A Health IT Soothsayer

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One of the best parts about predicting the future is how rarely the soothsayer is held accountable. The famous Michel de Nostredame, better known as Nostradamus, is popularly credited with predicting the rise of Hitler in Germany, the attacks of 9/11, and climate change. In reality, we do not focus on the predictions Nostradamus got wrong, and we pretzel-twist his vague predictions into specific, definitive ones.

Steve Levitt of Freakonomics fame said on a 2011 *Freakonomics Radio* podcast:

> "So, most predictions we remember are ones which were fabulously, wildly unexpected and then came true. Now, the person who makes that prediction has a strong incentive to remind everyone that they made that crazy prediction which came true. If you look at all the people, the economists, who talked about the financial crisis ahead of time, those guys harp on it constantly: 'I was right, I was right, I was right.' But if you're wrong, there's no person on the other side of the transaction who draws any real benefit from embarrassing you by bringing up the bad prediction over and over. So there's nobody who has a strong incentive, usually, to go back and say, 'Here's the list of the 118 predictions that were false.' And without any sort of market mechanism or incentive for keeping the prediction makers honest, there's lots of incentive to go out and to make these wild predictions." (Dubner, 2011).

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With 2019 on the horizon, it makes sense to offer up some health IT (HIT) predictions. What's the harm? If I am correct, the HIT community will praise my ability to critically think and predict the future. If I am miserably wrong, no one will care. So here goes.

Interoperability

Don Rucker, MD, head of the Office of the National Coordinator for HIT (ONC), continues to focus the agency on a single major goal: interoperability. While this effort is noble, the winds of the marketplace resist it. Economic incentives continue to work against healthcare provider organizations' efforts to easily, efficiently exchange personal health information. As electronic medical record (EMR) vendors strive to grow revenue now that the opportunity for net-new core EMR sales has dwindled, the removal of proprietary barriers to information exchange becomes a decreasing priority. These artificial barriers make choosing HIT enhancements from other vendors more difficult as the problems of interoperability only exist among vendors, not within them.

The expansion in the use of HL7's FHIR standard holds promise in breaking through this interoperability problem. Fortunately, EMR vendors are recognizing that their fight to expand market share is shifting

from interoperability barriers to the battlefield of robust APIs that work best with their own solutions, some of which utilize the FHIR standard.

At the end of 2019, the HIT community will continue to grumble about the failure to achieve complete interoperability, but there will be signs that technology advancements (e.g., FHIR), marketplace pressures (e.g., consumer demands), and government prodding (e.g., ONC) are at least getting us closer to the goal of free-flowing, efficient medical record exchange.

Digital therapeutics

While entrepreneurs attracted hundreds of millions in funding from private investors and venture capital firms to create mobile healthcare applications, few if any discovered an innovative revenue model to sustain their business. These applications linked their revenue either to typical per-member per-month payments from payer organizations or micropayments based on ad views and clicks. Unsurprisingly, because product development and user acquisition costs exceeded sustainable revenue streams, these firms' long-term prospects look bleak–and interest will continue to wane as EMR vendors expand their existing patient portals by incorporating some of the concepts included in these non-EMR vendor products.

Over the past year, a small number of innovative companies embraced the pharmaceutical industry's drug development model and applied it to patient-facing HIT applications. Rather than looking to the consumer (e.g., ads) or the insurer to pay for patient HIT based on unproven promises of efficacy and cost savings, these companies follow FDA rules for approval of prescription-controlled pharmaceuticals. This process forces these applications, dubbed digital therapeutics, to undergo clinical trial testing for safety and effectiveness before being released to the public.

Access to these applications requires a prescription written by a licensed clinician, just like any pharmaceutical not available over the counter. Along with FDA approval comes assignment of an NDC code, a unique 10-digit number that follows all the rules associated with reimbursable medications. In the end, digital therapeutics become just another prescription drug that payers cover as a typical drug benefit. In some situations, they are combined with a medication offering a treatment that leverages the synergy between the digital and non-digital therapeutic. Treatments currently approved or under development address substance abuse, opioid addiction, PTSD, depression, oncology, and cardiovascular disease.

By the end of 2019, there will be exponentially greater awareness of the availability of digital therapeutics and the number of ongoing digital therapeutic clinical trials. Investors, soured on the failures of standalone mobile applications, will shift their focus to digital therapeutics and reallocate their funds to this more realistic business model.

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Over the rainbow

Each year, 3D printing gets more capable and less expensive. Within the next 10 years, some innovator will introduce a 3D printer capable of creating a single pill that includes all of a patient's prescribed medications, at the exact dosages as defined by precision medicine therapeutic algorithms (Chaiken, 2012). Shortly afterward, phone and watch applications will monitor biological functions and feed results back to the algorithms to allow for minor dose changes, leading to personalized medications adjustable on a daily basis.

Returning to the thoughts of Steve Levitt, the predictions that prove true will bring great recognition to this soothsayer, while those that prove wrong will bring no mention at all. I can live with that. ✱

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