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Abstract

The American Recovery and Reinvestment Act of 2009 (ARRA), the stimulus package signed into law by President Barack Obama on February 17, 2009, directs \$1.1 billion to support “the development and dissemination of research assessing the comparative effectiveness of health care treatments and strategies, including through efforts that . . . conduct, support, or synthesize research that compares the clinical outcomes, effectiveness, and appropriateness of items, services, and procedures that are used to prevent, diagnose, or treat diseases, disorders, and other health conditions.”

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Comparative Effectiveness — Thinking beyond Medication A versus Medication B

Kevin G. Volpp, M.D., Ph.D., and Anup Das

The American Recovery and Reinvestment Act of 2009 (ARRA), the stimulus package signed into law by President Barack Obama on February 17, 2009, directs \$1.1 billion to support “the development and dissemination of research assessing the comparative effectiveness of health care treatments and strategies, including through efforts that . . . conduct, support, or synthesize research that compares the clinical outcomes, effectiveness, and appropriateness of items, services, and procedures that are used to prevent, diagnose, or treat diseases, disorders, and other health conditions.”

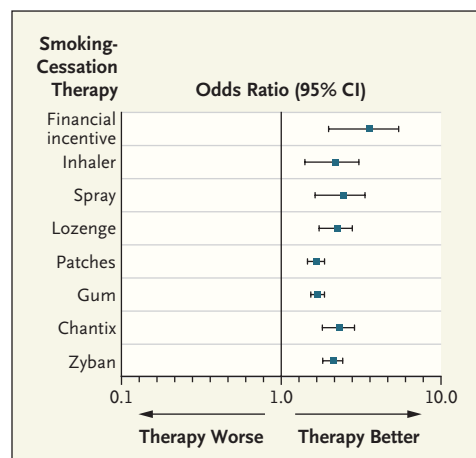
The rationale for seeking better information on comparative effectiveness is well understood. Many existing devices and therapeutic approaches have never been

subjected to the scrutiny of randomized, controlled trials comparing them with placebos, and even fewer have been directly tested against other approaches to improving the health of people with a given condition. Though there is controversy over whether such evaluations should include information on cost-effectiveness and how the findings should be used in coverage decisions, there is little debate that both health care professionals and the public will benefit greatly from better data to inform their choices among the available therapies for a given condition.

In considering the allocation of federal resources for comparative-effectiveness research (CER), however, it is important that we maintain a broad view of ways of improving the health of the population. As many as 40% of premature deaths in the United States are attributable to Americans' own health-related behaviors. If CER's full potential for improving the population's health is to be realized, such comparisons must go beyond those between medication A and medication B or device A and device B: we must also assess medications or devices in comparison with behavioral interventions, either alone or in conjunction with other approaches. In addition, since many diverse aspects of care delivery have a direct effect on patients' health outcomes, we should assess policy-based interventions and their relative effectiveness in improving health.

In many cases, it seems clear that patients' individual health-related behaviors are the proximate cause of disease and of the need for medical treatments. For example, obesity is a major risk factor for hypertension, diabetes, lower back pain, and other conditions. Patients who are able to lose weight may be able to reduce or eliminate their use of medications for these conditions. It therefore makes sense to compare, among patients with diabetes, medication-based approaches to the treatment of diabetes with, for example, the effects of behavioral approaches to weight reduction.

One of the best-known randomized, controlled trials comparing a lifestyle intervention with medical therapy, the Diabetes Prevention Program, showed that over a mean follow-up period of 2.8 years, intensive lifestyle therapy was significantly more effective than metformin therapy in preventing the onset of diabetes among persons without diabetes who, at enrollment, had elevated fasting and elevated post-load plasma glucose levels.¹ The incidence of diabetes was 11.0, 7.8, and 4.8 cases per 100 person-years in the placebo, metformin, and lifestyle-intervention groups, respectively, meaning that the lifestyle intervention reduced the incidence of diabetes by 58% (95% confidence interval [CI], 48 to 66), and metformin reduced the incidence by 31% (95% CI, 17 to 43), as compared with placebo. The



Odds Ratios of 12 Months of Continuous Abstinence from Smoking for Groups Using Smoking-Cessation Therapy, as Compared with Control Groups.

