

# The Sum is Greater than its Parts: The Center for Evidence-Based Medicine

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## ABSTRACT

The Center for Evidence-Based Medicine in the Brown School of Public Health develops computational tools to help analyze the vast amounts of data generated by medical research. By conducting meta-analyses and systemic reviews of published literature, Center researchers can tease out which treatments are most effective and efficient, helping to guide medical practice.

**KEYWORDS:** comparative effectiveness; evidence-based medicine; meta-analysis; systematic review; research

## INTRODUCTION

In a health-care environment of many choices and finite resources, providers, insurers, and other clinical decision-makers increasingly turn to evidence-based medicine for guidance. Evidence-based medicine evaluates interventions by developing methodologies for analyzing available data. In 2012, the Brown School of Public Health launched a Center for Evidence-Based Medicine (CEBM), building on the expertise of a cadre of physician-scientists, biostatisticians, and computer scientists who are collaborating with colleagues worldwide. The Center's director, Thomas Trikalinos, MD, PhD, relocated to Brown from Tufts Medical Center, with co-director Joseph Lau, MD, and Christopher Schmid, PhD, to launch the new enterprise with Issa Dahabreh, MD, MS, and Byron Wallace, PhD.

Evidence-based medicine will be integral to the evolution of health-care delivery. Comparative effectiveness research is mandated under the federal Affordable Care Act, evidence-based methodologies play a role in developing Medicare drug formularies, and related research is encouraged by the National Institutes of Health. As more emphasis is placed on curbing wasteful spending in the health-care system, there's an increasing need to show which interventions and screenings truly make a difference in outcomes.

Part of what the Center is doing is creating an open-source, web-based tool that will use machine learning to facilitate retrieval of biomedical literature while eliminating redundancies and reconciling subtle variations in methodologies, patient population, and other elements of study design. The team is also working on open-source software for performing meta-analysis—the statistical synthesis of evidence

from independent studies—and is a driving force of global initiatives in meta-analyses software. The team also collaborates with external colleagues through two international research consortia that collectively span more than 10 scientific disciplines and 100 countries and encompasses more than 30,000 members.



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Dr. Thomas Trikalinos is the director of the Center for Evidence-Based Medicine.

## GUIDING PRINCIPLES FOR PHYSICIANS AND PATIENTS

Findings from these meta-analyses translate into guidelines that physicians can follow to provide more effective and cost-efficient care to their patients. The results of the analysis can also help define the characteristics of disease and how it affects a patient population. For example, faculty from the center did the systematic reviews that informed the development of a very widely used classification for chronic kidney disease (CKD).<sup>1</sup> This work led to the recognition of CKD severity as a risk factor for cardiovascular outcomes, and has been a basis for describing and understanding the disease burden.

Systematic reviews can inform the decision-making process of policymakers at the national level, accelerating the translation of clinical evidence into practice. Take a question such as, 'What is the recommended daily allowance of vitamin D in various life stages, from infants to pregnant women or the elderly?' To make an informed recommendation, an Institute of Medicine panel on vitamin D relied on a large systematic review of randomized and observational studies on the relationship between vitamin D intakes and 17 outcomes led by members of Brown's CEBM.<sup>2,3</sup>

Sometimes systematic reviews can help sort out facts from commonly held beliefs or myths. For instance: what is the relationship between episodic physical and sexual activity with triggering of acute cardiac events? A meta-analysis by members of the CEBM team documented that episodic physical or sexual activity increases the risk of heart attacks approximately three-fold during and for one hour after the activity.<sup>4</sup> As is often the case in meta-analysis, the researchers do not have much information on the type of activities

that are more risky than others. Knowing the connection truly does exist is useful nonetheless.

The Brown School of Public Health's Center for Evidence-Based Medicine helps Rhode Island physicians to improve care of their patients. In an increasingly evidence-driven health-care system, the work of the Center is providing the analysis and deeper understanding that allows physicians to incorporate what works – and to avoid what doesn't – in their current practice.

For more information about the Center for Evidence-Based Medicine, visit <http://www.cebm.brown.edu/>.

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