

theme was the serious need for additional management options for treatment-resistant depression.

Esketamine represents a novel treatment for a severe and life-threatening condition, and its rapid onset of effect is a key benefit. The studies provide evidence of clinically meaningful efficacy when esketamine is used in combination with a newly initiated oral antidepressant. With implementation of a REMS to ensure safe use and minimize abuse poten-

tial, the benefit–risk balance is favorable, and the drug represents an important addition to the treatment options for patients with treatment-resistant depression.

Disclosure forms provided by the authors are available at NEJM.org.

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 An audio interview with Dr. Roy Perlis is available at NEJM.org

## “Meaningful Use” of Cost-Measurement Systems — Incentives for Health Care Providers

Merle Ederhof, Ph.D., and Paul B. Ginsburg, Ph.D.

The U.S. Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 authorized an estimated \$20 billion to \$40 billion in incentives for health care providers to both adopt and “meaningfully use” certified electronic health record (EHR) systems. One of the stated main goals of the law, encompassed by the E in the acronym, was the improvement in providers’ efficiency.<sup>1</sup> However, empirical studies have failed to document systematic improvements in provider efficiencies after the adoption of EHRs and the attestation of their meaningful use.<sup>2,3</sup> These findings are not very surprising, given that the meaningful use criteria that providers had to meet to qualify for the financial incentives did not include explicit efficiency measures. (In contrast, the Act did provide in-

centives for providers to record and report results on specific quality metrics, which, unsurprisingly, led to improvement in the measured areas.<sup>2</sup>)

Lawmakers could build on the HITECH Act by introducing additional criteria that prompt and guide providers in improving operational efficiency. Fundamental to efficiency improvements is reliable high-quality information on the resources that are used in providing services to patients. Legislation could require providers to first produce high-quality cost data and then integrate those data with clinical and operational data from their EHR systems.

In fact, providers have increasingly been implementing internal cost-measurement systems that enable them to produce detailed cost data at the level of the individual clinical service item.<sup>4</sup> Policymak-

ers could extend the certification for health information technology products currently used under the HITECH Act to such cost-measurement systems. Following the EHR meaningful-use policy, lawmakers could introduce incentives that progress from the production of cost information to the engagement of clinicians to use it for decision making.

In order to assess the potential usefulness of provider cost-measurement systems for efficiency improvements, in 2014 we conducted a survey of users of the two most widely adopted systems. These systems share the same underlying accounting methods, are licensed by health information technology companies, and have a user base of about 500 to 1000 hospitals each.

Under the HITECH Act, financial incentives are tied to the

“meaningful use” of EHR systems as opposed to their mere adoption. Analogously, licensing an internal cost-measurement system will improve efficiency only if providers use it to produce high-quality cost data and then use those data for operational improvements and strategic decisions in the organization. For example, New York University Langone Health has used its cost data to entice physicians to restructure clinical processes in more efficient ways, which has led to substantial cost savings for the organization.<sup>5</sup>

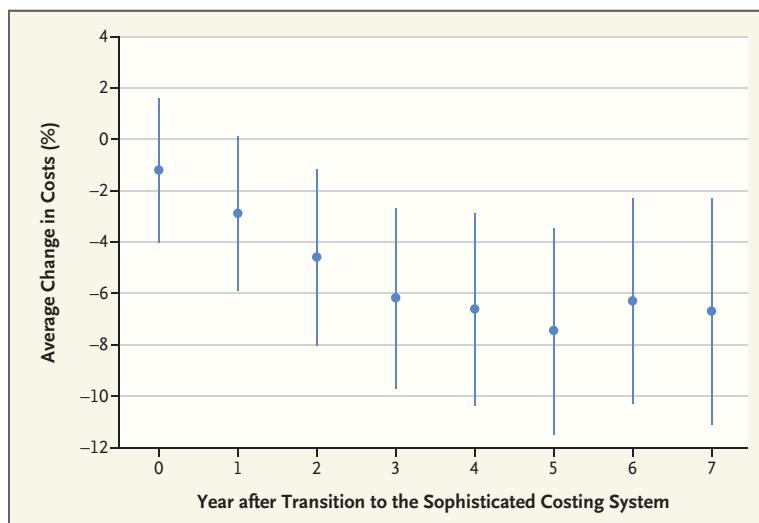
For the users of the systems that we studied, an important marker of the level of sophistication of the provider’s cost-measurement and management approach is whether cost data are produced using the crude ratio-of-cost-to-charge default method or the more refined relative-value-unit method (not to be confused with the “relative value units” used in the Medicare Physician Fee Schedule). Both methods produce cost data for each individual service item. Under the ratio-of-cost-to-charge method, a department-wide ratio is applied to the price of each service. In the relative-value-unit method, by contrast, distinct cost estimates are calculated by resource category, such as labor or supplies, using detailed resource-consumption measures; this method provides much more accurate costing.

