

## **“Guidelines for the IT Transformation of the Medical Practice”**

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### **< Abstract >**

New federal mandates urge for the early adoption of electronic health record and information technology under an incentive and penalties program going from 2011 up to 2015. Thus, several major milestones limit adoption of these technologies by physician providers. A six month pilot project was set to validate implementation protocols, key functional requirements and attainable benefits with a combination of various information technology tools. Initial results demonstrate that direct post “Go-Live” support to all end users by experts in different technical and clinical areas is essential for proper technology adoption. Same results show that an organized team of end users and external support resources reached significant improvements in the areas of clinical quality, financial advantage and operational efficiency.

### **< Objectives >**

1. Validate proper implementation protocols for information technology.
2. Develop in-depth awareness of the culture and intrinsic characteristics of the healthcare provider setting.
3. Increase consultants’ expertise in the areas of medical private practice information systems and current operational needs, workflow and nature.
4. Optimize functionality, interoperability and health information exchange capabilities of the health information systems used. Suggest particular and general mandatory requirements.
5. Show improvement in clinical quality, financial advantage and operational efficiency.
6. Direct physician practitioners towards accomplishing “Meaningful Use” of electronic health record information.

### **< Background >**

End-user adoption of technology has always been a function of understanding of the principles of operation and the inherited benefits, readiness of the environment where the technology will reside, willingness to overcome apprehension to change and learn new concepts and the ability to discern among all the technology hype that results from early adopters.

Perhaps the most pressing condition for technology acquisition and adoption is whether or not a continuous multidimensional support structure exists. Development of an end user support structure and tools will determine the

acquisition rate of technology by more cautious users. The gap between technology acquisition and proper adoption, if extensive, could represent an economical loss and it could be detrimental to the technology.

In healthcare, more than in any other industry, technology acquisition is heavily impacted by the economical feasibility of the provider, marketing strategy, competition for patients, relationship with manufacturers or by the need to retain specialists. In metropolitan areas with large patient populations all previous factors exist and new technology acquisition tends to be at times, and for certain modalities, in particular a very frequent activity. However, healthcare technology adoption “more often

than not” occurs at a different pace. For the majority of providers it starts occurring at periods much after the acquisition, installation, training and “Go-Live” dates. This whole paradigm is common for particular technologies and modalities but also for physician providers whose budgets are not generated or controlled by executive boards or technology assessment committee like those in hospitals, but by themselves.

Adoption is directly related to the time spent utilizing the technology; maximizing and exploring all its new functionalities and benefits. Time for on-going training, and continuous quality audits needs to be included in an already crowded agenda where seeing large amounts of patients daily is mandatory to generate necessary income. That is, the time deemed needed for proper technology adoption is a mere commodity not all physicians can afford.

The paradigm previously described, becomes more present at times when the federal mandate for the acquisition and adoption for electronic health record (EHR) technology becomes more pressing. New incentives and the announcement of future penalties for not abiding by this mandate are forcing manufacturers and physician providers to aggressively embark in new relationships all for the hopeful sake of better and more cost effective patient care.

The technology acquisition and adoption that mandates the federal government puts strong emphasis in physician clinics and private offices were an estimated 60-70% of patient physician encounters occur. It is the intention of the Department of Health and Human Services for all physicians to achieve meaningful use of electronic health information by encouraging everyone to transform their practices with information technology - See Appendix A. <sup>[1]</sup> An environment has been created such that not only technology acquisition takes place, but for physician providers to understand that proper

adoption must be achieved with the sole goal of improving the cost effectiveness and quality of the healthcare system. In other words, to properly use information technology (IT) tools to redefine healthcare into, what various experts believe should be, a value-based competition on results. <sup>[2]</sup> As it has been stated earlier, through proper adoption a transformation of the physician practice will take place and with that a whole new way of managing medical encounters.

At CIRACET <sup>[3a]</sup> medical informatics consultants concentrate in identifying the most appropriate way of achieving successful adoption of EHR technology. Previous experiences deploying digital healthcare technology in physicians’ environments suggests that direct on-going human support will be necessary for the mandated transformation really to take place. With this in mind, it is the intention of CIRACET’s staff to develop and share a roadmap and guidelines for medical practice transformation with IT.

