

The Creative Destruction of Medicine

“The invention of print, however, made it easier to manipulate public opinion, and the film and the radio carried the process further. With the development of television, and the technical advance which made it possible to receive and transmit simultaneously on the same instrument, private life came to an end.”

—George Orwell, 1984



I had brought a red from Maremma and a lovely prosecco to celebrate the stars coming into alignment—those being the Star of David and that of Bethlehem, given that Hanukkah and Christmas about this year. It was time for our book club. I selected the volume after reading an interview in the *New York Times* Book Review with Francis Collins, director of the National Institutes of Health, who cited *The Creative Destruction of Medicine* by cardiologist Eric Topol as his favorite book of the year.

This book describes how genomics and digitalization are driving medical care from a population-based approach to one of individualized therapy. We will have at our fingertips (literally) an overwhelming amount of information on a single patient to direct care. Topol makes the case that a seismic shift is inevitable for those involved in health care: patients, doctors, pharmaceutical companies, and other sectors of the healthcare industry. The revolution will be from population-based medicine to *theranostics*, the integrated use of treatments and diagnostics (especially genomic and protein information) to guide better, individualized therapy. Information will be readily available that will determine at birth whether a person will be susceptible to anything from a heart attack to Alzheimer disease decades in the future. A cell phone may well become the conduit for continuously monitoring the blood sugar of a patient with diabetes, the blood pressure of someone with hypertension, or the rhythm of a cardiac patient, generating an alert to a doctor when the patient runs into trouble.

Topol is against population-based medicine and in favor of granularity; we are all distinct entities and need to be managed as such. For example, drug approval has relied on the results of large clinical trials in which a difference between treatment arms might be statistically significant but clinically meaningless, and misleading for an individual patient. Thus, evidence-based medicine loses its basis because it does not account for differences among patients. He cites the case of statins, which are used in many despite benefitting only a few. In contrast, a wider use of pharmacogenomics could predict which patients are more likely to respond to a drug or to experience toxicity

from it. Using genomic information, clinical trials could be smaller, focusing on patients with a highly specific genetic profile. They therefore could be completed more quickly, and perhaps with less expense.

One question I raised was: How much information is too much? My young charges and colleagues were concerned about the impact of a deluge of information on those of us trying to practice clinical medicine. They were excited at the prospect of patient-directed management based on genomic and proteomic information, yet worried about our ability to filter the useful stuff from the irrelevant. Furthermore, relying too much on technology has the potential to dehumanize medicine. I asked my team why they went into medicine to begin with, and none said it was to master the potential of their iPhone. It was to care for patients directly. One example of this problem is the increasing use of telemedicine, in which patients are free to make a video call to their physician for a quick, virtual diagnostic evaluation. Should that really replace a hands-on visit? If patients have access to all of their health information, who will be there to interpret it for them in real time? Moreover, issues are raised regarding data security and patient privacy.

Topol provides a convincing case that moving to more individualized care is desirable and inevitable. Yet physicians are resistant to it. In a Topol world, the next generation of medical students will shift the focus of their learning from compassionate patient care to informatics, as genomics and technology fundamentally change how medicine is practiced. Yes, change is good and information is important. Patients will benefit from the intersection between the individual and science. However, at least from our perspective, we need to find a balance between the futuristic and the humanistic.

Until next year . . .

A handwritten signature in dark ink that reads "Bruce D. Cheson". The signature is written in a cursive, slightly slanted style.

Bruce D. Cheson, MD