In the survey, we asked respondents whether and when they had introduced relative-value-unit costing. We identified 170 hospitals that introduced this costing method between 1997 and 2014. We matched the survey data with financial and operational data obtained from Medicare Cost Reports, the American Hospital As-

sociation Annual Survey, and other databases maintained by the Centers for Medicare and Medicaid Services (CMS). We analyzed the hospitals’ operating costs before and after the transition to the more sophisticated cost-measurement approach. As compared with a control group of 573 hospitals that had not adopted a cost-measurement system by 2014, and accounting for industry-wide annual variation, local labor-market conditions, hospital competition, and time-varying hospital-specific factors including output adjusted for case-mix intensity and the proportion of inpatient and outpatient services, the number of beds, payer mix, and system affiliation, we found that the hospitals that introduced relative-value costing had significant reductions in their operating costs after the transition to the more advanced costing ap-

proach. Providers saw substantially reduced operating costs starting in the first year after the introduction of the more sophisticated costing method. The cost savings relative to the preimplementation baseline increased from about 3% in the first year to about 7% in the fifth year (see graph).

Adopting the relative-value-unit costing method can lower providers’ operating costs through a number of mechanisms. First, the cost data are more granular than in the simpler method and are thus expected to be more accurate, which should better facilitate efficiency-improvement efforts such as the restructuring of clinical processes.<sup>5</sup> Moreover, the relative-value-unit method requires an analysis of the nature and quantities of the resources used in the delivery of individual services, which is expected to suggest more



**Percentage Change in Hospital Operating Costs after the Transition to the More Sophisticated Costing Approach.**

Depicted are average changes (including 95% confidence intervals) in hospital operating costs as compared with the preimplementation period, which is normalized to 0. Year 0 indicates the year that the sophisticated costing system was implemented. Adjustments were made for industry-wide annual variation, local labor-market conditions and hospital competition, and time-varying hospital-specific factors including output adjusted for case-mix intensity and the proportion of inpatient and outpatient services, number of beds, payer mix, and system affiliation.

efficient ways of operating. Involvement of clinical department administrators and clinicians in the development of the relative-resource-consumption measures is expected to result in increased ownership by the clinical departments.

Although a substantial number of providers have adopted internal cost-measurement systems and have progressed to methods such as relative-value-unit costing, the overall level of cost-measurement and cost-management sophistication in the U.S. health care industry has not, in our view, moved beyond the early stages. Meaningfully using internal cost data to achieve efficiency improve-

ments is a heavy lift for health care providers. There are still important barriers to obtaining complete buy-in from the physician community. Introducing strong incentives tied to metrics that capture the production of cost data, integration of cost data with existing clinical and utilization data, and use of cost data in clinical decision making may be necessary to overcome the hurdles, especially given the competing objectives that hospital administrators are currently facing.

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## Imaging an Outbreak — Ultrasound in an Ebola Treatment Unit

Patricia C. Henwood, M.D.

**H**alf my patients died. They died from one disease, but so many different deaths.

After a decade of honing my ability to quickly determine “sick or not sick” and allocating time and resources accordingly, I learned that when managing a ward of patients with Ebola, clinical appearance did not always predict survival.

Layers of impermeable and stifling personal protective equipment (PPE) constitute an enormous physical barrier to patient care, complicating management of Ebola virus disease (EVD). The ability to auscultate is gone, you cannot smell, and layers of gloves

blunt your tactile sense. You cannot risk touching your face to re-adjust your PPE, so visual cues can also be a challenge.

In the extreme heat and humidity of our tarpaulin facility on a rural Liberian hilltop, my N-95 mask would sometimes collect enough condensation to drink — a clear signal that it’s time to wrap up bedside care, since your breathing needs to be composed for the methodical doffing of PPE. The fog collecting in my goggles during rounds in the “suspect” ward (housing patients with suspected EVD) usually condensed, permitting a clear view by the time we began rounds in the “confirmed”

ward, allowing us to use a bedside tool that offered a window into unfolding pathophysiology.

As we cared for roughly 100 patients during my first weeks in an Ebola treatment unit (ETU) in 2014, the varied manifestations of this poorly defined disease left us stumped. Many patients who seemed to be recovering would suddenly decompensate and die. We lacked on-site diagnostic capacity, so as I worked to secure critical resources to improve overall care, I also sought and received approval to incorporate point-of-care ultrasonography (see photo).

Mr. A. was roomed at the far end of the confirmed ward with