### < Methodology >

A six month pilot program has been devised as the way to support a team of five CIRACET resources will work directly with three different physicians from different specialty areas with the intention of experimenting with several healthcare IT tools and applications (“systems”). In addition to validating the interoperability potential of all selected systems, the purpose of the pilot project is to validate whether or not these physician providers with very diverse but similarly busy practices could attain proper EHR technology adoption and reach expected benefits in a timely fashion after acquisition. CIRACET’s team; made up of licensed nurses, engineering staff, IT and project management resources; focused on seven main tasks.

1. **Define scope of work.** The six months pilot project was divided in two 3-months phases - starting in September, 2009 up to March, 2010. Phase I includes two specialists, an

internal medicine/intensive care specialist and a neurologist. The scope of Phase one implementation concentrated in the automation of each individual practice. It included patient scheduling and registration, medical screening, clinical notes and patient management. Other tasks like patient education, order entry, results collection, document scanning, invoicing, payer communication, reporting, and clinical alerts were also included. (Various tools were installed and interconnected to perform these tasks.) Support was provided continuously and empirical analyses were performed to measure effectiveness and relevance of all features. Both successful and unsuccessful implementation methods were noted and evaluated.

Phase II will include a third office belonging to a pediatrician. All tasks performed in Phase I will also be conducted in this third provider office and will continue to be performed in the two initial ones as well. At this point new functionalities related with Health Information Exchanges will now be activated, measured and validated. Communication among providers, e-Prescribing, patient access to internet portals, physician Virtual Private Network access, results integration into EHR and various forms of portability will also be tested. A complete multidimensional support structure will be implemented.

2. **Define key focal areas for comparison.** Three focal areas each with 5-key metrics were identified and the staff developed the necessary tools to measure each one prior and many times after “Go-Live” - **clinical benefits, financial advantage and operational efficiency.** See appendix B.
3. **Characterize stakeholder operation.** A complete workflow analysis was performed at every practice to identify efficiencies but also areas where processes could become

more “lean” <sup>[3b]</sup> and efficient. Others like volumes, totals and time and motion variables were analyzed as well. A “Value Stream Map” was used to document workflow appropriately.

4. **Functionality request.** A systematic list of functions needed for the successful basic operation of each practice was developed together with a general description of many other functionalities that, if available or developed, “could” result in better outcomes and a great contribution for each practice. The resulting list became mandatory for the IT systems to be selected. Several “practice-specific” clinical templates and administration/clinical reports were also included in the final functionality requirements.
5. **Product evaluation and solution.** Over 5 different medical practice management information systems were evaluated. Several different applications for billing and collections, electronic transactions clearinghouse, e-Prescribing, and medical information libraries were reviewed in detail by CIRACET’s staff. All selected vendors agreed to collaborate in a limited *no-fee-for-license* agreement making it easier for physicians to participate, NeoDeck, Infomedika, Assertus and EBSCO. CIRACET provided all needed computer and communication hardware as well as all the necessary IT support.
6. **Systems implementation.** A detailed implementation plan (Gantt chart) for Phase I was developed. It included local area network (LAN) and virtual private network (VPN) access development, creating internet access, configuration of all servers and computers, user specific software configuration, creation of health insurance profiles and completion of essential master tables. Customization of clinical templates, integration with clinical portals, activation of both online and server

based libraries for clinical alerts and all of the corresponding training were additional key tasks performed by the support staff. Prior to “Go-Live”, several financial transactions were tested and various “dry-runs” and simulations were performed together with the physicians.

7. **Develop on-going support, audit, reporting and feedback structure.** During the initial two week period CIRACET’s staff provided direct user support to each physician as well as their staff. Direct support included assistance during patient registration, physician encounter data entry, information reconciliation, records management, bills preparation and invoicing. Once the initial two weeks support period was completed, audit visits were performed twice a week to ensure billing cycles were being completed successfully, all possible health information was being collected for every encounter, reports were being generated and contained relevant information and to conduct end user focus groups were, among other things, positive and negative anecdotes and feedback were recorded. At all times requests made by the end users and by CIRACET staff were immediately presented to the software providers for appropriate corrections or for inclusion at a later time in future programming modifications. (All new requirements are expected to be performed during Phase II) See Appendix B.

