

Health Policy Opinion



Metamorphosis of Medicine in the United States: A Carrot and Stick Policy of Electronic Medical Records

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With rising tides of information technology (IT) sweeping through medical practices, electronic medical records (EMRs) or electronic health records (EHRs) are the number one and most complex issue for all medical professionals, specifically independent practitioners (1-14). In fact, Dentzer (2) reported that many fans of the American Recovery and Reinvestment Act (ARRA) or the “stimulus” package, enacted in February 2009 (9), might not realize how much went to health care. For each \$5 in 2009 ARRA spending (9), \$1 was allocated to the health sector, mainly health IT. The primary interest of policy makers and a key provision was the Health Information Technology for Economic and Clinical Health (HITECH) Act, aimed at bringing US health care more fully into the so-called information age. Policy makers, supporters of EMRs, and IT providers and people managing information technology in health care continue to tout the advantages of EMRs, including improved care and cost savings. However, the transition to electronic medical records has been very expensive and resulted in a variety of challenges (1-12).

This manuscript explores how electronic medical or health records are leading the metamorphosis of contemporary and independent medical practice, along with implications for the future of health care in the United States with incentive programs and financial penalties utilizing a carrot and stick policy.

FACTS AND FALLACIES

The federal government has been encouraging adoption of health IT by physicians and hospitals for the last decade (5). However, rapid changes were made since the enactment of the stimulus package (9), allocating \$19 billion for health care technology spending and \$17 billion for adoption of EHRs, with incentive payments through Medicare and Medicaid reimbursement systems to encourage providers and hospitals to implement EHR technology systems. Since only about 6% of physicians and 2% of hospitals used full blown EHRs, per Dentzer (2), the Obama administration decided to induce this evolution with payment policy. The law authorized carrots, in the form of bonuses through Medicare and Medicaid, for providers who could demonstrate “Meaningful Use” of EHRs. Subsequently, federal authorities have defined the accompanying stick. The HITECH Act authorized incentive payments through Medicare and Medicaid to health care providers with eligible physicians receiving incentive payments over 5 years, starting in 2011. However, providers have to demonstrate that they are using a certified EHR system that meets 15 Stage 1 core set objectives and 5 of 10 menu set objectives. In addition, a federally funded Regional Extension Center (REC) program was also created to provide physicians with assistance in purchasing and implementing an EHR system, training staff, and addressing how they use their EHR system when they see patients (5). Based on the data from the US Department of Health and Human Ser-

vices (HHS), the REC program seeks to support 100,000 primary care providers, with particular emphasis given to practices with fewer than 10 clinicians and to clinicians who work in settings that tend to serve uninsured, underinsured, and medically underserved populations.

Starting in 2011, eligible Medicare physicians could receive up to \$63,000 over a 6-year period that would begin as late as 2016 and run through 2021. The Medicare and Medicaid EHR incentive programs are staged in 3 steps with increasing requirements for participation. Stage 1 of the EHR incentive programs began in 2011 and Stage 2 began in 2014.

The taxpayer investment in health information technology could reach \$29 billion through 2016. This will depend in a large part on whether or not the EMRs are accepted appropriately and the government can fund all the eligible professionals. The whole gamut of EMRs and incentives also involve a large stick which pushes physicians into paying penalties. Those who are not participating in the Meaningful Use program and Physician Quality Reporting System (PQRS) program are expected to pay a penalty of 1% to 2% for Meaningful Use and 1.5% for PQRS. This is in addition to the deficit reduction sequester, which is 2%, and 1% reduction for value-based modifier, a budget neutral item which increases and decreases in payments based on cost-quality data measures from 2 years earlier (Table 1

and Figs. 1 and 2). Thus, in 2015, physicians may expect total cuts of 5% to 6.5% towards their penalties, a large stick. These penalties, as shown in Table 1, are expected to increase yearly, totaling 8% in 2016, 11% in 2017, 12% or more in 2018, and 13% or more in 2019 and beyond (4).

Based on a multitude of these requirements, HHS has received numerous comments with pushback on the draft regulation from hospitals and physicians arguing that they have been asked to do too much with health IT too soon, with very little incentive and large penalties – a small carrot with a large stick.

REALITY

Federal authorities maintain that there is a growing use of EMRs (5,12). Bearing that in mind, fully implementable EMRs are used in less than 10% of practices as of 2010 and 23.5% as of 2012, in conjunction with declining office-based physician practices as shown in Fig. 3 (5). A recent manuscript published by the HHS, National Center for Health Statistics, showed trends in EHR system use among office-based physicians in the United States from 2007 to 2012 (5). These statistics as illustrated in Fig. 3 show that among office-based physicians with an EMR or EHR system in the United States from 2001 to 2012, overall use has increased for any type of EMR or EHR system from 18% in 2001 to

Table 1. Overlapping payment adjustments for physician practices.

