Currently, when healthcare data moves in this country it does it using fax machines and patient sneaker-nets. Automated digital interoperability is still in its earliest stages, mostly it has a history of being actively resisted by both the EHR vendors and large healthcare providers. We, as an industry, should be doing better, and our failure to do so is felt everyday by patients across the country.

The ONC-defined difference between EHRs and EMRs is that EHRs are interoperable. Yet, as I have said before, we have spent almost a billions of dollars and generally gotten EMRs instead of EHRs.

Comments were due Apr 3 for the ONC Interoperability Roadmap for 2015-2020. This was specifically separated out from the overall ONC Health IT Strategic Plan for which comments have closed.

Both of these plans ignore the lessons in execution from the previous strategic plan for health IT from ONC. The current Interoperability Roadmap mentions the "NwHIN" (Nationwide Health Information Network) for instance, and only covers what it accomplished, which are mostly policy successes like the DURSA (Data Use and Reciprocal Support Agreement). NwHIN was supposed to be a network of networks that connected every provider in the country… why hasn't that happened?

ONC has forgotten what the actual ambition was in 2010. It was not to create cool policy documents. The plan 5 years ago was to have the "interoperability problem" solved in 5 years. The plan 5 years before that was probably to solve the problem in 5 years. Apparently, our policy makers look at interoperability and say "wow this is a big problem, we need at least 5 years to solve it". Without any sense of ironic awareness that this is what they have been saying for decades, even before Kolodner was the ONC.

The silliness of this is that we need further planning on this at all. We don't need a plan for interoperability, we need interoperability. We could just republish the old plan and it would work just as well if ONC executes and just as poorly if ONC does not execute. At what point do we start looking carefully at what has happened before and start saying "Why is this process not working better?" and "What can we do truly differently?"

The alternative to this deep and uncomfortable introspection is self delusion. Our industry has a very bad habit of rebranding rather than rethinking interoperability. Remember Community Health Information Networks (CHINs)? Those were "not sustainable". So rather than find something that was "sustainable" we rebranded the same basic concepts as Regional Health Information Networks. But they typically failed too. Now the correct term for an unsustainable local exchange networks is a Health Information Exchange. See the problem here? No significant change in thinking or approach, just a rebranding, and the ushering in of a new generation of technology vendors. Swap out the old "bad" technology and protocols, and bring in the new. IHE is bad, we need SOAP. SOAP is bad, we need REST. The Direct Project is

bad, we need Argonaut. CCR is bad we need CDA. CDA is bad we need FHIR. See the pattern here? We need to completely step back and ask uncomfortable questions about our overall approach to interoperability.

Patients, nurses and doctors in this country need more than a cursory examination of the issues behind health information exchange. We need to carefully compare and contrast what was said then, and what is being said now. We need to understand why this part of the system continues to fail.

Lets take a brief look at the "in summary our approach is" from the previous plan:

> *The Nationwide Health Information Network has already demonstrated sharing of patient-health information between the VA, DoD, SSA, and many private sector partners. Extending the Nationwide Health Information Network specifications with additional building blocks such as the Direct specifications will include protocols for provider patient secure messaging, which is a major step towards patient-centered care.*

At the time, ONC was backing two protocols, the Direct Project and IHE (as implemented by CONNECT). Here you can see a video of the two protocols being promoted at the 2010 OSCON conference by the two project leaders at the time. Here I am doing essentially the same thing the next year, in 2011. I completely bought into that strategic plan.

Why didn't those two projects solve the problems over the course of the next 5 years?

From the old strategic document again:

> *Nationally, the government is developing a standards and interoperability framework (S&I framework) to harmonize existing standards and improve sharing of standards across different organizations and federal agencies, making it easier to broaden interoperability through shared standards for data and services.*

The S&I framework, and later Meaningful Use, would deeply endorse the CDA standard as a "harmonized" approach. Now the current roadmap has this to say about CDA:

> *Though much of the industry has implemented C-CDA as it is required in 2014 CEHRT and subsequently Meaningful Use stage 2, there is significant variability in the implementation of the standard.*

Seeing the pattern again? CDA was supposed to be the harmonized standard, and now the industry needs a harmonized standard. This occurs in the "Moving Forward and Critical Actions" section immediately after a discussion of how the industry borked CDA:

HL7's Fast Healthcare Interoperability Resources (FHIR) effort is one effort that is emerging and exploring ways to accommodate new methods of exchanging information.

During the Health IT ONC annual meeting (Feb 2015), the current ONC specifically held out hope that the Argonaut program was going to really address interoperability issues. (For those that do not know, Argonaut is a project to implement OAuth for a REST API based on SMART that delivers healthcare data using the FHIR standard).