#### < Initial Phase Results >

Preliminary results have been obtained after 60-90 days of using the “systems” for the first time. All results have been measured and collected by direct objective measurements; manual sampling, direct database extraction or through the systems own reporting features; by subjective analysis or by interviews with all stakeholders.

Special interest has been pay to all 15 metrics identified within the 3 focal areas – clinical benefits, financial advantage and operational efficiency. Support staff from CIRACET and each vendor worked together in highlighting key implementation guidelines, but more important in documenting those steps in the implementation plan that were not effective and needed to be changed to achieve good results. Together with end user comments, several relevant implementation and post “go-live” anecdotes were noted as they proved to be crucial in reaching the objectives, end-user adoption and in improving the “system’s” functionality.

- I. Focal Areas Metrics (Summary)
  - a. **Clinical Benefits.** All relevant patient information is available at a single point. Customization and standardization of the encounter allows the system to improve the quality of patient care. Higher utilization rates for functions such as preventive treatment plans, patient education and physician decision support will increase as the time spent using the system increases.
  - b. **Financial Advantage.** As a result of an invoice integrity alert system all invoices are ready to be processed immediately after the encounter ends. The system verifies compliance with all required data fields for billing while integrates tools that allow for on-line verification of patient eligibility. Denial rates for eligibility reasons have dropped down to zero.
  - c. **Operational Efficiency.** Survey shows that patient satisfaction has increased while office staff communication and workload

management capabilities have also increased. Electronic tools have eased document storage and retrieval while the management of routine processes like prescription renewals, creation of repeat orders and referrals, and the completion of medical forms has been simplified.

- II. **Key Implementation Guidelines and Modifications.** During the project management process the key points identified were the work flow process characterization; equipment and infrastructure requirements; and coordination of system's installation, configuration and training. Key points in the configuration were the creation of the medical encounter templates, billing profiles and key document templates. Other important implementation guidelines were system's testing previous to "Go-Live" and technical, operational and system support throughout the post implementation process. Project plan modifications were made to include the creation of the patients' demographics and appointments previous to the "Go-Live" date. These facilitated the management of the workflow and workload during the "Go-Live" period.

- III. **Interviews and Project Anecdotes.** Throughout the process participants shared their anecdotes, some of these are,
- a. "Other colleagues have the same information system, however, they do not use it due to the time it requires to create the encounter and key documents templates; and or, the technical support to achieve on time results "
  - b. "The hospital congratulated me on the new format for the patient admission's order."

- c. "Having the patient's medical and medication history in one screen facilitates the prescription process. Also, no more pharmacy calls due to legibility issues"
- d. "Since, I have quick access to the patient's insurance information due to the digitalization of the insurance card now the billing process per encounter has gone down to half a minute when it used to take five minutes."
- e. "Now the billing process starts immediately after the doctor closes the encounter in the system since the information is automatically registered."
- f. "...without your support, even after hours, I would have stopped using the system after the first couple of days."

#### < Conclusions and Recommendations >

1. **Subject Matter Experts.** Initial preliminary results show excellent progress and improvements especially in the areas of clinical quality and financial advantage. At all times direct input from end users confirmed initial hypothesis that direct daily support from experts in technical and clinical areas was essential for prompt adoption by everyone, but mainly for the physicians. Of similar importance is the fact that effective communication with software providers, payers and communication suppliers was always initiated by the external support staff whose primary responsibility was to achieve total system coherent utilization.
2. **EHR Content Managers.** Proper adoption cannot be validated unless the information collected with the system is relevant, complete and could lead to in-depth clinical analysis and treatment. Meaningful use of electronic health information, by definition, could only result from precise data sets

collected and compiled by careful users. It is imperative then that each practice identifies “champion users” and/or auditors that could validate the content of the EHR information.

- 3. System Requirements.** Key system requirements have been documented throughout the development of the project, top ten requirements are considered to be:
- a. Certified electronic health record.
  - b. Systematized nomenclature of medicine-clinical terms.
  - c. Provide access to comprehensive patient health and demographic information, for example – encounter history, digitalized documents, and medication history.
  - d. Facilitate the coordination of care.
  - e. Create reports on demand. System must use open system architecture – ODBC.
  - f. Integrate other systems through HL-7 interface.
  - g. Encounter templates according to the medical specialty.
  - h. Access to appointment history – past, present and future.
  - i. Ability to monitor specific conditions such as, diabetes, renal conditions, hypertension, cholesterol, etc..
  - j. Integration of the appointment, demographic and financial registration, electronic health record and billing modules.
- 4. Project Structure.** An integrated committee made up of system’s vendors, external consulting and support staff and committed end user representatives has to be in place prior, during and post “Go-Live” date. Up to date project management tools have to be used throughout the entire engagement. That is, a detailed project plan and timeline must be developed and reviewed and on-going project committee meetings must be held. Strategic documentation, effective communication and continuous feedback were key for success.