Year	Deficit reduction sequester	E-Prescribing	Health Information Technology/ Meaningful Use	Physician Quality Reporting System, including Maintenance of Certification (MOC) Program	Value-Based Modifier (Budget neutral increases and decreases in payments based on cost/ quality data measures from 2 years earlier)	Total Possible Payment Cuts Including Sequester
2014	(-2%)*	(-2%)	\$4-12K	0.5% if no MOC, 1.0% if MOC		(-4%)
2015	(-2%)		\$2-8K (-1% to 2%)	(-1.5%)	(-1%) Applied to groups of 100 or more/2013 data**	(-5.5% to 6.5%)
2016	(-2%)		\$2-4K (-2%)	(-2%)	(-2%) Groups of 10 or more/2014 data**	(-8%)
2017	(-2%)		(-3%)	(-2%)	(-4%) all physicians/2015 data**	(-11%)
2018	(-2%)		(-4%)	(-2%)	(?) all physicians/2016 data**	(-12%) or more
2019	(-2%)		(-5%)	(-2%)	(?) all physicians/2017 data**	(-13%) or more

*Red text indicates penalties, green text indicates bonuses.

**2017 marks the third year that the VBM will be applied; the magnitude of the adjustments that will be made in future years is determined through annual rulemaking. Since the adjustments have doubled each year since the VBM was first implemented, the potential for increasingly severe cuts in 2018 and beyond is significant. Some physicians will qualify for payment bonuses of an amount not yet known.

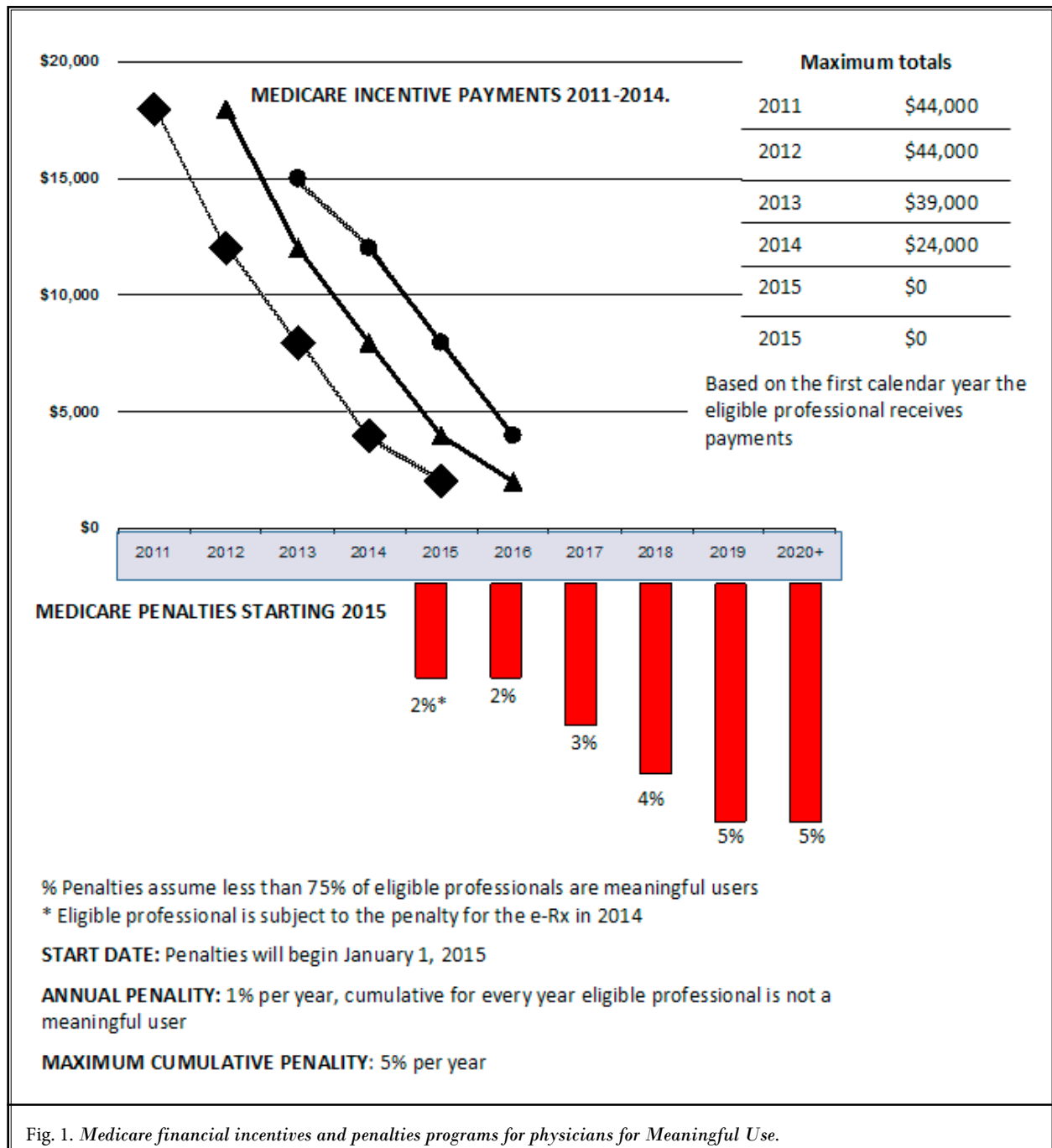


Fig. 1. Medicare financial incentives and penalties programs for physicians for Meaningful Use.

71.8% in 2012. However, of these, basic systems are utilized by 39.6% of office-based physicians, whereas in 2012 23.5% of office-based physicians utilized fully functional systems, which increased from 3.8% in 2007 to 10.5% in 2010. They also showed, as illustrated in Fig. 4, the use of EMR systems have been significantly

different among primary care physicians compared to non-primary care physicians and also based on the size of the group, with solo practitioners lagging behind and the highest use among practices with 11 or more physicians. However, the number of physicians practicing independently has been rapidly decreasing (15,16).