So everybody now loves REST and FHIR.

And they are not wrong, FHIR embraces JSON rather than just XML and REST/OAuth has proven itself as the best way to do modern API implementations.

But FHIR and REST will not solve the problem of interoperability. They are just todays shiny toys that will end up having exactly the same problems that Direct and IHE currently face. The hard parts of interoperability have never been about technology, it has always been about forcing and industry that has substantial disincentives to do interoperability to do it anyway.

The problem is this: The Meaningful Use (MU) incentives have no realistic protocols in place for EHR vendors and EHR users to prove that they are generating compliant versions of the current standards. There are no real meaty required tests for compliance to existing standards. There are no meaty requirements to actually exchange data.

You need to maintain a three pronged approach to interoperability testing in order to ensure that interoperability is going to work.

1. Require extensive pass-fail interoperability testing for MU3 EHR certification, using simulated exchange scenarios. Ensure that those tests still work in the wild during attestation.
2. Require that MU attestation force end users of EHR systems to detail who they exchange data with and how, allow them to subjectively rate their EHR vendors support of their interoperability efforts during attestation.
3. Develop a "tattle tell" interoperability endpoint that can accept and automatically de-identify forwarded CDA/FHIR/whatever files that are the result of real health information exchange, so that "standards bad actors" can be detected in the wild.

Here are the steps required to do extensive pass-fail interoperability testing for MU3 EHR certification, using simulated exchange scenarios.:

1. Create 1000 different correctly formed CDA and FHIR files.

2. Design 100 different "treatments" that can be broadly applied to all 1000 profiles. (i.e. "add content showing the patient just had a new HIV test come back positive", or "add content showing the patient has a new blood pressure reading of whatever/whatever"
3. Create 100,000 "end states" that represent how the 1000 start states should be transformed by the 100 "treatments".
4. In order to achieve MU3 certification, an EHR vendor must demonstrate the ingestion of all 1000 start states encoded in CDA, and properly model all 100 "treatments" on each profile, generating 100,000 different end states, which are then exported to CDA and run through a testing engine that accepts one and only one CCA configuration per test.
5. During attestation, EHR users will have to inject 6 simulated patient records, and perform 6 "treatments" properly and then send those 6 to the MU testing portal. Those simulated patients should both delivered and retrieved under all approved HIE transfer protocols, including Direct, IHE and Argonaut.

Then, during attestation, the MU portal should leverage the latest version of the [DocGraph referral dataset](#) to determine which 10 NPIs the submitting provider has the most shared patients with, who also have MU certified EHRs. Then simply ask who among those 10 providers they are exchanging data with, and how.

Attestors should also be asked to rate their vendors support of their interoperability efforts (from 1-6…provide no option for "neutral", cause we all know that is a cop-out and if it is available every attestor will choose it).

If attestors are not communicating with the providers they share patients with, then they should not be given Meaningful Use dollars.

If vendors are constantly resisting their customers efforts to exchange data their certifications should be revoked.

You cannot police whether interoperability is functioning without measuring it in the real world, and attestation is your primary tool for measuring what is happening in the market.

This proposal will be unpopular with providers, who will lament that their MU dollars are now dependent on the willingness of others to exchange data with them. But if HHS wants to ensure that its billions of dollars in EHR investment are resulting in Health Information Exchange, it needs to ensure that the exchange is actually working.

It is critical that neither vendors nor users be in a position to "either/or" their way out of real interoperability. Providers choose not to allow patients to communicate with them using Direct, because they could "either/or" give them access to patient data using a portal. All of the HL7 standards have more 'ors' than a viking warship.

But "options" is only part of the problem. Even when options have been narrowed and standards are explicit, "in the wild" variation is still common and problematic. As a result, the third component of a "real" interoperability system is a "tattle tell system". ONC should create a mechanism for providers to upload actual CDA/FHIR/Whatever files that they have gotten from their partners. They should be able to tag those files as being sent from specific EHR systems and version numbers, as well as tagging them with which healthcare providers sent them.

The tattle tale system should immediately de-identify the relevant files, and then pass them through the standards compliance guantlet. ONC has already invested in solid technology to test compliance, and these should be leveraged here. You should publish report cards showing standards compliance by both provider and EHR vendor basis. There should be a "self-testing mode" that is not publicly reported that will allow EHR vendors and providers to test their own file generation process, without fear of repercussion. Vendors and providers should be able to rely on the deidentification logic of this testing service to ensure that they are able to test accurately without sharing PHI unnecessarily.