Data are from Volpp et al.,² Eisenberg et al.,³ Stead et al.,⁴ and Hughes et al.⁵

number of patients who need to be treated to prevent one case of diabetes over a 3-year period was 6.9 with the lifestyle-intervention program and 13.9 with metformin.

Through our own research, we have found that financial incentives for smoking cessation are highly effective, tripling smoking-cessation rates at 9 to 12 months and resulting in “quit rates” that are 2.6 times those achieved with a control treatment at 15 to 18 months, 6 months after the termination of the incentive program.² To illustrate the importance of comparing behavioral therapies with “standard therapy” for smoking cessation, we compared our results with those published in three recent meta-analyses of placebo-controlled trials of medical therapies for smoking cessation, such as Zyban (bupropion), Chantix (varenicline), and nicotine-replacement therapies (gum, patches, spray, lozenges, and inhalers).³⁻⁵ We were interested in how the benefits of pharmacologic therapies compared with those of financial incentives in terms of the pooled odds ratios for 12 months of continuous abstinence (see graph).

This example highlights the value of including behavioral approaches in comparative studies: incentives appear to be at least as effective as pharmacologic aids in helping smokers to achieve long-term abstinence. Incentives may also be more cost-effective than medications, since they are paid only to smokers who succeed in quitting, whereas many patients who take medications for smoking cessation are unsuccessful. Such a comparison, however,

is no substitute for trials directly comparing the effectiveness of treatments. Different studies may have different quit rates because of the composition of the study population. We focused on the ratio of the quit rates in the treatment group and the control group in each study rather than directly comparing the quit rates between studies. The effectiveness of a given treatment may also vary with the population being studied, and direct, head-to-head comparisons of different approaches are needed.

On the population level, the behavior of the health care delivery system itself is another important factor in health outcomes whose effects are not captured in traditional CER. For instance, the recently released report by the Institute of Medicine on residents' duty hours and patients' safety (*Resident Duty Hours: Enhancing Sleep, Supervision, and Safety*) highlighted a number of policy interventions that are believed to affect patients' outcomes. Such interventions are rarely subjected to the same level of scrutiny as medical treatments, though variations in certain aspects of care delivery — such as use of electronic medical records, weekend and overnight staffing, and the work intensity of health care providers, their cross-coverage patterns, and the numbers of continuous hours and hours per week that they work — can have a tremendous effect on patients' safety. If the CER initiative is intended to improve the health of populations, some portion of the research efforts should focus on the relative effectiveness of system-level changes in improving outcomes for a

population of patients. Such efforts could include hospital-based, regional, or national quality-improvement interventions; behavioral economic interventions, such as changing default options (e.g., automatically providing 90-day, rather than 30-day, refills of prescriptions for chronic conditions); efforts using incentives to steer patients toward short-term decisions that are in their long-term best interest; and various regulatory, policy, or legislative approaches.

Several examples highlight the power that such approaches may have in achieving changes in health outcomes. For example, the scarcity of organs for transplantation could be addressed through an “opt-out” approach similar to those used by many Western European countries; countries in which an “opt-out” approach is used typically have organ-donation rates above 90%, whereas countries with an “opt-in” approach typically have rates of 5 to 15%, according to a 2003 study by Johnson and Goldstein. It is unlikely that any non-policy-based approach could ever achieve such an increase in rates. In another example — perhaps the most effective (and probably most cost-effective) way to reduce the rate of smoking, especially among young people, is to raise excise taxes.

In general, CER is a public good that has the potential to greatly inform the decisions of individual clinicians, patients, policymakers, and insurance plans in guiding the American people to preferentially use more-effective treatments. The full potential of this effort will be realized only if

we define problems broadly and include in these comparisons rigorous testing of behavioral and policy-based approaches to improving the health of populations.

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