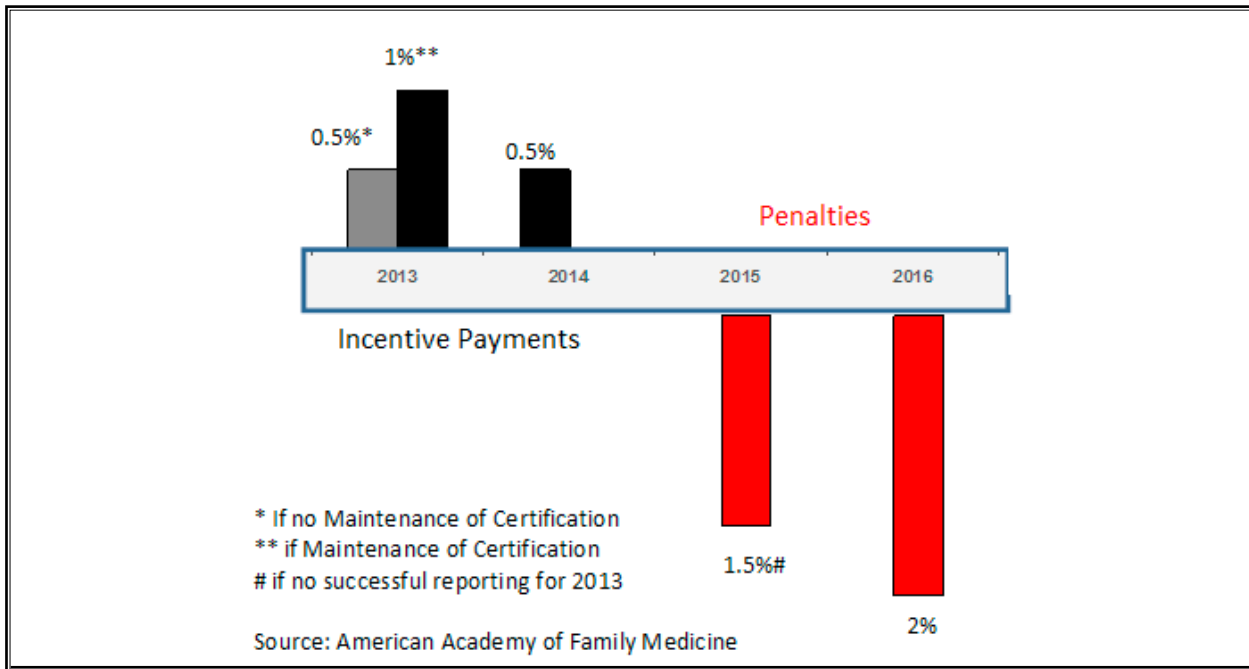


Fig. 2. Financial incentives and penalties programs for physician programs for Physician Quality Reporting System (PQRS): carrot and stick policy.

