Journal of
Cancer Science & Therapy

Costa, J Cancer Sci Ther 2011, 3.10
DOI: 10.4172/1948-5956.1000e102

Editorial Open Access

Basic Research, Applied Medicine and EHRs - Are we on the Right Track?

Fabricio F. Costa[1,2]*

1Cancer Biology and Epigenomics Program, Children's Memorial Research Center and Department of Pediatrics, Northwestern University's Feinberg School of Medicine, 2300 Children's Plaza Box 220, Chicago, IL, 60614, USA
2DataGenno Interactive Research, Rio de Janeiro, RJ, Brazil

The purpose of this editorial is to elaborate and discuss ways to unify three main fields in science and medicine that are currently disconnected: 1) basic research, which tries to understand the fundamental principles and phenomena that drive cells, organisms and systems in both normal and pathological conditions (such as cancer); 2) translational research and applied medicine, which represent the application of basic research to solve specific problems, aid in diseases and help society at different levels and 3) EHRs or "Electronic Health Records" that have been developed as a new technology to facilitate both patient care and research by collecting and archiving patients' history. The main problem being faced is how to efficiently integrate these three independent "parts" of medical and scientific areas in a single solution to improve patient care.

In health sciences, translational research focuses on removing barriers to multidisciplinary collaboration between scientists and physicians, thereby helping to "translate" basic discoveries in new drugs to treat diseases and/or identify better ways to manage chronic diseases such as cancer, diabetes, etc. Importantly, translational research has the potential to drive the advancement of applied science. It is also an attempt to bridge the medical and scientific communities to move discoveries from laboratory experiments through clinical trials to actual point-of-care patient applications. In that regard, we are in need of better ways to facilitate the communication between professionals with different backgrounds, especially when doing translational research. The physician needs to understand and be interested in the scientific side of the project, and conversely, the scientist has to understand the physician's needs in order to increase the rates of success. Improvements for better information exchange are crucial to develop multidisciplinary projects that have the potential to greatly impact patients suffering from diseases, especially cancer.

In 2009, the Obama administration and the American Congress made a fund of more than $19 billion dollars available to fulfill the need for better health care with digitalization of clinical and scientific data. At that time, EHRs were implemented and utilized by approximately 11 percent of hospitals and institutions [1] and less than 5 percent of physicians [2] in the United States (US). In the past three years, the adoption of electronic medical records by US doctors has roughly doubled to approximately 30 percent. On top of that, 80 percent of hospitals are also developing their EHRs. One successful example in the improvement of patient care is the use of EHRs by the Memphis information-sharing network with a Health Information Exchange (HIE) system [3]. Research has shown that the use of HIE was able to reduce medical tests and other procedures, thereby becoming an incentive for changes in the US health-care system, legislation and structure [3]. This new type of informatics infrastructure is important for sharing patient information, thus helping society to save on healthcare [3]. The use of HIE by this group was associated with a decrease in CT scans and other diagnostics as well as a reduction in hospitalizations [3]. This example indicates that the savings for hospitals using a similar solution around the US could be in the billions of dollars and lead to better medical outcomes for patients. However, this is an isolated case in the entire US, and improvements are needed to develop an EHR that fits to all institutions, which I call the "universal" EHR.

Progress in Health Information Technology is directly associated with the growth of personalized medicine - briefly described as "the right treatment for the right person at the right time". Physicians always apply personalized medicine in order to set the right dosage of medications, switch drugs to more efficient ones and utilize diagnostic tests. This traditional approach of personalized medicine is based on illness manifestation and patient's response to therapy. It is well known that patients can respond differently to the same medicine; for example around 75 percent of cancer patients respond differently to drugs [4]. Personalized medicine is mainly focused on genetic, genomic and molecular information. Genetic and other molecular tests can predict many diseases, including several types of cancer. The correct use of those tests allows the optimal therapy for the patient to be chosen by the physician, avoiding long trial periods of patient response to drugs. For example, women with HER2-positive breast cancer do not respond well to standard therapies [5]. Women with either BRCA1 and BRCA2 genetic mutation have approximately a 60 percent chance of developing breast cancer, compared to 12 percent in the general female population [6]. When a patient is found to have a potentially pathogenic mutation in BRCA1 or BRCA2, the patient can be more preventive and vigilant. Genetic screening also allows the identification of different subtypes of Acute Lymphoblastic Leukemia and indicates optimal treatment for specific patients [7]. Testing for genetic variations in the genome would also prevent patients from having adverse drug reactions and side effects due to variation in genes coding for specific enzymes (e.g.: CYP450) [8].

