Having Lost Sight of our Objectives, we Redoubled our Efforts
H. Dominic Covvey
National Institutes of Health Informatics

Remembering and Checking Predictions
In the 1970’s I read the probably apocryphal story of the translation of a passage from St. Matthew’s gospel (“The spirit is willing, but the flesh is weak”) into Russian and then back into English (becoming: “The vodka is good, but the meat is rotten”)! This was in counterpoint to an assertion in a book I read in 1965 that predicted that English-Russian-English translation would be mastered by 1967. Forty-three years later, automatic translation still leaves a lot to be desired, especially when dealing with idiom or poetry. We can conclude that, in 1965, those making predictions about translation didn’t fully comprehend the problem.

Today we read about ehealth predictions like womb-to-tomb EHRs by 2011 and billions in benefits from ehealth. Many, knowing the dimensions of the problems we face and the real limitations of our tools, methods and the humans affected by them, have become convinced that we have not fully comprehended the challenges of employing ehealth to support health, to realize a productive healthcare system, and to satisfy real needs.

What are we up Against?
What’s the possibility that we have blinkers on, are near-sighted or just don’t take the time to appreciate the depth and context of the problems we decide to “solve” through ehealth? Is this one of the reasons why quite a few of our “solutions” are wide of the mark, don’t satisfy the comprehensive needs of users, or are not usable? Why is it that smart ehealth designers and developers create systems that don’t produce the effects we need and don’t avoid unintended negative consequences - the ‘side effects’ of the ehealth prescription?

A key reason: the health system is very complex! I tell this to my students so they’ll look more deeply into the nature of humans and human health with which the health system is intended to deal. In fact, this almost unfathomable complexity attracts me to Health Informatics.

Consider this excerpt from Steven Straus’s blog “Electronic health records: We may be trying to do too much too quickly” (http://www.cbc.ca/health/story/2010/01/06/f-vp-strauss-electronic-health-records.html). Steven asks us to imagine we are in 1902 and intending to implement the road system. To quote him: “This means we need to create: Overpasses, underpasses, superhighways, toll booths, bridges, lane divisions, speed signs, parking meters,…, off ramps, warning lights, no parking …signs, handicap parking, bus stops, taxi stands, stop lights with turn signals…traffic cops, speed traps, tractor trailers, motorcycles, highway narrowing signs, break down lanes, sidewalks, car dealerships, bike paths, gas stations, garages, rest stops, …tow trucks, …snow plows, road salting machines, [and] lane sizes…”. You get the idea.

Stephen argues that this is a much better metaphor than the banking system for understanding the complexity of the challenge of putting the EHR (and, I’d add, ehealth) in place.

Note the word “complexity”, not “complicated” or “intricate”, both of which are certainly true, but not bearing the full connotations of the word “complexity”.
The Nature of Complexity

1. “The system contains a collection of many interacting objects or agents.
2. These objects’ [agents’] behavior is affected by memory or “feedback”. [I.e.]…something from the past affects something in the present.
3. The objects [agents] can adapt their strategies according to their history. [I.e.]… to improve performance.
4. The system is typically “open”. [ I.e.] the system can be influenced by its environment.
5. The system appears to be “alive”. The system evolves in a highly non-trivial and often complicated way, driven by an ecology of agents who interact and adapt under the influence of feedback.
6. The system exhibits emergent phenomena which are generally surprising, and may be extreme. In scientific terminology, the system is far from equilibrium.
7. The emergent phenomena typically arise in the absence of any sort of “invisible hand” or central controller. …Complex systems are often regarded as being more than the sum of their parts…
8. The system shows a complicated mix of ordered and disordered behavior.”

Absolutely every one of these applies to the health system. Let’s consider each one.