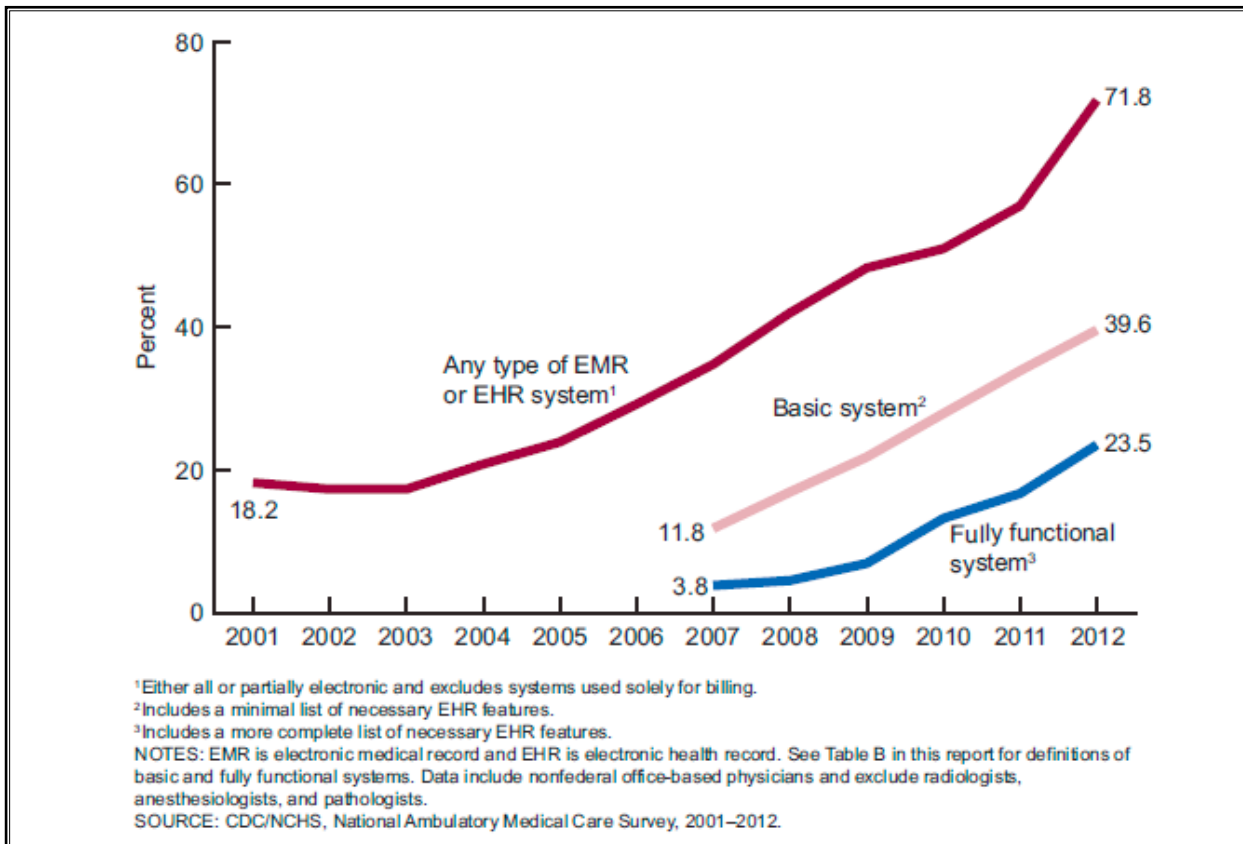
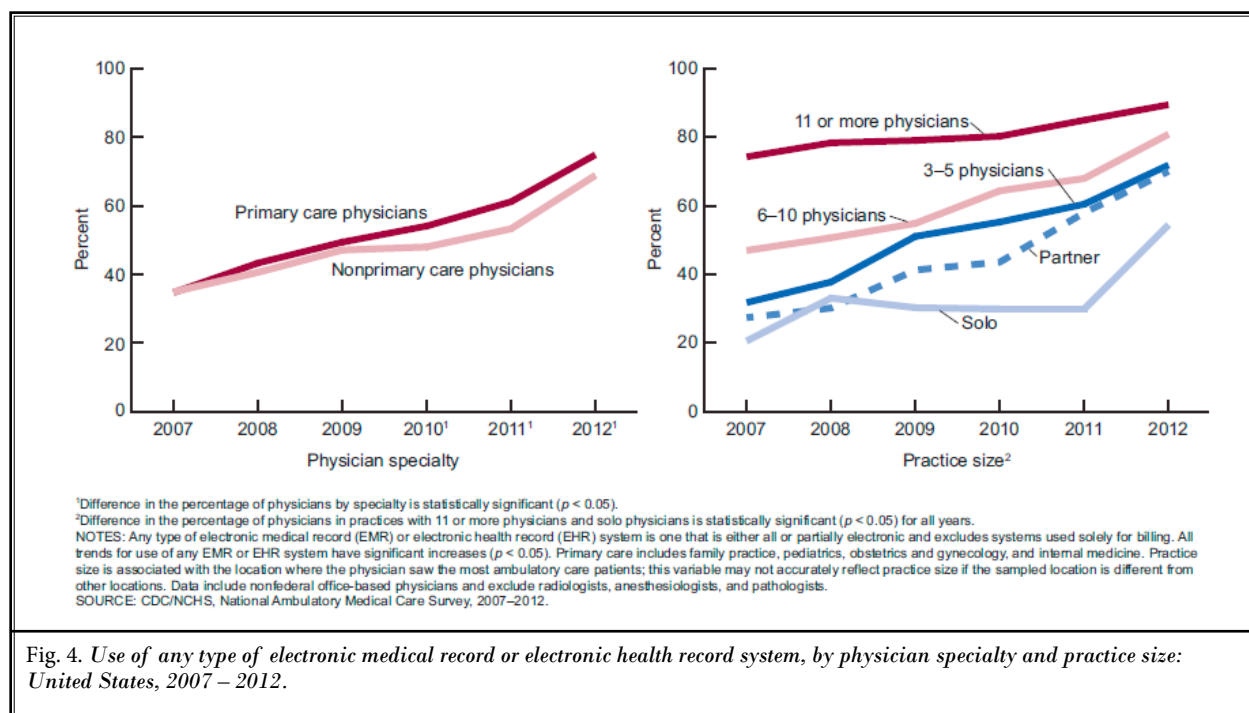


Fig. 3. Office-based physicians with an electronic medical record or electronic health record system: United States, 2001 – 2012.