Part of me feels silly spelling out the details of how these systems should work at this level of detail. Indeed, my specific technical recommendations might need to be tweaked in order to work. But I am providing the detail to illustrate that what I am suggesting is technically possible. But technically possible and bureaucratically viable are two different things.

If ONC wants to support six transport protocols and five data standards, then ALL of those need to supported by ALL end users of EHR systems. If that seems unrealistic (hint.. it is unrealistic) then ONC needs to make tough decisions regarding supported protocols. Because of the walled garden problem (which I have commented on before and will again), Argonaut cannot be a lone transport protocol. You need to support both freedom to move data at patient preference (Direct) and support ease of development against EHRs as a platform (Argonaut). I see no reason why ONC needs to support more than two interoperability standards.

Make no mistake, ONC can either be popular or it can solve the interoperability problem. If you want to be popular, continue to use the word "or" a lot. There are "ors" all over the current implementation standards. In fact, I would like to give the award for "Captain Understatement" to whoever wrote the phrase *there is significant variability in the implementation of the standard.* That is some priceless phrasing…

Yet within the document, I take most issue with this paragraph:

> *In some cases the implementation guides provide sufficient clarity, specific implementation instructions and reduce the potential for implementation variability to a minimum. In other cases, further work is necessary among SDOs* [Standards Development Organizations] *to further refine implementation guidance as well as to*

> *develop best practices to improve implementation consistency among health IT developers.*

It is clear that no amount of implementation guides are going to get this problem solved. Our industry ignores good implementation guides right along with bad implementation guides. As long as the EHR industry has the opportunity to flub interoperability, it will. EHR vendors and healthcare providers both have a huge motivation to not have interoperability work; as interoperability makes them both vendors and providers fireable. Patients who can move healthcare records around can switch doctors. Doctors who can move healthcare records around can switch EHR vendors. The Health IT industry needs to have comprehensive pass/fail testing that both the EHR vendors and their users have to conform to. ONC needs an ACID test for every interoperability standard it promotes. Then it needs to find a way to inject that ACID test into the real world as much as possible

We do not need more standards or better standards. We need ONC to arbitrarily enforce one single interpretation of the current standards. If ONC wants to change standards, go crazy with that, but in the end we need one single interpretation of those new standards.

If you want to make something change in the real world, it must be measured in the real world. The EPA spends lots of energy getting water samples in the real world. ONC needs to find ways to do the same thing. If the EPA changes its standards for what water quality should be in lakes and rivers, it then enforces those standards by measuring in the wild to ensure that they are properly enforced. The previous philosophy of the ONC has been so hands-off regarding testing that it would be equivalent to the EPA saying "we are going to totally change the standards for water quality in the United States, but we are going to halt our measuring program". Obviously that would not work, and that is precisely why previous standards have not worked.

Some people feel that ONC does not have a congressional mandate to do the kind of interoperability testing that I am suggesting. But it does. ONC has a congressional mandate to get interoperability to work, and the only way to get interoperability to work is to do extensive, real-world testing. That is the only reasonable interpretation of this mandate.

Congress has also made it clear that it wants more from ONC in this area. I think it's time to recognize that it's not Congress that is the problem here (I am pretty shocked that I just wrote that…).

Don't spend any more money on EMRs and data silos. Our country's patients were promised interoperability, and they so desperately need it.

-Fred Trotter

As per always, I prefer to end my comments with a good joke (as usually stolen from reddit), which is my contribution towards those who have the dull task of reading all the comments:

A minister dies and is waiting in line at the Pearly Gates. Ahead of him is a guy who's dressed in sunglasses, a loud shirt, leather jacket, and jeans.
Saint Peter addresses this guy, "Who are you, so that I may know whether or not to admit you to the Kingdom of Heaven?"
The guy replies, "I'm Joe Cohen, taxi-driver, of New York City."
Saint Peter consults his list. He smiles and says to the taxi-driver, "Take this silken robe and golden staff and enter the Kingdom of Heaven." The taxi-driver goes into Heaven with his robe and staff, and it's the minister's turn.
He stands erect and booms out, "I am Joseph Snow, pastor of Saint Mary's for the last forty-three years."
Saint Peter consults his list. He says to the minister, "Take this cotton robe and wooden staff and enter the Kingdom of Heaven."
"Just a minute," says the minister. "That man was a taxi-driver and he gets a silken robe and golden staff. How can this be?"
"Up here, we work by results," says Saint Peter. "While you preached, people slept; while he drove, people prayed."