or to ESA dosing regimens necessary to attain these targets prevents cardiovascular events or indeed does not increase their likelihood.

The TREAT results may seem less unfavorable than the others, although the pronounced difference between the two TREAT groups in the rate of stroke is very troublesome. It is tempting to speculate that the conservative dosing algorithm and the monitoring protocol in TREAT may have limited the increase in the risk of cardiovascular events. The true effect of these measures is unknown but could be assessed in randomized trials designed to compare different dosing strategies.

The trials raise major concerns regarding the use of ESAs to increase hemoglobin concentrations in patients with chronic kidney disease above a level intended solely to avert the need for erythrocyte transfusions. The trials do not rule out the possibility, however, that modest increases in the hemoglobin level could be beneficial. Indeed, the alarming rates of serious cardiovascular events in the trials (e.g., more than one death or cardiovascular event per 100 patients per month in both groups in TREAT) suggest that even small reductions in the relative risk could translate into substantial reductions in cardiovascular-related morbidity and mortality.

It is time to establish, through randomized trials, the optimal hemoglobin target, dosing algorithm, and monitoring approach for patients with anemia from chronic kidney disease. Clearly, more conservative hemoglobin targets — well below 12 g per deciliter — should be evaluated. Beyond lowering hemoglobin targets and reducing doses of ESAs, it is also possible that more frequent hemoglobin monitoring and more cautious dosing algorithms — including computer-directed algorithms — might reduce oscillations and overshoots in the hemoglobin concentration and improve outcomes. These approaches should be evaluated as well. The FDA anticipates convening a public advisory committee meeting in 2010 to reevaluate the use of ESAs in the treatment of anemia due to chronic kidney disease.

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Accelerating the Use of Electronic Health Records in Physician Practices

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North Shore Hospital System on Long Island in New York recently announced that it will pay an incentive of up to $40,000 to each physician in its network who adopts its electronic health record (EHR) — paying 50% of the cost to physicians who install an EHR that communicates with the hospital and 85% of the cost if the physician also shares de-identified data on the quality of care.[1] This payment would apparently come on top of the $44,000 incentive that the American Recovery and Reinvestment Act of 2009 (ARRA) has authorized Medicare to pay each eligible health care professional who uses certified EHRs in a meaningful manner. “Meaningful use" is still being defined, but the overarching goal is to improve the population's health through a transformed health care delivery system with the use of EHRs to improve local processes, foster quality measurement, and increase communication. North Shore's announcement is a sign of the continuing acceleration of EHR adoption by physicians' offices[2] and hospitals.[3] Support for information systems is exempted from the Stark amendment to the Omnibus Budget Reconciliation Act of 1989, which prohibits hospitals from offering physicians incentives for providing referrals or admissions. The exemption for information technology acknowledges that the likelihood of additional referrals may be part of the motivation for hospitals to form closer links with community physicians through EHRs. Another benefit to hospitals from supporting the use of EHRs by physicians who are linked to them by geography, academic appointment, or practice pattern is the enhanced ability to manage the quality and outcomes of care. For example, if financial penalties and incentives are to be imposed on the basis of rates of readmission, then the more closely aligned a hospital is with the physicians who provide its patients' postdischarge care, the greater the benefits it will reap.

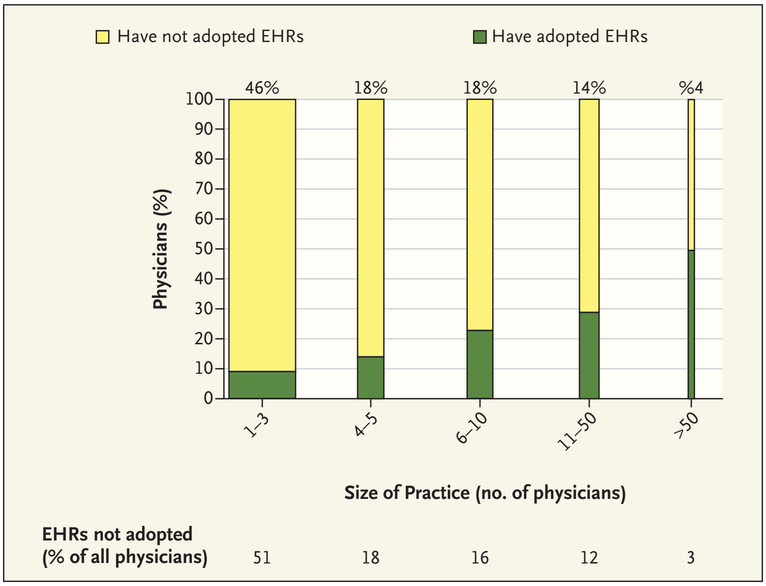
The cost–benefit calculus behind physicians' adoption of EHRs is also changing. Financial incentives are one element. The prices of EHRs have come down as the volume of software licenses being sold has increased. A second factor is that the time investment associated with data entry, which has long represented a major obstacle to adoption, has been reduced as systems have improved in performance and become more flexible with regard to individual preferences for data entry, including free text, templated data entry, dictation, speech recognition, and freehand graphic input. System usability has also improved, thanks to competition and customers' resistance to cumbersome products. Third, the addition to EHR systems of capabilities beyond documentation, including coding functions, the ability to create and export bills, the automated creation of consultation and patient letters, electronic prescribing, and task tracking, now translates into greater time savings for users. And a fourth factor is the increasing emphasis on quality of care, since payment for quality requires documentation of quality.