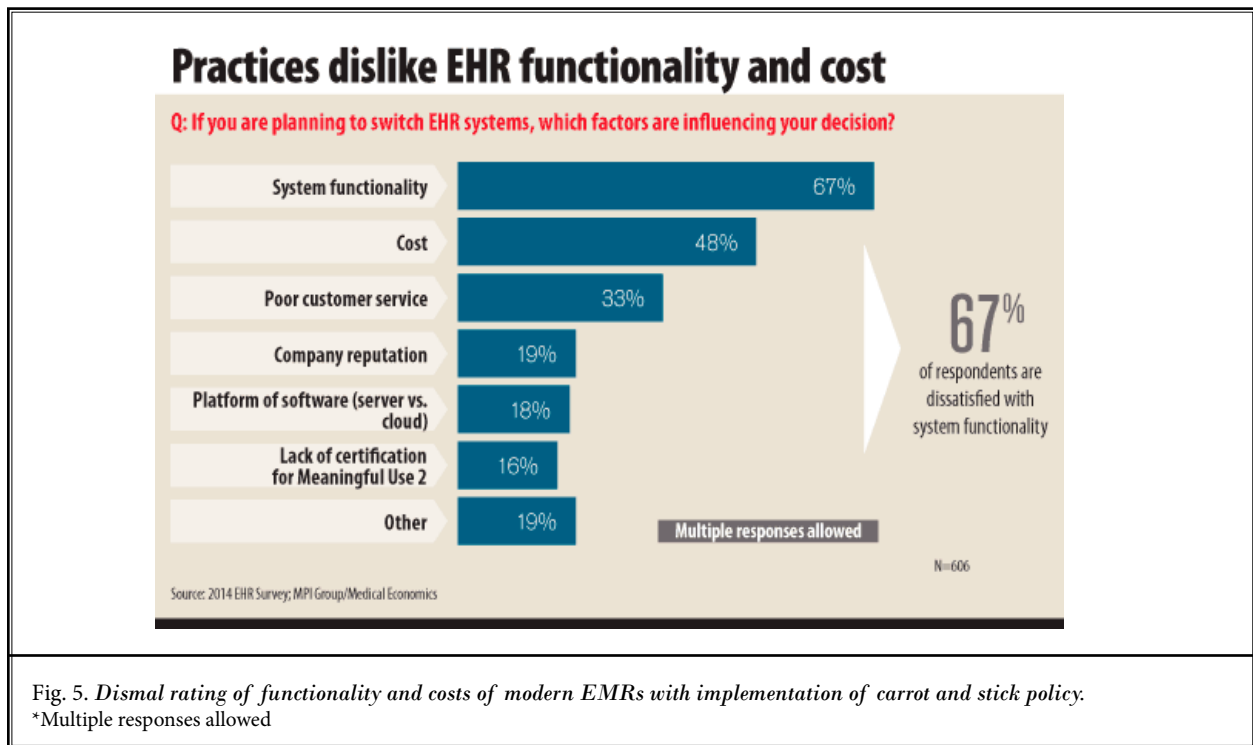
The supporters of health IT (2) state that it is clear that there are important reasons to move forward with health IT aggressively, but also reasons to tread carefully. They also quote that estimates show that the US Department of Veterans Affairs (VA) has captured more than \$3 billion in net benefits from its health IT investments and other achievements of VA systems (2,17-20). Considering the numerous issues related to VA health care, specifically in reference to quality that has resulted in myriad publicity and led to congressional hearings, with the Senate Oversight Committee described as death, delay, and dismay at the VA (21,22), one ought to be cautious about emulating their success. Supporters of the broader use of IT in healthcare are acknowledging major disadvantages including errors, glitches, and other drawbacks, which take months to years to expensively resolve. Further, there is evidence that the majority of providers dislike EMR functionality -- investments and financial losses with deteriorating patient care and with the inability to improve coordination of care as shown in Fig. 5 (10). In a survey conducted by the MPI Group and Medical Economics, the authors asked the following questions:

1. If you are planning to switch EHR systems, which factors are influencing your decision?
2. How much have you invested today in your EHR system, including hardware, software, training,

consulting, etc.?

3. To what extent has your EHR system saved you money?
4. To what extent has your EHR system improved the quality of patient care?
5. Has your EHR system improved coordination of care with hospitals?
6. If you had to do it all over again, would you purchase your current EHR system?
7. How confident are you that your EHR system will be viable in five years?
8. How confident are you that your EHR vendor will be in business in five years?
9. Has your EHR investment been worth the effort, resources, and costs?

The results were astonishing: 67% of the respondents were dissatisfied with system functionality, 48% were dissatisfied with cost, 33% faced poor customer service, 19% felt that the company's reputation was damaged, and 16% showed that there was a lack of certification for Meaningful Use Stage 2. In addition, in reference to costly implementation, 45% spent more than \$100,000 on EHRs, and overall, 77% of large practices spent more than \$200,000 with only 15% spending less than \$10,000, resulting in financial losses up to 65% and with significant losses for 38% of the practitioners.



Further, primary care internal medicine physicians also showed higher than average losses of 43%. Approximately half of the physicians believed that EHRs made patient care worse and 19% felt it was significantly worse, whereas only 11% felt it was significantly improved and 24% felt it was somewhat improved. The respondents also reported that overall coordination of care was affected in a negative manner with only 20% reporting improvement and 69% reporting a lack of improvement.

The reliability and longevity also has been dismal with 73% of the largest practices and two-thirds, or 66%, of all physicians declining to participate in an EMR system; whereas, 38% of respondents doubt that their system will be viable in 5 years, which may be more accurate and practical than the 52% of respondents who believe their EMR systems will be viable in 5 years. In addition to this, 26% of respondents doubt that their vendors will be in business in 5 years. These negative findings are illustrated despite recent consolidation in the health information technology (HIT) sector and an artificial increase in prices with government support and significant dissatisfaction.

In a survey of 845 physicians in December 2012, the American College of Physicians (ACP) reported that those surveyed lost 48 minutes a day to EHR processing

(3). This survey also showed that mean loss for trainees was 18 minutes; 90% felt that at least one data management function was slower after the introduction of EHRs, 64% felt note writing took longer, 34% felt it took more time to find and review medical data, and 32% felt it took more time to read electronic notes (3).

In addition, dismal results have been reported as of August 25, 2014, in reference to Meaningful Use and eligibility for funding from government sources (23). Based on the data available, 90% of eligible professionals have registered for the Medicare or Medicaid Electronic Health Record (EHR) Incentive Program, and so far more than 400,000 eligible professionals have received an incentive payment. However, the number of providers who have attested to Meaningful Use Stage 1 as of August 25, 2014, was only 8,024 eligible professionals and 436 hospitals. The data for Meaningful Use Stage 2 were even more dismal with only 3,152 eligible professionals and 143 hospitals attesting to Meaningful Use Stage 2. Consequently, the Meaningful Use Stage 2 deadline was extended to October 2015. While the 2009 stimulus package allocated \$19 billion for HIT globally, for Meaningful Use itself, as of August 1, 2014, payouts exceeded \$24.8 billion. It is rather surprising that the estimated costs were exceeded, even though the participation rate has been extremely low (23).

