Dinan pointed out that mode of delivery—cesarean vs vaginal—can also affect an infant’s microbiome. A baby born by cesarean delivery does not pick up its mother’s microbes through the vagina but instead picks up its microbiome from the surrounding environment. The health implications of cesarean delivery on the developing brain are not well understood, but given that the rate of cesarean deliveries has increased by more than 50% in areas around the world, including China and Brazil, this question begs investigation, he said. Dinan and colleagues are investigating the long-term effects of cesarean delivery, relative to vaginal birth, on mental health status in ongoing prospective studies in humans.

Future in the Clinic
Efforts are currently under way to substantiate the clinical efficacy of probiotics, including a placebo-controlled study by the McMaster group in patients with irritable bowel syndrome who have significant scores for depression, said Collins. The researchers examined whether the administration of a Bifidobacterium strain can attenuate depression and improve gut function. Using fMRI, they looked for an objective measurement in terms of brain activity in the amygdala, hippocampus, and parts of the frontal cortex that would correspond with improvement in depression, said Collins.

Dinan’s group also has been working on a number of clinical studies involving probiotics. They completed a placebo-controlled study of a Bifidobacterium in healthy participants, looking at stress responses and cognition in the subjects as well as doing an in-depth electroencephalography analysis. And they are about to embark on 2 studies of L. rhamnosus—the strain used in the earlier rodent study in which they determined the vagus nerve to be the communication route to the brain. One study is being carried out in healthy participants and the other in patients with treatment-resistant depression to see if augmentation with L. rhamnosus can improve the therapeutic benefits of antidepressant drug treatment.

Collins’ group has also recently carried out a yet-to-be published clinical study examining the microbiota of individuals newly diagnosed with depression or anxiety who have never been prescribed drug therapy for their condition, focusing in particular on the metabolites produced by the bacteria as well as the composition of the microbiome.

“In this way, if we do start to identify profiles or bacteria of interest, we can culture them and study what metabolites they produce that might have effects on the host brain,” said Collins. Such microbiome profiling studies may be particularly informative as it is currently unknown what microbial composition constitutes a “healthy” gut (Dash S et al. Curr Opin Psychiatry. 2015;28:1-6).

In the meantime, with human fecal transplants proposed as a treatment for intractable Clostridium difficile infections (Youngster I et al. JAMA. 2014;312[17]:1772-1778), findings from microbial transplants in rodent models raise the question of whether human fecal donors should be screened not only for pathogens but for a history of psychiatric illness, said Collins.

While the evidence is mounting that the gut microbiome is important in mental health and development, the field is still in its infancy, and there remains healthy skepticism as to whether recent work may have translational potential for treating anxiety and depression in humans.

Dinan pointed out that we need to better understand issues such as which communication routes between gut microbes and the brain are most important in humans, whether a psychiatric phenotype can be transferred with a fecal microbiota transplant, and if probiotics that produce an anxiolytic/antidepressant effect in rodents have the same effect in humans. In particular, experts have noted that there is a clear need for high-quality randomized clinical trials in humans to fully investigate the efficacy of microbiome modulation in improving mental health (Dash S et al. Curr Opin Psychiatry. 2015;28:1-6).
basic mode for how we care for patients has been locked into place by a Medicare payment model that largely pays only for certain kinds of things—hospital visits through the Part A program and physician visits through Part B.

Despite massive change in every other part of our lives, from the way we shop for clothes to the way we seek out medical information, Medicare’s static payment model has frozen into place a system of care delivery born in the 1960s. Although there have been modest “innovations” in Medicare payment models (such as diagnosis-related groups in the 1980s [http://bit.ly/1FXY0F]), much of Medicare looks about the way it did 5 decades ago. Given that Medicare sets the benchmark for how private payers pay health care, the rest of the industry has followed—until recently.

A major premise of the Affordable Care Act (ACA) was that it would spur new models of care delivery. The architects of the ACA understood that old models of care delivery impeded gains in productivity, made it difficult to improve patient outcomes, and made the health care delivery system inefficient. In response, the ACA established the Center for Medicare and Medicaid Innovation (CMMI), which is responsible for changing how we deliver health care (http://bit.ly/1c6sUz). The ACA provides CMMI with $1 billion per year for 10 years (http://bit.ly/1aFf7p), much larger than the budgets of the Agency for Healthcare Research and Quality and the Patient-Centered Outcomes Research Institute (http://bit.ly/180qQy), 2 entities that have gotten far more attention. Will CMMI achieve the meaningful new models of care delivery that our health care system needs? It is unclear, but there is reason for concern.

