their DNA can't be communicated in a clear and concise and timely manner to the health care provider who needs that information, the chain of utility for that technology is broken. Beyond that, even if the full information gets passed along efficiently. But lacks the context of metadata (annotation) or interpretation (classification) of what it means and what to do about it, again the remarkable technology has fallen short of its full potential

In other words, the fact that I was able to analyze my entire genome was an amazing technological feat. But unfortunately, the utility of this data is limited due to the inadequate framework and context of that data. The technology is there, but the means to deliver and interpret actionable data has yet to be fully developed.

PREDICTIVE ANALYTICS: CAN HEALTHCARE REALLY UTILIZE IT FULLY?

The buzzword fever around **predictive analytics** will likely continue to rise and fall. Unfortunately, lacking the proper infrastructure, staffing and resource to act when something is predicted with high certainty to happen, we fall short of the full potential of harnessing historic trends and patterns in patient data. In other words, without the willpower for clinical intervention, any predictor – no matter how good – is not fully utilized.

What does this have to do with Health Catalyst® and enterprise data warehouse expertise? Health Catalyst not only has the proper technology framework and metadata in place, but we also develop novel prescriptive analytics. More importantly, we tie each one carefully to clinical priorities and measurable events such as cost effectiveness, clinical protocols or patient outcomes.

In order to be successful, we feel that clinical event prediction and subsequent intervention should be both content driven and clinician driven. A more specific term is *prescriptive analytics*, which would include evidence, recommendations and actions for each predicted category or outcome.

Why? In medicine, technology and evidence should have the same end goal – to maximize the utility of the historical trend for improving patient care.

Within Health Catalyst, data modeling and algorithm development is performed using industry leading tools for data mining and supervised machine learning such as Weka, Orange, and R. Ongoing efforts include classification models for a generalized predictor of hospital readmissions, heart failure, length of stay and clustering of patient outcomes to historical cohorts at time of admit. Most importantly, we have internal access to millions of de-identified hospital records in both the inpatient and outpatient settings and adult and pediatric populations. This training data is crucial to addressing the predictive analytics demands of clients and site customization. So when your request comes – whether it involves classification or clustering or feature selection – HealthCatalyst has the tools and the data and the expertise to successfully deliver top performing predictive analytics.



About the Author

David Crockett joined Health Catalyst in July 2013 as Director of Research. Prior to coming here, he worked for ARUP Laboratories as Director of Research Informatics. David's undergraduate training was in molecular biology/genetics from Brigham Young University. He later earned his PhD in Biomedical Informatics from the University of Utah.