

## Penultimate

Recently, Karl Taro Greenfeld wrote an article regarding Jenny McCarthy and her *cause célèbre* against vaccines and their potential to cause autism (The Autism Debate: Who's Afraid of Jenny McCarthy? <http://www.time.com/time> [25 Feb 2010]). Trying to explain why individuals and groups maintain their conviction that vaccines cause autism despite extensive scientific data to the contrary, he concludes that "The answer has to do with our era's strained relationship with scientific truth, our tendency to place more faith in psychological truths than scientific ones." In an era of evidence-based medicine and the development of guidelines based on clinical evidence, how are we to overcome the public's strained relationship with scientific truth? Furthermore, as the US government attempts to transform its health-care system, how can we reconcile the public's lack of confidence in recommendations based on scientific principles?

As clinicians, we are confronted on a daily basis with skepticism regarding diagnoses (or lack thereof) and therapeutic recommendations. The proliferation of pseudoscientific concepts on the internet and via social networking resources rapidly overwhelms a physician's ability to make complex scientific principles easily understandable. By contrast, convinced zealots have no such problem in presenting simple, seemingly logical, explanations that have limited or no scientific validation. In the USA it is possible to market medicinal foods that claim to improve colon health, digestive health and immunity, without providing scientific data in support of these claims of therapeutic benefit. Although Dannon was recently fined US\$45 million for claiming unproven health benefits for two of its probiotic yoghurts, there is a great deal of leeway given for the advertising of other pseudotherapeutic claims. In the same manner, alternative medicine and associated therapies are flourishing in our society, which is, appropriately, dissatisfied with the ability of those in the medical profession to diagnose and cure a preponderance of chronic medical conditions.

The belief in science is being challenged in virtually every aspect of our lives, partly because, as Al Gore states in a recent editorial "...the scientific enterprise will never be free of mistakes." (We Can't Wish Away Climate Change, *New York Times (New York)* [27 Feb 2010]). He was speaking about how adversaries of global warming theories isolate and amplify flawed estimates ("...two

mistakes in thousands of pages of careful scientific work over 22 years by the Intergovernmental Panel on Climate Change.") to attack the "overwhelming consensus on global warming" and how this has led to "Global political paralysis..." As we come out of another harsh winter in the Northern Hemisphere, Gore points out that "Just as it is important not to miss the forest for the trees, neither should we miss the climate for the snowstorm."

The clash between science and lay convictions has numerous fronts. I won't delve into the realms of religion despite innumerable nexus, but politics is a major battleground that has an immediate impact on medicine. Recently, the US Preventive Services Task Force published a recommendation statement on screening for breast cancer that unleashed a maelstrom of controversy by recommending that mammography be eliminated as a standard test for women 40–49 years of age and performed every 2 years rather than every year in women aged 50–74 (*Ann. Intern. Med.* **151**, 716–726; 2009). At the same time that President Obama was attempting to pass new health-care reforms, this unbiased, scientifically supported document fueled flames unrelated to the scientific method that applies screening recommendations to populations, not individuals. Instead, the recommendation statement was used by interest groups and politicians to incite the public on the issue of rationing health care—a rallying cry against change in our societies' focus on individualized care (Truog, R. D. *N. Engl. J. Med.* **361**, 2501–2503; 2009).

As it pertains to individuals—and these are the patients that we see every day in clinical settings—when we diagnose an idiopathic disease, which is more often than not, and explain that we do not know the exact cause or have a medical cure, that is usually when the patient stops listening. If the medical scientists don't know the cause, then it is human nature to attempt to find associations. Indeed, the search for associations is often also the first step in the scientific process. It may be the penultimate step, if the scientific process is aborted by the absence of appropriate experimental data in favor of logical explanations that are better suited to the patient's, family's, interest group's, political group's or society's psyche and personal beliefs.

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**Competing interests**  
The author declares no competing interests.