



Handling the Truth

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In “A Few Good Men” the prosecutor, played by Tom Cruise, tells the Colonel on the stand, played by Jack Nicholson, that he wants the truth regarding the Colonel’s ordering the discipline of two young Marines. The Colonel responds, in one of Nicholson’s most memorable scenes: “You want the truth...You can’t handle the truth!”

I have been wondering if we, professionals fostering the introduction of ehealth technologies, can handle the truth.

I think all of us believe in our hearts the potential value of Information and Communications Technologies (ICT) in health. I ask, for instance, which other tools could we use to improve the efficiency and effectiveness of the health system? Then I have to quickly fill in that the ICT on its own isn’t enough and it needs to be augmented by the complementary factors (co-factors) of re-engineering, organizational and job restructuring, training, management of change, and so on. But a good ehealth intervention includes all of these: ICT plus the co-factors. One example of research that’s apropos is in the area of improving patient care processes. Many demonstrated that education can transiently improve the application of even simple clinical protocols, but 20-plus years ago it was shown that the effect of education fades out over just a few months. This led many to augment education with the introduction of computer-driven care protocols in an attempt to make the improvement persist. In fact, early results showed enhanced compliance of providers, although serious questions about the use of protocols have been raised recently.

On the other hand, there is more and more evidence that the ICT intervention has its downsides. We all know, for example, that quite a high percentage of ehealth projects fail by going belly up or at least not delivering the beneficial impacts projected by their progenitors. Granted, it is all in what you call “success” or “failure”. Some call getting an ehealth project out there and in action “success”: “...we did it within budget and on time”. Ok, that is a kind of success. Another kind of success is declared when the users like the system and are satisfied. True, that’s a kind of success also. However, I think most Health Informatics professionals would consider the achievement of measurable impacts on performance of health providers

or the health system itself to be the real indicators of success. This is, in fact, what distinguishes them from techies, as the effect on the “business” is their goal.

This “meatier” kind of success targets things like: improving the efficiency of the health system as perceived by patients, providers, administrators or all of the above, or improving the effectiveness of the health system related to patient care.

If we look more deeply at **efficiency-success**, this would involve the delivery of effects like reduced cost of care while holding quality constant, quicker turnaround times for exams and tests, reduced provider time to order lab tests or medications, and the like. These are all process improvements that result in a better running health system “machine”. Given the demand for care and budget constraints, these are noble goals and achieving effects like this would be called “success” by most of us.

Effectiveness-success goes one big step further and targets the primary goal of Health Informatics: to improve patient outcomes or at least to increase patient safety while under care. Here the objective is to improve the health and/or comfort of the clients of the health system. There are a number of major challenges here. For example, currently patients are not objectively assessed regarding their health status as they enter or are discharged from most components of the health system (1). Work has been done in a few sectors using the InterRai (2) instrument developed by Dr. John Hirdes at the University of Waterloo, but not yet related to the acute care system in Canada. Measuring patient outcomes is a significant challenge. Several current Infoway innovation projects have the goal of objectively assessing if they improve patient outcomes, but the process is challenging.

So, what about a little truth so that our minds can join our hearts as we foster ehealth? Can we all be intellectually honest as we promote ehealth? Consider the following:

1. There is only minimal, if any, experimental-quality evidence that ehealth interventions produce positive impacts on patient outcomes.

Most hear or read about the potential of ehealth to improve patient health and wellness. There are zillions of anecdotal reports out there, many written

by system developers making one or other claim. However, there have also been clinical trials - more than a hundred of them - that attempt to assess if a system has improved patients' status, e.g., improved blood pressure, or better control of diabetes. Unfortunately, systematic review of these trials that come to conclusions based on the totality of evidence, paint a bleak picture. For example, Brian Haynes at McMaster and others (3) did a systematic review 102 trials of Clinical Decision Support Systems and found "There is insufficient data on the effects of CDSS and patient outcomes" and "There are no "magic bullets" for improving the quality of health care..." Just to cite one more review, Basit Chaudhry analyzed 257 studies of health information technology (4). He found that there were 3 quality-of-care benefits: increased adherence to guideline-based care, enhanced surveillance and monitoring, and decreased medication errors. However, only 4 institutions demonstrated the efficacy of what they did. Effectiveness, the demonstration of similar benefits of the interventions in other hands in other settings, was not addressed.