Changing health care delivery is famously difficult. Physicians and nurses, who rightfully hold tremendous sway in how health care is delivered, were trained to practice in certain ways. Getting them to change how they work and changing the structure under which they work is both difficult and risky. Getting it wrong means wasted resources and, more importantly, harm to patients. Yet the status quo, where harm and waste are rampant, is unacceptable.

Change will also require substantially rethinking the role of physicians, nurses, and even patients. Because there is no blueprint for what new delivery models should look like, we need experimentation to discover these models. And what’s the hallmark of experimentation? Failures. Yet the early data suggest that CMMI has likely been far too cautious.

Four and a half years after launch, CMMI appears to have funded 36 new programs (http://1.usa.gov/1w497CN), of which we have evaluations for 9. Nearly all the evaluations are positive, although careful examination of the reports paints a far more mixed picture. Most programs are having minimal effects, on the margins.

For example, the Comprehensive Primary Care Initiative (http://1.usa.gov/1upG2Md), across 6 states, seems to have a monthly savings of $14 dollars (2% of total Parts A and B spending) per patient, compared with controls, a savings that actually turns negative when the costs of the program are included. The effects on quality are minimal, as well. Yet the underlying data present a far more interesting picture. Practices in New Jersey and Oklahoma have achieved savings of 5% to 7%, whereas those in Ohio, Kentucky, and Arkansas have seen their costs go up without much in the way of quality gains. Although it is possible that over time, some of these practices may recover, there are costs to waiting to see if that happens. The CMMI should seriously consider whether it wants to divert some of its resources to the successful practices or save them for other innovations, rather than continue to bet on failing efforts. It is true that sustainable change takes time, but organizations that struggle badly in the model in the first couple of years may themselves be better off in a different model of care delivery.

The best estimates from Silicon Valley and others suggest that as little as 25% of venture capital–based firms make enough money to provide a return on investment (http://on.wsj.com/1wIpOEB). Knowing that very few ventures will be transformational, investors bet across a large portfolio of efforts, identify failures early, and terminate those that look unlikely to be successful. The CMMI approach has been far more careful and methodical, and although that makes sense for a federal agency, it is unlikely to be sufficient for the task at hand.

The federal government has made paying for value a hallmark of its strategy over the next 5 years (http://bit.ly/16sT8T). Although the details are unclear, if this new orientation is to have meaning, we will need to reconceptualize what is high-value health care. And the best ideas aren’t going to come from Washington, DC. Indeed, the federal government has acknowledged as much by announcing a Health Care Payment Learning and Action Network (http://go.cms.gov/1y/V4Ju), which seeks to engage private payers, clinicians, health care facilities, and others in new ways of paying for care. For CMMI, these latest actions raise the stakes, and there are specific things the agency can do to be successful.

Foremost, CMMI needs to make meaningful bets on nontraditional players—such as startups and small delivery organizations—that are trying to fundamentally upend health care delivery. Next, focusing on organizations that are using technology in radically different ways, employing nontraditional personnel to facilitate care, and targeting new locations for care delivery would also be helpful. Focusing on nonincumbents and taking risks with nontraditional care models would pay much bigger dividends than the marginal savings that current programs are likely to generate.

But they would come at a cost: a high failure rate. Advocates of the current CMMI approach would argue that such failures are unpalatable, given the current political environment. Although that is surely true, the broader health care community must give CMMI the space to fail. Even the talented, highly capable people running CMMI can’t have success rates much higher than those seen in Silicon Valley, where comparably smart investors are using their own money to make bets. But, if they are willing to be risky—and willing to fail—they can have a profound effect on the way health care is delivered. And that will be an investment worth making. ■

Author Affiliation: Ashish K. Jha, MD, MPH, is K.T. Li Professor of International Health and Health Policy at the Harvard T. H. Chan School of Public Health and a practicing internist at the Veterans Affairs Boston Healthcare System. He received his MD from Harvard Medical School and was trained in Internal Medicine at the University of California, San Francisco. He received his MPH from Harvard School of Public Health. Dr Jha’s major research interests lie in improving the quality and costs of health care. His work has focused on 4 primary areas—public reporting, pay-for-performance, health information technology, and leadership—and the roles they play in fixing the US health care system.

Corresponding Author: Ashish K. Jha, MD, MPH (ajha@hsph.harvard.edu).

Published online: March 4, 2015, at http://newsatjama.jama.com/category/the-jama-forum/.

Disclaimer: Each entry in The JAMA Forum expresses the opinions of the author but does not necessarily reflect the views or opinions of JAMA, the editorial staff, or the American Medical Association.

Additional Information: Information about The JAMA Forum is available at http://newsatjama.jama.com/about/. Information about disclosures of potential conflicts of interest may be found at http://newsatjama.jama.com/jama-forum-disclosures/.