

Considering Causes: Can We Know Which Treatments are Truly Effective?

by Michael Sauder

How do we know which health treatments truly work? How do we ever conclude that one thing has caused another? Consider these fictional letters:

“Dear Editor: My neighbor has a cousin whose dad was cured of cancer after drinking hydrogen peroxide for two years. I’m trying it now, and I feel good.” –Sam

“Dear Editor: I now take a cold shower every morning, and suddenly all my warts disappeared!” –Cold in WA

“Dear Editor: Many people have difficulty losing weight. I started taking a new pill called Six O’clock that is effective, however. It seems strange because you need to swallow it at exactly 6:00 PM and then not eat anything before breakfast the next day. It’s also a bit expensive. However, I want others to be helped, so I’m writing this letter to the editor.” –Bob

“Dear Editor: I’ve long suffered from low energy, digestion issues, strange rashes, and Lyme disease. Over the past month, taking selenium supplements with ice-cold water every evening has given me energy and cured my digestion. Also, my Lyme and rashes have disappeared. And all from selenium! Please share this with all your readers so they can be benefited!” –Sally from PA

What is an editor to do? I am not an editor, but as a physician, I do answer health questions for a monthly periodical. Sometimes a reader requests that the magazine publish a testimonial about improvement. Should we publish what happened to that person?

How do any of us respond when friends share testimonies? What if the story seems fantastic or bizarre? It is one thing to hear and refrain from disapproving. Generally only when far-fetched attempts at cure are very expensive or known to be harmful do I express concern. But before I actively recommend a therapy, a different kind of thinking is required. Before recommending a therapy, I need to have substantial confidence that it will benefit. So here is what I would share with an editor about the fictional patient testimonials above.

Doctor to Editor

Dear Editor: Physicians and other medical practitioners are besieged by friends, family, and perfect strangers who want to relate stories of healing. Most of the stories are routine, some surprising, and a few fantastic. People outside of the medical field hear such stories also.

For each of the people who improve, I am thankful. Doctors do not know everything about what can help our bodies. People say “this caused that,” and they may be right. But, although none of us knows everything, we all know something. We know we cannot believe everything about all testimonials. If all the claims people make about how to be cured were true, we would have few sick people. But why must we be cautious with testimonials? I suggest that caution is required not so much with the details of the happenings in the story, but the teller’s *interpretation of cause and effect* within that story.

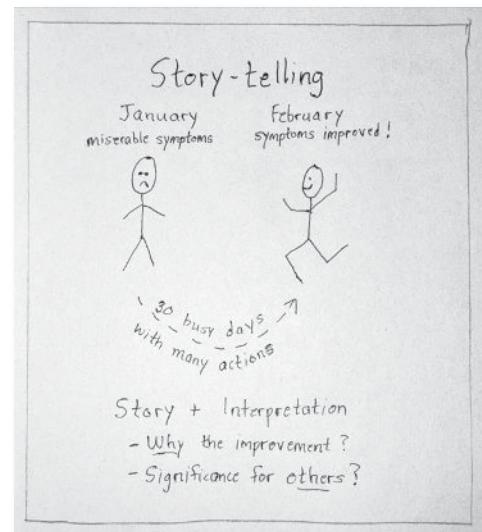
We hear that someone had a health problem with particular symptoms. A month later the problem is gone. In between, the person accomplished various actions. Of course, in every 30-day period, we do many different things. Some of those actions might be attempts at therapy, intended to cure a medical problem. How could we know whether an attempt at therapy was really the cause of symptoms disappearing?

As a listener, I am not really in the place to judge the symptoms. The storyteller is the one to judge how his or her own body feels at any time. But the causal connections drawn by the person telling the story is something different. Stories will contain not just descriptions of events, but also interpretations of events. Interpretation involves meaning-making. The meaning conveyed by a story might carry a lesson for the listener. But happenings are something different than interpretation of cause and effect between those happenings. These are difficult to separate. We have experiences, but at the same time we interpret those same experiences, making meaning for ourselves. And we generally think our interpretation is correct. But might improvement have happened even without that attempt at therapy? Might Sally have had more energy and better digestion even without taking the selenium? Here is my main point: **people generally underestimate their body’s own healing ability over time, and they overestimate the power of whatever attempt at therapy they were trying over that same time period.**

How Big is the Benefit?

How accurately most Americans estimate benefit or harms of treatments, screenings, and medical tests has been systematically investigated. One study summarized dozens of such studies. The authors concluded that most people overestimate the benefits of treatments, and underestimate the potential harms of a treatment or medical test.¹ Patients often assume that more tests and treatments indicate superior care. The authors noted “the appetite that people have for medical interventions. Many want to have more and resist having less.” One hundred years ago the Baltimore physician William Osler commented that what distinguishes humans from animals is that humans want to take medicines.²

I’ve heard people say that physicians are too skeptical about alternative therapies, that is, attempts at cure that have not been



¹ Hoffmann, TC et al. JAMA Internal Medicine 2015; 175(2): 274-86.