2. There is evidence, albeit not of experimental quality, that the use of ehealth to improve patient safety introduces new risks.

The literature in this case is only gradually developing. Existing studies are anecdotal and their results have been questioned. Most of the work has been done related to computer-based physician order entry (CPOE). A study by Yong Han at the Children's Hospital of Pittsburgh (5) noted an unexpected increase in mortality after the implementation of a system. By the way, another group soon followed contending no association with increased mortality with their implementation. Ted Palen and others at the Colorado Permanente Medical Group (6) found no significant increase in compliance with ordering the recommended laboratory monitoring protocols for patients receiving certain medications. Others have found that CPOE introduces new kinds of errors.

3. Most of the investigations claiming significant reduction in health system costs are projections, not the reporting of actual achievements.

Here it is necessary to look at the sources and basis for any of the reports that you hear about. You will note that most indicate that the gains are possible given certain constraints. On an industry-wide basis, I know of nothing that demonstrates this as a result of the review of actual projects on an industry sector scale.

4. Until recently, most systems that have been built have not been objectively evaluated as to their achievement of the effects they targeted.

Even now it does not appear to be widely understood that evaluations done by the developers of system, rather than at arm's length, are at least open to question.

So, where are we?

I would suggest that we all start collecting evidence based on actual measurements of the effects of ehealth systems. Individual organizations' results are useful, but evidence across multiple institutions is essential, much like evidence that a drug is safe and effective not only for one or two patients but for at least a defined population. Then we can all critically review how the study was done and how the results were concluded. Finally, we can share our findings. We would be happy to place these on the web for all to see. We need evidence to back our beliefs and claims!

In addition to this we can commit ourselves to have any implementations objectively evaluated so we get evidence of what our systems actually deliver in terms of effects.

Meanwhile, we should, as we promote ehealth, make it clear that we believe it will improve things but we need to take steps to clarify our goals, make sure the effects of our projects are measurable, and measure them so we can at least show we achieved what we targeted.

Ehealth, like most interventions in the real world is akin to a 2-edged sword. To be effective the sword must be sharp so it will cut. But it can cut us as well. Ehealth is not a proven solution. Nor is it a perfect solution with no downsides.

Can we handle the truth?

Selected References:

1. W. Crowley, D. Zitner, Operating in the Dark, Atlantic institute for Market Studies, <http://www.aims.ca/healthcare.asp?typeID=1&id=170>.
2. InterRai: <http://www.interrai.org>.
3. D. Oxman, M. A. Thomson, D. A. Davis, and R. B. Haynes, No magic bullets: a Systematic Review of 102 Trials of Interventions to Improve Professional Practice, *Can. Med. Assoc. J.*, Nov 1995; 153: 1423 - 1431.
4. B. Chaudhry, Jerome Wang, S. Wu, M. Maglione, W. Mojica, E. Roth, S.C. Morton; P.G. Shekelle, Systematic Review: Impact of Health Information Technology on Quality Efficiency and Costs of Medical Care, *Annals Internal Medicine*, May 2006; 144: 742 - 752.
5. Y.Y. Han, J.A. Carcillo, S.T. Venkataraman, R.S.B. Clark, R.S. Watson, T.C. Nguyen, H. Bayir, R.A. Orr, Unexpected Increased Mortality After Implementation of a Commercially Sold Computerized Physician Order Entry System, *Pediatrics*, Vol. 116, No. 6, December 2005.
6. T.E. Palen, M. Raebel, E. Lyons, D.M. Majid, Evaluation of Laboratory Monitoring Alerts Within a Computerized Physician Order Entry System for Medication Orders, *The American Journal of Managed care*, Vol. 12, No. 7, July 2006. ●