



Integration to Advance Translation

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Commentary

The science of translation has been taken over very fast by health stakeholders such as: investors, shareholders, sponsors, practitioners or any interested party in healthcare. The main reason is the demand to transfer discoveries faster to the ones who are in most need: the participants or patients [1]. Translation can be seen as the art of transferring scientific knowledge into evidenced based everyday practice; paving the way to increased effectiveness and efficiency in health care [2]. The concept of translation is not new. We can find many definitions, descriptions such as bench to bedside, classifications such as the T's, designations like Implementation Science or other characterizations; all according to the framework of the ones who are trying to explain and apply the concept [3]. Regardless of how it is defined, clinical translation can be achieved through an integration of disciplines, where the thinking of multiple minds with different viewpoints around a common challenge, such as a difficult clinical diagnosis, becomes more efficient, thus reaching an earlier, more precise, and sound decision.

The significance and impact of translation has been recognized by funding agencies, academicians, scientists, providers, stakeholders and other health-related organizations and entities. The current trend is towards collaboration and partnerships to create, expand and transform the way we do science, practice and education [4]. Laboratory disciplines, such as Clinical Laboratory Scientist (CLS), Cytotechnologists, Radiology and Pathology, have continued to expand in capacity and knowledge in their own areas of expertise through advances in technology that allow more accurate diagnosis. Now, with all the breakthroughs arising from clinical and translational research, the growth of data bases, advances in molecular diagnostics and ability for a more precise and earlier diagnosis, there is an urgent need to shift education, research and practice to learn to work as multidisciplinary translational teams [5]. Laboratory disciplines need to work effectively with other disciplines such as bioinformatics, epidemiology, statistics, computer science, behavioral, physicians, nursing, pharmacy and other health professions in the quest for scientific evidence taken from laboratory findings and correlated with new clinical approaches and technology.

The experience of becoming a Clinical Laboratory Scientist made a difference in my choices for opportunities in advancing as an academic leader, researcher, mentor and coach. The following aptitudes, which are developed during the career training and work experience of a laboratory related science, make us productive partners in a team:

- diversity in laboratory areas,
- broad knowledge of mechanisms of disease,
- managerial and networking abilities,
- multitasking skills and
- aptitude for detailed observation.

In addition, laboratory professionals learn to master tasks that are essential for success in a team such as: making the best use of time, organized, manage budgets, have a quick eye to see gaps in information and timely and precise judgment. We learn the physiology of the human body; work with all kinds of samples; handle simple and advanced instrumentation with technology changing continuously; do trouble shooting and solve problems. Nevertheless, the most important characteristic that all of us need to remember is that our lab results can save someone's life, so we need to make sure that we provide the most accurate patient's data to help the physician in his or her decision making.

Diagnostic errors and delays in diagnosis and prognosis are only a few of the current health care challenges that are forcefully moving the development and implementation of integrated approaches to diagnostics. Two major specialties, Pathology and Radiology, have already started to train and work together to facilitate communication and increase collaboration [6]. The current technological advances occurring in both fields of Pathology and Radiology to address the development of an integrated diagnostic reporting system, has provided a stimulus that supports better informed management decisions [7]. For example, such pathology and radiology workflow integration and communication between disciplines can help eliminate imaging-histologic discordances that could result in false negatives, resulting in a delay in diagnosis [8]. In addition to this proposed merge between Pathology and Radiology, Clinical Laboratory Science (CLS) should be included as an essential partner for advancing translation. Molecular laboratory diagnostics, immunodiagnostics, clinical flow cytometry, clinical mass

spectrometry, proteomics, genomics, metabolomics and lipidomics, emerging infections, bioinformatics, big data, biomarkers and personalized medicine are just a few of the reasons why laboratory scientists should be included in the diagnostic/prognostic/therapeutic continuum of health care.

With new laboratory and technological advances, such as the multi-marker approach to diagnose complex diseases, we will be able to reach more accurate and timely diagnosis [9]. Such efforts are in the way and we are starting to see the rising of incidence of certain diseases worldwide, where evidence suggests that the increase may be due to increased detection [10]. Another initiative with a goal to connect research teams across disciplines and countries was the cancer Biomedical Informatics Grid (caBIG), whose main objective was to enable researchers to use the same methods and language in order to produce an integrated informatics grid to advance the understanding of cancer with a personalized approach [11,12]. Nevertheless, the caBIG program supported by the National Cancer Institute (NCI) since 2003 came to a conclusion in 2012 followed by its successor, the National Cancer Informatics Program (NCIP). Despite failures and challenges, integration efforts will continue because of the urgency to have an infrastructure for data management that can communicate among disciplines, institutions and countries to advance biomedical applications, eliminate health disparities and achieve health equity.

In conclusion, the integration between Pathology, Clinical Laboratory Sciences and Radiology will require interdisciplinary professional training and education for a new healthcare workforce where researchers, practitioners and specialized experts will make the best use of available capacity, infrastructure and technology to collect, analyze and share data to advance translation.

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