Momentum grows to make 'personalized' medicine more 'precise'

In 2009, Wisconsin clinicians sequenced all the protein-coding DNA of a very ill 4-year-old boy named Nicholas Volker. They used the results to pinpoint a gene mutation at the root of his life-threatening gut inflammation, as well as to identify a risky but ultimately effective treatment. Nicholas's story was hailed as one of the first successes in the long-promised goal of using sequencing to steer clinical decisions. But as the approach proliferates in the treatment of rare genetic diseases, cancers and other areas of medicine, researchers say it's time to change both the name and the framework of a field that for more than a decade has been termed 'personalized medicine'.

"I think 'personalized medicine' was perhaps a useful rubric with which to launch this activity," Maynard Olson, a genome scientist at the University of Washington in Seattle, told colleagues at a conference last November, "but it sends a misleading message—actually both to ourselves and to the broader community."

First of all, 'personalized' implies the prospect of devising a different treatment for each individual patient. "On one hand, that's how medicine is practiced every day, and on the other, it's a complete fallacy," says David Altshuler, a geneticist at the Broad Institute in Cambridge, Massachusetts. Olson, Altshuler and others are pushing to retire the phrase and replace it with a new moniker—'precision medicine'—with the idea that molecular information improves the precision with which patients are categorized and treated.

The name change is starting to gain steam. On 31 January, Weill Cornell Medical College and the New York Presbyterian Hospital announced the creation of the Institute for Precision Medicine, a Manhattan-based research hub designed to systematize the translation of genomic discoveries into clinical care. This year will also see several conferences sporting the term, including one at the University of California–San Francisco (UCSF) and another at the Cold Spring Harbor Laboratory (CSHL) in Long Island, New York. Pharma, too, has jumped on the precision-medicine bandwagon. For instance, New York–based Pfizer has touted the success of its targeted lung cancer drug Xalkori (crizotinib) as an example of precision medicine in action, as company executives, including Morten Søgaard, who carries the title Head of Biotechnology and Precision Medicine, wrote in a commentary published last year (*Clin. Transl. Med.* **1**, 7, 2012).

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Hitting the bull's-eye: Genome sequencing technology aids drug selection.

Toward precision medicine

The current usage of 'personalized medicine' dates back to the turn of this century, when scientists began to realize the promise of the Human Genome Project. The term 'precision medicine' is much newer, only having entered the scientific lexicon in 2008 when business strategist Clayton Christensen, of Harvard Business School in Boston, coined the expression to describe how molecular diagnostics allows physicians to unambiguously diagnose the cause of a disease without having to rely on intuition. However, the name didn't gain traction until a committee convened by the US National Research Council laid out a blueprint in 2011 for modernizing the taxonomy of disease on the basis of molecular information such as causal genetic variants, rather than a symptom-based classification system. They called the report *Toward Precision Medicine*.

"We consciously spent a considerable amount of time on whether we were talking about personalized medicine or precision medicine," says Charles Sawyers, an oncologist at the Memorial Sloan-Kettering Cancer Center in New York who co-chaired the committee. "With the term 'precision medicine', we are trying to convey a more precise classification of disease into subgroups that in the past have been lumped together because there wasn't a clear way to discriminate between them."

"Precision medicine is more of a systems approach," says UCSF pharmacogeneticist Deanna Kroetz, who is co-organizing the upcoming Precision Medicine meeting at CSHL in November 2013. "People who have delved into the sequencing world, dissecting down to the molecular level of disease, feel they are getting a much more complete picture than what started with personalized medicine."

Yet, outside the research community, not everyone supports renaming personalized medicine. "I think the rebranding could be a mistake," says Edward Abrahams, president of the Personalized Medicine Coalition, a Washington, DC–based advocacy group. Even though some researchers are disavowing the current term because they fear it promises too much to each and every patient, Abrahams says, "there's not one iota of difference" between the definitions of 'personalized' and 'precision' medicine. Moving toward a more targeted system of medicine, whatever one calls it, involves more than just research, he explains. Policymakers and the public must also be convinced, and they are just getting comfortable with the current terminology.

Within the field, the change in nomenclature reflects more than a semantic distinction, however. "If the 'precision' versus 'personalized' debate leads to some serious introspection about where genomic medicine needs to go," Olson told *Nature Medicine*, "it will illustrate that names do matter."

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