### < Future Work >

Work for Phase II, as defined, will concentrate on further developing the skills of all end users including those added during the second 3-months period. Definition and field validation of what is needed to become a Meaningful EHR User will be a primary goal.

Some of the new technological features to be included, developed and validated for Phase II will be e-Prescribing, web and portal communication for providers and patients and health information exchange capabilities. CIRACET staff will continue evaluation and testing of all selected systems as well as others made available in the local market.

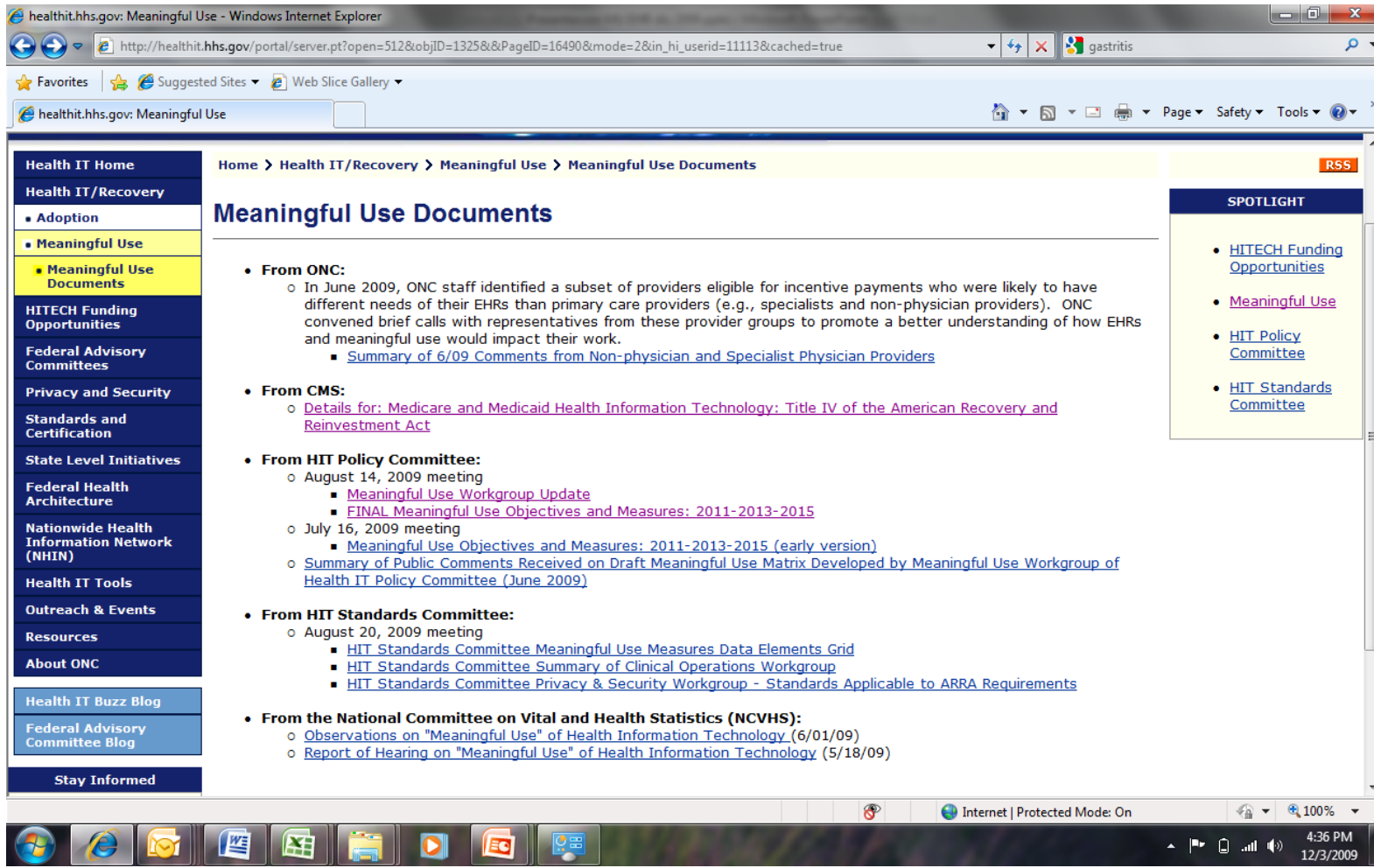
### < References >

1. Meaningful Use documents; [healthit.hhs.gov/meaningfuluse](http://healthit.hhs.gov/meaningfuluse)
2. Porter, Michael E. and Olmstead, E. “Redefining Healthcare”. Harvard Business School Press, 2006.
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4. Kilo, C. and Leavitt, M. “Medical Practice Transformation with Information Technology”, HIMSS Publications, 2005.
5. Goldsmith, J. “Digital Medicine”, Health Administration Press, 2003.

## Appendix A

### Meaningful Use information

Connect to [healthit.hhs.gov/meaningfuse](http://healthit.hhs.gov/meaningfuse) for more in-depth information about the discussion of meaningful use criteria and reference documents published by the Health and Human Services.



**Appendix B: Focal Areas** (Results obtained from a non-scientifically relevant sample)

| Clinical Quality   |  | Results         |                                    |                |                |     |  |
|--|--|-----------------|------------------------------------|----------------|----------------|-----|--|
| a. Access to digitalized patient information   | Quick access to patient demographic, insurance and previous clinical information is available electronically at all times  |                 |                                    |                |                |     |  |
| b. Automation of preventive treatment plans, patient education and physician decision support      | Although available, higher utilization rates will increase as the time spent using the system increases  |                 |                                    |                |                |     |  |
| c. Prescription alerts/recommendations/management and order entry assistance                       | August<br>0  |                 | September<br>5                     |                | October<br>5   |     |  |
| d. General statistics: i.e. Report of risk conditions and associated complications                 | Month  | HBP / 401.1     | DM / 250                           | CAD / 414      | GERD / 430.8   | 535 |  |
|  | September  | 98              | 32                                 | 33             | 22             | 31  |  |
