Continued Need for Clinical Research in Medical Residency: From Physician to Clinical-Translational Researcher

Although most Residency Training Programs (RTP) have integrated research experiences as part of the newly revised offerings when compared to traditional training programs, the burden of day-to-day clinical responsibilities still remains a significant limitation to develop research. Consequently, most programs might not offer any on-site research rotations or if so, these experiences might not be sufficient exposure to entice residents into research (1). Despite the overall mission of educating and empowering medical trainees to find ways to succeed as clinicians, some institutions are falling short of provoking critical thinking outside the realm of dissection clinical clues on history taking, formulation of a precise diagnostic testing plan and treatment algorithm.

Nowadays, research participation and research systems have become increasingly important. In addition to represent a potential benefit to patients and society, research venues stand as a feasible business proposition to academic institutions (2). Unfortunately, there will always be those who right away will oppose such a bold proposal of pursuing and supporting such enterprise unless direct benefit are first proposed, particularly in these troubling times of economic instability and fiscal constraints. Many ethical, logistic and financial aspects need to be taken into account when making this type of analysis and each institution needs to make their own considerations. It is imperative to make clear distinctions. First, surely clinical research is both an intensive and costly undertaking. Not all institutions and affiliated hospitals would be core laboratories or team leaders of major clinical trials; however, with proper mentoring and collaboration they might become part of an ongoing project or conversely give them the necessary tools to be independent thinkers and contributors. Second, institutional engagement in clinical research not necessarily implies that the system will be responsible in providing financial and infrastructure investment but to simply be flexible in allowing their residents and faculty pursue paths that will take them to develop critical thinking and intellectually contribute with ongoing studies.

The message is clear; academic governances and health care authorities surely need evidence that all required resources for establishment of serious research (beyond those required for care itself) are necessary and feasible. Moreover, not only both institutional and academic parties are critical for this enterprise to take shape and form, but also equally important is for the public to have a clear understanding of the benefits of research when is offered and embrace this opportunity in order for this whole endeavor to be set in motion and down the right path. Though challenging, we must as Healthcare professionals and policy makers be at the forefront of this movement to defend the impact of research as it especially pertains not only to improve population healthcare outcomes, but also in eliminating health disparity in treatment among ethnic groups. Surely these initiatives seem ideal; however, we should not be surprised if we find within our own institutions the main obstacles that will hinder any potential changes.

On the other hand, a clear dichotomy could be easily ascertained when assessing solvency of many medical residencies trying to sustain their current academic and clinical missions, yet alone to embark into research expeditions. Not all residency settings will reach their research goals and some would likely fold. However, certain academic institutions should be able to implement and develop such research enterprises and excel in early training of physicians in basic or clinical research (3). Furthermore, we could also emphasize that at least most programs should offer as part of their training process the opportunity to residents not only to explore but also to have first hand mentorship in some project so that research might become at least an option after obtaining their specialty degree.

Over the last few years, the Accreditation Council for Graduate Medical Education (ACGME) has established that residents should participate in scholarly activities as a requirement for successful completion of their training (4). However, this requirement still needs more substance and structure to avoid a diverse interpretation by each individual program. Currently, as a result of this, not all curricula are similar and not necessarily meet all expectations, which results in critical gaps in research productivity and dissatisfaction among residents.

No medical RTP with an established research pathway currently exists in Puerto Rico. The University of Puerto Rico School of Medicine (UPRSM), in a joined collaboration with the School of Health Professions has developed a Post-Doctoral Master in Clinical and Translational Research training program, which represents a well-structured tool that could encourage residents to transition into clinical-translational investigators. This program started in 2003 and since then it has graduated over 29 physicians from different disciplines. In view of this, the Department of Medicine has recently considered this Masters as a feasible training option within the Internal Medicine RTP and made a commitment, not only of allowing interested residents to be part of new research venues, but also of extending their residency training up to 4 years to accommodate for their clinical/research needs (Figure 1).

This "research pathway" has already provided some important contributions with only a year and a half of existence as seen on Table 1. With one resident enrolled, the research productivity of