The decision by North Shore to provide a financial incentive as well as the software license suggests that many physicians still do not believe that current-generation EHRs will offer a return on investment directly to physicians.

Other trends favoring EHR adoption include the emerging consensus that alignment of hospitals and physicians is necessary to provide higher-quality care and service for patients as they move among providers and traverse levels of care, as well as the recognition that information transfer is an important component of care given by multiple providers. Younger physicians — and some older ones — are more comfortable and function more efficiently and effectively in an electronic-information environment than in a world of paper records.

Some obstacles persist, of course. EHR products remain expensive to install and maintain — cost issues that should not be underestimated. The decision by North Shore to provide a financial incentive as well as the software license suggests that many physicians still do not believe that current-generation EHRs will offer a return on investment directly to physicians.

Wide dissemination of EHRs requires public trust. The sharing of patients' information — which has been common practice for decades for the purposes of billing, treatment, and public health — has come into the public eye because of the risks associated with vastly expanded sharing and the newfound ability to easily and quickly transfer many patient records simultaneously. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) created a framework for defining privacy, breaches of privacy, and penalties. The ARRA further defined privacy breaches and increased the penalties for them. One of



Rates of Adoption of Electronic Health Records According to Practice Size.

The percentage shown above each bar is the proportion of physicians who work in a practice of the given size. The green portion of each bar represents the percentage of physicians in a practice of a given size who have adopted at least basic electronic health records (EHRs), and the yellow portion represents the percentage of physicians who have not adopted EHRs.[2] For each practice size, the percentage of physicians who have not adopted EHRs relative to the total number of physicians in practice is shown at the bottom. Physicians in the smallest practices account for more than 50% of those who have not yet adopted EHRs, whereas physicians in the largest practices account for only about 3%.

the challenges to setting policy in this area is that electronic privacy and its relative importance are still being defined. The capability of providing a secure electronic environment for patient data — like the capability of providing reliable data storage — is beyond the reach of most individual physician practices. Truly secure and reliable EHRs are currently feasible only for larger organizations with centrally supported technological capabilities. This may be one reason why the rate of adoption has been much higher among large practices (see graph).

EHRs that are interoperable can connect not only to each other but also to common services. Sharing information allows local care providers to coordinate the provision of care — for example, by avoiding contraindicated medications and duplicative testing. It supports public health goals by facilitating population-level monitoring, and it supports sharing of information about the care process itself, including quality measures. The Department of Veterans Affairs' VistA system is the best known large-scale example of these capabilities.

Exchanging information requires that EHRs share common standards. Work is ongoing at organizations for standards development and facilitation such as Health Level Seven (HL7), which have been providing practical standards for decades. The ultimate in interoperability would be a single EHR for all health care providers, but the disadvantage of this model would be a loss of competition among vendors — a factor that has presumably contributed to increased usability and lower cost. Moreover, interoperability among disparate EHRs may actually increase competition and innovation if it makes it easier for health care providers to change vendors by populating a new system with an old system's data. Innovation is not predicated on competition alone, however. Increasing funding for EHR research and development — as opposed to implementation and evaluation — may produce evolutionary and revolutionary improvements in EHRs.

The next major step in EHR deployment is a concrete definition of the requirements — in terms of meaningful use, information sharing, and reporting of quality measures — for physicians to receive ARRA incentives. The federal Health Information Technology Policy Committee has submitted recommendations[4] to the National Coordinator of Health Information Technology; the Centers for Medicare and Medicaid Services published draft rules on December 30, 2009, and this publication will be followed by a period for public comment before a final set of rules is issued. Clarity on federal incentives for physicians to adopt EHRs will allow these incentives to be aligned with those offered by state governments, provider organizations, and commercial payers. Poorly aligned incentives may have unintended consequences, such as increases in health disparities or incentives for specialty-specific silo systems.

Electronic interaction between hospitals and physicians is just the beginning. Patients are also interacting electronically with the health care system, exchanging information with providers through secure patient portals and patient-based health records. More active transactions, such as remote case management by nurses for patients with chronic diseases,[5] may occur through telemedicine. Some possibilities that will be advanced by physicians' adoption of EHRs include the use of cell-phone technology for messaging, the capability of moving data from home monitoring devices to cell phones and upstream to EHRs, yet-to-be developed software capabilities that will allow EHRs to manage these uploaded data streams within clinical workflows, and the effective provision of out-of-office care.

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