|  | October  | 90              | 44                                 | 11             | 45             | 18  |  |
| e. Web/Portal access to patient information for data entry/query – physicians and patients         | To be Develop during Phase II  |                 |                                    |                |                |     |  |
| Financial Advantage  |  | Results         |                                    |                |                |     |  |
| f. Total amount of invoices generated for all types of services                                    | August<br>416  |                 | September<br>481                   |                | October<br>769 |     |  |
| g. Average time to generate invoices   | Before Go-Live<br>5 min / invoice  |                 | After Go Live<br>0.5 min / invoice |                |                |     |  |
| h. Percent (%) of invoices that are denied monthly   | August<br>4%   | September<br>2% | October<br>2%                      | November<br>0% |                |     |  |
| i. Access to digitalized documents   | August<br>0  |                 | September<br>148                   |                | October<br>194 |     |  |
| j. Management of electronic invoices   | System alerts the user of an outstanding patient payment balance, on billing deadlines and invoices readiness. During the month of September the system alerted of 15 errors in the creation of invoices, while it identified 5 for October. |                 |                                    |                |                |     |  |
| Operational Efficiency   |  | Results         |                                    |                |                |     |  |
| k. Electronic communication/messaging among office staff and clinical personnel                    | September<br>30  |                 | October<br>52                      |                |                |     |  |
| l. Internet access and on-line medical libraries/databases review                                  | EBSCO References and Libraries have been integrated with the systems and are available during encounters.  |                 |                                    |                |                |     |  |
| m. Routine processes administration – Fast Rx e-renewals, orders/referrals and completion of forms | August<br>0  |                 | September<br>30                    |                | October<br>60  |     |  |
| n. Used of electronic signatures document scanning/storage   | An e-Signature Pad is used with patients for all HIPAA forms.  |                 |                                    |                |                |     |  |
| o. Electronic patient scheduling   | Conflicts are detected, workload is planned and patient necessary information is available with every created appointment.   |                 |                                    |                |                |     |  |



Work in Progress