² Physicians also sometimes overestimate the benefit of therapies. Maybe a treatment has been proven effective for a certain condition, but we prescribe it for a different condition. This is usually unwise. Since doctors and patients together strongly desire that therapies work, sometimes we allow ourselves to get pulled into trying treatments that probably will not work.

systematically investigated for efficacy. But my impression is that physicians hold this skepticism not so much because of a bias that alternative therapies or “anything that is not expensive” cannot work or should not be attempted, but more because they realize how powerful the body’s own healing capacities are. Medical school teaches not just how the body works, but also how little we know about how the body works. Is the reluctance of physicians to recommend a therapy that has not been systematically investigated just an exercise of power, an attempt to exclude homegrown cures? Or is it due to an acute awareness that the body very often puts itself to rights, *no matter what we do?*

People can make their own choices about how they spend their money for their health. But refraining from judgment of others’ choices is one thing, and recommending a therapy is another. It is quite a responsibility to recommend that a patient spend hard-earned money on a particular type of cure. Before I can do that in good conscience, I need a substantial reason to think it will work. I need reliable information about the risks and benefits of that therapy. Price and effectiveness are both important. But considering effectiveness comes first. As a doctor, I propose and discuss treatments shown to be effective, even if expensive. But being cheap does not make it effective. And some inexpensive things (like hydrogen peroxide) are both inexpensive and dangerous, if used unsafely.

Of course, there are many things that are fine to try, even if there is no clear idea that they might work. You might avoid certain foods that seem to bother your stomach. Buy supplements if you want. Take cold showers whenever you want. This article is not about what you might decide to try. Instead, it is about judging whether what works for you will necessarily work for others.

I am sure there are many effective, inexpensive treatments that we have not yet found. Many of our drugs are derived from plants. But I suspect that many more uses of herbal compounds are beneficial, even if the studies have not been done. Often inexpensive attempts at therapy have not been studied systematically, and thus have not been demonstrated to work. Why are they not studied? It takes intense, organized investigation to establish whether a therapy actually works. It usually requires studying many people in a controlled, systematic way over time. That is complicated and expensive. Many simple attempts at therapy might work, but are not studied, precisely *because* they are simple. They would not yield enough profit for a private company to justify investigating them. As it turns out in our all-too-human world, treatments physicians propose are often expensive.

How could we fund expensive studies of inexpensive therapies? When knowledge would be in the public interest, everyone does have an interest in acquiring that knowledge. This is what the National Institutes of Health (NIH) and some philanthropies work to accomplish. The National Center for Complementary and Integrative Health, part of the NIH, funds some research on alternative therapies.

Examining Testimonials

In the last part of this essay, let us return to thinking about testimonials, sometimes routine, sometimes fantastic. There is more to say about how to consider causality. It is one thing to have events (cold showers; warts gone), it is another thing to interpret, to assign meaning, to say that “this thing that happened to me *means* such and so for you. If you have warts, include in your future a particular act (a cold shower).” Such an interpretation might not

be correct. The correctness depends not just on the factual input (an assessment of whether the shower was indeed cold or whether it was indeed in the morning), but also on whether the speaker has correctly concluded that the cold shower was *actually the cause of* the warts disappearing. Thinking in the right way about causation is challenging, and often we cannot be completely sure.

Think of it another way: acknowledging what happened in one person’s experience (person X) is one thing. Being aware of what happened is very different than understanding why it happened. On what basis could you truly recommend that someone else (person Y) act in a particular way based on the experience of person X? If you recommend that person Y follow what person X did, you are professing that you understand the causal relationships, the *connections between the events* in the life of person X. Furthermore, you are confident that the same causal relationships will hold in the different circumstances that necessarily exist in the life of person Y.

Very frequently we do not understand the world. In fact, I would say that we don’t understand the world more frequently than we *do* truly understand it. As a physician, my reservation to recommend interventions that have not been studied is based on my seeing many therapies recommended and then later demonstrated to be ineffective. We encountered this often in medical school lectures. Even treatments that seemed to have good evidence are sometimes later understood to cause more harm than good.

Meanwhile, as days pass, natural improvement might happen. We call it spontaneous regression. Often, digestion issues can improve on their own. We often do not understand what causes warts to disappear when they do. Sally completed many actions over a 30-day period. She was focused on selenium as a possible cause. How does she know that the cause of her improvement was not a different one of her many actions or improvement due to an unknown cause beyond her knowledge or control? To answer this question requires studying many people in a systematic way.

Regarding the testimonials, I would not dispute any of the reported diagnoses or symptoms. But I am skeptical about the causal relationships the writers have shared and thus would question the meaning the writers are assigning to their story. Editor, what would we communicate if we published these testimonials? What kind of confidence can we have that Sally’s improvement was related to the selenium? Publishing Sally’s story would seem a recommendation for others to try selenium with cold water for Lyme disease. In Sam’s case, is publishing his story endorsing hydrogen peroxide as a cure for cancer? I understand that we never have complete confidence or knowledge. Even therapies that have been investigated and are known to work for many people still might not work for everyone. But what level of confidence or evidence is required before we recommend a therapy? For sure, more evidence is needed than that supplied by a single use. Cause and effect are not easily understood. Rigorously evaluating the effectiveness of a treatment requires studying multiple cases across time. 

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