There also have been multiple reports of major health care security breaches affecting millions of individuals since September 2009 (24), making patients leery about sharing information (25), demonstrating a lack of preparation for managing IT risks in many hospitals and clinics (26), and development of even more IT tools (27-30).

Impossible Standards

The IT Standards Committee has been told that fewer than 8% of the vendors' customers have sent clinical data to another provider, and only 1% have both sent and received patient data via Consolidated Clinical Document Architecture (CCDA). The CCDAs have been highly variable since vendors customize templates for physician customers. It should be noted that even customized templates are considered as providing inadequate documentation and many are facing audits. Greater interoperability would require stricter and more clearly defined standards with less flexibility and implementation, which essentially will require further regulations and reduce efficiency and increase cost.

Now the HIT Standards Committee's Implementation Workgroup is considering more stringent guidelines for vendors during the certification process. The major disadvantage is that it will not only increase costs, but it would limit the customization and template choices that EMR vendors can provide their customers. More than 30.6 million individuals have been affected by major health care data breaches, based on data posted on the Department of Health and Human Services (HHS) Office of Civil Rights "wall of shame" Web site, which lists incidents affecting 500 or more individuals since September 2009, when the Health Insurance Portability and Accountability Act (HIPAA) breach notification rule first went into effect (24,25). This is considered as a significant underestimation and it is increasing continually. It is also startling that many hospitals and clinics are not prepared for IT risks (26). It has been shown that many health care organizations have little awareness of the risks associated with HIT, based on a report prepared by RAND Health in collaboration with the Office of the National Coordinator (ONC) for Health IT (26).

The research found that HIT safety often competes with other pressing priorities for limited resources within health care organizations, even though they have invested large amounts of funds in IT. This report also showed that users of EMRs believe there is a solution to patient safety problems and may not understand the new risks that may be introduced by EMRs. The data

were derived from 4 different hospitals and clinics of various sizes, locations, and patient loads, and found that many were unprepared to participate in an external HIT risk management assessment. This outcome suggests that even organizations with good intentions may be unable to achieve the goal of implementing an HIT safety project within a short time frame – even with technical assistance from an outside organization. Thus, the new security risk assessment (SRA) application, developed by the HHS, to help small to medium sized practices conduct risk assessments of their organizations may provide some assistance. However, this will only increase costs of care and costs of operating EMRs.

Multiple Meaningful Use 2 requirements also exacerbate the risks associated with using EMRs in practice settings.

In addition to EMRs and practice management systems, the proposed implementation of ICD-10 in the United States has been described as possibly more expensive than Y2K, which was estimated to cost \$300 billion, and the continued costs of HIPAA may range from \$200 billion to \$2 trillion with estimated costs of implementation potentially over \$1 trillion (8). The impact of ICD-10 implementation has been estimated to range from \$56,000 to over \$8 million for each practice, with cash flow disruptions ranging from a minimum of \$20,000 to as high as \$15 million (13,31-38). Further, even though the IT industry has been promoted as well-developed, industry preparedness is poor in reference to ICD-10. ICD-10 also affects multiple other programs including the Physician Quality Reporting System (PQRS), Meaningful Use, and value-based medicine. It will be an EHR challenge because the EHR systems are designed for ICD-9 codes which dramatically differ from ICD-10 codes (37). The switch to ICD-10 codes could have a significant effect on how EHR systems relate information and trigger patient service items. Consequently, the structures and additional information built into ICD-10 codes will require substantial changes to EHR systems to maintain their current functionality.

In the final analysis, it is not just a matter of presenting ICD-10 codes in place of ICD-9 codes for billing purposes; it will require significant changes to EHR functionality to maintain benefits while using a dramatically different diagnostic coding strategy. Multiple organizations concluded that plans for ICD-10 should be repealed or at least postponed to directly change to ICD-11 with a transition period of 2 to 5 years along with financial compensation for practices to offset ICD-10 costs, develop industry-wide contingency plans for

ICD-10 issues during the transition period, reinstate end-to-end testing and publicize results, test the quality measures, and work on other administrative simplification efforts to reduce overall costs in the health care industry.

THE FUTURE OF EMRS

The future of EMRs depends on health care reform concentrating on health care itself with improvement in quality and access and reductions in cost. At a meeting focused on transforming health care through technology, Robert Pearl, MD, CEO of the Permanente Medical Group, in a keynote address, described the 5 reasons why technology doesn't always easily integrate into the health care industry.

First, technology doesn't always address the issues at hand. Instead, technology entrepreneurs often discover a new technology and then figure out how to utilize it, instead of identifying a problem and working to solve it. Thus, even though technology is new and exciting, it does little in actual health management for reducing costs, and in fact, may increase them.

Second, a health professional cannot afford to pay for new technologies as the general public doesn't want to pay for new technologies despite the eagerness of patients, physicians, and hospitals for new technologies. In addition, under the fee-for-service reimbursement model, with continuing disastrous cuts, providers cannot afford or are less likely to implement technologies that lower costs or reduce patient visits and, in turn, reduce revenues and increase audit potential. In addition, the maintenance costs of IT explode each year with new technology or replacement technology every few years.

