'Small Wins' Called Key to Success in Harnessing Big Data in Healthcare

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CHICAGO (GenomeWeb) – Analytics from "big data" in healthcare has been around for at least a decade, with backers often trumpeting it as a "game changer" or "revolutionary."

While IBM may be part of that hype machine, Anil Jain, vice president and chief health informatics officer of IBM Watson Health offered a sobering reality check with seven simple words. "How much difference has it made in health?" Jain asked rhetorically at this week's Cleveland Clinic Medical Innovation Summit.

Instead of going for something revolutionary, look for "small wins" such as finding ways to bundle clinical, patient-generated, and genomics data on individuals or populations to deliver relevant insights where and when they are needed, Jain said Wednesday during a plenary session that was webcast to media unable to make it to Cleveland.

"Knowledge tools" like Watson help "scale the expertise" of biomedical professionals, Jain said, but big data and advanced analytics won't solve all that ails healthcare overnight. Such technologies thus need to demonstrate that "it's possible to make incremental progress," he explained. "Get some small wins, then iterate from that," Jain advised.

Peter Tippett, founder and CEO of HealthCelerate, an Ashburn, Virginia-based startup that enables secure health information exchange and patient-clinician communications, agreed about the imperative to deliver "actionable" information to physicians and patients. But, noting that health decisions usually happen far from a hospital or doctor's office, it no longer is sufficient to send information only to traditional clinical settings.

"We need to make sure we drive the insights to the point of need," said Tippett, former chief medical officer of Verizon Communications and a longtime entrepreneur.

Aashima Gupta, global head of healthcare solutions for the Google Cloud Platform, continued the discussion by noting that social determinants of health — physical environment and lifestyle choices — and genomic data are becoming at least as important as clinical records in informing care choices and said that it is impossible for even the most seasoned healthcare professional to consider all these factors without assistance. "We need knowledge sharing. We need data sharing," she said.

"The majority of healthcare will become less a relationship between patient and provider and more of a relationship between patient and information," added Tippett.

All of this data feeds into population health and value-based care that might bring down costs and improve outcomes, but there need to be useful tools for precision medicine, said Jain.

Those tools include analytics, machine learning, and artificial intelligence, which have proven to be difficult to harness. Gupta said that data standardization is a prerequisite for building useful tools for machine learning.

Even with standardization, informaticians need to decide what role such technologies should play in healthcare since physicians worry both about getting burned out and about machines replacing them. "Can we help them with decision support, not decision making, with AI?" Gupta said.

Clinical decision support that includes genomic information can be quite powerful. Gupta discussed a 2016 [paper in the *Journal of the American Medical Association*](#) that showed how ophthalmologists were able to detect subtle signs of diabetic retinopathy with an automated deep-learning algorithm.

Clinicians have been slow to bring genomics into their practice for several reasons, not the least of which is uncertainty. "What we don't know about the genome far outweighs what we do know about the genome," said Nabil Hafez, senior director of product management for Sunquest Information Systems' molecular and genetics product lines.

Practitioners — and, by extension, medical informaticians — should be wary of overreliance on genomic data, however. "Genomics isn't a crystal ball," Hafez said. Having a genetic predisposition to a disease doesn't mean one will get that disease, he noted. But combined with proteomics, transcriptomics, or other omics, as well as clinical and environmental data, a genome analysis could be a powerful tool for precision diagnostics and treatment planning, Hafez said.

Proper system design will be critical to the success or failure of precision medicine. One audience member asked if whole-genome or whole-exome sequences might generate too much data for clinical IT systems and for medical professionals.

"No, we don't need all that data," Jain responded. Perhaps pull genomic variants into AI systems along with phenotypic data from electronic health records and patient-facing health apps, he suggested.

Don't try to create a "perfect system," Jain advised. Look for the most relevant data, and keep applying AI to it. "At some point, you're going to get things pretty good," he said.

Jain and Gupta also suggested that machine-learning algorithms have to be transparent to create trust. "Docs are not going to do it unless they start trusting what comes out of these machine-learning algorithms," Jain said.

Transparency also helps developers improve their algorithms, Gupta added.