In the health system, crucial interacting agents include patients, their families, care providers and administrators. Objects include records, care protocols, and regulations. Everything that is done in the health system is affected by the past: what we learn from past interventions, the agents’ training and experience, and the record of the patient’s care to date. Almost every aspect of providing care is adapted based on history: the patient’s, the literature’s, and the care providers’ and there is the constant striving to improve performance though evidence-based change. The health system is dramatically influenced by government, by available technologies and interventions and even by fads. Further, we all see the system as virtually alive as it sprouts new entities, grows, and evolves. Many phenomena are emergent: wait lists, new organizational approaches, shortages of key providers, policy, and conflicts…and we are often at the edge of chaos! The very nature of the health system practically prevents central control, and much of what occurs comes from the players and their judgments and how they manage. Further, the interactivity of the parts and stakeholders creates another ‘meta-reality’ that emerges often unpredictably as the system works. Most of us have never seen an apparently functioning ‘system’ that is such an interesting integration of ordered and disordered components. Well, maybe some of our inventions. Helicopters have been described as a bunch of parts flying in close formation. Sound familiar?

Wicked Problems
Let’s try to nail this. The Wikipedia defines Wicked Problems as problems that are “difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize”. Consider what Tom Ritchey – and I must Thank Dr. Richard Irving at York University for pointing me at this - defines as 10 characteristics of “Wicked Problems”. I see healthcare as a constellation of Wicked Problems that make healthcare a “Meta-Wicked Problem” (http://en.wikipedia.org/wiki/Wicked_problem#endnote_2).
1. There is no definitive formulation of a Wicked Problem.
2. Wicked problems have no stopping rule.
3. Solutions to Wicked Problems are not true-or-false, but better or worse.
4. There is no immediate and no ultimate test of a solution to a Wicked Problem.
5. Every solution to a Wicked Problem is a "one-shot operation"; because there is no opportunity to learn by trial-and-error.
6. Wicked Problems do not have an exhaustively describable set of potential solutions, nor a well-described set of permissible operations that may be incorporated into the plan.
7. Every Wicked Problem is essentially unique.
8. Every Wicked Problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a Wicked Problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.
10. The planner has no right to be wrong (planners are liable for the consequences of the actions they generate).

So, if we accept that the healthcare system exhibits the properties of complexity and that we are facing what is a Meta-Wicked Problem, where does that get us?

**Take-Aways**

There are several practical messages I derive from this thinking:

Firstly, we are up against a world-class, industrial strength challenge, and we need to spend a lot more thought, time and money studying, understanding, analyzing and articulating the problems we are trying to address through ehealth. This must include defining the specific, measurable and feasible objectives that address demonstrable needs of the health system and its stakeholders. We cannot be driven by the human “Do-Something-Anything” gene. We cannot deliver enough value from solutions unless we fully understand the depth and context of the problems we are trying to solve.

To do this we need to heed Simon and Garfunkel’s song “Slow down, you’re moving too fast”. We are: (1) injecting large amounts of funding into the ehealth superstructure while largely ignoring a deficient infrastructure, (2) often solving the wrong problems or doing so inadequately, (3) pushing change at a rate that can’t be absorbed by our health system and its stakeholders, (4) forcing the process of innovation by setting unachievable deadlines, (5) promising the politicians (our patrons) what we can’t really deliver, (6) acting without a competent complement of human resources, and (7) seriously underestimating the needed investment in ehealth. All of these help set the stage for failure, ours and our patron’s…and the citizens who are the investors in ehealth.

There are other things we need to do. For example, we need to consider new program management techniques that are more suited for situations like this. Among these is the practice of “Chaordic Management” (Brenda Zimmerman, et al., “Edgeware: lessons from complexity science for health care leaders”, 1998), where the groups working on solving a problem have high degrees of freedom in terms of methods and tools, while being tightly aligned on purpose. We need to recognize that we need to use Agile Development, an iterative development methodology, and project management paradigms more suited for innovation than classic ‘drum beat’ methodologies. Parallel development by competitive teams is another approach that experts recommend. Right now, much of what is being done follows anything but these lines. I have particularly seen the bad effects of classic project management in Infoway
“innovation’ projects. Another tactic is true collaboration that involves all stakeholders and required expertise in a trans-disciplinary creative interaction.

Technophiles, by definition, get their jollies from creating solutions, and some of what they create has a beauty that sidesteps the need for justification…it’s better classified as art. However, if we are to have a systematic approach to realizing the true potential of e-solutions, we have to become far more humble before a very challenging task. We must refocus ourselves on understanding and better interpreting the true nature of the health system’s and stakeholders’ genuine needs. Then we must adopt strategies and tactics far more suited to addressing their complexity and ‘wickedness’.

Otherwise we are merely redoubling our efforts in the wrong directions!