Third, the technology creates barriers between physicians and patients as it has been shown in multiple studies, even by the supporters of IT. The ownership of medical records and health information will shift from physician to patient and finally, the physician will be held responsible.

Fourth, technology can take up too much of a physician's resources causing a decline in productivity and increase in expenses. Finally, as a fifth barrier, physicians often see technology as impersonal with doctors losing touch with the patient, and coordination of care and quality of care not improving overall.

Under the present atmosphere in health care, with excessive regulations, mandates, and lack of application of evidence-based facts crushing physicians and their ability to care for their patients (13), it appears

that use of EMRs will damage individual medical practices, but may be tolerated by consolidated hospital type practices and groups. AMA President Elect, Steven Stack, MD, in writing about doctors' views of EHRs and regulatory burdens, illustrated that an anesthesiologist specializing in pain management is experiencing a 40% drop in payments, essentially putting him/her out of business and causing hundreds of patients to seek care elsewhere. It was simply no longer possible to sustain his practice. These are not isolated instances (13). In spite of numerous attempts by the interventional pain management community, the Centers for Medicare and Medicaid Services (CMS) has influenced policy-makers, without evidence, to continue cuts, even though they reversed 2015 payment levels to those of 2013, they still bundled fluoroscopy into epidural injections (39-42). To improve patient care and reduce costs without increasing reimbursement, mandatory implementation and associated regulations must be eliminated, leaving independent practice measures to physicians and practices, creating competition among vendors and responsibility among purchasers. This will improve patient care, patient interaction and enhance the cost utility of interventions.

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REFERENCES

- Bendix J. EHRs not fulfilling promise of improved healthcare delivery. *Medical Economics*, August 13, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/content/tags/american-hospital-association-health-information-technology-survey/eh>
- Dentzer S. One year after the stimulus, will we get health IT right? *Health Aff (Millwood)* 2014; 29:582.
- McDonald CJ, Callaghan FM, Weissman A, Goodwin RM, Mundkur M, Kuhn T. Use of internist's free time by ambulatory care electronic medical record systems. *JAMA Intern Med* 2014 Sep 8 [Epub ahead of print].
- Letter to Marilyn Tavenner, Administrator, Centers for Medicare and Medicaid Services, U.S. Department of Health and Human Services from James Madara, MD, Executive Vice President, CEO, American Medical Association. RE: Medicare incentive programs. October 21, 2014.
- Hsiao CJ, Hing E, Ashman J. Trends in electronic health record system use among office-based physicians: United States, 2007-2012. *National Health Statistics Report* May 20, 2014, Number 75. www.cdc.gov/nchs/data/nhsr/nhsr075.pdf
- Public Law No: 111-148: H.R. 3590. Patient Protection and Affordable Care Act. March 23, 2010.
- Manchikanti L, Hirsch JA. Regulatory burdens of the Affordable Care Act. *Harvard Health Policy Rev* 2012; 13:9-12.
- Manchikanti L, Benjamin RM, Falco FJE, Hirsch JA. Metamorphosis of medicine in the United States: Is information technology (IT) a white knight or killer whale. *Pain Physician* 2014;17:E663-EE670.
- American Recovery and Reinvestment Act of 2009 (ARRA), P.L. 111-5, February 17, 2009.
- Verdon D. Physician outcry on EHR functionality, cost will shake the health information technology sector. *Medical Economics*, February 10, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/physician-outcry-ehr-functionality-cost-will-shake-health-information-technol>
- Verdon DR. (Slideshow) Medical Economics EHR survey probes physician angst about adoption, use of technology. *Medical Economics*, February 10, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/slideshow-medical-economics-ehr-survey-probes-physician-angst-about-adoption->
- Bendix J. EHR use growing, but unevenly. *Medical Economics*, January 30, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/ehr-use-growing-unevenly>
- Stack SJ. My journey to Bemidji: Doctors' views of EHRs, regulatory burdens. *AMA Wire*, October 3, 2014. www.ama-assn.org/ama/pub/ama-wire/ama-wire/post/journey-bemidji-doctors-views-of-ehrs-regulatory-burdens
- Yurkiewicz S. Friday feedback: Rehabilitate the EHR. *MedPage Today*, October 10, 2014.
- Kane CK, Emmons DW. New data on physician practice arrangements: Private practice remains strong despite shifts toward hospital employment. Policy Research Perspectives, American Medical Association, 2013. www.nmms.org/sites/default/files/images/2013_9_23_ama_survey_prp-physician-practice-arrangements.pdf
- Elliott VS. Doctors describe pressures driving them from independent practice. *American Medical News*, November 19, 2012. www.amednews.com/article/20121119/business/311199971/2/
- Asch SM, McGlynn EA, Hogan MM, Hayward RA, Schekelle PG, Rubenstein LV, Keeseey J, Adams JL, Kerr EA. Improving quality of care: How the VA outpaces other systems in delivering patient care. *Rand Health*, 2014. www.rand.org/content/dam/rand/pubs/research_briefs/2005/RAND_RB9100.pdf
- Longman P. The best care anywhere. *Washington Monthly*, January/February 2005. www.washingtonmonthly.com/features/2005/0501.longman.html
- Gerencer K. For quality, it's hard to top veterans' health care. *MarketWatch*, June 2, 2010. www.marketwatch.com/story/its-hard-to-top-veterans-health-care-2010-06-02
- Krumholz H. 3 things to know before you judge VA health system. *Pharma & Healthcare*, May 23, 2014. www.forbes.com/sites/harlankrumholz/2014/05/23/3-things-to-know-before-you-rush-to-judgment-about-va-health-system/
- Death, Delay & Dismay at the VA: Friendly Fire. An Oversight Report from Senator Tom Coburn, MD, 2014. www.coburn.senate.gov/public/index.cfm?a=Files.Serve&File_id=dfbod9c8-d3ee-4d0d-ab56-e842186574fe
- Chokshi DA. Improving health care for veterans – a watershed moment for the VA. *N Engl J Med* 2014; 371:297-299.
- Ritchie A. Meaningful use payments surpass \$24.8 billion. *Medical Economics*, September 5, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/content/tags/centers-medicare-and-medicaid-services/meaningful-use-payments-surpas?page=full>
- McGee MK. Health breach tally: 30 million victims. *Data Breach Today*, March, 31, 2014. www.databreachtoday.com/health-