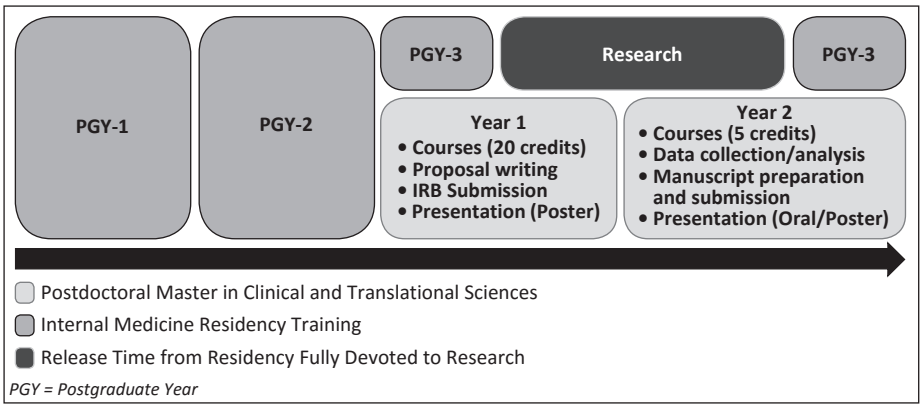

Figure 1. Proposed timeline for Internal Medicine Residency Training-Research pathway at the University of Puerto Rico School of Medicine.

the residency program has significantly increased. It is expected, as this program expands, more research opportunities should become available and new collaborations between different disciplines will develop. We can only speculate; however, this new RTP enterprise should expand the possibilities of residents to work beyond the simple task of participating in case reports, descriptive studies and review articles publication, that although still valuable, do not offer a true research experience.

In conclusion, as academicians we should stride confidently and undertake this research initiative as a winning stratagem. Since not only our RTP would benefit from such collaborative and scientific investments, but also our most gifted residents will have a unique opportunity that will certainly expand their horizons and turn on their interesting in pursuing an academic career. It is our duty and responsibility to become involved in these dynamic and provocative academic exercises as well as make ourselves available to serve sustain this necessary initiative. It is time that we set aside our old ways and any differences we might still have regarding traditional education. We all need to work together and fully train the new generation of clinician-scientists that will pave the way of new diagnostic algorithms and treatment modalities. It is in our hands not only the opportunity to open the doors to the future, but also to embrace it with great commitment and determination, as we will be shaping inquisitive minds into a

Table 1. Original research manuscripts produced by the Internal Medicine Residency Training-Research Pathway at the University of Puerto Rico School of Medicine during academic years 2015-2016, 2016-2017*.

Title	Peer-reviewed journal	Submission date	Status
Strain Imaging Echocardiography: What Imaging Cardiologist Should Know (5).	Current Cardiology Reviews	08/17/2016	Published
Potential of a Pharmacogenetic-Guided Algorithm to Predict Optimal Warfarin Dosing in a High-Risk Hispanic Patient: Role of a novel NQO1*2 Polymorphism (6).	Journal of Investigative Medicine High Impact Case Reports	09/30/2016	Published
Subclinical Right Ventricular Dysfunction in Patients with Severe Aortic Stenosis (7).	Cardiology and Therapy	12/05/2016	Published
Maximal Systolic Excursion of the Tricuspid Annulus is Independent of Right Atrial Size in Chronic Pulmonary Hypertension.	Echocardiography	11/23/2016	Accepted
Epidemiological profile of Hispanics admitted with acute myocardial infarction in Puerto Rico: The experience from 2007 to 2011.	Journal of Clinical Medicine Research	11/17/2016	Accepted
Left Ventricular Diastolic Function Assessment of a Heterogeneous Cohort of Pulmonary Arterial Hypertension Patients.	Journal of Clinical Medicine Research	01/10/2017	Accepted
Dyspnea Evaluation: A Practical Approach for the Practicing Physician.	Boletín de la Asociación Médica de Puerto Rico	08/17/2016	Under review
Potential Usefulness of Diastolic Strain Parameters in the Prediction and Management of Chemotherapy-Induced Cardiotoxicity.	Medical Hypotheses	10/21/2016	Under review
Left Ventricular Velocity of Propagation: A Potential Useful Noninvasive Measurement When Assessing Hemodynamic Alterations in Pulmonary Arterial Hypertension.	Cardiology	12/14/2016	Under Review
Challenging Diagnosis of Cryoglobulinemia and New Insights into Pre-Clinical Rheumatoid Arthritis Manifestations.	Journal of Investigative Medicine High Impact Case Reports	01/18/2017	Under Review
Potential Usefulness of Clopidogrel Pharmacogenetics in Cerebral Endovascular Procedures and Carotid Artery Stenting.	Current Clinical Pharmacology	01/23/2017	Under Review

*Updated on 01/31/2017.

different way of thinking. This is a crucial time to foster and participate into new and exciting venues that will help contour the minds of our medical trainees in ways not previously accomplished here in Puerto Rico. Our health stricken island desperately needs that these clinical-research opportunities prosper so that we can provide our population with a better fighting chance to improve the quality of health care. The time has come and a change needs to be made, we must take that first step that will forge stronger ties across disciplines and positively respond to this call to action in recognizing medical residency training as a promising platform to implement a satisfactory physician-scientist transition.

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