Ten Principles for Fostering Development of an "iPhone-like" Platform for Healthcare Information Technology

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Summary

The Informatics Program at Children's Hospital Boston (CHIP) recently convened a meeting of leading experts in health, innovation and technology to define ten core principles of a platform that would support healthcare information technology.

The meeting was held May 13 at the Harvard Medical School Center for Biomedical Informatics and took the form of a workshop. It followed publication of a *New England Journal of Medicine* Perspective article authored by CHIP researchers entitled, "*No Small Change for the Health Information Economy*." [1] In the paper, the authors argued that a vibrant and evolving health system requires a healthcare information technology infrastructure based less on monolithic, pre-defined products and more on a general-purpose platform that would support a collection of simple applications each doing a single task consistently and reliably. Under this view of a healthcare infrastructure, as one's needs evolve, one could substitute simple applications within a platform, rather than substitute in an "all or nothing" way, one vendor product for another. The platform would allow a clinical practice or hospital to select the combination of applications that are most useful for the local environment. A practice or a hospital would be able to download, for example, a medication management application from one vendor and a notifiable disease reporting tool from another. As alternative applications are developed by competitors, the existing ones may be replaced, or new ones added.

The authors of the *New England Journal of Medicine* perspective held up the Apple iPhone as an example of the success of substitutability. The iPhone is one of several products that employ a software platform with a published interface to facilitate a low-cost, efficient, and reliable software development process open to the market; there are now more than 20,000 applications that consumers can download and use with the iPhone. The iPhone separates the platform from the functionality provided by the applications, which are easily substitutable by the lay person. One can download a calendar reminder system, reject it, and download another one instead. The consumer commits to the platform because of its flexibility and commits to various applications on the basis of need, value, usability, and cost.

Participants of the May workshop believe that an infrastructure based on "substitutable" components is a highly promising way to drive down healthcare technology costs, allow flexibility, support standards evolution, accommodate differences in care workflow, foster competition in the market, and accelerate innovation. The model stands in stark contrast to the vast majority of health information systems that have been designed and implemented to date. The current trajectory of health information systems development, we fear, may not scale, may not be sufficiently adaptable, and may not meet even near-term national expectations, much less adapt rapidly to innovations in healthcare delivery.

The workshop participants believe this dramatically different, platform-based "substitutable" model is sufficiently promising to warrant consideration by the Department of Health and Human Services, and many other stakeholders, as they consider means of implementing the Health Information Technology for Economic and Clinical Health (HITECH) Act.

[1] Mandl KD, Kohane IS. No small change for the health information economy. *N Engl J Med.* Mar 26 2009;360(13):1278-1281.

Ten Principles for Fostering

Development of an "iPhone-like" Platform for Healthcare Information Technology

1. **Technology platforms that support substitutable applications should be promoted.** We suspect that low rates of technology adoption in practice settings may largely be explained in terms of the mismatch between system needs and available products. Rather than ask: "What electronic health record (EHR) is ideal for my practice?" perhaps we should ask, "What tasks do I 'hire' my EHR to support?" Some of these tasks—particularly basic clinical and administrative tasks—are fairly well-defined. But in many instances, we simply do not have a census on the specific work activities across the ever-growing number of settings in which technology can support and enable better healthcare. Those who understand these tasks are not empowered to create useful applications to support those tasks, because no platform exists to easily adopt such applications. Platforms composed of substitutable components would promote the creation of, and enable the incremental adoption of, useful task-specific applications with low switching costs. Such an approach is ideal when organizations are adapting to external changes in their practice environment, and discovering more effective means of performing their internal work. A platform of such applications also removes the constraint *of a priori* determination of tasks and avoids an over-specification of system requirements.

2. **Messages and protocols for data exchange should be allowed to emerge on demand in a market-driven approach, and specified transparently at every level.** The rapid and recent progress in the standards debate suggests a convergence nationally along a greatly restricted set of standards that can be made interoperable as the need arises and the market dictates. Substitutable applications enable interoperability to evolve with the evolving healthcare system from the bottom up. For example, a suite of wellness applications linked to everyday activities may require unique protocols, but these protocols are currently a matter of debate, and perhaps best resolved through the actual needs of the users of applications—not through forced consensus. While top-down approaches to such problems are at times necessary, they do not foster the nimbleness required to adopt the best of technology in addressing important healthcare needs.

3. **Protocols and application programming interfaces should allow the possibility of multiple platforms co-existing.** Successful evolution of a platform model may involve development of multiple competing platforms as long as each remains open to substitutable third party applications.

4. **Application programming interfaces should be open.** Third-party vendors should be able to develop plug-and-play applications and play without barriers.

5. **Substitutable application or platform vendors should not have control over what is installed on the platform.** In response to provider/practitioner **r**equests, local systems administrators should be able to install modules without permission from the vendor. As long as application developers demonstrate that their software does not adversely interact with other applications, and provides the specified services accurately, consistently, and reliably, platform vendors should have no control over what applications may be created, made available, or installed. Other mechanisms to certify, regulate, or recommend applications should be developed (e.g., through professional societies).

6. **Application installation should be turnkey.** Administrators of platform-based systems should be able to install applications from different vendors without software programming.

7. **The intellectual property of platforms and applications should be kept separate.** Only freely available application programming interfaces should be used for all application development. Undocumented access to platform internals should be prohibited, particularly by platform vendors.

8. **All applications should be removable and none should be required to run a platform.** To avoid “vendor lock,” even base system platform software bundled with substitutable applications should provide an option to remove those applications.

9. **The platform should have a highly efficient delivery mechanism for applications.** Successful platforms, such as the Apple iPhone platform, have demonstrated the importance of efficient mechanisms for delivering applications to customers.

10. **Certification requirements for platforms and applications should be kept minimal to maximize substitutability.** This approach moves away from definition of a product, and toward definition of a platform that supports substitutable applications that meet the tasks they are “hired” to perform. Each application must be rigorously shown to have reliable and proven interactions with the base platform, but should not be required to certify specific user functionality. Such an approach eliminates the risk of premature definitions of products like “EHRs,” and rightly returns the focus towards technologies that accomplish the tasks people “hire” these applications to do.

The following six individuals attended the workshop and support the collaborative statement of principles reflected in this document.

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