

Evidence Based Medicine: The Median Is Not the Message



Man is a creature who lives not upon bread alone,
but principally by catchwords.
— Robert Louis Stevenson, *Virginibus Puerisque* (1881)

The current vogue of evidence based medicine rests on the not unreasonable assumption that diagnostic and therapeutic and medical decisions should be based on the best available evidence — on facts, not on convention, prejudice, or supposition¹⁻³. Evidence based medicine not only applies to general internal medicine, but also the subspecialties including rheumatology⁴, although it remains unclear what exactly is the best evidence⁵. For the omnists, the best evidence is the double blind placebo controlled clinical trial, which has been aptly described as having a gold head but clay feet⁶. There are many reasons why this gold standard is flawed, not the least of which is that negative trial results tend not to be published⁷, so skewing the results of metaanalyses⁸. However, the major criticism of controlled clinical trials is that the patients taking part in the study are not necessarily representative of the general population. Patients at the extremes of age are almost always excluded, as are females in the child-bearing years, and those with comorbid disorders⁹. The patients are therefore “squeaky-clean,” and the results are not generalizable to the “real world” of medicine. There is also evidence that those who refuse to participate in clinical therapeutic trials differ from those who participate readily¹⁰. Clinical trials are usually double blind, but absent from most reports is any information as to how many patients were able to break the code. How double blind is double blind? Perhaps, as shown with nonsteroidal antiinflammatory analgesics in short term trials, it is of relatively little importance¹¹. However, with drugs such as cyclosporine, which may cause dramatic adverse reactions, breaking the code may be of greater significance¹². Placebos are not without their effect, both in terms of efficacy and toxicity¹³. Ideally a clinical therapeutic trial should have a no-treatment group, although this is not possible in patients with painful rheumatic disease. Adverse effects, both mild and severe, have been shown to potentiate analgesia¹⁴, but this is almost never taken into account in the analysis of antirheumat-

ic drug trials. Nor is patient preconceived preference on outcome considered, even in double blind trials¹⁵. Much has been made of assuring patient compliance in clinical drug trials, but to date there is no indication what degree of noncompliance is clinically important⁹. There is a large corpus of literature on the absence of proper statistical analysis of data in clinical therapeutic trials, but much less on the subject of statistical manipulation, aptly described as “data torturing”¹⁶.

However, the major weakness of the controlled clinical trial, and hence of evidence based medicine, is that the degree of improvement from a drug deals with the average, not the individual patient. Gould, in an essay dealing with this problem¹⁷, emphasizes that an average is not a basic reality, and that a “central tendency is an abstraction, variation the reality.” A patient is not either a mean or median, or as Gould misquotes the communication theorist Herbert Marshall McLuhan, “the median is not the message.” Thus clinical therapeutic trials speak the language of the epidemiologist studying populations, and not the language of the clinical practitioner who treats only one patient at a time. Proselytizers of evidence based medicine perhaps put too much faith in numbers, forgetting that numbers are mere abstractions, and that after a clinical trial has been completed it still requires a subjective evaluation of its clinical significance. Mathematics is a useful tool, but is not the whole answer. We are reminded of the study conducted on beautiful women’s faces some years ago. In all, 50 measurements were fed into a computer, and a mathematical formula for beauty computed. Surprisingly, Marilyn Monroe was found to have eyes too far apart, and too short a nose! The practice of medicine has long been and still is evidence based¹⁸. A recent review of “an evidence based approach to prescribing nonsteroidal antiinflammatory drugs” provides a critical account of the use of this class of drug¹⁹, but to us is no more critical than if it had been written before the era of evidence based medicine. Thus, the same authors would have been just as critical about the evidence had they published their review in the 1980s, prior to the introduction of evidence based medicine. The review does, however, ignore several important pieces of scientific issues relating to

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differentials in protein-binding and to enantiomer kinetics and dynamics.

If there is evidence based medicine, a cynic might ask what then is non-evidence based medicine, and has it a role to play. Anecdotal case reports are considered by epidemiologists the lowest form of intellectual life, even lower than case-control studies^{20,21}. However, the discovery of the epidemic of acquired immune deficiency syndrome was based on case reports^{22,23}, and the discovery that peptic ulcer disease was due to infection with *Helicobacter pylori*^{24,25} and could be treated with a regimen of antibiotics²⁶ was not based on the results of controlled clinical trials, although later confirmed by them. Diagnosis is based on pattern recognition²⁷: as Goethe's dictum says, "was weiss man, seht man" (what one knows, one sees). Discussion of a single patient's illness at clinicopathological conferences remains, in our opinion, the best method of learning the art of medicine, a view also held by others^{28,29}. The art of medicine is the ability to correctly apply the science of medicine. Case reports have also served well in identifying adverse reactions with newly introduced medications, most drugs having been removed from the market on the basis of single case reports³⁰.

We believe in a critical approach to medicine with emphasis on questioning every fact and idea and researching the evidence for them. We do, however, feel uncomfortable that the term evidence based medicine has become almost a mantra, relying so heavily as it does on the results of controlled clinical trials. The comments of Worthington Hooker (1806-1867), Professor of Medicine at Yale University a century and a half ago, seem germane³¹: "The physician who narrows his view down to a certain set of facts, is in danger of becoming enamored of them. And if he does, he is straightway in the fog and mists of error. He forsakes the practical for a fruitless will o' the wisp pursuit of the ideal, all the while believing that he has found vast mines of truth, and very confident that his search is to be still more abundantly rewarded."

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