- breach-tally-30-million-victims-a-6694
25. Ritchie A. EHRs may make patients leery about sharing information, study finds. *Medical Economics*, August 1, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/ehrs-may-make-patients-leery-about-sharing-information-study-finds>
 26. Marbury D. Many hospitals, clinics, not prepared for IT risks. *Medical Economics*, July 17, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/many-hospitals-clinics-not-prepared-it-risks>
 27. HIPAA app designed to help practices conduct risk analyses. *Medical Economics*, April 2, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/hipaa-app-designed-help-practices-conduct-risk-analyses>
 28. Mazzolini C. EHR template customization contributes to MU2 interoperability issues, vendors say. *Medical Economics*, August 1, 2014. <http://medicaleconomics.modernmedicine.com/medical-economics/news/ehr-template-customization-contributes-mu2-interoperability-issues-vendors-sa>
 29. U.S. Department of Health and Human Services. HHS releases security risk assessment tool to help providers with HIPAA compliance. March 28, 2014. www.hhs.gov/news/press/2014pres/03/20140328a.html
 30. Schneider EC, Ridgely MS, Meeker D, Hunter LE, Khodyakov D, Rudin R; RAND Evaluation Team. Promoting patient safety through effective health information technology risk management. *Rand Health*, May 2014. www.healthit.gov/sites/default/files/rr654_final_report_5-27-14.pdf
 31. Manchikanti L, Falco FJE, Hirsch JA. Necessity and implications of ICD-10: Facts and fallacies. *Pain Physician* 2011; 14:E405-E425.
 32. Manchikanti L, Falco FJE, Hirsch JA. Ready or not! Here comes ICD-10. *J Neurointerv Surg* 2013; 5:86-91.
 33. Hirsch JA, Leslie-Mazwi TM, Nicola GN, Oklu R, Schoppe KA, Silva III E, Manchikanti L. The ICD-10 system: A gift that keeps on taking. *J Neurointerv Surg* Published online first 21 June 2014.
 34. Chute CG, Huff SM, Ferguson JA, Walker JM, Halamaka JD. There are important reasons for delaying implementation of the new ICD-10 coding system. *Health Aff (Millwood)* 2012; 31:836-842.
 35. Nachimson Advisors. The impact of implementing ICD-10 on physician practices and clinical laboratories. Reisterstown (MD), Nachimson Advisors, Oct. 8, 2008. www.nachimsonadvisors.com/Documents/ICD-10%20Impacts%20on%20Providers.pdf
 36. Meyer H. Coding complexity: US health care gets ready for the coming of ICD-10. *Health Aff* 2011; 30:968-974.
 37. Spector N, Reid M. Achieving the benefits promised by administrative simplification, ICD-10, and EHRs. American Medical Association, White Paper. December 2013.
 38. Natale C. ICD-10 and EMRs: Technology is bringing major change to medical practices. *ICD10Watch*, July 18, 2011. www.icd10watch.com/blog/icd-10-emrs-technology-bringing-major-change-medical-practices
 39. Manchikanti L, Hansen H, Benyamin RM, Falco FJE, Kaye AD, Hirsch JA. Declining value of work of interventional pain physicians. *Pain Physician* 2014; 17:E11-E19.
 40. Manchikanti L, Benyamin RM, Hansen H, Swicegood JR, Hirsch JA. Reversal of epidural cuts in 2015 physician payment schedule: Two steps forward, one step back. *Pain Physician* 2014; 17:E565-E573.
 41. Department of Health and Human Services, Centers for Medicare & Medicaid Services. 42 CFR Parts 405, 410, 411, 414, 423, and 425. Medicare Program; Revisions to Payment Policies under the Physician Fee Schedule, Clinical Laboratory Fee Schedule & Other Revisions to Part B for CY 2014 (CMS-1600-FC). Final Rule. December 10, 2013.
 42. Department of Health and Human Services, Centers for Medicare & Medicaid Services. 42 CFR Parts 403, 405, 410, 414, 425, and 498. Medicare Program; Revisions to Payment Policies under the Physician Fee Schedule, Clinical Laboratory Fee Schedule, Access to Identifiable Data for the Center for Medicare and Medicaid Innovation Models & Other Revisions to Part B for CY 2015. Proposed Rule. June 19, 2014.