

# The critical importance of case reports

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## Editorial

Over the past few years, we have heard much about the importance of Randomized Clinical Trials in determining medical treatment plans. It would be easy to forget the important role that case reports have played in medical progress throughout history. Accurate observation and reflection on the meaning of those observations are critical to the advancement of science. In 2009, Albrecht, Werth and Bigby reviewed the impact of case reports in dermatology.<sup>1</sup> They emphasized that case reports are often the first line of evidence for new therapies, even if they are not sufficient to establish efficacy. Perhaps more importantly, they are the first and perhaps the major means of detecting rare adverse events and should be taken seriously.

It is not just in dermatology that such importance of case reports has been demonstrated. The story of the linkage of *Helicobacter pylori* to gastritis, peptic ulcer disease and gastric adenocarcinoma is a fascinating review of the importance of case reporting in pivotal advances in medicine.<sup>2</sup> More is added to the story as reviewed by Kyle, Steensma and Shampo in their 2016 narrative in *Mayo Clinic Proceedings*.<sup>3</sup> Barry Marshall and J. Robin Warren were intrigued by peculiar curved bacteria found in gastric biopsies. They learned that these bacteria had been found before but ignored as artifacts. Warren and Marshall reported on the findings in a Letter to the Editor in *the Lancet* in 1983.<sup>4</sup> Unfortunately, the prevailing theory of the development of peptic ulcer disease did not allow for a linkage to these bacteria. The “science was settled”.

Failing to find a suitable animal model to test his theory, in 1984 Marshall took matter into his own hands and described the ultimate case report of his actions in 1985.<sup>5</sup> After first undergoing a gastric biopsy to insure he did not carry the bacterium, he drank a culture and promptly developed peptic ulcer disease. Although it still took years to gain acceptance, it turned out that the science was indeed not settled.

Observational case reporting was the backbone of the development of a whole discipline of learning termed *Positive Deviance*.<sup>6</sup> Starting in the nutritional research literature and moving into the realm of public health it emphasized the opportunity of outliers. By studying why some poor children remained healthy and others did not, researchers such as Marian Zeitlin and Jerry and Monique Sternin were able to optimize nutrition in Third World nations by focusing on what went right, instead of what went wrong. In this way, observational case reporting found not only solutions to seemingly intractable problems, but the process of a whole new discipline of approach. Outliers became not problems, but opportunities!

This should not be unexpected, as Positive Deviance and the importance of case reports both grow out of an understanding of the differences between what is *truly complex* and what is *merely complicated*. I had always thought they were basically the same. Spending years in medical continuous quality improvement, much of my work was an attempt to standardize processes and minimize outliers. Being a Six Sigma Black Belt, my focus was on bell-shaped curves to collapse around their means. I was focused on *error reduction*

and *standardization*. While that was important, I should have devoted some of my time to *recognition of opportunity*. Most of the time the techniques worked very well. The successful projects sometimes were spectacular. We improved care and satisfaction and saved money and resources. Yet sometimes our projects were not successful. Some even made things worse! I kept searching for possible answers, but they were elusive.

Then I read *A Leader's Framework for Decision Making* by David Snowden and Mary Boone in the November 2007 issue of the *Harvard Business Review*.<sup>7</sup> Suddenly, it made sense. There were actually multiple domains: Simple, Complicated, Complex, Chaotic and Disorder (not able to be categorized with existing information). Cause and effect worked differently in each of these domains. In the Simple, everybody could see the relationship. In the Chaotic, there was no relationship between cause and effect. In the Complicated, the relationship could be understood ahead of time by experts. However, in the Complex the relationship could only be seen in retrospect, a term called *retrospective coherence*.

Like most physician scientists, I had lived my life in the Complicated domain where the scientific method was standard operating procedure. It works very well when dealing with merely complicated problems, but it fails miserably when faced with problems that are truly complex. Our failures in quality improvement occurred because we did not recognize that a different tool set is needed for truly complex problems. Instead of the usual “fail safe” approaches such as randomized clinical trials, the truly complex problem needs to be approached with multiple “safe fail” efforts.

This is where case reports shine! They are not meant to provide the end answer, but to *point the way towards the right questions*.

So, the next time someone attempts to minimize the importance of both authoring and reading “just case reports”, remember that some of those lead to a Nobel Prize.

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## Conflicts of interest

Author declares that there is no conflict of interest.

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