

## COMMENTARY: A MODEL FOR MEDICAL RESEARCH

A successful researcher should train with an efficient method and a well-organized approach toward an effective research project. Billions of dollars go into research each year. Researchers cannot squander funding on unproductive research. Students of medicine/research must understand the "science" of research and how to effectively use it. This project did not investigate an actual research issue but rather it investigated the methodology, approach and execution of a clinical research project from a Division of Kidney, Urologic, and Hematologic Diseases (DKUHD) point of view.

In order to conduct successful scientific research, the researcher must be involved in a four-step process for scientific approach and methodology. In addition to the most basic lab work, several exhaustive and effective ways exist by which an investigator can produce persuasive final results. Clinical trials, case-control studies, ecological and cohort studies all give an investigator the tools to achieve accredited results.

The specific aims of this project were: 1) to study the doctor/patient interactions and how a doctor analyzes the problem to suggest a solution; 2) to study researcher/case interaction and the researcher's approaches to developing data that will generate meaningful results; 3) to reflect upon all of these interactions and study and pass PEERS certification; 4) to create a scientific model by which students of scientific research can learn methodology and approach to answer a scientific issue/problem.

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### INTRODUCTION

Researchers around the world work to construct innovative yet applicable research projects that will affect and improve the lives of millions of people. The field of medicine continues to advance the science of health and good research is at the core of that effort. Without sustained research, medical momentum cannot continue into the next decade. Over the history of medical research, we have witnessed succinct periods of momentum and decline (eg, the great biomedical advance of the 21st century vs the stagnant effort of the 1930s). These contrasting time periods reflect the importance of approach and methodology employed in research. In-depth and comprehensive research galvanizes and sustains bio-medical momentum, whereas mediocre research and performance can hinder or even eliminate continuous medical momentum. In order to maintain a continual flow of revolutionary research, students of science and medicine must internalize an appropriate approach to furnish a successful investigation. Proper transition of methodology and approach will incite future students to produce groundbreaking research. If appropriate precautions are not taken to maintain a successful transition of effective approach for successful investigations, the medical momentum currently established will diminish without a universal teaching device.

The proper didactic model to scientific investigation and research displays the importance of academic honesty, patience and the need for meticulous planning and delivery. In the face of our technological era, past research models no longer suffice. Consequently, with

time, academia must implement new and improved research models. These models, however, must leave room for future adjustments. Models that future medical researchers can build upon as the bio-technological research standards will allow smooth transitions into new venues of research and the continuation of intelligent inquiry. Comprising the best research model is an exhaustive process and requires holistic coverage of all investigative aspects. This process requires observation and interpretation of investigator/case and doctor/patient interactions. When studying researcher/case dynamics, the most important feature to examine is the way in which the researcher conducts the investigation. The strict method and organizational approach an investigator employs is the most essential piece of the research teaching model. The long and meticulous process the researcher takes from certification to baseline to publication is a laborious, but indispensable, event that every research/medical student must internalize. Case observation is important as well. Investigating the way in which cases understand the research goal, follow directions, and the variations in both, highlight the proper approach a researcher should take to maximize case benefits without detriment to research outputs. The final piece to comprising a research-teaching guide is observing doctor/patient interactions in a clinic setting. Watching the transitional process from a patient's complaints, to a doctor's prognosis is crucial to research cognition. The most important impetus for high-quality research is serving patients; without a deep understanding of doctor prognosis or patient experience, an investigator cannot conduct influential research that

will benefit doctor efficiency and therefore patient care.

## MATERIALS AND METHODS

### Observation

The observational process took two different forms: literature review and personal examinations. Items reviewed included: *The Handbook of Sample Size Guidelines for Clinical Trials*, *The AASK Layperson's Abstract*, *The CRIC Layperson's Abstract*, an internet search for additional information on the research process, the abstract for the Outcome of Hypertension for Lactose Intolerant African Americans through Intake of Calcium-Enriched Mineral Water Clinical Trial (the Water study); several government medical items, such as the *JNC-7 Express Report on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*, and *The Guide to Lowering Your Blood Pressure with DASH Report*. Equipped with this background information on basic clinical trial guidelines, we applied the knowledge to a study occurring at the University of Michigan. Personal examinations included a role shadowing the co-investigator of the water clinical trial, preparation for the PEERS (human subjects and safety) modules, and certification in this series of modules that give students a better understanding of the research process and how to specifically get funding and certification for research under an academic institution.

Through this project, we gained experience in searching for funding and managing both sponsor and home institution responsibilities. In addition, we recognized the importance of knowing how to submit a project for institution review board approval and how to work with an overseeing board such as a DRDA (Division of Resource Development and Analysis) to maximize coordination between a sponsor and the home institution. Finally, by reviewing how the principal investigator

assumes full responsibility and how, at the conclusion of the trial, he or she must submit a financial statement and report before publication, we witnessed the importance of the ethics of clinical research. The knowledge gained from the PEERS modules and certification bolstered intuition and provided a firm foundation and instructive research presentation.

An opportunity to shadow Dr. Kenneth Jamerson during his patient examinations allowed an experience to better understand how patients explained their problems, how the clinician recorded the problems, compared it to previous records and lab work, and how this information was then synthesized into a proposed method of treatment. In addition to clinic experience, we reviewed and found contrasts between medical technician data collection and conducting specific tests such as the test for glomerular filtration rates and the echocardiography examination. In addition to understanding each test or exam, one should research new ways and venues on how to improve the techniques and how to implement those specific improvements in future studies (eg, utilizing groundbreaking research on 3-D echocardiography and understanding how this new research can help research and patient care).

### Analysis/Internalization

We performed an analysis of the different forms and methods of research. The cohort study was chosen as an example and then applied to a real-life situation. This allowed for the application and formulation of a concrete method that could be reported. This strategy can be applied with every type of research method: case-control, ecological study, clinical trial etc.

The study of principal and co-investigator interactions and how they calibrate and adjust problems back to normal or even into positive situations was informative. Immersion into projects such as AASK (African American

Study of Kidney Disease and Hypertension) trial or CRIC (Chronic Renal Insufficiency Cohort) study will eventually generate effective research models.

In summary, an informative research model requires a four-step process where the investigator must observe and rationally internalize researcher/case, doctor/patient, the different ways in which to execute a research project and fulfilling requirements of the certification process. The last step brings together the first three steps and finalizes the investigators foundational knowledge allowing them the tools needed to create a research model.

## RESULTS

After weeks of observation and interpretation in labs, clinics, and research institutions, a tangible research model was created. This model offers a tool by which academia can train future researchers in the basics of successful investigative inquiry. Furthermore, medical academia can build upon this model to cater to their medical specialty or to modifying trends in future.

## DISCUSSION

This article is an original attempt to analyze and understand the researcher/clinical scientist approach to successful research. This is a unique behavioral science project that takes an in-depth look at the present research system and how to manipulate it to a researcher's advantage. This model may be considered a stepping stone for future research models and an educational tool for students of medicine and scientific inquiry.

### ACKNOWLEDGMENTS

The author thanks Dr. Jamerson and Liz Williamson for their support as mentors throughout the project.