Physician 'cognitive drift' and medication errors—unintended consequences of the modern EMR

Medications represent the most common intervention in health care, but also lead to an estimated 1.5 million adverse drug events and tens of thousands of US hospital admissions annually.[1] The 98,000 deaths per year, and many more injuries resulting from medical errors, make patient safety top priority.[1] It was hoped that medication errors—the most common cause of preventable injuries in hospitals—could be prevented by computerized physician order entry (CPOE), a component of the (electronic medical record) EMR.[2] Earlier on, there were claims that the introduction of the EMR could reduce serious medication errors by 55%.[3] These hopes have not yet materialized; indeed, there is evidence that EMR and CPOE have led to some unintended consequences of increased medication errors under certain circumstances.[4]

"Cognitive drift" is said to occur if more than 1 second elapses between clicking a computer mouse and seeing new data on the screen.[5] Our informal poll of ICU physicians in a Northwestern Wisconsin hospital revealed that cognitive drift, defined by the elapsed time of >10 seconds was commonplace, with 10 of 10 (100%) ICU physicians experiencing cognitive drift several times a day. Cognitive drift represented a major cause of physician angst, a potential source of medication errors, and contributed to end-user resistance to EMR implementation.[6] Sometimes, the elapsed time was over 1 minute. Such delays were described as "most frustrating," "insane," "unacceptable," and "unbelievable." Prolonged waiting between mouse clicks translates into dangerous distractions during critical decision points and CPOE-related or other medical errors.

A functional EMR, in our opinion, ought to be robust, flexible, nimble, muscular, and encyclopedic, and should virtually eliminate the phenomenon of cognitive drift simply by being extremely fast.[5,6] There is no such EMR system out there, at least not yet—an indictment of the "medical industrial digital complex." This narrative is a call for more research into this area of physician-EMR interactions. On this point, Joseph Tan identified another major barrier to EMR innovation adoption and implementation and utilization when he noted the neglect of clinicians and system users in the development and design phase of EMR systems.[7] Tan also observed that few people are trained to work at the intersection of biomedicine and information technology (IT).[7] Front-line practicing physicians must play pivotal roles in all phases of EMR development and implementation.[6,7] This author posits that the increasing entry of physicians and other mid-level providers into graduate business or information systems programs would help close these very critical gaps in the growth and development of the EMR as an integral cognate component of modern health care delivery. It is this author's intention, since obtaining an MBA in May 2012, to help bridge this biomedicine IT gap.

Finally, cognitive drift is a common, yet unreported and unrecognized, source of physician stress and medical errors in the workplace.[6] A search in PubMed on December 18, 2011 for "cognitive drift" revealed 73 publications. All 73 articles dealt with neurology- and psychiatry-related topics; not one had anything to do with physicians and the EMR. So, whereas virtually all physicians experience this malady of the EMR every day at work, there is not one report of this phenomenon in the English literature. The solutions to resolving cognitive drift in the EMR, which include involving practicing physicians in all phases of EMR design, development, and implementation; deploying more robust and faster servers, networks, and work stations; minimizing the number of mouse clicks; and optimizing EMR connectivity must all be promptly executed to limit these unintended consequences.[6] This phenomenon of cognitive drift warrants further study in the United States and worldwide.

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Effective population management tools available

Serrano et al[1] report interesting results on managing populations of depressed patients in the primary care setting, particularly the underserved from federally qualified health centers (FQHCs) and the Veterans Administration system. Care management is, appropriately, the focus of their interventions, and much of the discussion and accompanying editorial point to the inadequacy of the technology support for this approach. As described, a clever, but somewhat convoluted health information technology process was used to manage the population.

Electronic medical records (EMRs) are designed to manage individual patients, and are belatedly beginning to try and address the need to manage populations of patients. I care for patients at a FQHC where staff have looked at many EMRs and talked to users of others. We think there is growing consensus that EMRs mostly lack the type of tracking ability needed to manage populations of patients. What is happening in this vacuum is that the data warehouse vendors have jumped into the void and are offering solutions that extract data from the EMR, and report population data back to the practice. There are several downsides in that warehouses have expensive ongoing costs and users have little control over what data they choose to assess. We are not warehouse experts, but it also appears that if one chooses to do something about those with bad

outcomes a whole other process must be put in place to track and manage individual patients who are in outlier groups.

About a decade ago we purchased a "population management software" package called i2iTracks (i2i Systems, Inc., Santa Rosa, California). It was developed by former FQHC technology people for the underserved populations in FQHCs. (There are other products available for FQHCs and similar products in the private practice world.) Their spread has been slowed by the EMR vendors' unsubstantiated claims that you can mange populations from within the EMR. (Perhaps aided by the lack of understanding of what it takes to manage populations.) Population software systems regularly extract data from the EMR/project management system to give real-time data on any useful population data points. This includes appointment data (next or last) not often considered in reporting systems. It does not extract every data point in an EMR, but only those useful for population management. So, you can see blood pressures and body mass indexes, for example, but would not normally need to see cardiovascular exam outcomes (murmurs, etc). You could map and see these points, if you chose, but why would you normally need those for population management? Changing the way a query runs is a snap. If you decide you want to use a PHQ-9 score of 14 instead of 15 as your tracking indicator, it literally takes seconds to make changes. Likewise you want to know who has not had a follow-up visit in 6 months instead of 3, it takes only seconds to change the question. There is no need to submit a request to the vendor for a different indicator. With a mouse click on the adverse outcome of interest (PHQ-9 >13 and no visit or call in the last 3 months), you get the entire roster of patients in that numerator. That list can be sorted by site/clinician and sent to those responsible for a follow-up call. Or a predetermined letter can be printed and sealed for mailing from within the system. It is ideal for health coaches/care managers, care coordinators. It has a sophisticated referral tracking system, which can be used for internal follow-up as well. All of these attributes allow the practice to take the next and crucial step (beyond simply reporting population data for benchmarking or pay for performance).

While we all wait on the illusive EMR system that does everything, there are current solutions for those practices, like Serrano's, in the vanguard of improving population health.

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