

## Evidence–Based Medicine and the Growing Popularity of Complementary and Alternative Treatments

Stephanie Lake<sup>a,°</sup>, BHSc MSc

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<sup>°</sup> Corresponding author: s.lake@alumni.ubc.ca

<sup>a</sup> PhD Candidate 2018, School of Population and Public Health, Faculty of Medicine, University of British Columbia, Vancouver, BC

Although society has experimented with unorthodox methods of treating health problems for centuries,<sup>1</sup> the business of complementary and alternative medicine (CAM) has grown and diversified dramatically over the past few decades.<sup>2</sup> Despite the unconventional nature of CAM interventions, their extensive promotion through mainstream outlets blurs the lines between what is and is not scientifically accepted. For example, cardiothoracic surgeon and popular television personality Dr. Oz recently came under fire at a U.S. Senate hearing after encouraging viewers to take various products that he deemed “miracle” weight-loss cures, despite his awareness of their lack of scientific evidence.<sup>3</sup> While it is hard not to be enticed by the promise of CAM, keeping a close eye on its evidence will be critical as the overlap between personalized and evidence–based medicine increases.

Between 29 % and 42 % of American adults have used some form of CAM in the previous year.<sup>4</sup> Studies of CAM use among children living with cancer from various countries around the world have recorded CAM prevalence rates as high as 91 % in some samples.<sup>5</sup> Despite the popularity of CAM treatments, we still know shockingly little about them. This is because CAM interventions are regulated (and sometimes not regulated at all) completely separately from conventional medicine,<sup>6</sup> and they therefore may be marketed and used without standing up to the same clinical tests of efficacy and safety. In contrast to conventional medicine, testimonial reports, such as those from Dr. Oz, often form the basis of CAM marketing. In reviewing CAM websites, researchers have found various anecdote–based recommendations for therapies that have been scientifically shown not only to have little benefit, but to even

be potentially dangerous.<sup>7</sup> Not bound by the same regulations as conventional medicine, CAM marketers may conveniently select compelling anecdotes that, despite holding no validity of measure, present as hopeful messages to a desperate patient.

While some CAM trials appear to exhibit strong scientific rigour, many others are fraught with methodological shortcomings.<sup>8</sup> One common drawback to clinical CAM research is a lack of comparison to a placebo—or control—group.<sup>9</sup> The problem with relying solely on treatment group outcomes is the utter neglect of effects that could arise from not receiving the treatment, such as natural improvement, regression to the mean, and the placebo effect, a physiological improvement arising from simply going through the motions of being “treated.” Unless we are able to measure baseline and post–treatment effects in both a treatment group and a control group, there is no way to confirm that the benefits gained were actually due to the treatment itself. In cases where CAM randomized controlled trials (RCT) exist, study validity is still called into question. For example, a Lancet review, which stirred controversy between CAM and conventional medicine proponents,<sup>10</sup> concluded that, after controlling for biases in both CAM and conventional RCTs, there was only weak evidence for a specific effect of CAM therapies, while there was strong evidence in support of conventional therapies.<sup>11</sup>

As more patients adopt an interest in CAM, its integration with conventional practice is becoming more common. For example, roughly 40 % of American mainstream physicians have referred patients for acupuncture and/or chiropractic therapies.<sup>12</sup> These types of CAM treatments might appear more favourable to physicians due to their longer histories of scientific

scrutiny, which have allowed them to be increasingly seen as accepted practices.<sup>13-15</sup> Physicians might also be integrating CAM into their practice in an effort to prevent the dangers of patients using it without their consultation. For example, despite decades of research showing the popular herbal supplement St. John’s wort to be an effective treatment for some forms of depression,<sup>16,17</sup> patients taking this product without physician consultation run the risk of suffering potentially dangerous reactions due to the supplement’s ability to interact with a long list of conventional drugs.<sup>18,19</sup> It is becoming increasingly important for physicians to be aware of the evidence base surrounding different CAM options in order to develop a safe and effective treatment plan for their CAM–using patients. Evidently, there is a strong and ongoing need for rigorous scientific evidence to inform the use of CAM.

But if we apply the same evidence–based model for CAM, would we be moving past the point of CAM altogether? As science writer Michael Specter has so simply put it,

**It is becoming increasingly important for physicians to be aware of the evidence base surrounding different CAM options in order to develop a safe and effective treatment plan for their CAM–using patients.**

"If we were to do that, there would really be nothing 'complementary' or 'alternative' about CAM."<sup>20</sup>

CAM approaches the healing process as a function of the "whole system," rather than through targeting a single physiological component, where the effect of the CAM approach is said to be greater than the sum of its individual effects.<sup>21</sup> As such, CAM proponents argue that in applying conventional study design to unconventional interventions, the true effect of the treatment is being diluted through the process of attempting to single it out.<sup>22-24</sup> The deductive evidence-based model by which conventional medicine is accepted into practice (i.e., understanding the molecular biology of a therapy before moving on to various stages of clinical trials and eventual practice) stands in stark contrast to the inductive approach used for CAM (i.e., widespread use of a CAM therapy before evaluation through clinical trials and eventual understanding of its molecular biology).<sup>22</sup>

Authors have suggested developing a separate framework for the evaluation of CAM, which takes into account its holistic philosophy to bridges the gap between the widespread positive anecdotal reports of CAM and the conventional-style evidence that opposes them.<sup>22</sup> Accordingly, CAM researchers are advocating for a comprehensive evidence-based evaluation model that uses observational (e.g., cohort, case-control, case series) research to complement RCTs, while considering the patient perspective, the conceptual basis, and the medical professionalism of the therapy through qualitative analysis.<sup>21</sup> Advocates of this so-called Whole Systems Research model suggest that the integration of non-randomized studies will help to capture health outcomes that may have been missed under the highly manipulated RCT environment (i.e., the effect of the treatment on the body, mind, and spirit as a whole).<sup>21</sup>

As we move into the era of individualized, integrated, and alternative medicine, we will have to decide what we are willing to accept as a "gold standard" for CAM, and whether this can stray from the pre-defined, single-outcome approach with which conventional practitioners are so comfortable. In the meantime, available unbiased and evidence-based resources

for CAM, such as the Natural Medicines database,<sup>25</sup> should be used by conventional practitioners and shared with patients. Safe and positive results could be possible with CAM, so long as we are able to set biases aside and to separate the evidence from the anecdote.

## disclosures

The author does not have any conflicts of interest.

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