Altogether, there is an increasing need for confluence between these three main areas - basic research, translational research and the development of platforms for clinical and scientific data storage - in order to facilitate patient care and research. Besides isolated cases of internal digitalization in specific institutions or the "internal EHRs", several companies have started developing solutions that can be applied on a larger scale, but until now there is no "universal" platform, and I do not see that coming in the near future.

A solution that could help address this problem is the development

***Corresponding author:** Fabricio F. Costa, PhD, Cancer Biology and Epigenomics Program, Children's Memorial Research Center, Northwestern University's Feinberg School of Medicine, 2300 Childrens Plaza, Box 220, Chicago, IL, 60614-3394, USA, Tel: 773 880 4000; Fax: 773 755 6551; E-mail: FCosta@childrensmemorial.org

Received December 02, 2011; **Accepted** December 05, 2011; **Published** December 07, 2011

Citation: Costa FF (2011) Basic Research, Applied Medicine and EHRs - Are we on the Right Track?. J Cancer Sci Ther 3: i-ii. doi:10.4172/1948-5956.1000e102

of online services such as DataGenno, available at datagenno.com [9]. This new platform is a database with storage capacity that could be used by healthcare professionals to access patient information in a real-time fashion [9]. DataGenno could also bridge the gap between healthcare professionals and scientists, combining clinical, genetic and genomic information from patients since it provides not just clinical data but also all genetic information available from that patient [9]. This association of features could help improve patient care and reduce costs. For example, if a patient is treated with a drug and a genetic test detects that this individual has slow metabolism for that drug, doctors will be able to access this data anywhere. This will facilitate dosage specification for drugs if the patient changes healthcare providers or moves to a different city (or even a different country). To enable discoveries that will eventually find their way into the clinic, software and Information Technology (IT) tools that facilitate the integration of disparate clinical and molecular data will be required. Genetic data stored in databases according to EHR using DataGenno will be a great opportunity for data mining in order to find direct associations between diseases, genes and therapies. This is important for academic, governmental and non-profit organizations that are willing to conduct research with data stored in such databases. The implementation of a "universal" EHR solution not just in the US, but globally, and the application of personalized medicine will improve the quality of healthcare, reduce the time of cure for diseases and decrease costs associated with medical care.

I believe that we are in need of better ways to transfer and access patient information. We have to develop IT platforms to communicate and achieve more successful translational research, especially now that genomic data is becoming available and genetic tests are a reality for the healthcare system. Some solutions in this direction are becoming available in the market, but we will need to come up with a "universal" EHR-type of solution that will impact not only patient care, but also improve scientific research. While some of these solutions will soon become available, such as DataGenno's portal [9], great challenges lie ahead to successfully integrate clinical and scientific data and improve translational medicine.

References

1. American Hospital Association (2007) Continued Progress: Hospital Use of Information Technology.
2. Hsiao CJ, Burt CW, Rechtsteiner E, Hing E, Woodwell D, et al. (2008) Preliminary estimates of electronic medical records use by office-based physicians: United States. Health E-Stat. National Center for Health Statistics.
3. Frisse ME, Johnson KB, Nian H, Davison CL, Gadd CS, et al. (2011) The financial impact of health information exchange on emergency department care. J Am Med Inform Assoc [Epub ahead of print].
4. Spear BB, Heath-Chiozzi M, Huff J (2001) Clinical application of pharmacogenetics. Trends Mol Med7: 201-204.
5. Ménard S, Pupa SM, Campiglio M, Tagliabue E (2003) Biologic and therapeutic role of HER2 in cancer. Oncogene 22: 6570-6578.
6. National Cancer Institute Fact Sheet on BRCA1 and BRCA2.
7. Pui CH, Evans WE (2006) Treatment of acute lymphoblastic leukemia. N Engl J Med 354: 166-178.
8. Phillips KA, Veenstra DL, Oren E, Lee JK, Sadee W (2001) Potential role of pharmacogenomics in reducing adverse drug reactions: a systematic review. JAMA 286: 2270-2279.
9. Costa FF, Foly LS, Coutinho MP (2011) DataGenno: building a new tool to bridge molecular and clinical genetics. The Application of Clinical Genetics. 4: 45-54.