# Technology Will Replace 80% Of What Doctors Do

Vinod Khosla

Healthcare today is often really the "practice of medicine" rather than the "science of medicine."

Take fever as an example. For 150 years, doctors have routinely prescribed antipyretics like ibuprofen to help reduce fever. But in 2005, researchers at the University of Miami, Florida, ran a study of 82 intensive care patients. The patients were randomly assigned to receive antipyretics either if their temperature rose beyond 101.3°F ("standard treatment") or only if their temperature reached 104°F. As the trial progressed, seven people getting the standard treatment died, while there was only one death in the group of patients allowed to have a higher fever. At this point, the trial was stopped because the team felt it would be unethical to allow any more patients to get the standard treatment.

So when something as basic as fever reduction is a hallmark of the "practice of medicine" and hasn't been challenged for 100+ years, we have to ask: What else might be practiced due to tradition rather than science?

Today's diagnoses are partially informed by patients' medical histories and partially by symptoms (but patients are bad at communicating what's really going on). They are mostly informed by advertising and the doctor's half-remembered and potentially obsolete lessons from medical school (which are laden with cognitive biases, recency biases, and other human errors). Many times, if you ask three doctors to look at the same problem, you'll get three different diagnoses and three different treatment plans.

The net effect is patient outcomes that are inferior to and more expensive than what they should be. A Johns Hopkins study found that as many as 40,500 patients die in an ICU in the U.S. each year due to misdiagnosis, rivaling the number of deaths from breast cancer. Yet another study found that 'system-related factors', e.g. poor processes, teamwork, and communication, were involved in 65% of studied diagnostic error cases. 'Cognitive factors' were involved in 75%, with 'premature closure' (sticking with the initial diagnosis and ignoring reasonable alternatives) as the most common cause. These types of diagnostic errors also add to rising healthcare expenditures, costing $300,000 per malpractice claim.

Healthcare should become more about data-driven deduction and less about trial-and-error. That's hard to pull off without technology, because of the increasing amount of data and research available. Next-generation medicine will utilize more complex models of physiology, and more sensor data than a human MD could comprehend, to suggest personalized diagnosis. Thousands of baseline and multi-omic data points, more integrative history, and demeanor will inform each diagnosis. Ever-improving dialog manager systems will help make data capture and exploration from patients more accurate and comprehensive. Data science will be

key to this. In the end, it will reduce costs, reduce physician workloads, and improve patient care.

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